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WELD COUNTY MONITORING NETWORK

AIR QUALITY AND METEOROLOGICAL MONITORING DATA: 2025 ANNUAL SUMMARY REPORT

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ACRONYMS AND ABBREVIATIONS

Above Ground Level	agl
Acidity	pH
Air Quality System	AQS
Ammonia	NH ₃
Ammonia Monitoring Network	AMoN
Ammonium	NH ₄
Bromide	Br
Calcium	Ca
Chloride	Cl
Colorado Ambient Air Quality Standards	CAAQS
Greenhouse Gas	GHG
Lab	L
Magnesium	Mg
Meter	m
Micrograms per meter cubed	µg/m ³
Micro-Siemens per centimeter	µS/cm
Milligrams per meter cubed	mg/m ³
Missile Site Park	MSP
National Ambient Air Quality Standards	NAAQS
National Ambient Air Quality Standards and Ambient Air Quality Standards	AAQS
National Trends Network	NTN
Nitrate	NO ₃
Nitrogen Dioxide	NO ₂
Nitrogen Oxide	NO
Oxides of Nitrogen	NO _x
Parts per billion	ppb

Parts per million	ppm
Phosphate	PO ₄
Potassium	K
Quality Assurance Project Plan	QAPP
Relative Humidity	RH
Sodium	Na
Sulfate	SO ₄
Teledyne Advanced Pollution Instrumentation	TAPI
United States Environmental Protection Agency	USEPA
US EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II, Ambient Air Monitoring Program	QA Handbook

1. 2025 MONITORING HIGHLIGHTS

Data Completeness

- Data completeness goals were met for all parameters at Hereford; for Missile Site Park (MSP) all goals were met besides solar radiation, which did not meet the targets for Q3, and for Orchard all goals were met except for precipitation in Q4.

Ozone

- **Annual Concentrations:** The 4th highest maximum daily 8-hour average (MDA8) ozone concentration at all three sites were below both the 2008 and 2015 federal health-based standards, at 68 ppb, 67 ppb, and 66 ppb at MSP, Hereford, and Orchard, respectively.
- **Spatial trends:** Consistent with previous years, MSP measured the highest ozone concentrations. Orchard and Hereford had similar values, both slightly lower than MSP values.
- **Annual trends:** Sites measured some of the lowest ozone concentrations relative to prior years. For comparison, in 2024, there were 20 days above the 2015 standard at MSP, eight at Hereford, and five at Orchard.
- **Exceedances:** The 2008 ozone standard was not exceeded at any site during 2025. The 2015 standard was exceeded only once at MSP, and no exceedances occurred at Hereford or Orchard. The ozone exceedance day at MSP occurred in Q2.
- **Comparison to NAA monitors:** Ozone values tend to be lower at Weld County monitors compared to other monitors in the nonattainment area, and 2025 was no exception. The 4th highest MDA8 for other sites in the NAA ranged between 62 to 73 ppb, with only two stations (Highlands and Blackhawk) below 68 ppb.¹ The controlling monitor in the nonattainment area (NREL) had a 4th highest MDA8 that was 3 ppb greater than MSP's 4th highest value. Notably, the 4th highest MDA8 at MSP was 5 ppb lower than the Timnath monitor, which is the closest monitor to MSP.² Orchard was tied with Blackhawk for the second lowest 4th highest MDA8 in the nonattainment area that was operational for the full year.
- **Design Values:** The 2023-2025 design value is 0.072 ppm (72 ppb) at MSP, which exceeds the 2015 standard, but not the 2008 standard. The 2023-2025 design values at Hereford and Orchard are 0.069 ppm (69 ppb) and 0.067 ppm (67 ppb) respectively, which are below both ozone standards.

Nitrogen Dioxide (NO₂)

- **Values:** Annual concentrations at MSP are well below federal annual and 1-hour health-based standards.
- **Annual trend:** The 2025 annual mean NO₂ value is 6.1 ppb, which is below 2024's annual value of 6.5 ppb.

¹ Regional Air Quality Council, *Ozone Season Review Presentation*, October 2025. Available at: https://raqc.egnyte.com/dl/pKchQhvXTY6p/2025_Ozone_Season_Review.pdf. Accessed: February 2026.

² While within critical criteria, MSP exhibited fluctuating calibration accuracy in Q4 2025 and may have imprecise results.

Annual Events

- **Climate trends:** While the sites have been operating for five years, this is too short a period to evaluate climate trends, so the 2025 meteorological conditions were evaluated using longer-term data produced by the High Plains Regional Climate Center. For Quarter 4 2025, temperatures in Weld County were 4-8°F warmer than normal, while precipitation was 1-2 inches below average.³ In 2025, temperatures in Weld County were approximately 1-3°F warmer than normal, while precipitation was between 2 inches below average in southwestern Weld County and 4 inches above average in northeastern Weld County.⁴
- **Wildfire smoke:** 2025 did not have notable wildfire activity, thus, no smoke screening analysis was performed for 2025. Due the fact that the 4th highest ozone values were below both standards, there is no regulatory benefit to conduct a smoke screening analysis.
- **Summary of non-routine site visits:** MSP had approximately 12 visits to troubleshoot parts of the gas analyzer systems and the precipitation gauge, remove/replace the Nafion conditioner line, and troubleshoot the zero air generator. Hereford had approximately four visits to troubleshoot the ozone calibration system, replace the Nafion conditioner line, repair signal wires to the precipitation sensor, and replace the photometer lamp to the ozone analyzer. Orchard had approximately three visits to replace the Nafion conditioner line, install a new AC unit, and to repair signal wires to the precipitation sensor.

³ High Plains Regional Climate Center, *ACIS Climate Maps*. Available at: <https://hprcc.unl.edu/maps.php?map=ACISClimateMaps>
Accessed: February 2026.

⁴ Id.

2. INTRODUCTION AND REPORT SUMMARY

Weld County has commissioned the installation and operation of an air quality and meteorological monitoring network consisting of three monitoring stations located in areas that do not have existing air quality monitoring stations. The purpose of the monitoring network is to collect ambient air quality and meteorological data to inform current and future air quality management actions and policies. Weld County monitoring objectives support a wide variety of air quality management goals that were developed in consideration of current and expected future regulatory drivers related to ozone (O₃), greenhouse gases (GHG), and nitrogen air pollutants. The three stations are named Missile Site Park (MSP), Hereford, and Orchard and their locations are shown in [Figure 1](#). MSP was operational and began collecting data on November 16, 2020. Hereford was operational and began collecting data on December 16, 2020. Orchard was operational and began collecting data on December 30, 2020.

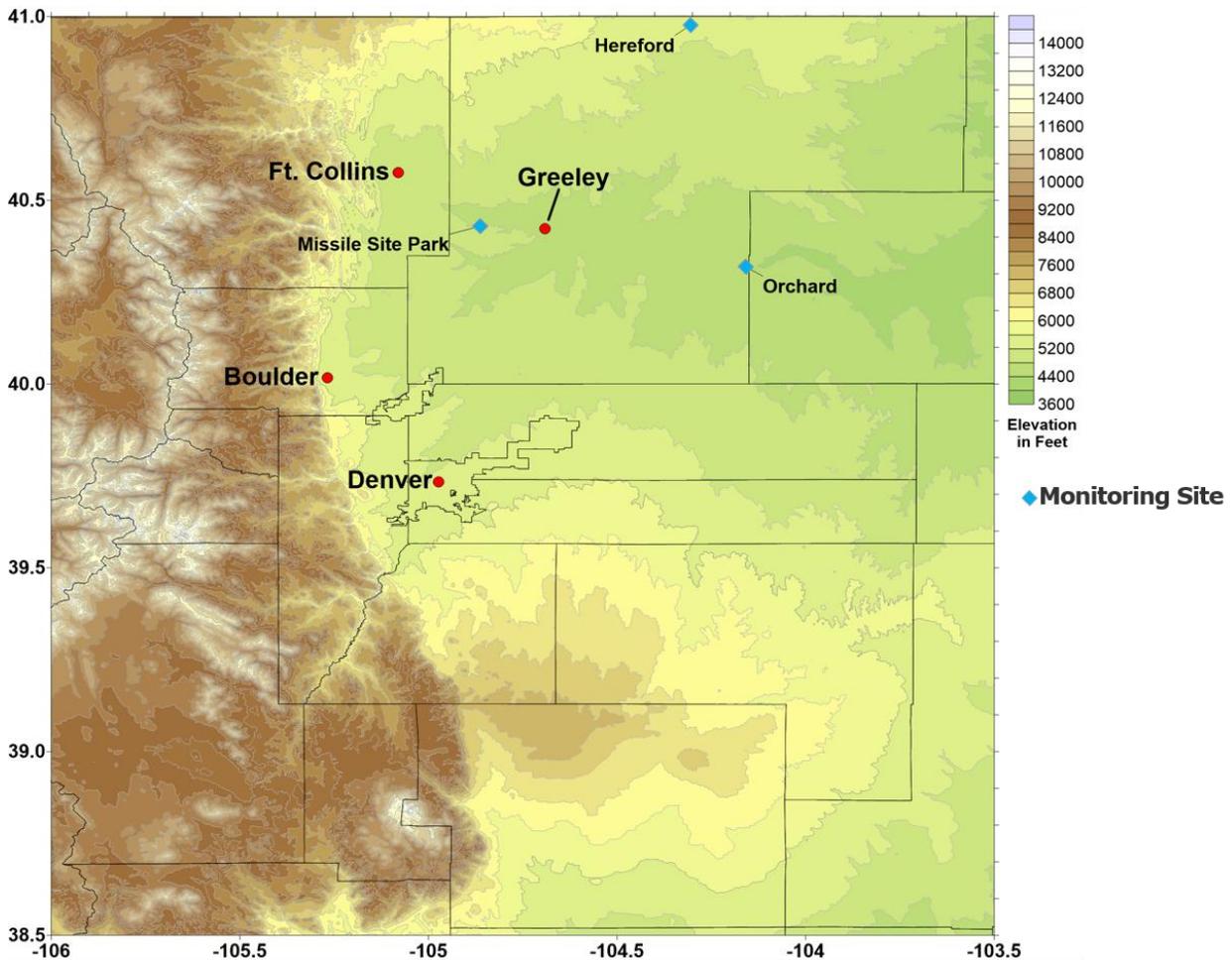


Figure 1. Weld County Monitoring Station Locations

All three monitoring stations measure O₃ concentrations and a full suite of meteorological parameters. A complete list of all collected meteorological measurements is included in [Chapter 3](#) of this report. In addition, oxides of nitrogen (NO_x) concentrations, measured as NO_x, nitrogen dioxide (NO₂) and nitrogen oxide (NO) are measured at MSP. Lastly, gaseous ammonia and precipitation chemistry are

measured at MSP and Orchard. Based on an air monitoring network assessment conducted for Weld County,⁵ it was recommended to monitor these compounds at these locations to best support Weld County's near-term data needs and air quality management goals. The Weld County Air Monitoring Network Assessment⁶ considered locations of existing monitors, concentration trends, and spatial distributions of emissions.

Ramboll Americas Engineering Solutions, Inc. (Ramboll) has prepared this Annual Report for Weld County's air quality and meteorological monitoring program to summarize the final, validated data and provide transparent, publicly available documentation regarding the quality assurance and quality control procedures. This report for 2025 provides an annual summary of all air quality and meteorological data collected at Weld County's monitoring stations during the period from January 1, 2025 through December 31, 2025. In addition, for completeness, Quarter 4 2025 tables and plots are available in [Appendix A](#) as this information is not available in other stand-alone reports. Details regarding the monitoring program, the three monitoring station locations, equipment specifications, and quality assurance procedures are included in the following sections. Lastly, a comprehensive summary of 2025 data is presented in comparison to National Ambient Air Quality Standards (NAAQS) and Colorado Ambient Air Quality Standards (CAAQS) to help readers understand how measurements compare to federal and state air quality standards.

NAAQS and CAAQS are collectively referred to as "AAQS." The AAQS for O₃ and NO₂ are listed in [Table 1](#) below. For O₃ there are two different AAQS: one standard of 0.075 part per million (ppm), which was established in 2008, and a more restrictive O₃ standard of 0.070 ppm, which was established in 2015. Both standards are still in effect; therefore, measured O₃ concentrations are compared to both standards. Similarly, for NO₂ there are two different AAQS: one standard is 100 parts per billion (ppb) for a 1-hr average and another standard is 53 ppb for a yearly average.

Both O₃ and NO₂ AAQS have both a "Primary" standard and a "Secondary" standard. The Primary standard is for protection of public health while the Secondary standard is for protection of public welfare (such as protection against damage to crops, animals and vegetation). For O₃ and NO₂, the level of the Primary and the Secondary standards are the same.

Meteorology measurements for 2025 were all within normal ranges for the area. At all three stations, average temperatures were coldest Quarter 1 and warmest during Quarter 3. Average solar radiation was highest in Quarter 2 and lowest in Quarter 4 at all sites. The maximum hourly precipitation occurred during Quarter 3 at all sites.

Continuous gaseous pollutant measurements indicate daily maximum 8-hour average O₃ concentration only exceeded 2015 AAQS once in 2025. The peak 8-hour average O₃ concentration was 0.071 ppm which occurred at MSP on June 15th. Concentrations remained below the 2015 AAQS values for ozone at Hereford and Orchard, with peak daily maximum 8-hour average O₃ concentrations of 0.070 ppm for both sites on May 10th and June 19th, respectively. At MSP, the highest hourly average NO₂ concentration during 2025 was 45.5 ppb, which occurred on December 4th.

⁵ Ramboll, Air Monitoring Network Assessment, 2020. Available by request.

⁶ Id.

It is important to note that O₃ and NO₂ measurements have now been collected for five years, enabling measurements to be compared to AAQS. The measured concentrations are compared to AAQS for informational purposes in Chapter 5 of this report.

Table 1. AAQS for O₃ and NO₂

Pollutant (Year)	Primary/Secondary	Averaging Time	Level	Form
O ₃ (2015)	Primary & Secondary	8 hours	0.070 ppm	Annual fourth-highest daily maximum 8-hour concentrations, averaged over 3 years
O ₃ (2008)	Primary & Secondary	8 hours	0.075 ppm	Annual fourth-highest daily maximum 8-hour concentrations, averaged over 3 years
NO ₂	Primary	1 hour	100 ppb	98 th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Primary & Secondary	1 year	53 ppb	Annual Mean

Notes:

O₃ Ozone ppb Parts per billion
 NO₂ Nitrogen dioxide ppm Parts per million

Adapted from the NAAQS Table available here: <https://www.epa.gov/criteria-air-pollutants/naaq-table>

3. SUMMARY OF MONITORING PROGRAM

3.1 Monitoring Station Locations

The three Weld County air quality station locations were guided by the *Weld County Air Monitoring Network Assessment* which analyzed Weld County's monitoring objectives, existing monitoring stations, and emissions source locations to determine high priority areas to conduct monitoring. Final station locations were determined in consideration of logistical requirements such as accessibility, availability of power, and proximity of large emissions sources which could affect the representativeness of site measurements. Weld County's monitoring network consists of three stations:

- MSP is the primary monitoring station and is located northwest of Greeley, CO. MSP monitors O₃, NO_x, wet deposition via the National Trends Network (NTN), gaseous ammonia via the Ammonia Monitoring Network (AMoN), and meteorological parameters on a 10-meter (m) tower;
- Hereford is a secondary station located in north-central Weld County and monitors O₃ and meteorological parameters on a 10-m tower; and
- Orchard is also a secondary station located in eastern Weld County to monitor O₃, wet deposition via the NTN, ammonia via the AMoN, and meteorological parameters on a 10-m tower.

3.2 Monitoring Instrumentation

The installation, configuration, calibration, and integration of the monitoring network along with technical specifications for all equipment and monitoring systems are summarized in the *Weld County Ambient Air Monitoring Program Quality Assurance Project Plan (QAPP)*, referred to hereafter as the QAPP.⁷ Weld County's monitoring program is conducted in accordance with the QAPP. **Table 2** and **Table 3** summarize the key air quality and meteorological monitoring equipment and measurement specifications for the Weld County stations. The monitoring system, sampling frequency, quality assurance program, and data management aspects of the monitoring program are described in the QAPP.⁸

⁷ Ramboll, Weld County Ambient Air Monitoring Program Quality Assurance Project Plan (QAPP) Verizon 5, December 20th, 2024. Available by request.

⁸ Id.

Table 2. Weld County Air Quality Monitoring Station Equipment Specifications

Measurement	Manufacturer	Model	Serial Number	Zero and Span Noise	Detection Limit	Drift Over 24-hour Period	Response Time	Units
Missile Site Park								
O₃	TAPI	T400	5986	<0.2 ppb @ 0 ppb & <0.5% reading above 100 ppb	<0.4 ppb	<1 ppb @ 0 ppb & <1% of reading @ span	<30 seconds to 95%	ppb, ppm, μg/m ³ , mg/m ³
NO_x	TAPI	T200 (w/ sample conditioner; part number KIT000262)	6727	<0.1 ppb @ 0 ppb & <0.2% reading above 50 ppb	<0.2 ppb	<0.5 ppb @ 0 ppb & <0.5% of reading @ full scale	<80 seconds to 95%	ppb, ppm, μg/m ³ , mg/m ³
Gas Dilution/O₃ Transfer Standard	TAPI	T700	4969	1% of reading (linearity)	N/A	<1.0 ppb @ 0 ppb	<20 seconds to 95% (photometer response)	N/A
Zero Air Generator	TAPI	T701	1961	NO/NO ₂ < 0.1 ppb; O ₃ < 0.4 ppb	N/A	N/A	N/A	N/A
NH₃	Radiello	N/A	N/A	N/A	0.083 mg/L (Network) 0.013 mg/L (Lab)	N/A	N/A	N/A

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Summary Report
Weld County Monitoring Network

Measurement	Manufacturer	Model	Serial Number	Zero and Span Noise	Detection Limit	Drift Over 24-hour Period	Response Time	Units
National Trends Network	N/A	N/A	N/A	N/A	Ca (0.023 mg/L) Mg (0.006 mg/L) K (0.005 mg/L) Na (0.010 mg/L) Br (0.006 mg/L) NH ₄ (0.017 mg/L) NO ₃ (0.018 mg/L) Cl (0.018 mg/L) SO ₄ (0.018 mg/L) PO ₄ (0.010 mg/L) Conductance (µS/cm) pH	N/A	N/A	N/A
Orchard								
O₃	TAPI	T400	5985	<0.2 ppb @ 0 ppb & <0.5% reading above 100 ppb	<0.4 ppb	<1 ppb @ 0 ppb & <1% of reading @ span	<30 seconds to 95%	ppb, ppm, µg/m ³ , mg/m ³
O₃ Transfer Standard	TAPI	T703	824	±1% of full scale (linearity)	N/A	<1 ppb @ 0 ppb (7 days) & <1% @ span	<20 seconds to 95% (photometer response)	N/A
NH₃	Radiello	N/A		N/A	0.083 mg/L (Network) 0.013 mg/L (Lab)	N/A	N/A	N/A

Annual 2025 Air Quality and Meteorological Monitoring Data
Summary Report
Weld County Monitoring Network

Measurement	Manufacturer	Model	Serial Number	Zero and Span Noise	Detection Limit	Drift Over 24-hour Period	Response Time	Units
National Trends Network	N/A	N/A	N/A	N/A	Ca (0.023 mg/L) Mg (0.006 mg/L) K (0.005 mg/L) Na (0.010 mg/L) Br (0.006 mg/L) NH ₄ (0.017 mg/L) NO ₃ (0.018 mg/L) Cl (0.018 mg/L) SO ₄ (0.018 mg/L) PO ₄ (0.010 mg/L) Conductance (µS/cm) pH	N/A	N/A	N/A
Hereford								
O₃	TAPI	T400	5984	<0.2 ppb @ 0 ppb & <0.5% reading above 100 ppb	<0.4 ppb	<1 ppb @ 0 ppb & <1% of reading @ span	<30 seconds to 95%	ppb, ppm, µg/m ³ , mg/m ³
O₃ Transfer Standard	TAPI	T703	825	±1% of full scale (linearity)	N/A	<1 ppb @ 0 ppb (7 days) & <1% @ span	<20 seconds to 95% (photometer response)	N/A

Measurement	Manufacturer	Model	Serial Number	Zero and Span Noise	Detection Limit	Drift Over 24-hour Period	Response Time	Units
Notes:								
O ₃	Ozone	ppb	parts per billion	Mg	Magnesium	NH ₄	Ammonium	
NO _x	Oxides of nitrogen	ppm	parts per million	K	Potassium	NO ₃	Nitrate	
NH ₃	Ammonia	µg/m ³	Micrograms per meter cubed	Na	Sodium	Cl	Chloride	
mg/m ³	Milligrams per meter cubed			Br	Bromide	SO ₄	Sulfate	
PO ₄	Phosphate	Ca	Calcium	pH	Acidity	TAPI	Teledyne Advanced Pollution Instrumentation	
		µS/cm	Micro-Siemens per centimeter					

Table 3. Weld County Meteorological Monitoring Station Equipment Specifications

Measurement	Count	Tower Location (m)	Manufacturer	Model	Serial Number	Accuracy	Range	Description
Missile Site Park								
Wind speed & direction	1	10	R.M. Young	05305V	180188	±0.2 m/s & ±3 degrees	0-50 m/s 0-355 deg	Wind monitor
Ambient temperature/Vertical temperature difference	2	2m and 10m	R.M. Young	41342VC	32951 (2 m) 32952 (10 m)	±0.1 °C	-50 to 50°C	Temperature probe with radiation shield
Relative humidity (RH)	1	2	Campbell Scientific/E+E Elektronik	EE181	20151600125038	±1.3% RH ¹	0-100%	Relative humidity and temperature sensor
Solar radiation	1	2	Hukseflux	LP02	48019	<0.15% per °C	0-2000 W/m ²	Thermal pyranometer
Barometric pressure	1	2	Setra	278	7563464	±1.5 hPa ²	450-825 mmHg	Barometric pressure sensor
Precipitation	1	Ground	R.M. Young	52202	TB16137	2%-3% ³	0-50 mm/hr	Heated tipping bucket rain gauge
Precipitation-NTN	1	Ground	ETI Instrument Systems	NOAH IV	4310	±0.254 mm	0-280 in/hour	Weight-based rain gauge
Collection bucket-NTN	1	Ground	N-CON	00-120-2N	60441	N/A	N/A	Wet deposition collection buckets
Orchard								
Wind speed & direction	1	10	R.M. Young	05305V	180186	±0.2 m/s & ±3 degrees	0-50 m/s 0-355 deg	Wind monitor
Ambient temperature/Vertical temperature difference	2	2m and 10m	R.M. Young	41342VC	32953 (2 m) 32954 (10 m)	±0.1 °C	-50 to 50°C	Temperature probe with radiation shield

Annual 2025 Air Quality and Meteorological Monitoring Data
Summary Report
Weld County Monitoring Network

Measurement	Count	Tower Location (m)	Manufacturer	Model	Serial Number	Accuracy	Range	Description
Relative humidity	1	2	Campbell Scientific/E+E Elektronik	EE181	201516001269F1	±1.3% RH ¹	0-100%	Relative humidity and temperature sensor
Solar radiation	1	2	Hukseflux	LP02	48014	<0.15% per °C	0-2000 W/m ²	Thermal pyranometer
Barometric pressure	1	2	Setra	278	7563445	±1.5 hPa ²	450-825 mmHg	Barometric pressure sensor
Precipitation	1	Ground	R.M. Young	52202	TB16138	2% - 3% ³	0-50 mm/hr	Heated tipping bucket rain gauge
Precipitation-NTN	1	Ground	ETI Instrument Systems	NOAH IV	4311	±0.254 mm	0-280 in/hour	Weight-based rain gauge
Collection bucket-NTN	1	Ground	N-CON	00-120-2N	60442	N/A	N/A	Wet deposition collection buckets
Hereford								
Wind speed & direction	1	10	R.M. Young	05305	209492	±0.2 m/s & ±3 degrees	0-50 m/s 0-355 deg	Wind monitor
Ambient temperature/Vertical temperature difference	2	2m and 10m	R.M. Young	41342VC	32950 (2 m) 32869 (10 m)	±0.1 °C	-50 to 50°C	Temperature probe with radiation shield
Relative humidity	1	2	Campbell Scientific/E+E Elektronik	EE181	2015160012638F	±1.3% RH ¹	0-100%	Relative humidity and temperature sensor
Solar radiation	1	2	Hukseflux	LP02	48015	<0.15% per °C	0-2000 W/m ²	Thermal pyranometer
Barometric pressure	1	2	Setra	278	7573233	±1.5 hPa ²	450-825 mmHg	Barometric pressure sensor
Precipitation	1	Ground	R.M. Young	52202	TB16139	2% - 3% ³	0-50 mm/hr	Heated tipping bucket rain gauge

Notes:

%	Percent	m/s	Meters per second	W/m ²	Watts per meter squared
°C	Degrees Celsius	RH	Relative humidity	mmHg	Millimeters of mercury
mm/hr	Millimeters per hour	deg	Degrees	in/hour	Inches per hour

¹ The manufacturer specifies an accuracy range based on a temperature range -15 to 40 °C and RH between 0 and 90%. Above 90% RH, the accuracy decreases to ±2.3% RH

² This accuracy range is achieved when the temperature is between -20 to 50 °C.

³ This accuracy is 2% when the precipitation rate is 25 mm/hr or less and the accuracy is 3% when the precipitation rate is between 25 mm/hr and 50 mm/hr.

4. MONITORING METHODOLOGY

4.1 Data Collection, Management and Storage

All meteorological and gas analyzer data are collected on a continuous basis using a Campbell Scientific Inc. (Campbell) CR3000 data logger. Data are then output to files on 15-minute, 60-minute, and 24-hour frequency. Custom 1-minute and 15-minute tables are also stored by the logger for gaseous calibration tracking and public access of meteorology, respectively. Data files are stored on the CR3000. All three stations are programmed to automatically download and save files from the CR3000 to a Ramboll computer on a daily basis. Data files are also manually saved to a separate Ramboll computer several times per week.

Real-time meteorological data for all three stations are also available on the Weld County Public Health Department website. Plots on the Weld County website provide wind speed, wind direction, surface temperature, relative humidity, barometric pressure, and precipitation for 15-minute intervals. Data are shown for the previous three days and are updated every 30 minutes.

4.2 Quality Assurance/Quality Control

The quality assurance objectives for this monitoring program are documented in the QAPP. These objectives are designed to be consistent with those outlined in 40 CFR Part 58 Appendix A and *US EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II, Ambient Air Monitoring Program*, and *US EPA Quality Assurance Handbook for Air Pollution Measurement Systems Volume IV: Meteorological Measurements* (together, the "QA Handbooks").^{9,10} The QA Handbooks specify the minimum system requirements applicable to data collection and quality assurance requirements for ambient air quality pollutants and meteorological measurements.

4.2.1 Accuracy and Performance Audits

The audit procedures for this monitoring program include semi-annual calibration visits and once a year independent audits in accordance with the QAPP.¹¹ Semi-annual calibration visits were performed in calendar Quarters 2 and 4. Independent audits were performed in Quarter 4. The Quarter 4 semi-annual calibration and independent audit results are available in this report in [Appendix B](#).

4.2.2 Calibration Protocol

The calibration procedures utilized for the Project included automated routine calibration checks in accordance with the QAPP. For O₃ analyzers, calibration checks include Precision-Span-Zero checks at all three stations three times per week. For the NO_x analyzer at MSP, calibration checks include Precision-Span-Zero checks and gas-phase titration checks twice per week. Note that the Precision-Span-Zero check and titration checks occur on different days. The minimum frequency required per

⁹ USEPA, *Quality Assurance Handbook for Ambient Air Quality Monitoring Volume II: Ambient Air Quality Monitoring Program*, January 2017. Available at: https://www.epa.gov/sites/default/files/2020-10/documents/final_handbook_document_1_17.pdf. Accessed February 2026.

¹⁰ USEPA, *Quality Assurance Handbook for Ambient Air Quality Monitoring Volume IV: Meteorological Measurements*, March 2008. Available at: https://www.epa.gov/sites/default/files/2021-04/documents/volume_iv_meteorological_measurements.pdf. Accessed February 2026.

¹¹ Ramboll, Weld County Ambient Air Monitoring Program Quality Assurance Project Plan (QAPP) Version 5, December 20th, 2024. Available by request.

check is once every 14 days, per Appendix D of the Quality Assurance Handbook, Volume II.¹² **Table 4** below highlights periods when the minimum frequency was not met and provides an explanation. Note, if the period between two calibration checks does not meet the 14-day criteria and the two calibration checks surrounding this period are passing, then no data is required to be invalidated. Since each calibration check surrounding the dates in **Table 4** was passing, no data was invalidated. Maintenance is performed as necessary in response to measured deviations during calibrations and as part of planned routine activities during station inspections. A summary of calibration data for 2025 is available in **Appendix C**.

Table 4. Periods When Minimum Calibration Frequency Not Met

Period	Number of Days	Calibration Check	Reason
Missile Site Park			
10/15/2025 – 10/30/2025	15	O ₃ : Precision-Span-Zero check	Calibrator removed for semi-annual calibration.
10/15/2025 – 10/30/2025	15	NO/NO _x : Precision-Span-Zero check	Calibrator removed for semi-annual calibration.
10/12/2025 – 10/30/2025	18	NO ₂ : GPT/Converter Efficiency	Calibrator removed for semi-annual calibration.

4.2.3 Data Completeness and Significant Events

Data completeness is calculated as the amount of valid data divided by the amount of potential data possible over a specified period, expressed as a percentage. In accordance with the QAPP, data are reviewed to determine that data are valid. Any data that is affected by known and qualifiable instrument performance problems, periods of routine maintenance, power failures, site visits, or calibration/audit checks are invalidated. Hours with invalid data are removed from the final valid dataset and lower the calculated data completeness statistics. Program activities conducted during 2025 included data collection, equipment programming and calibrations, station inspections, routine maintenance, semi-annual calibration visits, equipment troubleshooting and repair, routine data acquisition, data screening and validation, audits, and report preparation. Significant events that resulted in invalidation of data during Quarter 4 2025 are documented in **Appendix A2. Appendix A3** contains the site log for Quarter 4 2025.

Consistent with data completeness requirements specified in the QA Handbook, the quarterly data completeness goals are greater than (\geq) 75% for NO₂ data, and \geq 90% for meteorological data. For O₃, the data completeness goals are \geq 90% of the daily maximum 8-hour average O₃ during the O₃ season, which in Colorado is January to December.¹³ A summary of data completeness by quarter and for the year (2025) is presented in **Table 5**. In 2025 data recovery met requirements for all parameters for all quarters, except for two. The parameters where data recovery did not meet the requirements are solar radiation at MSP in Q3 and precipitation at Orchard in Q4. On September 9th at MSP, the solar radiation sensor was found to be obscured by bird excrement. After a data review, data

¹² USEPA, Quality Assurance Handbook for Ambient Air Quality Monitoring. Volume II Ambient Air Quality Monitoring Program, Appendix D, March 2017. Available at: https://www.epa.gov/sites/default/files/2020-10/documents/app_d_validation_template_version_03_2017_for_amtic_rev_1.pdf. Accessed: February 2026.

¹³ USEPA Ozone Seasons, February 13 2025. Available at: https://aq5.epa.gov/aqsweb/documents/codetables/ozone_seasons.html. Accessed: February 2026.

was deemed to be invalid between August 31st and September 9th. On October 15th, the Orchard precipitation sensor was found to have severed signal wires which were immediately temporarily repaired, and then permanently repaired on November 5th. After a data review, the precipitation sensor was determined to have invalid data from October 1st through October 15th.

In addition to data completeness requirements, the QA Handbook has also established goals for instrument accuracy and precision. **Figure 2** presents a graphic that depicts the importance of accuracy and precision. **Table 6** presents the instrument accuracy and precision targets and the accuracy and precision achieved by the instruments deployed at each station during the Quarter 2 and Quarter 4 2025 semi-annual calibrations and during the Quarter 4 independent audit.

Table 5. 2025 Annual Data Completeness for Continuous Measurement Devices

Measurement	Time Period	Completeness Target ^[1-6]	Site Completeness					Target Met? (Y/N)
			Q1	Q2	Q3	Q4	2025	
Missile Site Park								
NO ₂ ^[1]	Quarterly	≥75%	76%	93%	94%	93%	89%	Yes
NO _x , NO	N/A	N/A	76%	93%	94%	93%	89%	N/A
O ₃ ^[1]	O ₃ Season	≥90%	96%	96%	92%	96%	95%	Yes
Wind Direction ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Wind Speed ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Temperature ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Delta Temperature ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Relative Humidity	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Solar Radiation ^[2]	Quarterly	≥90%	100%	100%	89.6%	100%	97%	Yes Except for Q3
Barometric Pressure ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Precipitation ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Hereford								
O ₃ ^[1]	O ₃ Season	≥90%	100%	98%	99%	96%	98%	Yes
Wind Direction ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Wind Speed ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Temperature ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Delta Temperature ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Relative Humidity	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes

Measurement	Time Period	Completeness Target ^[1-6]	Site Completeness					Target Met? (Y/N)
			Q1	Q2	Q3	Q4	2025	
Solar Radiation ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Barometric Pressure ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Precipitation ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Orchard								
O ₃ ^[1]	O ₃ Season	≥90%	100%	98%	88%	99%	96%	Yes
Wind Direction ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Wind Speed ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Temperature ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Delta Temperature ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Relative Humidity	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Solar Radiation ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Barometric Pressure ^[2]	Quarterly	≥90%	100%	100%	100%	100%	100%	Yes
Precipitation ^[2]	Quarterly	≥90%	100%	100%	100%	84%	96%	Yes Except for Q4

Notes:

^[1] USEPA Quality Assurance Handbook for Air Pollution Measurement Systems (Volume II Ambient Air Quality Monitoring Program) recommends three consecutive response concentrations be within +/- 15% of the audit concentration for quarterly audits. For bi-weekly QC checks acceptable monitor responses are +/-15.1% for NO₂ and 7.1% for O₃. The data completeness target for NO₂ is ≥75%, per the rules for an annual standard concentration. there is no data completeness target for NO or NO_x. For O₃ the data completeness target is 90% of daily maximum 8-hour averages during the ozone season. In Colorado, the Ozone season is January through December (https://aqs.epa.gov/aqsweb/documents/codetables/ozone_seasons.html).

^[2] Table 0-10, USEPA Quality Assurance Handbook for Air Pollution Measurement Systems (Volume IV: Meteorological Measurements, Version 2.0). Temperature is measured at 2 meters above ground level.

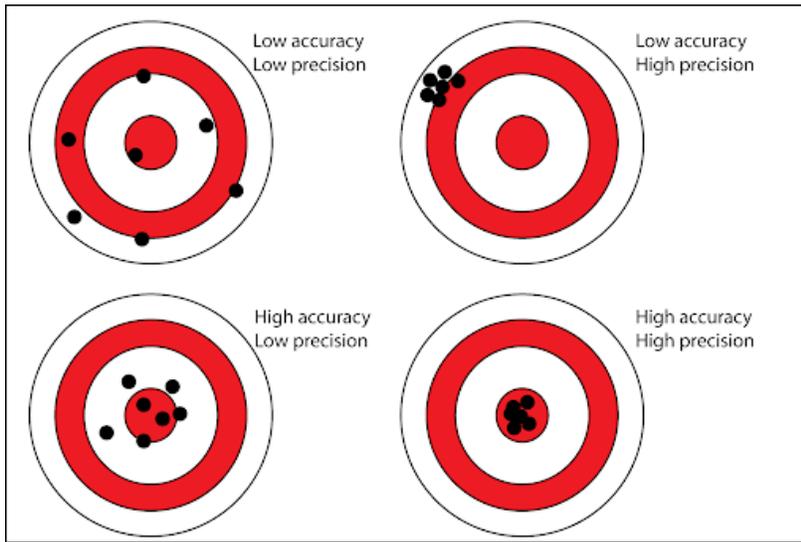


Figure 2. Graphical Representation of Accuracy and Precision

Table 6. 2025 Annual Accuracy and Precision

Measurement	Target Accuracy	Target Precision	Q2 Calibration Results ¹	Q4 Calibration Results ²	Independent Audit Results ³
Missile Site Park					
NO _x /NO/NO ₂	±15%	±15.1%	PASS	PASS	PASS
O ₃	±15%	±7.1%	PASS	PASS	PASS
Wind Direction	±5°	±5°	PASS	PASS	PASS
Wind Speed	±0.2 m/s	±0.2 m/s	PASS	PASS	PASS
Temperature	±0.5 °C	±0.5 °C	PASS	PASS	PASS
Delta Temperature	±0.1 °C	±0.1 °C	PASS	PASS	PASS
Relative Humidity	±7%	±7%	PASS	PASS	PASS
Solar Radiation	±5%	±5%	PASS	PASS	PASS
Barometric Pressure	±2.25 mm	±2.25 mm	PASS	PASS	PASS
Precipitation	±10%	±10%	PASS	PASS	PASS
Hereford					
O ₃	±15%	±7.1%	PASS	PASS	PASS
Wind Direction	±5°	±5°	PASS	PASS	PASS
Wind Speed	±0.2 m/s	±0.2 m/s	PASS	PASS	PASS
Temperature	±0.5 °C	±0.5 °C	PASS	PASS	PASS

Measurement	Target Accuracy	Target Precision	Q2 Calibration Results ¹	Q4 Calibration Results ²	Independent Audit Results ³
Delta Temperature	±0.1 °C	±0.1 °C	PASS	PASS	PASS
Relative Humidity	±7%	±7%	PASS	PASS	PASS
Solar Radiation	±5%	±5%	PASS	PASS	PASS
Barometric Pressure	±2.25 mm	±2.25 mm	PASS	PASS	PASS
Precipitation	±10%	±10%	PASS	PASS	PASS
Orchard					
O ₃	±15%	±7.1%	PASS	PASS	PASS
Wind Direction	±5°	±5°	PASS	PASS	PASS
Wind Speed	±0.2 m/s	±0.2 m/s	PASS	PASS	PASS
Temperature	±0.5 °C	±0.5 °C	PASS	PASS	PASS
Delta Temperature	±0.1 °C	±0.1 °C	PASS	PASS	PASS
Relative Humidity	±7%	±7%	PASS	PASS	PASS
Solar Radiation	±5%	±5%	PASS	PASS	PASS
Barometric Pressure	±2.25 mm	±2.25 mm	PASS	PASS	PASS
Precipitation	±10%	±10%	PASS	PASS	PASS
Notes: ^[1] Results are found in Quarter 2 Report. ^[2] Results are found in Appendices B1 through B3 of this report. ^[3] Results are found in Appendices B4 through B7 of this report.					

5. AIR QUALITY DATA SUMMARY

Air quality data collected includes O₃ at all three stations and NO_x at the MSP station. In addition, wet deposition and gaseous ammonia are measured in accordance with the NADP program standard operating procedures at MSP and Orchard. The full 2025 wet deposition and gaseous ammonia data from NADP are not yet available. When the remaining 2025 wet deposition and gaseous ammonia data are available, a separate memorandum will be issued. This section summarizes the O₃ and NO_x data collected during 2025.

5.1 Gaseous O₃ Data Summary

O₃ data collected for 2025 at all three stations were compared against the 2008 O₃ AAQS (0.075 ppm) and 2015 O₃ AAQS (0.070 ppm). Both the 2008 and 2015 O₃ AAQS are based on the fourth highest daily maximum 8-hour O₃ concentration averaged over 3 years. The daily maximum 8-hour average ozone concentrations measured at all three stations during 2025 were below the levels of both the 2008 and 2015 AAQS values, except for one instance at MSP. During 2025, MSP recorded one instance above the 2015 ozone AAQS value, while Hereford and Orchard recorded zero. There were no instances above the 2008 AAQS value at MSP, Hereford, or Orchard. The four highest daily maximum 8-hour O₃ concentrations for 2025 and dates that they occurred are presented in [Table 7](#) for all three stations. [Table 8](#) shows the 3-year average of the fourth highest daily maximum 8-hour average ozone concentrations at each site, which are essentially the 2023-2025 design values. It also shows historical design values at each station. Values are color-coded according to the AAQS values; yellow indicates values above only the 2015 AAQS, while orange indicates values above both the 2015 and 2008 AAQS. The highest daily maximum 8-hour O₃ concentrations in 2025 all occurred during Q2. The daily maximum 8-hour average O₃ concentrations for 2025 at MSP, Hereford, and Orchard are presented in [Figure 3](#) through [Figure 5](#), respectively. For detailed information about Q4 2025 data, see [Appendix A](#).

5.1.1 MSP O₃ Data Summary

At MSP during 2025, measured daily maximum 8-hour O₃ concentrations were above the 2008 standard zero times and were above the 2015 standard one time. Based on 2023 through 2025 data, the design value for MSP is 0.072 ppm, which is above the 2015 standard but below the 2008 standard.

5.1.2 Hereford O₃ Data Summary

At Hereford during 2025, measured daily maximum 8-hour O₃ concentrations were above the 2008 standard zero times and were above the 2015 standard zero times. Based on 2023 through 2025 data, the design value for Hereford is 0.069 ppm, which is below both the 2008 and 2015 standards.

5.1.3 Orchard O₃ Data Summary

At Orchard during 2025, measured daily maximum 8-hour O₃ concentrations were above the 2008 standard zero times and were above the 2015 standard zero times. Based on 2023 through 2025 data, the design value for Orchard is 0.067 ppm, which is below both the 2008 and 2015 standards. Note, that the gap in data from July 21st through July 31st in [Figure 5](#) was due to the failure of the shelter air conditioning system, during which the instrument was shut down to avoid operating above its safe temperature threshold.

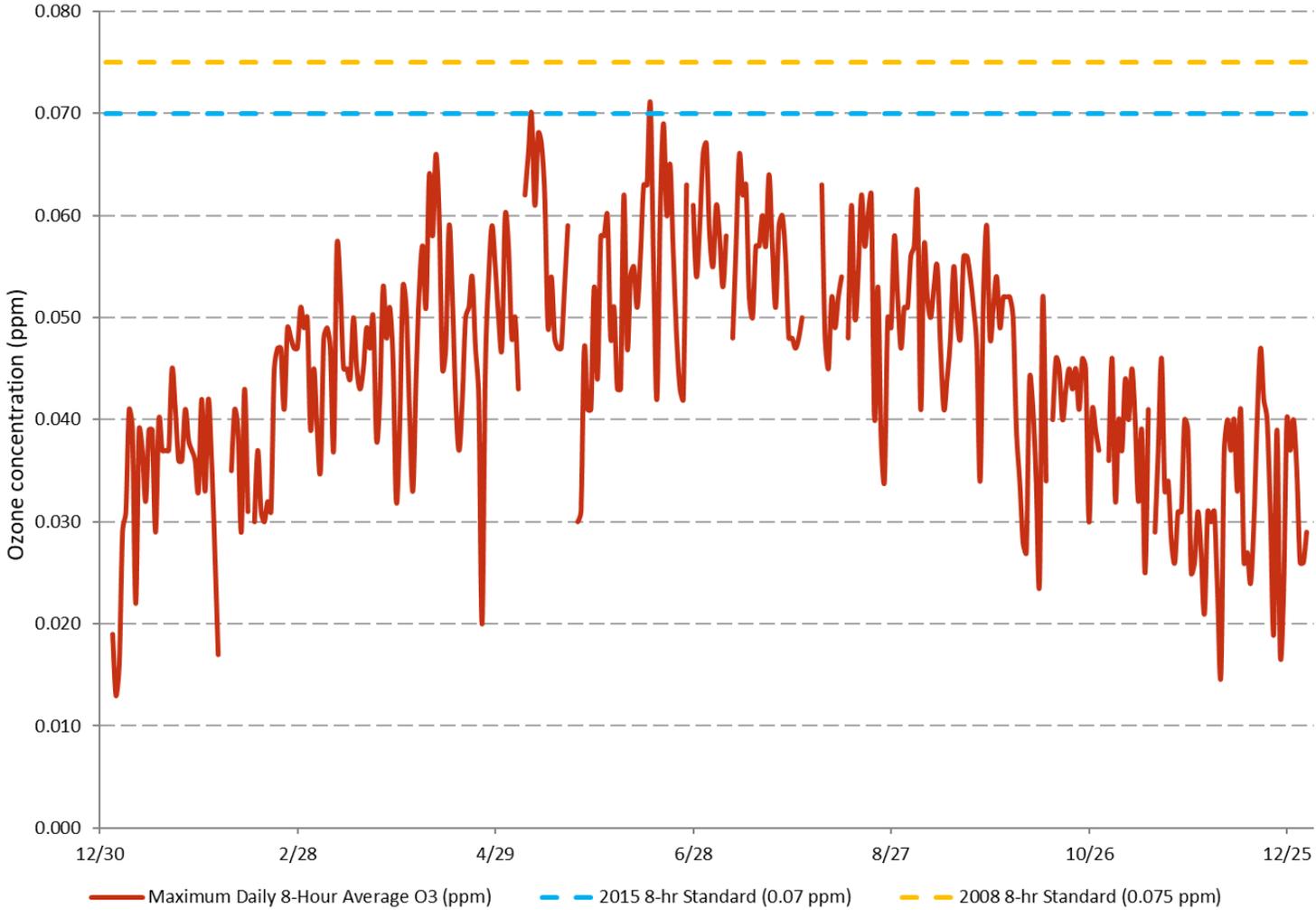


Figure 3. MSP 2025 Maximum Daily 8-hour Averaged O₃.

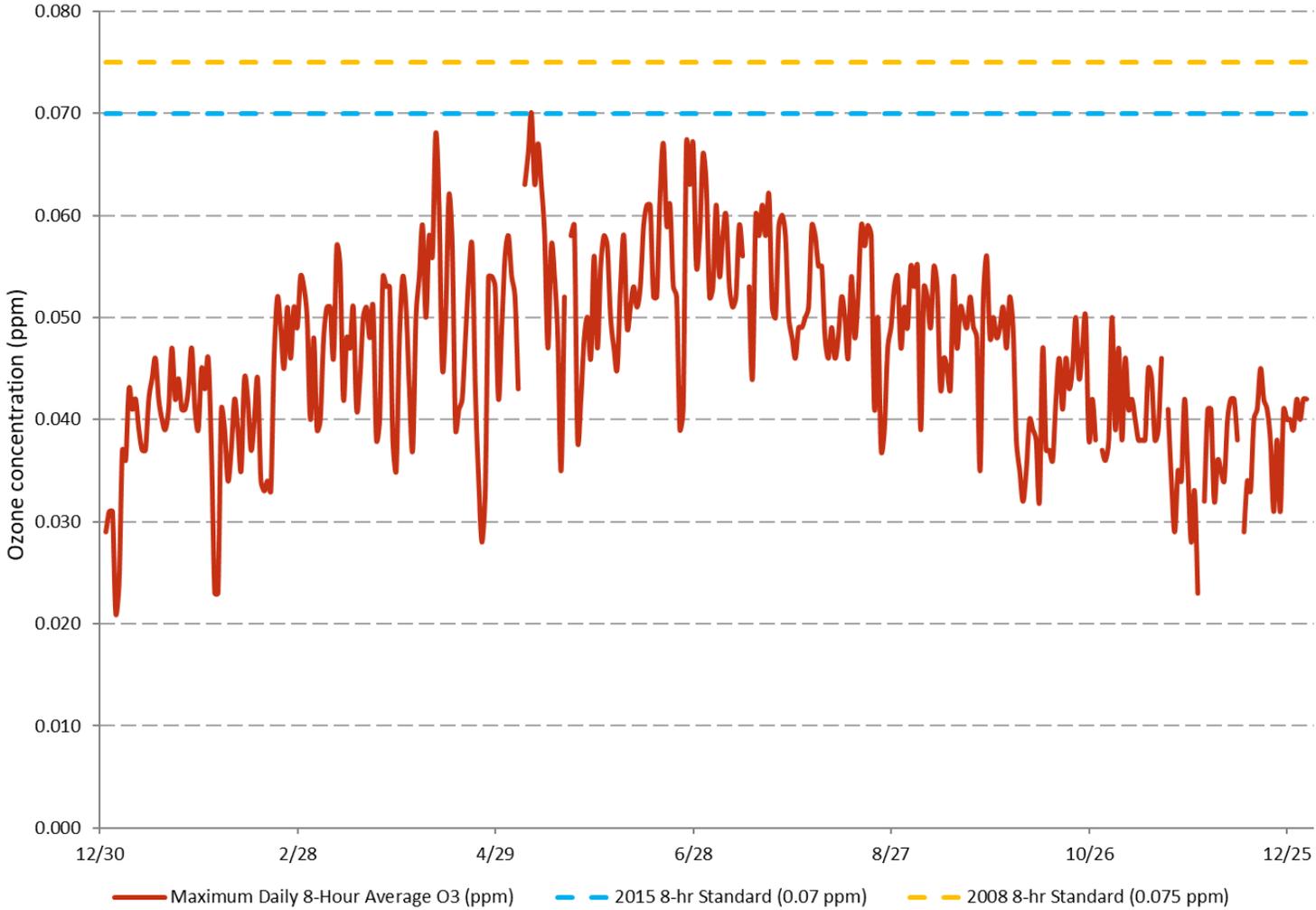


Figure 4. Hereford 2025 Maximum Daily 8-hour Averaged O₃.

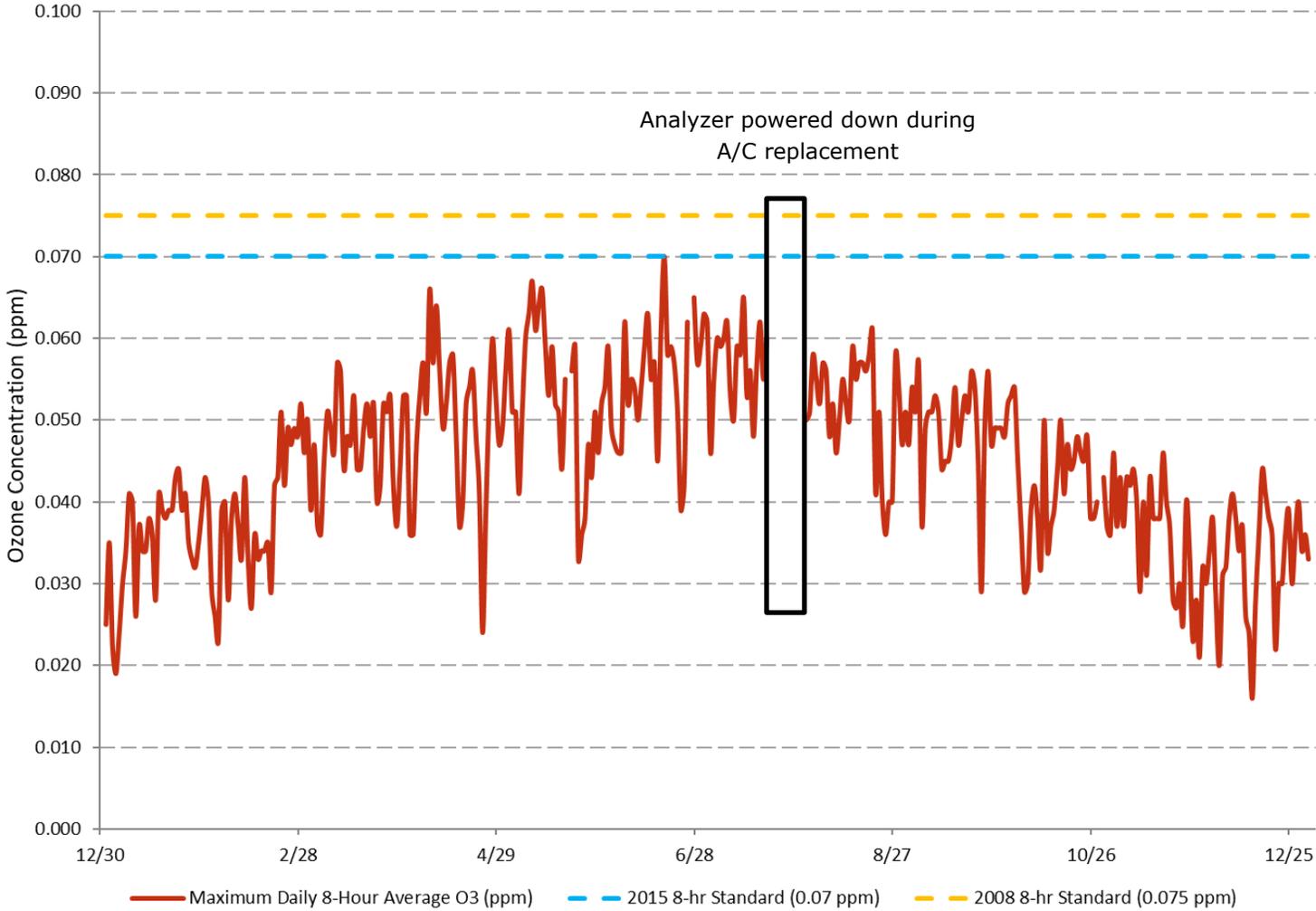


Figure 5. Orchard 2025 Maximum Daily 8-hour Averaged O₃.

Table 7. Weld County Network Highest Daily Maximum 8-hour Average O₃

Site Name	1st Max 8-Hour (ppm)	Date 1st Max 8-Hour	2nd Max 8-Hour (ppm)	Date 2nd Max 8-Hour	3rd Max 8-Hour (ppm)	Date 3rd Max 8-Hour	4th Max 8-Hour (ppm)	Date 4th Max 8-Hour	Max 8-Hour Averages Exceeding the 2008 AAQS Value ^[1]	Max 8-Hour Averages Exceeding the 2015 AAQS Value ^[1]
MSP	0.071	6/15/2025	0.070	5/10/2025	0.069	6/19/2025	0.068	5/12/2025	0	1
Hereford	0.070	5/10/2025	0.068	4/11/2025	0.067	5/12/2025	0.067	6/19/2026	0	0
Orchard	0.070	6/19/2025	0.067	5/10/2025	0.066	4/9/2025	0.066	5/13/2026	0	0

Notes:

^[1] The O₃ AAQS value is based on the 3-year average of the 99th percentile (4th highest) of 8-hour daily maximum concentrations. Comparison with the O₃ AAQS available in [Table 8](#) below.

^[2] Orange highlighting indicates that the value is above the 2008 O₃ standard. Yellow highlighting indicates that the value is above the 2015 O₃ standard.

Table 8. Weld County Network Historical and 2025 Comparison to O₃ AAQS

Year	MSP 4 th Max 8-Hour (ppm)	3-Year Average (ppm)	AAQS ^[1] Exceeded?	Hereford 4 th Max 8-Hour (ppm)	3-Year Average (ppm)	AAQS ^[1] Exceeded?	Orchard 4 th Max 8-Hour (ppm)	3-Year Average (ppm)	AAQS ^[1] Exceeded?
2021	0.079	-	-[2]	0.075	-	-[2]	0.075	-	-[2]
2022	0.073	-	-[2]	0.065	-	-[2]	0.069	-	-[2]
2023	0.069	0.073	Yes	0.063	0.067	No	0.064	0.069	No
2024	0.080	0.074	Yes	0.077	0.068	No	0.072	0.068	No
2025	0.068	0.072	Yes	0.067	0.069	No	0.066	0.067	No

Notes:

^[1] The O₃ AAQS value is based on the 3-year average of the 99th percentile (4th highest) of 8-hour daily maximum concentrations.

^[2] Three years of data are required for computation of the AAQS value and comparison to the standard.

^[3] Orange highlighting indicates that the value is above the 2008 O₃ standard. Yellow highlighting indicates that the value is above the 2015 O₃ standard.

5.2 Gaseous NO₂ Data Summary

NO₂ data collected at MSP was compared against the AAQS standard for 1-hour averaged NO₂ (100 ppb) and to the annual standard (53 ppb). The 1-hour average NO₂ standard is based on the 98th percentile of 1-hour daily maximum concentrations, averaged over 3-years. MSP has not recorded any values exceeding the 1-hour average or annual NO₂ standards during its five years of operation. The maximum 1-hour average concentration during 2025 was 45.5 ppb, recorded on December 4th. The annual average NO₂ concentration was 6.1 ppb. According to 40 CFR Part 50 Appendix S, the 1-hour design value for NO₂ is calculated using three years of complete data. A complete year encompasses four complete quarters, and a quarter is considered complete if at least 75% of the days are valid. A day is considered valid if at least 75% of the hours in that day are valid. At MSP, there are only two complete years, 2023 and 2025. 2024 is not a complete year because data completeness was not met

during Q4 2024. According to Section 3.2 of 40 CFR Part 50 Appendix S, there is a substitution test can be used to determine if the design value is valid, despite not meeting data completeness criteria. We performed the substitution test with the MSP NO₂ data and the test design value was 44 ppb. Since the test design value is below the 1-hour NAAQS, according to Section 3.2 of 40 CFR Part 50 Appendix S, the valid data can be used to calculate the measured design value. Based on 2023 through 2025 data, the measured design value for the 1-hour NAAQS is 41 ppb.

The 2025 annual design value is 6 ppb. Both the annual and 1-hour design values are below their respective AAQS. A summary of daily maximum 1-hour average NO₂ data for 2025 is presented in [Figure 6](#). A comparison to the 1-hour and annual standard are available in [Table 9](#) and [Table 10](#), respectively. Note, data was invalidated between January 25th and February 7th since this period does not meet quality assurance requirements due to a shift in response of the NO_x analyzer. See the annotation in [Figure 6](#).

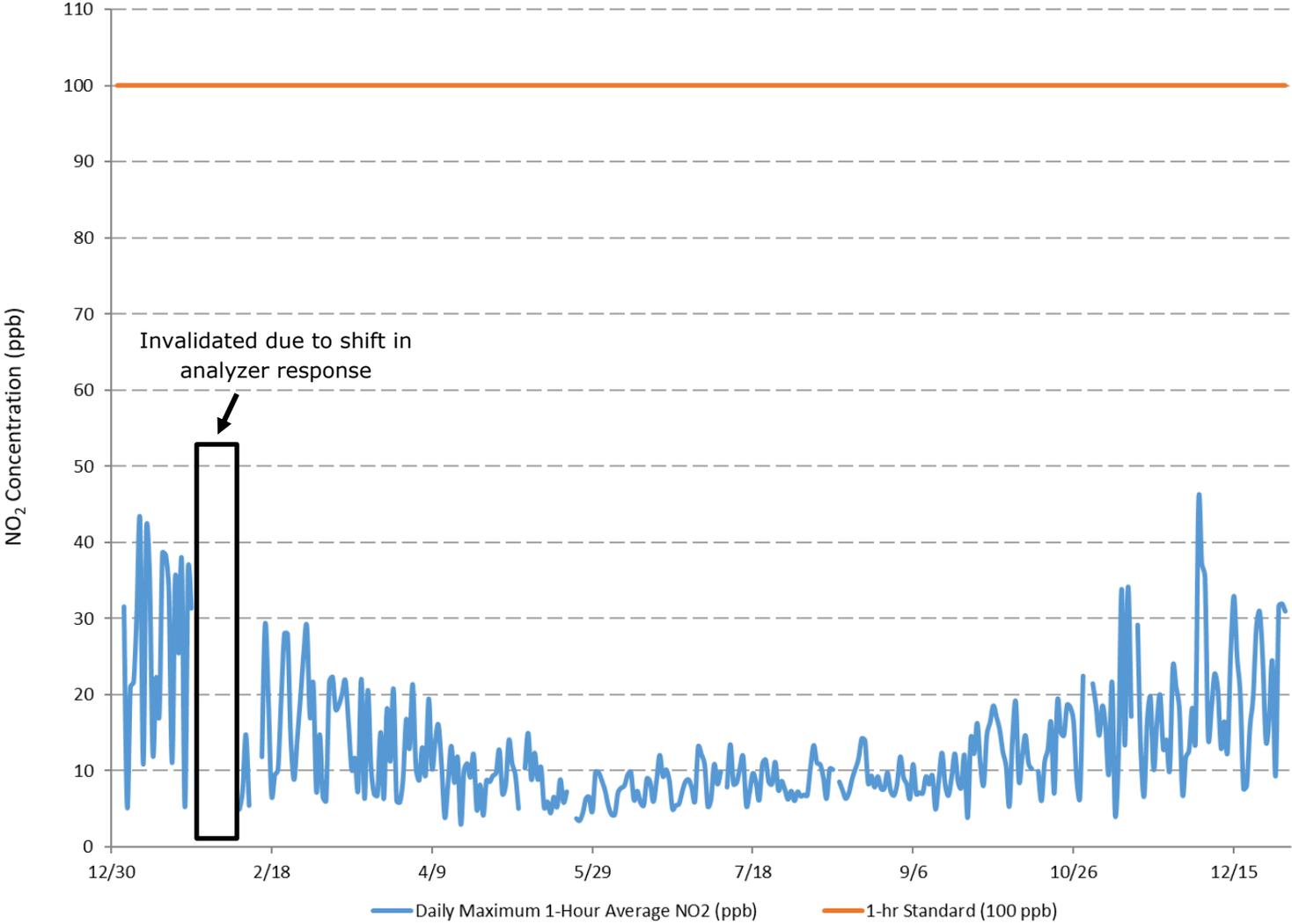


Figure 6. MSP 2025 Maximum Daily 1-hour Average NO₂.

Table 9. MSP Highest Daily Maximum 1-Hour Average NO₂

Period	1st Maximum	2nd Maximum	3rd Maximum	4th Maximum	5th Maximum	6th Maximum	7th Maximum	8th Maximum	Max 1-Hour Averages Exceeding the AAQS Value ^[1]
2022 NO ₂ (ppb)	67.2	63.4	62.0	58.0	57.4	56.9	54.5	54.5	0
2023 NO ₂ (ppb)	64.9	58.3	52.4	51.7	51.5	51.2	50.2	49.4	0
2024 NO ₂ (ppb) ^[2]	45.8	44.2	41.4	37.6	36.0	35.4	35.3	35.1	0
2025 NO ₂ (ppb)	45.5	42.9	41.9	38.7	38.4	37.6	37.2	36.6	0

Notes:
^[1] The 1-hour NO₂ AAQS standard is based on the 3-year average of the 98th percentile (8th highest) of 1-hour daily maximum concentrations.
^[2] Data completeness was not met for Q4 2024.

Table 10. MSP 1-Hour NO₂ Quarterly and Annual Averages

Period	Q1 Quarterly Average	Q2 Quarterly Average	Q3 Quarterly Average	Q4 Quarterly Average	Annual Mean	Annual AAQS Design Value ^[1] Exceeded?
2022 NO ₂ (ppb)	13.6	4.3	5.7	10.3	8.5	No
2023 NO ₂ (ppb)	13.4	4.8	4.8	9.7	8.0	No
2024 NO ₂ (ppb)	8.6	3.9	5.2	9.1 ^[2]	6.5	No
2025 NO ₂ (ppb)	7.7	4	4.4	8.4	6.1	No

Notes:
^[1] The annual NO₂ standard is based on the annual mean of 1-hour average NO₂ concentrations.
^[2] Quarter did not meet data completeness requirements.

6. METEOROLOGICAL DATA SUMMARY

This section summarizes the meteorological data collected during 2025.

6.1 Wind Data Summary

The 2025 average wind speed at the three stations at 10-m above ground level (agl) was 3.13 meters per second (m/s), 4.63 m/s, and 3.46 m/s at MSP, Hereford, and Orchard, respectively. The maximum hourly average wind speed for 2025 was 15.91 m/s at MSP, 21.17 m/s at Hereford, and 19.37 m/s at Orchard. **Figure 7** through **Figure 12** present wind rose plots for each station for the entirety of 2025 and as quarterly breakdowns. These wind roses are a graphical representation of how the wind speed and direction were distributed for 2025. On each wind rose, the bars at 0 degrees (°) correspond to wind coming from the north and the bars at 180° correspond to wind coming from the south. The size of each bar is an indication of how frequently the wind comes from a particular direction. The color of the bars represents the corresponding wind speed when the wind was blowing from a particular direction. Each station had a unique wind profile that varied depending on the time of year.

At the MSP station, winds tended to be strongest from the north, west and southwest over the course of the year but there was not a strong directional pattern. During all four quarters the winds were generally distributed in all directions, with the strongest winds from the northwest in quarters 1 and 4. At the Hereford station winds tended to be strongest and come mostly from the northwest during the year. During Quarter 1 and Quarter 4 winds were primarily from the northwest and were strongest from this direction. During Quarter 2 winds came from the north and southeast, while being strongest from the north. During Quarter 3 winds were generally weaker than the other quarters and came most frequently from the north and southeast. At the Orchard station, winds tended to have an east-west pattern, with the strongest winds coming from the north. During Quarter 1 and Quarter 4 winds more frequently came from the west and were strongest from the north-northwest. During Quarter 2 winds were broadly distributed except for the southwest/northeast axis, with no clear pattern to the strongest winds. During Quarter 3 winds were weaker and most frequently along the east/west axis. Hereford's wind patterns are likely driven by its proximity to the Cheyenne Ridge (north of the station), while Orchard's wind patterns are likely driven by its proximity to the South Platte River Basin (which is south of the station and is a west-to-east drainage direction). Average hourly and maximum wind speeds per quarter and for the year at each station are listed in **Table 11** along with all other measured meteorological parameters.

Records: 8760
Calms: 20 (0.2%)
Missing: 6 (0.1%)
Avg Speed: 3.1
Max Speed: 15.9

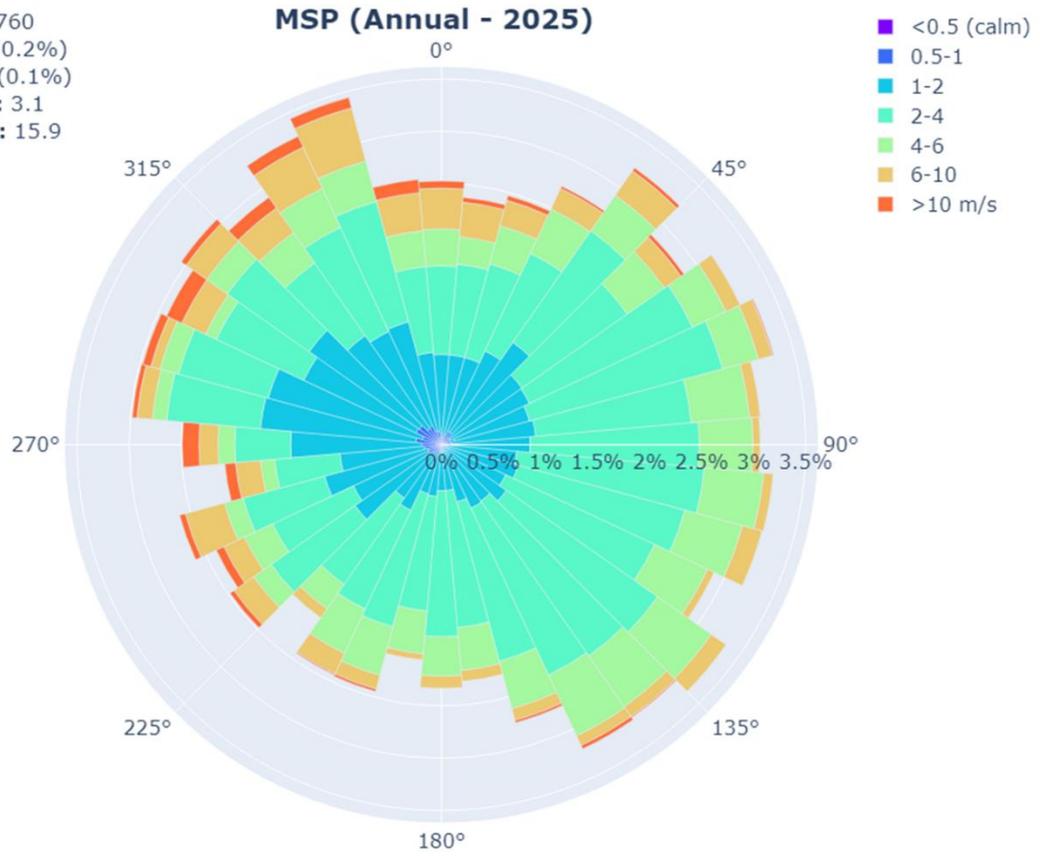


Figure 7. MSP 2025 Wind Rose

Annual 2025 Air Quality and Meteorological Monitoring Data
 Summary Report
 Weld County Monitoring Network

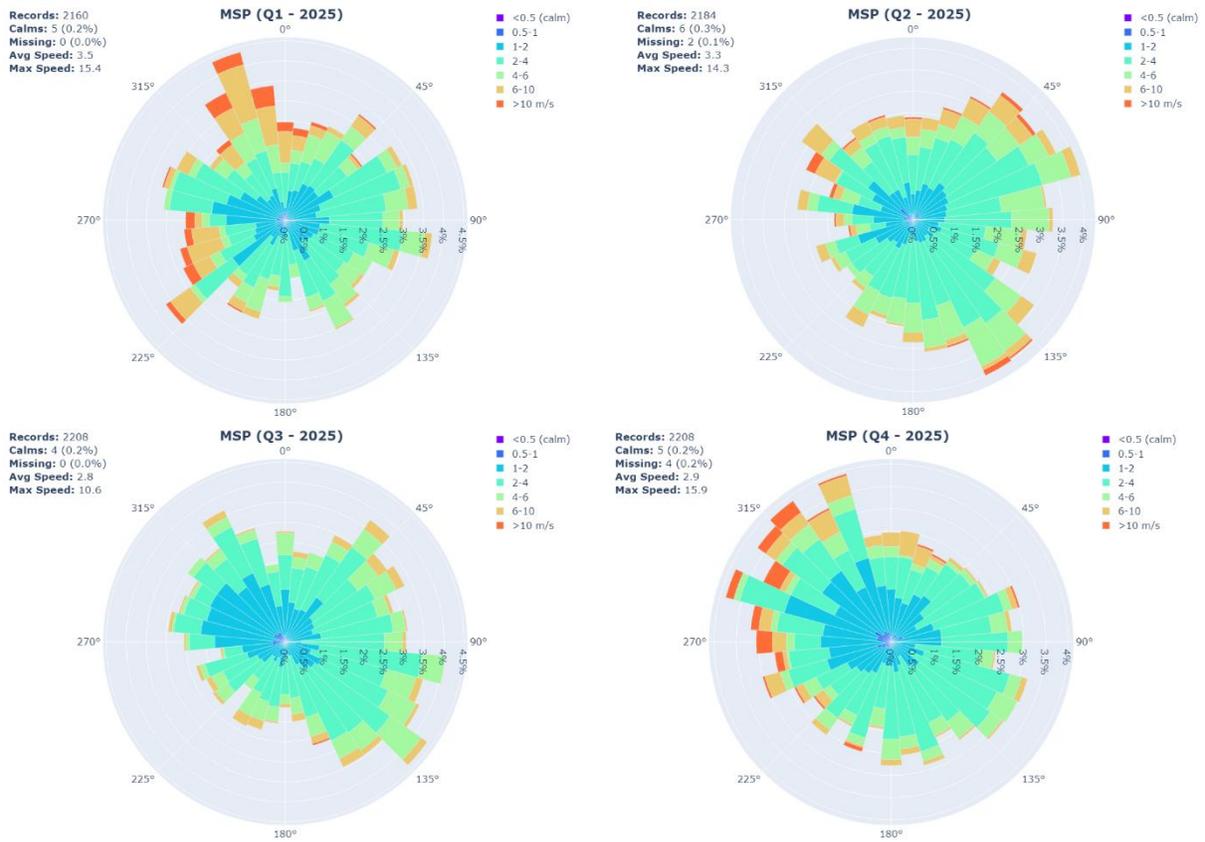


Figure 8. MSP 2025 Quarterly Wind Roses

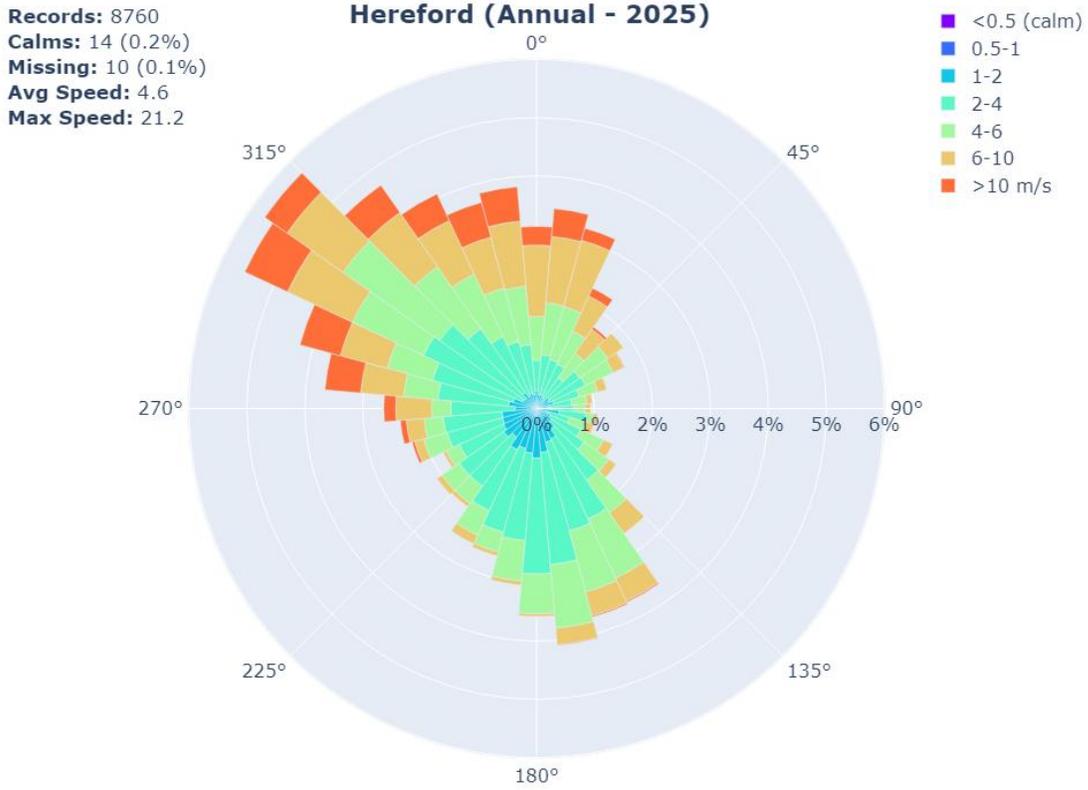


Figure 9. Hereford 2025 Wind Rose

Annual 2025 Air Quality and Meteorological Monitoring Data
 Summary Report
 Weld County Monitoring Network

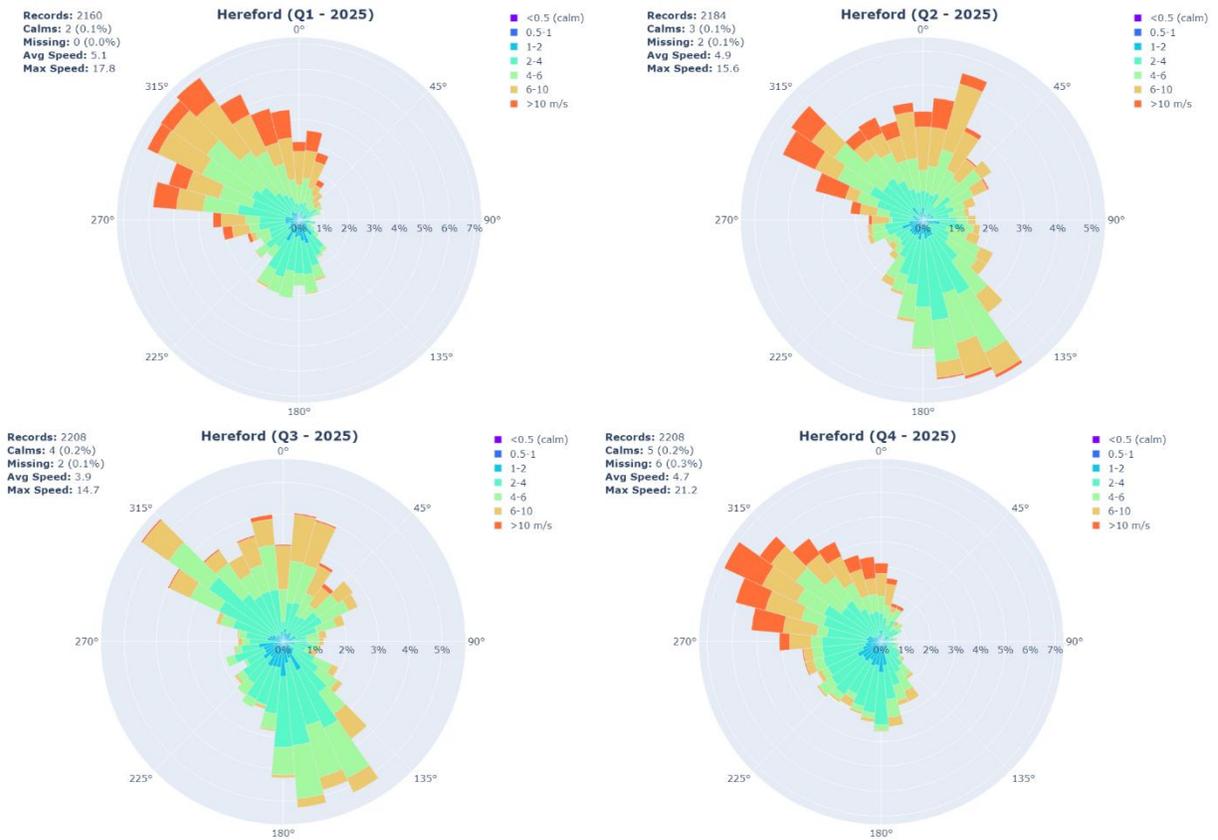


Figure 10. Hereford 2025 Quarterly Wind Roses

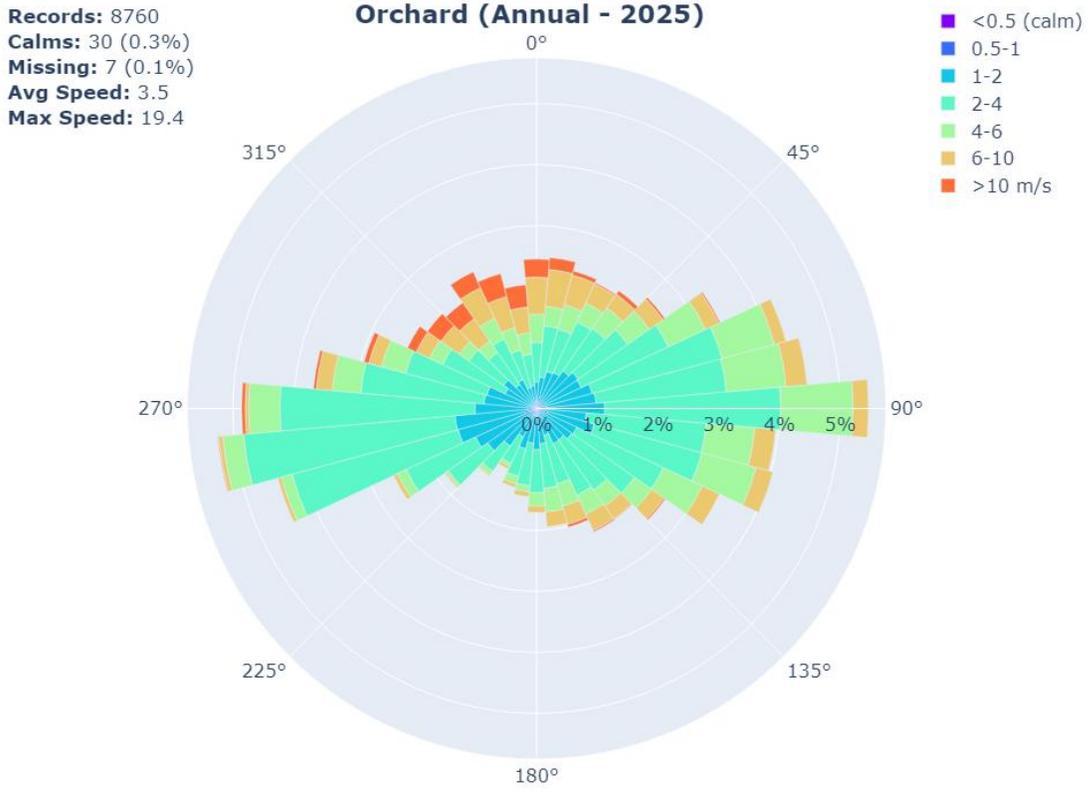


Figure 11. Orchard 2025 Wind Rose

Annual 2025 Air Quality and Meteorological Monitoring Data
 Summary Report
 Weld County Monitoring Network

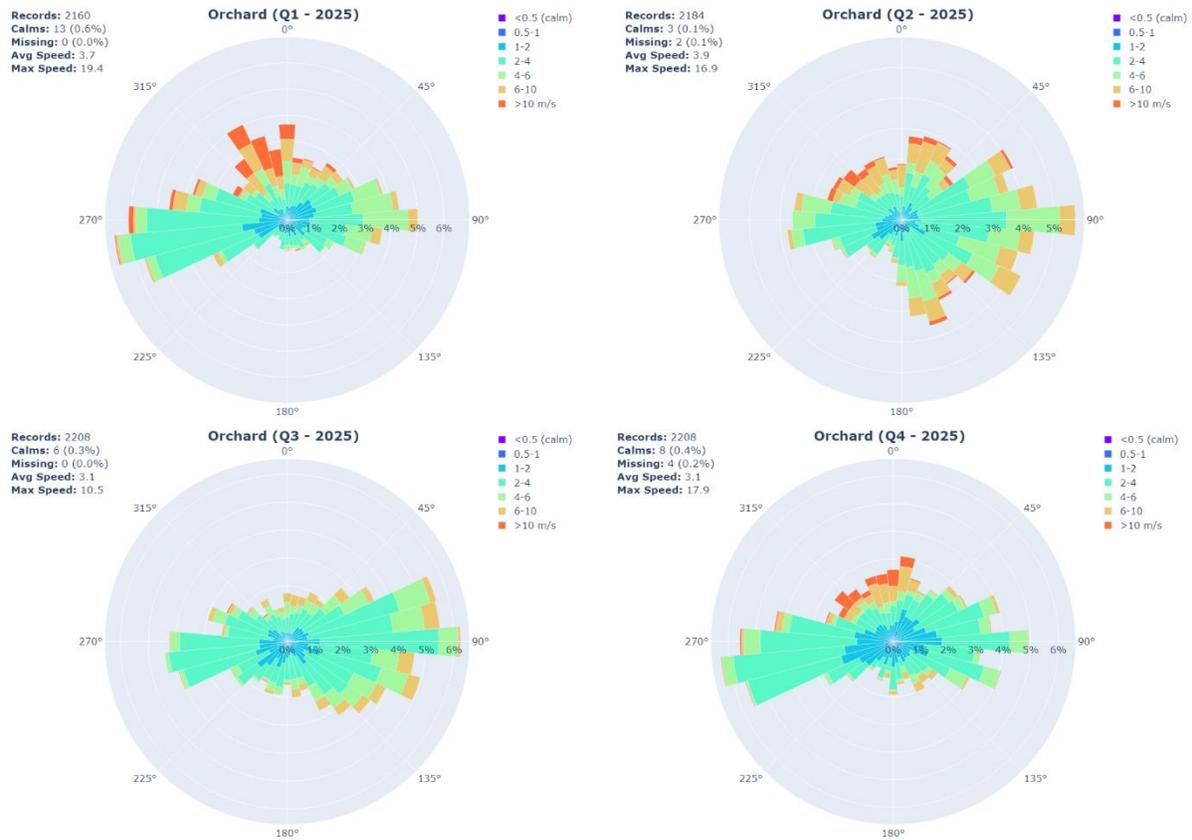


Figure 12. Orchard 2025 Quarterly Wind Roses

Table 11. 2025 Meteorological Data Summary

Parameter	Units	Form	Q1 ^[1]	Q2 ^[1]	Q3 ^[1]	Q4 ^[1]	Annual ^[1]
Missile Site Park							
2-M Temperature	°C	Quarterly Average	0.8	14.7	21.5	7.5	11.2
		Maximum Hourly Average	25.8	36.6	38.1	29.6	38.1
		Minimum Hourly Average	-24.8	-2.7	7.1	-12.6	-24.8
10-M Temperature	°C	Quarterly Average	1.1	14.7	21.4	8.0	11.3
		Maximum Hourly Average	24.9	35.7	36.8	28.6	36.8
		Minimum Hourly Average	-24.5	-2.6	7.7	-11.7	-24.5
Delta Temperature	°C	Quarterly Average	0.2	-0.1	-0.1	0.4	0.1
		Maximum Hourly Average	3.4	3.9	2.6	4.0	4.0
		Minimum Hourly Average	-1.7	-2.0	-2.3	-1.7	-2.3
10-M Horizontal Wind Speed	m/s	Quarterly Average	3.5	3.3	2.8	2.9	3.1
		Maximum Hourly Average	15.5	14.4	10.6	15.9	15.9
2-M Relative Humidity	Percent	Quarterly Average	57.7	58.6	56.2	55.0	56.9
		Maximum Hourly Average	100.0	100.0	100.0	100.0	100.0
Station Barometric Pressure	mm Hg	Quarterly Average	634.8	635.4	638.1	636.3	636.2
		Maximum Hourly Average	645.7	645.3	644.5	647.7	647.7
Station Precipitation	in	Quarterly Total	1.537	6.958	6.028	0.635	15.158
	in/hr	Maximum Hourly Total	0.146	0.709	0.800	0.110	0.800
2-M Solar Radiation	W/m ²	Quarterly Average	150	262	254	122	195
		Maximum Hourly Average	924	1117	1105	823	1117
Hereford							
2-M Temperature	°C	Quarterly Average	-1.0	13.0	19.8	6.0	9.5
		Maximum Hourly Average	24.5	35.8	37.4	28.2	37.4
		Minimum Hourly Average	-25.7	-8.8	3.0	-16.5	-25.7
10-M Temperature	°C	Quarterly Average	-0.6	13.0	19.9	6.8	9.8
		Maximum Hourly Average	23.6	35.0	35.7	27.3	35.7
		Minimum Hourly Average	-24.9	-6.8	4.7	-14.1	-24.9
Delta Temperature	°C	Quarterly Average	0.4	0.0	0.1	0.8	0.3
		Maximum Hourly Average	9.0	6.4	5.3	8.8	9.0
		Minimum Hourly Average	-1.7	-2.2	-2.2	-1.5	-2.2
10-M Horizontal Wind Speed	m/s	Quarterly Average	5.1	4.9	3.9	4.7	4.6
		Maximum Hourly Average	17.8	15.6	14.7	21.2	21.2
2-M Relative Humidity	Percent	Quarterly Average	61.9	60.9	60.9	58.1	60.5
		Maximum Hourly Average	100.0	100.0	100.0	100.0	100.0
Station Barometric Pressure	mm Hg	Quarterly Average	626.4	627.4	630.2	628.0	628.0
		Maximum Hourly Average	636.5	636.8	636.1	638.7	638.7
Station Precipitation	in	Quarterly Total	0.950	4.805	8.554	0.620	14.929
	in/hr	Maximum Hourly Total	0.118	0.485	0.591	0.095	0.591
2-M Solar Radiation	W/m ²	Quarterly Average	146	262	243	117	192

Parameter	Units	Form	Q1 ^[1]	Q2 ^[1]	Q3 ^[1]	Q4 ^[1]	Annual ^[1]
		Maximum Hourly Average	875	1066	1054	777	1066
Orchard							
2-M Temperature	°C	Quarterly Average	-0.8	14.6	20.8	5.3	10.0
		Maximum Hourly Average	26.7	38.3	40.1	30.6	40.1
		Minimum Hourly Average	-27.9	-7.7	2.3	-17.6	-27.9
10-M Temperature	°C	Quarterly Average	-0.1	14.8	21.2	6.5	10.7
		Maximum Hourly Average	25.6	37.7	38.4	29.6	38.4
		Minimum Hourly Average	-25.6	-5.1	4.3	-15.6	-25.6
Delta Temperature	°C	Quarterly Average	0.7	0.2	0.4	1.2	0.6
		Maximum Hourly Average	7.4	6.3	6.7	7.7	7.7
		Minimum Hourly Average	-1.8	-2.2	-2.2	-1.8	-2.2
10-M Horizontal Wind Speed	m/s	Quarterly Average	3.7	3.9	3.1	3.1	3.5
		Maximum Hourly Average	19.4	16.9	10.5	17.9	19.4
2-M Relative Humidity	Percent	Quarterly Average	64.9	61.5	64.2	64.1	63.7
		Maximum Hourly Average	99.7	100.0	100.0	100.0	100.0
Station Barometric Pressure	mm Hg	Quarterly Average	647.1	647.1	649.5	648.3	648.0
		Maximum Hourly Average	658.4	657.4	656.4	660.0	660.0
Station Precipitation	in	Quarterly Total	1.377	4.859	9.092	0.580	15.908
	in/hr	Maximum Hourly Total	0.095	0.709	1.848	0.071	1.848
2-M Solar Radiation	W/m ²	Quarterly Average	150	267	257	121	199
		Maximum Hourly Average	884	1086	1068	797	1086

^[1]There are small differences in precision relative to the finalized valid data due to rounding.

6.2 Precipitation Data Summary

Hourly precipitation data was collected at all three stations with a tipping bucket sensor at 1-m agl. Quarter 2 had the highest total precipitation at MSP, while Quarter 3 had the highest total precipitation for Hereford and Orchard. Quarter 3 had the highest maximum hourly precipitation at all three sites. MSP's highest total precipitation occurred in Quarter 2, coinciding with the spring rainy season, while Hereford and Orchard saw their highest total precipitations in Quarter 3, likely driven by summer convective storms. A summary of total quarterly and maximum hourly precipitation for each quarter of 2025 and for the year at all three stations is presented in [Figure 13](#) through [Figure 15](#) and in [Table 11](#).

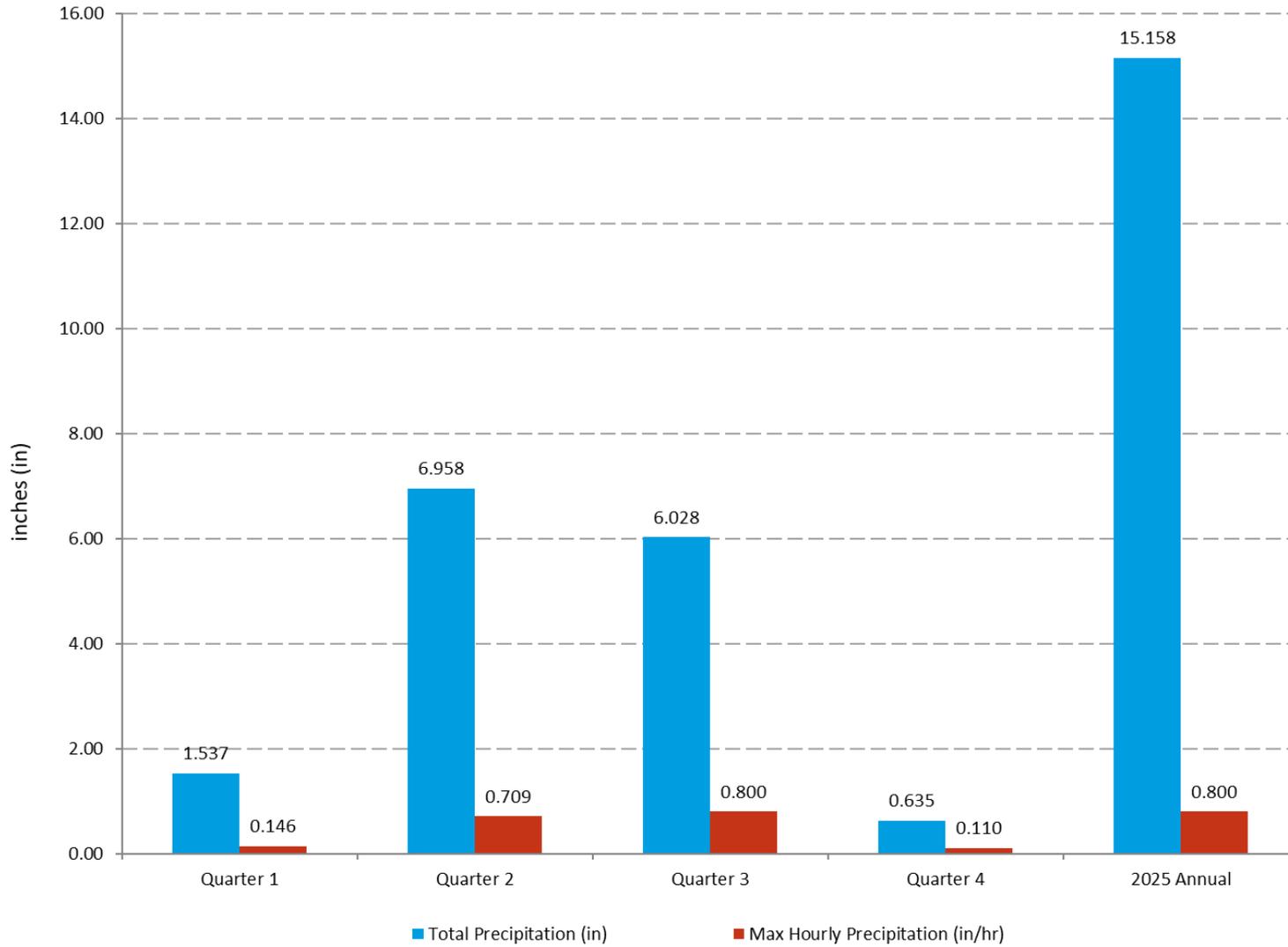


Figure 13. MSP 2025 Precipitation Summary

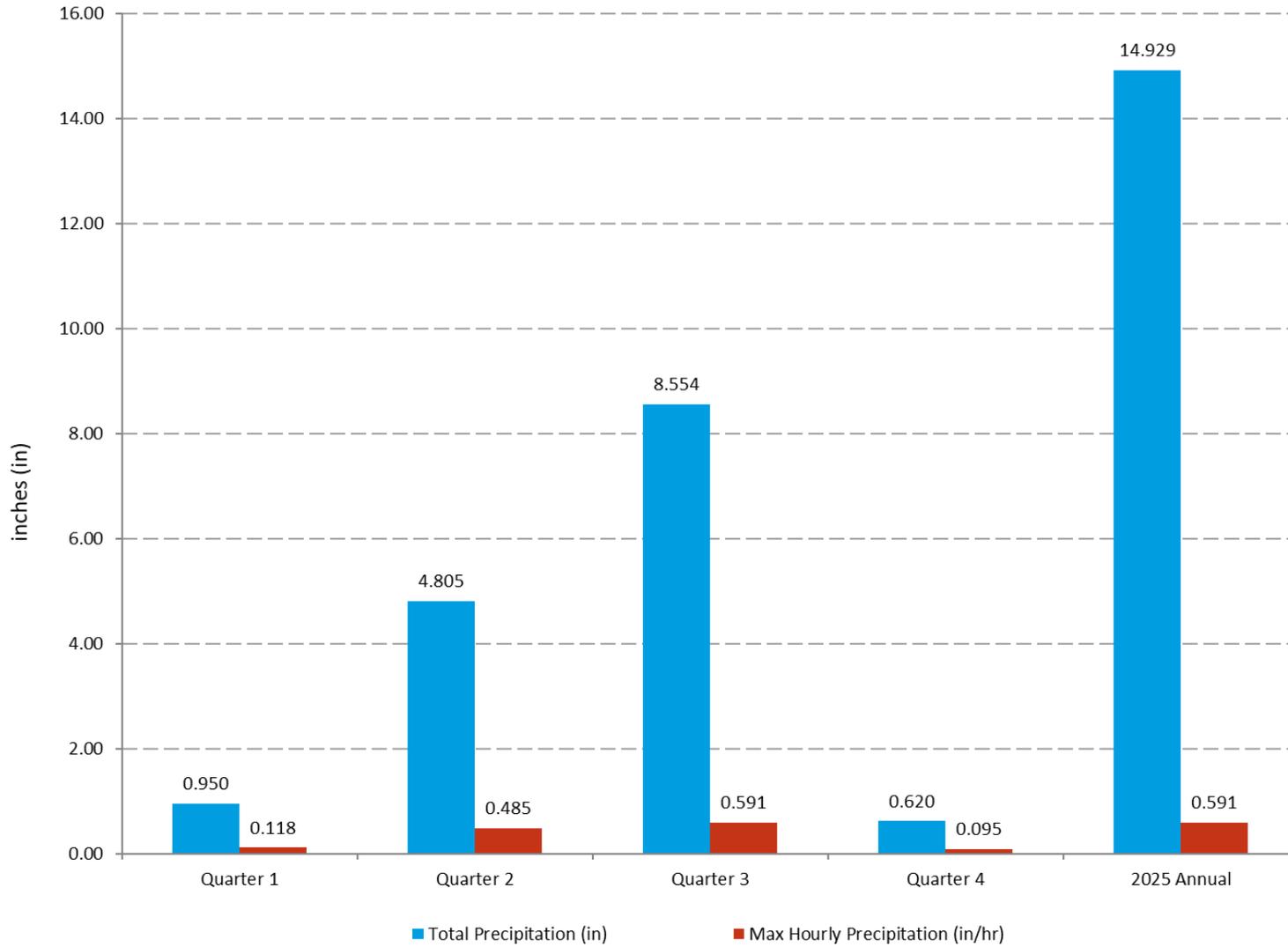


Figure 14. Hereford 2025 Precipitation Summary

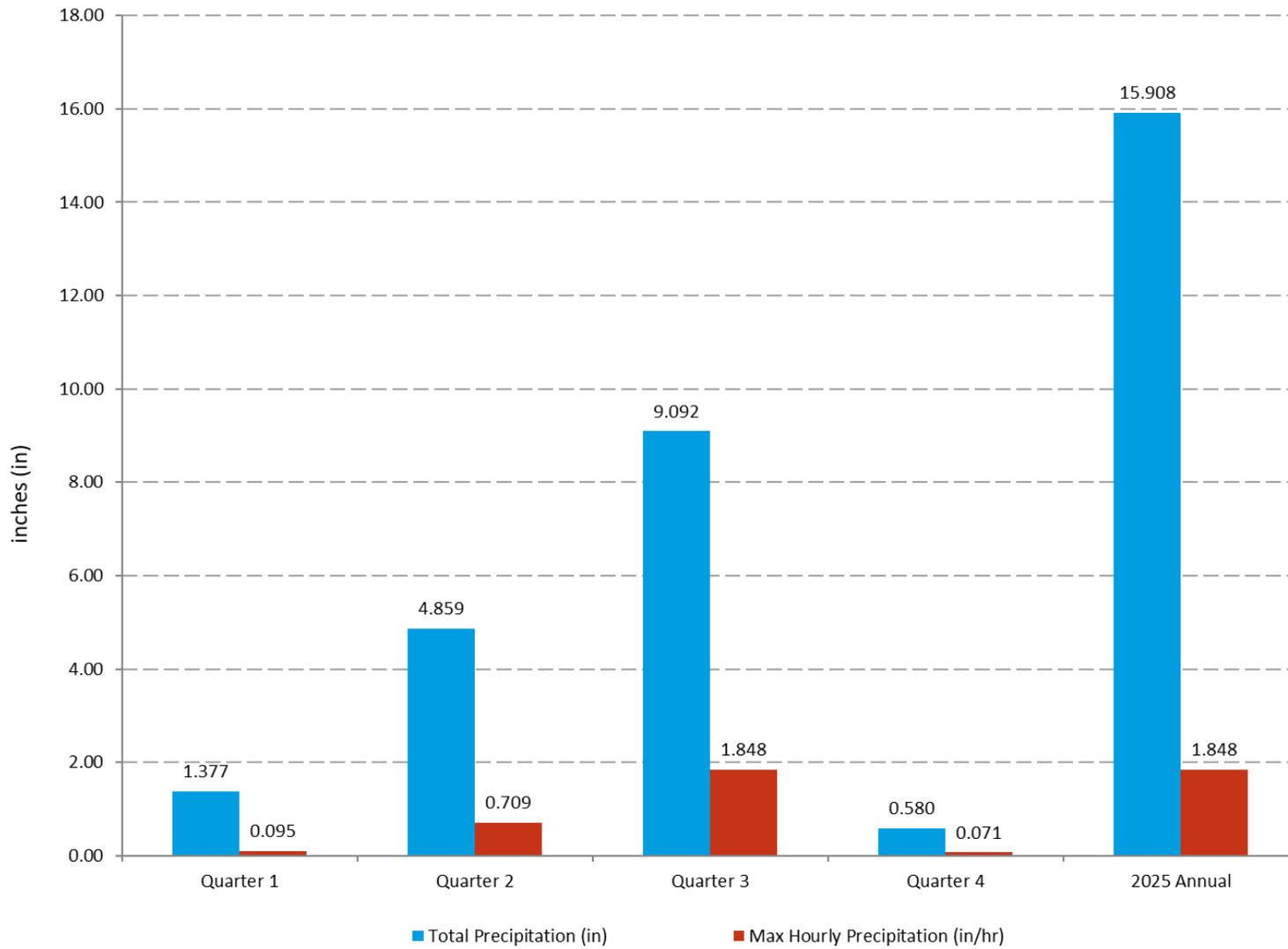


Figure 15. Orchard 2025 Precipitation Summary

6.3 Temperature Data Summary

At each station, the maximum one-hour average temperature was recorded during Quarter 3 at both sensor heights. Similarly, the highest average temperature for both sensor heights occurred during Quarter 3 at all three stations. Conversely, the minimum temperature was recorded during Quarter 1 for both sensor heights at each station. A summary of quarterly average and hourly maximum and minimum temperatures (for both 2 and 10-m probes) for each quarter of 2025 and for the year at all three stations is presented in [Figure 16](#) through [Figure 21](#) and [Table 11](#).

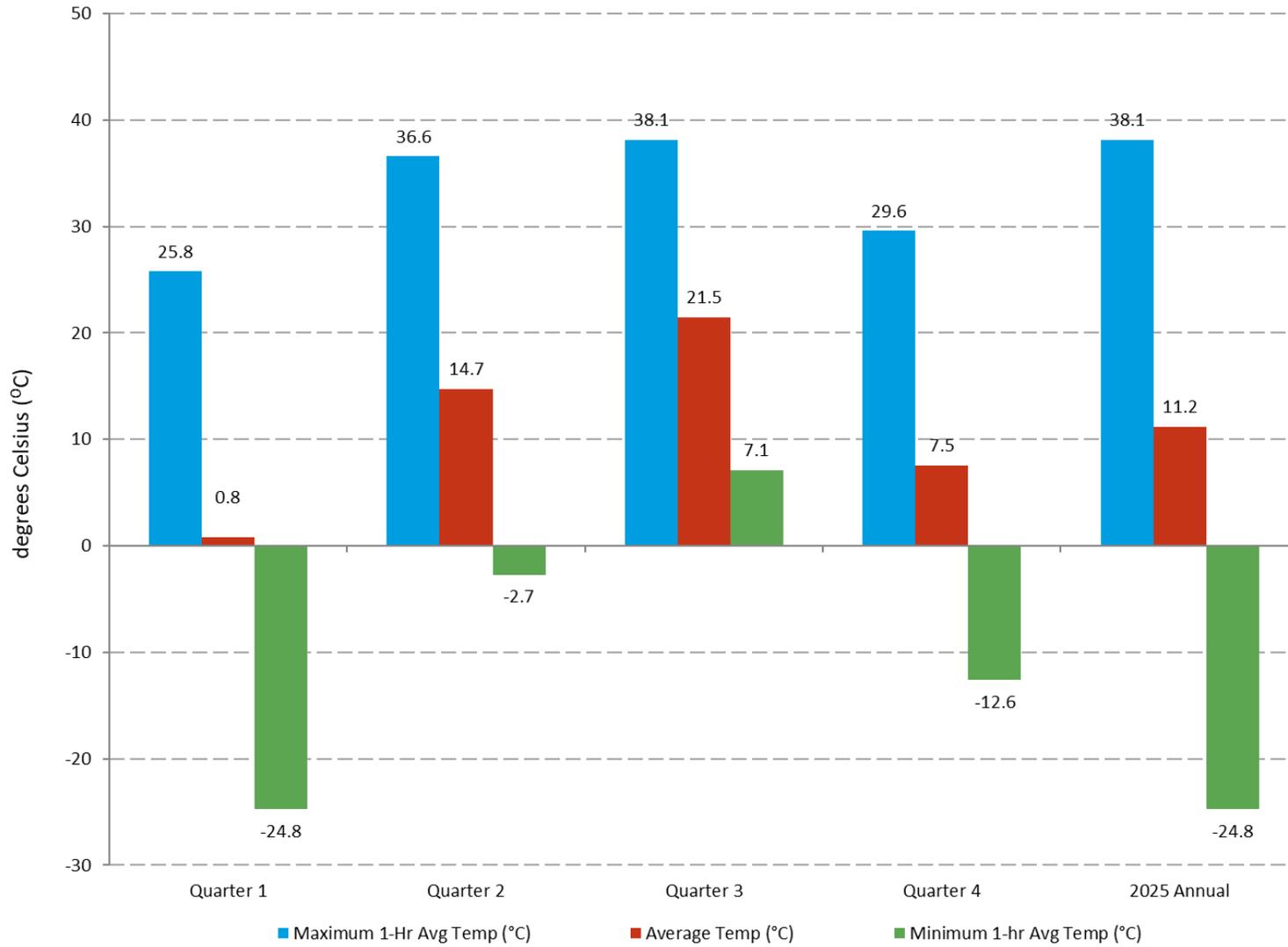


Figure 16. MSP 2025 2-Meter Temperature Summary

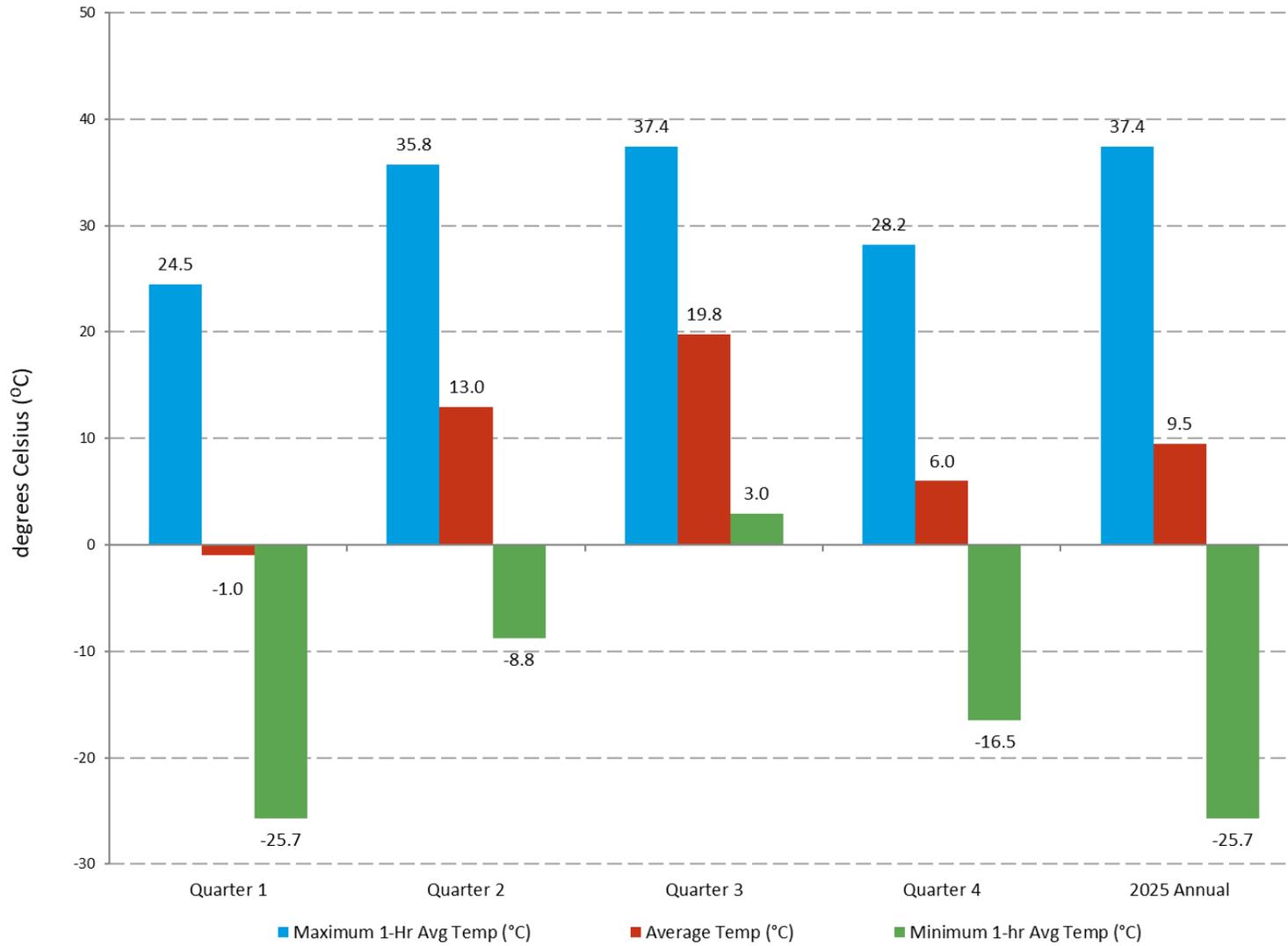


Figure 17. Hereford 2025 2-Meter Temperature Summary

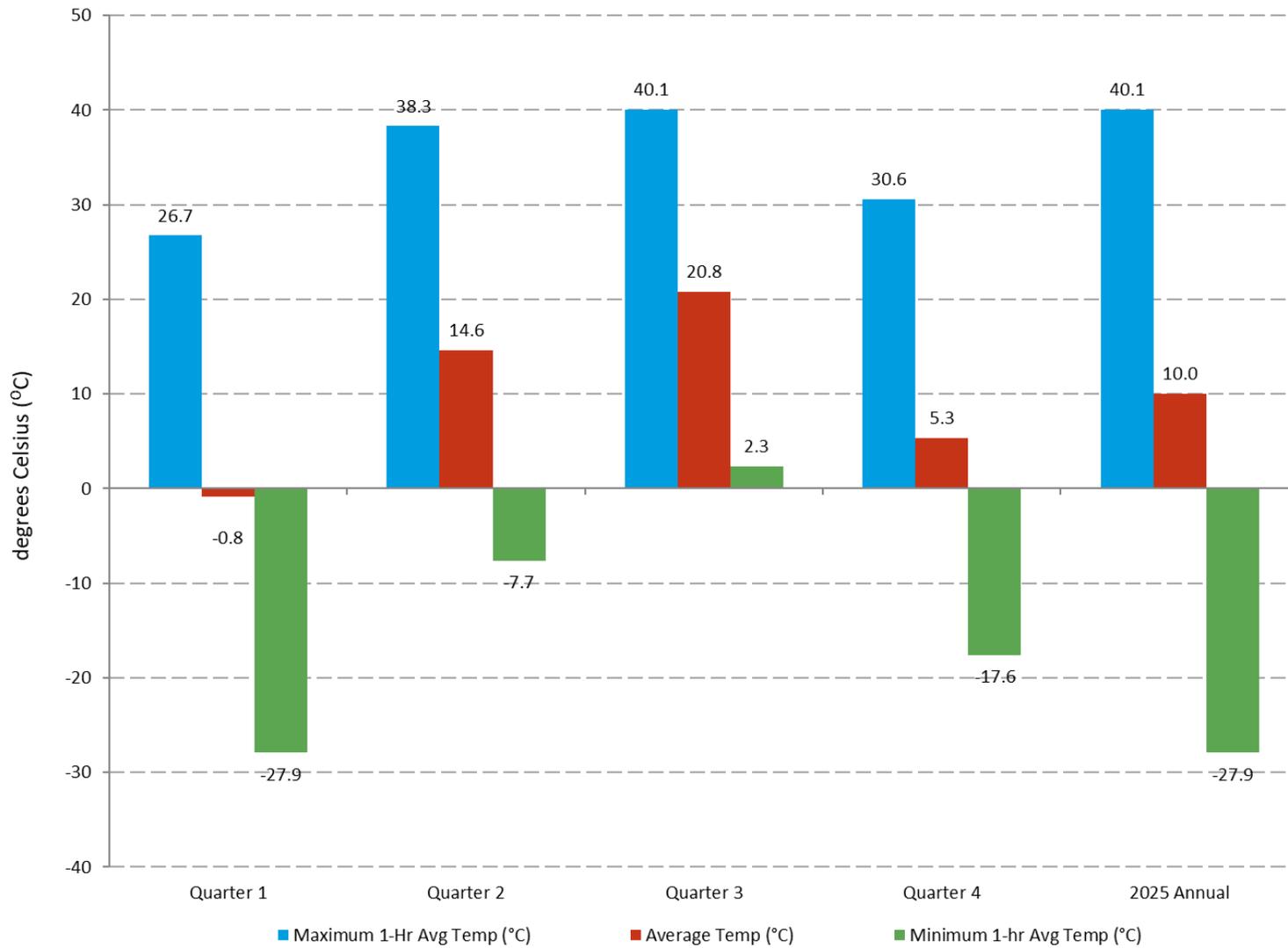


Figure 18. Orchard 2025 2-Meter Temperature Summary

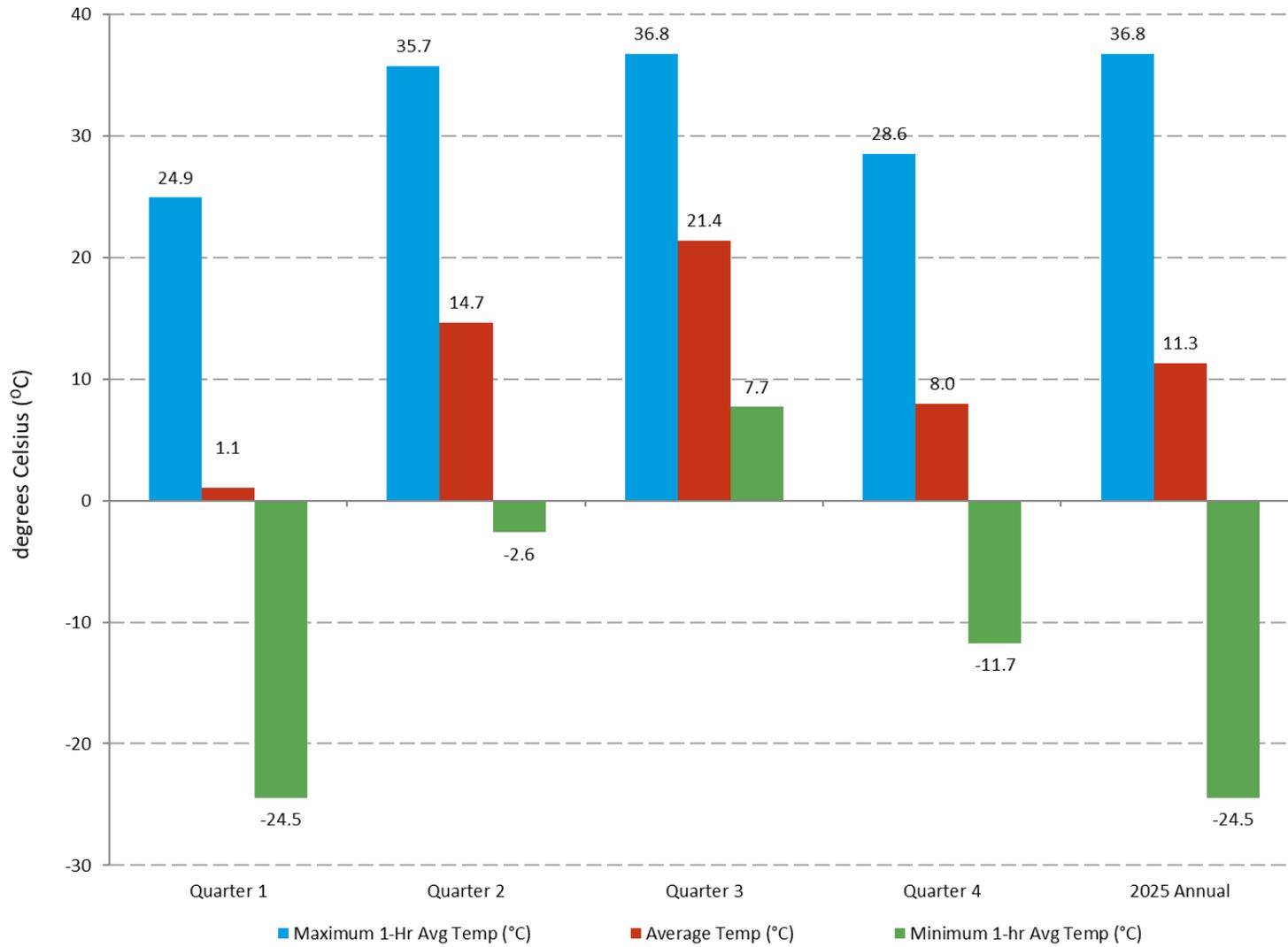


Figure 19. MSP 2025 10-Meter Temperature Summary

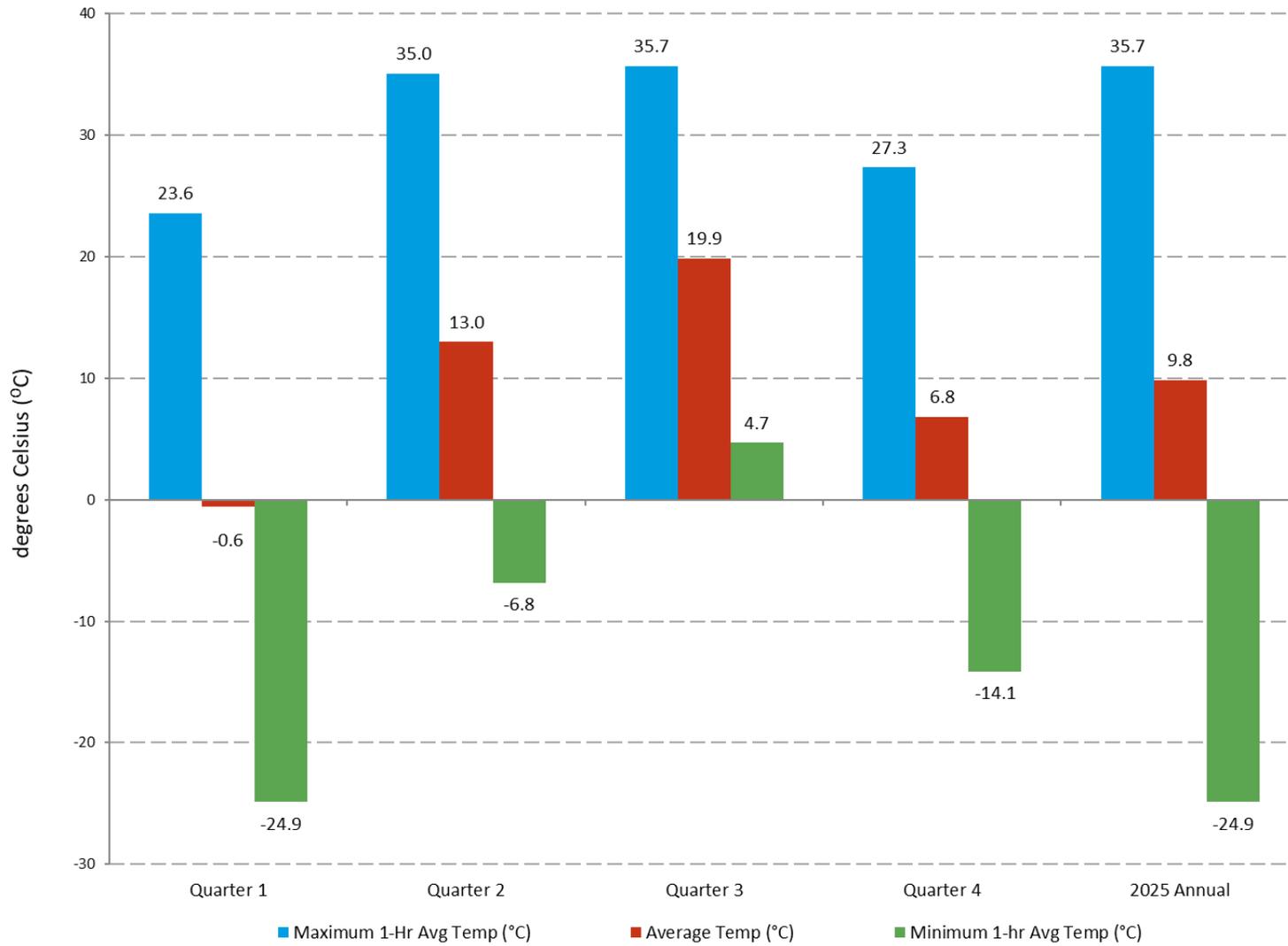


Figure 20. Hereford 2025 10-Meter Temperature Summary

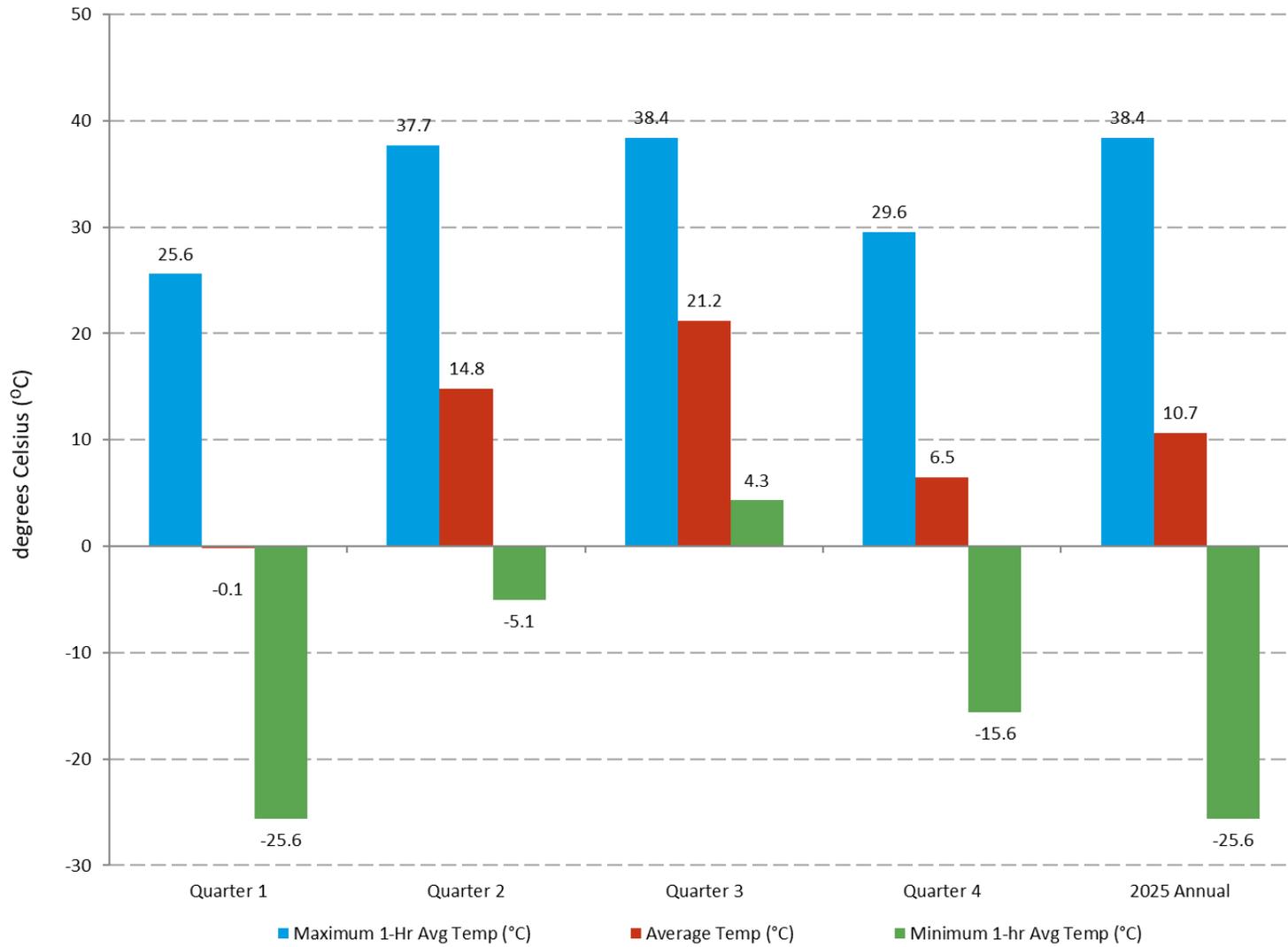


Figure 21. Orchard 2025 10-Meter Temperature Summary

6.4 Delta Temperature Data Summary

Delta temperature is a calculated measurement made by subtracting the 2-m temperature probe reading from the 10-m temperature probe reading (10-m – 2-m). It is an indicator of atmospheric stability and is important for modeling purposes. The maximum delta temperature measurements for each quarter at Hereford and Orchard were approximately 3 to 4 degrees higher than those measured at MSP, which means that Hereford and Orchard experienced stronger temperature inversions than MSP. The 2025 average delta temperature measured at both Hereford and Orchard were also more positive than at MSP. The minimum delta temperature measurements at each station were generally on par with one another for each quarter. A summary of quarterly average and hourly maximum and minimum delta temperature for each quarter of 2025 and for the year at all three stations is presented in [Figure 22](#) through [Figure 24](#) and [Table 11](#).

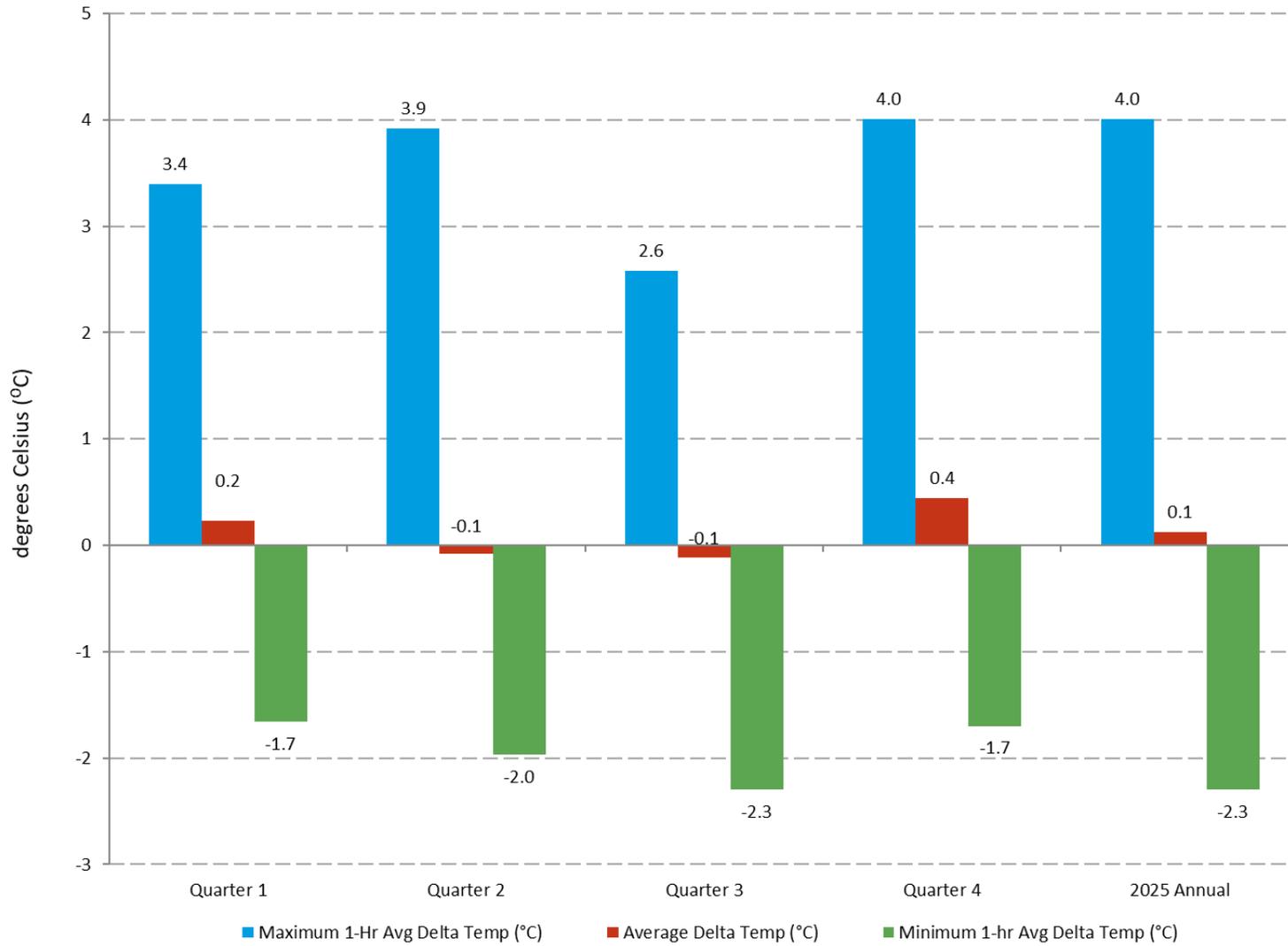


Figure 22. MSP 2025 Delta Temperature Summary

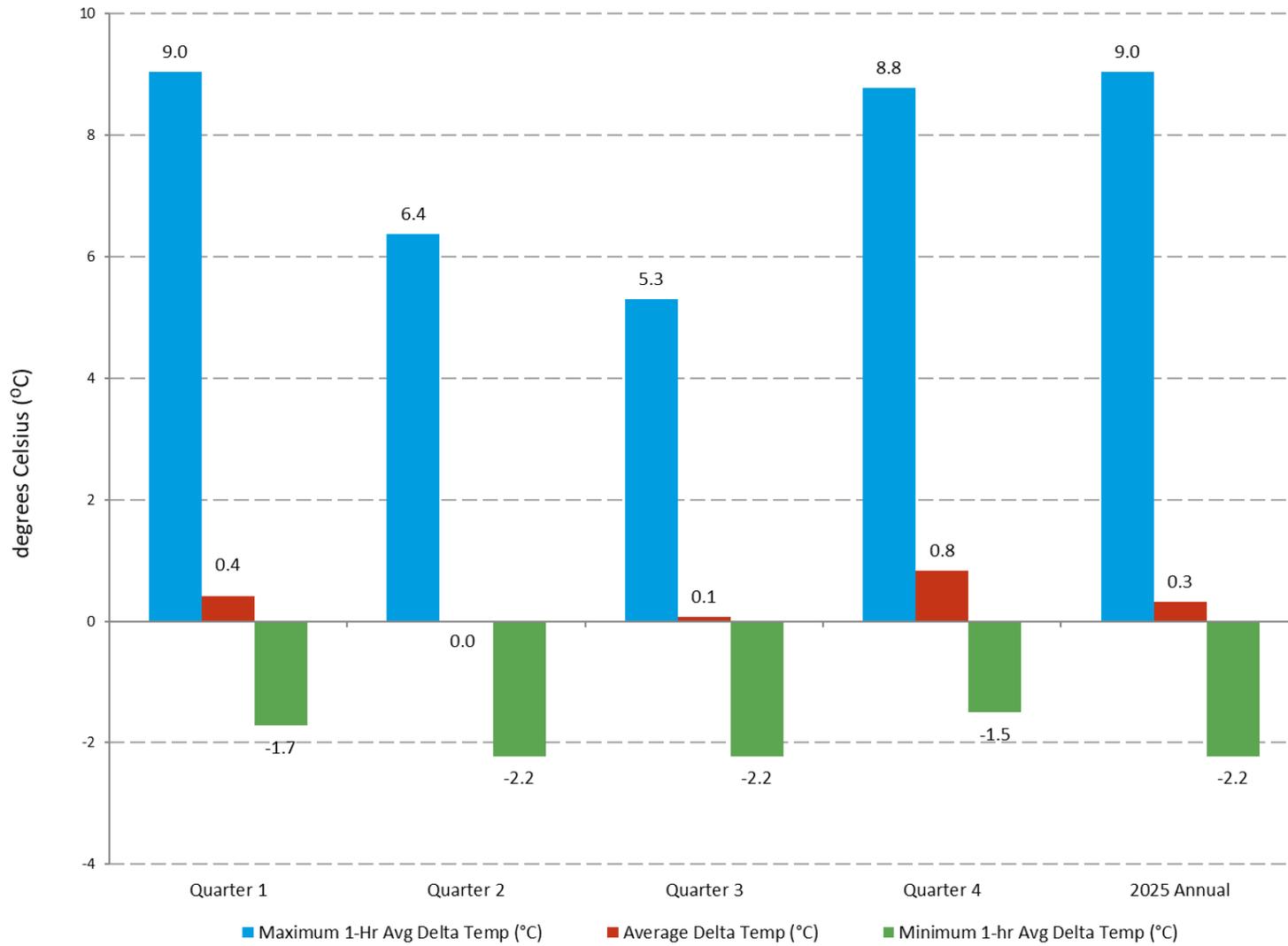


Figure 23. Hereford 2025 Delta Temperature Summary

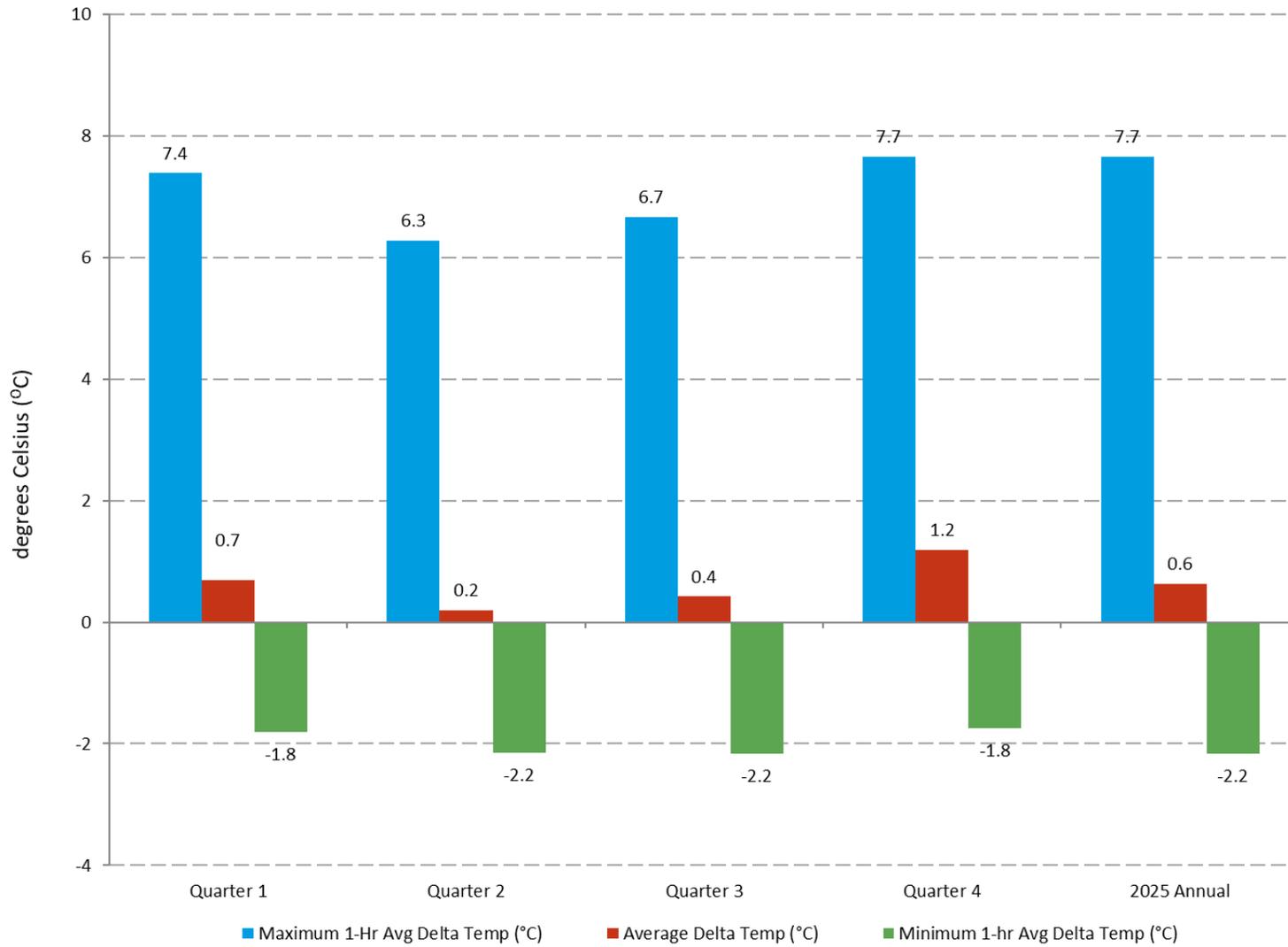


Figure 24. Orchard 2025 Delta Temperature Summary

6.5 Barometric Pressure Data Summary

Barometric pressure data is collected using a barometric pressure sensor located inside each station shelter. The average quarterly barometric pressure at each station was correlated with the elevation at each location, with the highest elevation station having the lowest quarterly average barometric pressure (Hereford) and the lowest elevation station having the highest quarterly average barometric pressure (Orchard). Maximum hourly average and quarterly average barometric pressures for each quarter of 2025 and for the year at all three stations are summarized in [Figure 25](#) through [Figure 27](#) and [Table 11](#).

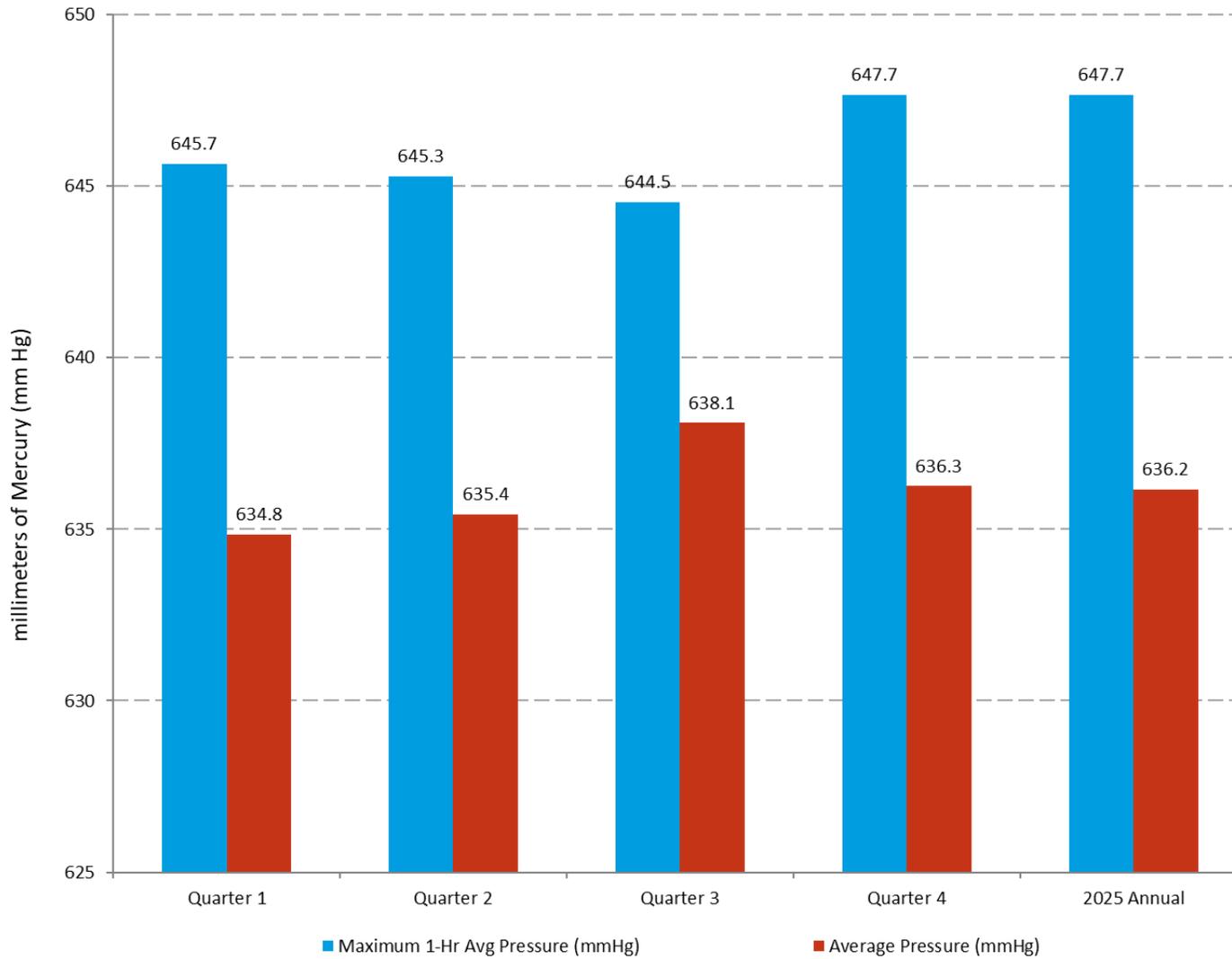


Figure 25. MSP 2025 Barometric Pressure Summary

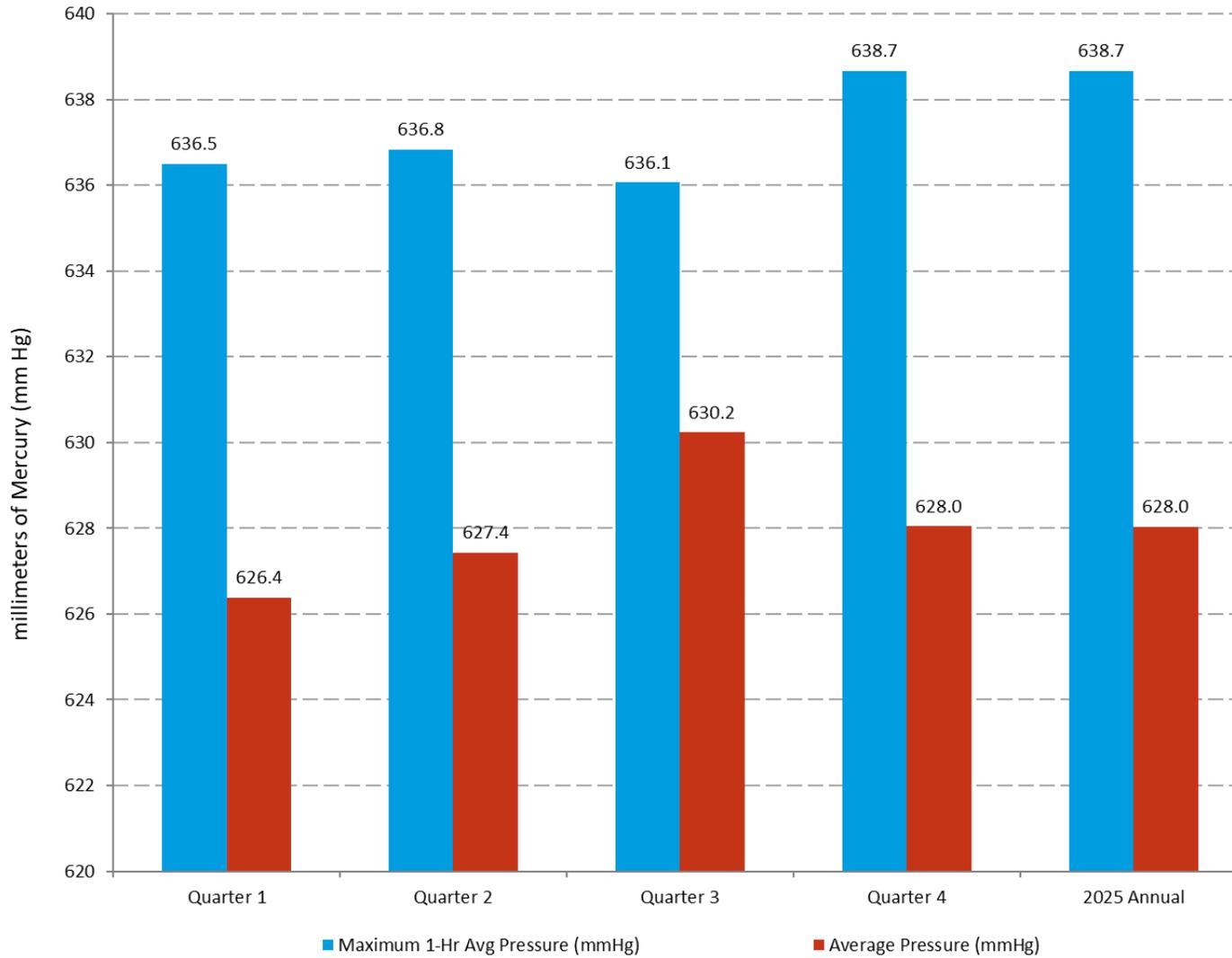


Figure 26. Hereford 2025 Barometric Pressure Summary

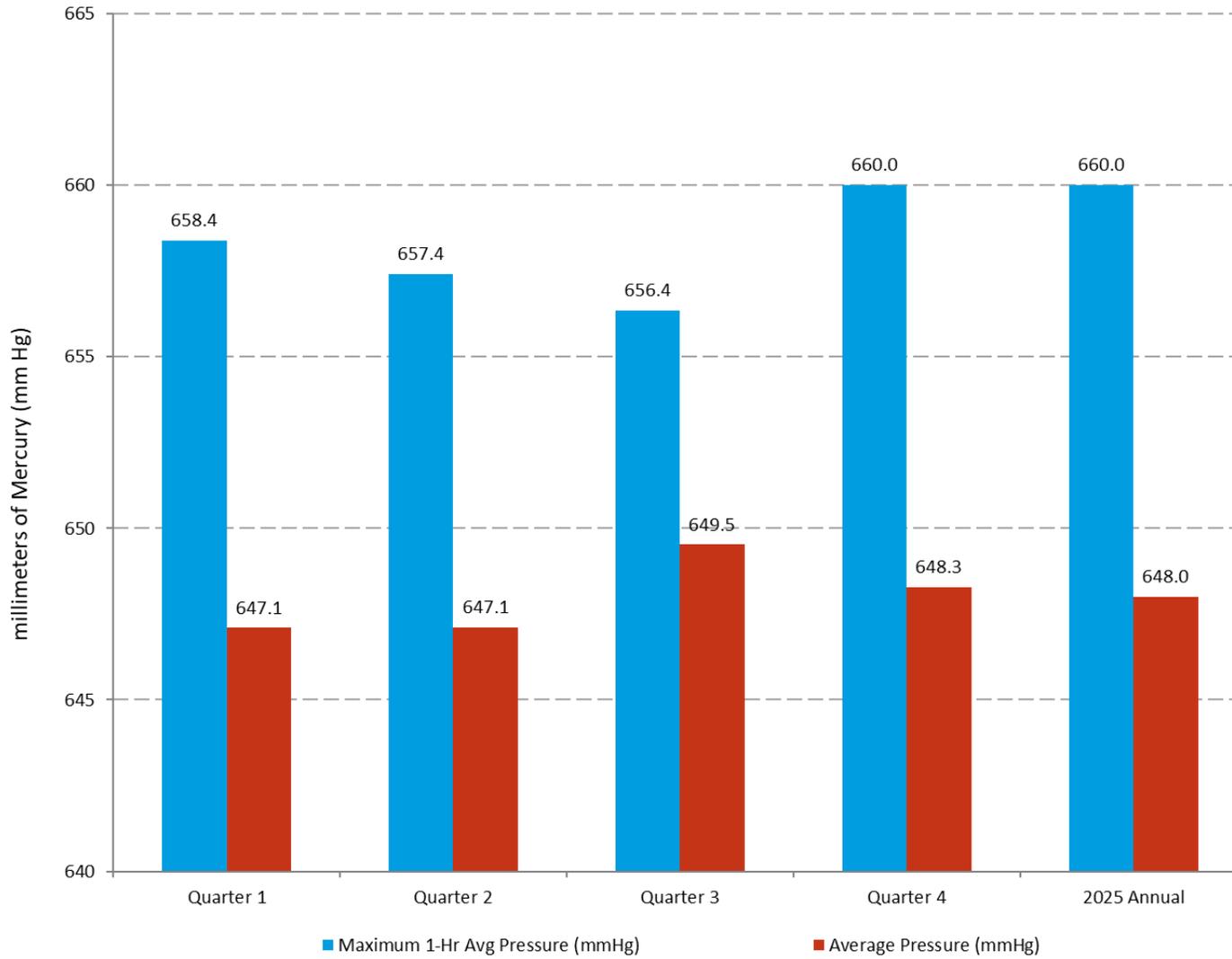


Figure 27. Orchard 2025 Barometric Pressure Summary

6.6 Relative Humidity Data Summary

Relative humidity data was collected at all three stations at 2-m agl. The average quarterly relative humidity was highest in Quarter 2 at MSP and in Quarter 1 at Hereford and Orchard. The average relative humidity was lowest in Quarter 4 for both MSP and Hereford, and in Quarter 2 for Orchard. Maximum hourly average and quarterly average relative humidity for each quarter of 2025 and for the year at all three stations is summarized in [Figure 28](#) through [Figure 30](#) and [Table 11](#).

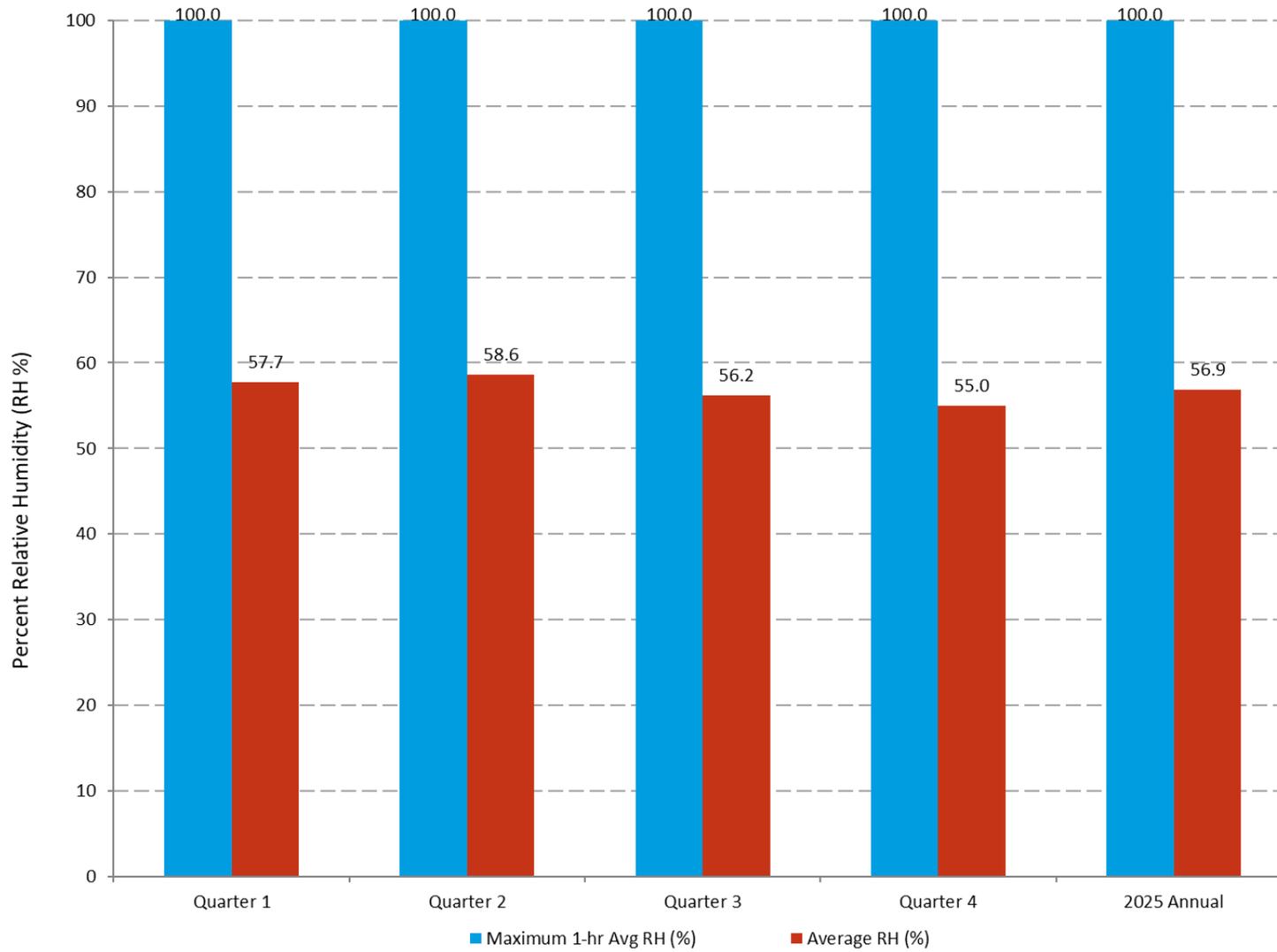


Figure 28. MSP 2025 Relative Humidity Summary

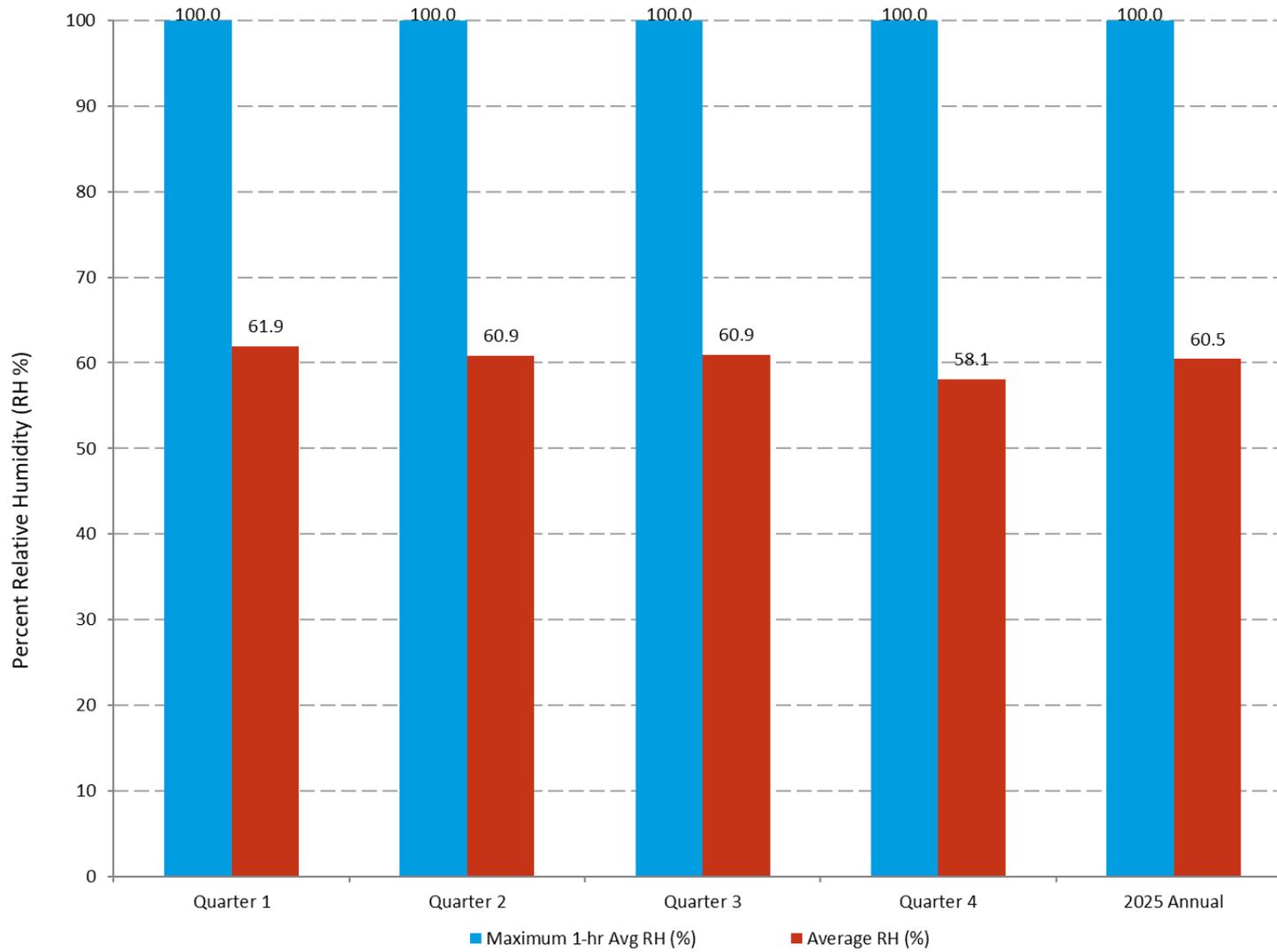


Figure 29. Hereford 2025 Relative Humidity Summary

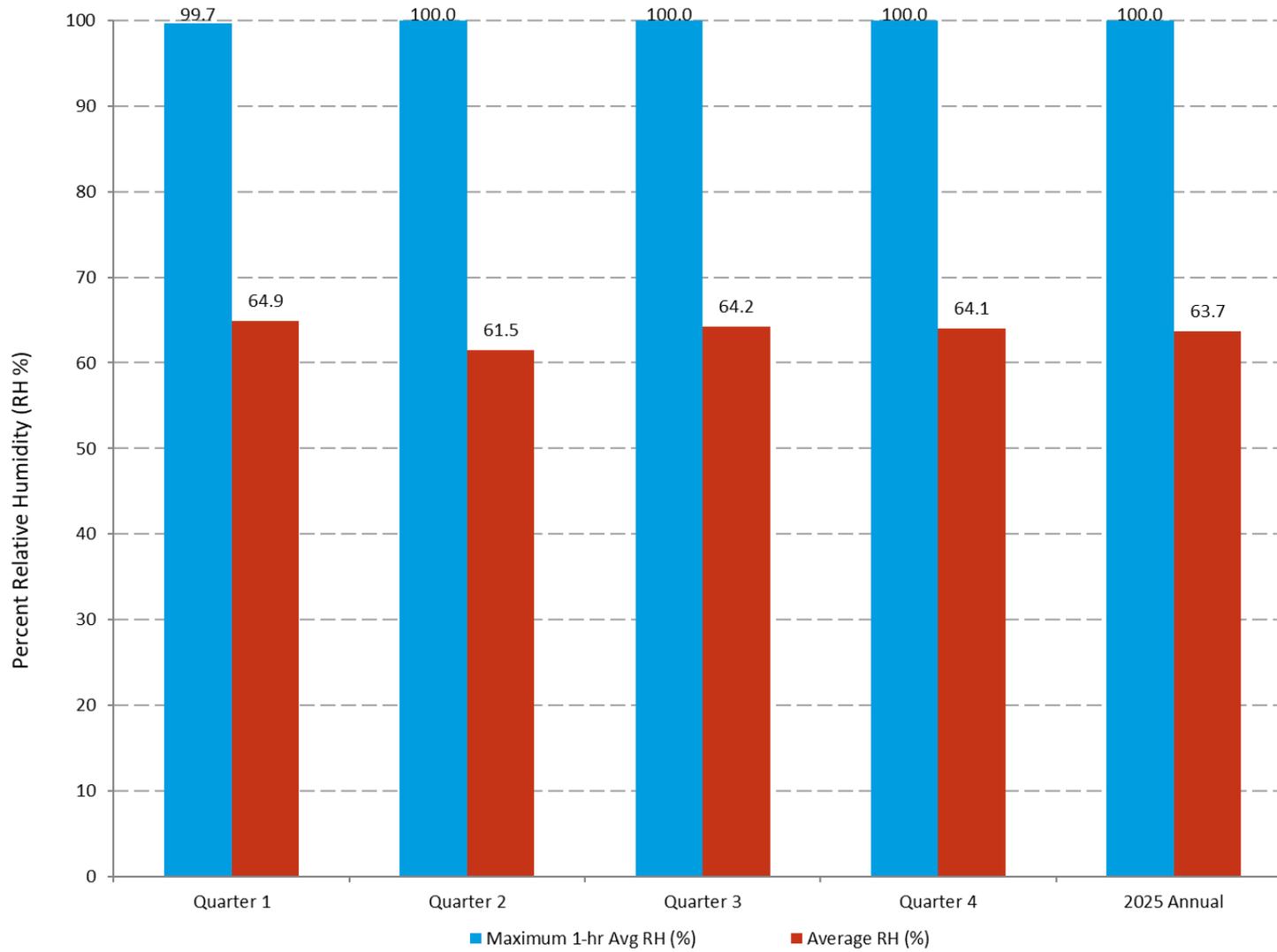


Figure 30. Orchard 2025 Relative Humidity Summary

6.7 Solar Radiation Data Summary

Solar Radiation data was collected at 2-m agl at all three stations using a cross-arm mounted sensor on the meteorology tower. At all three sites, the maximum 1-hour and average solar radiation measured occurred during Quarter 2. Maximum hourly average and quarterly average solar radiation for each quarter of 2025 and for the year at all three stations is summarized in [Figure 31](#) through [Figure 33](#) and [Table 11](#).

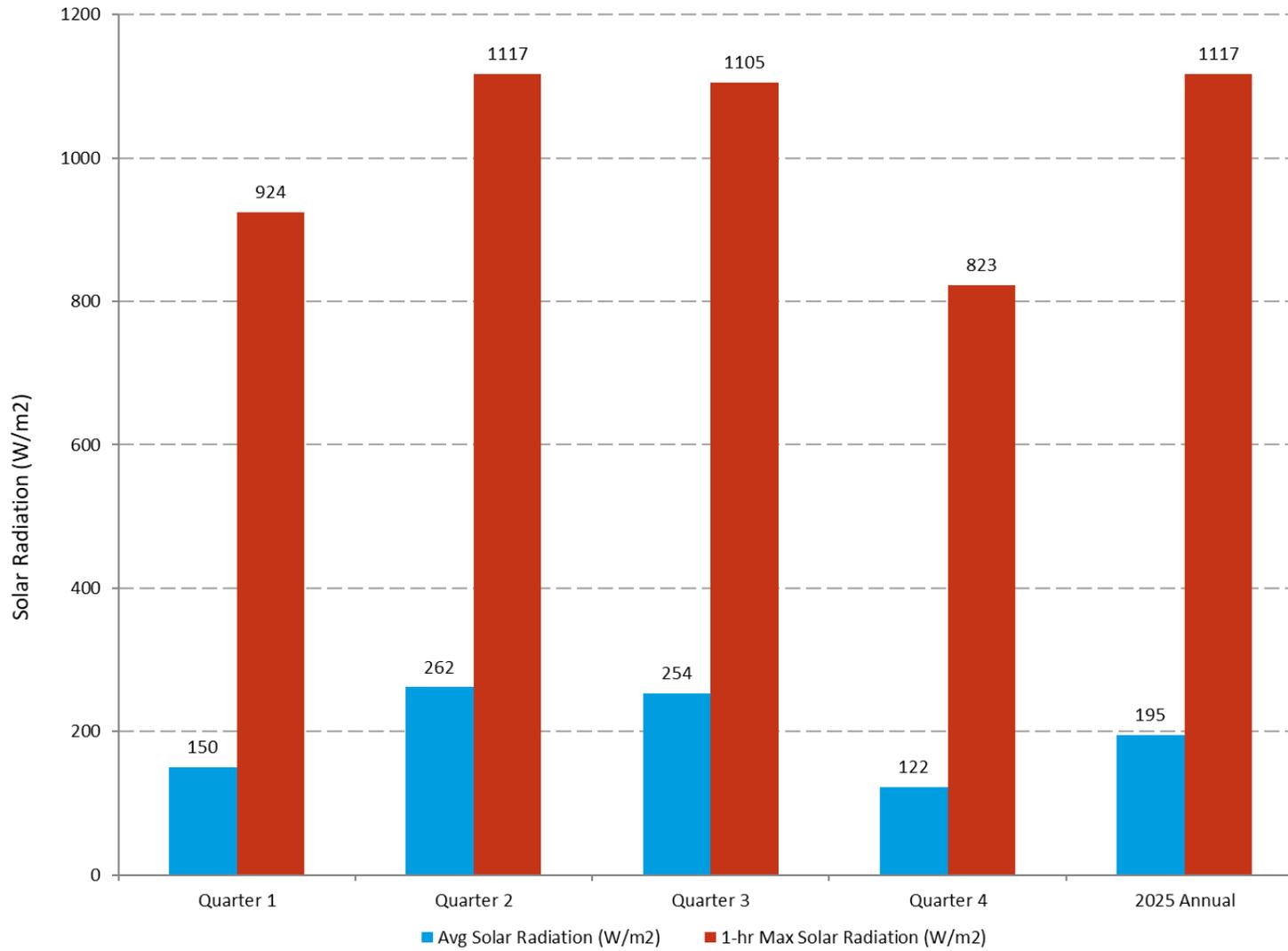


Figure 31. MSP 2025 Solar Radiation

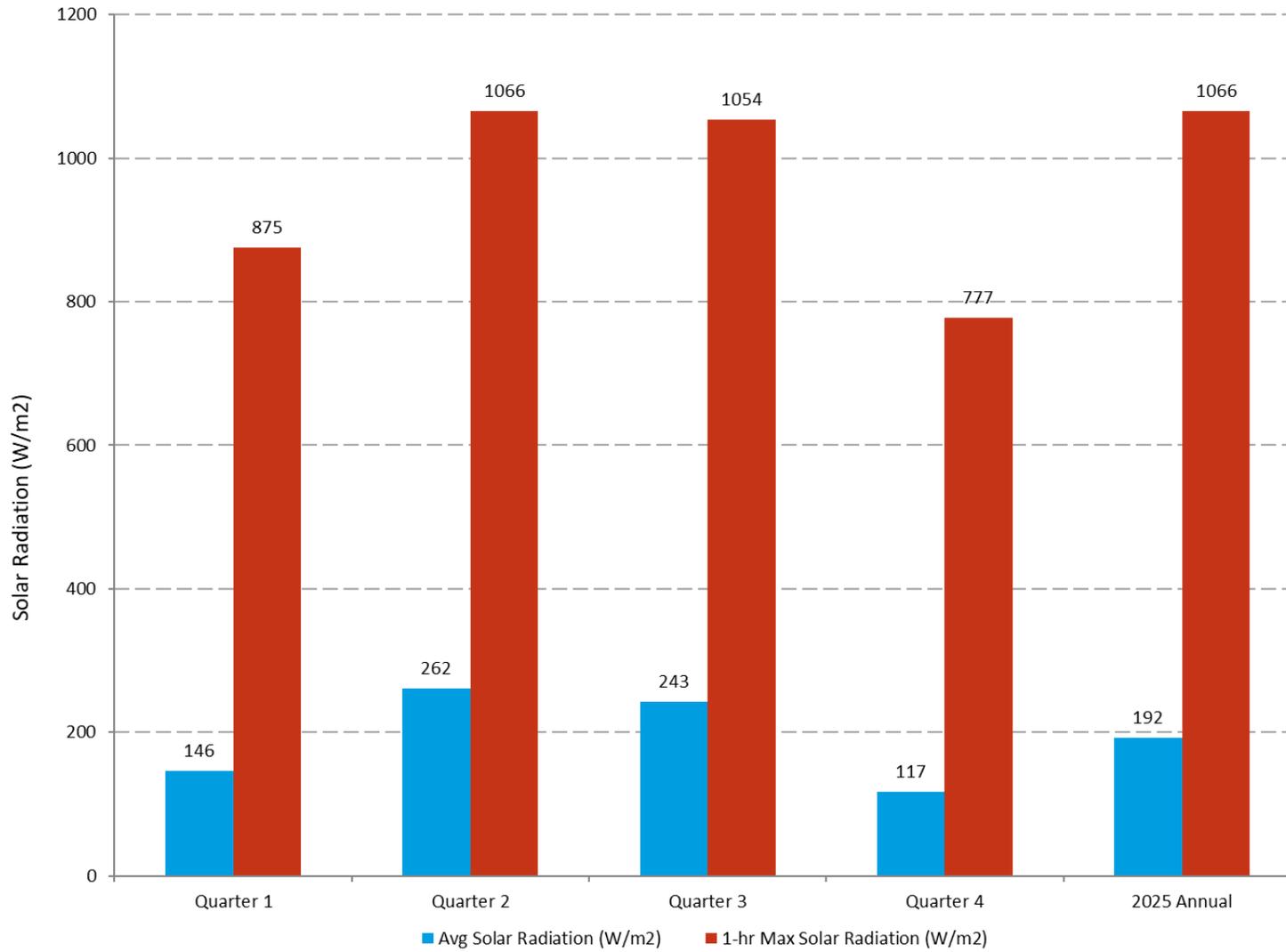


Figure 32. Hereford 2025 Solar Radiation Summary

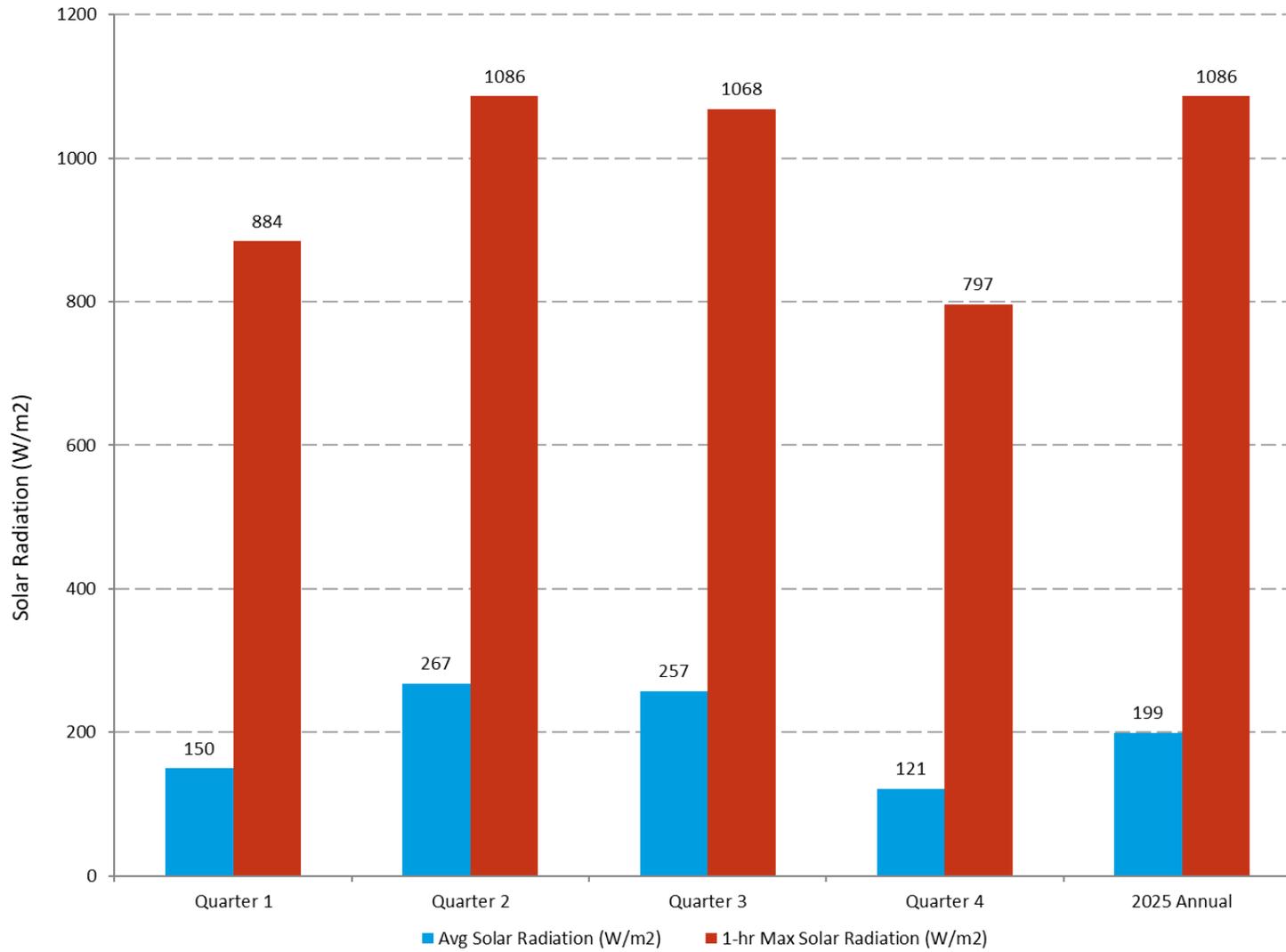


Figure 33. Orchard 2025 Solar Radiation Summary

7. ANNUAL REPORT DATA SUMMARY

Program activities conducted during 2025 included data collection, equipment programming and calibrations, station inspections, routine maintenance, equipment troubleshooting and repair, routine data acquisition, data screening and validation, audits, and report preparation. Data completeness goals were met for all parameters for all quarters, except for two: solar radiation at MSP in Q3 and precipitation at Orchard in Q4. For 2023, 2024, and 2025, data completeness for ozone for each station met the requirements of at least 90% for the ozone season.

Air quality data collected includes O₃ at all three stations and NO_x at the MSP station. The daily maximum 8-hour average O₃ concentrations were above the 2015 AAQS one time during the year at MSP, zero times at Hereford, and zero times at Orchard. The daily maximum 8-hour average O₃ concentrations were not above the 2008 AAQS for any site. Since more than three years of data have been collected, we can compare the three-year design values at each site to the AAQS. MSP, Hereford, and Orchard design values for the 2023-2025 period are 0.072 ppm, 0.069 ppm, and 0.067 ppm, respectively, see [Table 12](#) for more information. MSP is the only site with a 2023-2025 design value that exceeds either AAQS, which was the 2015 AAQS of 0.070 ppm.

The maximum 1-hr average concentration of NO₂ measured at MSP for 2025 was 45.5 ppb, which is below the AAQS standard of 100 ppb. The annual average NO₂ measured at MSP was 6.1 ppb, which is below the annual standard (53 ppb). The 1-hour average NO₂ standard is based on the 98th percentile of 1-hour daily maximum concentrations, averaged over 3-years. Since we did not meet data completeness for Q4 2024, a test design value was calculated per 40 CFR 50 Appendix S. The test design value was 44 ppb, which is lower than the 1-hour NO₂ NAAQS. Therefore, we can use the data collected to calculate a 2023-2025 design value, which is 41 ppb. The annual design value is 6 ppb. Both are below their respective AAQS. See [Table 13](#) and [Table 14](#) for the 1-hour and annual NO₂ design values.

Meteorological data were all within normal ranges for the area and season with the exception of precipitation, which was elevated for all sites when compared to 2021 and 2022, and similar to 2023 and 2024 which were also high precipitation years. While still within normal ranges, annual average 2 and 10m temperature at all three sites was higher than 2022 and 2023, but nearer to equal with 2021 and 2024 which were also relatively warm.

Table 12. Current Ozone Design Value, All Sites.

Site	4 th Highest Year 1, 2023 (ppm)	4 th Highest Year 2, 2024 (ppm)	4 th Highest Year 3, 2025 (ppm)	Design Value (2023-2025) (ppm)
MSP	0.069	0.080	0.068	0.072
Hereford	0.063	0.077	0.067	0.069
Orchard	0.064	0.072	0.066	0.067

Notes:

^[1] The O₃ standard is based on the three-year average of the fourth-highest daily maximum 8-hour O₃ average.

^[2] Orange highlighting means that the value is above the 2008 O₃ standard. Yellow highlighting means that the value is above the 2015 O₃ standard.

Table 13. Current 1-Hour NO₂ Design Value, MSP.

Period	98 th Percentile Year 1, 2023 (ppb)	98 th Percentile Year 2, 2024 (ppb)	98 th Percentile Year 3, 2025 (ppb)	Design Value 2023-2025 (ppb)
1-Hour	50.2	35.3	37.2	41

Table 14. Current Annual NO₂ Design Value, MSP.

Period	Design Value 2025 (ppb)
Annual	6

APPENDIX A: QUARTER 4 MATERIALS

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Project Number
1940118607-001

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WELD COUNTY MONITORING NETWORK

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1. QUARTER 4 SUMMARY

The Weld County Monitoring Network Quarter 4 2025 data tables and figures are presented in this appendix. Quarter 4 2025 data is presented as an abbreviated report to avoid reproducing efforts between a Quarter 4 report and an annual report. All tables and figures presenting monthly and quarterly data for Quarter 4 are presented here but no text descriptions are included. Gaseous tables are available in the main body report text. No major program or instrument changes were made during Quarter 4 2025. For a list of site instrumentation, see the main body text of the annual report.

The Quarter 4 2025 semi-annual calibration visits took place in late and mid-October, for gases and meteorology respectively. All parameters passed. The independent site audits, performed by the Colorado Department of Public Health & Environment and Air Resource Specialists, occurred in mid-November. All parameters passed their respective audits. Audit and calibration reports are available as Appendix B. In early October, the precipitation sensor at Orchard was found with a severed signal and heater cables which were assumed to have been chewed through by a rodent. The severed cables were spliced back together on October 15th. On October 30th ground-level cables were strung through a hard-sided conduit in order to protect them from further damage at MSP; the same was done at Hereford and Orchard on November 5th. Because of this, precipitation at Orchard did not meet data completeness goals for Quarter 4 2025. Next, on November 29th the ozone analyzer at Orchard began to produce lamp stability alarms and noisy data. On December 11th, Ramboll replaced the UV lamp on the Hereford ozone analyzer to solve the issue. Multi-point checks were performed before the lamp replacement, and again on December 12th as a post-maintenance check to confirm data validity. Corrective action reports for Quarter 4 2025 are available as Appendix A4.

Below are the Quarter 4 data completeness statistics, air quality data summaries, and meteorological data summaries. Also available are the data invalidation periods, site visitation log, and corrective action reports.

Table 1. Fourth Quarter 2025 Data Completeness for Continuous Measurement Devices

Measurement	Time Period	Completeness Target ^[1-6]	Site Completeness				Target Met? (Y/N)
			Oct	Nov	Dec	Q4 2024	
Missile Site Park							
NO ₂ ^[1]	Quarterly	≥75%	92%	93%	95%	93%	Yes
NO _x , NO	N/A	N/A	92%	93%	95%	93%	N/A
O ₃ ^[1]	O ₃ Season	≥90%	90%	97%	100%	96%	N/A
Wind Direction ^[2]	Quarterly	≥90%	100%	100%	100%	100%	Yes
Wind Speed ^[2]	Quarterly	≥90%	100%	100%	100%	100%	Yes
Temperature ^[2]	Quarterly	≥90%	100%	100%	100%	100%	Yes
Delta Temperature ^[2]	Quarterly	≥90%	100%	100%	100%	100%	Yes
Relative Humidity	Quarterly	≥90%	100%	100%	100%	100%	Yes
Solar Radiation ^[2]	Quarterly	≥90%	100%	100%	100%	100%	Yes
Barometric Pressure ^[2]	Quarterly	≥90%	100%	100%	100%	100%	Yes
Precipitation ^[2]	Quarterly	≥90%	99%	100%	100%	100%	Yes
Hereford							
O ₃ ^[1]	O ₃ Season	≥90%	97%	93%	97%	96%	N/A
Wind Direction ^[2]	Quarterly	≥90%	100%	99%	100%	100%	Yes
Wind Speed ^[2]	Quarterly	≥90%	100%	99%	100%	100%	Yes
Temperature ^[2]	Quarterly	≥90%	100%	99%	100%	100%	Yes
Delta Temperature ^[2]	Quarterly	≥90%	100%	99%	100%	100%	Yes
Relative Humidity	Quarterly	≥90%	100%	99%	100%	100%	Yes
Solar Radiation ^[2]	Quarterly	≥90%	100%	99%	100%	100%	Yes
Barometric Pressure ^[2]	Quarterly	≥90%	100%	100%	100%	100%	Yes

Measurement	Time Period	Completeness Target ^[1-6]	Site Completeness				Target Met? (Y/N)
			Oct	Nov	Dec	Q4 2024	
Precipitation ^[2]	Quarterly	≥90%	99%	99%	100%	100%	Yes
Orchard							
O ₃ ^[1,5]	O ₃ Season	≥90%	97%	100%	100%	99%	N/A
Wind Direction ^[2]	Quarterly	≥90%	100%	100%	100%	100%	Yes
Wind Speed ^[2]	Quarterly	≥90%	100%	100%	100%	100%	Yes
Temperature ^[2]	Quarterly	≥90%	100%	100%	100%	100%	Yes
Delta Temperature ^[2]	Quarterly	≥90%	100%	100%	100%	100%	Yes
Relative Humidity	Quarterly	≥90%	100%	100%	100%	100%	Yes
Solar Radiation ^[2]	Quarterly	≥90%	100%	100%	100%	100%	Yes
Barometric Pressure ^[2]	Quarterly	≥90%	100%	100%	100%	100%	Yes
Precipitation ^[2]	Quarterly	≥90%	52%	99%	100%	84%	No

Notes:

^[1] USEPA Quality Assurance Handbook for Air Pollution Measurement Systems (Volume II Ambient Air Quality Monitoring Program) recommends three consecutive response concentrations be within +/- 15% of the audit concentration for quarterly audits. For bi-weekly QC checks acceptable monitor responses are +/-15.1% for NO₂ and 7.1% for O₃. The data completeness target for NO₂ is ≥75%; there is no data completeness target for NO or NO_x. For O₃ the data completeness target is 90% of daily maximum 8-hour averages during the ozone season. In Colorado, the Ozone season is January through December (https://aqs.epa.gov/aqsweb/documents/codetables/ozone_seasons.html).

^[2] Table 0-10, USEPA Quality Assurance Handbook for Air Pollution Measurement Systems (Volume IV: Meteorological Measurements, Version 2.0). Temperature is measured at 2 meters above ground level.

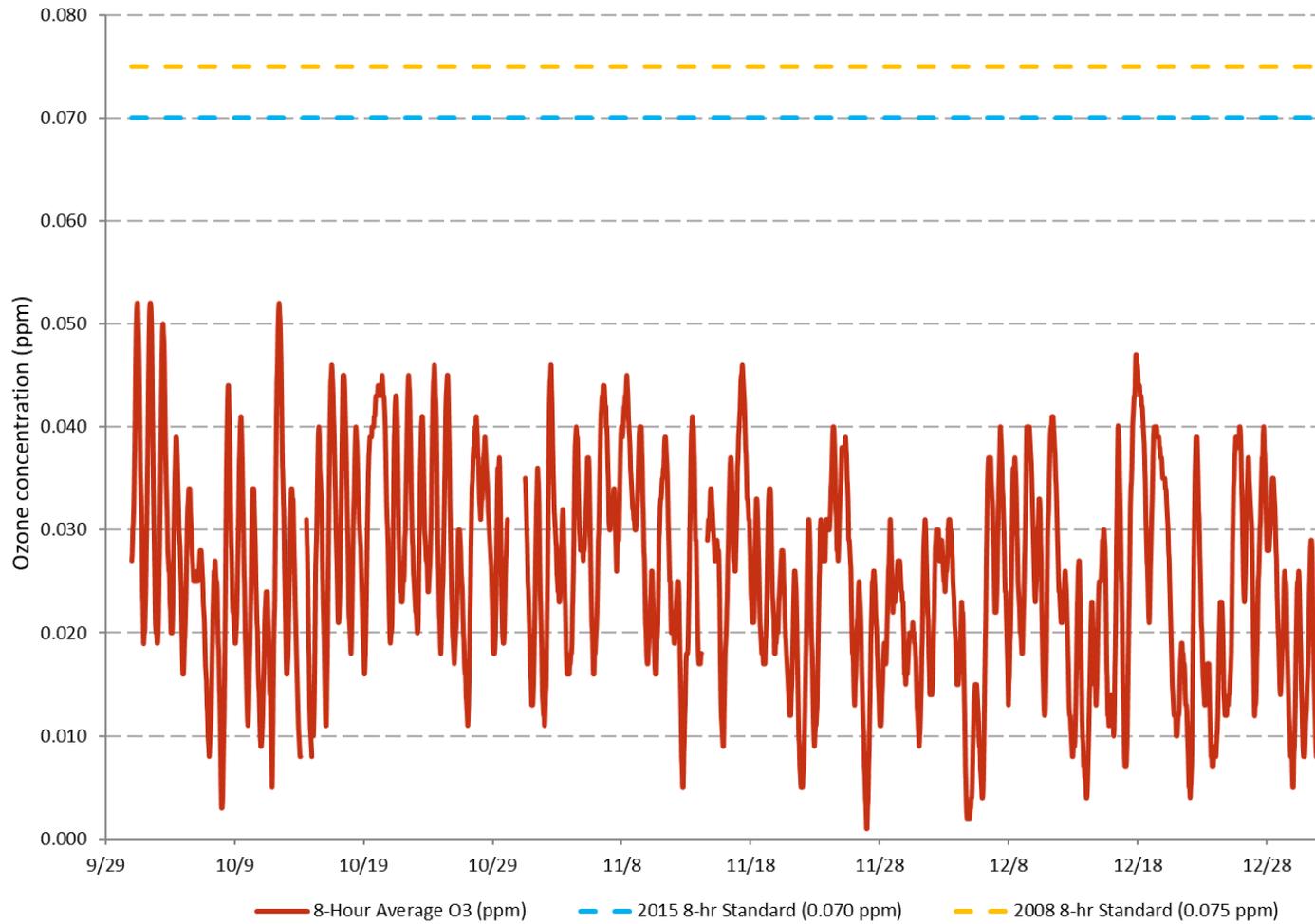


Figure 1. MSP Q4 2025 Rolling 8-hour Averaged O₃

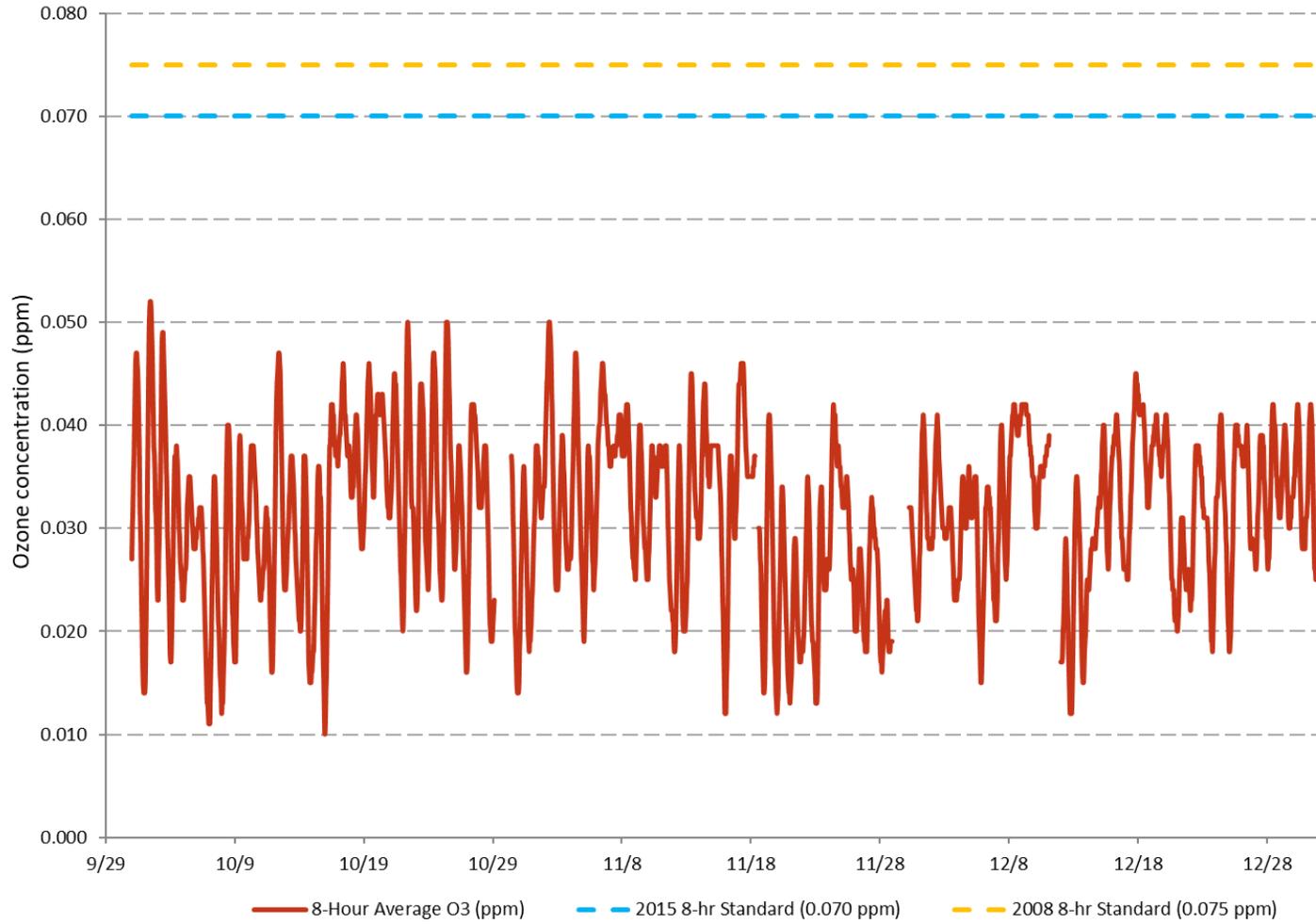


Figure 2. Hereford Q4 2025 Rolling 8-hour Averaged O₃

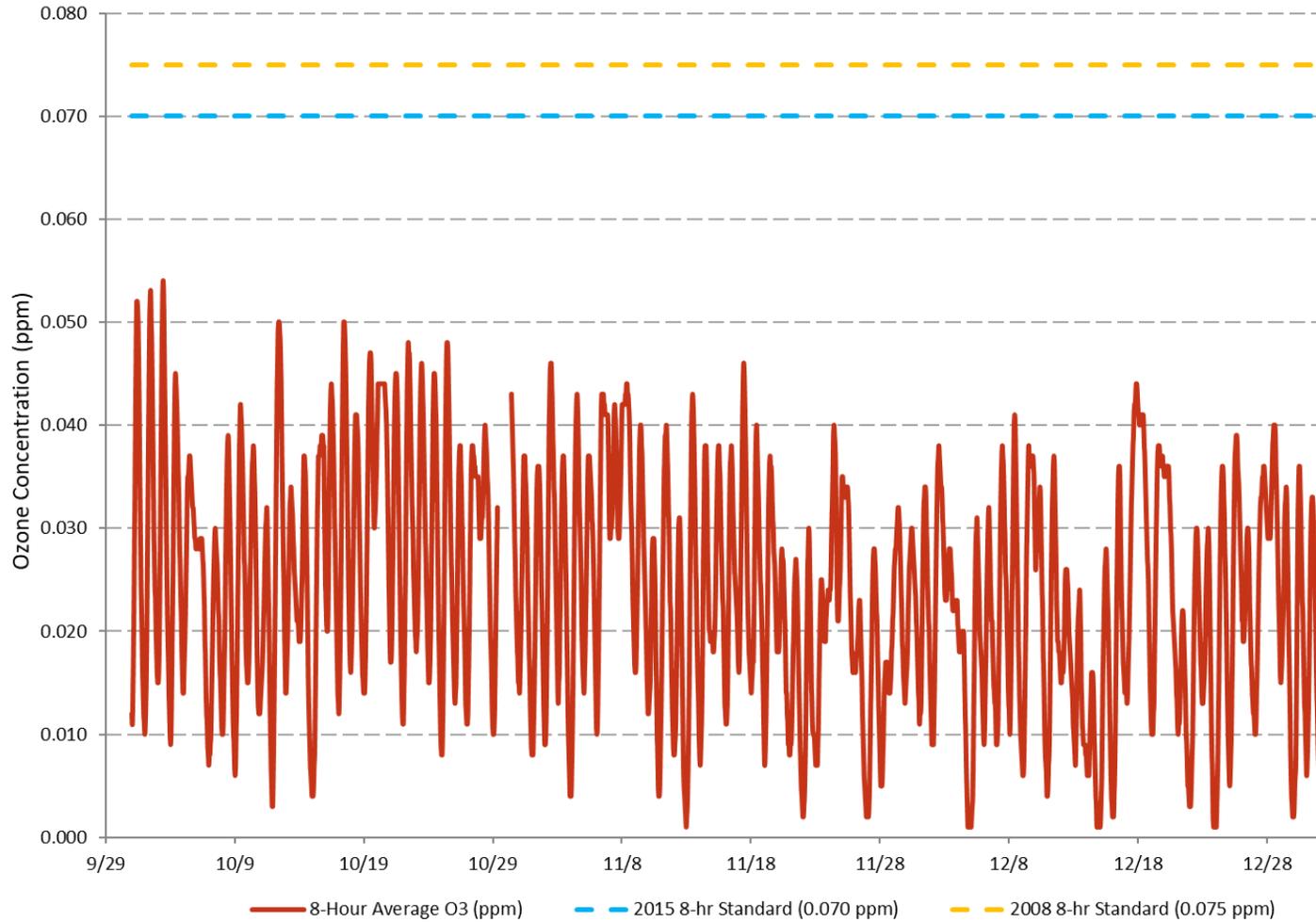


Figure 3. Orchard Q4 2025 Rolling 8-hour Averaged O₃

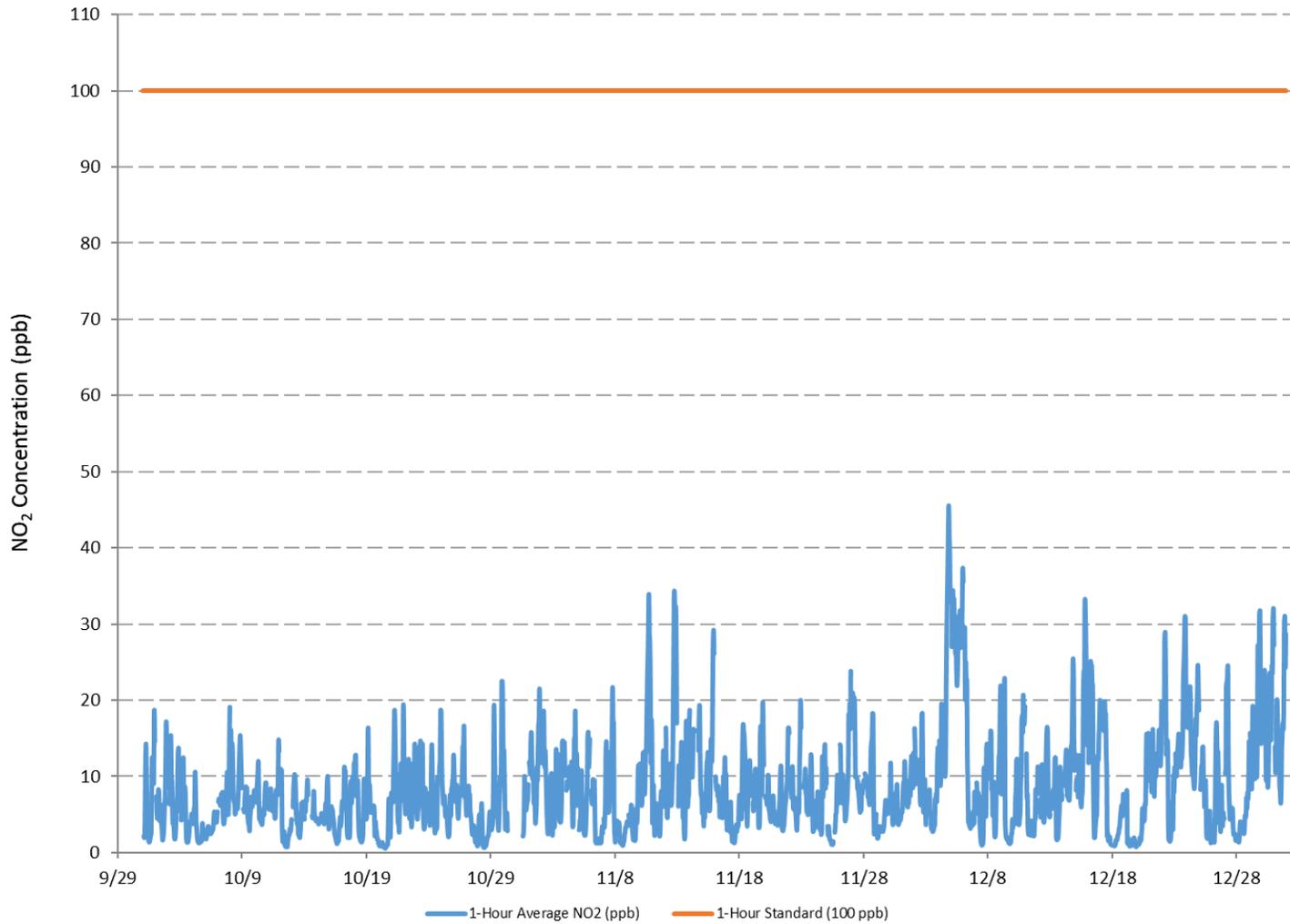


Figure 4. MSP Q4 2025 NO₂ 1-Hour Summary

Records: 2208
Calms: 5 (0.2%)
Missing: 4 (0.2%)
Avg Speed: 2.9
Max Speed: 15.9

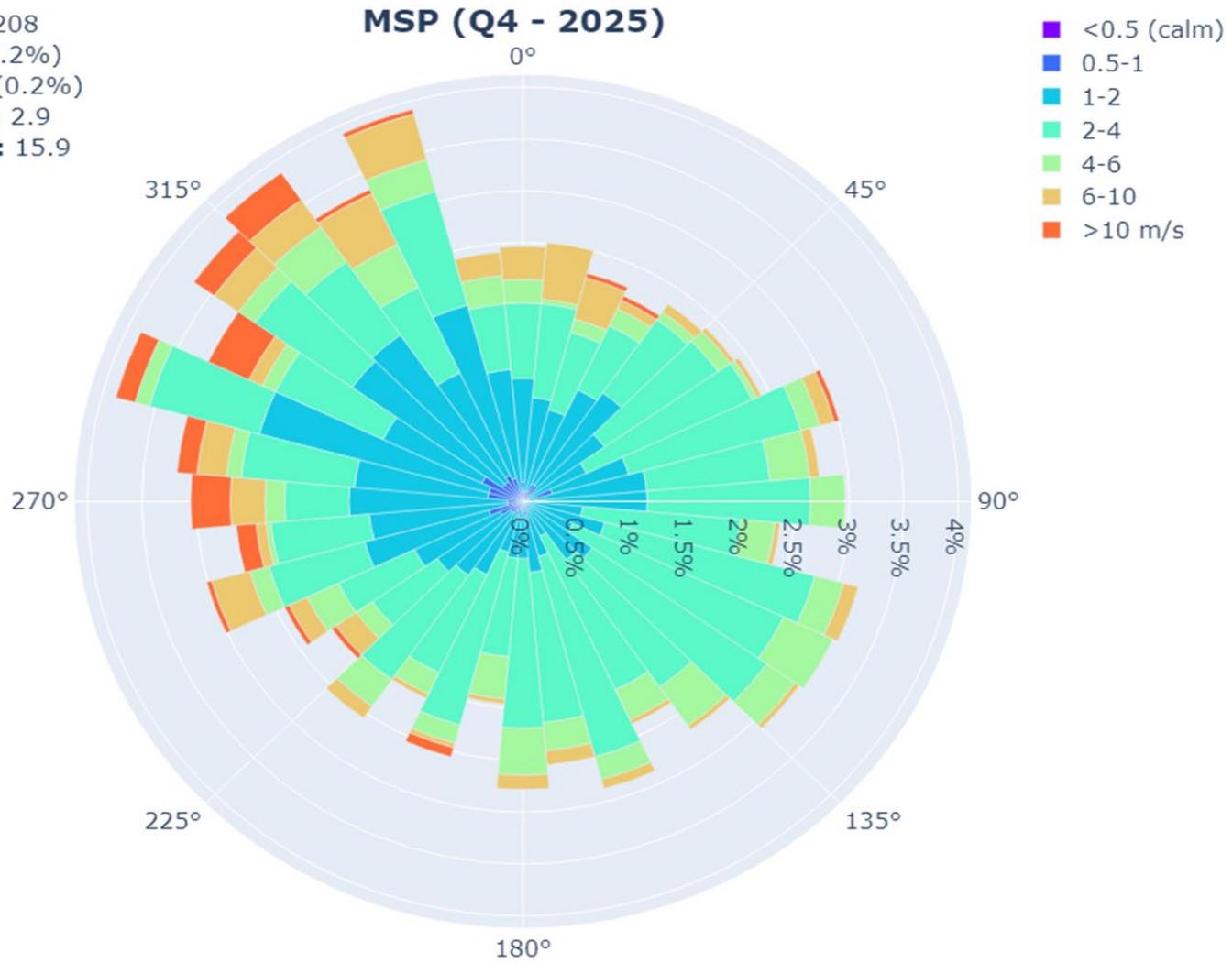


Figure 5. MSP Q4 2025 Wind Rose

Records: 2208
Calms: 5 (0.2%)
Missing: 6 (0.3%)
Avg Speed: 4.7
Max Speed: 21.2

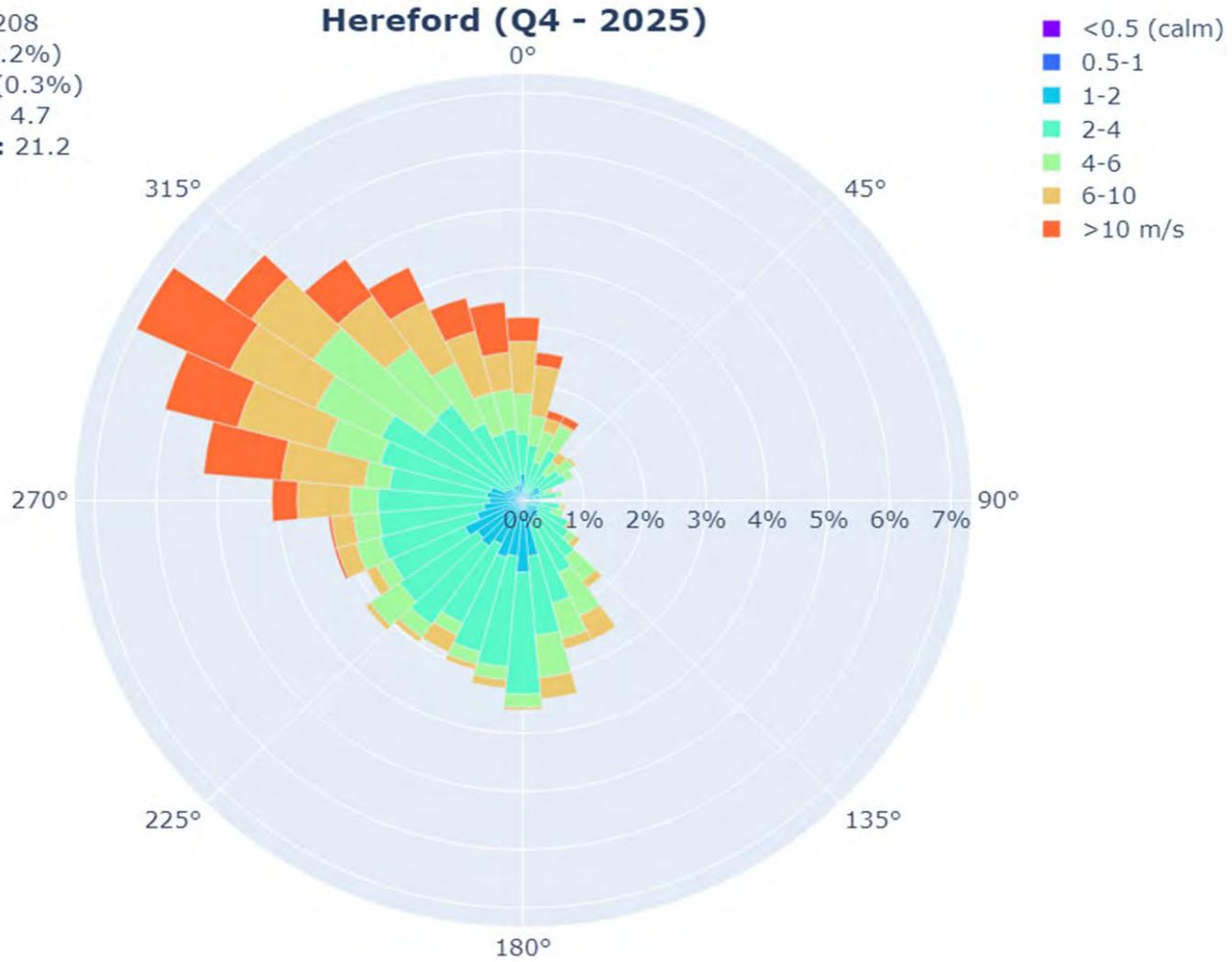


Figure 6. Hereford Q4 2025 Wind Rose

Records: 2208
Calms: 8 (0.4%)
Missing: 4 (0.2%)
Avg Speed: 3.1
Max Speed: 17.9

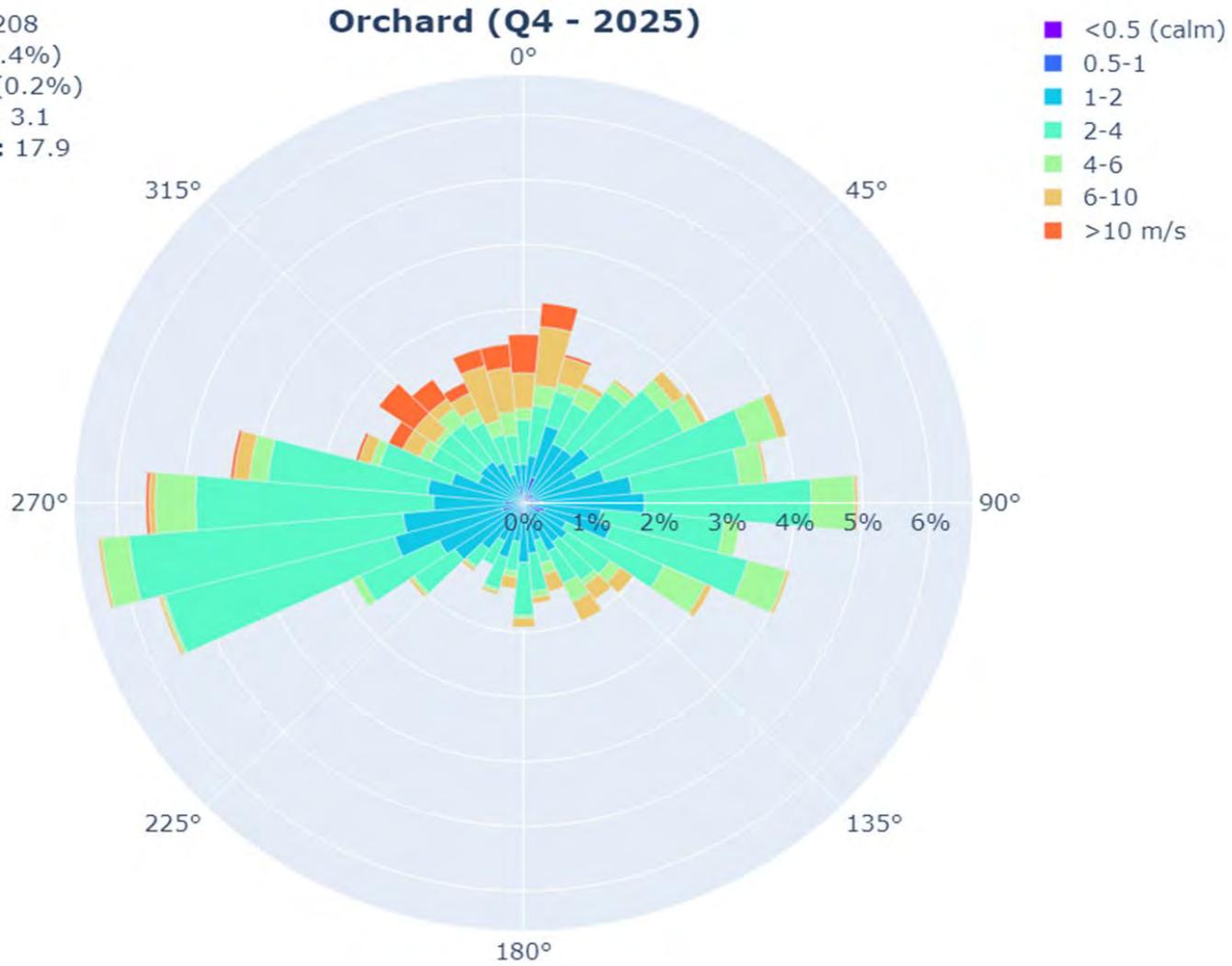


Figure 7. Orchard Q4 2025 Wind Rose

Table 2. Fourth Quarter 2025 Meteorological Data Summary

Parameter	Units	Form	October ^[1]	November ^[1]	December ^[1]
Missile Site Park					
2-M Temperature	°C	Monthly Average	11.5	7.0	4.1
		Maximum Hourly Average	29.6	26.1	22.6
		Minimum Hourly Average	-4.9	-11.0	-12.6
10-M Temperature	°C	Monthly Average	11.7	7.4	4.8
		Maximum Hourly Average	28.6	25.2	21.9
		Minimum Hourly Average	-4.3	-10.8	-11.7
Delta Temperature	°C	Monthly Average	0.2	0.5	0.7
		Maximum Hourly Average	3.1	3.8	4.0
		Minimum Hourly Average	-1.7	-1.7	-1.0
10-M Horizontal Wind Speed	m/s	Monthly Average	2.8	2.7	3.4
		Maximum Hourly Average	13.5	11.9	15.9
2-M Relative Humidity	Percent	Monthly Average	58.3	52.0	54.7
		Maximum Hourly Average	100.0	100.0	100.0
Station Barometric Pressure	mm Hg	Monthly Average	636.7	636.9	635.2
		Maximum Hourly Average	647.7	646.6	645.1
Station Precipitation	in	Monthly Total	0.356	0.052	0.227

Parameter	Units	Form	October ^[1]	November ^[1]	December ^[1]
	in/hr	Maximum Hourly Total	0.110	0.016	0.035
2-M Solar Radiation	W/m ²	Monthly Average	160	112	93
		Maximum Hourly Average	823	626	530
Hereford					
2-M Temperature	°C	Monthly Average	9.7	5.1	3.1
		Maximum Hourly Average	28.2	25.1	21.0
		Minimum Hourly Average	-9.2	-16.5	-15.6
10-M Temperature	°C	Monthly Average	10.3	6.0	4.2
		Maximum Hourly Average	27.3	24.7	20.6
		Minimum Hourly Average	-6.9	-14.1	-13.7
Delta Temperature	°C	Monthly Average	0.6	0.8	1.1
		Maximum Hourly Average	6.6	6.8	8.8
		Minimum Hourly Average	-1.5	-1.5	-1.0
10-M Horizontal Wind Speed	m/s	Monthly Average	4.2	4.4	5.4
		Maximum Hourly Average	21.2	16.2	21.0
2-M Relative Humidity	Percent	Monthly Average	63.3	56.3	54.7
		Maximum Hourly Average	100.0	100.0	100.0
	mm Hg	Monthly Average	628.7	628.7	626.8

Parameter	Units	Form	October ^[1]	November ^[1]	December ^[1]
Station Barometric Pressure		Maximum Hourly Average	638.7	637.6	636.5
Station Precipitation	in	Monthly Total	0.322	0.254	0.044
	in/hr	Maximum Hourly Total	0.095	0.079	0.020
2-M Solar Radiation	W/m ²	Monthly Average	160	107	85
		Maximum Hourly Average	777	638	533
Orchard					
2-M Temperature	°C	Monthly Average	10.3	4.4	1.1
		Maximum Hourly Average	30.6	27.3	22.4
		Minimum Hourly Average	-11.5	-14.7	-17.6
10-M Temperature	°C	Monthly Average	11.3	5.7	2.5
		Maximum Hourly Average	29.6	26.4	22.0
		Minimum Hourly Average	-9.2	-12.7	-15.6
Delta Temperature	°C	Monthly Average	1.0	1.2	1.4
		Maximum Hourly Average	7.0	7.7	7.3
		Minimum Hourly Average	-1.7	-1.5	-1.8
10-M Horizontal Wind Speed	m/s	Monthly Average	3.3	3.1	3.0
		Maximum Hourly Average	17.9	15.7	17.8
	Percent	Monthly Average	63.6	62.1	66.5

Parameter	Units	Form	October ^[1]	November ^[1]	December ^[1]
2-M Relative Humidity		Maximum Hourly Average	100.0	100.0	100.0
Station Barometric Pressure	mm Hg	Monthly Average	648.6	648.9	647.4
		Maximum Hourly Average	660.0	658.9	657.9
Station Precipitation	in	Monthly Total	0.076	0.345	0.159
	in/hr	Maximum Hourly Total	0.032	0.051	0.071
2-M Solar Radiation	W/m ²	Monthly Average	161	113	88
		Maximum Hourly Average	797	625	530
^[1] There are small differences in precision relative to the finalized valid data due to rounding.					

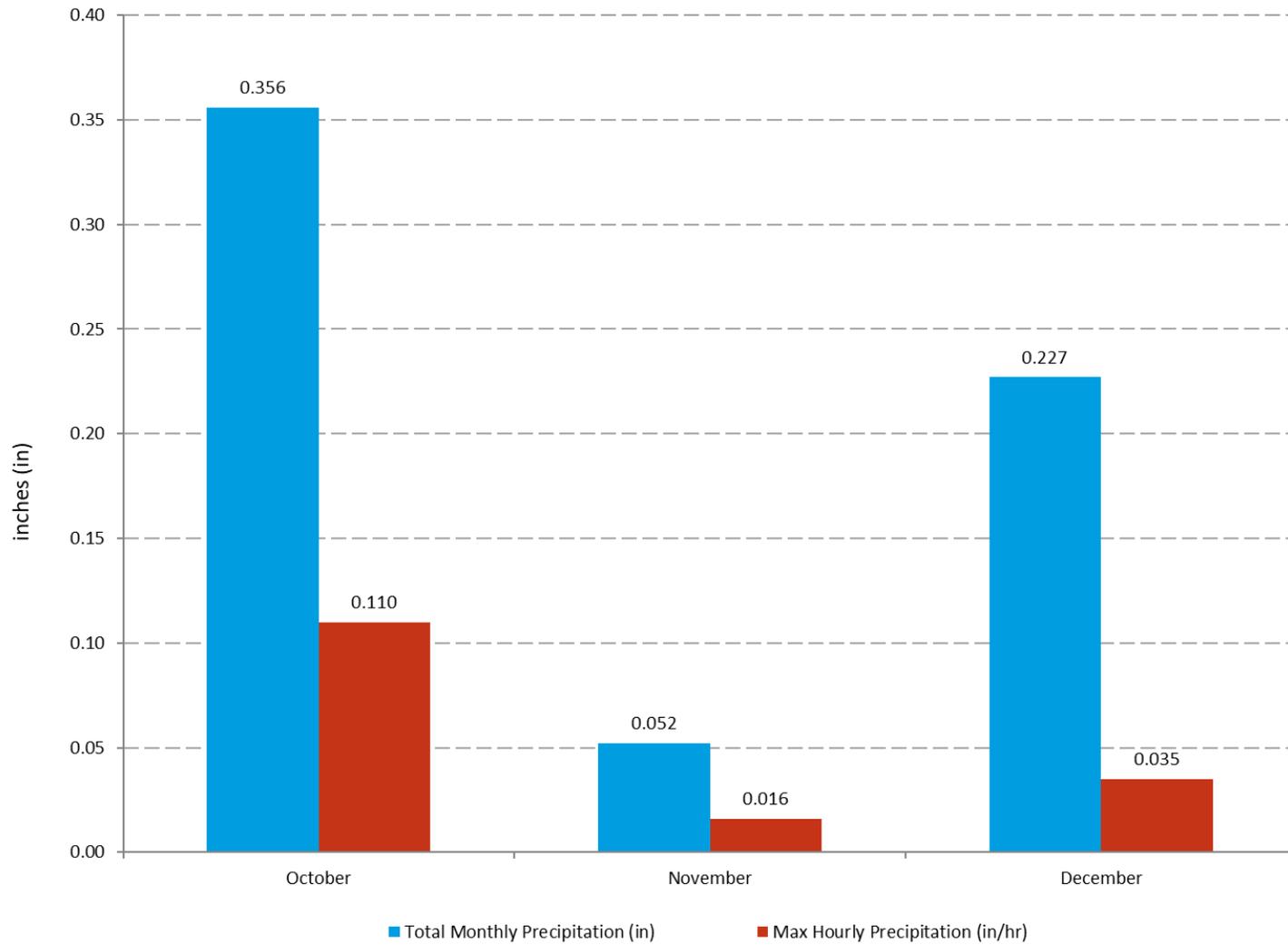


Figure 8. MSP Q4 2025 Precipitation Summary

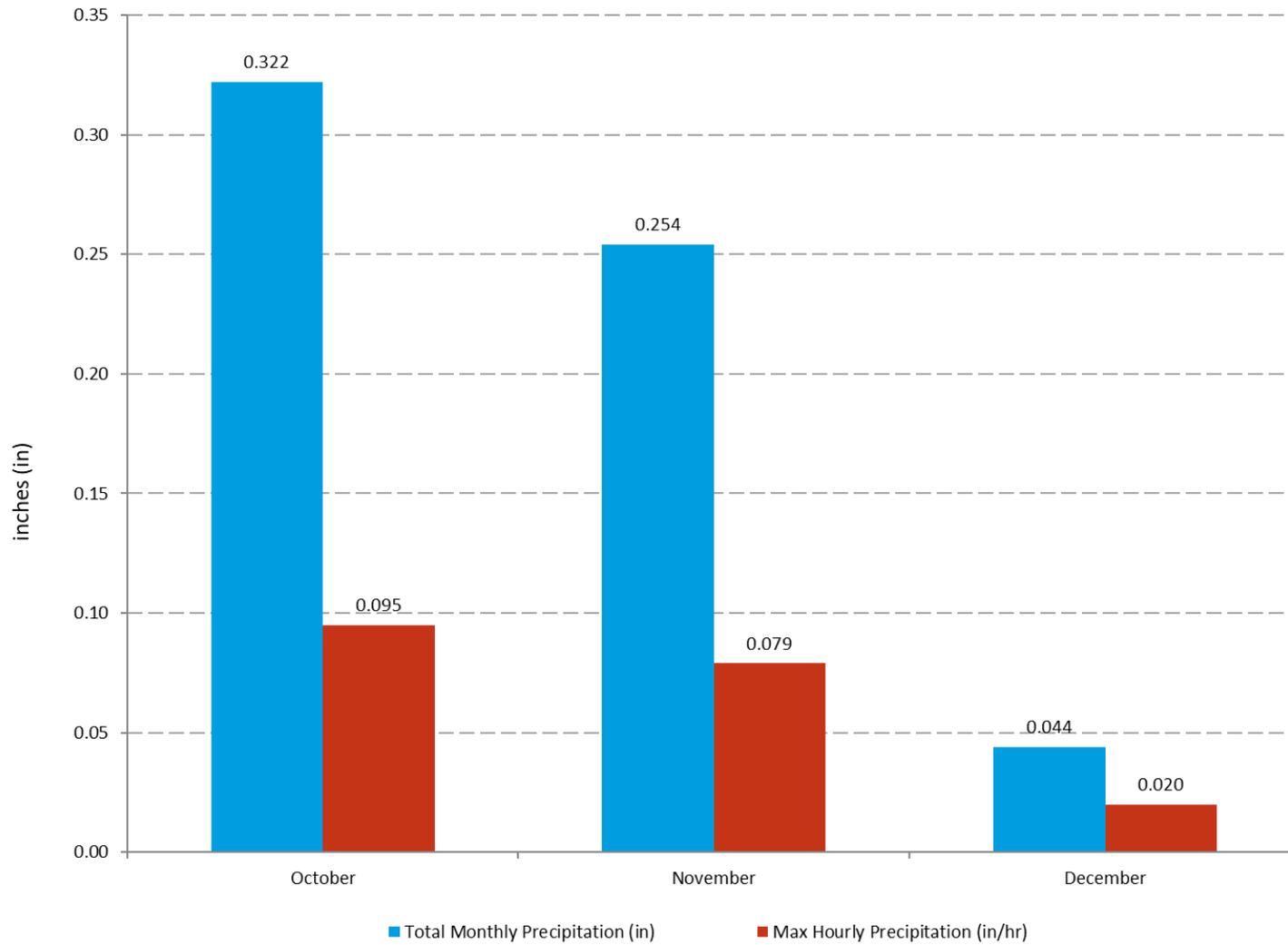


Figure 9. Hereford Q4 2025 Precipitation Summary

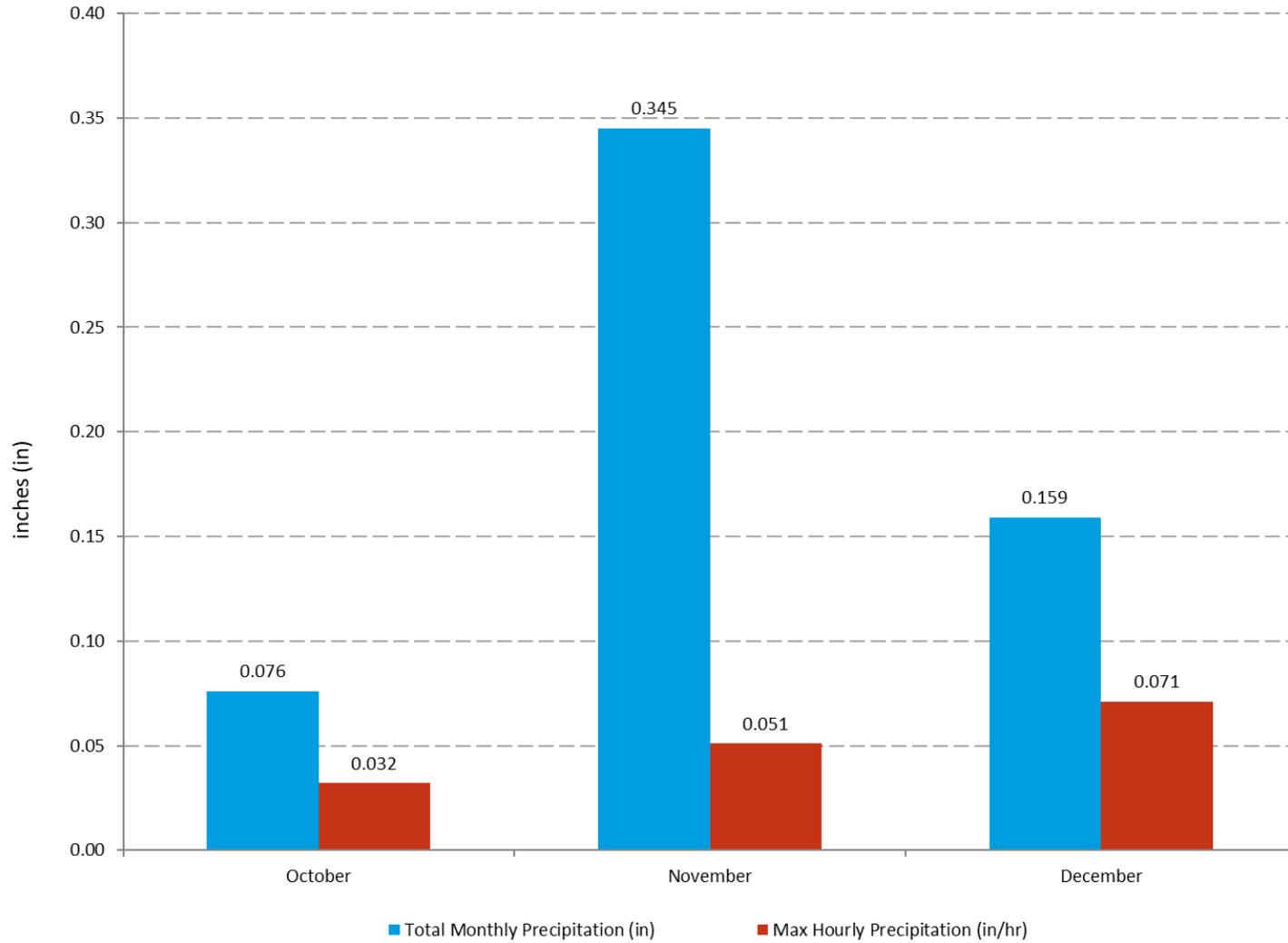


Figure 10. Orchard Q4 2025 Precipitation Summary

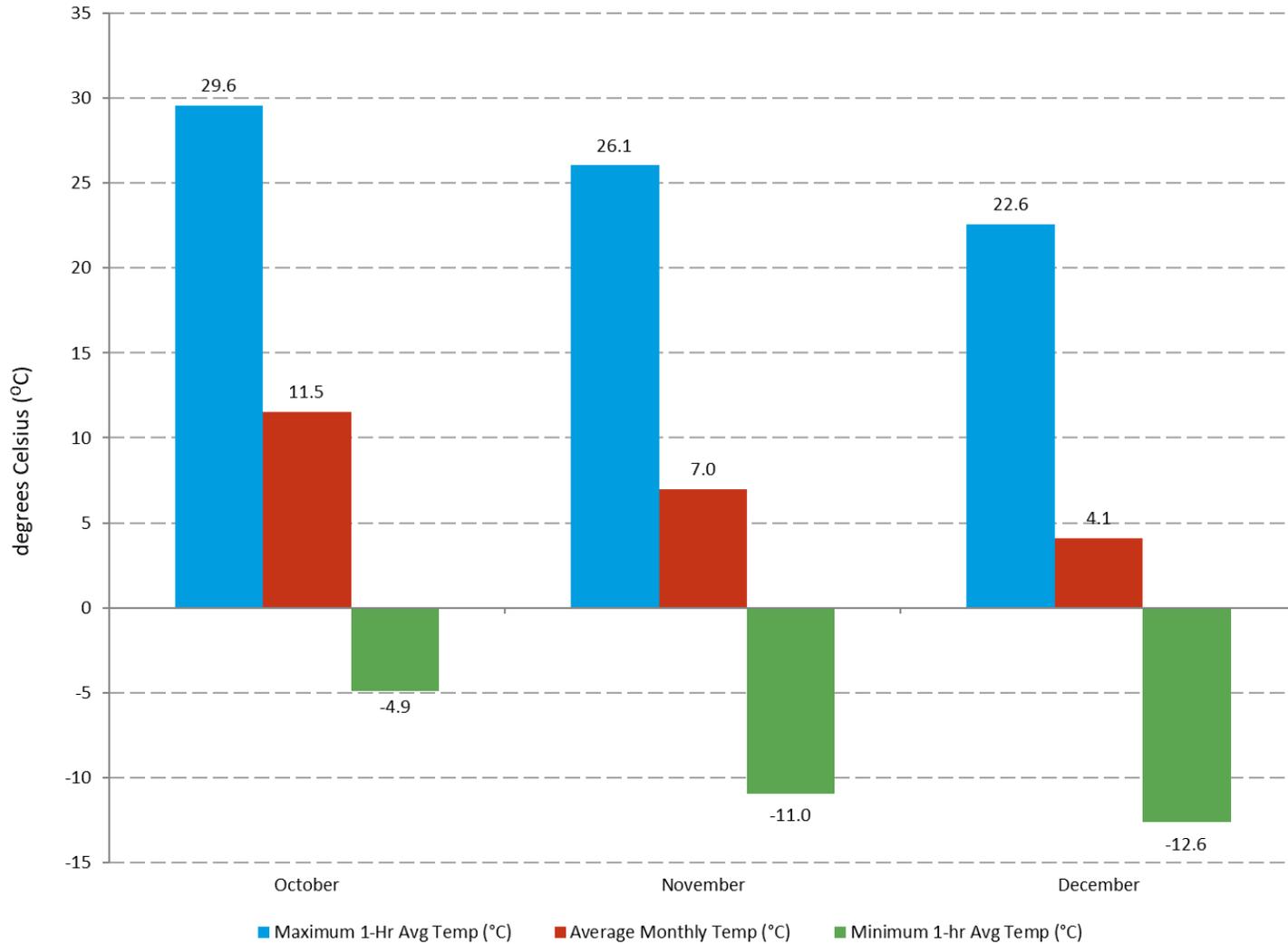


Figure 11. MSP Q4 2025 2-Meter Temperature Summary

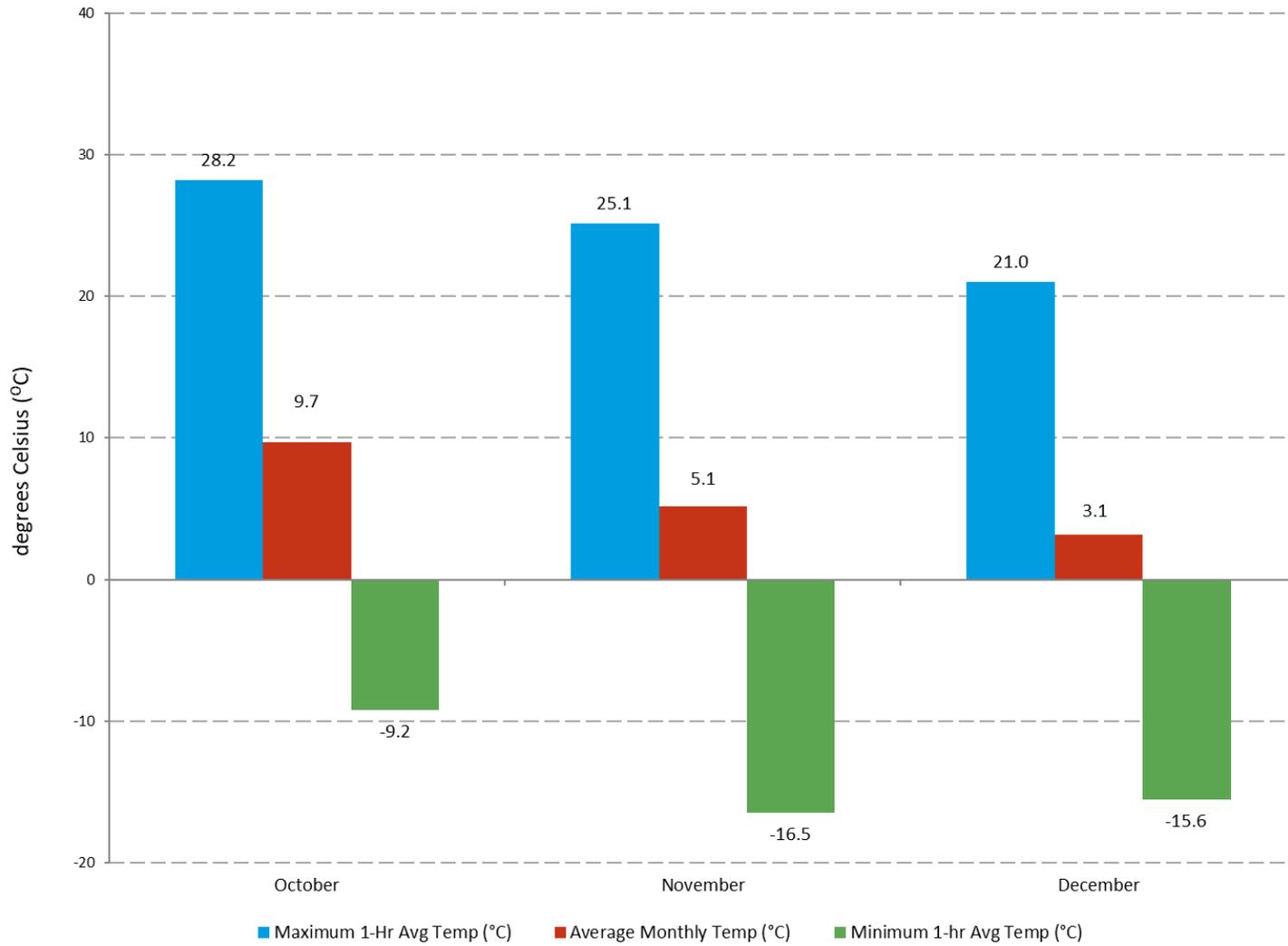


Figure 12. Hereford Q4 2025 2-Meter Temperature Summary

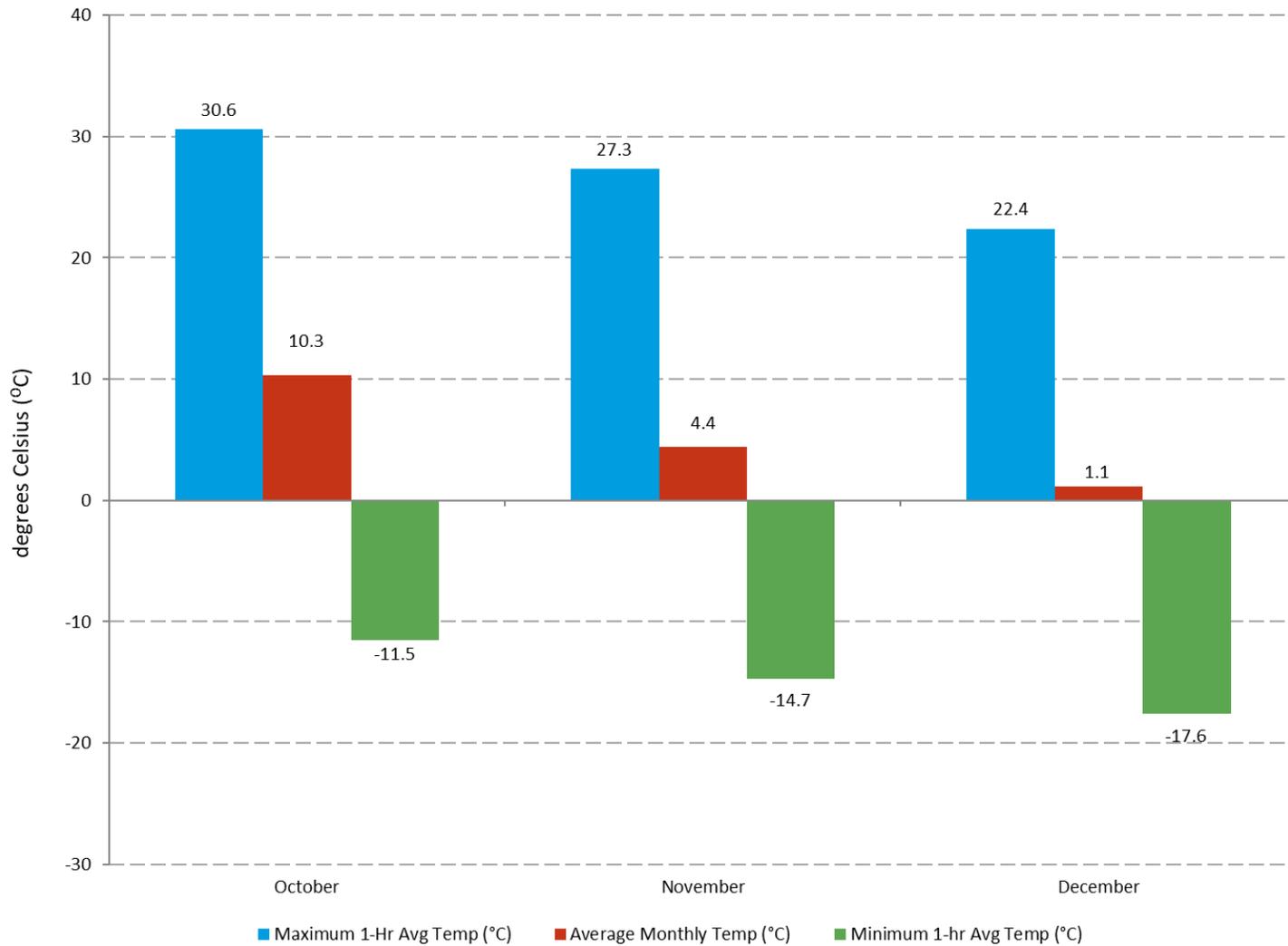


Figure 13. Orchard Q4 2025 2-Meter Temperature Summary

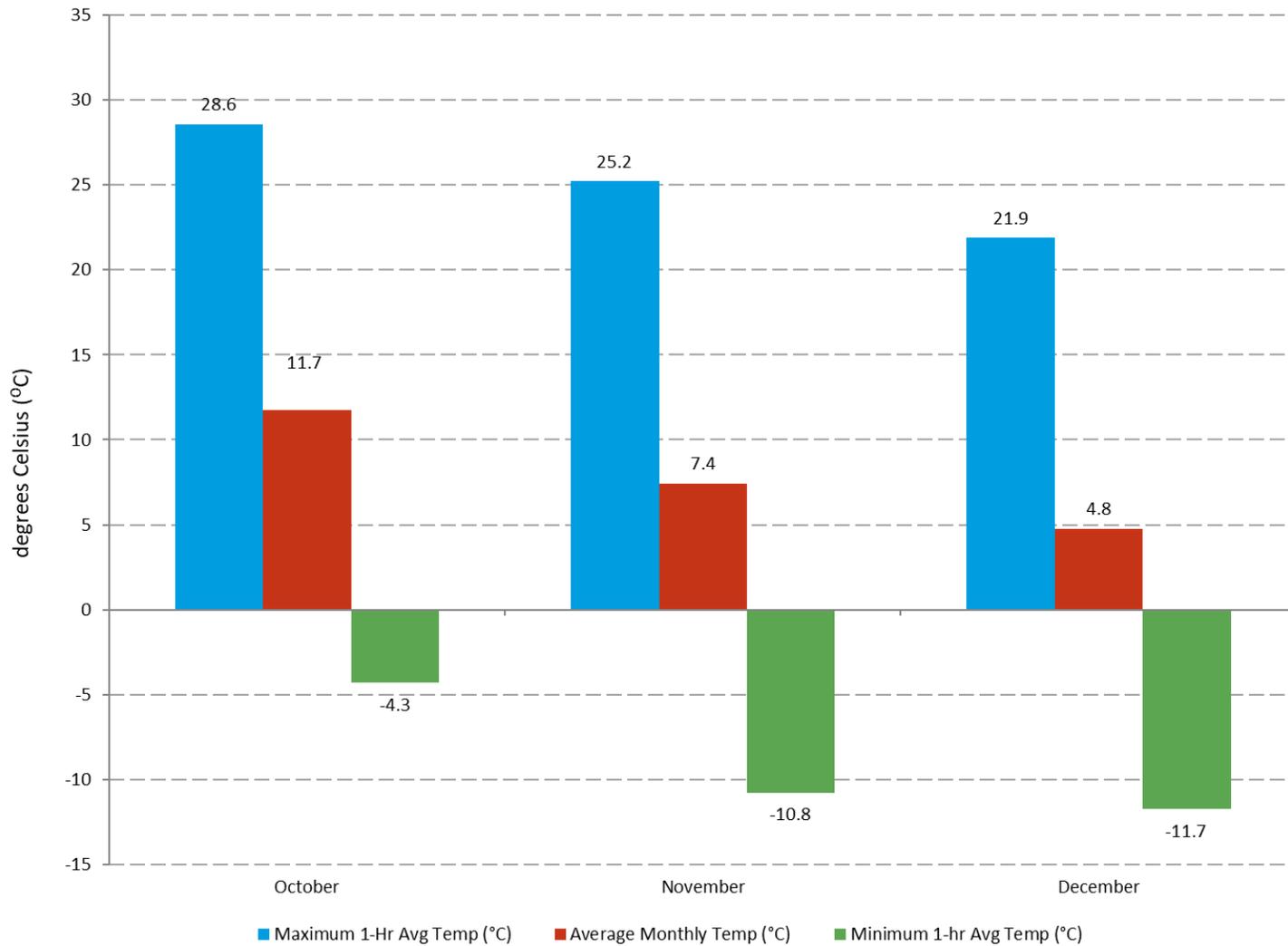


Figure 14. MSP Q4 2025 10-Meter Temperature Summary

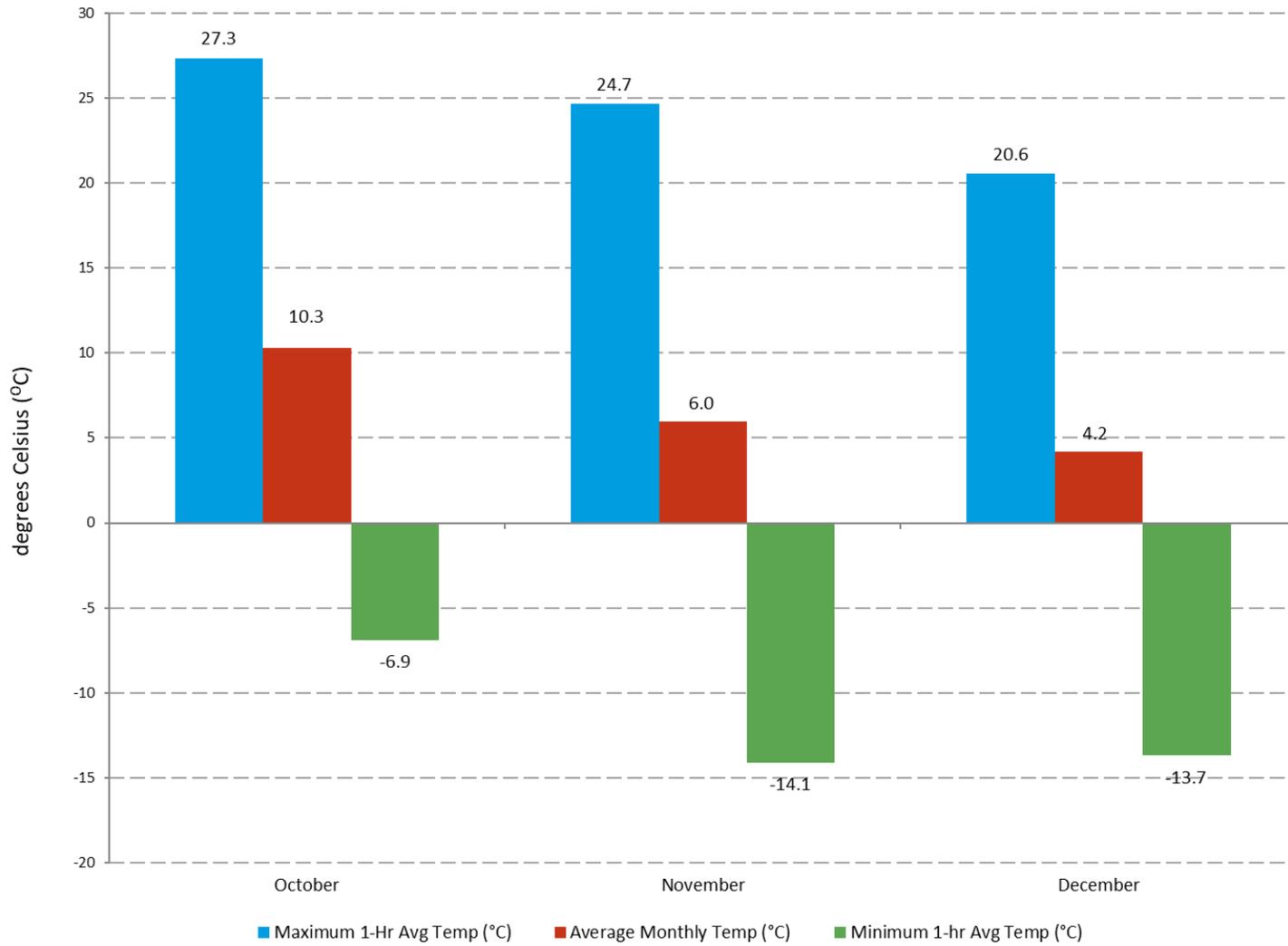


Figure 15. Hereford Q4 2025 10-Meter Temperature Summary

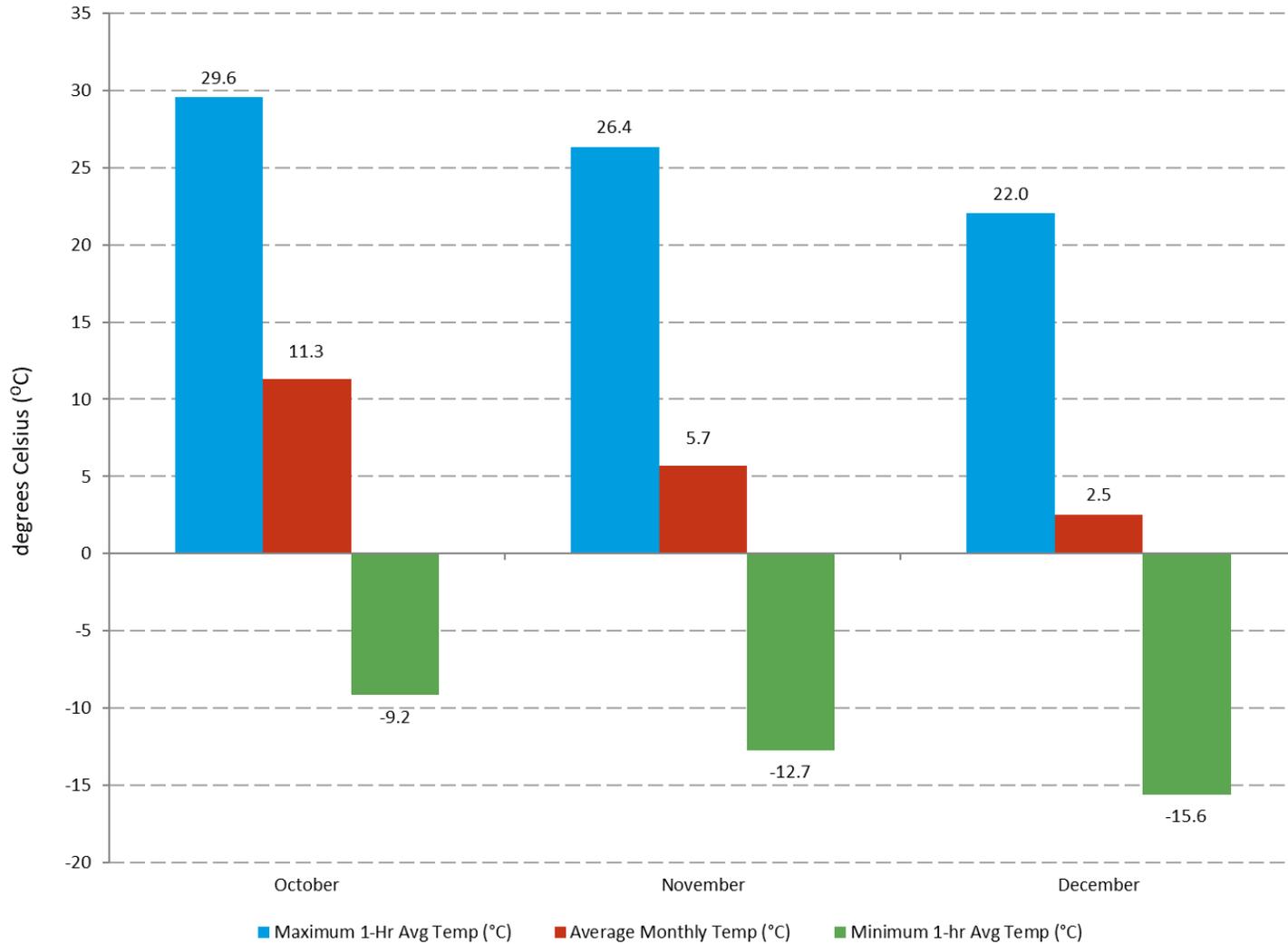


Figure 16. Orchard Q4 2025 10-Meter Temperature Summary

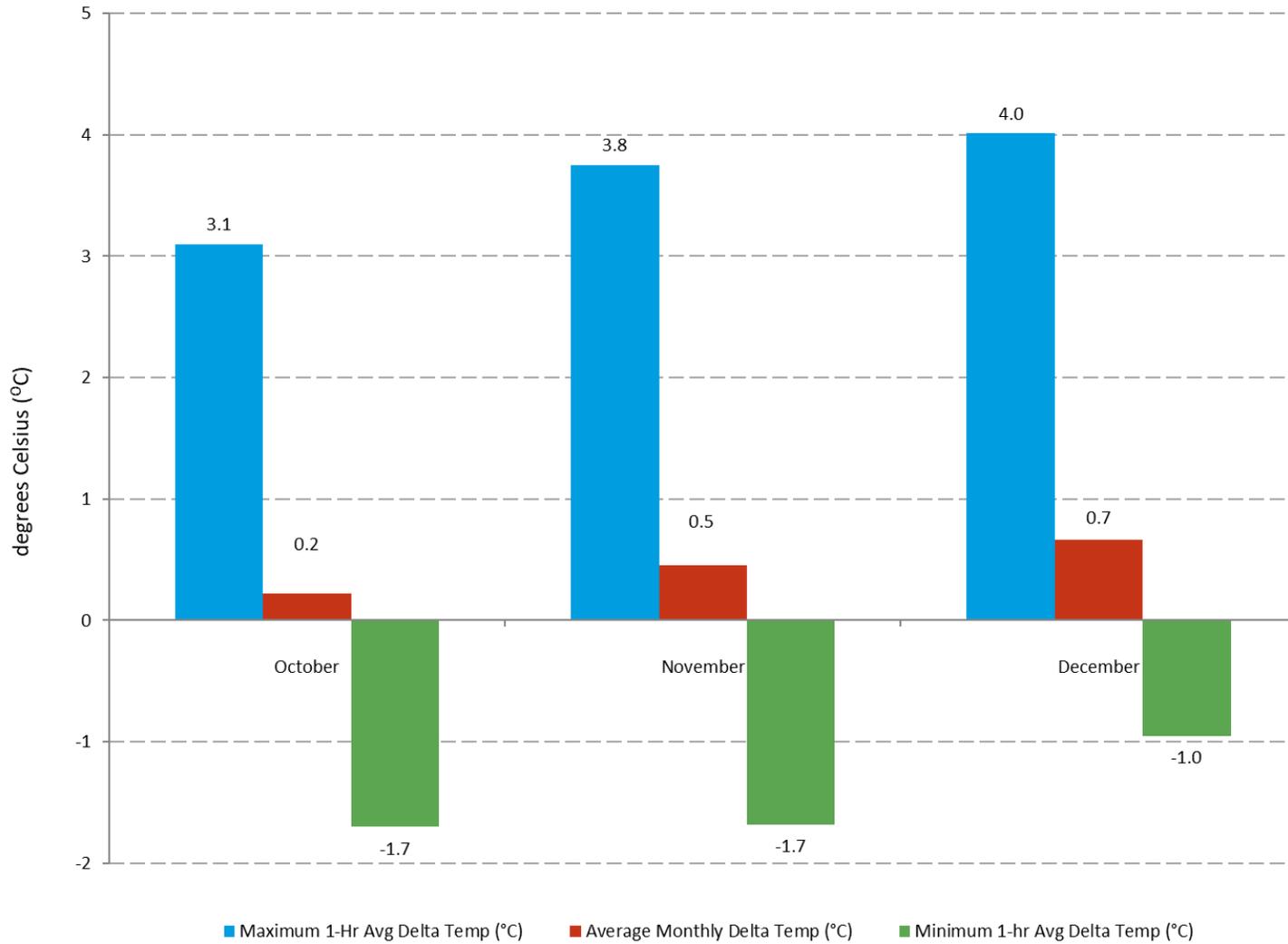


Figure 17. MSP Q4 2025 Delta Temperature Summary

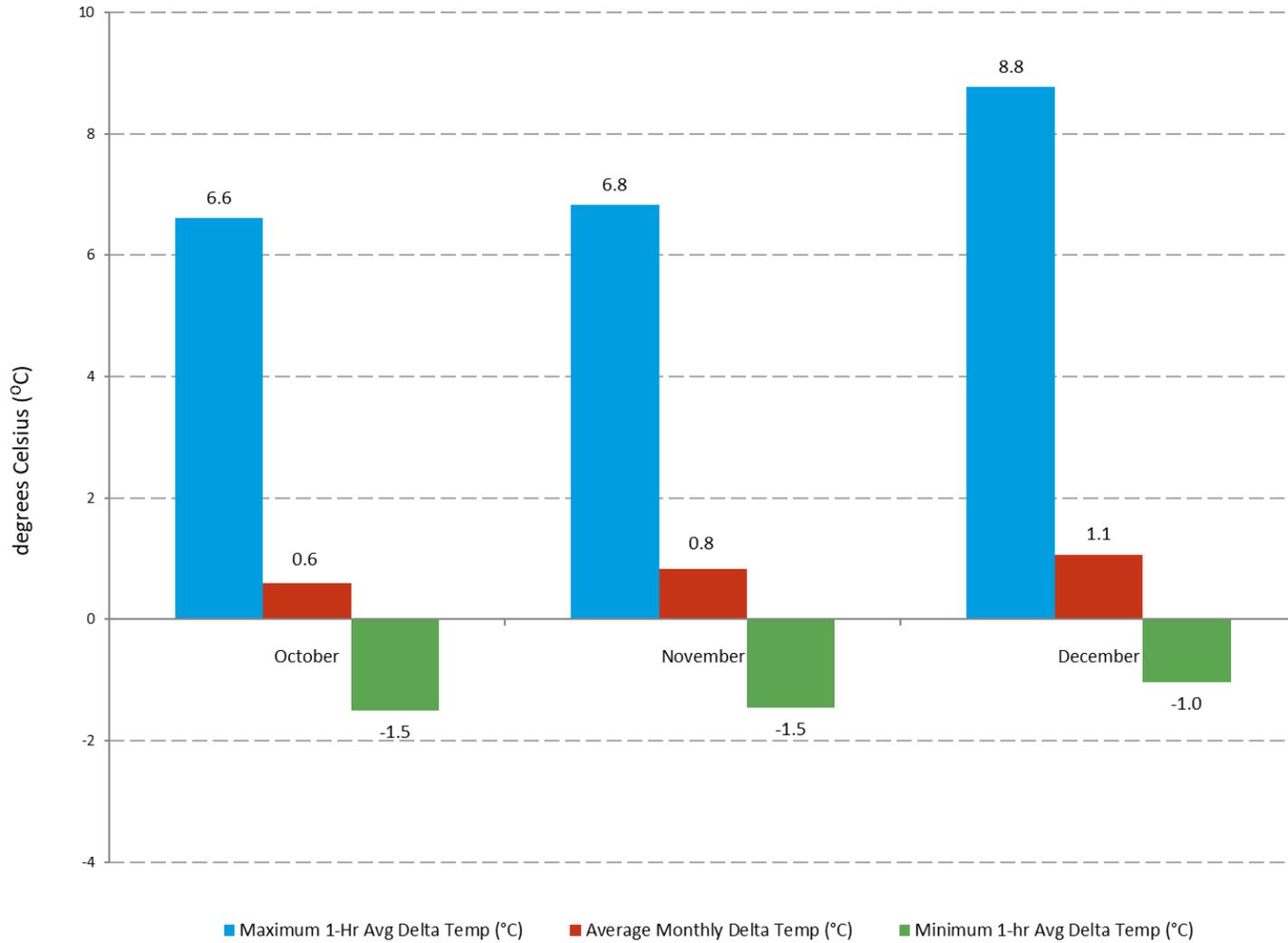


Figure 18. Hereford Q4 2025 Delta Temperature Summary

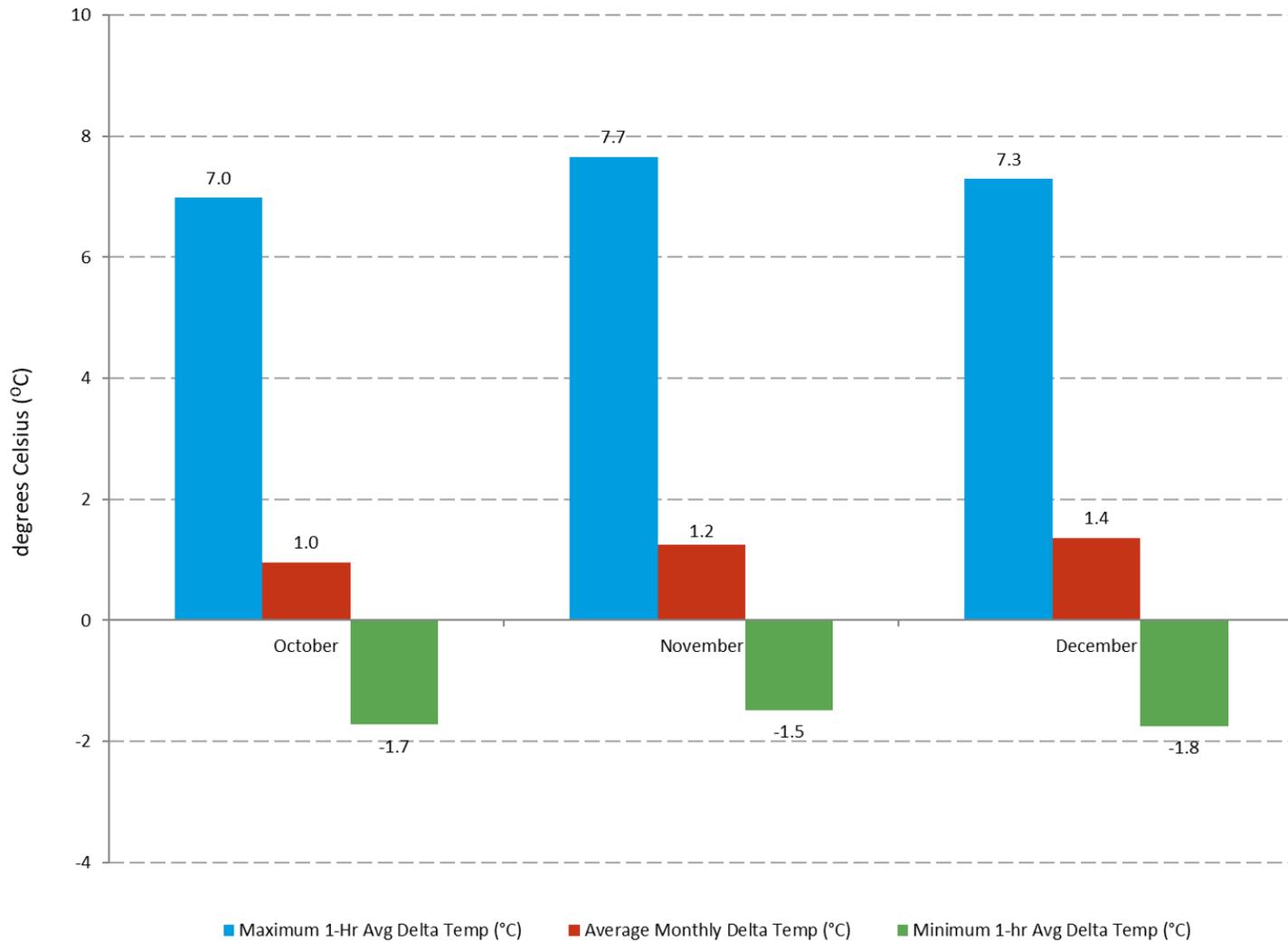


Figure 19. Orchard Q4 2025 Delta Temperature Summary

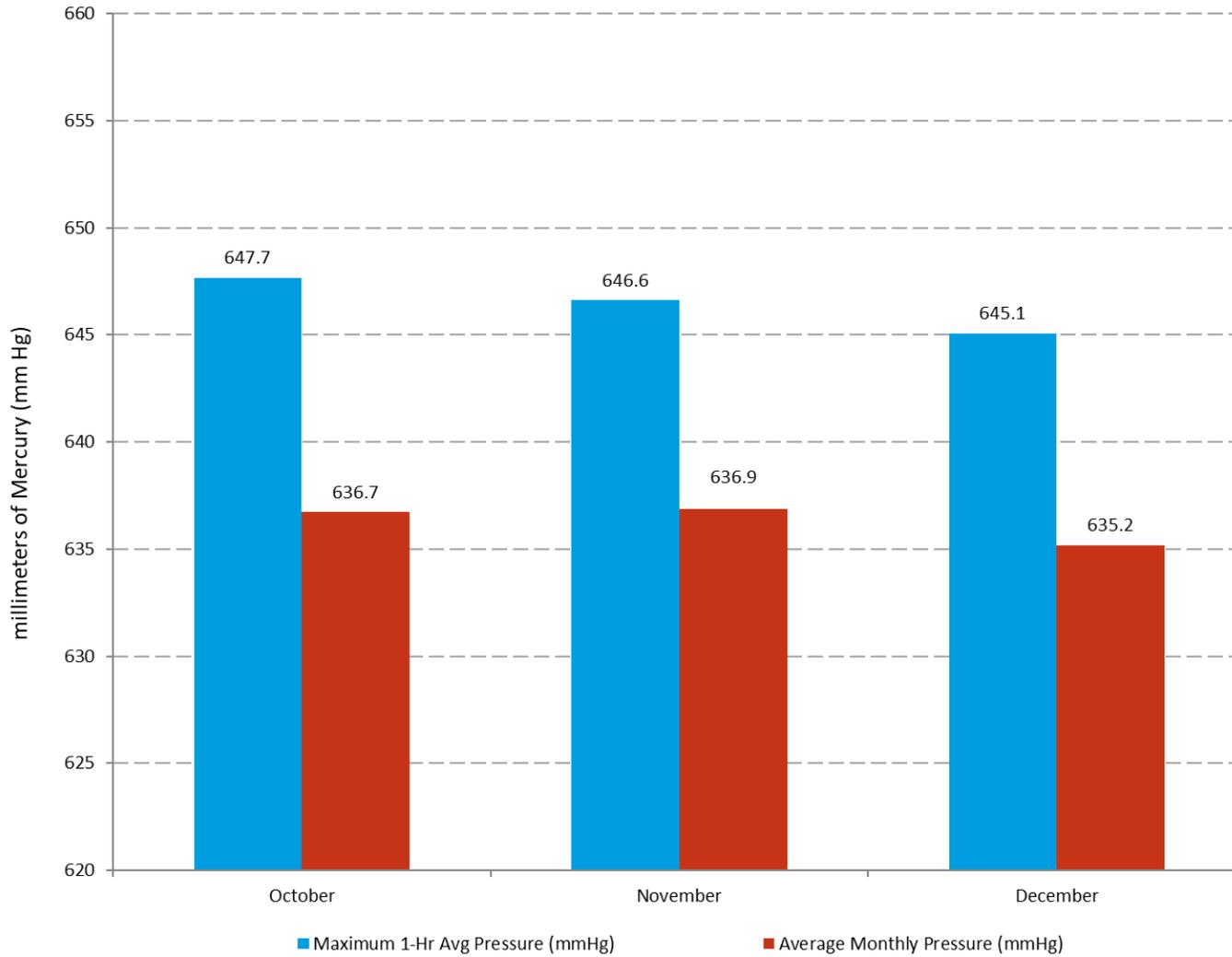


Figure 20. MSP Q4 2025 Barometric Pressure Summary

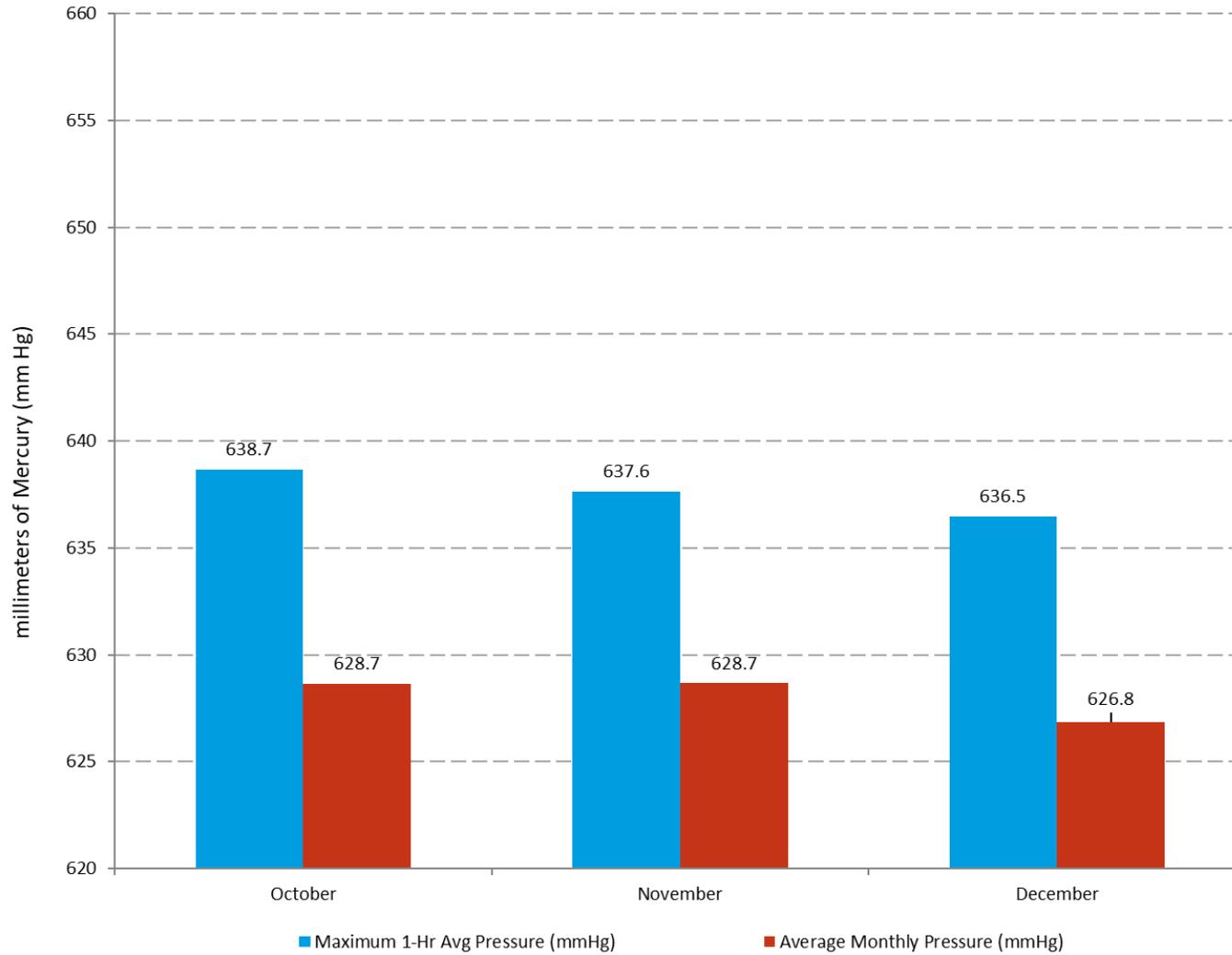


Figure 21. Hereford Q4 2025 Barometric Pressure Summary

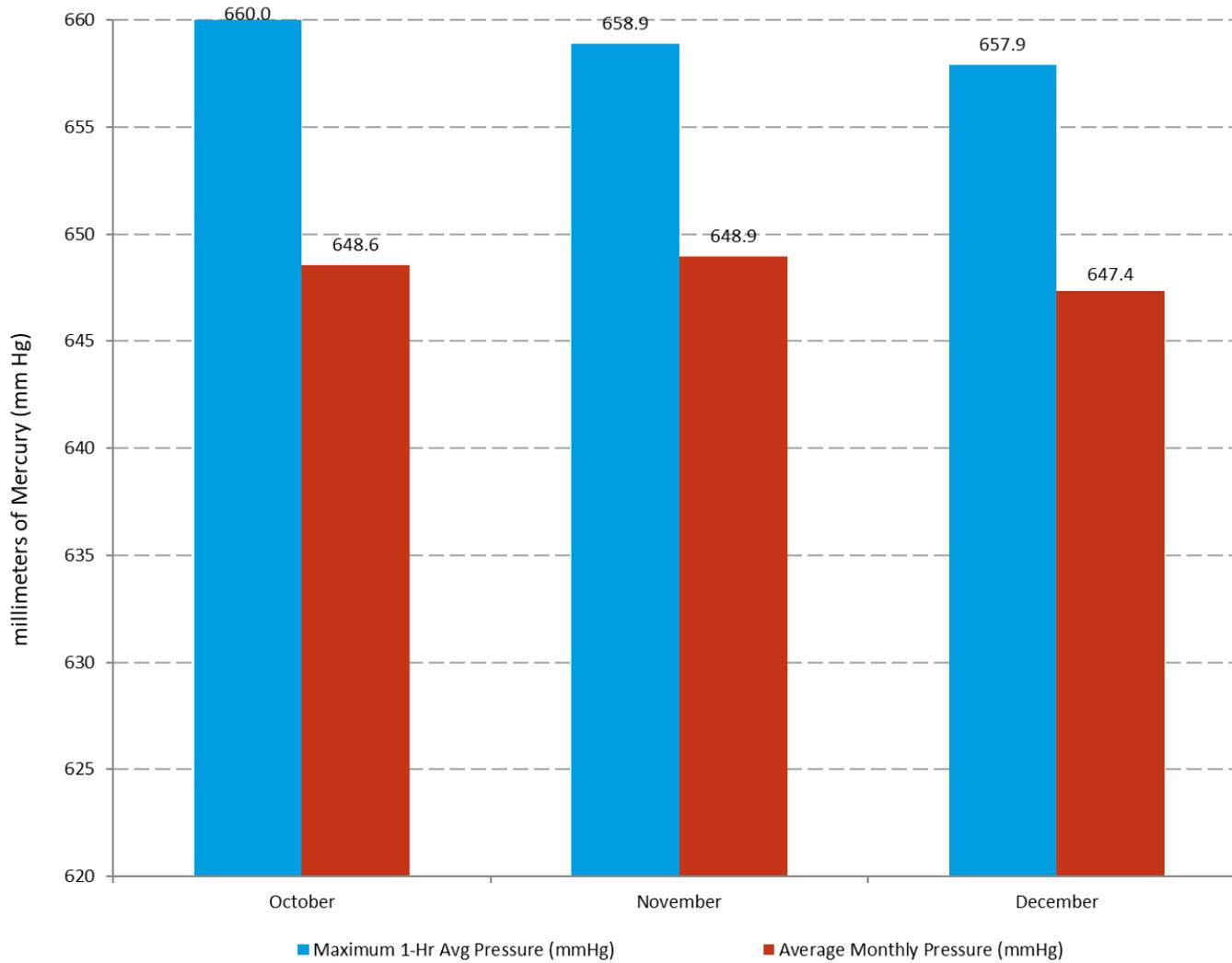


Figure 22. Orchard Q4 2025 Barometric Pressure Summary

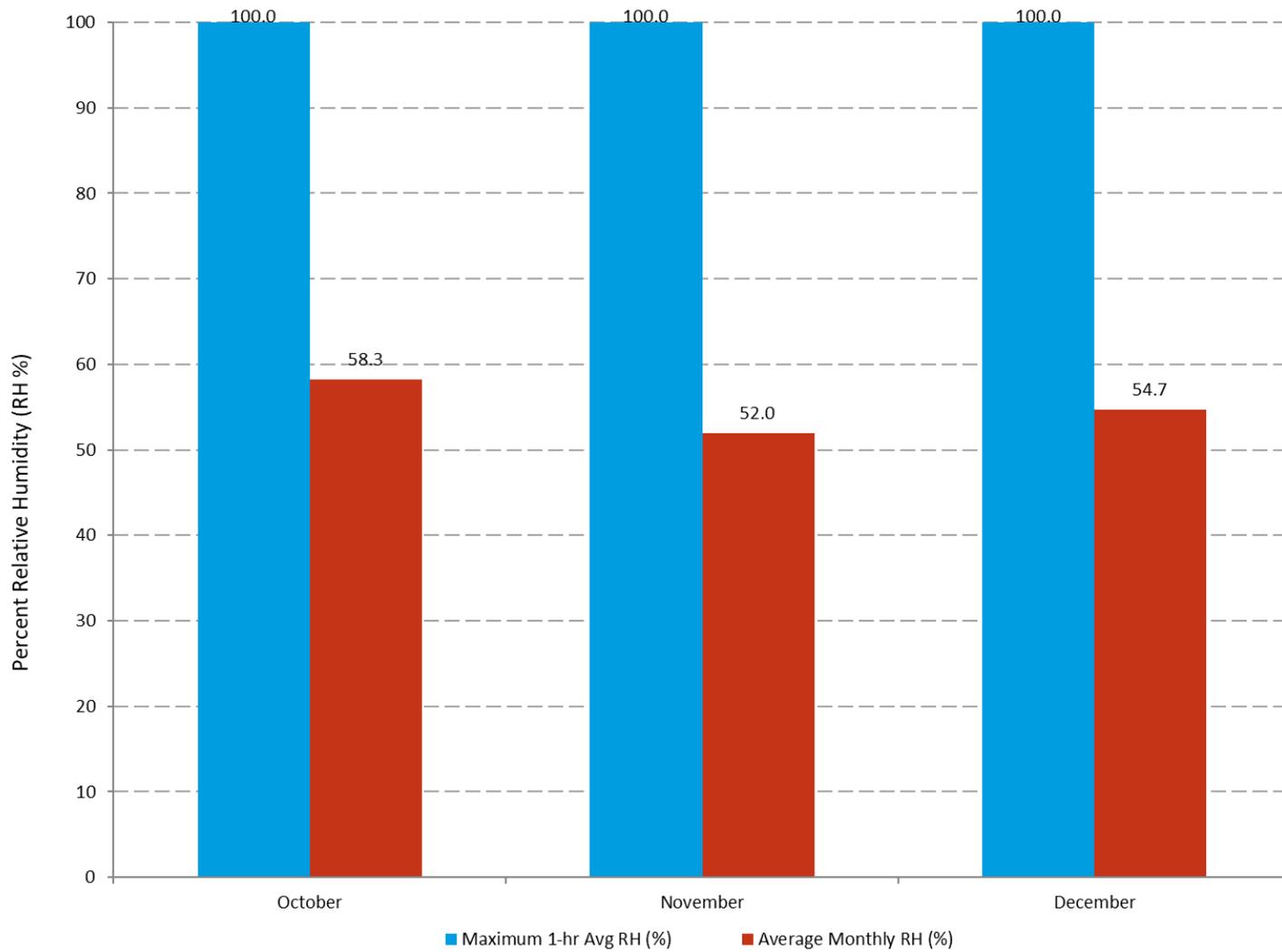


Figure 23. MSP Q4 2025 Relative Humidity Summary

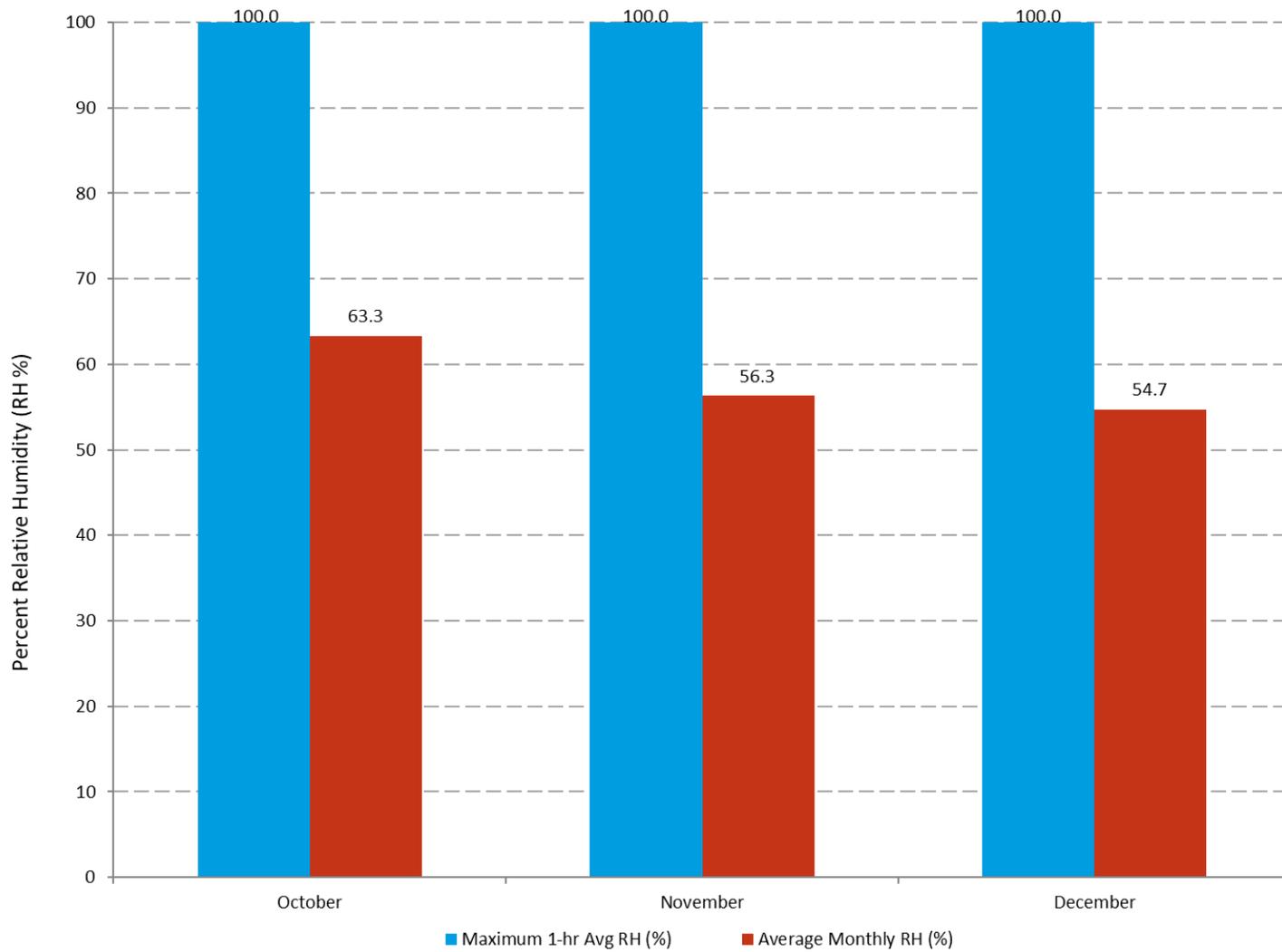


Figure 24. Hereford Q4 2025 Relative Humidity Summary

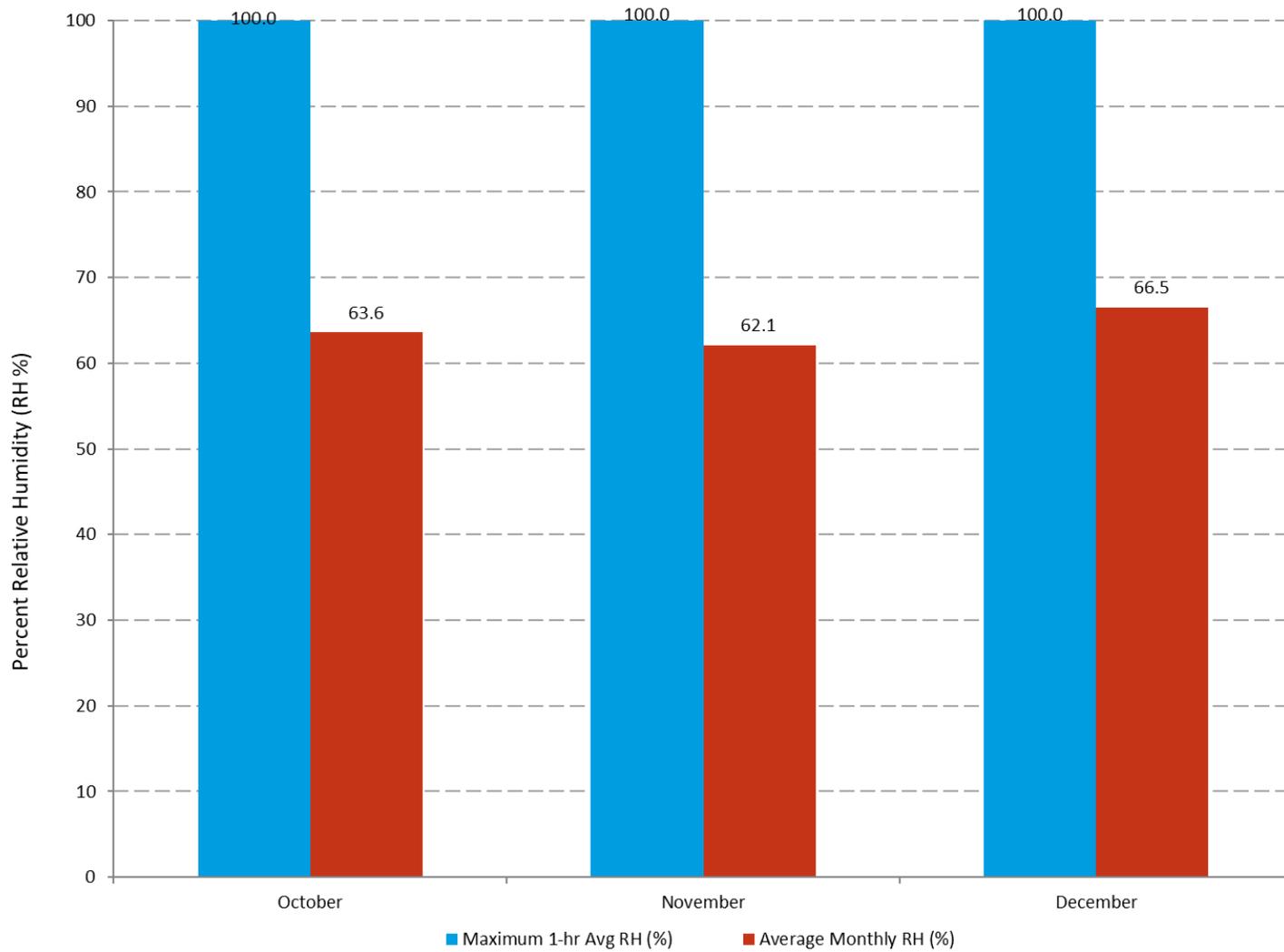


Figure 25. Orchard Q4 2025 Relative Humidity Summary

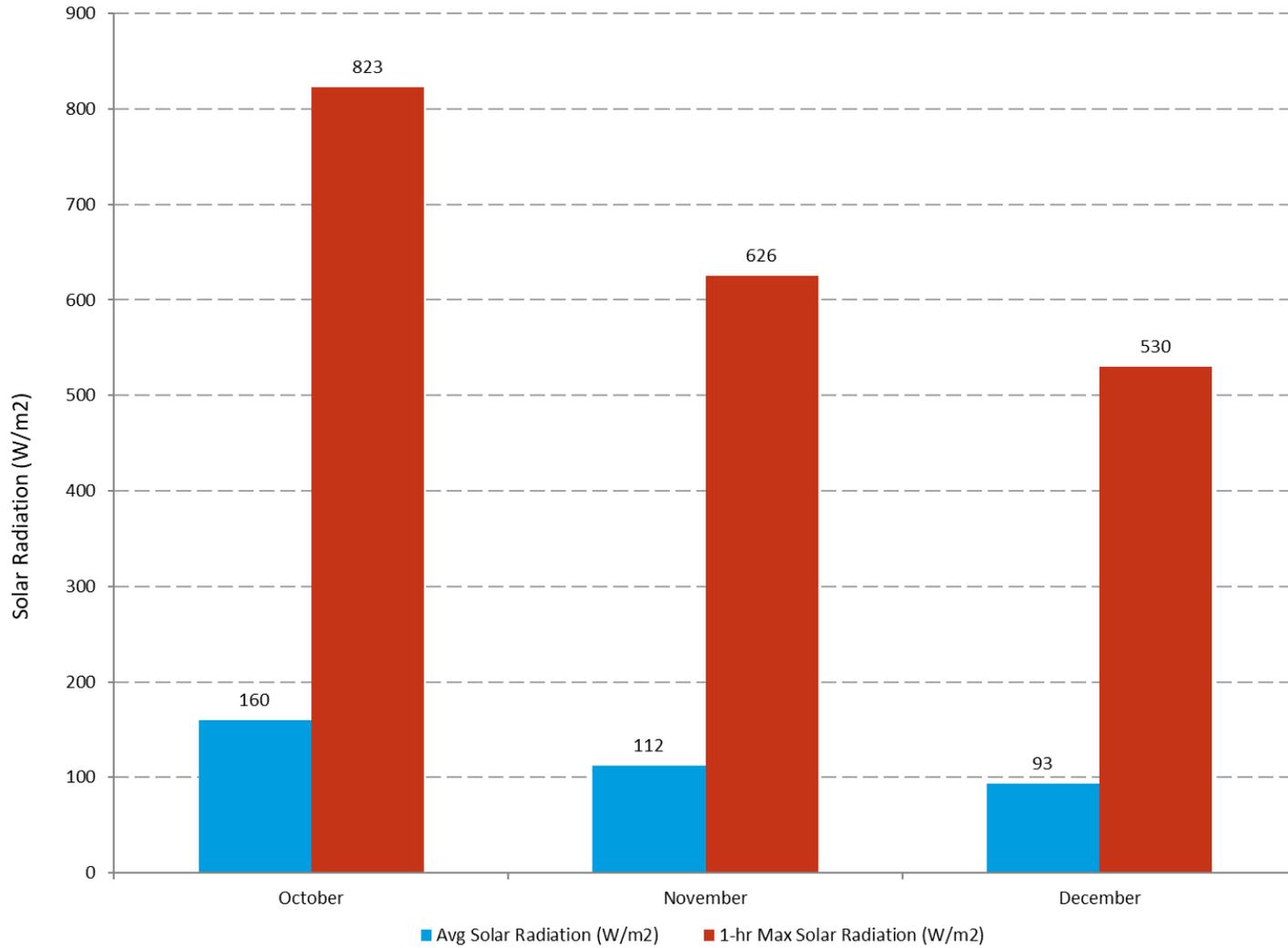


Figure 26. MSP Q4 2025 Solar Radiation Summary

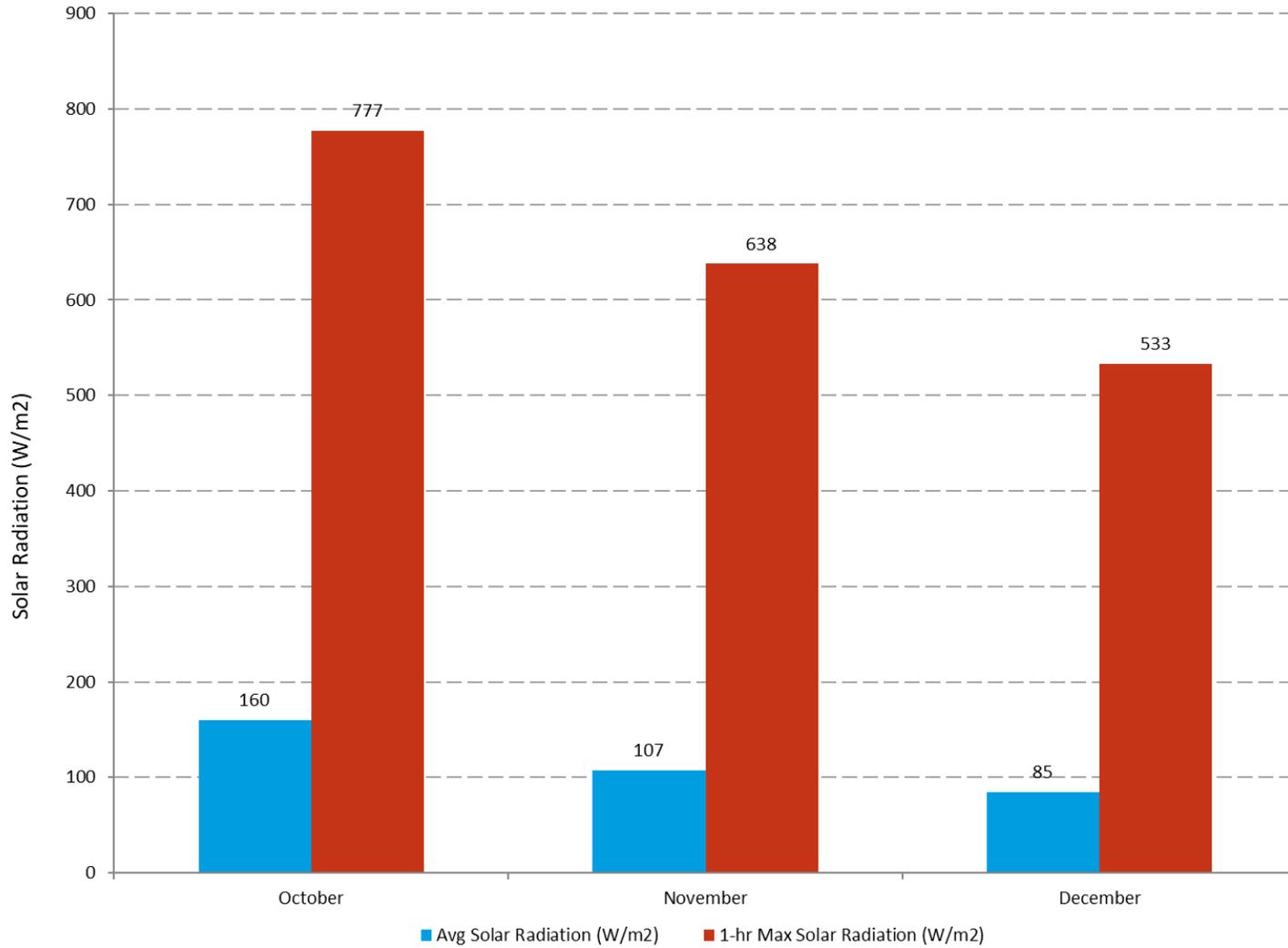


Figure 27. Hereford Q4 2025 Solar Radiation Summary

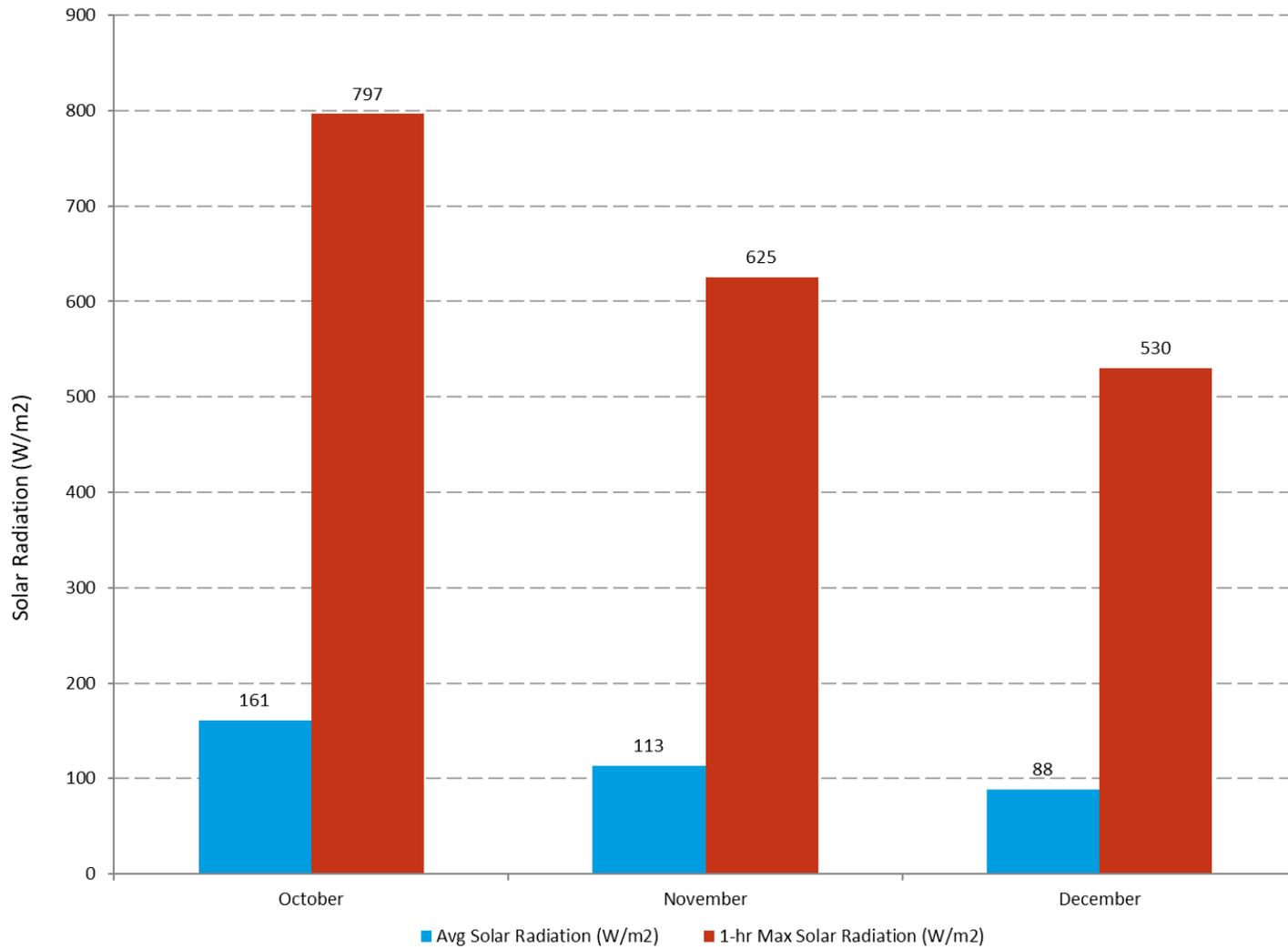


Figure 28. Orchard Q4 2025 Solar Radiation Summary

APPENDIX A2: INVALIDATION DOCUMENT

APPENDIX A2: PERIODS OF INVALID DATA AND QUALIFIER CODES

Data is presented by Month, Parameter, Qualifier Code, Date and Time, and Description

Qualifier Codes			
Code	Description	Code	Description
2	Operational Deviation: the standard deviation of shelter temperature was above 2.1°C for the previous 24 hours	AW	Wildlife Damage
AL	Voided by Operator	AZ	QC Audit
AM	Miscellaneous Void	BA	Maintenance / Routine Repairs
AS	Poor Quality Assurance Results.	BC	Multi-point Calibration
AT	Calibration	BD	Auto Calibration
AV	Power Failure	V	Value Validated

Periods of Invalidation				
Month	Parameter	Code	Date and Time	Description
MISSILE SITE PARK				
October	Wind Speed & Direction	BC	10/30/2025 10:00-11:00	Quarter 4 Multi-Point Calibration
	2 m, 10 m, & Delta Temperature	BC	10/30/2025 10:00-11:00	Quarter 4 Multi-Point Calibration
	Relative Humidity & Air Temperature (non-regulatory)	BC	10/30/2025 10:00-11:00	Quarter 4 Multi-Point Calibration
	Solar Radiation	BC	10/30/2025 10:00-11:00	Quarter 4 Multi-Point Calibration
	Precipitation	BC	10/30/2025 09:00-15:00	Quarter 4 Multi-Point Calibration
	Ozone/NO/NO2/NOx	BD	10/01/2025 02:00	Overnight calibration
		BD	10/02/2025 01:00-02:00	Overnight calibration
		BD	10/03/2025 02:00	Overnight calibration
		BD	10/04/2025 02:00	Overnight calibration
		BD	10/05/2025 01:00-02:00	Overnight calibration
		BD	10/06/2025 02:00	Overnight calibration
		BD	10/07/2025 02:00	Overnight calibration
		BD	10/08/2025 02:00	Overnight calibration
		BD	10/09/2025 01:00-02:00	Overnight calibration
		BD	10/10/2025 02:00	Overnight calibration
		BD	10/11/2025 02:00	Overnight calibration
		BD	10/12/2025 01:00-02:00	Overnight calibration
		BD	10/13/2025 02:00	Overnight calibration
		BD	10/14/2025 02:00	Overnight calibration

		V	10/14/2025 08:00	Value validated. Partial hour due to multi-point calibration.
		BC	10/14/2025 09:00-15:00	Quarter 4 Multi-Point Calibration
		BD	10/15/2025 02:00	Overnight calibration
		AT	10/15/2025 07:00-08:00	Manual calibration
		V	10/15/2025 11:00	Value validated. Partial hour due to inlet work.
		V	10/28/2025 13:00	Value validated. Partial hour due to filter change.
		AM	10/28/2025 14:00	Filter change
		V	10/30/2025 09:00	Value validated. Partial hour due to inlet work.
		AT	10/30/2025 10:00-13:00	Manual calibration
		BA	10/30/2025 14:00-15:00	Analyzer maintenance
		AL	10/30/2025 16:00-10/31/2025 08:00	Voided by Operator: Instrument response not verified.
		BC	10/31/2025 09:00-14:00	Quarter 4 Multi-Point Calibration
		V	10/31/2025 15:00	Value validated. Partial hour due to multi-point calibration
November	Wind Speed & Direction	AZ	11/14/2025 11:00-12:00	Quarter 4 Independent Audit
	2 m, 10 m, & Delta Temperature	AZ	11/14/2025 11:00-12:00	Quarter 4 Independent Audit
	Relative Humidity & Air Temperature (non-regulatory)	AZ	11/14/2025 11:00-12:00	Quarter 4 Independent Audit
	Solar Radiation	AZ	11/14/2025 11:00-12:00	Quarter 4 Independent Audit
	Precipitation	AZ	11/18/2025 10:00-11:00	Quarter 4 Independent Audit
	Ozone/NO/NO2/NOx	BD	11/01/2025 02:00	Overnight calibration
		BD	11/02/2025 01:00-02:00	Overnight calibration
		BD	11/03/2025 02:00	Overnight calibration
		BD	11/04/2025 02:00	Overnight calibration
		BD	11/05/2025 02:00	Overnight calibration
		BD	11/06/2025 01:00-02:00	Overnight calibration
		BD	11/07/2025 02:00	Overnight calibration
		BD	11/08/2025 02:00	Overnight calibration
		BD	11/09/2025 01:00-02:00	Overnight calibration

		BD	11/10/2025 02:00	Overnight calibration
		BD	11/11/2025 02:00	Overnight calibration
		BD	11/12/2025 02:00	Overnight calibration
		BD	11/13/2025 01:00-02:00	Overnight calibration
		BD	11/14/2025 02:00	Overnight calibration
		AZ	11/14/2025 11:00-17:00	Quarter 4 Independent Audit
		BD	11/15/2025 02:00	Overnight calibration
		BD	11/16/2025 01:00-02:00	Overnight calibration
		BD	11/17/2025 02:00	Overnight calibration
		BD	11/18/2025 02:00	Overnight calibration
		BD	11/19/2025 02:00	Overnight calibration
		BD	11/20/2025 01:00-02:00	Overnight calibration
		BD	11/21/2025 02:00	Overnight calibration
		BD	11/22/2025 02:00	Overnight calibration
		BD	11/23/2025 01:00-02:00	Overnight calibration
		BD	11/24/2025 02:00	Overnight calibration
		BD	11/25/2025 02:00	Overnight calibration
		AM	11/25/2025 15:00-16:00	Filter change
		BD	11/26/2025 02:00	Overnight calibration
		BD	11/27/2025 01:00-02:00	Overnight calibration
		BD	11/28/2025 02:00	Overnight calibration
		BD	11/29/2025 02:00	Overnight calibration
		BD	11/30/2025 01:00-02:00	Overnight calibration
December	Ozone/NO/NO2/NOx	BD	12/01/2025 02:00	Overnight calibration
		AT	12/01/2025 15:00	Manual calibration
		2	12/01/2025 22:00-12/02/2025 04:00	Standard deviation of shelter temperature greater than 2.1°C
		BD	12/02/2025 02:00	Overnight calibration
		BD	12/03/2025 02:00	Overnight calibration
		BD	12/04/2025 01:00-02:00	Overnight calibration
		BD	12/05/2025 02:00	Overnight calibration
		BD	12/06/2025 02:00	Overnight calibration
		BD	12/07/2025 01:00-02:00	Overnight calibration
		BD	12/08/2025 02:00	Overnight calibration
		BD	12/09/2025 02:00	Overnight calibration
		BD	12/10/2025 02:00	Overnight calibration

		BD	12/11/2025 01:00-02:00	Overnight calibration
		BD	12/12/2025 02:00	Overnight calibration
		BD	12/13/2025 02:00	Overnight calibration
		BD	12/14/2025 01:00-02:00	Overnight calibration
		BD	12/15/2025 02:00	Overnight calibration
		BD	12/16/2025 02:00	Overnight calibration
		BD	12/17/2025 02:00	Overnight calibration
		BD	12/18/2025 01:00-02:00	Overnight calibration
		BD	12/19/2025 02:00	Overnight calibration
		BD	12/20/2025 02:00	Overnight calibration
		BD	12/21/2025 01:00-02:00	Overnight calibration
		BD	12/22/2025 02:00	Overnight calibration
		BD	12/23/2025 02:00	Overnight calibration
		BD	12/24/2025 02:00	Overnight calibration
		BD	12/25/2025 01:00-02:00	Overnight calibration
		BD	12/26/2025 02:00	Overnight calibration
		BD	12/27/2025 02:00	Overnight calibration
		BD	12/28/2025 01:00-02:00	Overnight calibration
		BD	12/29/2025 02:00	Overnight calibration
		BD	12/30/2025 02:00	Overnight calibration
		BD	12/31/2025 02:00	Overnight calibration
Hereford				
October	Wind Speed & Direction	BC	10/29/2025 09:00-10:00	Quarter 4 Multi-Point Calibration
	2 m, 10 m, & Delta Temperature	BC	10/29/2025 09:00-10:00	Quarter 4 Multi-Point Calibration
	Relative Humidity & Air Temperature (non-regulatory)	BC	10/29/2025 09:00-10:00	Quarter 4 Multi-Point Calibration
	Solar Radiation	BC	10/29/2025 09:00-10:00	Quarter 4 Multi-Point Calibration
	Precipitation	BC	10/29/2025 09:00-12:00	Quarter 4 Multi-Point Calibration
	Ozone	BD	10/01/2025 02:00	Overnight calibration
		BD	10/03/2025 02:00	Overnight calibration
		BD	10/06/2025 02:00	Overnight calibration
		BD	10/08/2025 02:00	Overnight calibration
		BD	10/10/2025 02:00	Overnight calibration

		2	10/12/2025 15:00-20:00	Standard deviation of shelter temperature greater than 2.1°C
		BD	10/13/2025 02:00	Overnight calibration
		V	10/14/2025 08:00	Value validated. Partial hour due to multi-point calibration.
		BC	10/14/2025 09:00	Quarter 4 Multi-Point Calibration
		V	10/14/2025 10:00	Value validated. Partial hour due to multi-point calibration.
		BD	10/15/2025 02:00	Overnight calibration
		AT	10/15/2025 15:00-16:00	Manual calibration
		V	10/15/2025 17:00	Value validated. Partial hour due to inlet work.
		2	10/17/2025 08:00-10:00	Standard deviation of shelter temperature greater than 2.1°C
		2	10/17/2025 15:00-10/18/2025 02:00	Standard deviation of shelter temperature greater than 2.1°C
		2	10/18/2025 17:00	Standard deviation of shelter temperature greater than 2.1°C
		2	10/19/2025 19:00-10/20/2025 00:00	Standard deviation of shelter temperature greater than 2.1°C
		2	10/20/2025 09:00-19:00	Standard deviation of shelter temperature greater than 2.1°C
		2	10/21/2025 18:00-10/22/2025 02:00	Standard deviation of shelter temperature greater than 2.1°C
		AT	10/29/2025 09:00-10:00	Manual calibration
		BA	10/29/2025 11:00-12:00	Analyzer maintenance
		AL	10/29/2025 13:00-10/30/2025 09:00	Voided by Operator: Instrument response not verified
		BC	10/30/2025 10:00-12:00	Quarter 4 Multi-Point Calibration
		BD	10/31/2025 02:00	Overnight calibration
		AM	10/31/2025 13:00	Filter change
		V	10/31/2025 14:00	Value validated. Partial hour due to filter change.
November	Wind Speed & Direction	AV	11/06/2025 14:00-15:00	Power failure
		AZ	11/18/2025 14:00-15:00	Quarter 4 Independent Audit
	2 m, 10 m, & Delta Temperature	AV	11/06/2025 14:00-15:00	Power failure
		AZ	11/18/2025 14:00-15:00	Quarter 4 Independent Audit

	Relative Humidity & Air Temperature (non-regulatory)	AV	11/06/2025 14:00-15:00	Power failure
		AZ	11/18/2025 14:00-15:00	Quarter 4 Independent Audit
	Solar Radiation	AV	11/06/2025 14:00-15:00	Power failure
		AZ	11/18/2025 14:00-15:00	Quarter 4 Independent Audit
	Precipitation	AT	11/05/2025 10:00-11:00	Manual calibration
		AV	11/06/2025 14:00-15:00	Power failure
		AZ	11/18/2025 15:00-16:00	Quarter 4 Independent Audit
	Barometric Pressure	AV	11/06/2025 14:00-15:00	Power failure
	Ozone	BD	11/03/2025 02:00	Overnight calibration
		2	11/04/2025 21:00-11/05/2025 03:00	Standard deviation of shelter temperature greater than 2.1°C
		BD	11/05/2025 02:00	Overnight calibration
		AV	11/06/2025 14:00	Power failure
		V	11/06/2025 15:00	Value validated. Partial hour due to power failure.
		BD	11/07/2025 02:00	Overnight calibration
		BD	11/10/2025 02:00	Overnight calibration
		2	11/10/2025 22:00-11/11/2025 05:00	Standard deviation of shelter temperature greater than 2.1°C
		BD	11/12/2025 02:00	Overnight calibration
		BD	11/14/2025 02:00	Overnight calibration
		BD	11/17/2025 02:00	Overnight calibration
		2	11/17/2025 13:00-16:00	Standard deviation of shelter temperature greater than 2.1°C
		AZ	11/18/2025 14:00-16:00	Quarter 4 Independent Audit
		2	11/18/2025 20:00-11/19/2025 03:00	Standard deviation of shelter temperature greater than 2.1°C
		BD	11/19/2025 02:00	Overnight calibration
		BD	11/21/2025 02:00	Overnight calibration
		BD	11/24/2025 02:00	Overnight calibration
		2	11/24/2025 04:00-11/25/2025 04:00	Standard deviation of shelter temperature greater than 2.1°C
		AM	11/25/2025 11:00	Filter change
		V	11/25/2025 12:00	Value validated. Partial hour due to filter change.
		2	11/25/2025 12:00-14:00	Standard deviation of shelter temperature greater than 2.1°C

		BD	11/26/2025 02:00	Overnight calibration
		BD	11/28/2025 02:00	Overnight calibration
		AL	11/29/2025 05:00-08:00	Voided by operator: Analyzer lamp stability issues
		AL	11/29/2025 14:00-11/30/2025 08:00	Voided by operator: Analyzer lamp stability issues
December	Ozone	BD	12/01/2025 02:00	Overnight calibration
		BD	12/03/2025 02:00	Overnight calibration
		BD	12/05/2025 02:00	Overnight calibration
		BD	12/08/2025 02:00	Overnight calibration
		BD	12/10/2025 02:00	Overnight calibration
		BC	12/11/2025 09:00-10:00	Multi-point calibration
		AS	12/11/2025 11:00	Quality assurance not verified pre-maintenance
		BA	12/11/2025 12:00	Analyzer maintenance
		AS	12/11/2025 13:00-12/12/2025 01:00	Quality assurance not verified post-maintenance
		BD	12/12/2025 02:00	Overnight calibration
		BC	12/12/2025 10:00	Multi-point calibration
		V	12/12/2025 11:00	Value validated. Partial hour due to multi-point calibration.
		BD	12/15/2025 02:00	Overnight calibration
		BD	12/17/2025 02:00	Overnight calibration
		BD	12/19/2025 02:00	Overnight calibration
		2	12/19/2025 19:00-12/20/2025 01:00	Standard deviation of shelter temperature greater than 2.1°C
		2	12/20/2025 13:00-17:00	Standard deviation of shelter temperature greater than 2.1°C
		BD	12/22/2025 02:00	Overnight calibration
		BD	12/24/2025 02:00	Overnight calibration
		BD	12/26/2025 02:00	Overnight calibration
		2	12/27/2025 09:00-14:00	Standard deviation of shelter temperature greater than 2.1°C
		BD	12/29/2025 02:00	Overnight calibration
		V	12/30/2025 10:00	Value validated. Partial hour due to filter change.
		AM	12/30/2025 11:00	Filter change
		BD	12/31/2025 02:00	Overnight calibration
		2	12/31/2025 21:00-01/01/2026 00:00	Standard deviation of shelter temperature greater than 2.1°C
Orchard				
October	Wind Speed & Direction	BC	10/29/2025 14:00-15:00	Quarter 4 Multi-Point Calibration
	2 m, 10 m, & Delta Temperature	BC	10/29/2025 14:00-15:00	Quarter 4 Multi-Point Calibration

	Relative Humidity & Air Temperature (non-regulatory)	BC	10/29/2025 14:00-15:00	Quarter 4 Multi-Point Calibration
	Solar Radiation	BC	10/29/2025 14:00-15:00	Quarter 4 Multi-Point Calibration
	Precipitation	AW	10/01/2025 02:00-10/15/2025 13:00	Wildlife damage: Severed signal cable
		AT	10/15/2025 14:00-15:00	Manual calibration
		BC	10/29/2025 13:00-16:00	Quarter 4 Multi-Point Calibration
	Ozone	BD	10/01/2025 02:00	Overnight calibration
		BD	10/03/2025 02:00	Overnight calibration
		BD	10/06/2025 02:00	Overnight calibration
		BD	10/08/2025 02:00	Overnight calibration
		BD	10/10/2025 02:00	Overnight calibration
		BD	10/13/2025 02:00	Overnight calibration
		V	10/14/2025 08:00	Value validated: Partial hour due to multi-point calibration.
		BC	10/14/2025 09:00	Quarter 4 Multi-Point Calibration
		V	10/14/2025 10:00	Value validated: Partial hour due to multi-point calibration.
		BD	10/15/2025 02:00	Overnight calibration
		AT	10/15/2025 12:00	Manual calibration
		V	10/15/2025 13:00	Value validated: Partial hour due to manual calibration.
		2	10/19/2025 08:00-16:00	Standard deviation of shelter temperature greater than 2.1°C
		2	10/19/2025 22:00-10/20/2025 05:00	Standard deviation of shelter temperature greater than 2.1°C
		2	10/28/2025 09:00-14:00	Standard deviation of shelter temperature greater than 2.1°C
		V	10/28/2025 11:00	Value validated: Partial hour due to filter change.
		AM	10/28/2025 12:00	Filter change
		V	10/29/2025 14:00	Value validated: Partial hour due to inlet work.
		AT	10/29/2025 15:00	Manual calibration
		BA	10/29/2025 16:00	Analyzer maintenance
		AL	10/29/2025 17:00-10/30/2025 09:00	Voided by Operator: Instrument response not verified.
		2	10/29/2025 19:00-10/30/2025 09:00	Standard deviation of shelter temperature greater than 2.1°C
		BC	10/30/2025 10:00-12:00	Quarter 4 Multi-Point Calibration
		BD	10/31/2025 02:00	Overnight calibration

		2	10/31/2025 08:00-22:00	Standard deviation of shelter temperature greater than 2.1°C
November	Wind Speed & Direction	AZ	11/18/2025 10:00-11:00	Quarter 4 Independent Audit
	2 m, 10 m, & Delta Temperature	AZ	11/18/2025 10:00-11:00	Quarter 4 Independent Audit
	Relative Humidity & Air Temperature (non-regulatory)	AZ	11/18/2025 10:00-11:00	Quarter 4 Independent Audit
	Solar Radiation	AZ	11/18/2025 10:00-11:00	Quarter 4 Independent Audit
	Precipitation	AT	11/05/2025 12:00	Manual calibration
		BA	11/05/2025 13:00-14:00	Maintenance
		AT	11/05/2025 15:00	Manual calibration
		AZ	11/18/2025 13:00-14:00	Quarter 4 Independent Audit
	Ozone	2	11/01/2025 04:00-11/02/2025 09:00	Standard deviation of shelter temperature greater than 2.1°C
		BD	11/03/2025 02:00	Overnight calibration
		BD	11/05/2025 02:00	Overnight calibration
		BD	11/07/2025 02:00	Overnight calibration
		2	11/08/2025 10:00-16:00	Standard deviation of shelter temperature greater than 2.1°C
		2	11/09/2025 22:00-11/10/2025 01:00	Standard deviation of shelter temperature greater than 2.1°C
		BD	11/10/2025 02:00	Overnight calibration
		2	11/10/2025 22:00-11/11/2025 06:00	Standard deviation of shelter temperature greater than 2.1°C
		BD	11/12/2025 02:00	Overnight calibration
		BD	11/14/2025 02:00	Overnight calibration
		BD	11/17/2025 02:00	Overnight calibration
		V	11/18/2025 10:00	Value validated: Partial hour due to independent audit.
		AZ	11/18/2025 11:00-12:00	Quarter 4 Independent Audit
		V	11/18/2025 13:00	Value validated: Partial hour due to independent audit.
		BD	11/19/2025 02:00	Overnight calibration
		BD	11/21/2025 02:00	Overnight calibration
		2	11/24/2025 01:00-04:00	Standard deviation of shelter temperature greater than 2.1°C
		BD	11/24/2025 02:00	Overnight calibration
		2	11/25/2025 09:00-18:00	Standard deviation of shelter temperature greater than 2.1°C
		AM	11/25/2025 12:00-13:00	Filter change

		BD	11/26/2025 02:00	Overnight calibration
		BD	11/28/2025 02:00	Overnight calibration
December	Ozone	BD	12/01/2025 02:00	Overnight calibration
		BD	12/03/2025 02:00	Overnight calibration
		BD	12/05/2025 02:00	Overnight calibration
		BD	12/08/2025 02:00	Overnight calibration
		2	12/08/2025 21:00- 12/09/2025 04:00	Standard deviation of shelter temperature greater than 2.1°C
		2	12/09/2025 13:00- 14:00	Standard deviation of shelter temperature greater than 2.1°C
		BD	12/10/2025 02:00	Overnight calibration
		2	12/11/2025 22:00- 12/12/2025 04:00	Standard deviation of shelter temperature greater than 2.1°C
		BD	12/12/2025 02:00	Overnight calibration
		BD	12/15/2025 02:00	Overnight calibration
		2	12/15/2025 20:00- 12/17/2025 07:00	Standard deviation of shelter temperature greater than 2.1°C
		BD	12/17/2025 02:00	Overnight calibration
		BD	12/19/2025 02:00	Overnight calibration
		2	12/19/2025 21:00- 12/20/2025 07:00	Standard deviation of shelter temperature greater than 2.1°C
		BD	12/22/2025 02:00	Overnight calibration
		2	12/22/2025 22:00- 12/23/2025 05:00	Standard deviation of shelter temperature greater than 2.1°C
		BD	12/24/2025 02:00	Overnight calibration
		BD	12/26/2025 02:00	Overnight calibration
		2	12/27/2025 09:00- 17:00	Standard deviation of shelter temperature greater than 2.1°C
		BD	12/29/2025 02:00	Overnight calibration
		AM	12/30/2025 12:00- 13:00	Filter change
		BD	12/31/2025 02:00	Overnight calibration
		2	12/31/2025 20:00- 01/01/2026 00:00	Standard deviation of shelter temperature greater than 2.1°C

APPENDIX A3: SITE VISITATION LOG

Missile Site Park Site Access Log								
Name	Date	Arrival	Departure	Last Filter change		Pump off	Pump on	Notes
				NOx	Ozone			
Hoover (Remote)	10/14/2025	7:49	14:31					Multipoint O ₃ and NO/NO ₂ /NO _x calibration
Dearden (Remote)	10/15/2025	6:02	7:24					Manual ZSP for NO/NO _x and Ozone. Gasses offline
Hoover/Zaragoza	10/15/2025	7:26	11:00					Remove T700 for recertification. Cap gas calibration line. MFC calibration (updated 1 low flow point, several diluent MFC points), replaced ZAG charcoal and purafil, set ZAG to maintenance mode. Gases offline 10:27-10:29
Clemments	10/28/2025	13:30	14:00	10/28/2025	10/28/2025	13:48	13:50	AMoN and precip swap out, NO _x and O ₃ paper filter change
Hoover/Zaragoza	10/30/2025	8:13	15:06					Back pressure compensation, Q4 audits of meteorology tower (tower down at 9:21, up at 10:42am), precipitation as found test start ~8:30, precipitation as left test start at 14:10, O ₃ rebuilds of flow orifice and pump; NO ₂ pump rebuilt; Put signal cables through conduit and wrapped in protective metal mesh as rodent mitigation
Dearden (Remote)	10/31/2025	8:21	14:08					As-left multipoint calibrations. NO/NO ₂ /NO _x from 8:21-12:06, ozone from 12:06-14:08. All gasses offline for the entire time period.
Hoover/Zaragoza	11/14/2025	8:59	16:30					CDPHE independent audit, T701 dewpoint light green upon arrival, met tower down at 10:00, met tower up at 11:15, gases offline at 10:05, gases online at 16:25
Hoover	11/18/2025	8:45	10:30					Precip & solar start at 9:01am and end at 10:03am
Garcia	11/25/2025	14:30	14:50	11/25/2025	11/25/2025			AMoN and precip swap out, NO _x and O ₃ paper filter change
Hoover (Remote)	12/1/2025	14:06	14:54					Manual ZSP for O ₃ (Zero at 14:06, span at 14:16, precision at 14:43)
Garcia	12/30/2025	2:20	2:40	11/25/2025	11/25/2025	N/A	N/A	Precip bucket changed out, no NO _x /O ₃ filters changed due to running out of filters, AMoN filter retrieved but new filter was also broken, so new one was requested and was not deployed. Will deploy new one on 1/6/2026

Hereford Site Access Log							
Name	Date	Arrival	Departure	Last Filter change	Pump off	Pump on	Notes
				Ozone			
Hoover (Remote)	10/14/2025	7:53	9:06				O ₃ multipoint calibration
Dearden (Remote)	10/15/2025	14:42	15:24				Manual ZSP, Ozone offline
Hoover/Zaragoza	10/15/2025	16:49	17:01				Remove T703 for recertification. Cap gas calibration line. Gases offline 16:53-16:56
Hoover/Zaragoza	10/29/2025	7:43	11:43				Back pressure compensation, Q4 audits of meteorology tower (tower down 8:13, tower up by 9:45), precipitation as found test by 10:00am, precipitation as left test 10:31-11:30am, O ₃ rebuilds of flow orifice and pump
Dearden (Remote)	10/30/2025	9:28	11:45				Multipoint as-left calibration
Clemments	10/31/2025	12:10	12:15	10/31/2025	12:12	12:13	Filter and Desiccant change
Hoover/Zaragoza	11/5/2025	8:58	10:47				Precipitation as found 9:00-9:30am, precipitation as left 10:15-10:39am. Both used 250ml and passed. Put signal cables through conduit and wrapped in protective metal mesh as rodent mitigation
Zaragoza/Maestas	11/18/2025	13:20	15:41				CDPHE audit: Ozone down from 13:31 to 15:31. Tower down from 13:47 to 14:40
Hoover	11/18/2025	14:40	16:00				Precipitation & solar start at 14:46 and end at 15:57
Miguel	11/25/2025	10:00	10:15	11/25/2025	10:03	10:05	Precipitation and desiccant swap out, AMoN change, NO _x and O ₃ paper filter change
Dearden (Remote)	12/11/2025	8:13	9:40				Multipoint as-found calibration
Hoover	12/11/2025	11:02	11:49				Ozone offline at 11:05 AM, replaced photometer lamp per Section 5.6.9 of T400 manual, O ₃ back online at 11:40 AM
Dearden (Remote)	12/12/2025	9:05	10:10				Multipoint as-left calibration
Garcia	12/30/2025	9:50	10:05	12/30/2025	9:56	10:01	NO _x /O ₃ filter changed, desiccant swap out

Orchard Site Access Log							
Name	Date	Arrival	Departure	Last Filter change	Pump off	Pump on	Notes
				Ozone			
Clemments	10/7/2025	11:30	12:15				Unplugged heater unit from precipitation bucket. Wires had been chewed through by animal outside of bucket
Hoover (Remote)	10/14/2025	7:52	9:07				Ozone multipoint calibration
Dearden (Remote)	10/15/2025	11:01	11:50				Manual ZSP, ozone offline
Hoover/Zaragoza	10/15/2025	12:01	14:41				Remove T703 for recertification. Cap gas calibration line. Fixed severed wiring for NADP and precip sensor, sprayed rodenticide. Gases offline 12:33-12:35. Ramboll precip tested 13:16-14:30
Clemments	10/28/2025	11:40	12:15	10/28/2025	11:55	12:00	Filter change and normal NADP operations
Hoover/Zaragoza	10/29/2025	12:50	15:52				Back pressure compensation (13:47-13:56), Q4 audits of meteorology tower (tower down 13:13, tower up 14:17), precipitation as found test by 12:56, precipitation as left test 14:50, O ₃ rebuilds of flow orifice and pump (off at 14:45)
Dearden (Remote)	10/30/2025	9:54	11:38				Multipoint as-left calibration
Hoover/Zaragoza	11/5/2025	11:55	14:48				Precipitation as found 12:00-12:49pm, precipitation as left 14:15-14:34. Both used 250ml and passed. Put signal cables through conduit and wrapped in protective metal mesh as rodent mitigation
Zaragoza/Maestas	11/18/2025	9:04	12:15				CDPHE audit: Ozone down from 9:46 to 12:02. Tower down from 9:24 to 10:48
Hoover	11/18/2025	11:50	13:30				Precipitation & solar start at 12:02 and end at 13:06
Garcia	11/25/2025	11:30	11:40	11/25/2025	11:40	11:42	Filter and precipitation change, desiccant swap, AMoN change out, NO _x and O ₃ paper filter change
Garcia	12/30/2025	11:10	11:35	12/30/2025	11:21	11:27	NO _x /O ₃ filter change, desiccant swap, AMoN change out, NADP precipitation swap out

APPENDIX A4: CORRECTIVE ACTION REPORTS

CORRECTIVE ACTION REPORT NO.: 38

To Dan Joseph
 From Jake Zaragoza
 Copy to Courtney Taylor and Kaitlyn Elkind

Problem Identification	
Site (Location):	Orchard
System or Instrumentation:	Precipitation
Estimated start date/time	10/1/2025
Problem identified by:	Alex Clemments
Problem definition: • Parameter (s) affected	On-site precipitation sensor found with severed signal and heater cables • Precipitation
Planned corrective actions (if necessary):	Splice cables together to limit data loss. Pull cables through conduit for more robust rodent mitigation.
	Expected Completion Date: November 5, 2025

Problem Resolution	
Date corrective action taken:	10/15/2025, 11/5/2025, and 11/25/2025
Action taken by:	Bode Hoover & Jake Zaragoza
Corrective action taken:	On October 15 th , the signal and heater cable were replaced at the severed point with new segments as a quick fix. The sensor response was tested after the splice. On November 5 th , the spliced signal and heater cables were strung through hard-sided conduit for further rodent mitigation. The sensor response was tested after this maintenance. On November 25 th the issue start date was estimated after a review of data.
Effectiveness of corrective actions:	<input checked="" type="checkbox"/> Yes, it was resolved <input type="checkbox"/> No, it was NOT resolved

Corrective Action Report Author & Date	Signature
Prepared by: Jake Zaragoza Date: 12/18/2025	
QA Officer: Michael Ring Date: 12/18/2025	

CORRECTIVE ACTION REPORT NO.: 39

To Dan Joseph
 From Jake Zaragoza
 Copy to Courtney Taylor and Kaitlyn Elkind

Problem Identification		
Site (Location):	Orchard	
System or Instrumentation:	NADP Precipitation	
Estimated start date/time	10/7/2025	
Problem identified by:	Alex Clemments	
Problem definition: • Parameter (s) affected	NADP precipitation sensor found with severed cables • NADP NTN	
Planned corrective actions (if necessary):	Splice cables together and string through conduit for rodent mitigation.	
	Expected Completion Date:	November 5, 2025

Problem Resolution		
Date corrective action taken:	10/15/2025 & 11/5/2025	
Action taken by:	Bode Hoover & Jake Zaragoza	
Corrective action taken:	On October 15 th , the signal cable was spliced and the power cable replaced for the NOAH IV precipitation sensor. On November 5 th , both cables were strung through hard-sided conduit for further rodent mitigation.	
Effectiveness of corrective actions:	<input checked="" type="checkbox"/> Yes, it was resolved	<input type="checkbox"/> No, it was NOT resolved

Corrective Action Report Author & Date	Signature
Prepared by: Jake Zaragoza Date: 12/18/2025	
QA Officer: Michael Ring Date: 12/18/2025	

CORRECTIVE ACTION REPORT NO.: 40

To Dan Joseph
 From Jake Zaragoza
 Copy to Courtney Taylor and Kaitlyn Elkind

Problem Identification		
Site (Location):	Hereford	
System or Instrumentation:	Ozone	
Estimated start date/time	11/29/2025	
Problem identified by:	Alex Leake	
Problem definition: • Parameter (s) affected	Ozone analyzer produced lamp stability alarms and was accompanied by noisy data • Ozone	
Planned corrective actions (if necessary):	Replacement of the UV lamp	
	Expected Completion Date:	December 11, 2025

Problem Resolution		
Date corrective action taken:	12/10/2025-12/12/2025, & 1/5/2026	
Action taken by:	Bode Hoover & Jake Zaragoza	
Corrective action taken:	On December 10 th , a data review was completed for November data and several hours were invalidated. Invalidations were based on the timing of the lamp stability alarm on November 29 and a review of minute data following the lamp stability alarm. On December 11 th , Bode Hoover replaced the UV lamp on the Hereford ozone analyzer. Multi-point checks were performed before the lamp replacement, and again on December 12 th as a post-maintenance check. On January 5 th final validation decisions were made for December data. There were no lamp stability alarms in early December prior to replacement of the lamp.	
Effectiveness of corrective actions:	<input checked="" type="checkbox"/> Yes, it was resolved	<input type="checkbox"/> No, it was NOT resolved

Corrective Action Report Author & Date	Signature
Prepared by: Jake Zaragoza Date: 1/6/2026	

<p>QA Officer: Michael Ring Date: 1/7/2026</p>	
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APPENDIX B: SEMI-ANNUAL CALIBRATION VISITS AND INDEPENDENT AUDIT

APPENDIX B1: MISSILE SITE PARK STATION Q4 SEMI- ANNUAL CALIBRATION

TABLE B1-1

QUALITY ASSURANCE CALIBRATION RESULTS-AS FOUND

SITE NAME: WELD COUNTY MONITORING NETWORK: MISSILE SITE PARK SITE

AUDIT DATE: 10/30/2025

AUDIT CONDUCTED BY: Bode Hoover/Jake Zaragoza, Ramboll

HORIZONTAL WIND SPEED/DIRECTION AUDIT

SENSOR MODEL:	RM Young 05305V	START TIME	STOP TIME
SENSOR SERIAL #:	180188		
AUDIT DEVICE MODEL:	RM Young 18802	8:45	10:30
AUDIT DEVICE SERIAL #:	CA05458		
AUDIT DEVICE EXPIRATION:	12/17/2025		

PARAMETER	AUDIT METHOD	AUDIT VALUE	SENSOR RESPONSE	DIFFERENCE (M/S)	ACCEPTANCE CRITERIA	VALUE WITHIN ACCEPTANCE CRITERIA
HORIZONTAL WIND SPEED	DC MOTOR RPM	M/S	M/S	M/S	M/S	N/A
	0	0.000	-0.002	0.00	0.20	YES
	200	1.024	0.994	0.03	0.20	YES
	400	2.048	2.012	0.04	0.20	YES
	600	3.072	3.029	0.04	0.20	YES
	800	4.096	4.093	0.00	0.20	YES
	1000	5.120	5.094	0.03	0.20	YES
	2000	10.240	10.220	0.02	0.20	YES
	3000	15.360	15.344	0.02	0.20	YES
	4000	20.480	20.460	0.02	0.20	YES
	5000	25.600	25.590	0.01	0.20	YES
WIND DIRECTION	ALIGNMENT GAUGE	TORQUE VERIFICATION		CW = 0.1 CCW = 0.1	≤ 0.3 gm-cm ≤ 0.3 gm-cm	YES YES
		0	-0.92	0.92	5	YES
		30	28.48	1.52	5	YES
		60	59.86	0.14	5	YES
		90	91.63	1.63	5	YES
		120	121.60	1.60	5	YES
		150	150.65	0.65	5	YES
		180	179.95	0.05	5	YES
		210	210.43	0.43	5	YES
		240	239.10	0.90	5	YES
		270	269.70	0.30	5	YES
		300	299.47	0.53	5	YES
	330	329.24	0.76	5	YES	
360	361.10	1.10	5	YES		
TORQUE VERIFICATION		QUAD.#1 = - QUAD.#2 = -	≤ 9.0 gm-cm ≤ 9.0 gm-cm	- -		

° E CROSS ARM ALIGNMENT:	MAG DEC:	7.57 E	4 QUAD VANE ALIGNMENT:	N=	-1.57
	AS FOUND:	-2		E=	92.22
	TOLERANCE: +/- 5° (PASSED)			S=	180.28
				W=	269.44

WIND DIRECTION	TRANSIT ALIGNMENT	AUDIT =	-2	±2.0 degrees	YES
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- KEY:**
- HWS Horizontal wind speed
 - VWS Vertical wind speed
 - WD Wind direction
 - M/S Meters per second
 - N/A Not applicable
 - MAG. DEC. Magnetic Declination
 - CW Clockwise
 - CCW Counter Clockwise
 - AGL Above Ground Level

NOTES: Too breezy to perform wind direction torque test.

TABLE B1-2

QUALITY ASSURANCE CALIBRATION RESULTS-AS FOUND

SITE NAME: WELD COUNTY MONITORING NETWORK: MISSILE SITE PARK SITE

AUDIT DATE: 10/30/2025

AUDIT CONDUCTED BY: Bode Hoover/Jake Zaragoza, Ramboll

TEMPERATURE/DELTA TEMPERATURE AUDIT

SENSOR MODEL: RM YOUNG 41342VC

SENSOR SERIAL #: 032951 (2M)/032952 (10M)

AUDIT DEVICE: Omega HH42A

AUDIT DEVICE SERIAL #: 23KMM02815

AUDIT DEVICE EXPIRATION: 12/10/2025

START TIME	STOP TIME
9:30	11:00

WATER BATH PARAMETER	AUDIT SENSOR VALUE	2-M SENSOR VALUE	2-M VS. AUDIT DIFF.	10-M SENSOR VALUE	10-M VS. AUDIT DIFF.	ACCEPTANC E CRITERIA (+/-)	DELTA T: 10- M VS. 2-M DIFF.	ACCEPTANC E CRITERIA (+/-)	VALUE WITHIN ACCEPTANC E CRITERIA
	DEG. C	DEG. C	DEG. C	DEG. C	DEG. C	DEG. C	DEG. C	DEG. C	N/A
ICE BATH	0.25	0.39	0.14	0.32	0.07	0.50	-0.07	0.1	YES
AMBIENT BATH	27.28	27.33	0.05	27.26	-0.02	0.50	-0.07	0.1	YES
HOT BATH	42.10	42.00	-0.10	41.94	-0.16	0.50	-0.06	0.1	YES

NOTES: No changes made.

TABLE B1-3

QUALITY ASSURANCE CALIBRATION RESULTS-AS FOUND

SITE NAME: WELD COUNTY MONITORING NETWORK: MISSILE SITE PARK SITE

AUDIT DATE: 10/30/2025

AUDIT CONDUCTED BY: Bode Hoover/Jake Zaragoza, Ramboll

RELATIVE HUMIDITY AUDIT

SENSOR MODEL: EE181				START TIME STOP TIME		
SENSOR SERIAL #: 20151600125038				10:45 12:45		
AUDIT DEVICE MODEL: EE181						
AUDIT DEVICE SERIAL #: 214116001537C1						
AUDIT DEVICE EXPIRATION: 12/2/2025						
RELATIVE HUMIDITY		AUDIT SENSOR VALUE	2-M SENSOR VALUE	ABSOLUTE % RH DIFF.	ACCEPTANCE CRITERIA (+/-)	VALUE WITHIN ACCEPTANCE CRITERIA?
AVERAGE:		UNITS	% RH	% RH	% RH	PERCENT
			30.56	35.07	4.51	7.0
			31.25	36.17	4.92	7.0
			31.85	37.27	5.42	7.0
						N/A
						YES
						YES
						YES
NOTES: No changes made.						

BAROMETRIC PRESSURE AUDIT

SENSOR MODEL: Setra 278				START TIME STOP TIME		
SENSOR SERIAL #: 7563464				10:45 12:45		
AUDIT DEVICE MODEL: BVC10						
AUDIT DEVICE SERIAL #: 3753						
AUDIT DEVICE EXPIRATION: 7/2/2026						
BAROMETRIC PRESSURE		AUDIT SENSOR VALUE	2-M SENSOR VALUE	ABSOLUTE DIFF.	ACCEPTANCE CRITERIA (+/-)	VALUE WITHIN ACCEPTANCE CRITERIA?
AVERAGE:		UNITS	mm Hg	mm Hg	mm Hg	mm Hg
			639.4	639.7	0.30	2.25
						N/A
						YES
NOTES: No changes made.						

PRECIPITATION AUDIT

SENSOR MODEL: RM Young Heated Rain Gauge Model 52202				START TIME STOP TIME		
SENSOR SERIAL: TB16137				8:30 15:06		
AUDIT DEVICE MODEL: Drip Bottle						
AUDIT DEVICE SERIAL #: N/A						
PRECIPITATION		AUDIT SENSOR VALUE	2-M SENSOR VALUE	PERCENT DIFF.	ACCEPTANCE CRITERIA (+/-)	VALUE WITHIN ACCEPTANCE CRITERIA?
As Found						
300 ML WATER = 150 TIPS/0.3"		UNITS	Inches	Inches	PERCENT	PERCENT
Volume			1.969	2.056	4.4%	10
						N/A
						YES
As Left						
300 ML WATER = 150 TIPS/0.3"		UNITS	Inches	Inches	PERCENT	PERCENT
Volume			0.984	0.93	-5.5%	10
						N/A
						YES
NOTES: Tipping buckets cleaned						

PANEL TEMPERATURE AUDIT

SENSOR MODEL: Campbell Scientific CR3000				START TIME STOP TIME		
SENSOR SERIAL #: 13406				12:16 12:20		
AUDIT DEVICE MODEL: Omega HH42A						
AUDIT DEVICE SERIAL #: 23KMM02815						
AUDIT DEVICE EXPIRATION: 12/10/2025						
PANEL TEMPERATURE		AUDIT SENSOR VALUE	2-M SENSOR VALUE	ABSOLUTE DIFF.	ACCEPTANCE CRITERIA (+/-)	VALUE WITHIN ACCEPTANCE CRITERIA?
INSTANTANEOUS READING:		UNITS	DEG. C	DEG. C	DEG. C	ABS. DIFF
			23.95	24.06	0.11	2.1
						N/A
						YES
NOTES: No changes made.						



Table B1-4

QUALITY ASSURANCE CALIBRATION RESULTS-AS FOUND

SITE NAME: WELD COUNTY MONITORING NETWORK: MISSILE SITE PARK SITE

AUDIT DATE: 10/30/2025

AUDIT CONDUCTED BY: Bode Hoover/Jake Zaragoza, Ramboll

SOLAR RADIATION AUDIT

SENSOR MODEL: Hukseflux LP02

SENSOR SERIAL #: 48019

AUDIT DEVICE MODEL: SR05

AUDIT DEVICE SERIAL #: 19771

AUDIT DEVICE EXPIRATION: 5/14/2026

Timestamp	Audit Sensor (w/m2)	Site Sensor (w/m2)
12:45	610	614.4
12:30	624.5	629.8
12:15	632.1	638.4
12:00	636	639.8
11:45	640.1	643.3
11:30	640.1	643.4
11:15	633.7	635.4
11:00	623	623.3
AVG	629.9	633.5
	% DIFF=	-0.56%

NOTES: No changes made.

**TABLE B1-5
GAS CALIBRATION AS FOUND REPORT**

AUDIT DATE: 10/14/2025
AUDITED BY: Bode Hoover, Ramboll
SITE: Missile Site Park

ANALYZER DEVICE: TELEDYNE API T200 NOX ANALYZER RANGE = 0 - 500 PPB NOX
ANALYZER DEVICE: TELEDYNE API T400 O3 ANALYZER, RANGE 0 - 500 PPB O3
AUDIT DEVICE: TELEDYNE API T700 MULTI-GAS CALIBRATOR

Time Keeping	NO Audit												
	Calibration Gas Flows (LPM)			Audit Point	NO Audit Conc. (PPB)	NO _x Audit Conc. (PPB)	NO (PPB)	NO % diff.	NO _x (PPB)	NO _x % diff.	NO ₂ (PPB)	NO ₂ % diff.	NO _x Pass/Fail
Calibrations Start Time	Audit Gas	Zero Air											
9:43:00 AM	0.0000		6.0070	Zero	0.0	0.0	0.5	N/A	0.7	N/A	0.3	N/A	N/A
	0.0099		6.0050	2	50.5	50.7	49.4	-2.3	50.2	-1.0	0.5	N/A	PASS
	0.0198		5.9980	3	100.2	100.5	99.6	-0.6	100.4	-0.1	0.9	N/A	PASS
	0.0395		5.9760	4	200.4	201.1	200.3	0.0	201.1	0.0	0.9	N/A	PASS
	0.0788		5.9350	5	399.4	400.7	399.8	0.1	402.9	0.5	3.0	N/A	PASS
NO ₂ Audit (Gas Phase Titration)													
Calibrations Start Time	Calibration Gas Flows (LPM)			Audit Point	NO ₂ Audit Conc. (PPB)	NO Audit Conc. (PPB)	NO Orig. (PPB)	NO rem. (PPB)	NO _x (PPB)	NO ₂ (PPB)	NO ₂ % diff.	Molybdenum Converter Efficiency (%); >96% = PASS	NO ₂ Pass/Fail
	Audit Gas	Ozone	Zero Air										
9:43:00 AM	0.0000	0.0000	5.9110	Zero	0.0	0.0	N/A	0.5	0.6	0.2	N/A	101.0%	N/A
	0.0198	0.1050	5.8910	1 (40 PPB O ₃)	43.3	100.3	99.6	56.3	99.2	42.9	-0.8	PASS	PASS
Calibrations Stop Time	0.0395	0.1050	5.8740	2 (80 PPB O ₃)	82.6	200.3	200.3	117.7	200.5	83.2	0.7		PASS
3:31:00 PM	0.0788	0.1050	5.8330	3 (160 PPB O ₃)	162.3	399.3	399.8	237.6	402.9	165.3	1.9		PASS
Ozone Audit													
Calibrations Start Time	Audit Point	Uncorrected Audit Conc. (PPB)	Corrected Audit Conc. (PPB)	O ₃ (PPB)	O ₃ % diff.	Pass/Fail							
7:49:00 AM	Zero	-1.3	-1.3	0.19	N/A	N/A							
	1	399.7	399.7	394.07	-1.4	PASS							
	2	300.3	300.3	295.11	-1.7	PASS							
	3	199.8	199.8	197.49	-1.2	PASS							
Calibrations Stop Time	4	100.2	100.2	101.31	1.1	PASS							
9:22:00 AM	5	50.3	50.3	51.22	1.8	PASS							
Linear Regression				Diagnostics									
	NO	NO _x	NO ₂ (GPT)	O ₃	T700	T400	T200	Audit Gas					
Slope	1.002	1.005	1.019	0.980	Serial Number	4969	5986	Serial Number	6727	Cylinder SN	EB0136191		
Intercept	-0.443	-0.307	-0.537	1.974	O ₃ Slope	0.9800	1.05	NO _x Slope	1.056	NO Conc (PPM)	30.5		
Correlation	1.0000	1.0000	1.0000	1.0000	O ₃ Offset	-0.6000	-3.60	NO _x Offset	-0.5	NO _x Conc (PPM)	30.6		
Avg % diff.	-0.71	-0.15	0.60	-0.27	L3 O ₃ Slope Correction Factor	1.0000		NO Slope	1.063	NO ₂ Impurity (PPM)	0.1		
					L3 O ₃ Offset Correction Factor	0.0000		NO Offset	-0.7				
					Box Temp (C)	31.3	28.1	Box Temp (C)	31.6				
					(Photo) Sample Temp (C)	40.1	36.1	HVPS (V)	536				
					Ph. Lamp Temp (C)	58.0	58.0	Moly Conv Temp. (C)	314.4				
					Ozone Gen Lamp Temp (C)	48.0		O ₃ Flow (cc/min)	78.0				
					Photo Flow (lpm)	0.690		PMT Temp. (C)	6.8				
					Photo Press (in Hg)	25.0		Rx Cell Press (in Hg)	3.4				
					Sample Flow (cc/min)		697.7	Rx Cell Temp (C)	50.00				
					Sample Press (in Hg)		22.7	Sample Flow (cc/min)	525.0				
					O ₃ Ref (mV)	3949.4	3933.7	Sample Press (in Hg)	23.5				
Key:				NOTES: No changes made.									
NO ₂	Nitrogen Dioxide	%	Percent										
NO _x	Oxides of Nitrogen	TAPI	Teledyne Advanced Pollution Instrumentation										
N/A	Not Applicable	Avg	Average										
orig.	Original	Conc.	Concentration										
PPB	Parts Per Billion	diff.	Difference										
slpm	Standard liters per minute	GPT	Gas Phase Titration										
rem.	Remaining	NO	Nitrogen Oxide										

**TABLE B1-6
GAS CALIBRATION AS LEFT REPORT**

AUDIT DATE: 10/31/2025
AUDITED BY: Abraham Dearden, Ramboll
SITE: Missile Site Park

ANALYZER DEVICE: TELEDYNE API T200 NOX ANALYZER RANGE = 0 - 500 PPB NOX
ANALYZER DEVICE: TELEDYNE API T400 O3 ANALYZER, RANGE 0 - 500 PPB O3
AUDIT DEVICE: TELEDYNE API T700 MULTI-GAS CALIBRATOR

Time Keeping	NO Audit												
	Calibration Gas Flows (LPM)			Audit Point	NO Audit Conc. (PPB)	NO _x Audit Conc. (PPB)	NO (PPB)	NO % diff.	NO _x (PPB)	NO _x % diff.	NO ₂ (PPB)	NO ₂ % diff.	NO _x Pass/Fail
Calibrations Start Time	Audit Gas	Zero Air											
8:21:00 AM	0.0000		6.0080	Zero	0.0	0.0	0.8	N/A	0.9	N/A	0.5	N/A	N/A
	0.0099		5.9990	2	50.4	50.6	50.7	0.5	51.3	1.4	1.0	N/A	PASS
	0.0198		5.9930	3	100.2	100.5	101.2	1.0	101.9	1.3	0.9	N/A	PASS
	0.0395		5.9750	4	200.4	201.1	202.5	1.0	203.9	1.4	1.7	N/A	PASS
	0.7880		5.9340	5	399.6	400.9	404.4	1.2	407.0	1.5	2.4	N/A	PASS
NO ₂ Audit (Gas Phase Titration)													
Calibrations Start Time	Calibration Gas Flows (LPM)			Audit Point	NO ₂ Audit Conc. (PPB)	NO Audit Conc. (PPB)	NO Orig. (PPB)	NO rem. (PPB)	NO _x (PPB)	NO ₂ (PPB)	NO ₂ % diff.	Molybdenum Converter Efficiency (%); >96% = PASS	NO ₂ Pass/Fail
	Audit Gas	Ozone	Zero Air										
12:06:00 PM	0.0000	0.0000	6.0080	Zero	0.0	0.0	N/A	0.8	0.9	0.5	N/A	100.9%	N/A
	0.0198	0.1050	5.8930	1 (40 PPB O ₃)	42.2	100.2	101.2	59.0	101.6	42.6	1.1	PASS	PASS
	0.0395	0.1050	5.8720	2 (80 PPB O ₃)	87.2	200.3	202.5	115.4	203.4	88.7	1.8		PASS
	0.0788	0.1050	5.8340	3 (160 PPB O ₃)	171.8	399.5	404.4	232.6	407.8	175.1	1.9		PASS
Ozone Audit													
Calibrations Start Time				Audit Point	Uncorrected Audit Conc. (PPB)	Corrected Audit Conc. (PPB)	O ₃ (PPB)	O ₃ % diff.	Pass/Fail				
12:06:00 PM													
				Zero	0.00	0	0.23	N/A	N/A				
				1	49.90	49.9	50.63	1.5	PASS				
				2	99.50	99.5	100.56	1.1	PASS				
				3	199.70	199.7	197.31	-1.2	PASS				
				4	300.90	300.9	297.13	-1.3	PASS				
				5	399.70	399.7	395.60	-1.0	PASS				
Linear Regression					Diagnostics								
	NO	NO _x	NO ₂ (GPT)	O ₃	T700	T400	T200	Audit Gas					
Slope	1.011	1.014	1.017	0.986	Serial Number	4969	5986	Serial Number	6727				
Intercept	0.099	0.288	0.149	1.080	O ₃ Slope	0.9750	1.05	NO _x Slope	1.056				
Correlation	1.0000	1.0000	1.0000	1.0000	O ₃ Offset	0.2000	-3.60	NO _x Offset	-0.5				
Avg % diff.	0.94	1.42	1.58	-0.19	L3 O ₃ Slope Correction Factor	1.0000		NO Slope	1.063				
					L3 O ₃ Offset Correction Factor	0.0000		NO Offset	-0.7				
					Box Temp (C)	30.1	27.1	Box Temp (C)	29.7				
					(Photo) Sample Temp (C)	38.9	35.4	HVPS (V)	536				
					Ph. Lamp Temp (C)	58.0	58.0	Moly Conv Temp. (C)	314.5				
					Ozone Gen Lamp Temp (C)	48.0		O ₃ Flow (cc/min)	79.0				
					Photo Flow (lpm)	0.699		PMT Temp. (C)	6.8				
					Photo Press (in Hg)	24.2		Rx Cell Press (in Hg)	3.5				
					Sample Flow (cc/min)		693.7	Rx Cell Temp (C)	50.00				
					Sample Press (in Hg)		22.8	Sample Flow (cc/min)	525.0				
					O ₃ Ref (mV)	3927.5	3866.4	Sample Press (in Hg)	23.7				
Key:					NOTES: Ozone rebuilds of flow orifice and pump. NO/NO ₂ /NO _x pump rebuilt.								
NO ₂	Nitrogen Dioxide	%	Percent										
NO _x	Oxides of Nitrogen	TAPI	Teledyne Advanced Pollution Instrumentation										
N/A	Not Applicable	Avg	Average										
orig.	Original	Conc.	Concentration										
PPB	Parts Per Billion	diff.	Difference										
slpm	Standard liters per minute	GPT	Gas Phase Titration										
rem.	Remaining	NO	Nitrogen Oxide										

TABLE B1-7

QUALITY ASSURANCE CALIBRATION RESULTS-AS FOUND

SITE NAME: MISSILE SITE PARK

AUDIT DATE: 10/15/2025

AUDIT CONDUCTED BY: Jake Zaragoza/Bode Hoover, Ramboll

HIGH FLOW MASS FLOW CONTROLLER AUDIT

SENSOR MODEL: Hastings HFC-212
SENSOR SERIAL #: 0661178007
AUDIT DEVICE MODEL: MB-10SLPM-D
AUDIT DEVICE SERIAL #: 471381
AUDIT DEVICE EXPIRATION: 12/30/2025

START TIME	STOP TIME
8:44	9:26

AUDIT METHOD	AUDIT VALUE	SENSOR RESPONSE	DIFFERENCE (%)	ACCEPTANCE CRITERIA	VALUE WITHIN ACCEPTANCE CRITERIA
DRV	Ref. Flow (SLPM)	Inst. Flow (SLPM)	%	%	N/A
0	0.002	0.000	N/A	2.00	N/A
250	0.556	0.557	0.18%	2.00	YES
500	1.095	1.094	-0.09%	2.00	YES
750	1.626	1.622	-0.25%	2.00	YES
1000	2.167	2.163	-0.18%	2.00	YES
1250	2.702	2.696	-0.22%	2.00	YES
1500	3.237	3.229	-0.25%	2.00	YES
1750	3.775	3.763	-0.32%	2.00	YES
2000	4.313	4.300	-0.30%	2.00	YES
2250	4.854	4.837	-0.35%	2.00	YES
2500	5.386	5.362	-0.45%	2.00	YES
2750	5.924	5.894	-0.51%	2.00	YES
3000	6.473	6.429	-0.68%	2.00	YES
3250	7.011	6.956	-0.78%	2.00	YES
3500	7.551	7.488	-0.83%	2.00	YES
3750	8.086	7.986	-1.24%	2.00	YES
4000	8.630	8.515	-1.33%	2.00	YES
4250	9.170	9.055	-1.25%	2.00	YES
4500	9.717	9.583	-1.38%	2.00	YES
4750	10.265	10.154	-1.08%	2.00	YES
5000	10.804	10.690	-1.06%	2.00	YES

LOW FLOW MASS FLOW CONTROLLER AUDIT

SENSOR MODEL: Hastings HFC-212
SENSOR SERIAL #: 0763637014
AUDIT DEVICE MODEL: MBS-200SCCM-D
AUDIT DEVICE SERIAL #: 471382
AUDIT DEVICE EXPIRATION: 6/4/2026

START TIME	STOP TIME
7:44	8:39

AUDIT METHOD	AUDIT VALUE	SENSOR RESPONSE	DIFFERENCE (%)	ACCEPTANCE CRITERIA	VALUE WITHIN ACCEPTANCE CRITERIA
DRV	Ref. Flow (SCCM)	Inst. Flow (SCCM)	%	%	N/A
0	0.000	0.000	N/A	2.00	N/A
250	5.590	5.600	0.18%	2.00	YES
500	11.130	11.100	-0.27%	2.00	YES
750	16.620	16.700	0.48%	2.00	YES
1000	22.140	22.100	-0.18%	2.00	YES
1250	27.590	27.600	0.04%	2.00	YES
1500	33.000	33.200	0.61%	2.00	YES
1750	38.410	38.500	0.23%	2.00	YES
2000	43.810	43.800	-0.02%	2.00	YES
2250	49.130	49.200	0.14%	2.00	YES
2500	54.400	54.500	0.18%	2.00	YES
2750	59.700	59.700	0.00%	2.00	YES
3000	64.940	65.000	0.09%	2.00	YES
3250	70.160	70.400	0.34%	2.00	YES
3500	75.410	75.600	0.25%	2.00	YES
3750	80.630	80.600	-0.04%	2.00	YES
4000	85.860	85.900	0.05%	2.00	YES
4250	91.060	91.500	0.48%	2.00	YES
4500	96.300	96.400	0.10%	2.00	YES
4750	101.590	101.700	0.11%	2.00	YES
5000	106.840	106.900	0.06%	2.00	YES

TABLE B1-8

QUALITY ASSURANCE CALIBRATION RESULTS-AS LEFT

SITE NAME: MISSILE SITE PARK

AUDIT DATE: 10/15/2025

AUDIT CONDUCTED BY: Jake Zaragoza/Bode Hoover, Ramboll

HIGH FLOW MASS FLOW CONTROLLER AUDIT

SENSOR MODEL: Hastings HFC-212
SENSOR SERIAL #: 0661178007
AUDIT DEVICE MODEL: MB-10SLPM-D/GAS
AUDIT DEVICE SERIAL #: 471381
AUDIT DEVICE EXPIRATION: 12/30/2025

START TIME	STOP TIME
9:28	10:00

AUDIT METHOD	AUDIT VALUE	SENSOR RESPONSE	DIFFERENCE (%)	ACCEPTANCE CRITERIA	VALUE WITHIN ACCEPTANCE CRITERIA
DRV	Ref. Flow (SLPM)	Inst. Flow (SLPM)	%	%	N/A
0	0.002	0.000	N/A	2.00	N/A
250	0.559	0.557	-0.36%	2.00	YES
500	1.096	1.094	-0.18%	2.00	YES
750	1.629	1.622	-0.43%	2.00	YES
1000	2.168	2.163	-0.23%	2.00	YES
1250	2.707	2.696	-0.41%	2.00	YES
1500	3.241	3.229	-0.37%	2.00	YES
1750	3.778	3.763	-0.40%	2.00	YES
2000	4.317	4.300	-0.39%	2.00	YES
2250	4.859	4.837	-0.45%	2.00	YES
2500	5.393	5.386	-0.13%	2.00	YES
2750	5.929	5.924	-0.08%	2.00	YES
3000	6.478	6.473	-0.08%	2.00	YES
3250	7.015	7.011	-0.06%	2.00	YES
3500	7.557	7.551	-0.08%	2.00	YES
3750	8.098	8.086	-0.15%	2.00	YES
4000	8.640	8.630	-0.12%	2.00	YES
4250	9.180	9.170	-0.11%	2.00	YES
4500	9.728	9.717	-0.11%	2.00	YES
4750	10.277	10.265	-0.12%	2.00	YES
5000	10.823	10.804	-0.18%	2.00	YES

LOW FLOW MASS FLOW CONTROLLER AUDIT

SENSOR MODEL: Hastings HFC-212
SENSOR SERIAL #: 0763637014
AUDIT DEVICE MODEL: MBS-200SCCM-D
AUDIT DEVICE SERIAL #: 471382
AUDIT DEVICE EXPIRATION: 6/4/2026

START TIME	STOP TIME
N/A	N/A

AUDIT METHOD	AUDIT VALUE	SENSOR RESPONSE	DIFFERENCE (%)	ACCEPTANCE CRITERIA	VALUE WITHIN ACCEPTANCE CRITERIA
DRV	Ref. Flow (SCCM)	Inst. Flow (SCCM)	%	%	N/A
0	0.000	0.000	N/A	2.00	N/A
250	5.590	5.600	0.18%	2.00	YES
500	11.130	11.100	-0.27%	2.00	YES
750	16.620	16.700	0.48%	2.00	YES
1000	22.140	22.100	-0.18%	2.00	YES
1250	27.590	27.600	0.04%	2.00	YES
1500	33.000	33.200	0.61%	2.00	YES
1750	38.410	38.500	0.23%	2.00	YES
2000	43.810	43.800	-0.02%	2.00	YES
2250	49.130	49.200	0.14%	2.00	YES
2500	54.400	54.500	0.18%	2.00	YES
2750	59.700	59.700	0.00%	2.00	YES
3000	64.940	65.000	0.09%	2.00	YES
3250	70.160	70.400	0.34%	2.00	YES
3500	75.410	75.600	0.25%	2.00	YES
3750	80.630	80.600	-0.04%	2.00	YES
4000	85.860	85.900	0.05%	2.00	YES
4250	91.060	91.500	0.48%	2.00	YES
4500	96.300	96.400	0.10%	2.00	YES
4750	101.590	101.700	0.11%	2.00	YES
5000	106.840	106.900	0.06%	2.00	YES

Notes: No as left calibration was needed for the low flow MFC. Included values are identical to the 'as-found' checks.

APPENDIX B2: HEREFORD STATION Q4 SEMI-ANNUAL CALIBRATION

TABLE B2-1

QUALITY ASSURANCE CALIBRATION RESULTS-AS FOUND

SITE NAME: WELD COUNTY MONITORING NETWORK: HEREFORD SITE

AUDIT DATE: 10/29/2025

AUDIT CONDUCTED BY: Bode Hoover/Jake Zaragoza, Ramboll

HORIZONTAL WIND SPEED/DIRECTION AUDIT

SENSOR MODEL: RM Young 05305	<table border="1"> <tr> <th>START TIME</th> <th>STOP TIME</th> </tr> <tr> <td>8:35</td> <td>9:10</td> </tr> </table>	START TIME	STOP TIME	8:35	9:10
START TIME		STOP TIME			
8:35		9:10			
SENSOR SERIAL #: 209492					
AUDIT DEVICE MODEL: RM Young 18802					
AUDIT DEVICE SERIAL #: CA05458					
AUDIT DEVICE EXPIRATION: 12/17/2025					

PARAMETER	AUDIT METHOD	AUDIT VALUE	SENSOR RESPONSE	DIFFERENCE (M/S)	ACCEPTANCE CRITERIA	VALUE WITHIN ACCEPTANCE CRITERIA
HORIZONTAL WIND SPEED	DC MOTOR RPM	M/S	M/S	M/S	M/S	N/A
	0	0.000	0.000	0.00	0.20	YES
	200	1.024	1.024	0.00	0.20	YES
	400	2.048	2.048	0.00	0.20	YES
	600	3.072	3.072	0.00	0.20	YES
	800	4.096	4.096	0.00	0.20	YES
	1000	5.120	5.120	0.00	0.20	YES
	2000	10.240	10.240	0.00	0.20	YES
	3000	15.360	15.360	0.00	0.20	YES
	4000	20.480	20.480	0.00	0.20	YES
	5000	25.600	25.600	0.00	0.20	YES
	TORQUE VERIFICATION		CW = 0.3 CCW = 0.3	0.3 0.3	≤ 0.3 gm-cm ≤ 0.3 gm-cm	YES YES
WIND DIRECTION	ALIGNMENT GAUGE	0	2.66	2.66	5	YES
		30	31.42	1.42	5	YES
		60	59.41	-0.59	5	YES
		90	90.27	0.27	5	YES
		120	118.37	-1.63	5	YES
		150	149.40	-0.60	5	YES
		180	179.65	-0.35	5	YES
		210	210.16	0.16	5	YES
		240	239.46	-0.54	5	YES
		270	270.21	0.21	5	YES
		300	300.98	0.98	5	YES
		330	329.76	-0.24	5	YES
		360	361.33	1.33	5	YES
	TORQUE VERIFICATION		QUAD.#1 = QUAD.#2 =	- -	≤ 9.0 gm-cm ≤ 9.0 gm-cm	- -

° E CROSS ARM ALIGNMENT:	MAG DEC:	7.32 E	4 QUAD VANE ALIGNMENT:	N=	1.69
	AS FOUND:	1		E=	91.18
	TOLERANCE:	+/- 5° (PASSED)		S=	180.24
				W=	268.82

WIND DIRECTION	TRANSIT ALIGNMENT	AUDIT =	1	±2.0 degrees	YES
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- KEY:**
- HWS Horizontal wind speed
 - VWS Vertical wind speed
 - WD Wind direction
 - M/S Meters per second
 - N/A Not applicable
 - MAG. DEC. Magnetic Declination
 - CW Clockwise
 - CCW Counter Clockwise
 - AGL Above Ground Level

NOTES: Too breezy for wind direction torque verification.

TABLE B2-2

QUALITY ASSURANCE CALIBRATION RESULTS-AS LEFT

SITE NAME: WELD COUNTY MONITORING NETWORK: HEREFORD SITE

AUDIT DATE: 10/29/2025

AUDIT CONDUCTED BY: Bode Hoover/Jake Zaragoza, Ramboll

HORIZONTAL WIND SPEED/DIRECTION AUDIT

SENSOR MODEL: RM Young 05305	<table border="1"> <tr> <th>START TIME</th> <th>STOP TIME</th> </tr> <tr> <td>9:10</td> <td>9:40</td> </tr> </table>	START TIME	STOP TIME	9:10	9:40
START TIME		STOP TIME			
9:10		9:40			
SENSOR SERIAL #: 209492					
AUDIT DEVICE MODEL: RM Young 18802					
AUDIT DEVICE SERIAL #: CA05458					
AUDIT DEVICE EXPIRATION: 12/17/2025					

PARAMETER	AUDIT METHOD	AUDIT VALUE	SENSOR RESPONSE	DIFFERENCE (M/S)	ACCEPTANCE CRITERIA	VALUE WITHIN ACCEPTANCE CRITERIA
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HORIZONTAL WIND SPEED	DC MOTOR RPM	M/S	M/S	M/S	M/S	N/A
	0	0.000	0.000	0.00	0.20	YES
	200	1.024	1.024	0.00	0.20	YES
	400	2.048	2.048	0.00	0.20	YES
	600	3.072	3.072	0.00	0.20	YES
	800	4.096	4.096	0.00	0.20	YES
	1000	5.120	5.120	0.00	0.20	YES
	2000	10.240	10.240	0.00	0.20	YES
	3000	15.360	15.360	0.00	0.20	YES
	4000	20.480	20.480	0.00	0.20	YES
	5000	25.600	25.600	0.00	0.20	YES
		TORQUE VERIFICATION	CW =	0.3	≤ 0.3 gm-cm	YES
			CCW =	0.3	≤ 0.3 gm-cm	YES

WIND DIRECTION	ALIGNMENT GAUGE					
	0	2.66	2.66	5	5	YES
	30	31.42	1.42	5	5	YES
	60	59.41	-0.59	5	5	YES
	90	90.27	0.27	5	5	YES
	120	118.37	-1.63	5	5	YES
	150	149.40	-0.60	5	5	YES
	180	179.65	-0.35	5	5	YES
	210	210.16	0.16	5	5	YES
	240	239.46	-0.54	5	5	YES
	270	270.21	0.21	5	5	YES
	300	300.98	0.98	5	5	YES
	330	329.76	-0.24	5	5	YES
	360	361.33	1.33	5	5	YES
		TORQUE VERIFICATION	QUAD.#1 =	-	≤ 9.0 gm-cm	-
			QUAD.#2 =	-	≤ 9.0 gm-cm	-

° E CROSS ARM ALIGNMENT:	MAG DEC:	7.32 E	4 QUAD VANE ALIGNMENT:	N=	1.69
	AS FOUND:	1		E=	91.18
	TOLERANCE: +/- 5° (PASSED)			S=	180.24
				W=	268.82

WIND DIRECTION	TRANSIT ALIGNMENT	AUDIT =	1	±2.0 degrees	YES
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- KEY:**
- HWS** Horizontal wind speed
 - VWS** Vertical wind speed
 - WD** Wind direction
 - M/S** Meters per second
 - N/A** Not applicable
 - MAG. DEC.** Magnetic Declination
 - CW** Clockwise
 - CCW** Counter Clockwise
 - AGL** Above Ground Level

NOTES: Too breezy for wind direction torque verification. Wind speed nose-cone bearings replaced.

TABLE B2-3

QUALITY ASSURANCE CALIBRATION RESULTS-AS FOUND

SITE NAME: WELD COUNTY MONITORING NETWORK: HEREFORD SITE

AUDIT DATE: 10/29/2025

AUDIT CONDUCTED BY: Bode Hoover/Jake Zaragoza, Ramboll

TEMPERATURE/DELTA TEMPERATURE AUDIT

SENSOR MODEL: RM YOUNG 41342VC

SENSOR SERIAL #: 032950 (2M)/032869 (10M)

AUDIT DEVICE: Omega HH42A

AUDIT DEVICE SERIAL #: 23KMM02815

AUDIT DEVICE EXPIRATION: 12/10/2025

START TIME	STOP TIME
8:28	9:30

WATER BATH PARAMETER	AUDIT SENSOR VALUE	2-M SENSOR VALUE	2-M VS. AUDIT DIFF.	10-M SENSOR VALUE	10-M VS. AUDIT DIFF.	ACCEPTANC E CRITERIA (+/-)	DELTA T: 10- M VS. 2-M DIFF.	ACCEPTANC E CRITERIA (+/-)	VALUE WITHIN ACCEPTANC E CRITERIA
	DEG. C	DEG. C	DEG. C	DEG. C	DEG. C	DEG. C	DEG. C	DEG. C	N/A
ICE BATH	0.05	0.05	0.00	0.03	-0.02	0.50	-0.02	0.1	YES
AMBIENT BATH	33.17	33.08	-0.09	33.01	-0.16	0.50	-0.07	0.1	YES
HOT BATH	47.87	47.86	-0.01	47.79	-0.08	0.50	-0.07	0.1	YES

NOTES: No changes made.



TABLE B2-4

QUALITY ASSURANCE CALIBRATION RESULTS-AS FOUND

SITE NAME: **WELD COUNTY MONITORING NETWORK: HEREFORD SITE**

AUDIT DATE: **10/29/2025**

AUDIT CONDUCTED BY: **Bode Hoover/Jake Zaragoza, Ramboll**

RELATIVE HUMIDITY AUDIT

SENSOR MODEL: EE181				START TIME		STOP TIME	
SENSOR SERIAL #: 2015160012638F				8:30		9:30	
AUDIT DEVICE MODEL: EE181							
AUDIT DEVICE SERIAL #: 214116001537C1							
AUDIT DEVICE EXPIRATION: 12/2/2025							
RELATIVE HUMIDITY			AUDIT SENSOR VALUE	2-M SENSOR VALUE	ABSOLUTE % RH DIFF.	ACCEPTANCE CRITERIA (+/-)	VALUE WITHIN ACCEPTANCE CRITERIA
AVERAGE:			UNITS % RH	% RH	% RH	PERCENT	N/A
			25.57	30.25	4.68	7.0	YES
			25.86	30.6	4.74	7.0	YES
			27.52	32.38	4.86	7.0	YES
			28.40	33.44	5.04		
NOTES: No changes made.							

BAROMETRIC PRESSURE AUDIT

SENSOR MODEL: Setra 278				START TIME		STOP TIME	
SENSOR SERIAL #: 7573233				11:15		11:20	
AUDIT DEVICE MODEL: BVC10							
AUDIT DEVICE SERIAL #: 3753							
AUDIT DEVICE EXPIRATION: 7/2/2026							
BAROMETRIC PRESSURE			AUDIT SENSOR VALUE	2-M SENSOR VALUE	ABSOLUTE DIFF.	ACCEPTANCE CRITERIA (+/-)	VALUE WITHIN ACCEPTANCE CRITERIA
AVERAGE:			UNITS mm Hg	mm Hg	mm Hg	mm Hg	N/A
			633.9	634.0	0.14	2.25	YES
NOTES: Test performed on June 27, 2025							

PRECIPITATION AUDIT

SENSOR MODEL: RM Young Heated Rain Gauge Model 52202				START TIME		STOP TIME		
SENSOR SERIAL: TB16139				10:31		11:30		
AUDIT DEVICE MODEL: Drip Bottle								
AUDIT DEVICE SERIAL #: N/A								
PRECIPITATION			AUDIT S VALUE	2-M SENSOR VALUE	PERCENT DIFF.	ACCEPTANCE CRITERIA (+/-)	VALUE WITHIN ACCEPTANCE CRITERIA	
As Found								
300 ML WATER = 150 TIPS/0.591"			UNITS Inches	Inches	PERCENT	PERCENT	N/A	
Volume			1000	1.969	1.979	0.5%	10	YES
As Left								
300 ML WATER = 150 TIPS/0.591"			UNITS Inches	Inches	PERCENT	PERCENT	N/A	
Volume			500	0.984	0.994	1.0%	10	YES
NOTES: No changes made.								

PANEL TEMPERATURE AUDIT

SENSOR MODEL: Campbell Scientific CR3000				START TIME		STOP TIME	
SENSOR SERIAL #: 13408				11:15		11:20	
AUDIT DEVICE MODEL: Omega HH42A							
AUDIT DEVICE SERIAL #: 23KMM02815							
AUDIT DEVICE EXPIRATION: 12/10/2025							
PANEL TEMPERATURE			AUDIT SENSOR VALUE	2-M SENSOR VALUE	ABSOLUTE DIFF.	ACCEPTANCE CRITERIA (+/-)	VALUE WITHIN ACCEPTANCE CRITERIA
INSTANTANEOUS READING:			UNITS DEG. C	DEG. C	DEG. C	ABS. DIFF	N/A
			20.44	21.03	0.59	2.1	YES
NOTES: No changes made.							



Table B2-5

QUALITY ASSURANCE CALIBRATION RESULTS-AS FOUND

SITE NAME: WELD COUNTY MONITORING NETWORK: HEREFORD SITE

AUDIT DATE: 10/29/2025

AUDIT CONDUCTED BY: Bode Hoover/Jake Zaragoza, Ramboll

SOLAR RADIATION AUDIT

SENSOR MODEL: Hukseflux LP02

SENSOR SERIAL #: 48015

AUDIT DEVICE MODEL: SR05

AUDIT DEVICE SERIAL #: 19771

AUDIT DEVICE EXPIRATION: 5/14/2026

Timestamp	Audit Sensor (w/m2)	Site Sensor (w/m2)
10:00	549.4	540.7
10:15	586.3	578.1
10:30	597.3	590.8
10:45	620	613.7
11:00	631.4	626
11:15	634.8	629.8
AVG	603.2	596.5
	% DIFF=	1.11%

NOTES: No changes made.

**TABLE B2-6
GAS CALIBRATION AS FOUND REPORT**

AUDIT DATE: 10/14/2025
AUDITED BY: Bode Hoover, Ramboll
SITE: Hereford

ANALYZER DEVICE: TELEDYNE API T400 O3 ANALYZER, RANGE 0 - 500 PPB O3
AUDIT DEVICE: TELEDYNE API T703 MULTI-GAS CALIBRATOR

Time Keeping		Ozone Audit					Diagnostics		
Calibrations Start Time	Audit Point	Uncorrected Audit Conc. (PPB)	Corrected Audit Conc. (PPB)	O ₃ (PPB)	O ₃ % diff.	Pass/Fail	T703	T400	
7:53:00 AM	Zero	-0.1	-0.1	0.92	N/A	N/A	Serial Number	825	5984
	1	49.8	49.8	49.98	0.4	PASS	O ₃ Slope	0.9886	0.994
	2	99.9	99.9	98.76	-1.1	PASS	O ₃ Offset	0.1000	-1.70
	3	200.1	200.1	198.35	-0.9	PASS	L3 O ₃ Slope Correction Factor	1.0000	
Calibrations Stop Time	4	300.0	300.0	297.86	-0.7	PASS	L3 O ₃ Offset Correction Factor	0.0000	
9:06:00 AM	5	399.7	399.7	395.74	-1.0	PASS	Box Temp (C)	30.2	28.1
Key: NO ₂ Nitrogen Dioxide % Percent NO _x Oxides of Nitrogen TAPI Teledyne Advanced Pollution Instrumentation N/A Not Applicable Avg Average orig. Original Conc. Concentration PPB Parts Per Billion diff. Difference slpm Standard liters per minute GPT Gas Phase Titration rem. Remaining NO Nitrogen Oxide						Linear Regression			
								O3	
						Slope		0.989	
						Intercept		0.643	
						Correlation		1.0000	
Avg % diff.		-0.67							
							Photo Flow (lpm)	0.683	
							Photo Press (in Hg)	23.9	
							Sample Flow (cc/min)		642.8
							Sample Press (in Hg)		22.2
							O3 Ref (mV)	3962.0	4097.1

NOTES: No changes made.

**TABLE B2-7
GAS CALIBRATION AS LEFT REPORT**

AUDIT DATE: 10/30/2025
AUDITED BY: Abraham Dearden, Ramboll
SITE: Hereford

ANALYZER DEVICE: TELEDYNE API T400 O3 ANALYZER, RANGE 0 - 500 PPB O3
AUDIT DEVICE: TELEDYNE API T703 MULTI-GAS CALIBRATOR

Time Keeping		Ozone Audit					Diagnostics		
Calibrations Start Time	Audit Point	Uncorrected Audit Conc. (PPB)	Corrected Audit Conc. (PPB)	O ₃ (PPB)	O ₃ % diff.	Pass/Fail	T703	T400	
9:28:00 AM	Zero	0.00	0	0.03	N/A	N/A	Serial Number	825 5984	
	1	49.60	49.6	52.4507	5.7	PASS	O ₃ Slope	0.9760 0.994	
	2	100.00	100	102.53	2.5	PASS	O ₃ Offset	-0.6000 -1.70	
	3	199.90	199.9	204.57	2.3	PASS	L3 O ₃ Slope Correction Factor	1.0000	
Calibrations Stop Time	4	300.10	300.1	304.9427	1.6	PASS	L3 O ₃ Offset Correction Factor	0.0000	
11:45:00 AM	5	400.30	400.3	406.35	1.5	PASS	Box Temp (C)	27.5 23.8	
Key: NO ₂ Nitrogen Dioxide % Percent NO _x Oxides of Nitrogen TAPI Teledyne Advanced Pollution Instrumentation N/A Not Applicable Avg Average orig. Original Conc. Concentration PPB Parts Per Billion diff. Difference slpm Standard liters per minute GPT Gas Phase Titration rem. Remaining NO Nitrogen Oxide				Linear Regression					
						O3			
				Slope		1.013			
				Intercept		1.242			
				Correlation		1.0000			
Avg % diff.		2.75							
						Photo Flow (lpm)	0.519		
						Photo Press (in Hg)	24.3		
						Sample Flow (cc/min)		643.3	
						Sample Press (in Hg)		22.3	
						O3 Ref (mV)	3969.3	4000.2	

NOTES: Ozone pump and flow orifice rebuilt.

**TABLE B2-8
GAS CALIBRATION AS FOUND REPORT**

AUDIT DATE: 12/11/2025
AUDITED BY: Abraham Dearden, Ramboll
SITE: Hereford

ANALYZER DEVICE: TELEDYNE API T400 O3 ANALYZER, RANGE 0 - 500 PPB O3
AUDIT DEVICE: TELEDYNE API T703 MULTI-GAS CALIBRATOR

Time Keeping	Ozone Audit						Diagnostics		
	Audit Point	Uncorrected Audit Conc. (PPB)	Corrected Audit Conc. (PPB)	O ₃ (PPB)	O ₃ % diff.	Pass/Fail	T703	T400	
Calibrations Start Time									
8:13:00 AM	Zero	0.0	0.0	0.87	N/A	N/A	Serial Number	825 5984	
	1	49.7	49.7	50.649	1.9	PASS	O ₃ Slope	0.9760 0.994	
	2	100.0	100.0	100.33	0.3	PASS	O ₃ Offset	-0.6000 -1.70	
	3	200.0	200.0	202.79	1.4	PASS	L3 O ₃ Slope Correction Factor	1.0000	
Calibrations Stop Time	4	299.0	299.0	301.37	0.8	PASS	L3 O ₃ Offset Correction Factor	0.0000	
9:40:00 AM	5	400.5	400.5	402.88	0.6	PASS	Box Temp (C)	25.4 22.8	
							Sample Temp (C)	34.7 32.5	
							Ph. Lamp Temp (C)	58.0 58.0	
							Ozone Gen Lamp Temp (C)	48.0	
							Photo Flow (lpm)	0.669	
							Photo Press (in Hg)	23.5	
							Sample Flow (cc/min)	635.4	
							Sample Press (in Hg)	22.0	
							O3 Ref (mV)	3943.4 3877.4	

Key:

NO ₂	Nitrogen Dioxide	%	Percent
NO _x	Oxides of Nitrogen	TAPI	Teledyne Advanced Pollution Instrumentatio
N/A	Not Applicable	Avg	Average
orig.	Original	Conc.	Concentration
PPB	Parts Per Billion	diff.	Difference
slpm	Standard liters per minute	GPT	Gas Phase Titration
rem.	Remaining	NO	Nitrogen Oxide

Linear Regression	
	O3
Slope	1.005
Intercept	0.725
Correlation	1.0000
Avg % diff.	1.00

NOTES: No changes made.

**TABLE B2-9
GAS CALIBRATION AS LEFT REPORT**

AUDIT DATE: 12/12/2025
AUDITED BY: Abraham Dearden, Ramboll
SITE: Hereford

ANALYZER DEVICE: TELEDYNE API T400 O3 ANALYZER, RANGE 0 - 500 PPB O3
AUDIT DEVICE: TELEDYNE API T703 MULTI-GAS CALIBRATOR

Time Keeping	Ozone Audit						Diagnostics		
	Audit Point	Uncorrected Audit Conc. (PPB)	Corrected Audit Conc. (PPB)	O ₃ (PPB)	O ₃ % diff.	Pass/Fail	T703	T400	
Calibrations Start Time									
9:05:00 AM	Zero	0.0	0.0	0.88	N/A	N/A	Serial Number	825 5984	
	1	49.6	49.5	51.5001	4.0	PASS	O ₃ Slope	0.9760 0.994	
	2	99.6	99.6	100.99	1.4	PASS	O ₃ Offset	-0.6000 -1.70	
	3	200.3	200.3	201.96	0.8	PASS	L3 O ₃ Slope Correction Factor	1.0000	
Calibrations Stop Time	4	300.2	300.2	301.36	0.4	PASS	L3 O ₃ Offset Correction Factor	0.0000	
10:10:00 AM	5	399.4	399.4	399.00	-0.1	PASS	Box Temp (C)	26.6 23.8	
							Sample Temp (C)	35.1 32.6	
							Ph. Lamp Temp (C)	58.0 58.0	
							Ozone Gen Lamp Temp (C)	48.0	
							Photo Flow (lpm)	0.677	
							Photo Press (in Hg)	24.0	
							Sample Flow (cc/min)	642	
							Sample Press (in Hg)	22.3	
							O3 Ref (mV)	3940.7 4731.9	

Key:

NO ₂	Nitrogen Dioxide	%	Percent
NO _x	Oxides of Nitrogen	TAPI	Teledyne Advanced Pollution Instrumentatio
N/A	Not Applicable	Avg	Average
orig.	Original	Conc.	Concentration
PPB	Parts Per Billion	diff.	Difference
slpm	Standard liters per minute	GPT	Gas Phase Titration
rem.	Remaining	NO	Nitrogen Oxide

Linear Regression	
	O3
Slope	0.997
Intercept	1.721
Correlation	1.0000
Avg % diff.	1.31

NOTES: Ozone photometer lamp replaced.

APPENDIX B3: ORCHARD STATION Q4 SEMI-ANNUAL CALIBRATION

TABLE B3-1

QUALITY ASSURANCE CALIBRATION RESULTS-AS FOUND

SITE NAME: WELD COUNTY MONITORING NETWORK: ORCHARD SITE

AUDIT DATE: 10/29/2025

AUDIT CONDUCTED BY: Bode Hoover/Jake Zaragoza, Ramboll

10-METER HORIZONTAL WIND SPEED/DIRECTION AUDIT

SENSOR MODEL: RM YOUNG 05305V

SENSOR SERIAL #: 180186

AUDIT DEVICE MODEL: RM Young 18802

AUDIT DEVICE SERIAL #: CA05458

AUDIT DEVICE EXPIRATION: 12/17/2025

START TIME	STOP TIME
13:15	14:15

PARAMETER	AUDIT METHOD	AUDIT VALUE	SENSOR RESPONSE	DIFFERENCE (M/S)	ACCEPTANCE CRITERIA	VALUE WITHIN ACCEPTANCE CRITERIA
HORIZONTAL WIND SPEED	DC MOTOR RPM	M/S	M/S	M/S	M/S	N/A
	0	0.000	0.001	0.00	0.20	YES
	200	1.024	1.021	0.00	0.20	YES
	400	2.048	2.072	-0.02	0.20	YES
	600	3.072	3.059	0.01	0.20	YES
	800	4.096	4.096	0.00	0.20	YES
	1000	5.120	5.100	0.02	0.20	YES
	2000	10.240	10.240	0.00	0.20	YES
	3000	15.360	15.356	0.00	0.20	YES
	4000	20.480	20.485	0.00	0.20	YES
	5000	25.600	25.628	-0.03	0.20	YES
WIND DIRECTION	ALIGNMENT GAUGE	TORQUE VERIFICATION		CW = 0.1 CCW = 0.1	≤ 0.3 gm-cm ≤ 0.3 gm-cm	YES YES
		0	0.31	0.31	5	YES
		30	30.59	0.59	5	YES
		60	59.26	0.74	5	YES
		90	90.30	0.30	5	YES
		120	120.43	0.43	5	YES
		150	149.51	0.49	5	YES
		180	179.85	0.15	5	YES
		210	210.10	0.10	5	YES
		240	239.12	0.88	5	YES
		270	269.96	0.04	5	YES
300	300.39	0.39	5	YES		
330	331.00	1.00	5	YES		
360	360.93	0.93	5	YES		
TORQUE VERIFICATION		QUAD.#1 = QUAD.#2 =	- -	≤ 9.0 gm-cm ≤ 9.0 gm-cm	- -	

° E CROSS ARM ALIGNMENT:	MAG DEC: AS FOUND:	7.18 1	4 QUAD VANE ALIGNMENT:	N=	-0.0343
	TOLERANCE: +/- 5° (PASSED)			E=	90.1718
				S=	180.708
				W=	270.596

WIND DIRECTION	TRANSIT ALIGNMENT	AUDIT=	1	2.0 degrees	YES
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- KEY:**
- HWS Horizontal wind speed
 - VWS Vertical wind speed
 - WD Wind direction
 - M/S Meters per second
 - N/A Not applicable
 - MAG. DEC. Magnetic Declination
 - CW Clockwise
 - CCW Counter Clockwise

NOTES: Too breezy to perform wind direction torque test.

TABLE B3-2

QUALITY ASSURANCE CALIBRATION RESULTS-AS FOUND

SITE NAME: WELD COUNTY MONITORING NETWORK: ORCHARD SITE

AUDIT DATE: 10/29/2025

AUDIT CONDUCTED BY: Bode Hoover/Jake Zaragoza, Ramboll

TEMPERATURE/DELTA TEMPERATURE AUDIT

SENSOR MODEL: RM YOUNG 41342VC

SENSOR SERIAL #: 032953 (2M)/032954 (10M)

AUDIT DEVICE: Omega HH42A

AUDIT DEVICE SERIAL #: 23KMM02815

AUDIT DEVICE EXPIRATION: 12/10/2025

START TIME	STOP TIME
13:15	14:15

WATER BATH PARAMETER	AUDIT SENSOR VALUE	2-M SENSOR VALUE	2-M VS. AUDIT DIFF.	10-M SENSOR VALUE	10-M VS. AUDIT DIFF.	ACCEPTANC E CRITERIA (+/-)	DELTA T: 10- M VS. 2-M DIFF.	ACCEPTANC E CRITERIA (+/-)	VALUE WITHIN ACCEPTANC E CRITERIA
	DEG. C	DEG. C	DEG. C	DEG. C	DEG. C	DEG. C	DEG. C	DEG. C	N/A
ICE BATH	0.20	0.40	0.20	0.45	0.25	0.50	0.04	0.1	YES
AMBIENT BATH	29.63	29.72	0.09	29.67	0.04	0.50	-0.05	0.1	YES
HOT BATH	48.77	48.80	0.03	48.75	-0.02	0.50	-0.05	0.1	YES

NOTES: No changes made.



TABLE B3-3

QUALITY ASSURANCE CALIBRATION RESULTS-AS FOUND

SITE NAME: WELD COUNTY MONITORING NETWORK: ORCHARD SITE

AUDIT DATE: 10/29/2025

AUDIT CONDUCTED BY: Bode Hoover/Jake Zaragoza, Ramboll

RELATIVE HUMIDITY AUDIT

SENSOR MODEL: EE181				START TIME		STOP TIME	
SENSOR SERIAL #: 201516001269F1				14:30		15:30	
AUDIT DEVICE MODEL: EE181							
AUDIT DEVICE SERIAL #: 214116001537C1							
AUDIT DEVICE EXPIRATION: 12/2/2025							
RELATIVE HUMIDITY		AUDIT SENSOR VALUE	2-M SENSOR VALUE	ABSOLUTE % RH DIFF.	ACCEPTANCE CRITERIA (+/-)	VALUE WITHIN ACCEPTANCE CRITERIA	
AVERAGE:		UNITS % RH	% RH	% RH	PERCENT	N/A	
		14.8	18.7	3.90	7.0	YES	
		14.50	18.12	3.62	7.0	YES	
NOTES: No changes made.							

BAROMETRIC PRESSURE AUDIT

SENSOR MODEL: Setra 278				START TIME		STOP TIME	
SENSOR SERIAL #: 7563445				15:30		15:30	
AUDIT DEVICE MODEL: BVC10							
AUDIT DEVICE SERIAL #: 3753							
AUDIT DEVICE EXPIRATION: 7/2/2026							
BAROMETRIC PRESSURE		AUDIT SENSOR VALUE	2-M SENSOR VALUE	ABSOLUTE DIFF.	ACCEPTANCE CRITERIA (+/-)	VALUE WITHIN ACCEPTANCE CRITERIA	
AVERAGE:		UNITS mm Hg	mm Hg	mm Hg	mm Hg	N/A	
		651.1	651.5	0.44	2.25	YES	
NOTES: Test performed on June 27, 2025.							

PRECIPITATION AUDIT

SENSOR MODEL: RM Young Heated Rain Gauge Model 52202				START TIME		STOP TIME	
SENSOR SERIAL: TB16138				14:30		15:30	
AUDIT DEVICE MODEL: Drip Bottle							
AUDIT DEVICE SERIAL #: N/A							
PRECIPITATION		AUDIT S VALUE	2-M SENSOR VALUE	PERCENT DIFF.	ACCEPTANCE CRITERIA (+/-)	VALUE WITHIN ACCEPTANCE CRITERIA	
As Found							
300 ML WATER = 150 TIPS/0.591"		UNITS	Inches	Inches	PERCENT	N/A	
Volume		500	0.984	0.957	-2.8%	10	YES
As Left							
300 ML WATER = 150 TIPS/0.591"		UNITS	Inches	Inches	PERCENT	N/A	
Volume		500	0.984	1.059	7.6%	10	YES
NOTES: No changes made.							

PANEL TEMPERATURE AUDIT

SENSOR MODEL: Campbell Scientific CR3000				START TIME		STOP TIME	
SENSOR SERIAL #: 13405				14:27		14:27	
AUDIT DEVICE MODEL: Omega HH42A							
AUDIT DEVICE SERIAL #: 23KMM02815							
AUDIT DEVICE EXPIRATION: 12/10/2025							
PANEL TEMPERATURE		AUDIT SENSOR VALUE	2-M SENSOR VALUE	ABSOLUTE DIFF.	ACCEPTANCE CRITERIA (+/-)	VALUE WITHIN ACCEPTANCE CRITERIA	
INSTANTANEOUS READING:		UNITS DEG. C	DEG. C	DEG. C	ABS. DIFF	N/A	
		21.21	21.04	0.17	2.1	YES	
NOTES: No changes made.							



Table B3-4

QUALITY ASSURANCE CALIBRATION RESULTS-AS FOUND

SITE NAME: WELD COUNTY MONITORING NETWORK: ORCHARD SITE

AUDIT DATE: 10/29/2025

AUDIT CONDUCTED BY: Bode Hoover/Jake Zaragoza, Ramboll

SOLAR RADIATION AUDIT

SENSOR MODEL: Hukseflux LP02

SENSOR SERIAL #: 48014

AUDIT DEVICE MODEL: SR05

AUDIT DEVICE SERIAL #: 19771

AUDIT DEVICE EXPIRATION: 5/14/2026

Timestamp	Audit Sensor (w/m2)	Site Sensor (w/m2)
14:45	370	370.3
15:00	329	329.7
15:15	282.9	283.3
15:30	240.6	239.3
AVG	305.6	305.7
	% DIFF=	-0.01%

NOTES: No changes made.

**TABLE B3-5
GAS CALIBRATION AS FOUND REPORT**

AUDIT DATE: 10/14/2025
AUDITED BY: Bode Hoover, Ramboll
SITE: Orchard

ANALYZER DEVICE: TELEDYNE API T400 O3 ANALYZER, RANGE 0 - 500 PPB O3
AUDIT DEVICE: TELEDYNE API T703 MULTI-GAS CALIBRATOR

Time Keeping	Ozone Audit						Diagnostics		
	Audit Point	Uncorrected Audit Conc. (PPB)	Corrected Audit Conc. (PPB)	O ₃ (PPB)	O ₃ % diff.	Pass/Fail	T703	T400	
Calibrations Start Time	Zero	-0.20	-0.2	1.54	N/A	N/A	Serial Number	824	5985
7:52:00 AM	1	50.10	50.1	50.99	1.8	PASS	O ₃ Slope	0.9800	0.990
	2	100.40	100.4	100.69	0.3	PASS	O ₃ Offset	-0.2000	-0.10
	3	199.60	199.6	200.06	0.2	PASS	L3 O ₃ Slope Correction Factor	1.0000	
Calibrations Stop Time	4	299.90	299.9	299.94	0.0	PASS	L3 O ₃ Offset Correction Factor	0.0000	
9:07:00 AM	5	399.70	399.7	396.60	-0.8	PASS	Box Temp (C)	27.0	24.6
							Sample Temp (C)	37.4	33.2
							Ph. Lamp Temp (C)	58.0	58.0
							Ozone Gen Lamp Temp (C)	48.0	
							Photo Flow (lpm)	0.690	
							Photo Press (in Hg)	25.4	
							Sample Flow (cc/min)		739.3
							Sample Press (in Hg)		23.1
							O3 Ref (mV)	3966.6	3779.6

Key:			
NO ₂	Nitrogen Dioxide	%	Percent
NO _x	Oxides of Nitrogen	TAPI	Teledyne Advanced Pollution Instrumentation
N/A	Not Applicable	Avg	Average
orig.	Original	Conc.	Concentration
PPB	Parts Per Billion	diff.	Difference
slpm	Standard liters per minute	GPT	Gas Phase Titration
rem.	Remaining	NO	Nitrogen Oxide

Linear Regression	
	O3
Slope	0.991
Intercept	1.703
Correlation	1.0000
Avg % diff.	0.31

NOTES: No changes made.

**TABLE B3-6
GAS CALIBRATION AS LEFT REPORT**

AUDIT DATE: 10/30/2025
AUDITED BY: Abraham Dearden, Ramboll
SITE: Orchard

ANALYZER DEVICE: TELEDYNE API T400 O3 ANALYZER, RANGE 0 - 500 PPB O3
AUDIT DEVICE: TELEDYNE API T703 MULTI-GAS CALIBRATOR

Time Keeping	Ozone Audit						Diagnostics			
	Audit Point	Uncorrected Audit Conc. (PPB)	Corrected Audit Conc. (PPB)	O ₃ (PPB)	O ₃ % diff.	Pass/Fail	T703	T400		
Calibrations Start Time	Zero	0.00	0	1.65	N/A	N/A	Serial Number	824	5985	
9:54:00 AM	1	49.90	49.9	50.02103	0.2	PASS	O ₃ Slope	0.9770	0.990	
	2	100.20	100.2	99.95	-0.2	PASS	O ₃ Offset	0.5000	-0.10	
	3	199.30	199.3	199.94	0.3	PASS	L3 O ₃ Slope Correction Factor	1.0000		
Calibrations Stop Time	4	299.90	299.9	299.0009	-0.3	PASS	L3 O ₃ Offset Correction Factor	0.0000		
11:38:00 AM	5	400.40	400.4	398.96	-0.4	PASS	Box Temp (C)	29.5	25.2	
Key: NO ₂ Nitrogen Dioxide % Percent NO _x Oxides of Nitrogen TAPI Teledyne Advanced Pollution Instrumentation N/A Not Applicable Avg Average orig. Original Conc. Concentration PPB Parts Per Billion diff. Difference slpm Standard liters per minute GPT Gas Phase Titration rem. Remaining NO Nitrogen Oxide				Linear Regression				Sample Temp (C)	36.4	33.8
						O ₃		Ph. Lamp Temp (C)	58.0	58.0
				Slope		0.994		Ozone Gen Lamp Temp (C)	48.0	
				Intercept		1.011		Photo Flow (lpm)	0.724	
				Correlation		1.0000		Photo Press (in Hg)	24.6	
Avg % diff.		-0.07		Sample Flow (cc/min)		743.5				
				Sample Press (in Hg)		23.3				
				O ₃ Ref (mV)	3969.2	3770.7				

NOTES: Ozone pump rebuilt, ozone flow orifice rebuilt.

APPENDIX B4: MISSILE SITE PARK STATION CDPHE AUDIT

Meteorological Tower Audit



COLORADO
Air Pollution Control Division
Department of Public Health & Environment

Site: 888888888

Site Name: SPECIAL STUDY

Auditor: Joseph Time Offline: 10:00

Audit Date: 11/14/2025 Time Online: 11:15

Sensor Information			
Sensor	Serial Number	Make	Model
Wind Speed	180188	RM Young	05305VC
Wind Direction	180188	RM Young	05305VC
Temp (Upper)	032952	RM Young	41342VC
Temp (Lower)	032951	RM Young	41342VC
Hygrometer	20151600125038	RM Young	EE181
Barometer	7563464	Setra	278

Span/Zero Voltages		
Sensor	Zero	Span
Wind Speed		
Wind Direction		
Temp (Upper)		
Temp (Lower)		
Hygrometer		
Barometer		

Magnetic Declination: 7.6 Distance to Tower (ft): 100

Crossarm Orientation: N-S Correction (ft): -4.4

Subtract magnetic declination?

Pre-Audit Crossarm Alignment Check				
	Degrees	Minutes	Offset	Error
Normal	357	30	0	-2.5
Inverted	177	30	0	-2.5

Post-Audit Crossarm Alignment Check				
	Degrees	Minutes	Offset	Error
Normal	357	30	0	-2.5
Inverted	177	30	0	-2.5

Wind Speed Sensor Audit (+/- 5%)									
Audit Set Point (RPM)	Wind Speed (mph)	DVM (volts)	DVM (mph)	Error (%)	DCN Actual (volts)	DCN Actual (mph)	Error (%)	DCN Res. (mph)	Error (%)
Zero	0	0.0				0.0		0.0	
CW	600	6.9				6.9	0.3%	6.9	0.3%
CCW	600	6.9				6.9	0.1%	6.9	0.1%
CW	1700	19.5				19.4	-0.4%	19.4	-0.4%
CCW	1700	19.5				19.4	-0.5%	19.4	-0.5%
CW	3300	37.8				37.7	-0.3%	37.7	-0.3%
CCW	3300	37.8				37.7	-0.3%	37.7	-0.3%
CW	5400	61.8				61.7	-0.1%	61.7	-0.1%
CCW	5400	61.8				61.7	-0.1%	61.7	-0.1%

Wind Direction Sensor Audit (+/- 5 Degrees)										
Audit Set Point	Wind Dir. (degrees)	DVM (volts)	DVM (degrees)	DCN Act. (volts)	DCN Act. (degrees)	Offset	DCN Act. Error	DCN Res. (degrees)	DCN Res. Error	Composite Error
South	180				182.1	0.0	2.1	182.1	2.1	-0.4
CW West	270				271.9	0.0	1.9	271.9	1.9	-0.6
CW North	360				0.3	-360.0	0.3	0.3	0.3	-2.2
CW East	90				92.4	0.0	2.4	92.4	2.4	-0.1
CCW South	180				182.0	0.0	2.0	182.0	2.0	-0.5
CCW East	90				92.1	0.0	2.1	92.1	2.1	-0.4
CCW North	360				-1.6	-360.0	-1.6	-1.6	-1.6	-4.1
CCW West	270				270.5	0.0	0.5	270.5	0.5	-2.0

Temperature (+/- 2 Degrees C)										
Reading	Upper Temp. Sensor					Lower Temp. Sensor				
	DVM (volts)	DCN (volts)	Audit (F)	DCN (F)	Error	DVM (volts)	DCN (volts)	Audit (F)	DCN (F)	Error
Point 1			14.4	14.5	0.1			17.6	17.4	-0.2
Point 2			14.9	15.0	0.1			17.4	17.4	0.0
Avg.			14.6	14.8	0.1			17.5	17.4	-0.1

Humidity (+/- 5%)						Pressure (+/- 10 mm Hg)				
Reading	DVM (volts)	DCN (volts)	Audit (%)	DCN (%)	Error	DVM (volts)	DCN (volts)	Audit (mmHg)	DCN (mmHg)	Error
Point 1			24.5	26.7	2.2			635.0	634.2	-0.8
Point 2			24.5	27.1	2.6			635.0	634.2	-0.8
Avg.			24.5	26.9	2.4			635.0	634.2	-0.8

Audit Results										
Wind Speed			Wind Direction				Temperature			
CW 600 RPM	PASS		South	PASS		Upper Avg.	PASS			
CCW 600 RPM	PASS		CW West	PASS		Lower Avg.	PASS			
CW 1700 RPM	PASS		CW North	PASS		Humidity				
CCW 1700 RPM	PASS		CW East	PASS		Avg.	PASS			
CW 3300 RPM	PASS		CCW South	PASS		Pressure				
CCW 3300 RPM	PASS		CCW East	PASS		Avg.	PASS			
CW 5400 RPM	PASS		CCW North	PASS						
CCW 5400 RPM	PASS		CCW West	PASS						

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Comments

This audit was for the met. Tower at Missile Site Park. Please note: The temperatures listed are in Celsius. The wind speed was recorded in m/s but the values listed are in units of mph. All parameters were in tolerance of CDPHE criteria.

Audit Summary				
Audit Set Point	Conc. Out (ppm)	DAS Value (ppm)	Zero Corr. (ppm)	% Relative Error
Zero	-0.0006	0.0003		
Level 5	0.1249	0.1160	0.1160	-7.1%
Level 4	0.0755	0.0703	0.0703	-6.8%
Level 3	0.0356	0.0347	0.0347	-2.5%
Level 2	0.0155	0.0158	0.0158	2.1%
Level 1				

Audit Results					
DAS Results		Internal Temp.		Regression Results	
Zero	PASS	Station	PASS	Slope	0.922632
Level 5	PASS	Audit	PASS	Intercept	0.000942
Level 4	PASS	Difference	PASS	R-Squared	0.999792
Level 3	PASS				
Level 2	PASS				
Level 1					

Comments
This audit was for the T400 analyzer at Missile Site Park.

Nitrogen Dioxide Analyzer Audit



COLORADO

Air Pollution Control Division

Department of Public Health & Environment

Site	888888888				
Site Name	SPECIAL STUDY				
Monitor	42602				
POC	1	Method Code	99	AQS Units	8 (ppb)
Auditor	Joseph	Initial NO2	19.4	Calibrator SN	886
Audit Type	Performance	Time Offline	10:05	Zero Air SN	469
Audit Date	11/14/2025	Final NO2	14.1	Station Temp.	22.3
Audit Time	10:05	Time Online	15:46	Audit Temp.	21.3

Analyzer Information

Serial #	6727	Slope	1.063	Intercept	-0.7	Full Scale	500
----------	------	-------	-------	-----------	------	------------	-----

Do you want to zero correct the analyzer?

Upload to AQS?

Audit Set Point	NO Conc. Out (ppb)	NO Display Value (ppb)	NO Zero Corr. (ppb)	NO % Relative Error	NO2 Display Value (ppb)	NOx Display Value (ppb)	NOx % Relative Error
Zero							
Span							
Precision							

Audit Set Point	Target (ppb)	Cylinder	Source NO (ppm)	Source NOx (ppm)	Dilution Flow (l/min)	Cal. Flow (l/min)	NO Conc. Out (ppb)	NOx Conc. Out (ppb)	NO Indicated (ppb)
Zero	0.000				4.5130	0.0000	0.000	0.000	0.000
Level 6									
Level 5	400.000	CLM09957	9.965	9.979	3.3820	0.1408	398.283	398.843	398.200
Level 4	250.000	CLM09957	9.965	9.979	4.4100	0.1133	249.604	249.955	249.700
Level 3	150.000	CLM09957	9.965	9.979	5.4390	0.0831	149.960	150.170	150.000
Level 2	75.000	CLM09957	9.965	9.979	6.4720	0.0494	75.485	75.592	75.400
Level 1	15.000	CLM09957	9.965	9.979	7.5230	0.0113	14.946	14.967	15.000

Audit Set Point	NO Display Value (ppb)	NO Zero Corr. (ppb)	NO % Relative Error	NO2 Display Value (ppb)	NOx Display Value (ppb)	NOx % Relative Error
Zero	0.472			0.322	0.532	
Level 6						
Level 5	403.700	403.700	1.4%	0.322	403.800	1.2%
Level 4	251.900	251.900	0.9%	0.284	252.100	0.9%
Level 3	151.200	151.200	0.8%	0.513	151.500	0.9%
Level 2	76.269	76.269	1.0%	0.347	76.748	1.5%
Level 1	15.410	15.410	3.1%	0.380	15.657	4.6%

Regression Results

NO Results

NO		NOx	
Slope	1.011902	Slope	1.010223
Intercept	0.016784	Intercept	0.286243
R-Squared	0.999987	R-Squared	0.99999

Zero	PASS
Level 6	
Level 5	PASS
Level 4	PASS
Level 3	PASS
Level 2	PASS
Level 1	PASS

Gas-Phase Titration Data

Audit Set Point	Ozone Conc. Out (ppb)	NO Indicated (ppb)	NO Remaining (ppb)	NOx Indicated (ppb)	NOx Remaining (ppb)	NO2 Indicated (ppb)	NO2 Actual (ppb)
Level 6							
Level 5	320.000	78.320	77.382	403.700	399.331	325.380	322.048
Level 4	170.000	78.000	77.066	252.000	249.167	174.000	172.200
Level 3	70.000	77.318	76.392	150.993	149.182	73.675	73.292
Level 2	15.000	59.661	58.943	75.897	74.846	16.236	16.745
Level 1	4.000	11.377	11.227	15.343	14.904	3.966	3.989

NO2 Relative Error

NO Conv. Efficiency

Internal Temp.

Regression Results

Level 6	
Level 5	1.0%
Level 4	1.0%
Level 3	0.5%
Level 2	-3.0%
Level 1	-0.6%

Level 6	
Level 5	100.0%
Level 4	100.1%
Level 3	100.7%
Level 2	105.3%
Level 1	108.5%

Station	PASS
Audit	PASS
Difference	PASS

Slope	1.011689
Intercept	-0.37852
R-Squared	0.999997

Comments

This audit was for the T200 NOx analyzer at Missile Site Park.

APPENDIX B5: HEREFORD STATION CDPHE AUDIT

Meteorological Tower Audit



COLORADO
Air Pollution Control Division
Department of Public Health & Environment

Site: 888888888

Site Name: SPECIAL STUDY

Auditor: Joseph Time Offline: 13:47

Audit Date: 11/18/2025 Time Online: 14:40

Sensor Information			
Sensor	Serial Number	Make	Model
Wind Speed	209492	RM Young	05305
Wind Direction	209492	RM Young	05305
Temp (Upper)	032869	RM Young	41342VC
Temp (Lower)	032950	RM Young	41342VC
Hygrometer	2015160012638F	EE Elektronik	EE181
Barometer	7573233	Setra	278

Span/Zero Voltages		
Sensor	Zero	Span
Wind Speed		
Wind Direction		
Temp (Upper)		
Temp (Lower)		
Hygrometer		
Barometer		

Magnetic Declination: 7.3 Distance to Tower (ft): 100 Subtract magnetic declination?

Crossarm Orientation: N-S Correction (ft): 0.1

Pre-Audit Crossarm Alignment Check				
	Degrees	Minutes	Offset	Error
Normal	0	4	-360	0.1
Inverted	180	4	0	0.1

Post-Audit Crossarm Alignment Check				
	Degrees	Minutes	Offset	Error
Normal	0	5	-360	0.1
Inverted	180	5	0	0.1

Wind Speed Sensor Audit (+/- 5%)									
Audit Set Point (RPM)	Wind Speed (mph)	DVM (volts)	DVM (mph)	Error (%)	DCN Actual (volts)	DCN Actual (mph)	Error (%)	DCN Res. (mph)	Error (%)
Zero	0	0.0				0.0		0.0	
CW	600	6.9				6.9	0.0%	6.9	0.0%
CCW	600	6.9				6.9	0.0%	6.9	0.0%
CW	1700	19.5				19.5	-0.1%	19.5	-0.1%
CCW	1700	19.5				19.5	-0.1%	19.5	-0.1%
CW	3300	37.8				37.8	0.0%	37.8	0.0%
CCW	3300	37.8				37.8	0.0%	37.8	0.0%
CW	5400	61.8				61.8	0.0%	61.8	0.0%
CCW	5400	61.8				61.8	0.0%	61.8	0.0%

Wind Direction Sensor Audit (+/- 5 Degrees)										
Audit Set Point	Wind Dir. (degrees)	DVM (volts)	DVM (degrees)	DCN Act. (volts)	DCN Act. (degrees)	Offset	DCN Act. Error	DCN Res. (degrees)	DCN Res. Error	Composite Error
South	180				180.4	0.0	0.4	180.4	0.4	0.5
CW West	270				270.8	0.0	0.8	270.8	0.8	0.9
CW North	360				1.5	-360.0	1.5	1.5	1.5	1.6
CW East	90				89.9	0.0	-0.1	89.9	-0.1	0.0
CCW South	180				182.8	0.0	2.8	182.8	2.8	2.9
CCW East	90				93.8	0.0	3.8	93.8	3.8	3.9
CCW North	360				4.1	-360.0	4.1	4.1	4.1	4.2
CCW West	270				272.6	0.0	2.6	272.6	2.6	2.7

Temperature (+/- 2 Degrees C)										
Reading	Upper Temp. Sensor					Lower Temp. Sensor				
	DVM (volts)	DCN (volts)	Audit (F)	DCN (F)	Error	DVM (volts)	DCN (volts)	Audit (F)	DCN (F)	Error
Point 1			15.6	15.5	-0.1			17.5	17.5	0.0
Point 2			15.6	15.6	0.0			17.1	17.5	0.4
Avg.			15.6	15.6	-0.1			17.3	17.5	0.2

Reading	Humidity (+/- 5%)					Pressure (+/- 10 mm Hg)				
	DVM (volts)	DCN (volts)	Audit (%)	DCN (%)	Error	DVM (volts)	DCN (volts)	Audit (mmHg)	DCN (mmHg)	Error
Point 1			19.9	24.5	4.6			627.6	627.0	-0.6
Point 2			20.1	24.2	4.1			627.4	626.7	-0.6
Avg.			20.0	24.4	4.3			627.5	626.9	-0.6

Audit Results										
Wind Speed			Wind Direction				Temperature			
CW 600 RPM	PASS		South	PASS		Upper Avg.	PASS			
CCW 600 RPM	PASS		CW West	PASS		Lower Avg.	PASS			
CW 1700 RPM	PASS		CW North	PASS		Humidity				
CCW 1700 RPM	PASS		CW East	PASS		Avg.	PASS			
CW 3300 RPM	PASS		CCW South	PASS		Pressure				
CCW 3300 RPM	PASS		CCW East	PASS		Avg.	PASS			
CW 5400 RPM	PASS		CCW North	PASS						
CCW 5400 RPM	PASS		CCW West	PASS						

Comments

This audit was for the met. tower at the Weld County Hereford site. NOTE: The units for the temperatures are degrees Celsius. The units for the WS were recorded in m/s but are listed in mph. Any questions about these results should be sent to joseph.maestas1@state.co.us

Audit Summary				
Audit Set Point	Conc. Out (ppm)	DAS Value (ppm)	Zero Corr. (ppm)	% Relative Error
Zero	-0.0013	0.0004		
Level 5	0.1248	0.1248	0.1248	0.1%
Level 4	0.0755	0.0760	0.0760	0.7%
Level 3	0.0356	0.0366	0.0366	2.7%
Level 2	0.0159	0.0166	0.0166	4.5%
Level 1				

Audit Results					
DAS Results		Internal Temp.		Regression Results	
Zero	PASS	Station	PASS	Slope	0.993967
Level 5	PASS	Audit	PASS	Intercept	0.000906
Level 4	PASS	Difference	PASS	R-Squared	0.999877
Level 3	PASS				
Level 2	PASS				
Level 1					

Comments

This audit was for the T400 Ozone analyzer at the Weld County Hereford site. Any questions about these results should be sent to joseph.maestas1@state.co.us

APPENDIX B6: ORCHARD STATION CDPHE AUDIT

Meteorological Tower Audit



Site: 888888888

Site Name: SPECIAL STUDY

Auditor: Joseph Time Offline: 9:24

Audit Date: 11/18/2025 Time Online: 10:48

Sensor Information			
Sensor	Serial Number	Make	Model
Wind Speed	180186	RM Young	05305V
Wind Direction	180186	RM Young	05305V
Temp (Upper)	032954	RM Young	41342VC
Temp (Lower)	032953	RM Young	41342VC
Hygrometer	201516001269F1	EE Elektronik	EE181
Barometer	7563445	Setra	278

Span/Zero Voltages		
Sensor	Zero	Span
Wind Speed		
Wind Direction		
Temp (Upper)		
Temp (Lower)		
Hygrometer		
Barometer		

Magnetic Declination: 7.2 Distance to Tower (ft): 100 Subtract magnetic declination?

Crossarm Orientation: N-S Correction (ft): -2.6

Pre-Audit Crossarm Alignment Check				
	Degrees	Minutes	Offset	Error
Normal	358	30	0	-1.5
Inverted	178	30	0	-1.5

Post-Audit Crossarm Alignment Check				
	Degrees	Minutes	Offset	Error
Normal	358	30	0	-1.5
Inverted	178	30	0	-1.5

Wind Speed Sensor Audit (+/- 5%)									
Audit Set Point (RPM)	Wind Speed (mph)	DVM (volts)	DVM (mph)	Error (%)	DCN Actual (volts)	DCN Actual (mph)	Error (%)	DCN Res. (mph)	Error (%)
Zero	0	0.0				0.0		0.0	
CW	600	6.9				6.9	0.3%	6.9	0.3%
CCW	600	6.9				6.9	0.1%	6.9	0.1%
CW	1700	19.5				19.5	0.1%	19.5	0.1%
CCW	1700	19.5				19.5	0.1%	19.5	0.1%
CW	3300	37.8				37.8	0.2%	37.8	0.2%
CCW	3300	37.8				37.9	0.2%	37.9	0.2%
CW	5400	61.8				62.0	0.3%	62.0	0.3%
CCW	5400	61.8				62.0	0.3%	62.0	0.3%

Wind Direction Sensor Audit (+/- 5 Degrees)										
Audit Set Point	Wind Dir. (degrees)	DVM (volts)	DVM (degrees)	DCN Act. (volts)	DCN Act. (degrees)	Offset	DCN Act. Error	DCN Res. (degrees)	DCN Res. Error	Composite Error
South	180				180.5	0.0	0.5	180.5	0.5	-1.0
CW West	270				270.5	0.0	0.5	270.5	0.5	-1.0
CW North	360				1.1	-360.0	1.1	1.1	1.1	-0.4
CW East	90				90.1	0.0	0.1	90.1	0.1	-1.4
CCW South	180				181.6	0.0	1.6	181.6	1.6	0.1
CCW East	90				91.2	0.0	1.2	91.2	1.2	-0.3
CCW North	360				2.1	-360.0	2.1	2.1	2.1	0.6
CCW West	270				271.3	0.0	1.3	271.3	1.3	-0.2

Temperature (+/- 2 Degrees C)										
Reading	Upper Temp. Sensor					Lower Temp. Sensor				
	DVM (volts)	DCN (volts)	Audit (F)	DCN (F)	Error	DVM (volts)	DCN (volts)	Audit (F)	DCN (F)	Error
Point 1			12.2	12.2	0.0			13.8	13.9	0.1
Point 2			12.4	13.0	0.6			14.5	14.5	0.0
Avg.			12.3	12.6	0.3			14.1	14.2	0.0

Reading	Humidity (+/- 5%)					Pressure (+/- 10 mm Hg)				
	DVM (volts)	DCN (volts)	Audit (%)	DCN (%)	Error	DVM (volts)	DCN (volts)	Audit (mmHg)	DCN (mmHg)	Error
Point 1			23.9	28.7	4.8			648.7	648.2	-0.5
Point 2			23.4	28.1	4.7			648.2	648.2	0.0
Avg.			23.7	28.4	4.7			648.5	648.2	-0.3

Audit Results										
Wind Speed			Wind Direction				Temperature			
CW 600 RPM	PASS		South	PASS		Upper Avg.	PASS			
CCW 600 RPM	PASS		CW West	PASS		Lower Avg.	PASS			
CW 1700 RPM	PASS		CW North	PASS		Humidity				
CCW 1700 RPM	PASS		CW East	PASS		Avg.	PASS			
CW 3300 RPM	PASS		CCW South	PASS		Pressure				
CCW 3300 RPM	PASS		CCW East	PASS		Avg.	PASS			
CW 5400 RPM	PASS		CCW North	PASS						
CCW 5400 RPM	PASS		CCW West	PASS						

Comments

This audit was for the met. tower at the Weld County Orchard site. NOTE: The units for the temperatures are degrees Celsius. The units for the WS were recorded in m/s but are listed in mph. Any questions about these results should be sent to joseph.maestas1@state.co.us

Audit Summary				
Audit Set Point	Conc. Out (ppm)	DAS Value (ppm)	Zero Corr. (ppm)	% Relative Error
Zero	-0.0002	0.0016		
Level 5	0.1247	0.1234	0.1234	-1.1%
Level 4	0.0756	0.0749	0.0749	-1.0%
Level 3	0.0356	0.0362	0.0362	1.9%
Level 2	0.0157	0.0170	0.0170	8.1%
Level 1				

Audit Results					
DAS Results		Internal Temp.		Regression Results	
Zero	WARNING	Station	PASS	Slope	0.979534
Level 5	PASS	Audit	PASS	Intercept	0.001139
Level 4	PASS	Difference	PASS	R-Squared	0.999815
Level 3	PASS				
Level 2	PASS				
Level 1					

Comments
This audit was for the T400 Ozone analyzer at the Orchard site.

APPENDIX B7: NETWORK SOLAR RADIATION & PRECIPITATION ARS AUDIT

AUDIT REPORT
FOR
RAMBOLL US CONSULTING
WELD COUNTY, COLORADO
NOVEMBER 2025

Prepared for



Jake Zaragoza
RAMBOLL US CONSULTING
Ramboll Environmental & Health

Prepared by



2643 Midpoint Drive, Suite F
Fort Collins, CO 80525
970-484-7941
www.air-resource.com

Sites Audited: November 18, 2025



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1.0 INTRODUCTION

Air Resource Specialists, Inc. (ARS) conducted a performance audit of monitoring sites in Weld County, Colorado operated by Ramboll US Consulting on November 18, 2025. The monitoring sites are in Hereford, Orchard, and Greeley, Colorado. The table below documents their specific locations.

Table 1-1

Site Location Information

	Herford Monitoring Site, Hereford, CO	Orchard Monitoring Site, Orchard, CO	Missile Park Monitoring Site, Greeley, CO
Latitude	40° 58' 38.5" N	40° 19' 11.6" N	40° 25' 44.2" N
Longitude	104° 18' 18.7" W	104° 9' 34.0" W	104° 51' 41.3" W
UTM	13T 558460 4536471	13T 571413 4463598	13T 511753 4475383
Elevation	5,279 feet MSL	4,409 feet MSL	4,675 feet MSL

Audit results for the meteorological measurements are summarized in Tables 1-2 through 1-4. Detailed discussions of performance audit findings and other findings can be found in Section 3.0.

Table 1-2

Summary of Meteorological Audit Results
Hereford Monitoring Site, Hereford, CO

Parameter	Instrument	Within Accuracy Goal
Precipitation	RM Young 52202	Yes
Solar Radiation	Huskeflux LP02	Yes

Table 1-3

Summary of Meteorological Audit Results
Orchard Monitoring Site, Orchard, CO

Parameter	Instrument	Within Accuracy Goal
Precipitation	RM Young 52202	Yes
Solar Radiation	Huskeflux LP02	Yes

Table 1-4

Summary of Meteorological Audit Results
Missile Park Monitoring Site, Greeley, CO

Parameter	Sensor	Within Accuracy Goal
Precipitation	RM Young 52202	Yes
Solar Radiation	Huskeflux LP02	Yes

Details of the audit are presented in the following sections:

Section 2.0	Audit Methods and Equipment
Section 3.0	Audit Results
Appendix A	Audit Data Forms
Appendix B	Audit Standards Certifications

Any questions related to this audit or audit report should be addressed to:

Christian A. Kirk
Vice President – Technical Operations
Air Resource Specialists, Inc.
2643 Midpoint Dr., Suite F
Fort Collins, Colorado 80525
Telephone: 970-484-7941
E-mail: ckirk@air-resource.com

2.0 AUDIT METHODS

Audit procedures, audit challenge ranges, and acceptance criteria are described below. These ranges and limits conform to EPA's SLAMS guidelines. Audit results were verbally communicated to the site operator prior to departure from the sites. Audit details are provided in Appendix A.

Guidance from the following EPA documents was used to establish the audit procedures:

- 40 CFR Part 58, Appendix A. *Quality Assurance Requirements for Monitors Used in Evaluations of National Ambient Air Quality Standards*
- EPA *Quality Assurance Handbook for Air Pollution Measurement Systems*:
 - *Volume I. A Field Guide to Environmental Quality Assurance*
 - *Volume II. Ambient Air Quality Monitoring Program*
 - *Volume IV. Meteorological Measurements*
- EPA *Transfer Standards for Calibration of Air Monitoring Analyzers for Ozone*

2.1 METEOROLOGICAL PARAMETERS

Meteorological measurement systems are audited in accordance with (and accuracy goals were obtained from) the EPA's *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume IV – Meteorological Measurements*, (March 2008). ARS uses National Institute of Standards and Technologies (NIST) traceable test equipment for all meteorological parameters. All equipment is recertified annually. Audit ranges and acceptable criteria for each parameter are summarized in Table 2-1.

2.1.1 Solar Radiation

Solar radiation sensors are audited by collocation of the audit sensor under ambient conditions. Collocated comparisons are typically carried out using hourly averages. Audit data are collected by a datalogger provided by the auditor. Data observed from the on-site datalogger are used to assess the accuracy of sensors. Additionally, the level and cleanliness of the sensor is observed, where possible.

2.1.2 Precipitation

The tipping bucket style precipitation gauges are audited with a volumetric precipitation gauge calibrator by transferring a known amount of water through the gauge orifice at a maximum rate equivalent to 2.0 inches/hour of precipitation. The total values from the on-site datalogger values are compared to the actual introduced volume. The level and cleanliness of the sensor is observed where possible.

Table 2-1

Meteorological Sensors
Audit Ranges and Acceptance Criteria

Parameter	Audit Method	Acceptance Criteria
Precipitation	Accuracy via known volume of water	$\leq \pm 10\%$
Solar Radiation	Accuracy Via collocation in ambient conditions	$\leq \pm 10\%$

Table 2-2

Meteorological Audit Equipment

References	Manufacturer	Model Number	Serial Number	Expiration Date
Precipitation	R.M. Young	52260	N/A	N/A
Solar Radiation	Apogee	CS301	81421	7/22/2026
Solar Radiation	Apogee	CS301	81422	7/22/2026

3.0 AUDIT RESULTS

Audit findings and recommendations are discussed below. Detailed audit results are provided in Appendix A.

3.1 HEREFORD MONITORING SITE

All parameters passed the performance audit.

3.2 ORCHARD MONITORING SITE

All parameters passed the performance audit.

3.3 MISSILE PARK MONITORING SITE

All parameters passed the performance audit.

APPENDIX A
AUDIT DATA FORMS



PRECIPITATION SENSOR AUDIT

ABBR.	N/A				
CLIENT	Ramboll	FIELD SPECIALIST	B.Orth	DATE	11/18/2025
SITE NAME	Hereford Monitoring Sute				

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
Precipitation Reference	RM Young	52260	n/a	

Manufacturer	RM Young
Model	52202
Serial Number	TB 16137

AUDIT CRITERIA (<=)	
Difference from Input Volume (%)	10.0%

Reference Chart			Input Volume (mL)		1000	
Manufacturer	Model	Diameter (in.)	mm/tip	mL/tip	DAS target	
	Met One	385	12	0.254	18.53	13.71
x	RM Young	52202	6.2825	0.100	2.00	50.00
	Climatronics	100097-1-G0-H0	8	0.254	8.24	30.84
	Climatronics	100508	9.66	0.100	4.73	21.15

Conversions			
Value	Units	Value	Units
1.944	inch	49.38	mm
25.40	mm	1.000	inch

Reference (mL)	Target (mm)	Precipitation		
		DAS (mm)	Difference	
1000	50.00	49.38	-1.2%	PASS

Heater functional? Yes No N/A

NOTES:



SITE INFORMATION

ABBR.	N/A	
CLIENT	Ramboll	FIELD SPECIALIST
		B.Orth
DATE	11/18/2025	
SITE NAME	Hereford Monitoring Sute	

		Deg	Min	Sec
LATITUDE	North	40	58	38.5
LONGITUDE	West	104	18	18.7

--CALCULATE-->

Decimal
40.9774
104.3052

NOTES:



ABBR.	N/A				
CLIENT	Ramboll	FIELD SPECIALIST	B.Orth	DATE	11/18/2025
SITE NAME	Hereford Monitoring Sute				

	MANUFACTURER	MODEL	SERIAL #	Calibration Expiration Date	
Ozone Transfer Standard					
Gas Dilution Transfer Standard					
MFC High Flow Reference					
MFC Low Flow Reference					
Temperature Reference					
AT/RH Sensor Reference					
Barometric Pressure Reference					
Wind Speed Reference (high rpm)					
Wind Speed Reference (low rpm)					
Wind Speed Torque Gauge					
Wind Direction Alignment Reference					
Wind Direction Linearity Reference					
Wind Direction Torque Gauge					
Solar Radiation Reference #1	Apogee	CS301	81421	7/22/2026	
Solar Radiation Reference #2	Apogee	CS301	81422	7/22/2026	
UV Radiation Reference					
Multiplier		W/m2 / mV			
Precipitation Reference					
Volume	1000	mL	RM Young	52260	n/a

PM Flow Standard #1				
PM Flow Standard #2				
PM Flow Standard #3				
PM Flow Standard #4				

PM Temperature Standard #1				
PM Temperature Standard #2				
PM Temperature Standard #3				
PM Temperature Standard #4				

PM Barometric Pressure Standard #1				
PM Barometric Pressure Standard #2				
PM Barometric Pressure Standard #3				
PM Barometric Pressure Standard #4				

TEOM MTV Standard				
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HiVol Direct Flow Reference				
Orifice				
ΔP orifice manometer				



PRECIPITATION SENSOR AUDIT

ABBR.	N/A				
CLIENT	Ramboll	FIELD SPECIALIST	B.Orth	DATE	11/18/2025
SITE NAME	Orchard Monitoring Site				

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
Precipitation Reference	RM Young	52260	n/a	

Manufacturer	RM Young
Model	52202
Serial Number	TB 16138

AUDIT CRITERIA (<=)	
Difference from Input Volume (%)	10.0%

Reference Chart			Input Volume (mL)		1000	
Manufacturer	Model	Diameter (in.)	mm/tip	mL/tip	DAS target	
	Met One	385	12	0.254	18.53	13.71
x	RM Young	52202	6.2825	0.100	2.00	50.00
	Climatronics	100097-1-G0-H0	8	0.254	8.24	30.84
	Climatronics	100508	9.66	0.100	4.73	21.15

Conversions			
Value	Units	Value	Units
1.996	inch	50.70	mm
25.40	mm	1.000	inch

Reference (mL)	Target (mm)	Precipitation		
		DAS (mm)	Difference	
1000	50.00	50.70	1.4%	PASS

Heater functional? Yes No N/A

NOTES:



SITE INFORMATION

ABBR.	N/A				
CLIENT	Ramboll	FIELD SPECIALIST	B.Orth	DATE	11/18/2025
SITE NAME	Orchard Monitoring Site				

		Deg	Min	Sec
LATITUDE	North	40	19	11.6
LONGITUDE	West	104	9	34

--CALCULATE-->

Decimal
40.3199
104.1594

NOTES:

--



ABBR.	N/A				
CLIENT	Ramboll	FIELD SPECIALIST	B.Orth	DATE	11/18/2025
SITE NAME	Orchard Monitoring Site				

	MANUFACTURER	MODEL	SERIAL #	Calibration Expiration Date	
Ozone Transfer Standard					
Gas Dilution Transfer Standard					
MFC High Flow Reference					
MFC Low Flow Reference					
Temperature Reference					
AT/RH Sensor Reference					
Barometric Pressure Reference					
Wind Speed Reference (high rpm)					
Wind Speed Reference (low rpm)					
Wind Speed Torque Gauge					
Wind Direction Alignment Reference					
Wind Direction Linearity Reference					
Wind Direction Torque Gauge					
Solar Radiation Reference #1	Apogee	CS301	81421	7/22/2026	
Solar Radiation Reference #2	Apogee	CS301	81422	7/22/2026	
UV Radiation Reference					
Multiplier		W/m ² / mV			
Precipitation Reference					
Volume	1000	mL	RM Young	52260	n/a

PM Flow Standard #1				
PM Flow Standard #2				
PM Flow Standard #3				
PM Flow Standard #4				

PM Temperature Standard #1				
PM Temperature Standard #2				
PM Temperature Standard #3				
PM Temperature Standard #4				

PM Barometric Pressure Standard #1				
PM Barometric Pressure Standard #2				
PM Barometric Pressure Standard #3				
PM Barometric Pressure Standard #4				

TEOM MTV Standard				
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HiVol Direct Flow Reference				
Orifice				
ΔP orifice manometer				



SOLAR RADIATION SENSOR AUDIT

ABBR.	N/A	
CLIENT	Ramboll	FIELD SPECIALIST
SITE NAME	Missile Park Monitoring Site	
	B.Orth	DATE
		11/18/2025

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
Solar Radiation Reference #1	Apogee	CS301	81421	7/22/2026
Solar Radiation Reference #2	Apogee	CS301	81422	7/22/2026

Manufacturer	Huskeflux
Model	LP02
Serial Number	48014

Conversions			
Value	Units	Value	Units
1.000	Langley/m	697.80	W/m ²

AUDIT CRITERIA (<=)	
Difference from CTS (%)	10.0%

Hour	Solar Radiation			Difference
	#1 (W/m ²)	#2 (W/m ²)	DAS (W/m ²)	
915	199.7	201.8	199	-0.3%
930	223.9	225.8	221	-1.2%
945	244.1	245.9	241	-1.3%
1000	214.3	215.9	214	-0.3%
1015	201.4	222.4	200	-0.7%
MEAN ABS % DIFF 0.7% PASS				

Sensor found clean? Yes No

Sensor found level? Yes No

NOTES:



PRECIPITATION SENSOR AUDIT

ABBR.	N/A	
CLIENT	Ramboll	FIELD SPECIALIST
SITE NAME	Missile Park Monitoring Site	
	B.Orth	DATE
		11/18/2025

	MANUFACTURER	MODEL	SERIAL NUMBER	EXPIRATION DATE
Precipitation Reference	RM Young	52260	n/a	

Manufacturer	RM Young
Model	52202
Serial Number	TB 16138

AUDIT CRITERIA (<=)	
Difference from Input Volume (%)	10.0%

Reference Chart			Input Volume (mL)		1000
Manufacturer	Model	Diameter (in.)	mm/tip	mL/tip	DAS target
	Met One	385	12	0.254	18.53
x	RM Young	52202	6.2825	0.100	2.00
	Climatronics	100097-1-G0-H0	8	0.254	8.24
	Climatronics	100508	9.66	0.100	4.73

Conversions			
Value	Units	Value	Units
1.919	inch	48.74	mm
25.40	mm	1.000	inch

		Precipitation		
Reference (mL)	Target (mm)	DAS (mm)	Difference	
1000	50.00	48.74	-2.5%	PASS

Heater functional? Yes No N/A

NOTES:



SITE INFORMATION

ABBR.	N/A				
CLIENT	Ramboll	FIELD SPECIALIST	B.Orth	DATE	11/18/2025
SITE NAME	Missile Park Monitoring Site				

		Deg	Min	Sec
LATITUDE	North	40	25	44.2
LONGITUDE	West	104	51	41.3

--CALCULATE-->

Decimal
40.4289
104.8615

NOTES:

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ABBR.	N/A				
CLIENT	Ramboll	FIELD SPECIALIST	B.Orth	DATE	11/18/2025
SITE NAME	Missile Park Monitoring Site				

	MANUFACTURER	MODEL	SERIAL #	Calibration Expiration Date	
Ozone Transfer Standard					
Gas Dilution Transfer Standard					
MFC High Flow Reference					
MFC Low Flow Reference					
Temperature Reference					
AT/RH Sensor Reference					
Barometric Pressure Reference					
Wind Speed Reference (high rpm)					
Wind Speed Reference (low rpm)					
Wind Speed Torque Gauge					
Wind Direction Alignment Reference					
Wind Direction Linearity Reference					
Wind Direction Torque Gauge					
Solar Radiation Reference #1	Apogee	CS301	81421	7/22/2026	
Solar Radiation Reference #2	Apogee	CS301	81422	7/22/2026	
UV Radiation Reference					
Multiplier		W/m2 / mV			
Precipitation Reference					
Volume	1000	mL	RM Young	52260	n/a

PM Flow Standard #1				
PM Flow Standard #2				
PM Flow Standard #3				
PM Flow Standard #4				

PM Temperature Standard #1				
PM Temperature Standard #2				
PM Temperature Standard #3				
PM Temperature Standard #4				

PM Barometric Pressure Standard #1				
PM Barometric Pressure Standard #2				
PM Barometric Pressure Standard #3				
PM Barometric Pressure Standard #4				

TEOM MTV Standard				
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HiVol Direct Flow Reference				
Orifice				
ΔP orifice manometer				

APPENDIX B

AUDIT STANDARDS CERTIFICATIONS



721 West 1800 North
Logan, UT 84321

Certificate of Calibration

Silicon Cell Pyranometer

SP-100/200/400, CS300, and MP-100/200 Series

Serial Number	:	CS301_81421
Calibration Date	:	Jul-2025
Recommended Recalibration Date	:	Jul-2027
Calibration Factor	:	5 W m ⁻² per mV
Calibration Uncertainty	:	± 5 %
Measurement Repeatability	:	< 1 %
Non-stability (Long-term Drift)	:	< 2 % per year
Transfer Standard Mean	:	352.5 W m ⁻²
Test Sensor (As Found)	:	353.2 W m ⁻²
Change in Output (As Found)	:	0.2 %
Test Sensor (As Left)	:	352.5 W m ⁻²
Error (As Left)	:	0.0 %

Calibration Procedure

Calibration is based on a side-by-side comparison under high intensity discharge metal halide lamps using the mean of (4) Apogee transfer standard pyranometers. Apogee transfer standards are calibrated to the mean of at least (2) ISO-classified reference pyranometers under sunlight (clear sky conditions) in Logan, Utah. Each of the four ISO-classified reference pyranometers are recalibrated on an alternating year schedule (two instruments per year) at the National Renewable Energy Laboratory (NREL) in Golden, Colorado. NREL reference standards are calibrated to the World Radiometric Reference (WRR) in Davos, Switzerland.

Traceability

Reference Instrument	Serial Number	ISO 9060 Classification
EKO Instruments MS80	S16088044	Spectrally Flat Class A
Kipp & Zonen CM11	060089	Spectrally Flat Class A
Kipp & Zonen CMP11	101625	Spectrally Flat Class A
Hukseflux SR20	2497	Spectrally Flat Class A
Apogee SP-110	TS1	Fast Response Class C
Apogee SP-110	TS2	Fast Response Class C
Apogee SP-110	TS3	Fast Response Class C
Apogee SP-110	TS4	Fast Response Class C

Technical Manager :

Jacob Bingham

Date : 22-Jul-2025
ARS Expiration: 22-Jul-2026

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721 West 1800 North
Logan, UT 84321

Certificate of Calibration
Silicon Cell Pyranometer
SP-100/200/400, CS300, and MP-100/200 Series

Serial Number	:	CS301_81422
Calibration Date	:	Jul-2025
Recommended Recalibration Date	:	Jul-2027
Calibration Factor	:	5 W m ⁻² per mV
Calibration Uncertainty	:	± 5 %
Measurement Repeatability	:	< 1 %
Non-stability (Long-term Drift)	:	< 2 % per year
Transfer Standard Mean	:	352.7 W m ⁻²
Test Sensor (As Found)	:	351.4 W m ⁻²
Change in Output (As Found)	:	-0.4 %
Test Sensor (As Left)	:	352.9 W m ⁻²
Error (As Left)	:	0.0 %

Calibration Procedure

Calibration is based on a side-by-side comparison under high intensity discharge metal halide lamps using the mean of (4) Apogee transfer standard pyranometers. Apogee transfer standards are calibrated to the mean of at least (2) ISO-classified reference pyranometers under sunlight (clear sky conditions) in Logan, Utah. Each of the four ISO-classified reference pyranometers are recalibrated on an alternating year schedule (two instruments per year) at the National Renewable Energy Laboratory (NREL) in Golden, Colorado. NREL reference standards are calibrated to the World Radiometric Reference (WRR) in Davos, Switzerland.

Traceability

Reference Instrument	Serial Number	ISO 9060 Classification
EKO Instruments MS80	S16088044	Spectrally Flat Class A
Kipp & Zonen CM11	060089	Spectrally Flat Class A
Kipp & Zonen CMP11	101625	Spectrally Flat Class A
Hukseflux SR20	2497	Spectrally Flat Class A
Apogee SP-110	TS1	Fast Response Class C
Apogee SP-110	TS2	Fast Response Class C
Apogee SP-110	TS3	Fast Response Class C
Apogee SP-110	TS4	Fast Response Class C

Technical Manager :

Jacob Bingham

Date : 22-Jul-2025
ARS Expiration: 22-Jul-2026

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APPENDIX C: 2025 CALIBRATION STATISTICS

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C.1 PREFACE

Appendix D of the Quality Assurance Handbook Volume II

([https://www.epa.gov/sites/default/files/2020-](https://www.epa.gov/sites/default/files/2020-10/documents/app_d_validation_template_version_03_2017_for_amtic_rev_1.pdf)

[10/documents/app_d_validation_template_version_03_2017_for_amtic_rev_1.pdf](https://www.epa.gov/sites/default/files/2020-10/documents/app_d_validation_template_version_03_2017_for_amtic_rev_1.pdf)) specifies the frequency and allowable ranges of the one-point quality control (precision), zero, and span checks for ozone and NO/NO₂/NO_x, which are based on the Code of Federal Regulations (CFR). These allowable ranges are mostly percent differences between a measured point and the audit point. At each site, the measured point was taken as a 3-minute average of a stable analyzer reading while receiving calibration gas. The audit point is a preset calibration target that the on-site calibrators produce. For both ozone and NO/NO_x, the precision check is 60 ppb and the span check is 400 ppb. For NO₂, the target output concentrations from the calibrator are 48 ppb and 160 ppb for precision and span checks, respectively. Since the calibrator only indirectly calculates NO₂ concentration, the actual target NO₂ output is calculated as the difference in NO between the gas phase titration zero (GPTZ) and the gas phase titration (GPT) phases. The analyzer is then challenged against these actual target NO₂ concentrations. Each figure below highlights the percent difference between the measured point and the audit point, with the upper and lower lines representing the allowable upper and lower limits. NO₂ has an additional requirement for calculation of the converter efficiency in converting NO₂ to NO. Each converter efficiency check is plotted for it.

Additionally, each table below represents the results of the calculations detailed in 40CFR58, Appendix A, Section 4 'Calculations for Data Quality Assessments' (<https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-58>). They are provided only for informational purposes.

C.2 MISSILE SITE PARK SITE

Ozone (O₃)

Figure C - 1 and **Figure C - 2** below show the calibration span and precision percent differences for ozone at the Missile Site Park site. The second quarter semi-annual calibration occurred on May 7th and 23rd, and the fourth quarter semi-annual calibration occurred on October 14th and 31st. The calibrator was removed from May 8th through 22nd and from October 15th through 30th for recertification, so no automated calibrations occurred between those dates. Note that the minimum frequency required per calibration check is once every 14 days, per Appendix D of the Quality Assurance Handbook, Volume II.¹ As such, the minimum frequency was not met between October 15th and 30th, however, since the two calibration checks surrounding this period were passing no data invalidation was required. Between August 1st and August 6th, data was invalidated because of poor calibration results caused by an issue with the Nafion sample conditioner. The Nafion conditioner was removed on August 13th, and a new one was installed on September 30th. Additionally, regularly scheduled calibrations did not occur on September 14th and 15th and September 17th and 25th due to an issue with the zero-air generator (ZAG). All calibration checks were within the upper and lower bounds specified in Appendix D of the Quality Assurance Handbook Volume II. **Table C - 1** highlights the assessment statistics detailed in 40CFR58, Appendix A, Section 4. These values are estimated from a sample of the entire dataset at the site.

¹ USEPA, Quality Assurance Handbook for Ambient Air Quality Monitoring. Volume II Ambient Air Quality Monitoring Program, Appendix D, March 2017.

Available at: https://www.epa.gov/sites/default/files/2020-10/documents/app_d_validation_template_version_03_2017_for_amtic_rev_1.pdf. Accessed: February 2026.

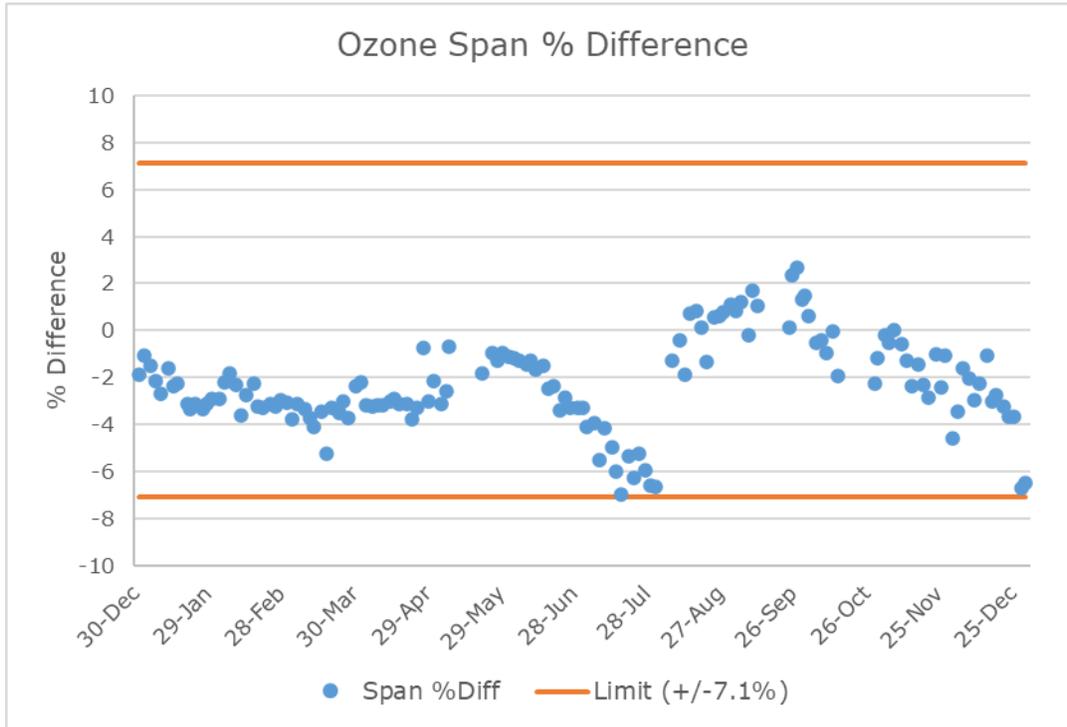


Figure C - 1. 2025 Calibration span percent difference for O₃ at Missile Site Park.

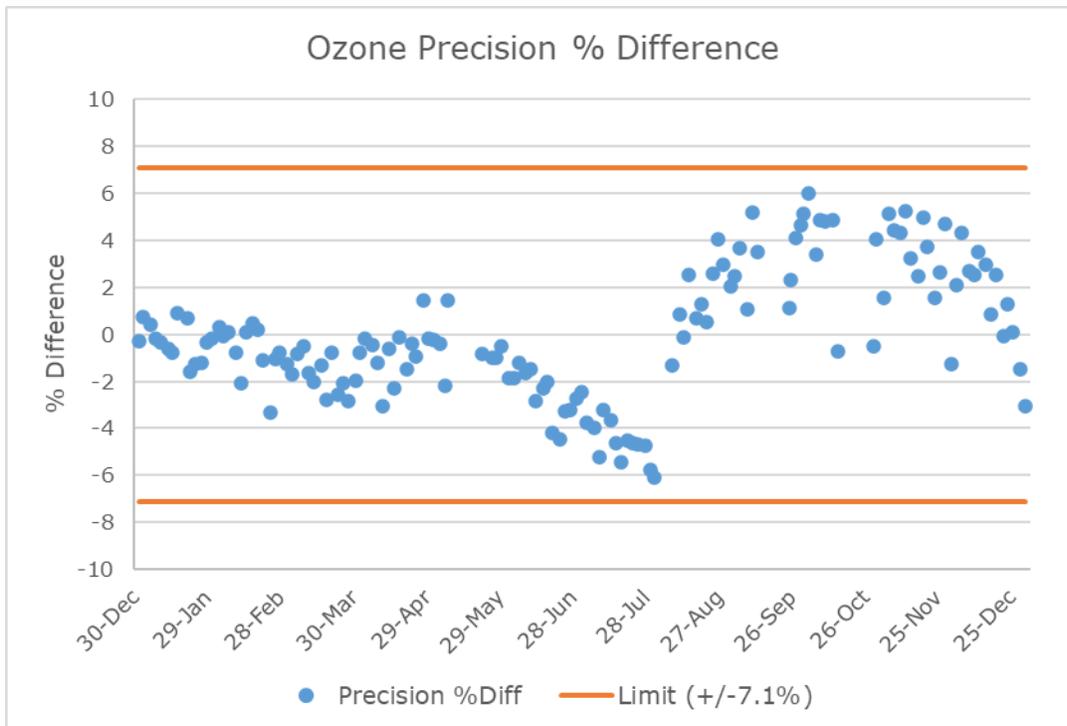


Figure C - 2. 2025 Calibration precision percent difference for O₃ at Missile Site Park.

Table C - 1. Summary of 2025 calibration statistics for O₃ at Missile Site Park.

Formula	Precision	Span
STDEV	8.80	8.39
Count	142	142
Chi ² , 0.1, n-1	119.95	119.95
CV	9.54	9.10
Bias	4.05	4.38
Bias (+/-/U)	U	-
AB	2.89	3.23
AS	8.34	8.29
t _{0.95, n-1}	1.66	1.66
25 th	-1.86	-3.28
75 th	1.81	-1.13

Nitric Oxide (NO)

Figure C - 3 and **Figure C - 4** below show the calibration span and precision percent differences for NO at the Missile Site Park site. The second quarter semi-annual calibration occurred on May 7th and 23rd, and the fourth quarter semi-annual calibration occurred on October 14th and 31st. The calibrator was removed from May 8th through 22nd and from October 15th through 30th for recertification, so no automated calibrations occurred during between dates. Note that the minimum frequency required per calibration check is once every 14 days, per Appendix D of the Quality Assurance Handbook, Volume II.² As such, the minimum frequency was not met between October 15th and 30th, however, since the two calibration checks surrounding this period were passing no data invalidation was required. Additionally, data and calibrations between January 25th and February 7th, and between February 12th and 14th were invalidated due to a shift in analyzer response and were excluded from the dataset. Furthermore, regularly scheduled NO/NO₂/NO_x calibrations did not occur on September 14th and September 18th – 25th due to a ZAG malfunction. All calibration checks were within the upper and lower bounds specified in Appendix D of the Quality Assurance Handbook Volume II. **Table C - 2** highlights the assessment statistics detailed in 40CFR58, Appendix A, Section 4.

² Id.

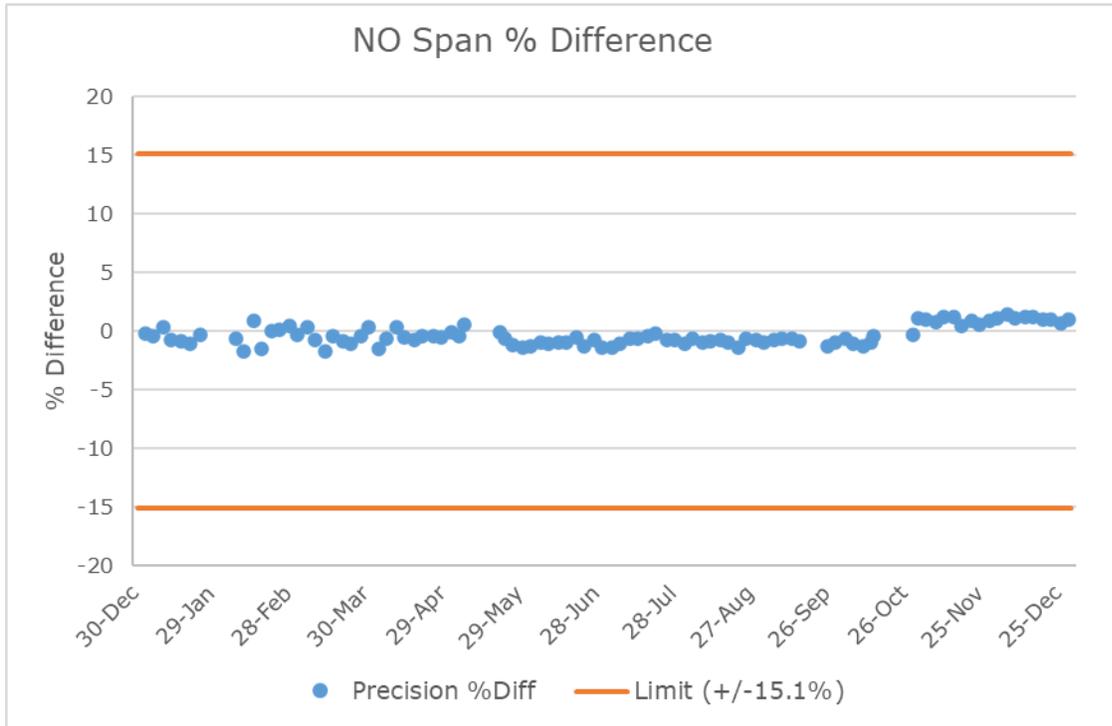


Figure C - 3. 2025 Calibration span percent difference for NO at Missile Site Park.

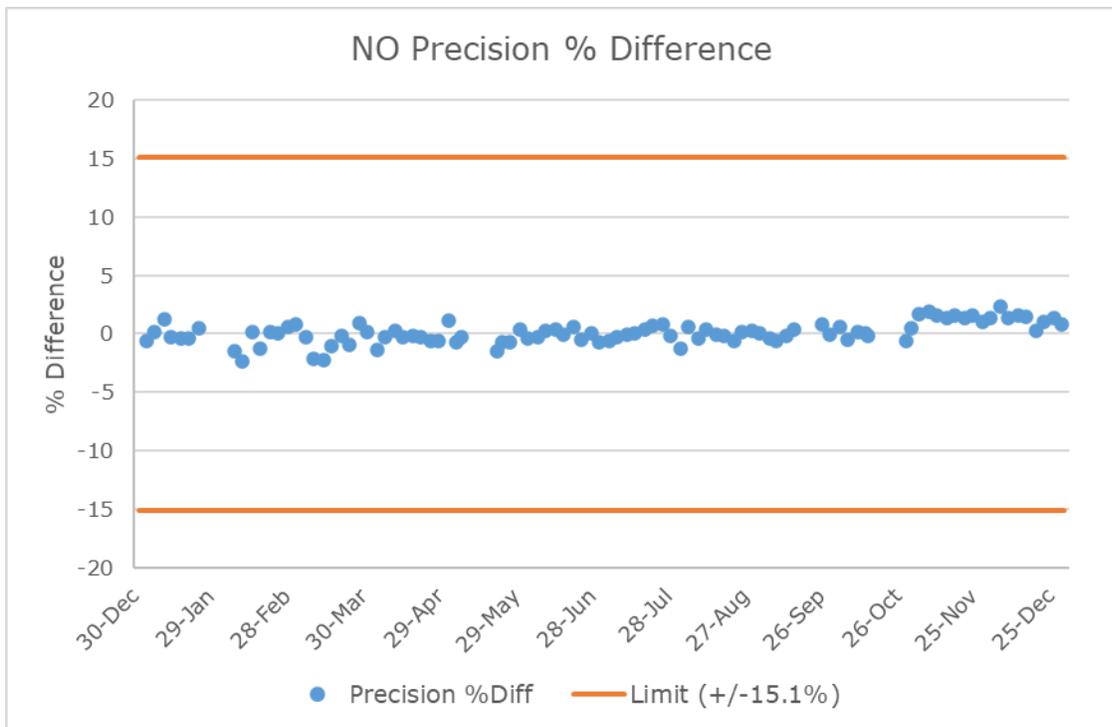


Figure C - 4. 2025 Calibration precision percent difference for NO at Missile Site Park.

Table C - 2. Summary of 2025 calibration statistics for NO at Missile Site Park.

Formula	Precision	Span
STDEV	0.91	0.82
Count	95	95
Chi ² , 0.1, n-1	76.91	76.91
CV	1.00	0.90
Bias	0.80	0.88
Bias (+/-/U)	U	U
AB	0.70	0.81
AS	0.58	0.38
t _{0.95, n-1}	1.66	1.66
25 th	-0.42	-0.96
75 th	0.62	0.30

Nitrogen Dioxide (NO₂)

Figure C - 5 below shows the converter efficiency (CE) during both precision (shown in blue) and span (shown in gold) calibrations for NO₂. CE has been calculated based on the latest published federal guidance³. The federal record requires only a minimum CE rate of 96%, while the upper limit of 104.1% is an EPA recommendation⁴ only. Note that the data shown in **Figure C - 5** represent estimates of CE determined from a 1-point precision or span NO₂ gas phase titration (GPT) level only. Furthermore, gas flow rates are not available during the single-point GPT checks so that the correction factor for NO₂ impurity cannot be included in the computation. In contrast, the CE values determined from a multi-point check is computed via a linear fit across multiple GPT points, and flow rates are available so that the impurity correction can be included. The CE determined during the multi-point quarterly calibration checks is therefore expected to be a more accurate assessment of the CE than the values determined during the single-point quality control checks. In Q4 2025, the two multi-point calibrations yielded a CE value of 101.0% and 100.9%.

Figure C - 6 and **Figure C - 7** below show the calibration percent difference for NO₂ during span and precision calibrations, respectively. The second quarter semi-annual calibration occurred on May 7th and 23rd, and the fourth quarter semi-annual calibration occurred on October 14th and 31st. The calibrator was removed from May 8th through 22nd and from October 15th through 30th for recertification, so no automated calibrations occurred between those dates. Note that the minimum frequency required per calibration check is once every 14 days, per Appendix D of the Quality Assurance Handbook, Volume II.⁵ As such, the minimum frequency was not met between October 12th and 30th, however, since the two calibration checks surrounding this period were passing no data invalidation was required. Additionally,

³ Converter efficiency calculations follow 40CFR Part 50 Appendix F, Sections 1.5.10 and 2.4.10.

⁴ USEPA, Quality Assurance Handbook for Ambient Air Quality Monitoring. Volume II Ambient Air Quality Monitoring Program, Appendix D, March 2017. Available at: https://www.epa.gov/sites/default/files/2020-10/documents/app_d_validation_template_version_03_2017_for_amtic_rev_1.pdf. Accessed: February 2026.

⁵ Id.

data and calibrations between January 25th and February 7th, and between February 12th and 14th were invalidated due to a shift in analyzer response and were excluded from the dataset. Furthermore, regularly scheduled NO/NO₂/NO_x calibrations did not occur on September 14th and September 18th – 25th due to a ZAG malfunction. All calibration checks were within the upper and lower bounds specified in Appendix D of the Quality Assurance Handbook Volume II. **Table C - 3** highlights the assessment statistics detailed in 40CFR58, Appendix A, Section 4.

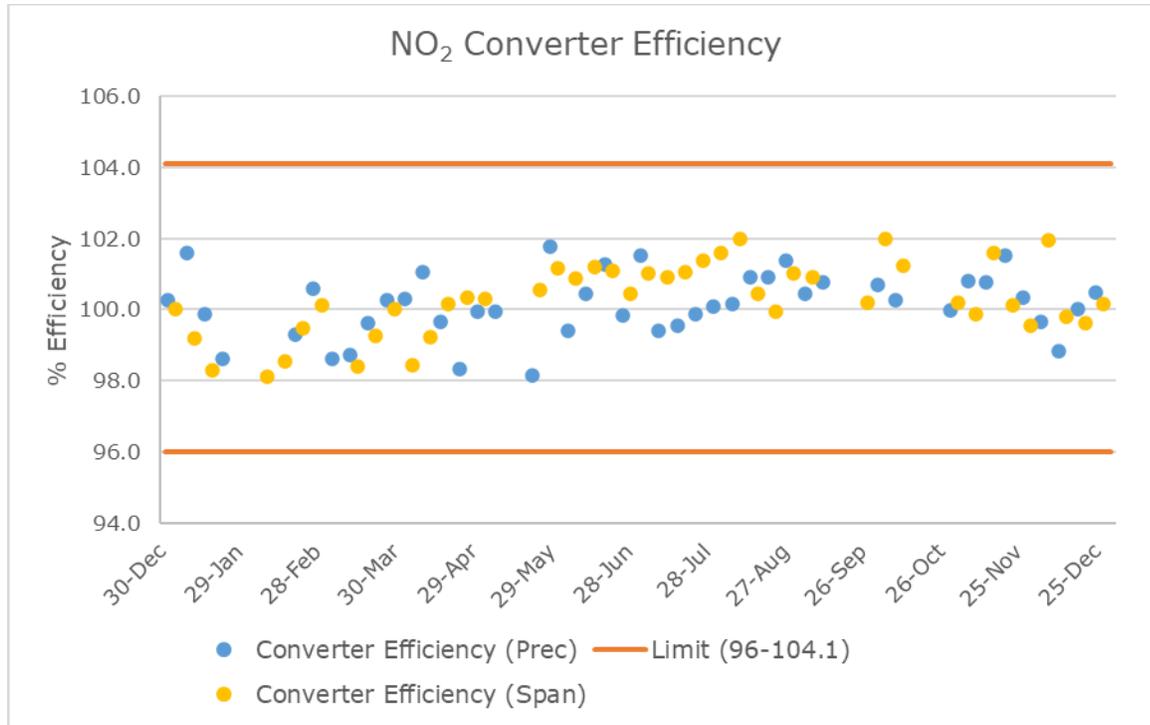


Figure C - 5. 2025 Converter efficiency for NO₂ at Missile Site Park.

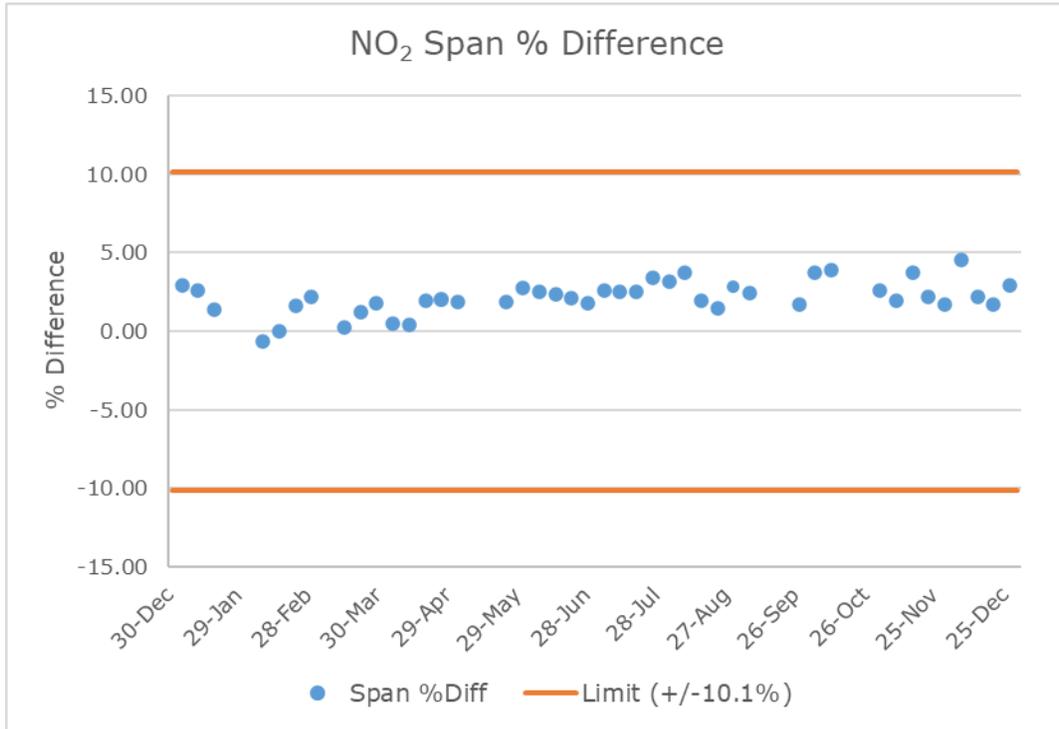


Figure C - 6. 2025 Calibration span percent difference for NO₂ at Missile Site Park.

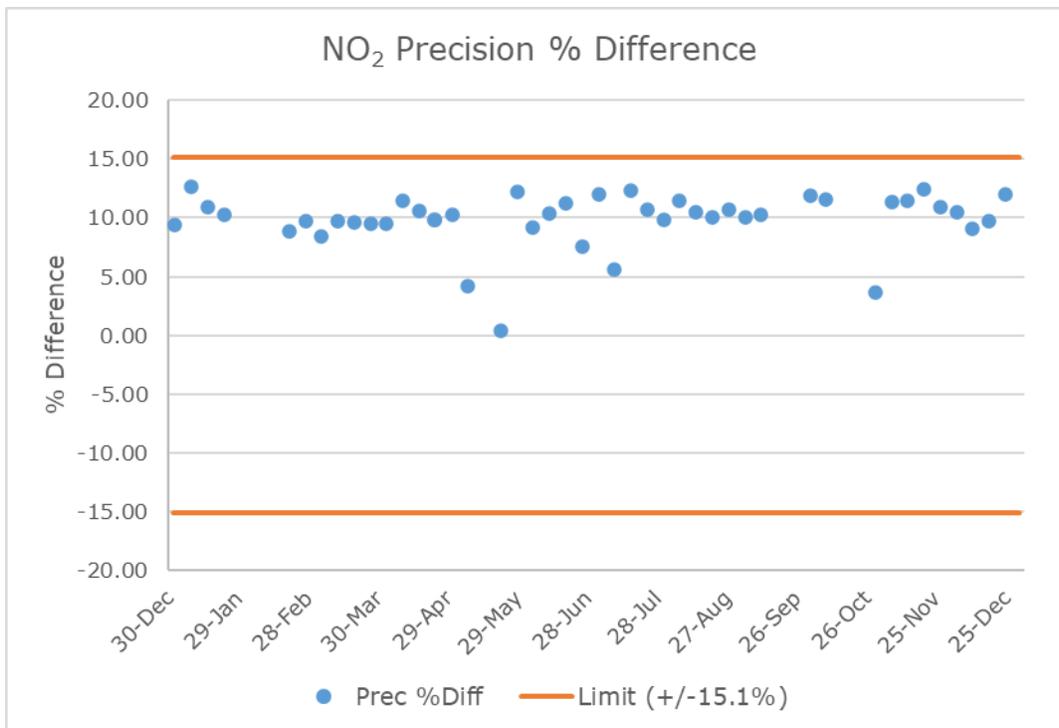


Figure C - 7. 2025 Calibration precision percent difference for NO₂ at Missile Site Park.

Table C - 3. Summary of 2025 calibration statistics for NO₂ at Missile Site Park.

Formula	Precision	Span
STDEV	2.41	1.06
Count	44	43
Chi ² , 0.1, n-1	31.63	30.77
CV	2.81	1.24
Bias	10.47	2.44
Bias (+/-/U)	+	+
AB	9.86	2.18
AS	2.41	1.00
t _{0.95, n-1}	1.68	1.68
25 th	9.53	1.73
75 th	11.42	2.68

Nitrogen Oxides (NO_x)

Figure C - 8 and **Figure C - 9** below show the calibration span and precision percent differences for NO_x at the Missile Site Park site. The second quarter semi-annual calibration occurred on May 7th and 23rd, and the fourth quarter semi-annual calibration occurred on October 14th and 31st. The calibrator was removed from May 8th through 22nd and from October 15th through 30th for recertification, so no automated calibrations occurred between those dates. Note that the minimum frequency required per calibration check is once every 14 days, per Appendix D of the Quality Assurance Handbook, Volume II.⁶ As such, the minimum frequency was not met between October 15th and 30th, however, since the two calibration checks surrounding this period were passing no data invalidation was required. Additionally, data and calibrations between January 25th and February 7th, and between February 12th and 14th were invalidated due to a shift in analyzer response and were excluded from the dataset. Furthermore, regularly scheduled NO/NO₂/NO_x calibrations did not occur on September 14th and September 18th – 25th due to a ZAG malfunction. All calibration checks were within the upper and lower bounds specified in Appendix D of the Quality Assurance Handbook Volume II. **Table C - 4** highlights the assessment statistics detailed in 40CFR58, Appendix A, Section 4.

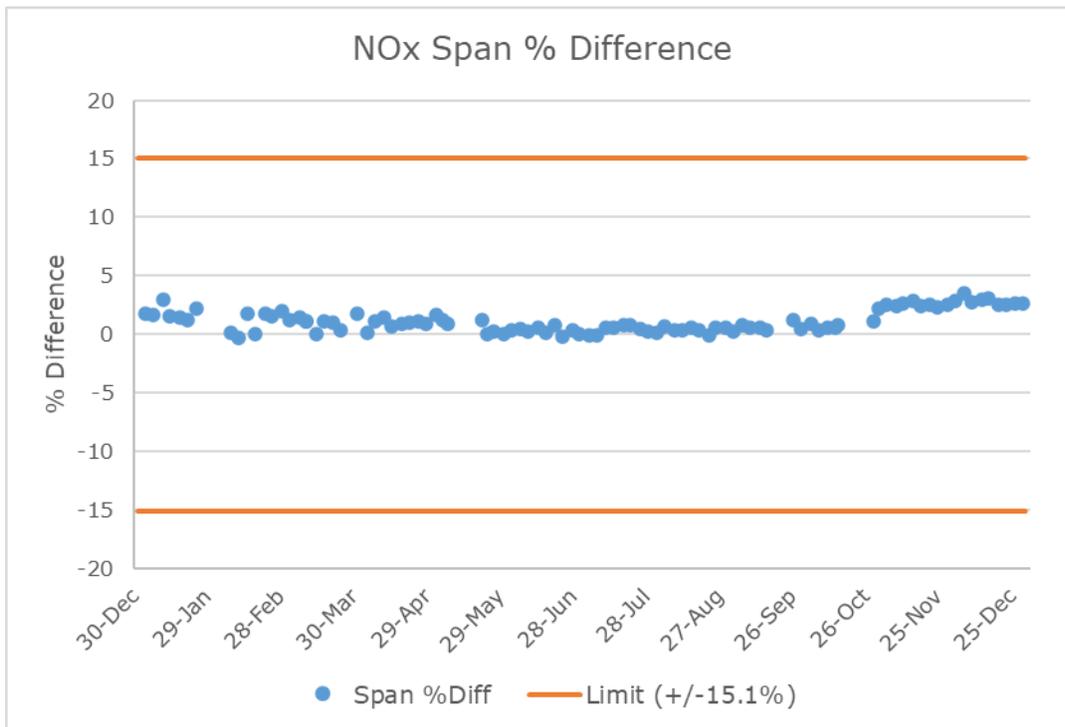


Figure C - 8. 2025 Calibration span percent difference for NO_x at Missile Site Park.

⁶ Id.

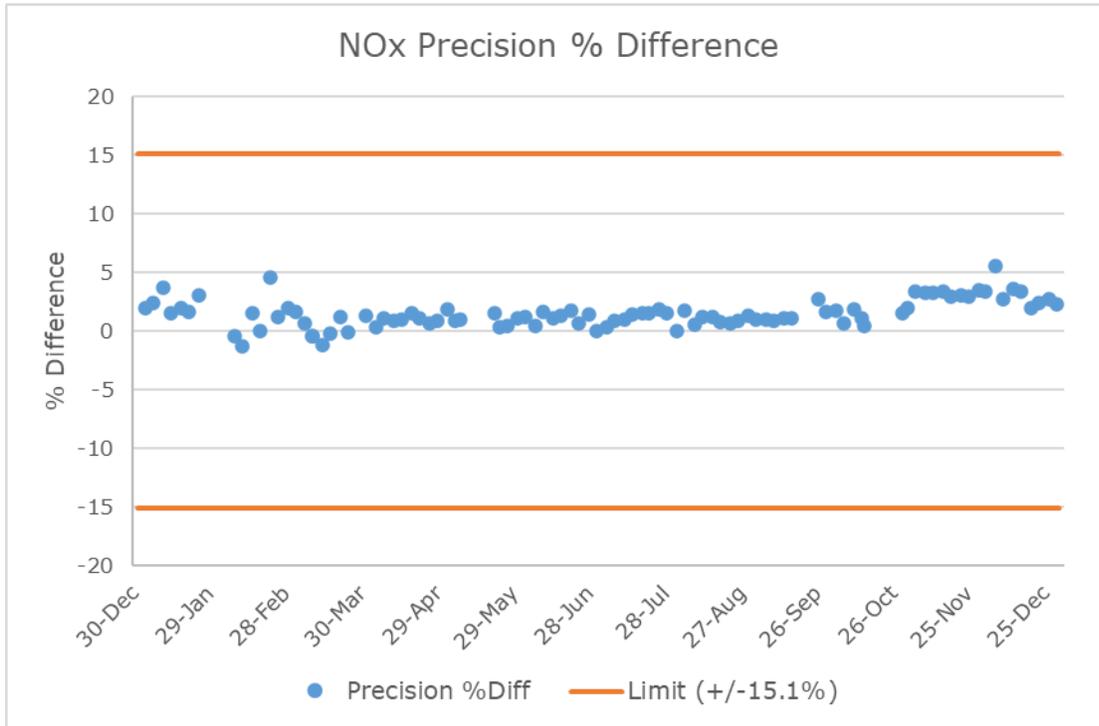


Figure C - 9. 2025 Calibration precision percent difference for NO_x at Missile Site Park.

Table C - 4. Summary of 2025 calibration statistics for NO_x at Missile Site Park.

Formula	Precision	Span
STDEV	1.17	0.94
Count	95	95
Chi ² , 0.1, n-1	76.91	76.91
CV	1.30	1.04
Bias	1.78	1.30
Bias (+/-/U)	+	+
AB	1.59	1.14
AS	1.06	0.92
t _{0.95, n-1}	1.66	1.66
25 th	0.87	0.38
75 th	1.96	1.74

C.3 HEREFORD SITE

Ozone (O₃)

Figure C - 10 and Figure C - 11 below show the calibration span and precision percent differences for ozone at the Hereford site. Each check is within the upper and lower bounds specified in Appendix D of the Quality Assurance Handbook Volume II. The second quarter semi-annual calibration occurred on May 8th and May 22nd, and the fourth quarter semi-annual calibration occurred on October 14th and 30th. The calibrator was removed from May 8th through 21st and from October 15th through 29th for recertification, so no automated calibrations occurred between those dates. Table C - 5 highlights the assessment statistics detailed in 40CFR58, Appendix A, Section 4 and does not include calibration data from periods that were invalidated or during which the analyzer was offline.

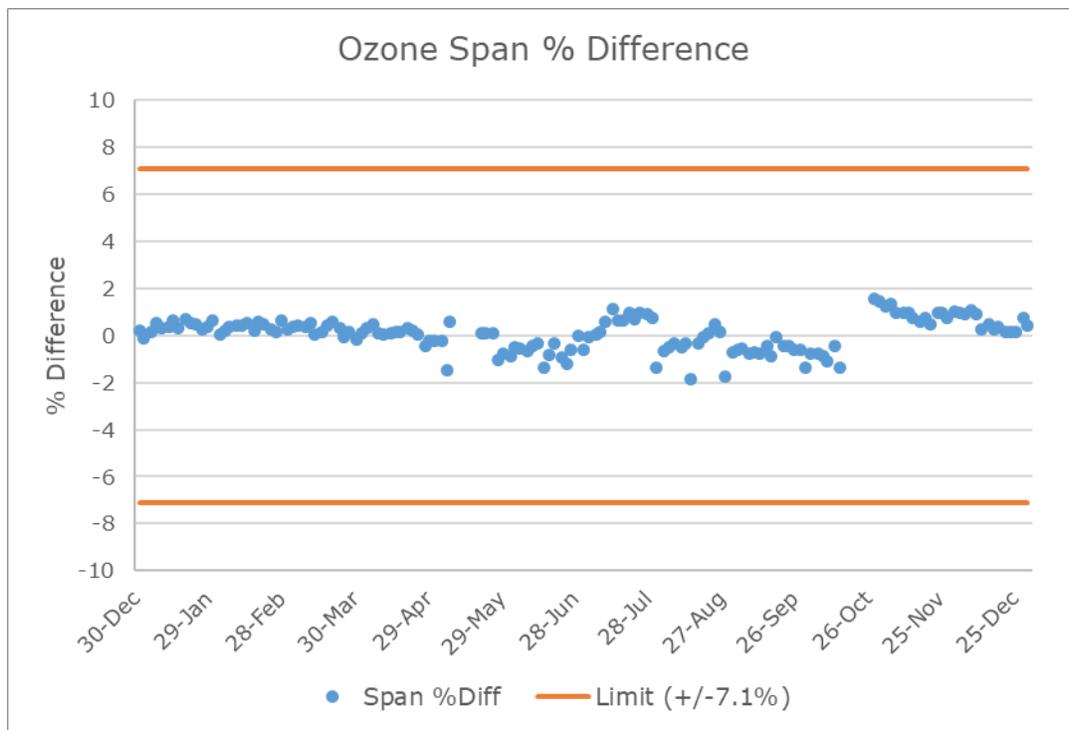


Figure C - 10. 2025 Calibration span percent difference for O₃ at Hereford.

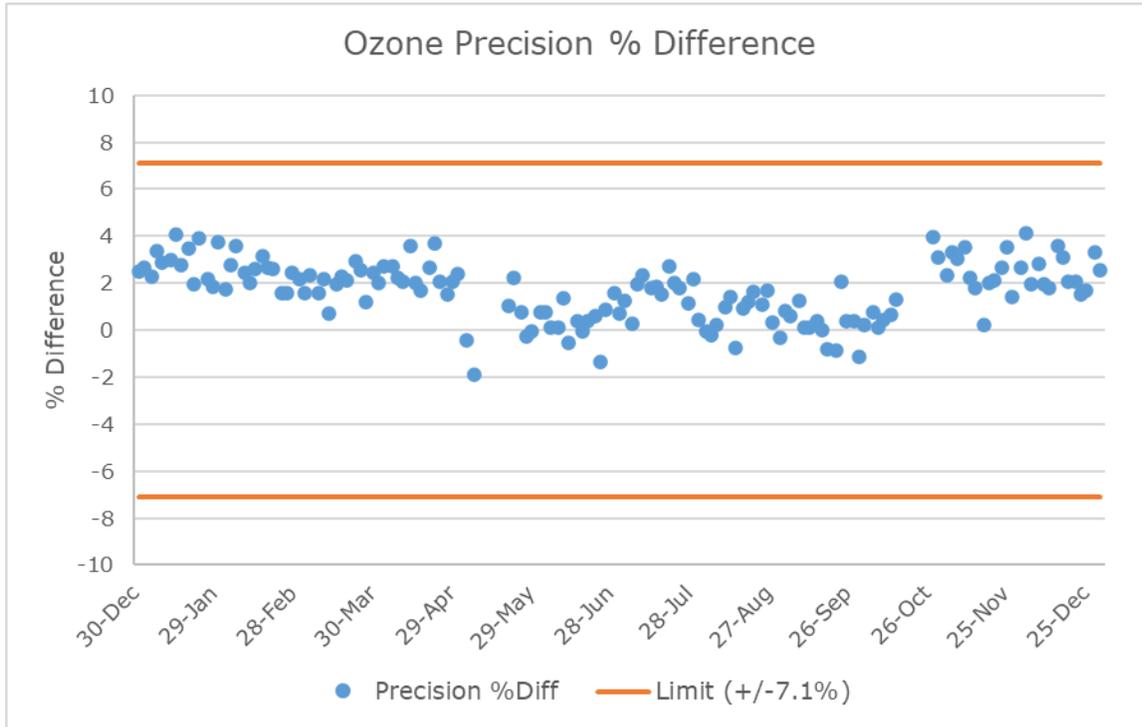


Figure C - 11. 2025 Calibration precision percent difference for O₃ at Hereford.

Table C - 5. Summary of 2025 calibration statistics for O₃ at Hereford.

Formula	Precision	Span
STDEV	1.71	0.68
Count	148	148
Chi ² , 0.1, n-1	125.50	125.50
CV	1.85	0.74
Bias	2.08	0.61
Bias (+/-/U)	+	U
AB	1.87	0.56
`AS	1.58	0.39
t _{0.95, n-1}	1.66	1.66
25 th	0.73	-0.46
75 th	2.57	0.54

C.4 ORCHARD SITE

Ozone (O₃)

Figure C - 12 and Figure C - 13 below show the calibration span and precision percent differences for ozone at Orchard. Each check is within the upper and lower bounds specified in Appendix D of the Quality Assurance Handbook Volume II. The second quarter semi-annual calibration occurred on May 7th and May 22nd, and the fourth quarter semi-annual calibration occurred on October 14th and 30th. The calibrator was removed from May 8th through 21st and from October 15th through 29th for recertification, so no automated calibrations occurred between those dates. In addition, data was invalidated between July 21st and July 31st due to an issue with the shelter air conditioner. Table C - 6 highlights the assessment statistics detailed in 40CFR58, Appendix A, Section 4 and does not include calibration data from periods that were invalidated or during which the analyzer was offline.

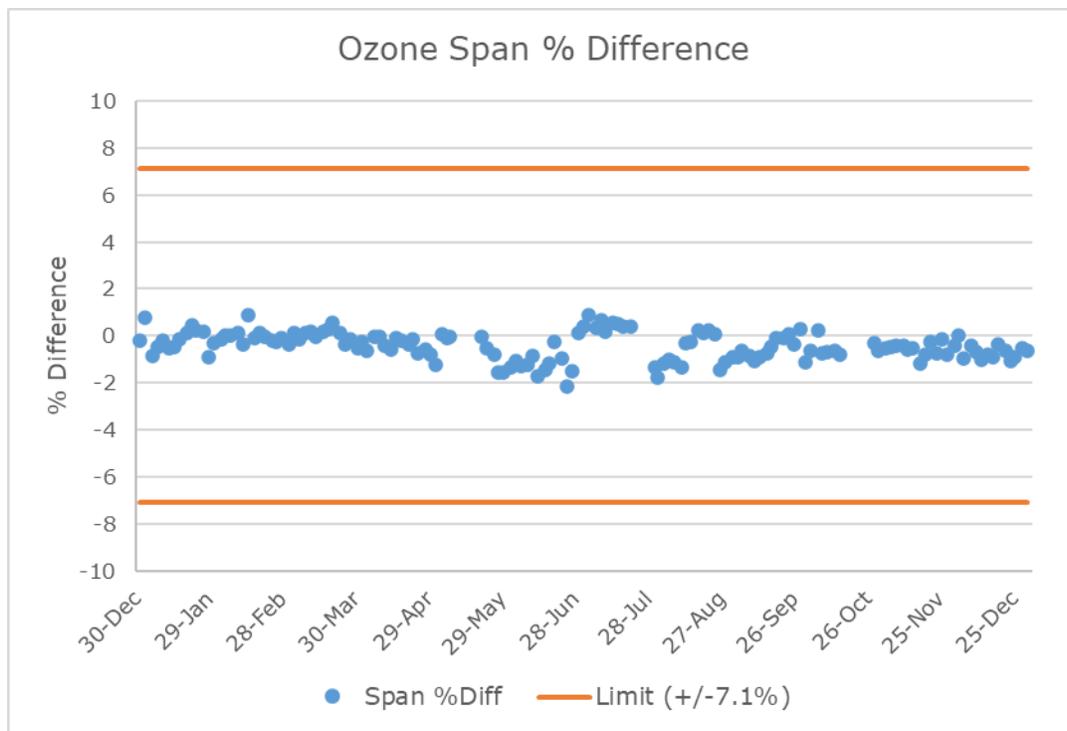


Figure C - 12. 2025 Calibration span percent difference for O₃ at Orchard.

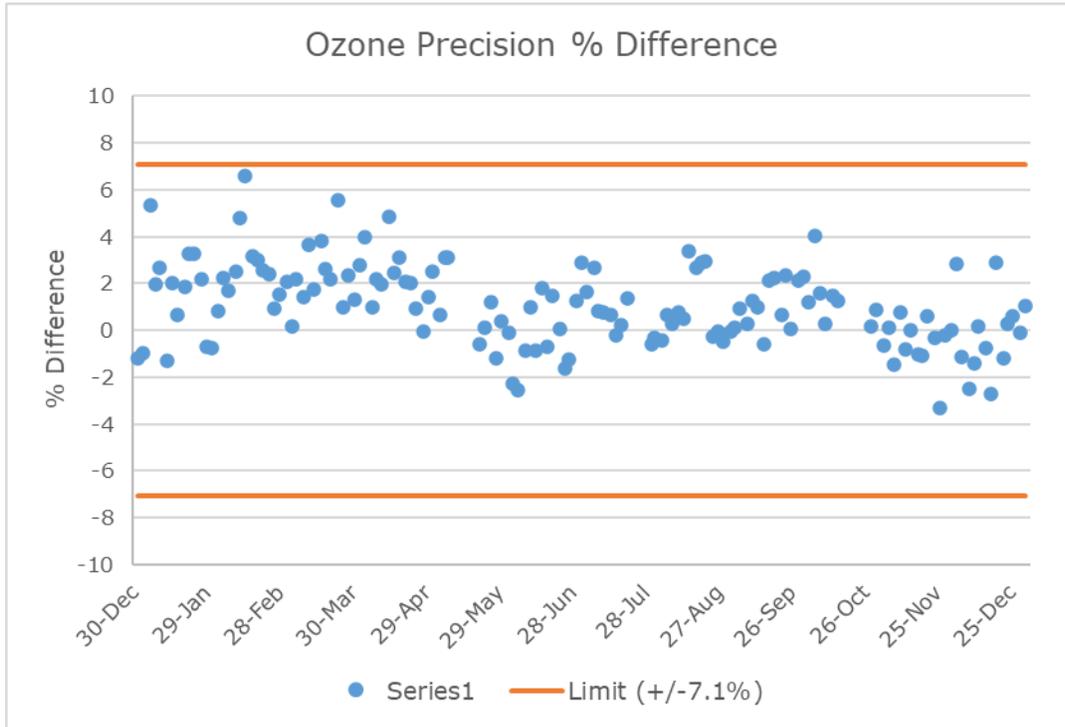


Figure C - 13. 2025 Calibration precision percent difference for O₃ at Orchard.

Table C - 6. Summary of 2025 calibration statistics for O₃ at Orchard.

Formula	Precision	Span
STDEV	1.73	0.58
Count	145	145
Chi ² , 0.1, n-1	122.72	122.72
CV	1.88	0.63
Bias	1.76	0.63
Bias (+/-U)	U	-
AB	1.59	0.57
AS	1.26	0.44
t _{0.95, n-1}	1.66	1.66
25 th	-0.09	-0.82
75 th	2.21	-0.02