# 2017 – 4th Quarter Report

# Support for Conducting Systems & Performance Audits of CASTNET Sites and NADP Monitoring Stations

**EPA Contract No. GS-10F-075AA**

**Prepared for:**

**U. S. Environmental Protection Agency**

**Prepared by:**

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## List of Acronyms and Abbreviations

| | |
|---|---|
| % diff | percent difference |
| A/D | analog to digital converter |
| ARS | Air Resource Specialist, Inc. |
| ASTM | American Society for Testing and Materials |
| CASTNET | Clean Air Status and Trends Network |
| DAS | data acquisition system |
| DC | direct current |
| deg | degree |
| DVM | digital voltmeter |
| EEMS | Environmental, Engineering & Measurement Services, Inc. |
| EPA | U.S. Environmental Protection Agency |
| ESC | Environmental Systems Corporation |
| FSAD | Field Site Audit Database |
| GPS | geographical positioning system |
| lpm | liters per minute |
| MLM | Multilayer Model |
| m/s | meters per second |
| mv | milivolt |
| NIST | National Institute of Standards and Technology |
| NOAA | National Oceanic and Atmospheric Administration |
| NPS | National Park Service |
| QAPP | Quality Assurance Project Plan |
| SOP | standard operating procedure |
| TEI | Thermo Environmental Instruments |
| USNO | United States Naval Observatory |
| V | volts |
| WRR | World Radiation Reference |

# 1.0 CASTNET Quarterly Report

## 1.1 Introduction

The Clean Air Status and Trends Network (CASTNET) is a national air monitoring program developed under mandate of the 1990 Clean Air Act Amendments. Each site in the network measures acidic gases and particles using a continuous collection filter aggregated over a one week period, and/or other forms of atmospheric pollution. Hourly averages of surface ozone concentrations and selected meteorological variables are also measured.

Site measurements are used to estimate deposition rates of the various pollutants with the objective of determining relationships between emissions, air quality, deposition, and ecological effects. In conjunction with other national monitoring networks, CASTNET data are used to determine the effectiveness of national emissions control programs and to assess temporal trends and spatial deposition patterns in atmospheric pollutants. CASTNET data are also used for long-range transport model evaluations and effects research.

CASTNET pollutant flux estimates are calculated as the aggregate product of weekly measured chemical concentrations and model-estimated deposition velocities. Currently, the Community Multi-scale Air Quality (CMAQ) Model is used to derive deposition velocity estimates.

As of January 2018, the network is comprised of 95 active rural sampling sites across the Untied States and Canada, cooperatively operated by the Environmental Protection Agency (EPA), the National Park Service (NPS), Environment Canada, Bureau of Land Management (BLM) and several independent partners. Wood Group (Wood) is responsible for operating the EPA and Environment Canada sponsored sites, and Air Resource Specialist, Inc. (ARS) is responsible for operating the NPS and BLM sponsored sites.

## 1.2 Project Objectives

The objectives of this project are to establish an independent and unbiased program of performance and systems audits for all CASTNET sampling sites. Ongoing Quality Assurance (QA) programs are an essential part of any long-term monitoring network.

Performance audits verify that all evaluated variables are consistent with the accuracy goals as defined in the CASTNET Quality Assurance Project Plan (QAPP). The parameter specific accuracy goals are presented in Table 1. Only four EPA sponsored sites that are operated by Wood continue to operate meteorological sensors. Those sites are BEL116, BVL30, CHE185, and PAL190. Six sites in WY sponsored by EPA and operated by the BLM/ARS also operate meteorological sensors and are PND165, BAS601, NEC602, BUF603, FOR604, and SHE604. The NPS added a new site at Chaco Culture National Historical Park (CHC432) which also monitors meteorological variables. The state of Maine with cooperation from the NPS operates meteorological sensors at Acadia National Park (ACA416). The meteorological sensors at sites ACA416 and BVL130 were audited during the station audits performed in fourth quarter 2017.

Some or all of the additional monitored variables, NOy, CO, and $SO_2$ have been added to the EPA sponsored sites BVL130, HWF187, PND165, PNF126, GRS420, MAC426, ROM206, and DUK008. Those variables were audited at sites HWF187, BVL130, MAC426, GRS420, and PNF126 during fourth quarter 2017. All of the trace gas results for those audits were found to be within acceptance criteria. The preliminary reports of those results were delivered following the audits and are not included in this report.

**Table 1. Performance Audit Challenge and Acceptance Criteria**

| Sensor | Parameter | Audit Challenge | Acceptance Criteria |
|---|---|---|---|
| Precipitation | Response | 10 manual tips | 1 DAS count per tip |
| Precipitation | Accuracy | 2 introductions of known amounts of water | ≤ ±10.0% of input amount |
| Relative Humidity | Accuracy | Compared to reference instrument or standard solution | ≤ ±10.0% RH |
| Solar Radiation | Accuracy | Compared to WRR traceable standard | ≤ ±10.0% of daytime average |
| Surface Wetness | Response | Distilled water spray mist | Positive response |
| Surface Wetness | Sensitivity | 1% decade resistance | N/A |
| Temperature | Accuracy | Comparison to 3 NIST measured baths<br>(~ 0° C, ambient, ~ full-scale) | ≤ ± 0.5° C |
| Temperature Difference | Accuracy | Comparison to station temperature sensor | ≤ ± 0.50° C |
| Shelter Temperature | Accuracy | Comparison to station temperature sensor | ≤ ± 2.0° C |
| Wind Direction | Orientation Accuracy | Parallel to alignment rod/crossarm, or sighted to distant point | ≤ ±5° from degrees true |
| Wind Direction | Linearity | Eight cardinal points on test fixture | ≤ ±5° mean absolute error |
| Wind Direction | Response Threshold | Starting torque tested with torque gauge | < 10 g-cm Climatronics;<br>< 20 g-cm R.M. Young |

| Sensor | Parameter | Audit Challenge | Acceptance Criteria |
|---|---|---|---|
| Wind Speed | Accuracy | Shaft rotational speed generated and measured with certified synchronous motor | ≤ ±0.5 mps below 5.0 mps input;<br>≤ ±5.0% of input at or above 5.0 mps |
| Wind Speed | Starting Threshold | Starting torque tested with torque gauge | < 0.5 g-cm |
| Mass Flow Controller | Flow Rate | Comparison with Primary Standard | ≤ ± 5.0% of designated rate |
| Ozone | Slope | Linear regression of multi-point test gas concentration as measured with a certified transfer standard | 0.9000 ≤ m ≤ 1.1000 |
| Ozone | Intercept | | -5.0 ppb ≤ b ≤ 5.0 ppb |
| Ozone | Correlation Coefficient | | 0.9950 ≤ r |
| Ozone | Percent Difference | Comparison with Level 2 standard concentration | ≤ ±15.1% of test gas concentration |
| DAS | Accuracy | Comparison with certified standard | ≤ ± 0.003 VDC |

Performance audits are conducted using standards that are traceable to the National Institute of Standards and Technology (NIST), or another authoritative organization, and certified as current.

Site systems audits are intended to provide a qualitative appraisal of the total measurement system. Site planning, organization, and operation are evaluated to ensure that good Quality Assurance/Quality Control (QA/QC) practices are being applied. At a minimum the following audit issues were addressed at each site systems audit:

- Site locations and configurations match those provided in the CASTNET QAPP.
- Meteorological instruments are in good physical and operational condition and are sited to meet EPA ambient monitoring guidelines (EPA-600/4-82-060).
- Sites are accessible, orderly, and if applicable, compliant with OSHA safety standards.
- Sampling lines are free of leaks, kinks, visible contamination, weathering, and moisture.
- Site shelters provide adequate temperature control.
- All ambient air quality instruments are functional, being operated in the appropriate range, and the zero air supply desiccant is unsaturated.
- All instruments are in current calibration.
- Site documentation (maintenance schedules, on-site SOPs, etc.) is current and log book records are complete.
- All maintenance and on-site SOPs are performed on schedule.

- Corrective actions are documented and appropriate for required maintenance/repair activity.
- Site operators demonstrate an adequate knowledge and ability to perform required site activities, including documentation and maintenance activities.

## 1.3 CASTNET Sites Visited Fourth Quarter 2017

This report consists of the systems and performance and other audit results from the CASTNET sites visited during the fourth quarter (October through December) of 2017. The locations and dates of the site visits for complete audits are presented in Table 2.

**Table 2. Site Audit Visits**

| Side ID | Audit Type | Sponsor | Site Visit Date | Station Name |
|---|---|---|---|---|
| WFM007 | Flow Only | EPA | 10/02/2017 | Whiteface Mountain |
| GTH161 | Without Met | EPA | 10/03/2017 | Gothic |
| ACA416 | With Met | Maine/NPS | 10/10/2017 | Acadia NP |
| WNC429 | Without Met | NPS | 10/12/2017 | Wind Cave NP |
| EGB181 | Flow Only | EPA | 10/13/2017 | Egbert, ON |
| PRK134 | Without Met | EPA | 10/22/2017 | Perkinstown |
| STK138 | Without Met | EPA | 10/25/2017 | Stockton |
| ALH157 | Without Met | EPA | 10/27/2017 | Alhambra |
| VIN140 | Without Met | EPA | 10/30/2017 | Vincennes |
| BVL130 | With Met | EPA | 11/9/2017 | Bondville |
| MAC426 | Without Met | NPS | 11/13/2017 | Mammoth Cave NP |
| GRS420 | Without Met | NPS | 11/15/2017 | Great Smoky Mountains NP |

| Side ID | Audit Type | Sponsor | Site Visit Date | Station Name |
|---|---|---|---|---|
| CND125 | Without Met | EPA | 11/19/2017 | Candor |
| BFT142 | Without Met | EPA | 11/27/2017 | Beaufort |
| BWR139 | Without Met | EPA | 11/27/2017 | Blackwater NWR |
| WSP144 | Without Met | EPA | 11/28/2017 | Washington Crossing St. Park |
| SHN418 | Without Met | NPS | 11/29/2017 | Shenandoah NP - Big Meadows |

In addition to the sites listed in Table 2 that were visited for complete audits, the sites listed in Table 3 were visited to conduct Through-The-Probe (TTP) pollutant Performance Evaluations (PE).

**Table 3. TTP Pollutant PE Visits**

| Side ID | PE Audit Type | Sponsor | Site Visit Date | Station Name |
|---|---|---|---|---|
| DIN431 | Ozone | NPS | 10/04/2017 | Dinosaur NM |
| ARE128 | Ozone | EPA | 10/08/2017 | Arendtsville |
| PSU106 | Ozone | EPA | 10/9/2017 | Penn State University |
| CTH110 | Ozone | EPA | 10/11/2017 | Connecticut Hill |
| HOW191 | Ozone | EPA | 10/12/2017 | Howland |
| ASH135 | Ozone | EPA | 10/13/2017 | Ashland |
| HWF187 | Ozone & NOy | EPA | 10/18/2017 | Huntington Wildlife Forest |
| ANA115 | Ozone | EPA | 10/19/2017 | Ann Arbor |
| SAL133 | Ozone | EPA | 10/19/2017 | Salamonie Reservoir |
| HOX148 | Ozone | EPA | 10/20/2017 | Hoxeyville |

| **Side ID** | **PE Audit Type** | **Sponsor** | **Site Visit Date** | **Station Name** |
|---|---|---|---|---|
| UVL124 | Ozone | | 10/20/2017 | Unionville |
| DEN417 | Ozone | NPS | 10/24/2017 | Denali NP |
| BVL130 | SO2, CO, NOy | EPA | 11/11/2017 | Bondville |
| MAC426 | NOy | NPS | 11/13/2017 | Mammoth Cave NP |
| GRS420 | NOy | NPS | 11/15/2017 | Great Smoky Mountains NP |
| PNF126 | Ozone & NOy | EPA | 11/16/2017 | Cranberry |
| BEL116 | Ozone | EPA | 11/20/2017 | Beltsville |

## 1.4 Audit Results

The observations and results of the systems and performance audits are included in Appendix A, *CASTNET Audit Report Forms* by site, arranged by audit date.

Photographs of site conditions are included within each systems report where necessary.

Copies of the spot reports that were sent immediately following the audit of each site are included as Appendix B, *CASTNET Site Spot Report Forms*.

The Ozone PE results and observations are included in Appendix C, *CASTNET Ozone Performance Evaluation Forms.*

# 2.0 NADP Quarterly Report

## 2.1 Introduction

The National Atmospheric Deposition Program (NADP) operates three precipitation chemistry networks and two atmospheric concentration networks. The National Trends Network (NTN) has been measuring acidic precipitation since 1978. The network currently has more than 250 sites. The Atmospheric Integrated Research Monitoring Network (AIRMoN) began operation in 1992 and currently measures event based precipitation events at 6 sites. The Mercury Deposition Network (MDN) measures total mercury in precipitation samples from more than 120 stations. The MDN began operation in 1996 and includes sites throughout the US and Canada. The Atmospheric Mercury Network (AMNet) and the Ammonia Monitoring Network (AMoN) measure ambient concentrations of mercury and ammonia, respectively.

The NADP and other long-term monitoring networks provide critical information to the EPA regarding evaluating the effectiveness of emission reduction control programs from the power industry.

The NADP Program Office operates and administers the three precipitation chemistry networks (NTN, MDN and AIRMoN), two atmospheric concentration networks (AMNet and AMoN), two analytical laboratories (the Central Analytical Laboratory (CAL) located at the University of Illinois/Illinois State Water Survey and the Mercury Analytical Laboratory (HAL) located at Eurofins Frontier Global Sciences), and the network equipment depot (NED).

## 2.2 Project Objectives

The objective of this project is to perform independent and unbiased evaluations of the sites along with its operations. These evaluations provide quality assurance pertaining to siting, sample collection and handling, equipment operation and maintenance, record keeping and field laboratory procedures.

More specifically, the surveys determine and report findings based on an established methodology consisting of completing a site questionnaire, testing the equipment and documenting with photographs the location, siting criteria, existing equipment, and any issues encountered that require such documentation.

## 2.3 NADP Sites Visited Fourth Quarter 2017

This report covers the results from the NADP sites surveyed during the fourth quarter (October through December) of 2017. The station names and dates of the audits are presented in Table 4.

**Table 4. Sites Surveyed – Fourth Quarter 2017**

| Side ID | Network | Visit Date | Station Name |
|---|---|---|---|
| CAN5 | NTN | 10/16/2017 | Frelighsburg |
| CO10 | NTN | 10/3/2017 | Gothic |
| CO97 | MDN/NTN | 10/17/2017 | Buffalo Pass-Summit Lake |
| IA08 | NTN | 10/26/2017 | Big Springs Fish Hatchery |
| IL46 | AMoN | 10/27/2017 | Alhambra |
| ME00 | MDN/NTN | 10/13/2017 | Caribou |
| ME94 | NTN | 10/9/2017 | Indian Township |
| ME98 | MDN/NTN | 10/10/2017 | Acadia National Park-McFarland Hill |
| MI52 | AMon | 10/19/2017 | Ann Arbor |
| MN08 | NTN | 10/24/2017 | Hovland |
| MN99 | NTN | 10/24/17 | Wolf Ridge |
| MT00 | NTN | 10/13/2017 | Little Bighorn Battlefield National Monument |
| NF19 | MDN | 10/4/2017 | Stephenville |
| NS01 | MDN/AMoN | 10/6/2017 | Kejimkujik National Park |
| NY08 | NTN | 10/11/2017 | Aurora Research Farm |
| NY20 | MDN/NTN/AMoN | 10/18/2017 | Huntington Wildlife |
| NY67 | AIRMoN/AMoN | 10/10/2017 | Ithaca |
| ON07 | MDN | 10/13/2017 | Egbert |
| PA15 | NTN | 10/9/2017 | Penn State |
| SD18 | MDN | 10/11/2017 | Eagle Butte |

| **Side ID** | **Network** | **Visit Date** | **Station Name** |
|---|---|---|---|
| SD99 | NTN | 10/10/2017 | Huron Well Field |
| WI35 | NTN/AMoN | 10/23/2017 | Perkinstown |
| WI37 | NTN | 10/23/2017 | Spooner |
| WY99 | NTN | 10/12/2017 | Newcastle |
| IL11 | AMoN | 11/11/207 | Bondville |
| MD99 | MDN/NTN/AMoN | 11/21/2017 | Beltsville |
| NC03 | NTN | 11/21/2017 | Lewiston |
| NC06 | AMoN | 11/27/2017 | Beaufort |
| NC08 | MDN | 11/28/2017 | Waccamaw State Park |
| NC34 | NTN | 11/20/2017 | Piedmont Research Station |
| NC41 | NTN | 11/20/2017 | Finley Farm |
| VA28 | MDN/NTN | 11/29/2017 | Shenandoah National Park-Big Meadow |
| AL10 | NTN | 12/12/2017 | Marion Junction |

## 2.4 Survey Results

Site survey results are entered into a relational database. The database in turn generates Site Spot Reports which are distributed among the interested parties as soon as all the site data has been entered. Database tables with all the data collected and reviewed are then sent to the NADP Program Office and to the U.S. EPA Project Officers.

Other items gathered during the surveys (i.e., photographs, Belfort charts, etc.) are uploaded to EEMS' server where the NADP PO and the U.S. EPA POs can access them and download them as needed by login into the server site.

Given the volume of data generated, and the fact that data is distributed and/or is available through EEMS' server, no survey results are included in this report.

# APPENDIX A

# CASTNET Audit Report Forms

# Site Inventory by Site Visit

*WFM007-Eric Hebert-10/02/2017*

| Site Visit Date | | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| 1 | 10/2/2017 | DAS | Campbell | 000834 | CR850 | 32796 |
| 2 | 10/2/2017 | elevation | Elevation | none | none | none |
| 3 | 10/2/2017 | Filter pack flow pump | Permotec | none | BL30EB | Illegible |
| 4 | 10/2/2017 | Flow Rate | Apex | 000833 | AXMC105LPMDPCV | illegible |
| 5 | 10/2/2017 | Infrastructure | Infrastructure | none | none | none |
| 6 | 10/2/2017 | Modem | Sierra wireless | 06950 | unknown | unknown |
| 7 | 10/2/2017 | siting criteria | Siting Criteria | none | none | None |
| 8 | 10/2/2017 | Temperature | RM Young | 06958 | 41342 | 024085 |

# Flow Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Apex | illegible | WFM007 | Eric Hebert | 10/02/2017 | Flow Rate | 000833 |

|  |  |  |  |
|---|---|---|---|
| **Mfg** | BIOS | **Parameter** | Flow Rate |
| **Serial Number** | 122974 | **Tfer Desc.** | BIOS 220-H |
| **Tfer ID** | 01416 |  |  |
| **Slope** | 1.00732 | **Intercept** | -0.02202 |
| **Cert Date** | 3/8/2017 | **CorrCoff** | 0.99970 |

| **DAS 1:** |  | **DAS 2:** |  |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 0.77% | 0.99% |  |  |

**Cal Factor Zero** -0.028

**Cal Factor Full Scale** 0.996

**Rotometer Reading:** 3.2

| Desc. | Test type | Input l/m | Input Corr_ | MfcDisp. | OutputSignal | Output S E | InputUnit | OutputSignalI | PctDifference |
|---|---|---|---|---|---|---|---|---|---|
| primary | pump off | 0.000 | 0.000 | 0.00 | 0.000 | -0.03 | l/m | l/m |  |
| primary | leak check | 0.000 | 0.000 | 0.00 | 0.000 | -0.03 | l/m | l/m |  |
| primary | test pt 1 | 3.018 | 3.020 | 2.95 | 0.000 | 3.00 | l/m | l/m | -0.66% |
| primary | test pt 2 | 3.023 | 3.020 | 2.95 | 0.000 | 3.00 | l/m | l/m | -0.66% |
| primary | test pt 3 | 3.029 | 3.030 | 2.95 | 0.000 | 3.00 | l/m | l/m | -0.99% |

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| **Sensor Component** | Leak Test | **Condition** |  | **Status** | pass |
| **Sensor Component** | Tubing Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Filter Position | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Rotometer Condition | **Condition** | Clean and dry | **Status** | pass |
| **Sensor Component** | Moisture Present | **Condition** | No moisture present | **Status** | pass |
| **Sensor Component** | Filter Distance | **Condition** | 4.5 cm | **Status** | pass |
| **Sensor Component** | Filter Depth | **Condition** | 2.0 cm | **Status** | pass |
| **Sensor Component** | Filter Azimuth | **Condition** | 270 deg | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** |  | **Status** | pass |

# Temperature Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 024085 | WFM007 | Eric Hebert | 10/02/2017 | Temperature | 06958 |

| | | | |
|---|---|---|---|
| **Mfg** | Extech | **Parameter** | Temperature |
| **Serial Number** | H232679 | **Tfer Desc.** | RTD |
| **Tfer ID** | 01228 | | |
| **Slope** | 1.00656 | **Intercept** | -0.03341 |
| **Cert Date** | 2/4/2017 | **CorrCoff** | 1.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **Abs Avg Err** | **Abs Max Er** | **Abs Avg Err** | **Abs Max Er** |
| 0.02 | 0.04 | | |

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Low Range | -0.01 | 0.02 | 0.000 | 0.1 | C | 0.04 |
| primary | Temp Mid Range | 25.94 | 25.80 | 0.000 | 25.8 | C | 0.01 |
| primary | Temp High Range | 36.64 | 36.43 | 0.000 | 36.4 | C | -0.02 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Shield | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

## Infrastructure Data For

**Site ID** WFM007 **Technician** Eric Hebert **Site Visit Date** 10/02/2017

| Shelter Make | Shelter Model | Shelter Size |
|---|---|---|
| | | |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Tower Type | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Conduit | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Met Tower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Moisture Trap | **Condition** | Not installed | **Status** | pass |
| **Sensor Component** | Power Cables | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Temp Control | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Rotometer | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Sample Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Condition | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Shelter Door | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Shelter Roof | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Shelter Floor | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Signal Cable | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Tubing Type | **Condition** | 3/8 teflon | **Status** | pass |
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |

# Field Systems Comments

**1** **Parameter:** DasComments

The sample tower is approximately one meter in height mounted to and accessed directly from the roof of the facility.

**2** **Parameter:** DocumentationCo

There is no logbook onsite to record site visit information.

**3** **Parameter:** SitingCriteriaCom

The site is located at the summit of Whiteface Mountain on the roof of the ASRC facility with other monitoring instrumentation.

**4** **Parameter:** MetSensorComme

The temperature sensor is mounted approximately one meter above a black roof.

# Field Systems Data Form

F-02058-1500-S1-rev002

**Site ID** WFM007 **Technician** Eric Hebert **Site Visit Date** 10/02/2017

| | | | | |
|---|---|---|---|---|
| **Site Sponsor (agency)** | EPA | **USGS Map** | | |
| **Operating Group** | SUNY | **Map Scale** | | |
| **AQS #** | | **Map Date** | | |
| **Meteorological Type** | | | | |
| **Air Pollutant Analyzer** | | **QAPP Latitude** | | |
| **Deposition Measurement** | | **QAPP Longitude** | | |
| **Land Use** | | **QAPP Elevation Meters** | | |
| **Terrain** | | **QAPP Declination** | | |
| **Conforms to MLM** | | **QAPP Declination Date** | | |
| **Site Telephone** | | **Audit Latitude** | | 44.365885 |
| **Site Address 1** | | **Audit Longitude** | | -73.903102 |
| **Site Address 2** | | **Audit Elevation** | | 1473 |
| **County** | | **Audit Declination** | | -15 |
| **City, State** | Wilmington, NY | | **Present** | |
| **Zip Code** | 12997 | **Fire Extinguisher** | ☑ | |
| **Time Zone** | Eastern | **First Aid Kit** | ☑ | |
| **Primary Operator** | | **Safety Glasses** | ☑ | |
| **Primary Op. Phone #** | | **Safety Hard Hat** | ☑ | |
| **Primary Op. E-mail** | | **Climbing Belt** | ☑ | |
| **Backup Operator** | | **Security Fence** | ☐ | |
| **Backup Op. Phone #** | | **Secure Shelter** | ☑ | |
| **Backup Op. E-mail** | | **Stable Entry Step** | ☑ | |

**Shelter Working Room** ☑ **Make** **Model** **Shelter Size**

**Shelter Clean** ☑ **Notes**

**Site OK** ☑ **Notes**

**Driving Directions**

# Field Systems Data Form

F-02058-1500-S2-rev002

**Site ID** WFM007 **Technician** Eric Hebert **Site Visit Date** 10/02/2017

| Potential Interferent | Minimum Distance From Measurement Apparatus | Distance | Pass = Checked |
|---|---|---|---|
| Large Point Source of SO2 or NOx | 20 to 40 km | | ☑ |
| Major industrial complex | 10 to 20 km | | ☑ |
| City > 50,000 population | 40 km | | ☑ |
| City 10,000 to 50,000 population | 10 km | | ☑ |
| City 1,000 to 10,000 population | 5 km | | ☑ |
| Major highway, airport or rail yard | 2 km | | ☑ |
| Secondary road, heavily traveled | 500 m | | ☑ |
| Secondary road, lightly traveled | 200 m | | ☑ |
| Feedlot operations | 500 m | | ☑ |
| Intensive agricultural ops (including aerial spraying) | 500 m | | ☑ |
| Limited agricultural operations | 200 m | | ☑ |
| Large parking lot | 200 m | | ☑ |
| Small parking lot | 100 m | | ☑ |
| Tree line | 50 m | | ☑ |
| Obstacles to wind | 10 times obstacle height | | ☑ |

**Siting Distances OK** ☑

**Siting Criteria Comment**

The site is located at the summit of Whiteface Mountain on the roof of the ASRC facility with other monitoring instrumentation.

# Field Systems Data Form

F-02058-1500-S3-rev002

**Site ID** WFM007 **Technician** Eric Hebert **Site Visit Date** 10/02/2017

| | | | |
|---|---|---|---|
| 1 | Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? | ☑ | N/A |
| 2 | Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) | ☑ | N/A |
| 3 | Are the tower and sensors plumb? | ☑ | N/A |
| 4 | Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? | ☑ | |
| 5 | Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) | ☑ | one meter above roof |
| 6 | Is the solar radiation sensor plumb? | ☑ | N/A |
| 7 | Is it sited to avoid shading, or any artificial or reflected light? | ☑ | N/A |
| 8 | Is the rain gauge plumb? | ☑ | N/A |
| 9 | Is it sited to avoid sheltering effects from buildings, trees, towers, etc? | ☑ | N/A |
| 10 | Is the surface wetness sensor sited with the grid surface facing north? | ☑ | N/A |
| 11 | Is it inclined approximately 30 degrees? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The temperature sensor is mounted approximately one meter above a black roof.

# Field Systems Data Form

F-02058-1500-S4-rev002

**Site ID** WFM007 **Technician** Eric Hebert **Site Visit Date** 10/02/2017

| | | | |
|---|---|---|---|
| 1 | Do all the meterological sensors appear to be intact, in good condition, and well maintained? | ☑ | Temperature only |
| 2 | Are all the meteorological sensors operational online, and reporting data? | ☑ | Temperature only |
| 3 | Are the shields for the temperature and RH sensors clean? | ☑ | |
| 4 | Are the aspirated motors working? | ☑ | N/A |
| 5 | Is the solar radiation sensor's lens clean and free of scratches? | ☑ | N/A |
| 6 | Is the surface wetness sensor grid clean and undamaged? | ☑ | N/A |
| 7 | Are the sensor signal and power cables intact, in good condition, and well maintained? | ☑ | |
| 8 | Are the sensor signal and power cable connections protected from the elements and well maintained? | ☑ | |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S5-rev002

**Site ID** WFM007 **Technician** Eric Hebert **Site Visit Date** 10/02/2017

## Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E

| | | | |
|---|---|---|---|
| 1 | Do the sample inlets have at least a 270 degree arc of unrestricted airflow? | ☑ | |
| 2 | Are the sample inlets 3 - 15 meters above the ground? | ☑ | |
| 3 | Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? | ☑ | |

## Pollutant analyzers and deposition equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the analyzers and equipment appear to be in good condition and well maintained? | ☑ | |
| 2 | Are the analyzers and monitors operational, on-line, and reporting data? | ☑ | |
| 3 | Describe ozone sample tube. | | N/A |
| 4 | Describe dry dep sample tube. | | 3/8 teflon by 6 meters |
| 5 | Are in-line filters used in the ozone sample line? (if yes indicate location) | ☑ | N/A |
| 6 | Are sample lines clean, free of kinks, moisture, and obstructions? | ☑ | |
| 7 | Is the zero air supply desiccant unsaturated? | ☑ | N/A |
| 8 | Are there moisture traps in the sample lines? | ☐ | |
| 9 | Is there a rotometer in the dry deposition filter line, and is it clean? | ☑ | |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form F-02058-1500-S6-rev002

**Site ID** WFM007 **Technician** Eric Hebert **Site Visit Date** 10/02/2017

## DAS, sensor translators, and peripheral equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the DAS instruments appear to be in good condition and well maintained? | ☑ | |
| 2 | Are all the components of the DAS operational? (printers, modem, backup, etc) | ☑ | |
| 3 | Do the analyzer and sensor signal leads pass through lightning protection circuitry? | ☑ | |
| 4 | Are the signal connections protected from the weather and well maintained? | ☑ | |
| 5 | Are the signal leads connected to the correct DAS channel? | ☑ | |
| 6 | Are the DAS, sensor translators, and shelter properly grounded? | ☑ | |
| 7 | Does the instrument shelter have a stable power source? | ☑ | |
| 8 | Is the instrument shelter temperature controlled? | ☑ | N/A |

| | | Stable | Grounded |
|---|---|---|---|
| 9 | Is the met tower stable and grounded? | ☐ | ☐ |
| 10 | Is the sample tower stable and grounded? | ☑ | ☑ |
| 11 | Tower comments? | | |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The sample tower is approximately one meter in height mounted to and accessed directly from the roof of the facility.

# Field Systems Data Form

F-02058-1500-S7-rev002

**Site ID** WFM007 **Technician** Eric Hebert **Site Visit Date** 10/02/2017

## Documentation

### Does the site have the required instrument and equipment manuals?

| | Yes | No | N/A | | Yes | No | N/A |
|---|---|---|---|---|---|---|---|
| Wind speed sensor | ☐ | ☐ | ☑ | Data logger | ☐ | ☑ | ☐ |
| Wind direction sensor | ☐ | ☐ | ☑ | Data logger | ☐ | ☐ | ☑ |
| Temperature sensor | ☐ | ☑ | ☐ | Strip chart recorder | ☐ | ☐ | ☑ |
| Relative humidity sensor | ☐ | ☐ | ☑ | Computer | ☐ | ☐ | ☑ |
| Solar radiation sensor | ☐ | ☐ | ☑ | Modem | ☐ | ☑ | ☐ |
| Surface wetness sensor | ☐ | ☐ | ☑ | Printer | ☐ | ☐ | ☑ |
| Wind sensor translator | ☐ | ☐ | ☑ | Zero air pump | ☐ | ☐ | ☑ |
| Temperature translator | ☐ | ☐ | ☑ | Filter flow pump | ☐ | ☑ | ☐ |
| Humidity sensor translator | ☐ | ☐ | ☑ | Surge protector | ☐ | ☐ | ☑ |
| Solar radiation translator | ☐ | ☐ | ☑ | UPS | ☐ | ☐ | ☑ |
| Tipping bucket rain gauge | ☐ | ☐ | ☑ | Lightning protection device | ☐ | ☐ | ☐ |
| Ozone analyzer | ☐ | ☐ | ☑ | Shelter heater | ☐ | ☐ | ☑ |
| Filter pack flow controller | ☑ | ☐ | ☐ | Shelter air conditioner | ☐ | ☐ | ☑ |
| Filter pack MFC power supply | ☐ | ☐ | ☑ | | | | |

### Does the site have the required and most recent QC documents and report forms?

| | Present | | Current |
|---|---|---|---|
| Station Log | ☐ | Not present | ☐ |
| SSRF | ☑ | | ☑ |
| Site Ops Manual | ☑ | | ☑ |
| HASP | ☑ | | ☑ |
| Field Ops Manual | ☑ | | ☑ |
| Calibration Reports | ☐ | Not present | ☐ |
| Ozone z/s/p Control Charts | ☐ | | ☐ |
| Preventive maintenance schedul | ☐ | | ☐ |

| | | | |
|---|---|---|---|
| 1 | Is the station log properly completed during every site visit? | ☐ | No logbook |
| 2 | Are the Site Status Report Forms being completed and current? | ☑ | |
| 3 | Are the chain-of-custody forms properly used to document sample transfer to and from lab? | ☑ | |
| 4 | Are ozone z/s/p control charts properly completed and current? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

There is no logbook onsite to record site visit information.

# Field Systems Data Form

**F-02058-1500-S8-rev002**

**Site ID** WFM007 **Technician** Eric Hebert **Site Visit Date** 10/02/2017

**Site operation procedures**

| | | | |
|---|---|---|---|
| 1 | Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ | |
| 2 | Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ | |
| 3 | Is the site visited regularly on the required Tuesday schedule? | ☑ | |
| 4 | Are the standard CASTNET operational procedures being flollowed by the site operator? | ☑ | |
| 5 | Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation) | ☑ | |

**Are regular operational QA/QC checks performed on meteorological instruments?**

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multipoint Calibrations | ☑ | Semiannually | ☑ |
| Visual Inspections | ☑ | Weekly | ☑ |
| Translator Zero/Span Tests (climatronics) | ☑ | N/A | ☑ |
| Manual Rain Gauge Test | ☑ | N/A | ☐ |
| Confirm Reasonableness of Current Values | ☑ | Weekly | ☑ |
| Test Surface Wetness Response | ☑ | Weekly | ☑ |

**Are regular operational QA/QC checks performed on the ozone analyzer?**

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point Calibrations | ☑ | N/A | ☑ |
| Automatic Zero/Span Tests | ☑ | N/A | ☑ |
| Manual Zero/Span Tests | ☑ | N/A | ☑ |
| Automatic Precision Level Tests | ☑ | N/A | ☑ |
| Manual Precision Level Test | ☑ | N/A | ☑ |
| Analyzer Diagnostics Tests | ☑ | N/A | ☑ |
| In-line Filter Replacement (at inlet) | ☑ | N/A | ☑ |
| In-line Filter Replacement (at analyze | ☑ | N/A | ☑ |
| Sample Line Check for Dirt/Water | ☑ | N/A | ☑ |
| Zero Air Desiccant Check | ☑ | N/A | ☑ |

| | | | |
|---|---|---|---|
| 1 | Do multi-point calibration gases go through the complete sample train including all filters? | ☑ | N/A |
| 2 | Do automatic and manual z/s/p gasses go through the complete sample train including all filters? | ☑ | N/A |
| 3 | Are the automatic and manual z/s/p checks monitored and reported? If yes, how? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S9-rev002

**Site ID** WFM007 **Technician** Eric Hebert **Site Visit Date** 10/02/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Is the filter pack being changed every Tuesday as scheduled? | ☑ | Filter changed mornings |
| 2 | Are the Site Status Report Forms being completed and filed correctly? | ☑ | |
| 3 | Are data downloads and backups being performed as scheduled? | ☑ | No longer required |
| 4 | Are general observations being made and recorded? How? | ☑ | SSRF |
| 5 | Are site supplies on-hand and replenished in a timely fashion? | ☑ | |
| 6 | Are sample flow rates recorded? How? | ☑ | SSRF, call-in |
| 7 | Are samples sent to the lab on a regular schedule in a timely fashion? | ☑ | |
| 8 | Are filters protected from contamination during handling and shipping? How? | ☑ | Clean gloves on and off |
| 9 | Are the site conditions reported regularly to the field operations manager or staff? | ☑ | |

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point MFC Calibrations | ☑ | Semiannually | ☑ |
| Flow System Leak Checks | ☑ | Weekly | ☑ |
| Filter Pack Inspection | ☑ | Weekly | ☑ |
| Flow Rate Setting Checks | ☑ | Weekly | ☑ |
| Visual Check of Flow Rate Rotometer | ☑ | Weekly | ☑ |
| In-line Filter Inspection/Replacement | ☑ | Semiannually | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S10-rev002

**Site ID** WFM007 **Technician** Eric Hebert **Site Visit Date** 10/02/2017

**Site Visit Sensors**

| Parameter | Manufacturer | Model | S/N | Client ID |
|---|---|---|---|---|
| DAS | Campbell | CR850 | 32796 | 000834 |
| elevation | Elevation | none | none | none |
| Filter pack flow pump | Permotec | BL30EB | Illegible | none |
| Flow Rate | Apex | AXMC105LPMDPC | illegible | 000833 |
| Infrastructure | Infrastructure | none | none | none |
| Modem | Sierra wireless | unknown | unknown | 06950 |
| siting criteria | Siting Criteria | none | None | none |
| Temperature | RM Young | 41342 | 024085 | 06958 |

# Site Inventory by Site Visit

| | Site Visit Date | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *GTH161-Martin Valvur-10/03/2017* | | | | | | |
| 1 | 10/3/2017 | Computer | Dell | 000251 | D520 | 5HFNHB1 |
| 2 | 10/3/2017 | DAS | Campbell | 000416 | CR3000 | 2513 |
| 3 | 10/3/2017 | Elevation | Elevation | None | 1 | None |
| 4 | 10/3/2017 | Filter pack flow pump | Thomas | 00517 | 107CAB18 | 100300020817 |
| 5 | 10/3/2017 | Flow Rate | Apex | 000558 | AXMC105LPMDPCV | 50735 |
| 6 | 10/3/2017 | Infrastructure | Infrastructure | none | none | none |
| 7 | 10/3/2017 | Modem | Raven | 06611 | H4223-C | 0844355568 |
| 8 | 10/3/2017 | Ozone | ThermoElectron Inc | 000517 | 49i A1NAA | 1009241760 |
| 9 | 10/3/2017 | Ozone Standard | ThermoElectron Inc | 000208 | 49i A3NAA | 0611416461 |
| 10 | 10/3/2017 | Sample Tower | Aluma Tower | 03564 | A | none |
| 11 | 10/3/2017 | Shelter Temperature | Campbell | none | 107-L | none |
| 12 | 10/3/2017 | Siting Criteria | Siting Criteria | None | 1 | None |
| 13 | 10/3/2017 | Temperature | RM Young | 06120 | 41342VC | 11742 |
| 14 | 10/3/2017 | Zero air pump | Werther International | 06927 | P 70/4 | 000836211 |

# DAS Data Form

**DAS Time Max Error:** 0

| Mfg | Serial Number | Site | Technician | Site Visit Date | Parameter | Use Desc. |
|---|---|---|---|---|---|---|
| Campbell | 2513 | GTH161 | Martin Valvur | 10/03/2017 | DAS | Primary |

**Das Date:** 10/3 /2017
**Das Time:** 11:43:00
**Das Day:** 276

**Audit Date** 10/3 /2017
**Audit Time** 11:43:00
**Audit Day** 276

**Low Channel:**

**Avg Diff:** 0.0004
**Max Diff:** 0.0025

**High Channel:**

**Avg Diff:** 0.0004
**Max Diff:** 0.0025

**Mfg** HY
**Parameter** DAS
**Serial Number** 12010039329
**Tfer Desc.** Source generator (D
**Tfer ID** 01322
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 6/15/2014
**CorrCoff** 1.00000

**Mfg** Fluke
**Parameter** DAS
**Serial Number** 95740243
**Tfer Desc.** DVM
**Tfer ID** 01312
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 1/23/2017
**CorrCoff** 1.00000

| Channel | Input | DVM Output | DAS Output | InputUnit | OutputUnit | Difference |
|---|---|---|---|---|---|---|
| 7 | 0.0000 | -0.0003 | -0.0028 | V | V | -0.0025 |
| 7 | 0.1000 | 0.0997 | 0.0996 | V | V | -0.0001 |
| 7 | 0.3000 | 0.2997 | 0.2998 | V | V | 0.0001 |
| 7 | 0.5000 | 0.4998 | 0.4999 | V | V | 0.0001 |
| 7 | 0.7000 | 0.6999 | 0.6997 | V | V | -0.0002 |
| 7 | 0.9000 | 0.9003 | 0.9003 | V | V | 0.0000 |
| 7 | 1.0000 | 0.9998 | 0.9997 | V | V | -0.0001 |

# Flow Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Apex | 50735 | GTH161 | Martin Valvur | 10/03/2017 | Flow Rate | 000558 |

| | | | |
|---|---|---|---|
| **Mfg** | BIOS | **Parameter** | Flow Rate |
| **Serial Number** | 148613 | **Tfer Desc.** | BIOS 220-H |
| **Tfer ID** | 01421 | | |
| **Slope** | 1.00153 | **Intercept** | 0.00366 |
| **Cert Date** | 1/25/2017 | **CorrCoff** | 1.00000 |

**DAS 1:**

**DAS 2:**

| A Avg % Diff: | A Max % Di | A Avg %Dif | A Max % Di |
|---|---|---|---|
| 0.33% | 0.33% | | |

**Cal Factor Zero** -0.02

**Cal Factor Full Scale** 0.99

**Rotometer Reading:** 3.85

| Desc. | Test type | Input l/m | Input Corr_ | MfcDisp. | OutputSignal | Output S E | InputUnit | OutputSignalI | PctDifference |
|---|---|---|---|---|---|---|---|---|---|
| primary | pump off | 0.000 | 0.000 | -0.02 | 0.000 | -0.04 | l/m | l/m | |
| primary | leak check | 0.000 | 0.000 | 0.00 | 0.000 | -0.03 | l/m | l/m | |
| primary | test pt 1 | 3.000 | 2.990 | 3.00 | 0.000 | 3.00 | l/m | l/m | 0.33% |
| primary | test pt 2 | 3.000 | 2.990 | 3.00 | 0.000 | 3.00 | l/m | l/m | 0.33% |
| primary | test pt 3 | 3.000 | 2.990 | 3.00 | 0.000 | 3.00 | l/m | l/m | 0.33% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Leak Test | **Condition** | | **Status** | pass |
| **Sensor Component** | Tubing Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Filter Position | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Rotometer Condition | **Condition** | Clean and dry | **Status** | pass |
| **Sensor Component** | Moisture Present | **Condition** | No moisture present | **Status** | pass |
| **Sensor Component** | Filter Distance | **Condition** | 5.5 cm | **Status** | pass |
| **Sensor Component** | Filter Depth | **Condition** | 1.5 cm | **Status** | pass |
| **Sensor Component** | Filter Azimuth | **Condition** | 225 deg | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1009241760 | GTH161 | Martin Valvur | 10/03/2017 | Ozone | 000517 |

| | | | |
|---|---|---|---|
| **Slope:** | 0.98580 | **Slope:** | 0.00000 |
| **Intercept** | 2.61367 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99987 | **CorrCoff** | 0.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 4.5% | 7.3% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 49CPS-70008-364 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01110 | | |
| **Slope** | 1.00801 | **Intercept** | -0.05199 |
| **Cert Date** | 9/11/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.50 | 0.54 | 3.89 | ppb | |
| primary | 2 | 17.15 | 17.06 | 18.30 | ppb | 7.27% |
| primary | 3 | 35.03 | 34.80 | 37.16 | ppb | 6.78% |
| primary | 4 | 65.04 | 64.57 | 66.39 | ppb | 2.82% |
| primary | 5 | 110.45 | 109.62 | 110.70 | ppb | 0.99% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.000 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.018 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 89.9 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.8 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.61 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 521.7 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 31.1 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 95.8 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.55 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 521.1 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Temperature Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 11742 | GTH161 | Martin Valvur | 10/03/2017 | Temperature | 06120 |

| | | | |
|---|---|---|---|
| **Mfg** | Fluke | **Parameter** | Temperature |
| **Serial Number** | 3275143 | **Tfer Desc.** | RTD |
| **Tfer ID** | 01229 | | |
| **Slope** | 1.00006 | **Intercept** | 0.03191 |
| **Cert Date** | 1/23/2017 | **CorrCoff** | 1.00000 |

| DAS 1: Abs Avg Err | DAS 1: Abs Max Er | DAS 2: Abs Avg Err | DAS 2: Abs Max Er |
|---|---|---|---|
| 0.06 | 0.07 | | |

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Low Range | 0.14 | 0.11 | 0.000 | 0.2 | C | 0.07 |
| primary | Temp Mid Range | 25.02 | 24.99 | 0.000 | 25.1 | C | 0.06 |
| primary | Temp High Range | 47.53 | 47.50 | 0.000 | 47.6 | C | 0.05 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Shield | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Shelter Temperature Data For

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Campbell | none | GTH161 | Martin Valvur | 10/03/2017 | Shelter Temperature | none |

| DAS 1: | | DAS 2: | |
|---|---|---|---|
| Abs Avg Err | Abs Max Er | Abs Avg Err | Abs Max Er |
| 0.69 | 1.55 | | |

**Mfg** Fluke
**Parameter** Shelter Temperatur
**Serial Number** 3275143
**Tfer Desc.** RTD
**Tfer ID** 01229
**Slope** 1.00006
**Intercept** 0.03191
**Cert Date** 1/23/2017
**CorrCoff** 1.00000

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Mid Range | 24.59 | 24.56 | 0.000 | 26.1 | C | 1.55 |
| primary | Temp Mid Range | 25.86 | 25.83 | 0.000 | 26.0 | C | 0.2 |
| primary | Temp Mid Range | 27.13 | 27.10 | 0.000 | 27.4 | C | 0.31 |

**Sensor Component** System Memo
**Condition**
**Status** pass

**Infrastructure Data For**

**Site ID** GTH161 **Technician** Martin Valvur **Site Visit Date** 10/03/2017

| **Shelter Make** | **Shelter Model** | **Shelter Size** |
|---|---|---|
| Ekto | 8810 (s/n 2149-12) | 640 cuft |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Tower Type | **Condition** | Type B | **Status** | pass |
| **Sensor Component** | Conduit | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Met Tower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Moisture Trap | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Power Cables | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Temp Control | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Rotometer | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Sample Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Door | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Roof | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Floor | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Signal Cable | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Tubing Type | **Condition** | 3/8 teflon | **Status** | pass |
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |

# Field Systems Comments

1 **Parameter:** SiteOpsProcComm

Due to the remote location of the site, it can take up to a week to return the filter sample to the lab after it is removed from the tower in the winter.

2 **Parameter:** ShelterCleanNotes

Some floor tiles are damaged.

3 **Parameter:** MetSensorComme

The temperature sensor has been moved to the sample tower and mounted in a naturally aspirated shield facing south and over the shelter roof.  The met tower has been removed.

4 **Parameter:** MetOpMaintCom

The temperature signal cable is showing signs of wear.

# Field Systems Data Form F-02058-1500-S1-rev002

**Site ID** GTH161 **Technician** Martin Valvur **Site Visit Date** 10/03/2017

| | | | | |
|---|---|---|---|---|
| **Site Sponsor (agency)** | EPA | **USGS Map** | | Gothic |
| **Operating Group** | RMBL | **Map Scale** | | |
| **AQS #** | 08-051-9991 | **Map Date** | | |
| **Meteorological Type** | R.M. Young | | | |
| **Air Pollutant Analyzer** | Ozone | **QAPP Latitude** | | 38.9573 |
| **Deposition Measurement** | dry, wet | **QAPP Longitude** | | -106.9854 |
| **Land Use** | mountain meadow, woodland - mixed | **QAPP Elevation Meters** | | 2926 |
| **Terrain** | complex | **QAPP Declination** | | 10.75 |
| **Conforms to MLM** | No | **QAPP Declination Date** | | 2/23/2006 |
| **Site Telephone** | (970) 349-5691 | **Audit Latitude** | | 38.95627 |
| **Site Address 1** | RMBL | **Audit Longitude** | | -106.98587 |
| **Site Address 2** | Gothic | **Audit Elevation** | | 2915 |
| **County** | Gunnison | **Audit Declination** | | 9.6 |
| **City, State** | Crested Butte, CO | | **Present** | |
| **Zip Code** | 81224 | **Fire Extinguisher** | ☑ | Inspected July 2015 |
| **Time Zone** | Mountain | **First Aid Kit** | ☑ | |
| **Primary Operator** | | **Safety Glasses** | ☐ | |
| **Primary Op. Phone #** | | **Safety Hard Hat** | ☑ | |
| **Primary Op. E-mail** | | **Climbing Belt** | ☐ | |
| **Backup Operator** | | **Security Fence** | ☐ | |
| **Backup Op. Phone #** | | **Secure Shelter** | ☐ | |
| **Backup Op. E-mail** | | **Stable Entry Step** | ☑ | |

**Shelter Working Room** ☑ **Make** Ekto **Model** 8810 (s/n 2149-12) **Shelter Size** 640 cuft

**Shelter Clean** ☑ **Notes** Some floor tiles are damaged.

**Site OK** ☑ **Notes**

**Driving Directions** From Gunnison take route 135 north to Crested Butte. Continue through town to Mount Crested Butte. Continue through town past the fire station and the road maintenance facility onto the dirt road to Gothic. Continue approximately three miles and park at the visitor area at the bottom of the hill below the site. The site is approximately 200 meters on the path up the hill.

# Field Systems Data Form

F-02058-1500-S2-rev002

**Site ID** GTH161 **Technician** Martin Valvur **Site Visit Date** 10/03/2017

| Potential Interferent | Minimum Distance From Measurement Apparatus | Distance | Pass = Checked |
|---|---|---|---|
| Large Point Source of SO2 or NOx | 20 to 40 km | | ☑ |
| Major industrial complex | 10 to 20 km | | ☑ |
| City > 50,000 population | 40 km | | ☑ |
| City 10,000 to 50,000 population | 10 km | | ☑ |
| City 1,000 to 10,000 population | 5 km | | ☑ |
| Major highway, airport or rail yard | 2 km | | ☑ |
| Secondary road, heavily traveled | 500 m | | ☑ |
| Secondary road, lightly traveled | 200 m | | ☑ |
| Feedlot operations | 500 m | | ☑ |
| Intensive agricultural ops (including aerial spraying) | 500 m | | ☑ |
| Limited agricultural operations | 200 m | | ☑ |
| Large parking lot | 200 m | | ☑ |
| Small parking lot | 100 m | | ☑ |
| Tree line | 50 m | | ☑ |
| Obstacles to wind | 10 times obstacle height | | ☑ |

**Siting Distances OK** ☑

**Siting Criteria Comment**

# Field Systems Data Form

**F-02058-1500-S3-rev002**

**Site ID** GTH161 **Technician** Martin Valvur **Site Visit Date** 10/03/2017

| | | | |
|---|---|---|---|
| 1 | **Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?** | ☑ | N/A |
| 2 | **Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind)** | ☑ | N/A |
| 3 | **Are the tower and sensors plumb?** | ☑ | N/A |
| 4 | **Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?** | ☐ | South |
| 5 | **Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)** | ☐ | Over shelter |
| 6 | **Is the solar radiation sensor plumb?** | ☑ | N/A |
| 7 | **Is it sited to avoid shading, or any artificial or reflected light?** | ☑ | N/A |
| 8 | **Is the rain gauge plumb?** | ☑ | N/A |
| 9 | **Is it sited to avoid sheltering effects from buildings, trees, towers, etc?** | ☑ | N/A |
| 10 | **Is the surface wetness sensor sited with the grid surface facing north?** | ☑ | N/A |
| 11 | **Is it inclined approximately 30 degrees?** | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The temperature sensor has been moved to the sample tower and mounted in a naturally aspirated shield facing south and over the shelter roof. The met tower has been removed.

# Field Systems Data Form

F-02058-1500-S4-rev002

**Site ID** GTH161 **Technician** Martin Valvur **Site Visit Date** 10/03/2017

| | | | |
|---|---|---|---|
| 1 | Do all the meterological sensors appear to be intact, in good condition, and well maintained? | ☑ | |
| 2 | Are all the meteorological sensors operational online, and reporting data? | ☑ | |
| 3 | Are the shields for the temperature and RH sensors clean? | ☑ | |
| 4 | Are the aspirated motors working? | ☑ | N/A |
| 5 | Is the solar radiation sensor's lens clean and free of scratches? | ☑ | N/A |
| 6 | Is the surface wetness sensor grid clean and undamaged? | ☑ | N/A |
| 7 | Are the sensor signal and power cables intact, in good condition, and well maintained? | ☑ | |
| 8 | Are the sensor signal and power cable connections protected from the elements and well maintained? | ☑ | |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The temperature signal cable is showing signs of wear.

# Field Systems Data Form

F-02058-1500-S5-rev002

**Site ID** GTH161 **Technician** Martin Valvur **Site Visit Date** 10/03/2017

## Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E

| | | | |
|---|---|---|---|
| 1 | Do the sample inlets have at least a 270 degree arc of unrestricted airflow? | ☑ | |
| 2 | Are the sample inlets 3 - 15 meters above the ground? | ☑ | |
| 3 | Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? | ☑ | |

## Pollutant analyzers and deposition equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the analyzers and equipment appear to be in good condition and well maintained? | ☑ | |
| 2 | Are the analyzers and monitors operational, on-line, and reporting data? | ☑ | |
| 3 | Describe ozone sample tube. | | 1/4 teflon by 12 meters |
| 4 | Describe dry dep sample tube. | | 3/8 teflon by 15 meters |
| 5 | Are in-line filters used in the ozone sample line? (if yes indicate location) | ☑ | At inlet only |
| 6 | Are sample lines clean, free of kinks, moisture, and obstructions? | ☑ | |
| 7 | Is the zero air supply desiccant unsaturated? | ☑ | |
| 8 | Are there moisture traps in the sample lines? | ☑ | |
| 9 | Is there a rotometer in the dry deposition filter line, and is it clean? | ☑ | Clean and dry |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

# F-02058-1500-S6-rev002

**Site ID** GTH161 **Technician** Martin Valvur **Site Visit Date** 10/03/2017

## DAS, sensor translators, and peripheral equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the DAS instruments appear to be in good condition and well maintained? | ☑ | |
| 2 | Are all the components of the DAS operational? (printers, modem, backup, etc) | ☑ | |
| 3 | Do the analyzer and sensor signal leads pass through lightning protection circuitry? | ☑ | Met sensors only |
| 4 | Are the signal connections protected from the weather and well maintained? | ☑ | |
| 5 | Are the signal leads connected to the correct DAS channel? | ☑ | |
| 6 | Are the DAS, sensor translators, and shelter properly grounded? | ☑ | |
| 7 | Does the instrument shelter have a stable power source? | ☑ | |
| 8 | Is the instrument shelter temperature controlled? | ☑ | |

| | | Stable | Grounded |
|---|---|---|---|
| 9 | Is the met tower stable and grounded? | ☐ | ☐ |
| 10 | Is the sample tower stable and grounded? | ☑ | ☑ |

11 Tower comments? Tower does not have ground rod but is bolted to shelter.

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

# Field Systems Data Form

**F-02058-1500-S7-rev002**

**Site ID** GTH161

**Technician** Martin Valvur

**Site Visit Date** 10/03/2017

## Documentation

### Does the site have the required instrument and equipment manuals?

| | Yes | No | N/A |
|---|---|---|---|
| Wind speed sensor | ☐ | ☐ | ☑ |
| Wind direction sensor | ☐ | ☐ | ☑ |
| Temperature sensor | ☑ | ☐ | ☐ |
| Relative humidity sensor | ☐ | ☐ | ☑ |
| Solar radiation sensor | ☐ | ☐ | ☑ |
| Surface wetness sensor | ☐ | ☐ | ☑ |
| Wind sensor translator | ☐ | ☐ | ☑ |
| Temperature translator | ☐ | ☐ | ☑ |
| Humidity sensor translator | ☐ | ☐ | ☑ |
| Solar radiation translator | ☐ | ☐ | ☑ |
| Tipping bucket rain gauge | ☐ | ☐ | ☑ |
| Ozone analyzer | ☐ | ☑ | ☐ |
| Filter pack flow controller | ☑ | ☐ | ☐ |
| Filter pack MFC power supply | ☐ | ☐ | ☑ |

| | Yes | No | N/A |
|---|---|---|---|
| Data logger | ☐ | ☑ | ☐ |
| Data logger | ☐ | ☐ | ☑ |
| Strip chart recorder | ☐ | ☐ | ☑ |
| Computer | ☑ | ☐ | ☐ |
| Modem | ☐ | ☑ | ☐ |
| Printer | ☐ | ☐ | ☑ |
| Zero air pump | ☐ | ☑ | ☐ |
| Filter flow pump | ☐ | ☑ | ☐ |
| Surge protector | ☐ | ☐ | ☑ |
| UPS | ☐ | ☑ | ☐ |
| Lightning protection device | ☐ | ☐ | ☑ |
| Shelter heater | ☐ | ☑ | ☐ |
| Shelter air conditioner | ☐ | ☑ | ☐ |

### Does the site have the required and most recent QC documents and report forms?

| | Present | | Current |
|---|---|---|---|
| Station Log | ☑ | | ☑ |
| SSRF | ☑ | | ☑ |
| Site Ops Manual | ☑ | Oct 2001 | ☐ |
| HASP | ☐ | | ☐ |
| Field Ops Manual | ☑ | July 1990 | ☐ |
| Calibration Reports | ☐ | | ☐ |
| Ozone z/s/p Control Charts | ☐ | | ☐ |
| Preventive maintenance schedul | ☐ | | ☐ |

| | | | |
|---|---|---|---|
| 1 | Is the station log properly completed during every site visit? | ☑ | |
| 2 | Are the Site Status Report Forms being completed and current? | ☑ | |
| 3 | Are the chain-of-custody forms properly used to document sample transfer to and from lab? | ☑ | |
| 4 | Are ozone z/s/p control charts properly completed and current? | ☐ | Control charts not used |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form F-02058-1500-S8-rev002

**Site ID** GTH161 **Technician** Martin Valvur **Site Visit Date** 10/03/2017

## Site operation procedures

1 Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? ☐ Trained by previous operator

2 Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? ☐

3 Is the site visited regularly on the required Tuesday schedule? ☑

4 Are the standard CASTNET operational procedures being flollowed by the site operator? ☑

5 Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation) ☑

## Are regular operational QA/QC checks performed on meteorological instruments?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multipoint Calibrations | ☑ | N/A | ☑ |
| Visual Inspections | ☑ | N/A | ☑ |
| Translator Zero/Span Tests (climatronics) | ☑ | N/A | ☑ |
| Manual Rain Gauge Test | ☑ | N/A | ☑ |
| Confirm Reasonableness of Current Values | ☑ | N/A | ☑ |
| Test Surface Wetness Response | ☑ | N/A | ☑ |

## Are regular operational QA/QC checks performed on the ozone analyzer?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point Calibrations | ☑ | Semiannually | ☑ |
| Automatic Zero/Span Tests | ☑ | Daily | ☑ |
| Manual Zero/Span Tests | ☑ | | ☑ |
| Automatic Precision Level Tests | ☑ | Daily | ☑ |
| Manual Precision Level Test | ☑ | | ☑ |
| Analyzer Diagnostics Tests | ☑ | Weekly | ☑ |
| In-line Filter Replacement (at inlet) | ☑ | Every 2 weeks | ☑ |
| In-line Filter Replacement (at analyze | ☑ | N/A | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |
| Zero Air Desiccant Check | ☑ | Semiannually | ☑ |

1 Do multi-point calibration gases go through the complete sample train including all filters? ☐ Unknown

2 Do automatic and manual z/s/p gasses go through the complete sample train including all filters? ☑

3 Are the automatic and manual z/s/p checks monitored and reported? If yes, how? ☑ SSRF, call-in

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

# F-02058-1500-S9-rev002

**Site ID** GTH161 **Technician** Martin Valvur **Site Visit Date** 10/03/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Is the filter pack being changed every Tuesday as scheduled? | ☑ | Filter changed morinings |
| 2 | Are the Site Status Report Forms being completed and filed correctly? | ☑ | |
| 3 | Are data downloads and backups being performed as scheduled? | ☐ | No longer required |
| 4 | Are general observations being made and recorded? How? | ☑ | SSRF, logbook |
| 5 | Are site supplies on-hand and replenished in a timely fashion? | ☑ | |
| 6 | Are sample flow rates recorded? How? | ☑ | SSRF, call-in |
| 7 | Are samples sent to the lab on a regular schedule in a timely fashion? | ☑ | |
| 8 | Are filters protected from contamination during handling and shipping? How? | ☑ | Clean gloves on and off |
| 9 | Are the site conditions reported regularly to the field operations manager or staff? | ☑ | |

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point MFC Calibrations | ☑ | Semiannually | ☑ |
| Flow System Leak Checks | ☑ | Weekly | ☑ |
| Filter Pack Inspection | ☐ | | ☐ |
| Flow Rate Setting Checks | ☑ | Weekly | ☑ |
| Visual Check of Flow Rate Rotometer | ☑ | Weekly | ☑ |
| In-line Filter Inspection/Replacement | ☑ | Semiannually | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

Due to the remote location of the site, it can take up to a week to return the filter sample to the lab after it is removed from the tower in the winter.

# Field Systems Data Form

F-02058-1500-S10-rev002

**Site ID** GTH161 **Technician** Martin Valvur **Site Visit Date** 10/03/2017

**Site Visit Sensors**

| Parameter | Manufacturer | Model | S/N | Client ID |
|---|---|---|---|---|
| Computer | Dell | D520 | 5HFNHB1 | 000251 |
| DAS | Campbell | CR3000 | 2513 | 000416 |
| Elevation | Elevation | 1 | None | None |
| Filter pack flow pump | Thomas | 107CAB18 | 100300020817 | 00517 |
| Flow Rate | Apex | AXMC105LPMDPC | 50735 | 000558 |
| Infrastructure | Infrastructure | none | none | none |
| Modem | Raven | H4223-C | 0844355568 | 06611 |
| Ozone | ThermoElectron Inc | 49i A1NAA | 1009241760 | 000517 |
| Ozone Standard | ThermoElectron Inc | 49i A3NAA | 0611416461 | 000208 |
| Sample Tower | Aluma Tower | A | none | 03564 |
| Shelter Temperature | Campbell | 107-L | none | none |
| Siting Criteria | Siting Criteria | 1 | None | None |
| Temperature | RM Young | 41342VC | 11742 | 06120 |
| Zero air pump | Werther International | P 70/4 | 000836211 | 06927 |

# *Site Inventory by Site Visit*

### *ACA416-Eric Hebert-10/10/2017*

| Site Visit Date | | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| 1 | 10/10/2017 | DAS | Environmental Sys Corp | ACADIA1 | 8832 | unknown2 |
| 2 | 10/10/2017 | Elevation | Elevation | None | 1 | None |
| 3 | 10/10/2017 | F460 translator | Climatronics | none | 100163 | 683 |
| 4 | 10/10/2017 | Filter pack flow pump | Thomas | none | 107CAB11 | 109500000040 |
| 5 | 10/10/2017 | Flow Rate | Tylan | none | FC260 | AW02213003 |
| 6 | 10/10/2017 | Infrastructure | Infrastructure | none | none | none |
| 7 | 10/10/2017 | Mainframe | Climatronics | 01342 | 100081 | 1288 |
| 8 | 10/10/2017 | Met tower | Climatronics | none | unknown | illegible |
| 9 | 10/10/2017 | MFC power supply | Tylan | none | RO-32 | none |
| 10 | 10/10/2017 | Ozone | ThermoElectron Inc | 90744 | 49C | 49C-74536-376 |
| 11 | 10/10/2017 | Precipitation | Climatronics | 01322 | 100508-2 | illegible |
| 12 | 10/10/2017 | Relative Humidity | Vaisala | none | missing | missing |
| 13 | 10/10/2017 | Sample Tower | Aluma Tower | none | B | AT-71103-7I-3 |
| 14 | 10/10/2017 | Shelter Temperature | Agilaire | none | Unknown | None |
| 15 | 10/10/2017 | Shield (2 meter) | Climatronics | none | 100325 | illegible |
| 16 | 10/10/2017 | Siting Criteria | Siting Criteria | None | 1 | None |
| 17 | 10/10/2017 | Solar Radiation | Licor | none | LI-200 | PY16746 |
| 18 | 10/10/2017 | Solar Radiation Translator | Climatronics | none | 100144 | 309 |
| 19 | 10/10/2017 | Surface Wetness | RM Young | none | 58101 | none |
| 20 | 10/10/2017 | Temperature Translator | Climatronics | 03630 | 100088-2 | 401 |
| 21 | 10/10/2017 | Temperature2meter | Climatronics | none | 100093 | missing |
| 22 | 10/10/2017 | Wind Direction | Climatronics | none | 100076 | illegible |
| 23 | 10/10/2017 | Wind Speed | Climatronics | none | 100075 | illegible |
| 24 | 10/10/2017 | Zero air pump | ThermoElectron Inc | none | 111 | 111-30215-237 |

# DAS Data Form

**DAS Time Max Error:** 2.6

| Mfg | Serial Number | Site | Technician | Site Visit Date | Parameter | Use Desc. |
|---|---|---|---|---|---|---|
| Environmental Sys | unknown2 | ACA416 | Eric Hebert | 10/10/2017 | DAS | Primary |

**Das Date:** 10/11/2017
**Das Time:** 10:23:36
**Das Day:** 284

**Audit Date** 10/11/2017
**Audit Time** 10:21:00
**Audit Day** 284

| **Low Channel:** | | **High Channel:** | |
|---|---|---|---|
| **Avg Diff:** | **Max Diff:** | **Avg Diff:** | **Max Diff:** |
| 0.0000 | 0.0000 | 0.0000 | 0.0000 |

**Mfg** Datel
**Parameter** DAS
**Serial Number** 4000392
**Tfer Desc.** Source generator (D
**Tfer ID** 01321
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 1/22/2015
**CorrCoff** 1.00000

**Mfg** Fluke
**Parameter** DAS
**Serial Number** 86590148
**Tfer Desc.** DVM
**Tfer ID** 01310
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 2/23/2017
**CorrCoff** 1.00000

| Channel | Input | DVM Output | DAS Output | InputUnit | OutputUnit | Difference |
|---|---|---|---|---|---|---|
| 1 | 1.0000 | 0.0000 | 0.0000 | V | V | 0.0000 |

# Flow Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Tylan | AW02213003 | ACA416 | Eric Hebert | 10/10/2017 | Flow Rate | none |

**Mfg** Tylan

**SN/Owner ID** none none

**Parameter** MFC power supply

**Mfg** BIOS

**Parameter** Flow Rate

**Serial Number** 122974

**Tfer Desc.** BIOS 220-H

**Tfer ID** 01416

**Slope** 1.00732

**Intercept** -0.02202

**Cert Date** 3/8/2017

**CorrCoff** 0.99970

**DAS 1:**

**DAS 2:**

| A Avg % Diff: | A Max % Di | A Avg %Dif | A Max % Di |
|---|---|---|---|
| 0.91% | 1.13% | | |

**Cal Factor Zero** -0.008

**Cal Factor Full Scale** 5.1

**Rotometer Reading:** 1.5

| Desc. | Test type | Input l/m | Input Corr_ | MfcDisp. | OutputSignal | Output S E | InputUnit | OutputSignalI | PctDifference |
|---|---|---|---|---|---|---|---|---|---|
| primary | pump off | 0.000 | 0.000 | 0.00 | 0.0000 | 0.06 | l/m | l/m | |
| primary | leak check | 0.000 | 0.000 | 0.01 | 0.0000 | 0.07 | l/m | l/m | |
| primary | test pt 1 | 1.492 | 1.500 | 1.50 | 0.0000 | 1.52 | l/m | l/m | 1.13% |
| primary | test pt 2 | 1.494 | 1.500 | 1.50 | 0.0000 | 1.52 | l/m | l/m | 1.13% |
| primary | test pt 3 | 1.501 | 1.510 | 1.50 | 0.0000 | 1.52 | l/m | l/m | 0.46% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Leak Test | **Condition** | | **Status** | pass |
| **Sensor Component** | Tubing Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Filter Position | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Rotometer Condition | **Condition** | Clean and dry | **Status** | pass |
| **Sensor Component** | Moisture Present | **Condition** | No moisture present | **Status** | pass |
| **Sensor Component** | Filter Distance | **Condition** | 5.5 cm | **Status** | pass |
| **Sensor Component** | Filter Depth | **Condition** | 0.0 cm | **Status** | pass |
| **Sensor Component** | Filter Azimuth | **Condition** | | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Ozone Data Form

| **Mfg** | **Serial Number Ta** | **Site** | **Technician** | **Site Visit Date** | **Parameter** | **Owner ID** |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 49C-74536-376 | ACA416 | Eric Hebert | 10/10/2017 | Ozone | 90744 |

| | | | |
|---|---|---|---|
| **Slope:** | 1.02812 | **Slope:** | 0.00000 |
| **Intercept** | -0.51449 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99981 | **CorrCoff** | 0.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 2.0% | 4.2% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 0517112167 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01113 | | |
| **Slope** | 1.00504 | **Intercept** | 0.32915 |
| **Cert Date** | 9/12/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.27 | -0.05 | -0.99 | ppb | |
| primary | 2 | 11.11 | 10.72 | 10.81 | ppb | 0.84% |
| primary | 3 | 34.57 | 34.06 | 35.49 | ppb | 4.20% |
| primary | 4 | 68.65 | 67.97 | 68.00 | ppb | 0.04% |
| primary | 5 | 112.67 | 111.77 | 114.90 | ppb | 2.80% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 1.5 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.096 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 103.7 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 1.0 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.74 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 735.2 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 32.0 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 109.2 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.73 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 734.6 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Wind Speed Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Climatronics | illegible | ACA416 | Eric Hebert | 10/10/2017 | Wind Speed | none |

**Mfg** Climatronics

**SN/Owner ID** 683 none

**Parameter** F460 translator

**Mfg** RM Young

**Parameter** wind speed

**Serial Number**

**Tfer Desc.** wind speed motor (h

**Tfer ID** 01262

**Slope** 1.00000

**Intercept** 0.00000

**Cert Date** 1/26/2017

**CorrCoff** 1.00000

**Prop or Cups SN** 2033

**Prop or Cups Torque** 0.4 **to** 0.4

**Prop Correction Fact** N/A

|  | DAS 1: |  | DAS 2: |  |
|---|---|---|---|---|
|  | Low Range | High Range | Low Range | High Range |
| Abs Avg Err | 0.18 | 1.07% |  |  |
| Abs Max Er | 0.20 | 2.62% |  |  |

| UseDescription: | Input Device | Input RPM | Input m/s | Out V | DAS m/s | Diff/ %Diff | Diff | WsM |
|---|---|---|---|---|---|---|---|---|
| primary | none | 0 | 0.20 | 0.0 | 0.0 |  | -0.18 |  |
| primary | 01262 | 50 | 1.40 | 0.0 | 1.2 |  | -0.20 |  |
| primary | 01262 | 100 | 2.57 | 0.0 | 2.4 |  | -0.18 |  |
| primary | 01262 | 170 | 4.22 | 0.0 | 4.1 |  | -0.17 |  |
| primary | 01262 | 250 | 6.10 | 0.0 | 5.9 | -2.62% |  |  |
| primary | 01262 | 500 | 11.97 | 0.0 | 11.9 | -1.00% |  |  |
| primary | 01262 | 800 | 19.02 | 0.0 | 19.0 | -0.37% |  |  |
| primary | 01262 | 2000 | 47.22 | 0.0 | 47.4 | 0.28% |  |  |

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| **Sensor Component** | Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Prop or Cups Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Sensor Heater | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Torque | **Condition** |  | **Status** | pass |
| **Sensor Component** | Sensor Plumb | **Condition** | Plumb | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** |  | **Status** | pass |

# Wind Direction Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Climatronics | illegible | ACA416 | Eric Hebert | 10/10/2017 | Wind Direction | none |

**Mfg** Climatronics

**SN/Owner ID** 683 none

**Parameter** F460 translator

**Vane SN:** 1491

**C. A. Align. deg. true:** 360

**VaneTorque** 8 **to** 10

**Mfg** RM Young **Parameter** wind direction

**Serial Number** None **Tfer Desc.** wind direction wheel

**Tfer ID** 01458

**Slope** 1.00000 **Intercept** 0.00000

**Cert Date** 1/1/2017 **CorrCoff** 1.00000

**Mfg** Ushikata **Parameter** wind direction

**Serial Number** 191832 **Tfer Desc.** transit

**Tfer ID** 01272

**Slope** 1.00000 **Intercept** 0.00000

**Cert Date** 2/8/2017 **CorrCoff** 1.00000

|  | DAS 1: Orientation | DAS 1: Linearity: | DAS 2: Orientation | DAS 2: Linearity: |
|---|---|---|---|---|
| **Abs Avg Err** | 3.5 | 1.8 |  |  |
| **Abs Max Er** | 4 | 5 |  |  |

| UseDescription | TferID | Input Raw | Linearity | Output V | Output Deg. | Difference | Change | Error |
|---|---|---|---|---|---|---|---|---|
| primary | 01458 | 0 | ☑ | 0.0000 | 356 | 4 | 43.7 | -1.31 |
| primary | 01458 | 45 | ☑ | 0.0000 | 37 | 8 | 41.61 | -3.39 |
| primary | 01458 | 90 | ☑ | 0.0000 | 87 | 3 | 49.99 | 4.99 |
| primary | 01458 | 135 | ☑ | 0.0000 | 132 | 4 | 44.4 | -0.54 |
| primary | 01458 | 180 | ☑ | 0.0000 | 175 | 5 | 43.4 | -1.59 |
| primary | 01458 | 225 | ☑ | 0.0000 | 221 | 4 | 46.3 | 1.29 |
| primary | 01458 | 270 | ☑ | 0.0000 | 267 | 3 | 46 | 1 |
| primary | 01458 | 315 | ☑ | 0.0000 | 312 | 3 | 44.6 | -0.39 |
| primary | 01272 | 90 | ☐ | 0.0000 | 87 | 3 |  | 3 |
| primary | 01272 | 180 | ☐ | 0.0000 | 176 | 4 |  | 4 |
| primary | 01272 | 270 | ☐ | 0.0000 | 267 | 3 |  | 3 |
| primary | 01272 | 360 | ☐ | 0.0000 | 356 | 4 |  | 4 |

**Sensor Component** Condition **Condition** Good **Status** pass

**Sensor Component** Mast **Condition** Good **Status** pass

**Sensor Component** Sensor Heater **Condition** Functioning **Status** pass

**Sensor Component** Sensor Plumb **Condition** Plumb **Status** pass

**Sensor Component** Torque **Condition** **Status** pass

**Sensor Component** Vane Condition **Condition** Good **Status** pass

**Sensor Component** System Memo **Condition** **Status** pass

# 2 Meter Temperature Data Form

Calc. Difference

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Climatronics | missing | ACA416 | Eric Hebert | 10/10/2017 | Temperature2meter | none |

**Mfg** Climatronics

**SN/Owner ID** 401 03630

**Parameter** Temperature Translator

**Mfg** Extech

**Parameter** Temperature

**Serial Number** H232679

**Tfer Desc.** RTD

**Tfer ID** 01228

**Slope** 1.00656

**Intercept** -0.03341

**Cert Date** 2/4/2017

**CorrCoff** 1.00000

| DAS 1: Abs Avg Err | DAS 1: Abs Max Er | DAS 2: Abs Avg Err | DAS 2: Abs Max Er |
|---|---|---|---|
| 0.2 | 0.25 | | |

| UseDescription | Test type | InputTmpRaw | InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Low Rang | -0.04 | -0.01 | 0.0000 | 0.13 | C | 0.14 |
| primary | Temp Mid Rang | 23.97 | 23.85 | 0.0000 | 23.60 | C | -0.25 |
| primary | Temp High Rang | 49.35 | 49.06 | 0.0000 | 48.85 | C | -0.21 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Properly Sited | **Condition** | Properly sited | **Status** | pass |
| **Sensor Component** | Shield | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Solar Radiation Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Licor | PY16746 | ACA416 | Eric Hebert | 10/10/2017 | Solar Radiation | none |

**Mfg** Climatronics

**SN/Owner ID** 309 none

**Parameter** Solar Radiation Translator

**Mfg** Eppley **Parameter** solar radiation

**Serial Number** 10765 **Tfer Desc.** SR transfer translat

**Tfer ID** 01246

**Slope** 1.00000 **Intercept** 0.00000

**Cert Date** 2/10/2017 **CorrCoff** 1.00000

**Mfg** Eppley **Parameter** solar radiation

**Serial Number** 34341F3 **Tfer Desc.** SR transfer sensor

**Tfer ID** 01245

**Slope** 1.00000 **Intercept** 0.00000

**Cert Date** 2/10/2017 **CorrCoff** 1.00000

| DAS 1: |  | DAS 2: |  |
|---|---|---|---|
| % Diff of Avg | %Diff of Max | %Diff of Avg | %Diff of Max |
| 4.8% | 2.9% | 0.0% | 0.0% |

| UseDescription | Measure Date | MeasureTime | Tfer Raw | Tfer Corr | DAS w/m2 | PctDifference |
|---|---|---|---|---|---|---|
| primary | 10/11/2017 | 9:00 | 558 | 558 | 509 | -8.8% |
| primary | 10/11/2017 | 10:00 | 570 | 570 | 536 | -5.9% |
| primary | 10/11/2017 | 11:00 | 630 | 630 | 612 | -2.9% |
| primary | 10/11/2017 | 12:00 | 597 | 597 | 575 | -3.7% |
| primary | 10/11/2017 | 13:00 | 470 | 470 | 432 | -8.1% |
| primary | 10/11/2017 | 14:00 | 193 | 193 | 210 | 8.8% |

**Sensor Component** Sensor Clean **Condition** Clean **Status** pass

**Sensor Component** Sensor Level **Condition** Level **Status** pass

**Sensor Component** Properly Sited **Condition** Properly sited **Status** pass

**Sensor Component** System Memo **Condition** **Status** pass

# Humidity Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Vaisala | missing | ACA416 | Eric Hebert | 10/10/2017 | Relative Humidity | none |

| | | | |
|---|---|---|---|
| **Mfg** | Rotronic | **Parameter** | Relative Humidity |
| **Serial Number** | 124432 | **Tfer Desc.** | Hygroclip |
| **Tfer ID** | 01225 | | |
| **Slope** | 0.87488 | **Intercept** | 5.14795 |
| **Cert Date** | 10/10/2017 | **CorrCoff** | 0.99493 |

| | DAS 1: | | DAS 2: | |
|---|---|---|---|---|
| | **Low Range** | **High Range** | **Low Range** | **High Range** |
| **Abs Avg Err** | 2.7 | | | |
| **Abs Max Er** | 6.2 | | | |

| UseDesc. | Test type | Device | Input RH | GTL Raw | RH Corr. | DAS Volts | DAS %RH | Difference |
|---|---|---|---|---|---|---|---|---|
| primary | RH Low Range | Hygroclip | 32.8 | 32.7 | 32.8 | 0.0000 | 39.1 | 6.2 |
| primary | RH Low Range | Hygroclip | 52.9 | 53.6 | 52.9 | 0.0000 | 53.1 | 0.2 |
| primary | RH Low Range | Hygroclip | 75.3 | 70.0 | 75.3 | 0.0000 | 72.0 | -3.3 |
| primary | RH Low Range | Ambient | | 46.3 | 47.0 | 0.0000 | 46.1 | -0.9 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | RH Filter | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Shield | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Precipitation Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Climatronics | illegible | ACA416 | Eric Hebert | 10/10/2017 | Precipitation | 01322 |

**Mfg** PMP

**Parameter** Precipitation

**Serial Number** EW-06134-50

**Tfer Desc.** 250ml graduate

**Tfer ID** 01250

**Slope** 1.00000

**Intercept** 0.00000

**Cert Date** 9/5/2005

**CorrCoff** 1.00000

**DAS 1:**

| A Avg % Diff: | A Max % Di |
|---|---|
| 5.0% | 6.0% |

**DAS 2:**

| A Avg %Dif | A Max % Di |
|---|---|
| | |

| UseDesc. | Test type | TferVolume | Iteration | TimePerTip | Eq.Ht | DAS eng | Eq.HtUnit | OSE Unit | TferUnits | PctDifference |
|---|---|---|---|---|---|---|---|---|---|---|
| primary | test 1 | 231.5 | 1 | 8 sec | 5.00 | 4.70 | mm | mm | ml | -6.0% |
| primary | test 2 | 231.5 | 2 | 10 sec | 5.00 | 4.80 | mm | mm | ml | -4.0% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Properly Sited | **Condition** | 45 degree rule | **Status** | Fail |
| **Sensor Component** | Gauge Drain Screen | **Condition** | Not installed | **Status** | Fail |
| **Sensor Component** | Funnel Clean | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Gauge Screen | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Gauge Clean | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Level | **Condition** | Level | **Status** | pass |
| **Sensor Component** | Sensor Heater | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Surface Wetness Data Form

| **Mfg** | **Serial Number Ta** | **Site** | **Technician** | **Site Visit Date** | **Parameter** | **Owner ID** |
|---|---|---|---|---|---|---|
| RM Young | none | ACA416 | Eric Hebert | 10/10/2017 | Surface Wetness | none |

**Mfg** Ohmite
**Parameter** surface wetness
**Serial Number** 296-1200
**Tfer Desc.** decade box
**Tfer ID** 01210
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 1/4/2011
**CorrCoff** 1.00000

☑ **Manual Test Pass**

| UseDescription | Test Type | Tfer kOhms | OutputSignal | DAS eng | OutputSignalEngUni | TferUnits | OutputSignalUnit |
|---|---|---|---|---|---|---|---|
| primary | dry | N/A | 0.0030 | 0.30 | V | N/A | % Wet |
| primary | wet | N/A | 1.0040 | 100.40 | V | N/A | % Wet |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Properly Sited | **Condition** | Properly sited | **Status** | pass |
| **Sensor Component** | Grid Clean | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Grid Angle | **Condition** | About 30 deg | **Status** | pass |
| **Sensor Component** | Grid Orientation | **Condition** | North | **Status** | pass |
| **Sensor Component** | Grid Condition | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Grid Type | **Condition** | Grid without holes | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Shelter Temperature Data For

| **Mfg** | **Serial Number Ta** | **Site** | **Technician** | **Site Visit Date** | **Parameter** | **Owner ID** |
|---|---|---|---|---|---|---|
| Agilaire | None | ACA416 | Eric Hebert | 10/10/2017 | Shelter Temperature | none |

**DAS 1:**

| **Abs Avg Err** | **Abs Max Er** |
|---|---|
| 0.74 | 1.05 |

**DAS 2:**

| **Abs Avg Err** | **Abs Max Er** |
|---|---|
| | |

**Mfg** Extech

**Parameter** Shelter Temperatur

**Serial Number** H232679

**Tfer Desc.** RTD

**Tfer ID** 01228

**Slope** 1.00656

**Intercept** -0.03341

**Cert Date** 2/4/2017

**CorrCoff** 1.00000

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Mid Range | 22.66 | 22.55 | 0.000 | 23.6 | C | 1.05 |
| primary | Temp Mid Range | 24.24 | 24.12 | 0.000 | 23.7 | C | -0.42 |

**Sensor Component** System Memo

**Condition**

**Status** pass

## Infrastructure Data For

**Site ID** ACA416 **Technician** Eric Hebert **Site Visit Date** 10/10/2017

| **Shelter Make** | **Shelter Model** | **Shelter Size** |
|---|---|---|
| Ekto | 8818 (s/n 2920-1) | 1152 cuft |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Tower Type | **Condition** | Type B | **Status** | pass |
| **Sensor Component** | Conduit | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Met Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Moisture Trap | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Power Cables | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Temp Control | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Rotometer | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Sample Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Door | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Roof | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Floor | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Signal Cable | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Tubing Type | **Condition** | 3/8 teflon | **Status** | pass |
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |

# Field Systems Data Form

# F-02058-1500-S1-rev002

**Site ID** ACA416 **Technician** Eric Hebert **Site Visit Date** 10/10/2017

| | | | | |
|---|---|---|---|---|
| **Site Sponsor (agency)** | NPS/EPA | **USGS Map** | | Salsbury Cove |
| **Operating Group** | NPS/MEDEP | **Map Scale** | | |
| **AQS #** | 23-009-0103 | **Map Date** | | |
| **Meteorological Type** | Climatronics | | | |
| **Air Pollutant Analyzer** | Ozone, SO2, NOx, NOy, PM, VOC | **QAPP Latitude** | | 44.3770 |
| **Deposition Measurement** | dry, wet, Hg | **QAPP Longitude** | | -68.2610 |
| **Land Use** | Costal, woodland - mixed | **QAPP Elevation Meters** | | 158 |
| **Terrain** | rolling | **QAPP Declination** | | |
| **Conforms to MLM** | No | **QAPP Declination Date** | | |
| **Site Telephone** | (432) 288-9322 | **Audit Latitude** | | 44.377086 |
| **Site Address 1** | Route 233 | **Audit Longitude** | | -68.2608 |
| **Site Address 2** | | **Audit Elevation** | | 153 |
| **County** | Hancock | **Audit Declination** | | -16.4 |
| **City, State** | Bar Harbor, ME | | **Present** | |
| **Zip Code** | 04609 | **Fire Extinguisher** | ☑ | Inspected Aug 2017 |
| **Time Zone** | Eastern | **First Aid Kit** | ☐ | |
| **Primary Operator** | | **Safety Glasses** | ☐ | |
| **Primary Op. Phone #** | | **Safety Hard Hat** | ☐ | |
| **Primary Op. E-mail** | | **Climbing Belt** | ☐ | |
| **Backup Operator** | | **Security Fence** | ☐ | |
| **Backup Op. Phone #** | | **Secure Shelter** | ☑ | |
| **Backup Op. E-mail** | | **Stable Entry Step** | ☑ | |

**Shelter Working Room** ☑ **Make** Custom **Model** Unknown **Shelter Size** Unknown

**Shelter Clean** ☑ **Notes** The shelter is new, clean and well organized. Equipment is still being moved from the old shelter.

**Site OK** ☑ **Notes**

**Driving Directions** From Bangor go east on 1A to Ellsworth. From Ellsworth take route 3 east to Bar Harbor. At the west edge of town, take Eagle Lake Rd (route 233) west toward Acadia National Park. The site is through a gate, at the end of a gravel road, across from the Park Headquarters.

# Field Systems Data Form

F-02058-1500-S2-rev002

**Site ID** ACA416 **Technician** Eric Hebert **Site Visit Date** 10/10/2017

| Potential Interferent | Minimum Distance From Measurement Apparatus | Distance | Pass = Checked |
|---|---|---|---|
| Large Point Source of SO2 or NOx | 20 to 40 km | | ☑ |
| Major industrial complex | 10 to 20 km | | ☑ |
| City > 50,000 population | 40 km | | ☑ |
| City 10,000 to 50,000 population | 10 km | | ☑ |
| City 1,000 to 10,000 population | 5 km | | ☑ |
| Major highway, airport or rail yard | 2 km | | ☑ |
| Secondary road, heavily traveled | 500 m | | ☑ |
| Secondary road, lightly traveled | 200 m | | ☑ |
| Feedlot operations | 500 m | | ☑ |
| Intensive agricultural ops (including aerial spraying) | 500 m | | ☑ |
| Limited agricultural operations | 200 m | | ☑ |
| Large parking lot | 200 m | | ☑ |
| Small parking lot | 100 m | | ☑ |
| Tree line | 50 m | 25 m | ☐ |
| Obstacles to wind | 10 times obstacle height | | ☑ |

**Siting Distances OK** ☑

**Siting Criteria Comment**

# Field Systems Data Form

**F-02058-1500-S3-rev002**

**Site ID** ACA416 **Technician** Eric Hebert **Site Visit Date** 10/10/2017

| | | | |
|---|---|---|---|
| 1 | Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? | ☑ | |
| 2 | Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) | ☑ | |
| 3 | Are the tower and sensors plumb? | ☑ | |
| 4 | Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? | ☑ | |
| 5 | Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) | ☑ | |
| 6 | Is the solar radiation sensor plumb? | ☑ | |
| 7 | Is it sited to avoid shading, or any artificial or reflected light? | ☑ | |
| 8 | Is the rain gauge plumb? | ☑ | |
| 9 | Is it sited to avoid sheltering effects from buildings, trees, towers, etc? | ☐ | 45 degree rule violation |
| 10 | Is the surface wetness sensor sited with the grid surface facing north? | ☑ | |
| 11 | Is it inclined approximately 30 degrees? | ☑ | |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S4-rev002

**Site ID** ACA416 **Technician** Eric Hebert **Site Visit Date** 10/10/2017

| | | | |
|---|---|---|---|
| 1 | Do all the meterological sensors appear to be intact, in good condition, and well maintained? | ☑ | |
| 2 | Are all the meteorological sensors operational online, and reporting data? | ☑ | |
| 3 | Are the shields for the temperature and RH sensors clean? | ☑ | |
| 4 | Are the aspirated motors working? | ☑ | |
| 5 | Is the solar radiation sensor's lens clean and free of scratches? | ☑ | |
| 6 | Is the surface wetness sensor grid clean and undamaged? | ☑ | |
| 7 | Are the sensor signal and power cables intact, in good condition, and well maintained? | ☑ | |
| 8 | Are the sensor signal and power cable connections protected from the elements and well maintained? | ☑ | |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The sensor signal cables are beginning to show signs of wear.  Some are being replaced as instruments are installed in the new shelter.

# Field Systems Data Form

F-02058-1500-S5-rev002

**Site ID** ACA416 **Technician** Eric Hebert **Site Visit Date** 10/10/2017

## Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E

| | | | |
|---|---|---|---|
| 1 | Do the sample inlets have at least a 270 degree arc of unrestricted airflow? | ☑ | |
| 2 | Are the sample inlets 3 - 15 meters above the ground? | ☑ | |
| 3 | Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? | ☑ | |

## Pollutant analyzers and deposition equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the analyzers and equipment appear to be in good condition and well maintained? | ☑ | |
| 2 | Are the analyzers and monitors operational, on-line, and reporting data? | ☑ | |
| 3 | Describe ozone sample tube. | | 3/8 teflon by 12 meters |
| 4 | Describe dry dep sample tube. | | 3/8 teflon by 12 meters |
| 5 | Are in-line filters used in the ozone sample line? (if yes indicate location) | ☑ | At inlet only |
| 6 | Are sample lines clean, free of kinks, moisture, and obstructions? | ☑ | |
| 7 | Is the zero air supply desiccant unsaturated? | ☑ | |
| 8 | Are there moisture traps in the sample lines? | ☑ | |
| 9 | Is there a rotometer in the dry deposition filter line, and is it clean? | ☑ | Clean and dry |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

New sample lines have been installed in the new shelter. The ozone inlet was not approved material but was replaced shortly after the audit.

# Field Systems Data Form

F-02058-1500-S6-rev002

**Site ID** ACA416 **Technician** Eric Hebert **Site Visit Date** 10/10/2017

**DAS, sensor translators, and peripheral equipment operations and maintenance**

| | | | |
|---|---|---|---|
| 1 | Do the DAS instruments appear to be in good condition and well maintained? | ☑ | |
| 2 | Are all the components of the DAS operational? (printers, modem, backup, etc) | ☑ | |
| 3 | Do the analyzer and sensor signal leads pass through lightning protection circuitry? | ☑ | |
| 4 | Are the signal connections protected from the weather and well maintained? | ☑ | |
| 5 | Are the signal leads connected to the correct DAS channel? | ☑ | |
| 6 | Are the DAS, sensor translators, and shelter properly grounded? | ☑ | |
| 7 | Does the instrument shelter have a stable power source? | ☑ | |
| 8 | Is the instrument shelter temperature controlled? | ☑ | |

| | | Stable | Grounded |
|---|---|---|---|
| 9 | Is the met tower stable and grounded? | ☑ | ☑ |
| 10 | Is the sample tower stable and grounded? | ☑ | ☑ |

11 Tower comments?

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

The accuracy of the DAS was not tested due to poor wiring conditions at the logger and lack of wiring documentation. It was decided that it was safer not to disturb the signal connections. The sensors will be moved to the new logger in the near future.

# Field Systems Data Form F-02058-1500-S7-rev002

**Site ID** ACA416 **Technician** Eric Hebert **Site Visit Date** 10/10/2017

## Documentation

### Does the site have the required instrument and equipment manuals?

| | Yes | No | N/A | | Yes | No | N/A |
|---|---|---|---|---|---|---|---|
| Wind speed sensor | ☐ | ☑ | ☐ | Data logger | ☑ | ☐ | ☐ |
| Wind direction sensor | ☐ | ☑ | ☐ | Data logger | ☐ | ☐ | ☑ |
| Temperature sensor | ☑ | ☐ | ☐ | Strip chart recorder | ☑ | ☐ | ☐ |
| Relative humidity sensor | ☐ | ☑ | ☐ | Computer | ☐ | ☑ | ☐ |
| Solar radiation sensor | ☑ | ☐ | ☐ | Modem | ☐ | ☑ | ☐ |
| Surface wetness sensor | ☐ | ☑ | ☐ | Printer | ☐ | ☑ | ☐ |
| Wind sensor translator | ☐ | ☑ | ☐ | Zero air pump | ☐ | ☑ | ☐ |
| Temperature translator | ☑ | ☐ | ☐ | Filter flow pump | ☐ | ☑ | ☐ |
| Humidity sensor translator | ☐ | ☑ | ☐ | Surge protector | ☐ | ☑ | ☐ |
| Solar radiation translator | ☑ | ☐ | ☐ | UPS | ☐ | ☑ | ☐ |
| Tipping bucket rain gauge | ☑ | ☐ | ☐ | Lightning protection device | ☐ | ☑ | ☐ |
| Ozone analyzer | ☑ | ☐ | ☐ | Shelter heater | ☐ | ☑ | ☐ |
| Filter pack flow controller | ☐ | ☑ | ☐ | Shelter air conditioner | ☐ | ☑ | ☐ |
| Filter pack MFC power supply | ☐ | ☑ | ☐ | | | | |

### Does the site have the required and most recent QC documents and report forms?

| | Present | | Current |
|---|---|---|---|
| Station Log | ☑ | Dataview | ☑ |
| SSRF | ☑ | | ☑ |
| Site Ops Manual | ☑ | June 2000 | ☑ |
| HASP | ☐ | | ☐ |
| Field Ops Manual | ☐ | | ☐ |
| Calibration Reports | ☑ | | ☑ |
| Ozone z/s/p Control Charts | ☐ | | ☐ |
| Preventive maintenance schedul | ☑ | | ☑ |

| | | | |
|---|---|---|---|
| 1 | Is the station log properly completed during every site visit? | ☑ | Dataview |
| 2 | Are the Site Status Report Forms being completed and current? | ☑ | |
| 3 | Are the chain-of-custody forms properly used to document sample transfer to and from lab? | ☑ | |
| 4 | Are ozone z/s/p control charts properly completed and current? | ☐ | Control charts not used |

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

# Field Systems Data Form F-02058-1500-S8-rev002

**Site ID** ACA416 **Technician** Eric Hebert **Site Visit Date** 10/10/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ | |
| 2 | Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? | ☑ | Trained on-site by ARS during site installation |
| 3 | Is the site visited regularly on the required Tuesday schedule? | ☑ | |
| 4 | Are the standard CASTNET operational procedures being flollowed by the site operator? | ☑ | Operator procedures are very good for filter replacement |
| 5 | Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation) | ☑ | |

## Are regular operational QA/QC checks performed on meteorological instruments?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multipoint Calibrations | ☑ | Semiannually by MEDEP | ☑ |
| Visual Inspections | ☑ | Weekly | ☑ |
| Translator Zero/Span Tests (climatronics) | ☑ | Semiannually | ☑ |
| Manual Rain Gauge Test | ☑ | Monthly | ☑ |
| Confirm Reasonableness of Current Values | ☑ | Weekly | ☑ |
| Test Surface Wetness Response | ☐ | Not performed | ☐ |

## Are regular operational QA/QC checks performed on the ozone analyzer?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point Calibrations | ☑ | Monthly | ☑ |
| Automatic Zero/Span Tests | ☑ | Weekly | ☑ |
| Manual Zero/Span Tests | ☑ | Weekly | ☑ |
| Automatic Precision Level Tests | ☑ | Weekly | ☑ |
| Manual Precision Level Test | ☑ | Weekly | ☑ |
| Analyzer Diagnostics Tests | ☑ | Weekly | ☑ |
| In-line Filter Replacement (at inlet) | ☑ | Monthly | ☑ |
| In-line Filter Replacement (at analyze | ☐ | N/A | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |
| Zero Air Desiccant Check | ☑ | Weekly | ☑ |

| | | | |
|---|---|---|---|
| 1 | Do multi-point calibration gases go through the complete sample train including all filters? | ☑ | |
| 2 | Do automatic and manual z/s/p gasses go through the complete sample train including all filters? | ☑ | |
| 3 | Are the automatic and manual z/s/p checks monitored and reported? If yes, how? | ☑ | Results are recorded weekly on a checklist |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The meteorological and ozone instrument checks and maintenance are performed by the State of Maine DEP.

# Field Systems Data Form

F-02058-1500-S9-rev002

**Site ID** ACA416 **Technician** Eric Hebert **Site Visit Date** 10/10/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Is the filter pack being changed every Tuesday as scheduled? | ☑ | Filter changed morinings, 90% |
| 2 | Are the Site Status Report Forms being completed and filed correctly? | ☑ | Flow and general observation sections only |
| 3 | Are data downloads and backups being performed as scheduled? | ☐ | No longer required |
| 4 | Are general observations being made and recorded? How? | ☑ | SSRF |
| 5 | Are site supplies on-hand and replenished in a timely fashion? | ☑ | |
| 6 | Are sample flow rates recorded? How? | ☑ | SSRF |
| 7 | Are samples sent to the lab on a regular schedule in a timely fashion? | ☑ | |
| 8 | Are filters protected from contamination during handling and shipping? How? | ☑ | Clean gloves on and off |
| 9 | Are the site conditions reported regularly to the field operations manager or staff? | ☐ | |

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point MFC Calibrations | ☑ | Semiannually | ☑ |
| Flow System Leak Checks | ☑ | Weekly | ☑ |
| Filter Pack Inspection | ☐ | Not performed | ☐ |
| Flow Rate Setting Checks | ☑ | Weekly | ☑ |
| Visual Check of Flow Rate Rotometer | ☑ | Weekly | ☑ |
| In-line Filter Inspection/Replacement | ☑ | As needed | ☑ |
| Sample Line Check for Dirt/Water | ☐ | Not performed | ☐ |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

This site is operated by both the NPS and the State of Maine DEP. It is not visited by ARS for semiannual calibration and maintenance visits. The site operator does not perform many of the routine checks conducted at other CASTNET sites, such as tip checks, wetness sensor tests, and visual checks of the blowers. The state of Maine personnel maintain the meteorological systems and the ozone monitor.

# Field Systems Data Form

F-02058-1500-S10-rev002

**Site ID** ACA416 **Technician** Eric Hebert **Site Visit Date** 10/10/2017

**Site Visit Sensors**

| Parameter | Manufacturer | Model | S/N | Client ID |
|---|---|---|---|---|
| DAS | Environmental Sys Corp | 8832 | unknown2 | ACADIA1 |
| Elevation | Elevation | 1 | None | None |
| F460 translator | Climatronics | 100163 | 683 | none |
| Filter pack flow pump | Thomas | 107CAB11 | 109500000040 | none |
| Flow Rate | Tylan | FC260 | AW02213003 | none |
| Infrastructure | Infrastructure | none | none | none |
| Mainframe | Climatronics | 100081 | 1288 | 01342 |
| Met tower | Climatronics | unknown | illegible | none |
| MFC power supply | Tylan | RO-32 | none | none |
| Ozone | ThermoElectron Inc | 49C | 49C-74536-376 | 90744 |
| Precipitation | Climatronics | 100508-2 | illegible | 01322 |
| Relative Humidity | Vaisala | missing | missing | none |
| Sample Tower | Aluma Tower | B | AT-71103-7I-3 | none |
| Shelter Temperature | Agilaire | Unknown | None | none |
| Shield (2 meter) | Climatronics | 100325 | illegible | none |
| Siting Criteria | Siting Criteria | 1 | None | None |
| Solar Radiation | Licor | LI-200 | PY16746 | none |
| Solar Radiation Translator | Climatronics | 100144 | 309 | none |
| Surface Wetness | RM Young | 58101 | none | none |
| Temperature Translator | Climatronics | 100088-2 | 401 | 03630 |
| Temperature2meter | Climatronics | 100093 | missing | none |
| Wind Direction | Climatronics | 100076 | illegible | none |
| Wind Speed | Climatronics | 100075 | illegible | none |
| Zero air pump | ThermoElectron Inc | 111 | 111-30215-237 | none |

# Site Inventory by Site Visit

| Site Visit | Date | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *WNC429-Martin Valvur-10/12/2017* | | | | | | |
| 1 | 10/12/2017 | Computer | Hewlett Packard | none | 6560 b | 5CB1520H5J |
| 2 | 10/12/2017 | DAS | Environmental Sys Corp | None | 8832 | A4868 |
| 3 | 10/12/2017 | Elevation | Elevation | None | 1 | None |
| 4 | 10/12/2017 | Filter pack flow pump | Thomas | none | 107CAB18 | 0688001767 |
| 5 | 10/12/2017 | flow rate | Tylan | 03379 | FC280AV | AW9403023 |
| 6 | 10/12/2017 | Infrastructure | Infrastructure | none | none | none |
| 7 | 10/12/2017 | Met tower | unknown | none | unknown | none |
| 8 | 10/12/2017 | MFC power supply | Tylan | 03684 | RO-32 | FP9404003 |
| 9 | 10/12/2017 | Ozone | ThermoElectron Inc | none | 49i A3NAA | 0615817056 |
| 10 | 10/12/2017 | Ozone Standard | ThermoElectron Inc | none | 49i PSA2AB | 0807328333 |
| 11 | 10/12/2017 | Sample Tower | Aluma Tower | none | B | none |
| 12 | 10/12/2017 | Shelter Temperature | RM Young | none | 41342 | 018819 |
| 13 | 10/12/2017 | Shield (2 meter) | RM Young | none | 43532 | none |
| 14 | 10/12/2017 | Siting Criteria | Siting Criteria | None | 1 | None |
| 15 | 10/12/2017 | Temperature2meter | RM Young | none | 41342 | 14264 |
| 16 | 10/12/2017 | Zero air pump | ThermoElectron Inc | none | 111 | 111-78387-388 |

# DAS Data Form

**DAS Time Max Error:** 3.32

| Mfg | Serial Number | Site | Technician | Site Visit Date | Parameter | Use Desc. |
|---|---|---|---|---|---|---|
| Environmental Sys | A4868 | WNC429 | Martin Valvur | 10/12/2017 | DAS | Primary |

**Das Date:** 10/12/2017
**Das Time:** 8:35:26
**Das Day:** 285

**Audit Date** 10/12/2017
**Audit Time** 8:38:45
**Audit Day** 285

**Low Channel:**

**High Channel:**

| Low Channel Avg Diff: | Low Channel Max Diff: | High Channel Avg Diff: | High Channel Max Diff: |
|---|---|---|---|
| 0.0003 | 0.0004 | 0.0003 | 0.0004 |

**Mfg** HY
**Parameter** DAS
**Serial Number** 12010039329
**Tfer Desc.** Source generator (D
**Tfer ID** 01322
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 6/15/2014
**CorrCoff** 1.00000

**Mfg** Fluke
**Parameter** DAS
**Serial Number** 95740243
**Tfer Desc.** DVM
**Tfer ID** 01312
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 1/23/2017
**CorrCoff** 1.00000

| Channel | Input | DVM Output | DAS Output | InputUnit | OutputUnit | Difference |
|---|---|---|---|---|---|---|
| 1 | 0.0000 | -0.0005 | -0.0004 | V | V | 0.0001 |
| 1 | 0.1000 | 0.0996 | 0.0994 | V | V | -0.0002 |
| 1 | 0.3000 | 0.2997 | 0.3000 | V | V | 0.0003 |
| 1 | 0.5000 | 0.4996 | 0.4993 | V | V | -0.0003 |
| 1 | 0.7000 | 0.6994 | 0.6997 | V | V | 0.0003 |
| 1 | 0.9000 | 0.8993 | 0.8996 | V | V | 0.0003 |
| 1 | 1.0000 | 0.9993 | 0.9989 | V | V | -0.0004 |

# Flow Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Tylan | AW9403023 | WNC429 | Martin Valvur | 10/12/2017 | flow rate | 03379 |

**Mfg** Tylan

**SN/Owner ID** FP9404003 03684

**Parameter** MFC power supply

**Mfg** BIOS

**Parameter** Flow Rate

**Serial Number** 148613

**Tfer Desc.** BIOS 220-H

**Tfer ID** 01421

**Slope** 1.00153

**Intercept** 0.00366

**Cert Date** 1/25/2017

**CorrCoff** 1.00000

| DAS 1: | | DAS 2: | |
|---|---|---|---|
| A Avg % Diff: | A Max % Di | A Avg %Dif | A Max % Di |
| 1.01% | 1.11% | | |

**Cal Factor Zero** 0.392

**Cal Factor Full Scale** 5.866

**Rotometer Reading:** 3.3

| Desc. | Test type | Input l/m | Input Corr_ | MfcDisp. | OutputSignal | Output S E | InputUnit | OutputSignalI | PctDifference |
|---|---|---|---|---|---|---|---|---|---|
| primary | pump off | 0.000 | 0.000 | -0.38 | 0.0000 | 0.05 | l/m | l/m | |
| primary | leak check | 0.000 | 0.000 | -0.38 | 0.0000 | 0.05 | l/m | l/m | |
| primary | test pt 1 | 2.980 | 2.970 | 2.63 | 0.0000 | 3.00 | l/m | l/m | 1.11% |
| primary | test pt 2 | 2.980 | 2.970 | 2.64 | 0.0000 | 3.00 | l/m | l/m | 1.11% |
| primary | test pt 3 | 2.990 | 2.980 | 2.60 | 0.0000 | 3.00 | l/m | l/m | 0.81% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Leak Test | **Condition** | | **Status** | pass |
| **Sensor Component** | Tubing Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Filter Position | **Condition** | Poor | **Status** | Fail |
| **Sensor Component** | Rotometer Condition | **Condition** | Clean and dry | **Status** | pass |
| **Sensor Component** | Moisture Present | **Condition** | No moisture present | **Status** | pass |
| **Sensor Component** | Filter Distance | **Condition** | 6.5 cm | **Status** | pass |
| **Sensor Component** | Filter Depth | **Condition** | -1.5 cm | **Status** | Fail |
| **Sensor Component** | Filter Azimuth | **Condition** | 90 deg | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 0615817056 | WNC429 | Martin Valvur | 10/12/2017 | Ozone | none |

| | | | |
|---|---|---|---|
| **Slope:** | 0.96148 | **Slope:** | 0.00000 |
| **Intercept** | -0.00563 | **Intercept** | 0.00000 |
| **CorrCoff** | 1.00000 | **CorrCoff** | 0.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 3.7% | 3.9% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 49CPS-70008-364 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01110 | | |
| **Slope** | 1.00801 | **Intercept** | -0.05199 |
| **Cert Date** | 9/11/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.07 | 0.12 | -0.01 | ppb | |
| primary | 2 | 16.48 | 16.40 | 15.87 | ppb | -3.23% |
| primary | 3 | 34.48 | 34.25 | 32.96 | ppb | -3.77% |
| primary | 4 | 67.32 | 66.83 | 64.26 | ppb | -3.85% |
| primary | 5 | 112.28 | 111.43 | 107.10 | ppb | -3.89% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.000 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.408 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | -0.0004 | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | 10.0018 | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 95.2 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.4 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.62 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 620.9 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 32.4 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 95.4 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 1.33 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 620.9 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# 2 Meter Temperature Data Form

Calc. Difference

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 14264 | WNC429 | Martin Valvur | 10/12/2017 | Temperature2meter | none |

| | | | |
|---|---|---|---|
| **Mfg** | Fluke | **Parameter** | Temperature |
| **Serial Number** | 3275143 | **Tfer Desc.** | RTD |
| **Tfer ID** | 01229 | | |
| **Slope** | 1.00006 | **Intercept** | 0.03191 |
| **Cert Date** | 1/23/2017 | **CorrCoff** | 1.00000 |

| DAS 1: | | DAS 2: | |
|---|---|---|---|
| **Abs Avg Err** | **Abs Max Er** | **Abs Avg Err** | **Abs Max Er** |
| 0.15 | 0.31 | | |

| UseDescription | Test type | InputTmpRaw | InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Low Rang | 0.27 | 0.24 | 0.0000 | 0.12 | C | -0.12 |
| primary | Temp Mid Rang | 24.46 | 24.43 | 0.0000 | 24.41 | C | -0.02 |
| primary | Temp High Rang | 47.67 | 47.64 | 0.0000 | 47.33 | C | -0.31 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Properly Sited | **Condition** | Properly sited | **Status** | pass |
| **Sensor Component** | Shield | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Shelter Temperature Data For

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 018819 | WNC429 | Martin Valvur | 10/12/2017 | Shelter Temperature | none |

**DAS 1:**

| Abs Avg Err | Abs Max Er |
|---|---|
| 0.95 | 1.74 |

**DAS 2:**

| Abs Avg Err | Abs Max Er |
|---|---|
| | |

**Mfg** Fluke

**Parameter** Shelter Temperatur

**Serial Number** 3275143

**Tfer Desc.** RTD

**Tfer ID** 01229

**Slope** 1.00006

**Intercept** 0.03191

**Cert Date** 1/23/2017

**CorrCoff** 1.00000

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Mid Range | 21.48 | 21.45 | 0.000 | 22.1 | C | 0.66 |
| primary | Temp Mid Range | 21.42 | 21.39 | 0.000 | 21.8 | C | 0.45 |
| primary | Temp Mid Range | 21.45 | 21.42 | 0.000 | 19.7 | C | -1.74 |

**Sensor Component** System Memo

**Condition**

**Status** pass

## Infrastructure Data For

**Site ID** WNC429 **Technician** Martin Valvur **Site Visit Date** 10/12/2017

| Shelter Make | Shelter Model | Shelter Size |
|---|---|---|
| Ekto | 8810 (s/n 3034-1) | 640 cuft |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Tower Type | **Condition** | Type B | **Status** | pass |
| **Sensor Component** | Conduit | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Met Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Moisture Trap | **Condition** | Not installed | **Status** | pass |
| **Sensor Component** | Power Cables | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Temp Control | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Rotometer | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Sample Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Door | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Roof | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Floor | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Signal Cable | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Tubing Type | **Condition** | 3/8 teflon | **Status** | pass |
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |

# Site Visit Comments

| Parameter | Site | Technician | S.V. Date | Component | Mfg | Serial No. | Hazard | Problem |
|---|---|---|---|---|---|---|---|---|
| Flow Rate | WNC429 | Martin Valvur | 10/12/2017 | Filter Position | Tylan | 1345 | ☐ | ☑ |

The filter attachment plate is mounted too low in the enclosure resulting in the filter being exposed to wind-driven rain and in the standard geometric orientation.

# Field Systems Comments

**1** **Parameter:** SiteOpsProcComm

The general observations section of the SSRF is still not completed. Gloves are not used when handling the filter pack.

**2** **Parameter:** SiteOpsProcedures

The ozone analyzer is operated by the state of South Dakota. There is no means for introducing routine test gas at the sample inlet and all routine checks are performed at the back of the analyzer. Audit test gas was introduced through the sample inlet flooding the glass manifold.

**3** **Parameter:** DocumentationCo

Records of the routine checks performed by the state personnel are kept onsite in a logbook.

**4** **Parameter:** ShelterCleanNotes

One shelter houses the gas analyzers and is in good condition and clean. The analyzer sample train is a glass manifold with an exhaust fan. The second shelter houses the flow system, met translator, and IMPROVE. It is older and not climate controlled.

**5** **Parameter:** PollAnalyzerCom

The dry deposition filter is mounted low in the enclosure which changes the particle collection characteristics, and can allow precipitation to enter. The ozone sample train is a 3 meter glass manifold with a 1/4 inch Teflon tubing connection to the analyzer.

**6** **Parameter:** MetOpMaintCom

The temperature sensor signal cable insulation is cracked and showing signs of extreme wear.

# Field Systems Data Form

**F-02058-1500-S1-rev002**

**Site ID** WNC429 **Technician** Martin Valvur **Site Visit Date** 10/12/2017

| | | | |
|---|---|---|---|
| **Site Sponsor (agency)** | NPS | **USGS Map** | Wind Cave |
| **Operating Group** | NPS and state of SD | **Map Scale** | |
| **AQS #** | 46-033-0132 | **Map Date** | |
| **Meteorological Type** | R.M. Young | | |
| **Air Pollutant Analyzer** | Ozone, NOx, PM2.5, PM10, IMPROVE | **QAPP Latitude** | 43.5578 |
| **Deposition Measurement** | dry, wet | **QAPP Longitude** | -103.4839 |
| **Land Use** | prairie - woodland - evergreen | **QAPP Elevation Meters** | 1292 |
| **Terrain** | rolling | **QAPP Declination** | |
| **Conforms to MLM** | Marginally | **QAPP Declination Date** | |
| **Site Telephone** | | **Audit Latitude** | 43.557639 |
| **Site Address 1** | Visitor Center | **Audit Longitude** | -103.483856 |
| **Site Address 2** | Route 385 Wind Cave National Park | **Audit Elevation** | 1288 |
| **County** | Custer | **Audit Declination** | 8.1 |

| | | | **Present** | |
|---|---|---|---|---|
| **City, State** | Hot Springs, SD | | | |
| **Zip Code** | 57747 | **Fire Extinguisher** | ☐ | |
| **Time Zone** | Mountain | **First Aid Kit** | ☐ | |
| **Primary Operator** | | **Safety Glasses** | ☐ | |
| **Primary Op. Phone #** | | **Safety Hard Hat** | ☐ | |
| **Primary Op. E-mail** | | **Climbing Belt** | ☐ | |
| **Backup Operator** | | **Security Fence** | ☐ | |
| **Backup Op. Phone #** | | **Secure Shelter** | ☑ | |
| **Backup Op. E-mail** | | **Stable Entry Step** | ☑ | |

**Shelter Working Room** ☑ **Make** Ekto **Model** 8810 (s/n 3034-1) **Shelter Size** 640 cuft

**Shelter Clean** ☑ **Notes** One shelter houses the gas analyzers and is in good condition and clean. The analyzer sample train is a glass manifold with an exhaust fan. The second shelter houses the flow system, met translator, and IMPROVE. It is older and not climate controlled.

**Site OK** ☑ **Notes**

**Driving Directions** From Hot Springs proceed north on 385 into Wind Cave National Park. Turn left onto the visitor center loop road. The site operator's office is in the visitors center. The site is up the gravel access road to the park water supply on the opposite side of the parking lot from the visitor center.

# Field Systems Data Form

F-02058-1500-S2-rev002

**Site ID** WNC429 **Technician** Martin Valvur **Site Visit Date** 10/12/2017

| Potential Interferent | Minimum Distance From Measurement Apparatus | Distance | Pass = Checked |
|---|---|---|---|
| Large Point Source of SO2 or NOx | 20 to 40 km | | ☑ |
| Major industrial complex | 10 to 20 km | | ☑ |
| City > 50,000 population | 40 km | | ☑ |
| City 10,000 to 50,000 population | 10 km | | ☑ |
| City 1,000 to 10,000 population | 5 km | | ☑ |
| Major highway, airport or rail yard | 2 km | | ☑ |
| Secondary road, heavily traveled | 500 m | | ☑ |
| Secondary road, lightly traveled | 200 m | | ☑ |
| Feedlot operations | 500 m | | ☑ |
| Intensive agricultural ops (including aerial spraying) | 500 m | | ☑ |
| Limited agricultural operations | 200 m | | ☑ |
| Large parking lot | 200 m | | ☑ |
| Small parking lot | 100 m | | ☑ |
| Tree line | 50 m | | ☑ |
| Obstacles to wind | 10 times obstacle height | | ☑ |

**Siting Distances OK** ☑

**Siting Criteria Comment**

# Field Systems Data Form

F-02058-1500-S3-rev002

**Site ID** WNC429

**Technician** Martin Valvur

**Site Visit Date** 10/12/2017

| | | | |
|---|---|---|---|
| 1 | Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? | ☑ | N/A |
| 2 | Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) | ☑ | N/A |
| 3 | Are the tower and sensors plumb? | ☑ | N/A |
| 4 | Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? | ☑ | |
| 5 | Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) | ☑ | |
| 6 | Is the solar radiation sensor plumb? | ☑ | N/A |
| 7 | Is it sited to avoid shading, or any artificial or reflected light? | ☑ | N/A |
| 8 | Is the rain gauge plumb? | ☑ | N/A |
| 9 | Is it sited to avoid sheltering effects from buildings, trees, towers, etc? | ☑ | N/A |
| 10 | Is the surface wetness sensor sited with the grid surface facing north? | ☑ | N/A |
| 11 | Is it inclined approximately 30 degrees? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S4-rev002

**Site ID** WNC429 **Technician** Martin Valvur **Site Visit Date** 10/12/2017

| | | | |
|---|---|---|---|
| 1 | Do all the meterological sensors appear to be intact, in good condition, and well maintained? | ☑ | |
| 2 | Are all the meteorological sensors operational online, and reporting data? | ☑ | |
| 3 | Are the shields for the temperature and RH sensors clean? | ☑ | |
| 4 | Are the aspirated motors working? | ☑ | |
| 5 | Is the solar radiation sensor's lens clean and free of scratches? | ☑ | N/A |
| 6 | Is the surface wetness sensor grid clean and undamaged? | ☑ | N/A |
| 7 | Are the sensor signal and power cables intact, in good condition, and well maintained? | ☑ | Signs of wear |
| 8 | Are the sensor signal and power cable connections protected from the elements and well maintained? | ☑ | |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The temperature sensor signal cable insulation is cracked and showing signs of extreme wear.

# Field Systems Data Form

F-02058-1500-S5-rev002

**Site ID** WNC429 **Technician** Martin Valvur **Site Visit Date** 10/12/2017

## Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E

| | | | |
|---|---|---|---|
| 1 | **Do the sample inlets have at least a 270 degree arc of unrestricted airflow?** | ☑ | |
| 2 | **Are the sample inlets 3 - 15 meters above the ground?** | ☑ | 3 meter glass |
| 3 | **Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees?** | ☑ | |

## Pollutant analyzers and deposition equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | **Do the analyzers and equipment appear to be in good condition and well maintained?** | ☑ | |
| 2 | **Are the analyzers and monitors operational, on-line, and reporting data?** | ☑ | |
| 3 | **Describe ozone sample tube.** | | 3 meter glass manifold and 1/4 inch teflon with tee fittings |
| 4 | **Describe dry dep sample tube.** | | 3/8 teflon by 12 meters |
| 5 | **Are in-line filters used in the ozone sample line? (if yes indicate location)** | ☑ | At analyzer only |
| 6 | **Are sample lines clean, free of kinks, moisture, and obstructions?** | ☑ | |
| 7 | **Is the zero air supply desiccant unsaturated?** | ☑ | |
| 8 | **Are there moisture traps in the sample lines?** | ☐ | |
| 9 | **Is there a rotometer in the dry deposition filter line, and is it clean?** | ☑ | Clean and dry |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The dry deposition filter is mounted low in the enclosure which changes the particle collection characteristics, and can allow precipitation to enter. The ozone sample train is a 3 meter glass manifold with a 1/4 inch Teflon tubing connection to the analyzer.

# Field Systems Data Form

F-02058-1500-S6-rev002

**Site ID** WNC429 **Technician** Martin Valvur **Site Visit Date** 10/12/2017

## DAS, sensor translators, and peripheral equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the DAS instruments appear to be in good condition and well maintained? | ☑ | |
| 2 | Are all the components of the DAS operational? (printers, modem, backup, etc) | ☑ | |
| 3 | Do the analyzer and sensor signal leads pass through lightning protection circuitry? | ☑ | Met sensors only |
| 4 | Are the signal connections protected from the weather and well maintained? | ☑ | Signs of wear |
| 5 | Are the signal leads connected to the correct DAS channel? | ☑ | |
| 6 | Are the DAS, sensor translators, and shelter properly grounded? | ☑ | |
| 7 | Does the instrument shelter have a stable power source? | ☑ | |
| 8 | Is the instrument shelter temperature controlled? | ☑ | Both on |

| | | Stable | Grounded |
|---|---|---|---|
| 9 | Is the met tower stable and grounded? | ☑ | ☑ |
| 10 | Is the sample tower stable and grounded? | ☑ | ☑ |

11 Tower comments?

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

# Field Systems Data Form

F-02058-1500-S7-rev002

**Site ID** WNC429 **Technician** Martin Valvur **Site Visit Date** 10/12/2017

## Documentation

### Does the site have the required instrument and equipment manuals?

| | Yes | No | N/A | | Yes | No | N/A |
|---|---|---|---|---|---|---|---|
| Wind speed sensor | ☐ | ☐ | ☑ | Data logger | ☐ | ☑ | ☐ |
| Wind direction sensor | ☐ | ☐ | ☑ | Data logger | ☐ | ☐ | ☑ |
| Temperature sensor | ☑ | ☐ | ☐ | Strip chart recorder | ☐ | ☐ | ☑ |
| Relative humidity sensor | ☐ | ☐ | ☑ | Computer | ☐ | ☑ | ☐ |
| Solar radiation sensor | ☐ | ☐ | ☑ | Modem | ☐ | ☑ | ☐ |
| Surface wetness sensor | ☐ | ☐ | ☑ | Printer | ☐ | ☑ | ☐ |
| Wind sensor translator | ☐ | ☐ | ☑ | Zero air pump | ☐ | ☑ | ☐ |
| Temperature translator | ☐ | ☐ | ☑ | Filter flow pump | ☐ | ☑ | ☐ |
| Humidity sensor translator | ☐ | ☐ | ☑ | Surge protector | ☐ | ☐ | ☑ |
| Solar radiation translator | ☐ | ☐ | ☑ | UPS | ☐ | ☐ | ☑ |
| Tipping bucket rain gauge | ☐ | ☐ | ☑ | Lightning protection device | ☐ | ☐ | ☑ |
| Ozone analyzer | ☑ | ☐ | ☐ | Shelter heater | ☐ | ☑ | ☐ |
| Filter pack flow controller | ☐ | ☑ | ☐ | Shelter air conditioner | ☑ | ☐ | ☐ |
| Filter pack MFC power supply | ☐ | ☑ | ☐ | | | | |

### Does the site have the required and most recent QC documents and report forms?

| | Present | | Current |
|---|---|---|---|
| Station Log | ☑ | Dataview | ☑ |
| SSRF | ☑ | | ☑ |
| Site Ops Manual | ☑ | Jan 2006 | ☑ |
| HASP | ☐ | | ☐ |
| Field Ops Manual | ☐ | | ☐ |
| Calibration Reports | ☑ | | ☐ |
| Ozone z/s/p Control Charts | ☐ | | ☐ |
| Preventive maintenance schedul | ☐ | | ☐ |

| | | | |
|---|---|---|---|
| 1 | Is the station log properly completed during every site visit? | ☑ | Dataview |
| 2 | Are the Site Status Report Forms being completed and current? | ☑ | |
| 3 | Are the chain-of-custody forms properly used to document sample transfer to and from lab? | ☑ | |
| 4 | Are ozone z/s/p control charts properly completed and current? | ☐ | Control charts not used |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

Records of the routine checks performed by the state personnel are kept onsite in a logbook.

# Field Systems Data Form

**F-02058-1500-S8-rev002**

**Site ID** WNC429

**Technician** Martin Valvur

**Site Visit Date** 10/12/2017

**Site operation procedures**

| | | | |
|---|---|---|---|
| 1 | Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? | ☑ | Trained during site installation |
| 2 | Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ | Trained by site operator |
| 3 | Is the site visited regularly on the required Tuesday schedule? | ☑ | |
| 4 | Are the standard CASTNET operational procedures being flollowed by the site operator? | ☑ | |
| 5 | Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation) | ☑ | |

**Are regular operational QA/QC checks performed on meteorological instruments?**

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multipoint Calibrations | ☑ | N/A | ☑ |
| Visual Inspections | ☑ | N/A | ☑ |
| Translator Zero/Span Tests (climatronics) | ☐ | N/A | ☑ |
| Manual Rain Gauge Test | ☑ | N/A | ☑ |
| Confirm Reasonableness of Current Values | ☑ | N/A | ☑ |
| Test Surface Wetness Response | ☑ | N/A | ☑ |

**Are regular operational QA/QC checks performed on the ozone analyzer?**

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point Calibrations | ☑ | Quarterly | ☑ |
| Automatic Zero/Span Tests | ☐ | | ☐ |
| Manual Zero/Span Tests | ☑ | Every 2 weeks | ☐ |
| Automatic Precision Level Tests | ☐ | | ☐ |
| Manual Precision Level Test | ☑ | Every 2 weeks | ☐ |
| Analyzer Diagnostics Tests | ☐ | | ☐ |
| In-line Filter Replacement (at inlet) | ☐ | | ☐ |
| In-line Filter Replacement (at analyze | ☐ | | ☐ |
| Sample Line Check for Dirt/Water | ☐ | | ☐ |
| Zero Air Desiccant Check | ☐ | | ☐ |

| | | | |
|---|---|---|---|
| 1 | Do multi-point calibration gases go through the complete sample train including all filters? | ☐ | |
| 2 | Do automatic and manual z/s/p gasses go through the complete sample train including all filters? | ☐ | |
| 3 | Are the automatic and manual z/s/p checks monitored and reported? If yes, how? | ☑ | Logbook |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The ozone analyzer is operated by the state of South Dakota. There is no means for introducing routine test gas at the sample inlet and all routine checks are performed at the back of the analyzer. Audit test gas was introduced through the sample inlet flooding the glass manifold.

# Field Systems Data Form

F-02058-1500-S9-rev002

**Site ID** WNC429 **Technician** Martin Valvur **Site Visit Date** 10/12/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Is the filter pack being changed every Tuesday as scheduled? | ☑ | Filter changed morinings |
| 2 | Are the Site Status Report Forms being completed and filed correctly? | ☐ | |
| 3 | Are data downloads and backups being performed as scheduled? | ☐ | no longer required |
| 4 | Are general observations being made and recorded? How? | ☐ | |
| 5 | Are site supplies on-hand and replenished in a timely fashion? | ☑ | |
| 6 | Are sample flow rates recorded? How? | ☑ | SSRF |
| 7 | Are samples sent to the lab on a regular schedule in a timely fashion? | ☑ | |
| 8 | Are filters protected from contamination during handling and shipping? How? | ☐ | Gloves not used |
| 9 | Are the site conditions reported regularly to the field operations manager or staff? | ☐ | |

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point MFC Calibrations | ☑ | Semiannually | ☑ |
| Flow System Leak Checks | ☑ | Weekly | ☑ |
| Filter Pack Inspection | ☐ | | ☐ |
| Flow Rate Setting Checks | ☑ | Weekly | ☑ |
| Visual Check of Flow Rate Rotometer | ☑ | Weekly | ☑ |
| In-line Filter Inspection/Replacement | ☑ | As needed | ☑ |
| Sample Line Check for Dirt/Water | ☐ | | ☐ |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The general observations section of the SSRF is still not completed.  Gloves are not used when handling the filter pack.

# Field Systems Data Form

F-02058-1500-S10-rev002

**Site ID** WNC429 **Technician** Martin Valvur **Site Visit Date** 10/12/2017

**Site Visit Sensors**

| Parameter | Manufacturer | Model | S/N | Client ID |
|---|---|---|---|---|
| Computer | Hewlett Packard | 6560 b | 5CB1520H5J | none |
| DAS | Environmental Sys Corp | 8832 | A4868 | None |
| Elevation | Elevation | 1 | None | None |
| Filter pack flow pump | Thomas | 107CAB18 | 0688001767 | none |
| flow rate | Tylan | FC280AV | AW9403023 | 03379 |
| Infrastructure | Infrastructure | none | none | none |
| Met tower | unknown | unknown | none | none |
| MFC power supply | Tylan | RO-32 | FP9404003 | 03684 |
| Ozone | ThermoElectron Inc | 49i A3NAA | 0615817056 | none |
| Ozone Standard | ThermoElectron Inc | 49i PSA2AB | 0807328333 | none |
| Sample Tower | Aluma Tower | B | none | none |
| Shelter Temperature | RM Young | 41342 | 018819 | none |
| Shield (2 meter) | RM Young | 43532 | none | none |
| Siting Criteria | Siting Criteria | 1 | None | None |
| Temperature2meter | RM Young | 41342 | 14264 | none |
| Zero air pump | ThermoElectron Inc | 111 | 111-78387-388 | none |

# *Site Inventory by Site Visit*

| | Site Visit Date | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *PRK134-Sandy Grenville-10/22/2017* | | | | | | |
| 1 | 10/22/2017 | Computer | Dell | 07021 | Inspiron 15 | 2884848822 |
| 2 | 10/22/2017 | DAS | Campbell | 000411 | CR3000 | 2509 |
| 3 | 10/22/2017 | Elevation | Elevation | None | 1 | None |
| 4 | 10/22/2017 | Filter pack flow pump | Thomas | 03633 | 107CAB18 | 049400004507 |
| 5 | 10/22/2017 | Flow Rate | Apex | 000656 | AXMC105LPMDPCV | illegible |
| 6 | 10/22/2017 | Infrastructure | Infrastructure | none | none | none |
| 7 | 10/22/2017 | Modem | Raven | 06460 | H4223-C | 0808334384 |
| 8 | 10/22/2017 | Ozone | ThermoElectron Inc | 000690 | 49i A1NAA | 1030244800 |
| 9 | 10/22/2017 | Ozone Standard | ThermoElectron Inc | 000369 | 49i A3NAA | 0726124890 |
| 10 | 10/22/2017 | Sample Tower | Aluma Tower | 000930 | B | AT214072-Z-7-2 |
| 11 | 10/22/2017 | Shelter Temperature | Campbell | none | 107-L | unknown |
| 12 | 10/22/2017 | Siting Criteria | Siting Criteria | None | 1 | None |
| 13 | 10/22/2017 | Temperature | RM Young | 06306 | 41342VC | 12545 |
| 14 | 10/22/2017 | Zero air pump | Werther International | 06905 | C 70/4 | 000821907 |

# DAS Data Form

**DAS Time Max Error:** 0

| Mfg | Serial Number | Site | Technician | Site Visit Date | Parameter | Use Desc. |
|---|---|---|---|---|---|---|
| Campbell | 2509 | PRK134 | Sandy Grenville | 10/22/2017 | DAS | Primary |

**Das Date:** 10/22/2017 **Audit Date** 10/22/2017

**Das Time:** 12:17:01 **Audit Time** 12:17:01

**Das Day:** 295 **Audit Day** 295

| Low Channel: | | High Channel: | |
|---|---|---|---|
| Avg Diff: | Max Diff: | Avg Diff: | Max Diff: |
| 0.0000 | 0.0000 | 0.0000 | 0.0000 |

**Mfg** Datel **Parameter** DAS

**Serial Number** 15510194 **Tfer Desc.** Source generator (D

**Tfer ID** 01320

**Slope** 1.00000 **Intercept** 0.00000

**Cert Date** 2/13/2012 **CorrCoff** 1.00000

**Mfg** Fluke **Parameter** DAS

**Serial Number** 95740135 **Tfer Desc.** DVM

**Tfer ID** 01311

**Slope** 1.00000 **Intercept** 0.00000

**Cert Date** 1/23/2017 **CorrCoff** 1.00000

| Channel | Input | DVM Output | DAS Output | InputUnit | OutputUnit | Difference |
|---|---|---|---|---|---|---|
| 7 | 0.0000 | 0.0000 | 0.0000 | V | V | 0.0000 |
| 7 | 0.1000 | 0.0999 | 0.0999 | V | V | 0.0000 |
| 7 | 0.3000 | 0.2997 | 0.2997 | V | V | 0.0000 |
| 7 | 0.5000 | 0.4996 | 0.4996 | V | V | 0.0000 |
| 7 | 0.7000 | 0.6995 | 0.6995 | V | V | 0.0000 |
| 7 | 0.9000 | 0.8993 | 0.8993 | V | V | 0.0000 |
| 7 | 1.0000 | 0.9992 | 0.9992 | V | V | 0.0000 |

# Flow Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Apex | illegible | PRK134 | Sandy Grenville | 10/22/2017 | Flow Rate | 000656 |

| | | | |
|---|---|---|---|
| **Mfg** | BIOS | **Parameter** | Flow Rate |
| **Serial Number** | 103471 | **Tfer Desc.** | nexus |
| **Tfer ID** | 01420 | | |
| **Slope** | 0.99825 | **Intercept** | 0.00497 |
| **Cert Date** | 2/7/2017 | **CorrCoff** | 0.99991 |
| **Mfg** | BIOS | **Parameter** | Flow Rate |
| **Serial Number** | 103424 | **Tfer Desc.** | BIOS cell |
| **Tfer ID** | 01410 | | |
| **Slope** | 0.99825 | **Intercept** | 0.00497 |
| **Cert Date** | 2/7/2017 | **CorrCoff** | 0.99991 |

**DAS 1:**

| A Avg % Diff: | A Max % Di |
|---|---|
| 1.32% | 1.32% |

**DAS 2:**

| A Avg %Dif | A Max % Di |
|---|---|
| | |

| | |
|---|---|
| **Cal Factor Zero** | 0 |
| **Cal Factor Full Scale** | 0.96 |
| **Rotometer Reading:** | 1.55 |

| Desc. | Test type | Input l/m | Input Corr_ | MfcDisp. | OutputSignal | Output S E | InputUnit | OutputSignalI | PctDifference |
|---|---|---|---|---|---|---|---|---|---|
| primary | pump off | 0.000 | 0.000 | 0.00 | 0.000 | 0.00 | l/m | l/m | |
| primary | leak check | 0.000 | 0.000 | 0.00 | 0.000 | 0.01 | l/m | l/m | |
| primary | test pt 1 | 1.526 | 1.520 | 1.55 | 0.000 | 1.50 | l/m | l/m | -1.32% |
| primary | test pt 2 | 1.525 | 1.520 | 1.55 | 0.000 | 1.50 | l/m | l/m | -1.32% |
| primary | test pt 3 | 1.527 | 1.520 | 1.55 | 0.000 | 1.50 | l/m | l/m | -1.32% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Leak Test | **Condition** | | **Status** | pass |
| **Sensor Component** | Tubing Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Filter Position | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Rotometer Condition | **Condition** | Clean and dry | **Status** | pass |
| **Sensor Component** | Moisture Present | **Condition** | No moisture present | **Status** | pass |
| **Sensor Component** | Filter Distance | **Condition** | 4.0 cm | **Status** | pass |
| **Sensor Component** | Filter Depth | **Condition** | 0.5 cm | **Status** | pass |
| **Sensor Component** | Filter Azimuth | **Condition** | 85 deg | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1030244800 | PRK134 | Sandy Grenville | 10/22/2017 | Ozone | 000690 |

| | | | |
|---|---|---|---|
| **Slope:** | 0.98190 | **Slope:** | 0.00000 |
| **Intercept** | 0.28944 | **Intercept** | 0.00000 |
| **CorrCoff** | 1.00000 | **CorrCoff** | 0.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 1.1% | 1.7% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 517112175 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01111 | | |
| **Slope** | 1.00250 | **Intercept** | 0.45870 |
| **Cert Date** | 3/21/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.45 | 0.00 | 0.31 | ppb | |
| primary | 2 | 15.01 | 14.51 | 14.44 | ppb | -0.48% |
| primary | 3 | 35.01 | 34.46 | 34.10 | ppb | -1.04% |
| primary | 4 | 68.02 | 67.39 | 66.67 | ppb | -1.07% |
| primary | 5 | 110.14 | 109.40 | 107.60 | ppb | -1.65% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | -0.40 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.020 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 123.5 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.65 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 700.6 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 35.6 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 99.9 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.3 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.75 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 701.5 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Temperature Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 12545 | PRK134 | Sandy Grenville | 10/22/2017 | Temperature | 06306 |

**Mfg** Extech
**Parameter** Temperature
**Serial Number** H232734
**Tfer Desc.** RTD
**Tfer ID** 01227
**Slope** 1.00759
**Intercept** 0.14754
**Cert Date** 2/4/2017
**CorrCoff** 1.00000

| DAS 1: Abs Avg Err | DAS 1: Abs Max Er | DAS 2: Abs Avg Err | DAS 2: Abs Max Er |
|---|---|---|---|
| 0.13 | 0.26 | | |

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Low Range | 0.16 | 0.01 | 0.000 | 0.1 | C | 0.05 |
| primary | Temp Mid Range | 25.83 | 25.49 | 0.000 | 25.2 | C | -0.26 |
| primary | Temp High Range | 49.00 | 48.48 | 0.000 | 48.4 | C | -0.08 |

| Sensor Component | | Condition | | Status | |
|---|---|---|---|---|---|
| **Sensor Component** | Shield | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Shelter Temperature Data For

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Campbell | unknown | PRK134 | Sandy Grenville | 10/22/2017 | Shelter Temperature | none |

**DAS 1:**

| Abs Avg Err | Abs Max Er |
|---|---|
| 0.19 | 0.31 |

**DAS 2:**

| Abs Avg Err | Abs Max Er |
|---|---|
|  |  |

**Mfg** Extech

**Parameter** Shelter Temperatur

**Serial Number** H232734

**Tfer Desc.** RTD

**Tfer ID** 01227

**Slope** 1.00759

**Intercept** 0.14754

**Cert Date** 2/4/2017

**CorrCoff** 1.00000

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Mid Range | 24.08 | 23.75 | 0.000 | 23.4 | C | -0.31 |
| primary | Temp Mid Range | 18.28 | 18.00 | 0.000 | 18.2 | C | 0.24 |
| primary | Temp Mid Range | 23.15 | 22.83 | 0.000 | 22.8 | C | 0.01 |

**Sensor Component** System Memo

**Condition**

**Status** pass

## Infrastructure Data For

**Site ID** PRK134 **Technician** Sandy Grenville **Site Visit Date** 10/22/2017

| Shelter Make | Shelter Model | Shelter Size |
|---|---|---|
| Ekto | 8810 (s/n 2116-11) | 640 cuft |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Tower Type | **Condition** | Type B | **Status** | pass |
| **Sensor Component** | Conduit | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Met Tower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Moisture Trap | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Power Cables | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Temp Control | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Rotometer | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Sample Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Door | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Roof | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Floor | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Signal Cable | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Tubing Type | **Condition** | 3/8 teflon | **Status** | pass |
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |

# Field Systems Comments

1 **Parameter:** DasComments

The sample tower and guy wires have been replaced.

2 **Parameter:** SitingCriteriaCom

Clover and Barley have been planted for hay within 20m of the site starting in 2008.

3 **Parameter:** ShelterCleanNotes

The shelter is clean, neat, and well organized.

# Field Systems Data Form F-02058-1500-S1-rev002

**Site ID** PRK134 **Technician** Sandy Grenville **Site Visit Date** 10/22/2017

| | | | | |
|---|---|---|---|---|
| **Site Sponsor (agency)** | EPA | **USGS Map** | | Perkinstown |
| **Operating Group** | Private | **Map Scale** | | |
| **AQS #** | 55-119-9991 | **Map Date** | | |
| **Meteorological Type** | R.M. Young | | | |
| **Air Pollutant Analyzer** | Ozone, PM2.5 | **QAPP Latitude** | | 45.2066 |
| **Deposition Measurement** | dry, wet | **QAPP Longitude** | | -90.5972 |
| **Land Use** | woodland - mixed | **QAPP Elevation Meters** | | 472 |
| **Terrain** | gently rolling | **QAPP Declination** | | 1.6 |
| **Conforms to MLM** | Yes | **QAPP Declination Date** | | 2/22/2006 |
| **Site Telephone** | | **Audit Latitude** | | 45.206525 |
| **Site Address 1** | W 10776 CTH M | **Audit Longitude** | | -90.597209 |
| **Site Address 2** | | **Audit Elevation** | | 462 |
| **County** | Taylor | **Audit Declination** | | -1.3 |
| **City, State** | Medford, WI | | **Present** | |
| **Zip Code** | 54451 | **Fire Extinguisher** | ☑ | new in 2015 |
| **Time Zone** | Central | **First Aid Kit** | ☑ | |
| **Primary Operator** | | **Safety Glasses** | ☐ | |
| **Primary Op. Phone #** | | **Safety Hard Hat** | ☑ | |
| **Primary Op. E-mail** | | **Climbing Belt** | ☑ | |
| **Backup Operator** | | **Security Fence** | ☐ | |
| **Backup Op. Phone #** | | **Secure Shelter** | ☑ | |
| **Backup Op. E-mail** | | **Stable Entry Step** | ☑ | |

**Shelter Working Room** ☑ **Make** Ekto **Model** 8810 (s/n 2116-11) **Shelter Size** 640 cuft

**Shelter Clean** ☑ **Notes** The shelter is clean, neat, and well organized.

**Site OK** ☑ **Notes**

**Driving Directions** From Medford continue north on 13 approximately 4.5 miles and turn left (west) onto county route M. Continue approximately 13 miles. Before reaching Perkinstown, and just after crossing a small creek and two sharp curves, the site will be visible behind the landowners house on the right.

# Field Systems Data Form

F-02058-1500-S2-rev002

**Site ID** PRK134 **Technician** Sandy Grenville **Site Visit Date** 10/22/2017

| Potential Interferent | Minimum Distance From Measurement Apparatus | Distance | Pass = Checked |
|---|---|---|---|
| Large Point Source of SO2 or NOx | 20 to 40 km | | ☑ |
| Major industrial complex | 10 to 20 km | | ☑ |
| City > 50,000 population | 40 km | | ☑ |
| City 10,000 to 50,000 population | 10 km | | ☑ |
| City 1,000 to 10,000 population | 5 km | | ☑ |
| Major highway, airport or rail yard | 2 km | | ☑ |
| Secondary road, heavily traveled | 500 m | | ☑ |
| Secondary road, lightly traveled | 200 m | | ☑ |
| Feedlot operations | 500 m | | ☑ |
| Intensive agricultural ops (including aerial spraying) | 500 m | | ☑ |
| Limited agricultural operations | 200 m | 20 m | ☐ |
| Large parking lot | 200 m | | ☑ |
| Small parking lot | 100 m | | ☑ |
| Tree line | 50 m | | ☑ |
| Obstacles to wind | 10 times obstacle height | | ☑ |

**Siting Distances OK** ☑

**Siting Criteria Comment**

Clover and Barley have been planted for hay within 20m of the site starting in 2008.

# Field Systems Data Form

F-02058-1500-S3-rev002

**Site ID** PRK134 **Technician** Sandy Grenville **Site Visit Date** 10/22/2017

| | | | |
|---|---|---|---|
| 1 | Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? | ☑ | N/A |
| 2 | Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) | ☑ | N/A |
| 3 | Are the tower and sensors plumb? | ☑ | N/A |
| 4 | Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? | ☑ | Mounted to sample tower |
| 5 | Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) | ☑ | |
| 6 | Is the solar radiation sensor plumb? | ☑ | N/A |
| 7 | Is it sited to avoid shading, or any artificial or reflected light? | ☑ | N/A |
| 8 | Is the rain gauge plumb? | ☑ | N/A |
| 9 | Is it sited to avoid sheltering effects from buildings, trees, towers, etc? | ☑ | N/A |
| 10 | Is the surface wetness sensor sited with the grid surface facing north? | ☑ | N/A |
| 11 | Is it inclined approximately 30 degrees? | ☑ | N/A |

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

# Field Systems Data Form

F-02058-1500-S4-rev002

**Site ID** PRK134 **Technician** Sandy Grenville **Site Visit Date** 10/22/2017

| | | | |
|---|---|---|---|
| 1 | Do all the meterological sensors appear to be intact, in good condition, and well maintained? | ☑ | |
| 2 | Are all the meteorological sensors operational online, and reporting data? | ☑ | |
| 3 | Are the shields for the temperature and RH sensors clean? | ☑ | |
| 4 | Are the aspirated motors working? | ☑ | N/A |
| 5 | Is the solar radiation sensor's lens clean and free of scratches? | ☑ | N/A |
| 6 | Is the surface wetness sensor grid clean and undamaged? | ☑ | N/A |
| 7 | Are the sensor signal and power cables intact, in good condition, and well maintained? | ☑ | N/A |
| 8 | Are the sensor signal and power cable connections protected from the elements and well maintained? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

**F-02058-1500-S5-rev002**

**Site ID** PRK134 **Technician** Sandy Grenville **Site Visit Date** 10/22/2017

## Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E

| | | | |
|---|---|---|---|
| 1 | Do the sample inlets have at least a 270 degree arc of unrestricted airflow? | ☑ | |
| 2 | Are the sample inlets 3 - 15 meters above the ground? | ☑ | |
| 3 | Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? | ☑ | |

## Pollutant analyzers and deposition equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the analyzers and equipment appear to be in good condition and well maintained? | ☑ | |
| 2 | Are the analyzers and monitors operational, on-line, and reporting data? | ☑ | |
| 3 | Describe ozone sample tube. | | 1/4 teflon by 15 meters |
| 4 | Describe dry dep sample tube. | | 3/8 teflon by 15 meters |
| 5 | Are in-line filters used in the ozone sample line? (if yes indicate location) | ☑ | At inlet only |
| 6 | Are sample lines clean, free of kinks, moisture, and obstructions? | ☑ | |
| 7 | Is the zero air supply desiccant unsaturated? | ☑ | |
| 8 | Are there moisture traps in the sample lines? | ☑ | Flow line only |
| 9 | Is there a rotometer in the dry deposition filter line, and is it clean? | ☑ | Clean and dry |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S6-rev002

**Site ID** PRK134 **Technician** Sandy Grenville **Site Visit Date** 10/22/2017

## DAS, sensor translators, and peripheral equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the DAS instruments appear to be in good condition and well maintained? | ☑ | |
| 2 | Are all the components of the DAS operational? (printers, modem, backup, etc) | ☑ | |
| 3 | Do the analyzer and sensor signal leads pass through lightning protection circuitry? | ☑ | Met sensors only |
| 4 | Are the signal connections protected from the weather and well maintained? | ☑ | |
| 5 | Are the signal leads connected to the correct DAS channel? | ☑ | |
| 6 | Are the DAS, sensor translators, and shelter properly grounded? | ☑ | |
| 7 | Does the instrument shelter have a stable power source? | ☑ | |
| 8 | Is the instrument shelter temperature controlled? | ☑ | |

| | | Stable | Grounded |
|---|---|---|---|
| 9 | Is the met tower stable and grounded? | ☐ | ☐ |
| 10 | Is the sample tower stable and grounded? | ☑ | ☐ |

11 Tower comments?

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

The sample tower and guy wires have been replaced.

# Field Systems Data Form

# F-02058-1500-S7-rev002

**Site ID** PRK134 **Technician** Sandy Grenville **Site Visit Date** 10/22/2017

## Documentation

### Does the site have the required instrument and equipment manuals?

| | Yes | No | N/A | | Yes | No | N/A |
|---|---|---|---|---|---|---|---|
| Wind speed sensor | ☐ | ☐ | ☑ | Data logger | ☐ | ☑ | ☐ |
| Wind direction sensor | ☐ | ☐ | ☑ | Data logger | ☐ | ☐ | ☑ |
| Temperature sensor | ☑ | ☐ | ☐ | Strip chart recorder | ☐ | ☐ | ☑ |
| Relative humidity sensor | ☐ | ☐ | ☑ | Computer | ☑ | ☐ | ☐ |
| Solar radiation sensor | ☐ | ☐ | ☑ | Modem | ☐ | ☑ | ☐ |
| Surface wetness sensor | ☐ | ☐ | ☑ | Printer | ☐ | ☐ | ☑ |
| Wind sensor translator | ☐ | ☐ | ☑ | Zero air pump | ☐ | ☑ | ☐ |
| Temperature translator | ☐ | ☐ | ☑ | Filter flow pump | ☐ | ☑ | ☐ |
| Humidity sensor translator | ☐ | ☐ | ☑ | Surge protector | ☐ | ☐ | ☑ |
| Solar radiation translator | ☐ | ☐ | ☑ | UPS | ☐ | ☐ | ☑ |
| Tipping bucket rain gauge | ☐ | ☐ | ☑ | Lightning protection device | ☐ | ☐ | ☑ |
| Ozone analyzer | ☐ | ☑ | ☐ | Shelter heater | ☐ | ☑ | ☐ |
| Filter pack flow controller | ☑ | ☐ | ☐ | Shelter air conditioner | ☑ | ☐ | ☐ |
| Filter pack MFC power supply | ☐ | ☐ | ☑ | | | | |

### Does the site have the required and most recent QC documents and report forms?

| | Present | | Current |
|---|---|---|---|
| Station Log | ☑ | | ☑ |
| SSRF | ☑ | | ☑ |
| Site Ops Manual | ☑ | Feb 2001 | ☐ |
| HASP | ☑ | Fe b 2014 | ☑ |
| Field Ops Manual | ☑ | July 1990 | ☐ |
| Calibration Reports | ☑ | | ☑ |
| Ozone z/s/p Control Charts | ☐ | | ☐ |
| Preventive maintenance schedul | ☐ | | ☐ |

| | | | |
|---|---|---|---|
| 1 | Is the station log properly completed during every site visit? | ☑ | |
| 2 | Are the Site Status Report Forms being completed and current? | ☑ | |
| 3 | Are the chain-of-custody forms properly used to document sample transfer to and from lab? | ☑ | |
| 4 | Are ozone z/s/p control charts properly completed and current? | ☐ | Control charts not used |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

# F-02058-1500-S8-rev002

**Site ID** PRK134 **Technician** Sandy Grenville **Site Visit Date** 10/22/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ | |
| 2 | Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ | |
| 3 | Is the site visited regularly on the required Tuesday schedule? | ☑ | |
| 4 | Are the standard CASTNET operational procedures being flollowed by the site operator? | ☑ | Channels up during ozone diagnostics |
| 5 | Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation) | ☑ | |

## Are regular operational QA/QC checks performed on meteorological instruments?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multipoint Calibrations | ☑ | N/A | ☑ |
| Visual Inspections | ☑ | N/A | ☑ |
| Translator Zero/Span Tests (climatronics) | ☐ | N/A | ☑ |
| Manual Rain Gauge Test | ☑ | N/A | ☑ |
| Confirm Reasonableness of Current Values | ☑ | N/A | ☑ |
| Test Surface Wetness Response | ☑ | N/A | ☑ |

## Are regular operational QA/QC checks performed on the ozone analyzer?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point Calibrations | ☑ | Semiannually | ☑ |
| Automatic Zero/Span Tests | ☑ | Daily | ☑ |
| Manual Zero/Span Tests | ☑ | As needed | ☑ |
| Automatic Precision Level Tests | ☑ | Daily | ☑ |
| Manual Precision Level Test | ☑ | As needed | ☑ |
| Analyzer Diagnostics Tests | ☑ | Weekly | ☑ |
| In-line Filter Replacement (at inlet) | ☑ | Every 2 weeks | ☑ |
| In-line Filter Replacement (at analyze | ☑ | N/A | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |
| Zero Air Desiccant Check | ☑ | Weekly | ☑ |

| | | | |
|---|---|---|---|
| 1 | Do multi-point calibration gases go through the complete sample train including all filters? | ☑ | |
| 2 | Do automatic and manual z/s/p gasses go through the complete sample train including all filters? | ☑ | |
| 3 | Are the automatic and manual z/s/p checks monitored and reported? If yes, how? | ☑ | Logbook, call-in |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

# F-02058-1500-S9-rev002

**Site ID** PRK134 **Technician** Sandy Grenville **Site Visit Date** 10/22/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Is the filter pack being changed every Tuesday as scheduled? | ☑ | Filter changed morinings |
| 2 | Are the Site Status Report Forms being completed and filed correctly? | ☑ | |
| 3 | Are data downloads and backups being performed as scheduled? | ☐ | No longer required |
| 4 | Are general observations being made and recorded? How? | ☑ | SSRF, logbook |
| 5 | Are site supplies on-hand and replenished in a timely fashion? | ☑ | |
| 6 | Are sample flow rates recorded? How? | ☑ | SSRF, logbook, call-in |
| 7 | Are samples sent to the lab on a regular schedule in a timely fashion? | ☑ | |
| 8 | Are filters protected from contamination during handling and shipping? How? | ☑ | Clean gloves on and off |
| 9 | Are the site conditions reported regularly to the field operations manager or staff? | ☑ | |

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point MFC Calibrations | ☑ | Semiannually | ☑ |
| Flow System Leak Checks | ☑ | Weekly | ☑ |
| Filter Pack Inspection | ☐ | | ☐ |
| Flow Rate Setting Checks | ☑ | Weekly | ☑ |
| Visual Check of Flow Rate Rotometer | ☑ | Weekly | ☑ |
| In-line Filter Inspection/Replacement | ☑ | Semiannually | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

# F-02058-1500-S10-rev002

**Site ID** PRK134 **Technician** Sandy Grenville **Site Visit Date** 10/22/2017

**Site Visit Sensors**

| Parameter | Manufacturer | Model | S/N | Client ID |
|---|---|---|---|---|
| Computer | Dell | Inspiron 15 | 2884848822 | 07021 |
| DAS | Campbell | CR3000 | 2509 | 000411 |
| Elevation | Elevation | 1 | None | None |
| Filter pack flow pump | Thomas | 107CAB18 | 049400004507 | 03633 |
| Flow Rate | Apex | AXMC105LPMDPC | illegible | 000656 |
| Infrastructure | Infrastructure | none | none | none |
| Modem | Raven | H4223-C | 0808334384 | 06460 |
| Ozone | ThermoElectron Inc | 49i A1NAA | 1030244800 | 000690 |
| Ozone Standard | ThermoElectron Inc | 49i A3NAA | 0726124890 | 000369 |
| Sample Tower | Aluma Tower | B | AT214072-Z-7-2 | 000930 |
| Shelter Temperature | Campbell | 107-L | unknown | none |
| Siting Criteria | Siting Criteria | 1 | None | None |
| Temperature | RM Young | 41342VC | 12545 | 06306 |
| Zero air pump | Werther International | C 70/4 | 000821907 | 06905 |

# *Site Inventory by Site Visit*

*STK138-Sandy Grenville-10/25/2017*

|  | Site Visit Date | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| 1 | 10/25/2017 | Computer | Dell | 07022 | Inspiron 15 | 34UMC12 |
| 2 | 10/25/2017 | DAS | Campbell | 000349 | CR3000 | 2128 |
| 3 | 10/25/2017 | Elevation | Elevation | None | 1 | None |
| 4 | 10/25/2017 | Filter pack flow pump | Thomas | 04923 | 107CAB18 | 060300019959 |
| 5 | 10/25/2017 | Flow Rate | Apex | 000661 | AXMC105LPMDPCV | illegible |
| 6 | 10/25/2017 | Infrastructure | Infrastructure | none | none | none |
| 7 | 10/25/2017 | Modem | Raven | 06603 | H4223-C | 0844356279 |
| 8 | 10/25/2017 | Ozone | ThermoElectron Inc | 000743 | 49i A1NAA | 1105347321 |
| 9 | 10/25/2017 | Ozone Standard | ThermoElectron Inc | 000688 | 49i A3NAA | 1030244817 |
| 10 | 10/25/2017 | Sample Tower | Aluma Tower | 03554 | A | none |
| 11 | 10/25/2017 | Shelter Temperature | Campbell | none | 107-L | unknown |
| 12 | 10/25/2017 | Siting Criteria | Siting Criteria | None | 1 | None |
| 13 | 10/25/2017 | Temperature | RM Young | 06407 | 41342VC | 14040 |
| 14 | 10/25/2017 | Zero air pump | Werther International | 06915 | C 70/4 | 000829162 |

# DAS Data Form

**DAS Time Max Error:** 0

| **Mfg** | **Serial Number** | **Site** | **Technician** | **Site Visit Date** | **Parameter** | **Use Desc.** |
|---|---|---|---|---|---|---|
| Campbell | 2128 | STK138 | Sandy Grenville | 10/25/2017 | DAS | Primary |

**Das Date:** 10/25/2017
**Das Time:** 14:33:00
**Das Day:** 298

**Audit Date** 10/25/2017
**Audit Time** 14:33:00
**Audit Day** 298

**Low Channel:**

**Avg Diff:** 0.0001
**Max Diff:** 0.0001

**High Channel:**

**Avg Diff:** 0.0001
**Max Diff:** 0.0001

**Mfg** Datel
**Parameter** DAS
**Serial Number** 15510194
**Tfer Desc.** Source generator (D
**Tfer ID** 01320
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 2/13/2012
**CorrCoff** 1.00000

**Mfg** Fluke
**Parameter** DAS
**Serial Number** 95740135
**Tfer Desc.** DVM
**Tfer ID** 01311
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 1/23/2017
**CorrCoff** 1.00000

| Channel | Input | DVM Output | DAS Output | InputUnit | OutputUnit | Difference |
|---|---|---|---|---|---|---|
| 7 | 0.0000 | -0.0001 | 0.0000 | V | V | 0.0001 |
| 7 | 0.1000 | 0.0998 | 0.0999 | V | V | 0.0001 |
| 7 | 0.3000 | 0.2997 | 0.2997 | V | V | 0.0000 |
| 7 | 0.5000 | 0.4995 | 0.4996 | V | V | 0.0001 |
| 7 | 0.7000 | 0.6994 | 0.6995 | V | V | 0.0001 |
| 7 | 0.9000 | 0.8993 | 0.8994 | V | V | 0.0001 |
| 7 | 1.0000 | 0.9992 | 0.9992 | V | V | 0.0000 |

# Flow Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Apex | illegible | STK138 | Sandy Grenville | 10/25/2017 | Flow Rate | 000661 |

**Mfg** BIOS
**Parameter** Flow Rate
**Serial Number** 103471
**Tfer Desc.** nexus
**Tfer ID** 01420
**Slope** 0.99825
**Intercept** 0.00497
**Cert Date** 2/7/2017
**CorrCoff** 0.99991

**Mfg** BIOS
**Parameter** Flow Rate
**Serial Number** 103424
**Tfer Desc.** BIOS cell
**Tfer ID** 01410
**Slope** 0.99825
**Intercept** 0.00497
**Cert Date** 2/7/2017
**CorrCoff** 0.99991

**DAS 1:**

**DAS 2:**

| A Avg % Diff: | A Max % Di | A Avg %Dif | A Max % Di |
|---|---|---|---|
| 1.75% | 1.96% | | |

**Cal Factor Zero** -0.02
**Cal Factor Full Scale** 0.99
**Rotometer Reading:** 1.4

| Desc. | Test type | Input l/m | Input Corr_ | MfcDisp. | OutputSignal | Output S E | InputUnit | OutputSignalI | PctDifference |
|---|---|---|---|---|---|---|---|---|---|
| primary | pump off | 0.000 | 0.000 | 0.00 | 0.000 | -0.02 | l/m | l/m | |
| primary | leak check | 0.000 | 0.000 | 0.00 | 0.000 | -0.02 | l/m | l/m | |
| primary | test pt 1 | 1.532 | 1.530 | 1.50 | 0.000 | 1.50 | l/m | l/m | -1.96% |
| primary | test pt 2 | 1.533 | 1.530 | 1.50 | 0.000 | 1.50 | l/m | l/m | -1.96% |
| primary | test pt 3 | 1.526 | 1.520 | 1.50 | 0.000 | 1.50 | l/m | l/m | -1.32% |

| Sensor Component | | Condition | | Status | |
|---|---|---|---|---|---|
| Sensor Component | Leak Test | Condition | | Status | pass |
| Sensor Component | Tubing Condition | Condition | Good | Status | pass |
| Sensor Component | Filter Position | Condition | Good | Status | pass |
| Sensor Component | Rotometer Condition | Condition | Clean and dry | Status | pass |
| Sensor Component | Moisture Present | Condition | No moisture present | Status | pass |
| Sensor Component | Filter Distance | Condition | 4.5 cm | Status | pass |
| Sensor Component | Filter Depth | Condition | 1.5 cm | Status | pass |
| Sensor Component | Filter Azimuth | Condition | 200 deg | Status | pass |
| Sensor Component | System Memo | Condition | | Status | pass |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1105347321 | STK138 | Sandy Grenville | 10/25/2017 | Ozone | 000743 |

| | | | |
|---|---|---|---|
| **Slope:** | 1.01407 | **Slope:** | 0.00000 |
| **Intercept** | -0.06140 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99998 | **CorrCoff** | 0.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 1.3% | 2.4% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 517112175 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01111 | | |
| **Slope** | 1.00250 | **Intercept** | 0.45870 |
| **Cert Date** | 3/21/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.01 | -0.44 | -0.34 | ppb | |
| primary | 2 | 15.01 | 14.51 | 14.86 | ppb | 2.41% |
| primary | 3 | 34.93 | 34.38 | 34.41 | ppb | 0.09% |
| primary | 4 | 68.04 | 67.41 | 68.09 | ppb | 1.01% |
| primary | 5 | 110.04 | 109.30 | 111.00 | ppb | 1.56% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.40 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.038 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 108.0 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.68 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 691.2 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 32.0 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 95.2 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.64 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 690.6 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Temperature Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 14040 | STK138 | Sandy Grenville | 10/25/2017 | Temperature | 06407 |

**Mfg** Extech
**Parameter** Temperature
**Serial Number** H232734
**Tfer Desc.** RTD
**Tfer ID** 01227
**Slope** 1.00759
**Intercept** 0.14754
**Cert Date** 2/4/2017
**CorrCoff** 1.00000

**DAS 1:**

**DAS 2:**

| Abs Avg Err | Abs Max Er | Abs Avg Err | Abs Max Er |
|---|---|---|---|
| 0.03 | 0.04 | | |

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Low Range | 0.13 | -0.02 | 0.000 | 0.0 | C | 0.03 |
| primary | Temp Mid Range | 25.38 | 25.04 | 0.000 | 25.1 | C | 0.03 |
| primary | Temp High Range | 49.12 | 48.60 | 0.000 | 48.6 | C | -0.04 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Shield | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Shelter Temperature Data For

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Campbell | unknown | STK138 | Sandy Grenville | 10/25/2017 | Shelter Temperature | none |

| DAS 1: | | DAS 2: | |
|---|---|---|---|
| **Abs Avg Err** | **Abs Max Er** | **Abs Avg Err** | **Abs Max Er** |
| 1.11 | 1.28 | | |

| | | | |
|---|---|---|---|
| **Mfg** | Extech | **Parameter** | Shelter Temperatur |
| **Serial Number** | H232734 | **Tfer Desc.** | RTD |
| **Tfer ID** | 01227 | | |
| **Slope** | 1.00759 | **Intercept** | 0.14754 |
| **Cert Date** | 2/4/2017 | **CorrCoff** | 1.00000 |

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Mid Range | 22.02 | 21.71 | 0.000 | 22.6 | C | 0.86 |
| primary | Temp Mid Range | 20.22 | 19.92 | 0.000 | 21.2 | C | 1.28 |
| primary | Temp Mid Range | 17.61 | 17.33 | 0.000 | 18.5 | C | 1.18 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

## Infrastructure Data For

**Site ID** STK138 **Technician** Sandy Grenville **Site Visit Date** 10/25/2017

| Shelter Make | Shelter Model | Shelter Size |
|---|---|---|
| Ekto | 8810 (s/n 2149-21) | 640 cuft |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Tower Type | **Condition** | Type A | **Status** | pass |
| **Sensor Component** | Conduit | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Met Tower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Moisture Trap | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Power Cables | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Temp Control | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Rotometer | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Sample Tower | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Shelter Condition | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Shelter Door | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Shelter Roof | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Floor | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Signal Cable | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Tubing Type | **Condition** | 3/8 teflon | **Status** | pass |
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |

# Field Systems Comments

**1** **Parameter:** SiteOpsProcedures

The ozone sample train is leak tested every 2 weeks.

**2** **Parameter:** SitingCriteriaCom

The site is located in a corn field on a cattle farm. Corn is planted within 10 meters.

**3** **Parameter:** ShelterCleanNotes

The shelter is somewhat dirty and cluttered. There are signs of leaks on the walls and floor rot.

# Field Systems Data Form

F-02058-1500-S1-rev002

**Site ID** STK138 **Technician** Sandy Grenville **Site Visit Date** 10/25/2017

| | | | | |
|---|---|---|---|---|
| **Site Sponsor (agency)** | EPA | **USGS Map** | | Kent |
| **Operating Group** | Private | **Map Scale** | | |
| **AQS #** | 17-085-9991 | **Map Date** | | |
| **Meteorological Type** | R.M. Young | | | |
| **Air Pollutant Analyzer** | Ozone | **QAPP Latitude** | | 42.2872 |
| **Deposition Measurement** | dry | **QAPP Longitude** | | -89.9998 |
| **Land Use** | agricultural | **QAPP Elevation Meters** | | 274 |
| **Terrain** | rolling | **QAPP Declination** | | 1.3 |
| **Conforms to MLM** | Yes | **QAPP Declination Date** | | 2/22/2006 |
| **Site Telephone** | | **Audit Latitude** | | 42.287216 |
| **Site Address 1** | 10939 E. Parker Road | **Audit Longitude** | | -89.99995 |
| **Site Address 2** | | **Audit Elevation** | | 281 |
| **County** | Jo Daviess | **Audit Declination** | | -1.3 |
| **City, State** | Stockton, IL | | **Present** | |
| **Zip Code** | 61085 | **Fire Extinguisher** | ☑ | new in 2015 |
| **Time Zone** | Central | **First Aid Kit** | ☑ | |
| **Primary Operator** | | **Safety Glasses** | ☐ | |
| **Primary Op. Phone #** | | **Safety Hard Hat** | ☑ | |
| **Primary Op. E-mail** | | **Climbing Belt** | ☐ | |
| **Backup Operator** | | **Security Fence** | ☐ | |
| **Backup Op. Phone #** | | **Secure Shelter** | ☐ | |
| **Backup Op. E-mail** | | **Stable Entry Step** | ☑ | |

**Shelter Working Room** ☑ **Make** Ekto **Model** 8810 (s/n 2149-21) **Shelter Size** 640 cuft

**Shelter Clean** ☐ **Notes** The shelter is somewhat dirty and cluttered. There are signs of leaks on the walls and floor rot.

**Site OK** ☑ **Notes**

**Driving Directions** From Stockton go south on 78 (Main Street) for approximately 2.5 miles. As the road turns sharply to the right, continue straight onto a dirt road. There will be a stop sign at another dirt road intersection within 100 yards. Continue through that intersection, the site will be visible in the distance on a hill-side to the left. Continue another 1.5 miles bearing to the left on dirt roads to the Evans farm. The site is past both houses in the hay field.

# Field Systems Data Form

F-02058-1500-S2-rev002

**Site ID** STK138 **Technician** Sandy Grenville **Site Visit Date** 10/25/2017

| Potential Interferent | Minimum Distance From Measurement Apparatus | Distance | Pass = Checked |
|---|---|---|---|
| Large Point Source of SO2 or NOx | 20 to 40 km | | ☑ |
| Major industrial complex | 10 to 20 km | | ☑ |
| City > 50,000 population | 40 km | | ☑ |
| City 10,000 to 50,000 population | 10 km | | ☑ |
| City 1,000 to 10,000 population | 5 km | | ☑ |
| Major highway, airport or rail yard | 2 km | | ☑ |
| Secondary road, heavily traveled | 500 m | | ☑ |
| Secondary road, lightly traveled | 200 m | | ☑ |
| Feedlot operations | 500 m | | ☑ |
| Intensive agricultural ops (including aerial spraying) | 500 m | | ☑ |
| Limited agricultural operations | 200 m | 20 m | ☐ |
| Large parking lot | 200 m | | ☑ |
| Small parking lot | 100 m | | ☑ |
| Tree line | 50 m | | ☑ |
| Obstacles to wind | 10 times obstacle height | | ☑ |

**Siting Distances OK** ☑

**Siting Criteria Comment**

The site is located in a corn field on a cattle farm.  Corn is planted within 10 meters.

# Field Systems Data Form

**F-02058-1500-S3-rev002**

**Site ID** STK138

**Technician** Sandy Grenville

**Site Visit Date** 10/25/2017

| | | | |
|---|---|---|---|
| 1 | Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? | ☑ | N/A |
| 2 | Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) | ☑ | N/A |
| 3 | Are the tower and sensors plumb? | ☑ | N/A |
| 4 | Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? | ☑ | Mounted to sample tower |
| 5 | Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) | ☑ | |
| 6 | Is the solar radiation sensor plumb? | ☑ | N/A |
| 7 | Is it sited to avoid shading, or any artificial or reflected light? | ☑ | N/A |
| 8 | Is the rain gauge plumb? | ☑ | N/A |
| 9 | Is it sited to avoid sheltering effects from buildings, trees, towers, etc? | ☑ | N/A |
| 10 | Is the surface wetness sensor sited with the grid surface facing north? | ☑ | N/A |
| 11 | Is it inclined approximately 30 degrees? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S4-rev002

**Site ID** STK138 **Technician** Sandy Grenville **Site Visit Date** 10/25/2017

| | | | |
|---|---|---|---|
| 1 | Do all the meterological sensors appear to be intact, in good condition, and well maintained? | ☑ | |
| 2 | Are all the meteorological sensors operational online, and reporting data? | ☑ | |
| 3 | Are the shields for the temperature and RH sensors clean? | ☑ | |
| 4 | Are the aspirated motors working? | ☑ | N/A |
| 5 | Is the solar radiation sensor's lens clean and free of scratches? | ☑ | N/A |
| 6 | Is the surface wetness sensor grid clean and undamaged? | ☑ | N/A |
| 7 | Are the sensor signal and power cables intact, in good condition, and well maintained? | ☑ | N/A |
| 8 | Are the sensor signal and power cable connections protected from the elements and well maintained? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form F-02058-1500-S5-rev002

**Site ID** STK138 **Technician** Sandy Grenville **Site Visit Date** 10/25/2017

## Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E

| | | | |
|---|---|---|---|
| 1 | Do the sample inlets have at least a 270 degree arc of unrestricted airflow? | ☑ | |
| 2 | Are the sample inlets 3 - 15 meters above the ground? | ☑ | |
| 3 | Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? | ☑ | |

## Pollutant analyzers and deposition equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the analyzers and equipment appear to be in good condition and well maintained? | ☑ | |
| 2 | Are the analyzers and monitors operational, on-line, and reporting data? | ☑ | |
| 3 | Describe ozone sample tube. | | 1/4 teflon by 18 meters |
| 4 | Describe dry dep sample tube. | | 3/8 teflon by 18 meters |
| 5 | Are in-line filters used in the ozone sample line? (if yes indicate location) | ☑ | At inlet only |
| 6 | Are sample lines clean, free of kinks, moisture, and obstructions? | ☑ | |
| 7 | Is the zero air supply desiccant unsaturated? | ☑ | |
| 8 | Are there moisture traps in the sample lines? | ☑ | Flow line only |
| 9 | Is there a rotometer in the dry deposition filter line, and is it clean? | ☑ | Clean and dry |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

# F-02058-1500-S6-rev002

**Site ID** STK138

**Technician** Sandy Grenville

**Site Visit Date** 10/25/2017

## DAS, sensor translators, and peripheral equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the DAS instruments appear to be in good condition and well maintained? | ☑ | |
| 2 | Are all the components of the DAS operational? (printers, modem, backup, etc) | ☑ | |
| 3 | Do the analyzer and sensor signal leads pass through lightning protection circuitry? | ☑ | Met sensors only |
| 4 | Are the signal connections protected from the weather and well maintained? | ☑ | |
| 5 | Are the signal leads connected to the correct DAS channel? | ☑ | |
| 6 | Are the DAS, sensor translators, and shelter properly grounded? | ☑ | |
| 7 | Does the instrument shelter have a stable power source? | ☑ | |
| 8 | Is the instrument shelter temperature controlled? | ☑ | |

| | | Stable | Grounded |
|---|---|---|---|
| 9 | Is the met tower stable and grounded? | ☐ | ☐ |
| 10 | Is the sample tower stable and grounded? | ☑ | ☑ |
| 11 | Tower comments? | | |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

**F-02058-1500-S7-rev002**

**Site ID** STK138 **Technician** Sandy Grenville **Site Visit Date** 10/25/2017

## Documentation

### Does the site have the required instrument and equipment manuals?

| | Yes | No | N/A | | Yes | No | N/A |
|---|---|---|---|---|---|---|---|
| Wind speed sensor | ☐ | ☐ | ☑ | Data logger | ☐ | ☑ | ☐ |
| Wind direction sensor | ☐ | ☐ | ☑ | Data logger | ☐ | ☐ | ☑ |
| Temperature sensor | ☑ | ☐ | ☐ | Strip chart recorder | ☐ | ☐ | ☑ |
| Relative humidity sensor | ☐ | ☐ | ☑ | Computer | ☑ | ☐ | ☐ |
| Solar radiation sensor | ☐ | ☐ | ☑ | Modem | ☐ | ☑ | ☐ |
| Surface wetness sensor | ☐ | ☐ | ☑ | Printer | ☐ | ☐ | ☑ |
| Wind sensor translator | ☐ | ☐ | ☑ | Zero air pump | ☐ | ☑ | ☐ |
| Temperature translator | ☐ | ☐ | ☑ | Filter flow pump | ☐ | ☑ | ☐ |
| Humidity sensor translator | ☐ | ☐ | ☑ | Surge protector | ☐ | ☐ | ☑ |
| Solar radiation translator | ☐ | ☐ | ☑ | UPS | ☐ | ☐ | ☑ |
| Tipping bucket rain gauge | ☐ | ☐ | ☑ | Lightning protection device | ☐ | ☐ | ☑ |
| Ozone analyzer | ☐ | ☑ | ☐ | Shelter heater | ☐ | ☑ | ☐ |
| Filter pack flow controller | ☑ | ☐ | ☐ | Shelter air conditioner | ☑ | ☐ | ☐ |
| Filter pack MFC power supply | ☐ | ☐ | ☑ | | | | |

### Does the site have the required and most recent QC documents and report forms?

| | Present | | Current |
|---|---|---|---|
| Station Log | ☑ | | ☑ |
| SSRF | ☑ | | ☑ |
| Site Ops Manual | ☑ | Oct 2010 | ☐ |
| HASP | ☑ | Oct 2010 | ☐ |
| Field Ops Manual | ☑ | July 1990 | ☐ |
| Calibration Reports | ☐ | | ☐ |
| Ozone z/s/p Control Charts | ☐ | | ☐ |
| Preventive maintenance schedul | ☐ | | ☐ |

| | | | |
|---|---|---|---|
| 1 | Is the station log properly completed during every site visit? | ☑ | Minimal information |
| 2 | Are the Site Status Report Forms being completed and current? | ☑ | |
| 3 | Are the chain-of-custody forms properly used to document sample transfer to and from lab? | ☑ | |
| 4 | Are ozone z/s/p control charts properly completed and current? | ☐ | Control charts not used |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

# F-02058-1500-S8-rev002

**Site ID** STK138 **Technician** Sandy Grenville **Site Visit Date** 10/25/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? | ☑ | Trained on site during installation |
| 2 | Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ | |
| 3 | Is the site visited regularly on the required Tuesday schedule? | ☑ | |
| 4 | Are the standard CASTNET operational procedures being flollowed by the site operator? | ☑ | |
| 5 | Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation) | ☑ | |

## Are regular operational QA/QC checks performed on meteorological instruments?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multipoint Calibrations | ☑ | N/A | ☑ |
| Visual Inspections | ☑ | N/A | ☑ |
| Translator Zero/Span Tests (climatronics) | ☐ | N/A | ☑ |
| Manual Rain Gauge Test | ☑ | N/A | ☑ |
| Confirm Reasonableness of Current Values | ☑ | N/A | ☑ |
| Test Surface Wetness Response | ☑ | N/A | ☑ |

## Are regular operational QA/QC checks performed on the ozone analyzer?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point Calibrations | ☑ | Semiannually | ☑ |
| Automatic Zero/Span Tests | ☑ | Daily | ☑ |
| Manual Zero/Span Tests | ☑ | As needed | ☑ |
| Automatic Precision Level Tests | ☑ | Daily | ☑ |
| Manual Precision Level Test | ☑ | As needed | ☑ |
| Analyzer Diagnostics Tests | ☑ | Weekly | ☑ |
| In-line Filter Replacement (at inlet) | ☑ | Monthly | ☑ |
| In-line Filter Replacement (at analyze | ☐ | N/A | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |
| Zero Air Desiccant Check | ☑ | Weekly | ☑ |

| | | | |
|---|---|---|---|
| 1 | Do multi-point calibration gases go through the complete sample train including all filters? | ☐ | Unknown |
| 2 | Do automatic and manual z/s/p gasses go through the complete sample train including all filters? | ☑ | |
| 3 | Are the automatic and manual z/s/p checks monitored and reported? If yes, how? | ☑ | Call-in only |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The ozone sample train is leak tested every 2 weeks.

# Field Systems Data Form

F-02058-1500-S9-rev002

**Site ID** STK138 **Technician** Sandy Grenville **Site Visit Date** 10/25/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Is the filter pack being changed every Tuesday as scheduled? | ☑ | Filter changed various times |
| 2 | Are the Site Status Report Forms being completed and filed correctly? | ☑ | |
| 3 | Are data downloads and backups being performed as scheduled? | ☐ | No longer required |
| 4 | Are general observations being made and recorded? How? | ☑ | SSRF, logbook |
| 5 | Are site supplies on-hand and replenished in a timely fashion? | ☑ | |
| 6 | Are sample flow rates recorded? How? | ☑ | SSRF, call-in |
| 7 | Are samples sent to the lab on a regular schedule in a timely fashion? | ☑ | |
| 8 | Are filters protected from contamination during handling and shipping? How? | ☑ | Clean gloves on and off |
| 9 | Are the site conditions reported regularly to the field operations manager or staff? | ☑ | |

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point MFC Calibrations | ☑ | Semiannually | ☑ |
| Flow System Leak Checks | ☑ | Weekly | ☑ |
| Filter Pack Inspection | ☐ | | ☐ |
| Flow Rate Setting Checks | ☑ | Weekly | ☑ |
| Visual Check of Flow Rate Rotometer | ☑ | Weekly | ☑ |
| In-line Filter Inspection/Replacement | ☑ | Semiannually | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S10-rev002

**Site ID** STK138

**Technician** Sandy Grenville

**Site Visit Date** 10/25/2017

**Site Visit Sensors**

| Parameter | Manufacturer | Model | S/N | Client ID |
|---|---|---|---|---|
| Computer | Dell | Inspiron 15 | 34UMC12 | 07022 |
| DAS | Campbell | CR3000 | 2128 | 000349 |
| Elevation | Elevation | 1 | None | None |
| Filter pack flow pump | Thomas | 107CAB18 | 060300019959 | 04923 |
| Flow Rate | Apex | AXMC105LPMDPC | illegible | 000661 |
| Infrastructure | Infrastructure | none | none | none |
| Modem | Raven | H4223-C | 0844356279 | 06603 |
| Ozone | ThermoElectron Inc | 49i A1NAA | 1105347321 | 000743 |
| Ozone Standard | ThermoElectron Inc | 49i A3NAA | 1030244817 | 000688 |
| Sample Tower | Aluma Tower | A | none | 03554 |
| Shelter Temperature | Campbell | 107-L | unknown | none |
| Siting Criteria | Siting Criteria | 1 | None | None |
| Temperature | RM Young | 41342VC | 14040 | 06407 |
| Zero air pump | Werther International | C 70/4 | 000829162 | 06915 |

# *Site Inventory by Site Visit*

| *Site Visit Date* | | *Parameter* | *Mfg* | *Owner ID* | *Model Number* | *Serial Number* |
|---|---|---|---|---|---|---|
| *ALH157-Sandy Grenville-10/27/2017* | | | | | | |
| 1 | 10/27/2017 | Computer | Dell | 07052 | Inspiron 15 | DB3MC12 |
| 2 | 10/27/2017 | DAS | Campbell | 000428 | CR3000 | 2534 |
| 3 | 10/27/2017 | Elevation | Elevation | None | 1 | None |
| 4 | 10/27/2017 | Filter pack flow pump | Thomas | 06285 | 107CA18 | 0990007057 |
| 5 | 10/27/2017 | Flow Rate | Apex | 000604 | AXMC105LPMDPCV | unknown |
| 6 | 10/27/2017 | Infrastructure | Infrastructure | none | none | none |
| 7 | 10/27/2017 | Modem | Raven | 06605 | H4222-C | 0844355805 |
| 8 | 10/27/2017 | Ozone | ThermoElectron Inc | 000695 | 49i A1NAA | 1030244801 |
| 9 | 10/27/2017 | Ozone Standard | ThermoElectron Inc | 000440 | 49i A3NAA | CM08200016 |
| 10 | 10/27/2017 | Sample Tower | Aluma Tower | illegible | B | none |
| 11 | 10/27/2017 | Shelter Temperature | Campbell | none | 107-L | none |
| 12 | 10/27/2017 | Siting Criteria | Siting Criteria | None | 1 | None |
| 13 | 10/27/2017 | Temperature | RM Young | 04942 | 41342 | 8894 |
| 14 | 10/27/2017 | Zero air pump | Werther International | 06910 | C 70/4 | 000829160 |

# DAS Data Form

**DAS Time Max Error:** 0

| **Mfg** | **Serial Number** | **Site** | **Technician** | **Site Visit Date** | **Parameter** | **Use Desc.** |
|---|---|---|---|---|---|---|
| Campbell | 2534 | ALH157 | Sandy Grenville | 10/27/2017 | DAS | Primary |

**Das Date:** 10/27/2017
**Das Time:** 11:52:03
**Das Day:** 300

**Audit Date** 10/27/2017
**Audit Time** 11:52:03
**Audit Day** 300

**Low Channel:**

**Avg Diff:** 0.0001
**Max Diff:** 0.0001

**High Channel:**

**Avg Diff:** 0.0001
**Max Diff:** 0.0001

**Mfg** Datel
**Parameter** DAS
**Serial Number** 15510194
**Tfer Desc.** Source generator (D
**Tfer ID** 01320
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 2/13/2012
**CorrCoff** 1.00000

**Mfg** Fluke
**Parameter** DAS
**Serial Number** 95740135
**Tfer Desc.** DVM
**Tfer ID** 01311
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 1/23/2017
**CorrCoff** 1.00000

| Channel | Input | DVM Output | DAS Output | InputUnit | OutputUnit | Difference |
|---|---|---|---|---|---|---|
| 7 | 0.0000 | 0.0000 | 0.0000 | V | V | 0.0000 |
| 7 | 0.1000 | 0.0998 | 0.0999 | V | V | 0.0001 |
| 7 | 0.3000 | 0.2996 | 0.2997 | V | V | 0.0001 |
| 7 | 0.5000 | 0.4995 | 0.4995 | V | V | 0.0000 |
| 7 | 0.7000 | 0.6994 | 0.6994 | V | V | 0.0000 |
| 7 | 0.9000 | 0.8993 | 0.8992 | V | V | -0.0001 |
| 7 | 1.0000 | 0.9992 | 0.9991 | V | V | -0.0001 |

# Flow Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Apex | unknown | ALH157 | Sandy Grenville | 10/27/2017 | Flow Rate | 000604 |

| | | | |
|---|---|---|---|
| **Mfg** | BIOS | **Parameter** | Flow Rate |
| **Serial Number** | 103471 | **Tfer Desc.** | nexus |
| **Tfer ID** | 01420 | | |
| **Slope** | 0.99825 | **Intercept** | 0.00497 |
| **Cert Date** | 2/7/2017 | **CorrCoff** | 0.99991 |
| **Mfg** | BIOS | **Parameter** | Flow Rate |
| **Serial Number** | 103424 | **Tfer Desc.** | BIOS cell |
| **Tfer ID** | 01410 | | |
| **Slope** | 0.99825 | **Intercept** | 0.00497 |
| **Cert Date** | 2/7/2017 | **CorrCoff** | 0.99991 |

**DAS 1:**

**DAS 2:**

| A Avg % Diff: | A Max % Di | A Avg %Dif | A Max % Di |
|---|---|---|---|
| 1.01% | 1.32% | | |

**Cal Factor Zero** 0

**Cal Factor Full Scale** 0.99

**Rotometer Reading:** 1.5

| Desc. | Test type | Input l/m | Input Corr_ | MfcDisp. | OutputSignal | Output S E | InputUnit | OutputSignalI | PctDifference |
|---|---|---|---|---|---|---|---|---|---|
| primary | pump off | 0.000 | 0.000 | -0.01 | 0.000 | -0.01 | l/m | l/m | |
| primary | leak check | 0.000 | 0.000 | -0.01 | 0.000 | 0.00 | l/m | l/m | |
| primary | test pt 1 | 1.516 | 1.510 | 1.51 | 0.000 | 1.50 | l/m | l/m | -0.60% |
| primary | test pt 2 | 1.521 | 1.520 | 1.51 | 0.000 | 1.50 | l/m | l/m | -1.32% |
| primary | test pt 3 | 1.518 | 1.520 | 1.51 | 0.000 | 1.50 | l/m | l/m | -1.12% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Leak Test | **Condition** | | **Status** | pass |
| **Sensor Component** | Tubing Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Filter Position | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Rotometer Condition | **Condition** | Clean and dry | **Status** | pass |
| **Sensor Component** | Moisture Present | **Condition** | No moisture present | **Status** | pass |
| **Sensor Component** | Filter Distance | **Condition** | 2.0 cm | **Status** | pass |
| **Sensor Component** | Filter Depth | **Condition** | 3.0 cm | **Status** | pass |
| **Sensor Component** | Filter Azimuth | **Condition** | 360 deg | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1030244801 | ALH157 | Sandy Grenville | 10/27/2017 | Ozone | 000695 |

| | | | |
|---|---|---|---|
| **Slope:** | 0.99956 | **Slope:** | 0.00000 |
| **Intercept** | -0.04828 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99996 | **CorrCoff** | 0.00000 |

**DAS 1:** **DAS 2:**

| A Avg % Diff: | A Max % Di | A Avg %Dif | A Max % Di |
|---|---|---|---|
| 0.8% | 2.1% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 517112175 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01111 | | |
| **Slope** | 1.00250 | **Intercept** | 0.45870 |
| **Cert Date** | 3/21/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.30 | -0.15 | -0.70 | ppb | |
| primary | 2 | 15.01 | 14.51 | 14.82 | ppb | 2.14% |
| primary | 3 | 35.02 | 34.47 | 34.46 | ppb | -0.03% |
| primary | 4 | 68.10 | 67.47 | 67.78 | ppb | 0.46% |
| primary | 5 | 110.54 | 109.80 | 109.40 | ppb | -0.36% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.60 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.041 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 69.2 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.74 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 723.8 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 26.5 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 63.1 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.73 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 724.1 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Temperature Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 8894 | ALH157 | Sandy Grenville | 10/27/2017 | Temperature | 04942 |

**Mfg** Extech
**Parameter** Temperature

**Serial Number** H232734
**Tfer Desc.** RTD

**Tfer ID** 01227

**Slope** 1.00759
**Intercept** 0.14754

**Cert Date** 2/4/2017
**CorrCoff** 1.00000

| DAS 1: Abs Avg Err | DAS 1: Abs Max Er | DAS 2: Abs Avg Err | DAS 2: Abs Max Er |
|---|---|---|---|
| 0.12 | 0.16 | | |

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Low Range | 0.14 | -0.01 | 0.000 | 0.1 | C | 0.15 |
| primary | Temp Mid Range | 25.23 | 24.89 | 0.000 | 25.1 | C | 0.16 |
| primary | Temp High Range | 47.58 | 47.08 | 0.000 | 47.0 | C | -0.05 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Shield | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Shelter Temperature Data For

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Campbell | none | ALH157 | Sandy Grenville | 10/27/2017 | Shelter Temperature | none |

**DAS 1:**

| Abs Avg Err | Abs Max Er |
|---|---|
| 0.44 | 0.67 |

**DAS 2:**

| Abs Avg Err | Abs Max Er |
|---|---|
| | |

**Mfg** Extech

**Parameter** Shelter Temperatur

**Serial Number** H232734

**Tfer Desc.** RTD

**Tfer ID** 01227

**Slope** 1.00759

**Intercept** 0.14754

**Cert Date** 2/4/2017

**CorrCoff** 1.00000

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Mid Range | 19.28 | 18.99 | 0.000 | 19.1 | C | 0.06 |
| primary | Temp Mid Range | 17.71 | 17.43 | 0.000 | 18.1 | C | 0.67 |
| primary | Temp Mid Range | 17.23 | 16.95 | 0.000 | 17.6 | C | 0.6 |

**Sensor Component** System Memo

**Condition**

**Status** pass

## Infrastructure Data For

**Site ID** ALH157 **Technician** Sandy Grenville **Site Visit Date** 10/27/2017

| **Shelter Make** | **Shelter Model** | **Shelter Size** |
|---|---|---|
| Ekto | 8810 (2149-7) | 640 cuft |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Tower Type | **Condition** | Type B | **Status** | pass |
| **Sensor Component** | Conduit | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Met Tower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Moisture Trap | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Power Cables | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Temp Control | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Rotometer | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Sample Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Condition | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Shelter Door | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Roof | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Shelter Floor | **Condition** | Poor | **Status** | Fail |
| **Sensor Component** | Signal Cable | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Tubing Type | **Condition** | 3/8 teflon | **Status** | pass |
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |

# Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The backup site operator is not always consistently using gloves to handle the filter pack.

2 **Parameter:** SitingCriteriaCom

The site is located on a privately operated farm which rotates corn and soy bean crops.

3 **Parameter:** ShelterCleanNotes

The shelter floor is soft and deteriorating and many tiles are loose. Walls have signs of leaks.

4 **Parameter:** MetSensorComme

Met tower removed, temperature mounted in naturally aspirated shield on sample tower.

# Field Systems Data Form F-02058-1500-S1-rev002

| | | | | | |
|---|---|---|---|---|---|
| **Site ID** | ALH157 | **Technician** | Sandy Grenville | **Site Visit Date** | 10/27/2017 |

| | | | | |
|---|---|---|---|---|
| **Site Sponsor (agency)** | EPA | **USGS Map** | | Pocahontas |
| **Operating Group** | private | **Map Scale** | | |
| **AQS #** | 17-119-9991 | **Map Date** | | |
| **Meteorological Type** | Climatronics | | | |
| **Air Pollutant Analyzer** | Ozone | **QAPP Latitude** | | 38.8690 |
| **Deposition Measurement** | dry, wet | **QAPP Longitude** | | -89.6229 |
| **Land Use** | agricultural | **QAPP Elevation Meters** | | 164 |
| **Terrain** | flat | **QAPP Declination** | | 0.9 |
| **Conforms to MLM** | Yes | **QAPP Declination Date** | | 1/28/2004 |
| **Site Telephone** | | **Audit Latitude** | | 38.869001 |
| **Site Address 1** | Fairview Road | **Audit Longitude** | | -89.622815 |
| **Site Address 2** | | **Audit Elevation** | | 164 |
| **County** | Madison | **Audit Declination** | | -1.1 |
| **City, State** | Pocahontas, IL | | **Present** | |
| **Zip Code** | 62275 | **Fire Extinguisher** | ☑ | new in 2015 |
| **Time Zone** | Central | **First Aid Kit** | ☑ | |
| **Primary Operator** | | **Safety Glasses** | ☑ | |
| **Primary Op. Phone #** | | **Safety Hard Hat** | ☑ | |
| **Primary Op. E-mail** | | **Climbing Belt** | ☑ | |
| **Backup Operator** | | **Security Fence** | ☐ | |
| **Backup Op. Phone #** | | **Secure Shelter** | ☑ | |
| **Backup Op. E-mail** | | **Stable Entry Step** | ☑ | |

**Shelter Working Room** ☑ **Make** Ekto **Model** 8810 (2149-7) **Shelter Size** 640 cuft

**Shelter Clean** ☑ **Notes** The shelter floor is soft and deteriorating and many tiles are loose. Walls have signs of leaks.

**Site OK** ☑ **Notes**

**Driving Directions** From I-70 take exit 36 (Pokey Road) north to the intersection of route 140. Turn left (west) on route 140 and continue approximately 1.5 miles. Turn left (south) onto CR 5. At the first intersection turn right (west) onto Meffert road. After the road turns left 90 degrees, turn at the first farm on the left. The site is approximately 1/2 mile on the dirt road under the power lines.

# Field Systems Data Form

**F-02058-1500-S2-rev002**

**Site ID** ALH157 **Technician** Sandy Grenville **Site Visit Date** 10/27/2017

| Potential Interferent | Minimum Distance From Measurement Apparatus | Distance | Pass = Checked |
|---|---|---|---|
| Large Point Source of SO2 or NOx | 20 to 40 km | | ☑ |
| Major industrial complex | 10 to 20 km | | ☑ |
| City > 50,000 population | 40 km | | ☑ |
| City 10,000 to 50,000 population | 10 km | | ☑ |
| City 1,000 to 10,000 population | 5 km | | ☑ |
| Major highway, airport or rail yard | 2 km | | ☑ |
| Secondary road, heavily traveled | 500 m | | ☑ |
| Secondary road, lightly traveled | 200 m | | ☑ |
| Feedlot operations | 500 m | | ☑ |
| Intensive agricultural ops (including aerial spraying) | 500 m | 20 m | ☐ |
| Limited agricultural operations | 200 m | | ☑ |
| Large parking lot | 200 m | | ☑ |
| Small parking lot | 100 m | | ☑ |
| Tree line | 50 m | | ☑ |
| Obstacles to wind | 10 times obstacle height | | ☑ |

**Siting Distances OK** ☑

**Siting Criteria Comment**

The site is located on a privately operated farm which rotates corn and soy bean crops.

# Field Systems Data Form

**F-02058-1500-S3-rev002**

**Site ID** ALH157 **Technician** Sandy Grenville **Site Visit Date** 10/27/2017

| | | | |
|---|---|---|---|
| 1 | Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? | ☑ | N/A |
| 2 | Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) | ☑ | N/A |
| 3 | Are the tower and sensors plumb? | ☑ | N/A |
| 4 | Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? | ☑ | |
| 5 | Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) | ☑ | |
| 6 | Is the solar radiation sensor plumb? | ☑ | N/A |
| 7 | Is it sited to avoid shading, or any artificial or reflected light? | ☑ | N/A |
| 8 | Is the rain gauge plumb? | ☑ | N/A |
| 9 | Is it sited to avoid sheltering effects from buildings, trees, towers, etc? | ☑ | N/A |
| 10 | Is the surface wetness sensor sited with the grid surface facing north? | ☑ | N/A |
| 11 | Is it inclined approximately 30 degrees? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

Met tower removed, temperature mounted in naturally aspirated shield on sample tower.

# Field Systems Data Form

F-02058-1500-S4-rev002

**Site ID** ALH157 **Technician** Sandy Grenville **Site Visit Date** 10/27/2017

| | | | |
|---|---|---|---|
| 1 | Do all the meterological sensors appear to be intact, in good condition, and well maintained? | ☑ | |
| 2 | Are all the meteorological sensors operational online, and reporting data? | ☑ | |
| 3 | Are the shields for the temperature and RH sensors clean? | ☑ | |
| 4 | Are the aspirated motors working? | ☑ | N/A |
| 5 | Is the solar radiation sensor's lens clean and free of scratches? | ☑ | N/A |
| 6 | Is the surface wetness sensor grid clean and undamaged? | ☑ | N/A |
| 7 | Are the sensor signal and power cables intact, in good condition, and well maintained? | ☑ | N/A |
| 8 | Are the sensor signal and power cable connections protected from the elements and well maintained? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form F-02058-1500-S5-rev002

**Site ID** ALH157 **Technician** Sandy Grenville **Site Visit Date** 10/27/2017

## Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E

| | | | |
|---|---|---|---|
| 1 | Do the sample inlets have at least a 270 degree arc of unrestricted airflow? | ☑ | |
| 2 | Are the sample inlets 3 - 15 meters above the ground? | ☑ | |
| 3 | Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? | ☑ | |

## Pollutant analyzers and deposition equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the analyzers and equipment appear to be in good condition and well maintained? | ☑ | |
| 2 | Are the analyzers and monitors operational, on-line, and reporting data? | ☑ | |
| 3 | Describe ozone sample tube. | | 1/4 teflon by 15 meters |
| 4 | Describe dry dep sample tube. | | 3/8 teflon by 12 meters |
| 5 | Are in-line filters used in the ozone sample line? (if yes indicate location) | ☑ | At inlet only |
| 6 | Are sample lines clean, free of kinks, moisture, and obstructions? | ☑ | |
| 7 | Is the zero air supply desiccant unsaturated? | ☑ | |
| 8 | Are there moisture traps in the sample lines? | ☑ | Flow line only |
| 9 | Is there a rotometer in the dry deposition filter line, and is it clean? | ☑ | Clean and dry |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

# F-02058-1500-S6-rev002

**Site ID** ALH157 **Technician** Sandy Grenville **Site Visit Date** 10/27/2017

## DAS, sensor translators, and peripheral equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the DAS instruments appear to be in good condition and well maintained? | ☑ | |
| 2 | Are all the components of the DAS operational? (printers, modem, backup, etc) | ☑ | |
| 3 | Do the analyzer and sensor signal leads pass through lightning protection circuitry? | ☑ | Met sensors only |
| 4 | Are the signal connections protected from the weather and well maintained? | ☑ | |
| 5 | Are the signal leads connected to the correct DAS channel? | ☑ | |
| 6 | Are the DAS, sensor translators, and shelter properly grounded? | ☑ | |
| 7 | Does the instrument shelter have a stable power source? | ☑ | |
| 8 | Is the instrument shelter temperature controlled? | ☑ | |

| | | Stable | Grounded |
|---|---|---|---|
| 9 | Is the met tower stable and grounded? | ☐ | ☐ |
| 10 | Is the sample tower stable and grounded? | ☑ | ☑ |
| 11 | Tower comments? | Met tower removed | |

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

# Field Systems Data Form

**F-02058-1500-S7-rev002**

**Site ID** ALH157 **Technician** Sandy Grenville **Site Visit Date** 10/27/2017

## Documentation

### Does the site have the required instrument and equipment manuals?

| | Yes | No | N/A |
|---|---|---|---|
| Wind speed sensor | ☐ | ☐ | ☑ |
| Wind direction sensor | ☐ | ☐ | ☑ |
| Temperature sensor | ☑ | ☐ | ☐ |
| Relative humidity sensor | ☐ | ☐ | ☑ |
| Solar radiation sensor | ☐ | ☐ | ☑ |
| Surface wetness sensor | ☐ | ☐ | ☑ |
| Wind sensor translator | ☐ | ☐ | ☑ |
| Temperature translator | ☐ | ☐ | ☑ |
| Humidity sensor translator | ☐ | ☐ | ☑ |
| Solar radiation translator | ☐ | ☐ | ☑ |
| Tipping bucket rain gauge | ☐ | ☐ | ☑ |
| Ozone analyzer | ☐ | ☑ | ☐ |
| Filter pack flow controller | ☐ | ☑ | ☐ |
| Filter pack MFC power supply | ☐ | ☐ | ☑ |

| | Yes | No | N/A |
|---|---|---|---|
| Data logger | ☐ | ☑ | ☐ |
| Data logger | ☐ | ☐ | ☑ |
| Strip chart recorder | ☐ | ☐ | ☑ |
| Computer | ☑ | ☐ | ☐ |
| Modem | ☐ | ☑ | ☐ |
| Printer | ☐ | ☐ | ☑ |
| Zero air pump | ☐ | ☑ | ☐ |
| Filter flow pump | ☐ | ☑ | ☐ |
| Surge protector | ☐ | ☐ | ☑ |
| UPS | ☐ | ☐ | ☑ |
| Lightning protection device | ☐ | ☐ | ☑ |
| Shelter heater | ☐ | ☑ | ☐ |
| Shelter air conditioner | ☑ | ☐ | ☐ |

### Does the site have the required and most recent QC documents and report forms?

| | Present | | Current |
|---|---|---|---|
| Station Log | ☑ | | ☑ |
| SSRF | ☑ | | ☑ |
| Site Ops Manual | ☑ | Oct 2001 | ☑ |
| HASP | ☑ | Feb 2014 | ☑ |
| Field Ops Manual | ☑ | July 1990 | ☑ |
| Calibration Reports | ☑ | | ☑ |
| Ozone z/s/p Control Charts | ☐ | | ☐ |
| Preventive maintenance schedul | ☐ | | ☐ |

| | | | |
|---|---|---|---|
| 1 | Is the station log properly completed during every site visit? | ☑ | |
| 2 | Are the Site Status Report Forms being completed and current? | ☑ | |
| 3 | Are the chain-of-custody forms properly used to document sample transfer to and from lab? | ☑ | |
| 4 | Are ozone z/s/p control charts properly completed and current? | ☐ | Control charts not used |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

**F-02058-1500-S8-rev002**

**Site ID** ALH157 **Technician** Sandy Grenville **Site Visit Date** 10/27/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? | ☑ | 1987 at ESE in FL |
| 2 | Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ | |
| 3 | Is the site visited regularly on the required Tuesday schedule? | ☑ | |
| 4 | Are the standard CASTNET operational procedures being flollowed by the site operator? | ☑ | |
| 5 | Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation) | ☑ | |

## Are regular operational QA/QC checks performed on meteorological instruments?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multipoint Calibrations | ☑ | N/A | ☑ |
| Visual Inspections | ☑ | N/A | ☑ |
| Translator Zero/Span Tests (climatronics) | ☑ | N/A | ☑ |
| Manual Rain Gauge Test | ☑ | N/A | ☑ |
| Confirm Reasonableness of Current Values | ☑ | N/A | ☑ |
| Test Surface Wetness Response | ☑ | N/A | ☑ |

## Are regular operational QA/QC checks performed on the ozone analyzer?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point Calibrations | ☑ | Semiannually | ☑ |
| Automatic Zero/Span Tests | ☑ | Daily | ☑ |
| Manual Zero/Span Tests | ☐ | | ☑ |
| Automatic Precision Level Tests | ☑ | Daily | ☑ |
| Manual Precision Level Test | ☐ | | ☑ |
| Analyzer Diagnostics Tests | ☑ | Weekly | ☑ |
| In-line Filter Replacement (at inlet) | ☑ | Every 2 weeks | ☑ |
| In-line Filter Replacement (at analyze | ☐ | N/A | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |
| Zero Air Desiccant Check | ☐ | | ☐ |

| | | | |
|---|---|---|---|
| 1 | Do multi-point calibration gases go through the complete sample train including all filters? | ☐ | Unknown |
| 2 | Do automatic and manual z/s/p gasses go through the complete sample train including all filters? | ☑ | |
| 3 | Are the automatic and manual z/s/p checks monitored and reported? If yes, how? | ☑ | Logbook, call-in |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form F-02058-1500-S9-rev002

**Site ID** ALH157 **Technician** Sandy Grenville **Site Visit Date** 10/27/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Is the filter pack being changed every Tuesday as scheduled? | ☑ | Filter changed morinings |
| 2 | Are the Site Status Report Forms being completed and filed correctly? | ☑ | |
| 3 | Are data downloads and backups being performed as scheduled? | ☐ | No longer required |
| 4 | Are general observations being made and recorded? How? | ☑ | SSRF, logbook |
| 5 | Are site supplies on-hand and replenished in a timely fashion? | ☑ | |
| 6 | Are sample flow rates recorded? How? | ☑ | SSRF, logbook, call-in |
| 7 | Are samples sent to the lab on a regular schedule in a timely fashion? | ☑ | |
| 8 | Are filters protected from contamination during handling and shipping? How? | ☑ | Clean gloves on and off |
| 9 | Are the site conditions reported regularly to the field operations manager or staff? | ☑ | |

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point MFC Calibrations | ☑ | Semiannually | ☑ |
| Flow System Leak Checks | ☑ | Weekly | ☑ |
| Filter Pack Inspection | ☐ | | ☐ |
| Flow Rate Setting Checks | ☑ | Weekly | ☑ |
| Visual Check of Flow Rate Rotometer | ☑ | Weekly | ☑ |
| In-line Filter Inspection/Replacement | ☑ | Semiannually | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The backup site operator is not always consistently using gloves to handle the filter pack.

# Field Systems Data Form

F-02058-1500-S10-rev002

**Site ID** ALH157 **Technician** Sandy Grenville **Site Visit Date** 10/27/2017

**Site Visit Sensors**

| Parameter | Manufacturer | Model | S/N | Client ID |
|---|---|---|---|---|
| Computer | Dell | Inspiron 15 | DB3MC12 | 07052 |
| DAS | Campbell | CR3000 | 2534 | 000428 |
| Elevation | Elevation | 1 | None | None |
| Filter pack flow pump | Thomas | 107CA18 | 0990007057 | 06285 |
| Flow Rate | Apex | AXMC105LPMDPC | unknown | 000604 |
| Infrastructure | Infrastructure | none | none | none |
| Modem | Raven | H4222-C | 0844355805 | 06605 |
| Ozone | ThermoElectron Inc | 49i A1NAA | 1030244801 | 000695 |
| Ozone Standard | ThermoElectron Inc | 49i A3NAA | CM08200016 | 000440 |
| Sample Tower | Aluma Tower | B | none | illegible |
| Shelter Temperature | Campbell | 107-L | none | none |
| Siting Criteria | Siting Criteria | 1 | None | None |
| Temperature | RM Young | 41342 | 8894 | 04942 |
| Zero air pump | Werther International | C 70/4 | 000829160 | 06910 |

# *Site Inventory by Site Visit*

*VIN140-Sandy Grenville-10/30/2017*

| | Site Visit Date | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| 1 | 10/30/2017 | Computer | Dell | 07040 | Inspiron 15 | 6K2MC12 |
| 2 | 10/30/2017 | DAS | Campbell | 000358 | CR3000 | 2136 |
| 3 | 10/30/2017 | Elevation | Elevation | None | 1 | None |
| 4 | 10/30/2017 | Filter pack flow pump | Thomas | 04920 | 107CAB18 | 060300019956 |
| 5 | 10/30/2017 | Flow Rate | Apex | 000465 | AXMC105LPMDPCV | 43974 |
| 6 | 10/30/2017 | Infrastructure | Infrastructure | none | none | none |
| 7 | 10/30/2017 | Modem | Raven | 06461 | V4221-V | 0808338875 |
| 8 | 10/30/2017 | Ozone | ThermoElectron Inc | 000740 | 49i A1NAA | 1105347311 |
| 9 | 10/30/2017 | Ozone Standard | ThermoElectron Inc | 000546 | 49i A3NAA | 0929938239 |
| 10 | 10/30/2017 | Sample Tower | Aluma Tower | 000137 | B | none |
| 11 | 10/30/2017 | Shelter Temperature | Campbell | none | 107-L | none |
| 12 | 10/30/2017 | Siting Criteria | Siting Criteria | None | 1 | None |
| 13 | 10/30/2017 | Temperature | RM Young | 04687 | 41342 | 6701 |
| 14 | 10/30/2017 | Zero air pump | Werther International | 06906 | C 70/4 | 000821908 |

# DAS Data Form

**DAS Time Max Error:** 0

| Mfg | Serial Number | Site | Technician | Site Visit Date | Parameter | Use Desc. |
|---|---|---|---|---|---|---|
| Campbell | 2136 | VIN140 | Sandy Grenville | 10/30/2017 | DAS | Primary |

| | | | |
|---|---|---|---|
| **Das Date:** | 10/30/2017 | **Audit Date** | 10/30/2017 |
| **Das Time:** | 11:19:52 | **Audit Time** | 11:19:52 |
| **Das Day:** | 303 | **Audit Day** | 303 |

| **Low Channel:** | | **High Channel:** | |
|---|---|---|---|
| **Avg Diff:** | **Max Diff:** | **Avg Diff:** | **Max Diff:** |
| 0.0001 | 0.0002 | 0.0001 | 0.0002 |

| | | | |
|---|---|---|---|
| **Mfg** | Datel | **Parameter** | DAS |
| **Serial Number** | 15510194 | **Tfer Desc.** | Source generator (D |
| **Tfer ID** | 01320 | | |
| **Slope** | 1.00000 | **Intercept** | 0.00000 |
| **Cert Date** | 2/13/2012 | **CorrCoff** | 1.00000 |
| **Mfg** | Fluke | **Parameter** | DAS |
| **Serial Number** | 95740135 | **Tfer Desc.** | DVM |
| **Tfer ID** | 01311 | | |
| **Slope** | 1.00000 | **Intercept** | 0.00000 |
| **Cert Date** | 1/23/2017 | **CorrCoff** | 1.00000 |

| Channel | Input | DVM Output | DAS Output | InputUnit | OutputUnit | Difference |
|---|---|---|---|---|---|---|
| 7 | 0.0000 | 0.0000 | 0.0000 | V | V | 0.0000 |
| 7 | 0.1000 | 0.0998 | 0.0999 | V | V | 0.0001 |
| 7 | 0.3000 | 0.2996 | 0.2998 | V | V | 0.0002 |
| 7 | 0.5000 | 0.4995 | 0.4997 | V | V | 0.0002 |
| 7 | 0.7000 | 0.6994 | 0.6996 | V | V | 0.0002 |
| 7 | 0.9000 | 0.8993 | 0.8994 | V | V | 0.0001 |
| 7 | 1.0000 | 0.9991 | 0.9993 | V | V | 0.0002 |

# Flow Data Form

| **Mfg** | **Serial Number Ta** | **Site** | **Technician** | **Site Visit Date** | **Parameter** | **Owner ID** |
|---|---|---|---|---|---|---|
| Apex | 43974 | VIN140 | Sandy Grenville | 10/30/2017 | Flow Rate | 000465 |

|  |  |  |  |
|---|---|---|---|
| **Mfg** | BIOS | **Parameter** | Flow Rate |
| **Serial Number** | 103471 | **Tfer Desc.** | nexus |
| **Tfer ID** | 01420 |  |  |
| **Slope** | 0.99825 | **Intercept** | 0.00497 |
| **Cert Date** | 2/7/2017 | **CorrCoff** | 0.99991 |
| **Mfg** | BIOS | **Parameter** | Flow Rate |
| **Serial Number** | 103424 | **Tfer Desc.** | BIOS cell |
| **Tfer ID** | 01410 |  |  |
| **Slope** | 0.99825 | **Intercept** | 0.00497 |
| **Cert Date** | 2/7/2017 | **CorrCoff** | 0.99991 |

**DAS 1:**

| **A Avg % Diff:** | **A Max % Di** |
|---|---|
| 0.48% | 0.66% |

**DAS 2:**

| **A Avg %Dif** | **A Max % Di** |
|---|---|
|  |  |

**Cal Factor Zero** -0.012

**Cal Factor Full Scale** 0.979

**Rotometer Reading:** 1.5

| Desc. | Test type | Input l/m | Input Corr_ | MfcDisp. | OutputSignal | Output S E | InputUnit | OutputSignalI | PctDifference |
|---|---|---|---|---|---|---|---|---|---|
| primary | pump off | 0.000 | 0.000 | 0.00 | 0.000 | -0.01 | l/m | l/m |  |
| primary | leak check | 0.000 | 0.000 | 0.10 | 0.000 | 0.09 | l/m | l/m |  |
| primary | test pt 1 | 1.515 | 1.510 | 1.52 | 0.000 | 1.51 | l/m | l/m | -0.13% |
| primary | test pt 2 | 1.516 | 1.510 | 1.52 | 0.000 | 1.50 | l/m | l/m | -0.66% |
| primary | test pt 3 | 1.517 | 1.510 | 1.52 | 0.000 | 1.50 | l/m | l/m | -0.66% |

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| **Sensor Component** | Leak Test | **Condition** |  | **Status** | pass |
| **Sensor Component** | Tubing Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Filter Position | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Rotometer Condition | **Condition** | Clean and dry | **Status** | pass |
| **Sensor Component** | Moisture Present | **Condition** | No moisture present | **Status** | pass |
| **Sensor Component** | Filter Distance | **Condition** | 4.0 cm | **Status** | pass |
| **Sensor Component** | Filter Depth | **Condition** | 2.0 cm | **Status** | pass |
| **Sensor Component** | Filter Azimuth | **Condition** | 280 deg | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** |  | **Status** | pass |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1105347311 | VIN140 | Sandy Grenville | 10/30/2017 | Ozone | 000740 |

**Slope:** 0.99697
**Intercept** -0.04294
**CorrCoff** 0.99999

**Slope:** 0.00000
**Intercept** 0.00000
**CorrCoff** 0.00000

**DAS 1:**

| A Avg % Diff: | A Max % Di |
|---|---|
| 0.7% | 2.2% |

**DAS 2:**

| A Avg %Dif | A Max % Di |
|---|---|
| | |

**Mfg** ThermoElectron Inc
**Parameter** ozone
**Serial Number** 517112175
**Tfer Desc.** Ozone primary stan
**Tfer ID** 01111
**Slope** 1.00250
**Intercept** 0.45870
**Cert Date** 3/21/2017
**CorrCoff** 1.00000

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.44 | -0.01 | 0.01 | ppb | |
| primary | 2 | 14.99 | 14.49 | 14.17 | ppb | -2.21% |
| primary | 3 | 35.04 | 34.49 | 34.48 | ppb | -0.03% |
| primary | 4 | 68.09 | 67.46 | 67.33 | ppb | -0.19% |
| primary | 5 | 110.50 | 109.76 | 109.30 | ppb | -0.42% |

| Sensor Component | Condition | Status |
|---|---|---|
| Sample Train | Good | pass |
| 22.5 degree rule | | pass |
| Inlet Filter Condition | Clean | pass |
| Battery Backup | N/A | pass |
| Offset | 0.10 | pass |
| Span | 1.026 | pass |
| Zero Voltage | N/A | pass |
| Fullscale Voltage | N/A | pass |
| Cell A Freq. | 91.2 kHz | pass |
| Cell A Noise | 0.6 ppb | pass |
| Cell A Flow | 0.72 lpm | pass |
| Cell A Pressure | 703.8 mmHg | pass |
| Cell A Tmp. | 29.7 C | pass |
| Cell B Freq. | 89.6 kHz | pass |
| Cell B Noise | 0.7 ppb | pass |
| Cell B Flow | 0.71 lpm | pass |
| Cell B Pressure | Not tested | pass |
| Cell B Tmp. | | pass |
| Line Loss | Not tested | pass |
| System Memo | | pass |

# Temperature Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 6701 | VIN140 | Sandy Grenville | 10/30/2017 | Temperature | 04687 |

**Mfg** Extech
**Parameter** Temperature
**Serial Number** H232734
**Tfer Desc.** RTD
**Tfer ID** 01227
**Slope** 1.00759
**Intercept** 0.14754
**Cert Date** 2/4/2017
**CorrCoff** 1.00000

| DAS 1: |  | DAS 2: |  |
|---|---|---|---|
| Abs Avg Err | Abs Max Er | Abs Avg Err | Abs Max Er |
| 0.08 | 0.10 |  |  |

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Low Range | 0.16 | 0.01 | 0.000 | 0.0 | C | -0.05 |
| primary | Temp Mid Range | 25.44 | 25.10 | 0.000 | 25.0 | C | -0.1 |
| primary | Temp High Range | 49.32 | 48.80 | 0.000 | 48.7 | C | -0.1 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Shield | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** |  | **Status** | pass |

# Shelter Temperature Data For

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Campbell | none | VIN140 | Sandy Grenville | 10/30/2017 | Shelter Temperature | none |

**DAS 1:**

| Abs Avg Err | Abs Max Er |
|---|---|
| 0.55 | 1.10 |

**DAS 2:**

| Abs Avg Err | Abs Max Er |
|---|---|
| | |

**Mfg** Extech

**Parameter** Shelter Temperatur

**Serial Number** H232734

**Tfer Desc.** RTD

**Tfer ID** 01227

**Slope** 1.00759

**Intercept** 0.14754

**Cert Date** 2/4/2017

**CorrCoff** 1.00000

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Mid Range | 18.78 | 18.49 | 0.000 | 18.7 | C | 0.17 |
| primary | Temp Mid Range | 22.79 | 22.47 | 0.000 | 22.1 | C | -0.37 |
| primary | Temp Mid Range | 16.58 | 16.31 | 0.000 | 17.4 | C | 1.1 |

**Sensor Component** System Memo

**Condition**

**Status** pass

## Infrastructure Data For

**Site ID** VIN140 **Technician** Sandy Grenville **Site Visit Date** 10/30/2017

| **Shelter Make** | **Shelter Model** | **Shelter Size** |
|---|---|---|
| Ekto | 8810 (s/n 2116-1) | 640 cuft |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Tower Type | **Condition** | Type B | **Status** | pass |
| **Sensor Component** | Conduit | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Met Tower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Moisture Trap | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Power Cables | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Temp Control | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Rotometer | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Sample Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Condition | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Shelter Door | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Shelter Roof | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Floor | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Signal Cable | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Tubing Type | **Condition** | 3/8 teflon | **Status** | pass |
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |

# Field Systems Comments

**1** **Parameter:** DasComments

The sample tower ground wire is broken.

**2** **Parameter:** SitingCriteriaCom

The site is in an agricultural research center with farm activities adjacent to the site. A train track is approximately 200 meters to the north.

**3** **Parameter:** ShelterCleanNotes

The shelter is in good condition and well maintained, however rot is beginning to form at the bottom of the walls.

**4** **Parameter:** MetSensorComme

The temperature sensor is mounted on the sample tower.

# Field Systems Data Form

# F-02058-1500-S1-rev002

**Site ID** VIN140
**Technician** Sandy Grenville
**Site Visit Date** 10/30/2017

| | | | |
|---|---|---|---|
| **Site Sponsor (agency)** | EPA | **USGS Map** | Fritchton |
| **Operating Group** | Purdue University | **Map Scale** | |
| **AQS #** | 18-083-9991 | **Map Date** | |
| **Meteorological Type** | Climatronics | | |
| **Air Pollutant Analyzer** | Ozone | **QAPP Latitude** | 38.7406 |
| **Deposition Measurement** | dry, wet | **QAPP Longitude** | -87.4844 |
| **Land Use** | agriculture | **QAPP Elevation Meters** | 134 |
| **Terrain** | flat | **QAPP Declination** | 4.25 |
| **Conforms to MLM** | Yes | **QAPP Declination Date** | 2/23/2006 |
| **Site Telephone** | | **Audit Latitude** | 38.740792 |
| **Site Address 1** | Southwest Purdue Agricultural Center | **Audit Longitude** | -87.484923 |
| **Site Address 2** | 4669 North Purdue Road | **Audit Elevation** | 136 |
| **County** | Knox | **Audit Declination** | -2.7 |

| | | | **Present** | |
|---|---|---|---|---|
| **City, State** | Vincennes, IN | | | |
| **Zip Code** | 47591 | **Fire Extinguisher** | ☑ | New in 2015 |
| **Time Zone** | Central | **First Aid Kit** | ☑ | |
| **Primary Operator** | | **Safety Glasses** | ☑ | |
| **Primary Op. Phone #** | | **Safety Hard Hat** | ☑ | |
| **Primary Op. E-mail** | | **Climbing Belt** | ☑ | |
| **Backup Operator** | | **Security Fence** | ☐ | |
| **Backup Op. Phone #** | | **Secure Shelter** | ☑ | |
| **Backup Op. E-mail** | | **Stable Entry Step** | ☑ | |

**Shelter Working Room** ☑ **Make** Ekto **Model** 8810 (s/n 2116-1) **Shelter Size** 640 cuft

**Shelter Clean** ☑ **Notes** The shelter is in good condition and well maintained, however rot is beginning to form at the bottom of the walls.

**Site OK** ☑ **Notes**

**Driving Directions** From Vincennes go approximately 3 miles north on route 41. Turn left at the sign for the Southwest Purdue Agricultural Center. The site is just over the hill on the dirt road to the right.

# Field Systems Data Form

**F-02058-1500-S2-rev002**

**Site ID** VIN140 **Technician** Sandy Grenville **Site Visit Date** 10/30/2017

| Potential Interferent | Minimum Distance From Measurement Apparatus | Distance | Pass = Checked |
|---|---|---|---|
| Large Point Source of SO2 or NOx | 20 to 40 km | | ☑ |
| Major industrial complex | 10 to 20 km | | ☑ |
| City > 50,000 population | 40 km | | ☑ |
| City 10,000 to 50,000 population | 10 km | | ☑ |
| City 1,000 to 10,000 population | 5 km | | ☑ |
| Major highway, airport or rail yard | 2 km | | ☑ |
| Secondary road, heavily traveled | 500 m | | ☑ |
| Secondary road, lightly traveled | 200 m | | ☑ |
| Feedlot operations | 500 m | | ☑ |
| Intensive agricultural ops (including aerial spraying) | 500 m | 200 m | ☐ |
| Limited agricultural operations | 200 m | 10 m | ☐ |
| Large parking lot | 200 m | | ☑ |
| Small parking lot | 100 m | | ☑ |
| Tree line | 50 m | | ☑ |
| Obstacles to wind | 10 times obstacle height | | ☑ |

**Siting Distances OK** ☑

**Siting Criteria Comment**

The site is in an agricultural research center with farm activities adjacent to the site. A train track is approximately 200 meters to the north.

# Field Systems Data Form

F-02058-1500-S3-rev002

**Site ID** VIN140 **Technician** Sandy Grenville **Site Visit Date** 10/30/2017

| | | | |
|---|---|---|---|
| 1 | Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? | ☑ | N/A |
| 2 | Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) | ☑ | N/A |
| 3 | Are the tower and sensors plumb? | ☑ | N/A |
| 4 | Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? | ☑ | |
| 5 | Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) | ☑ | |
| 6 | Is the solar radiation sensor plumb? | ☑ | N/A |
| 7 | Is it sited to avoid shading, or any artificial or reflected light? | ☑ | N/A |
| 8 | Is the rain gauge plumb? | ☑ | N/A |
| 9 | Is it sited to avoid sheltering effects from buildings, trees, towers, etc? | ☑ | N/A |
| 10 | Is the surface wetness sensor sited with the grid surface facing north? | ☑ | N/A |
| 11 | Is it inclined approximately 30 degrees? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The temperature sensor is mounted on the sample tower.

# Field Systems Data Form

F-02058-1500-S4-rev002

**Site ID** VIN140 **Technician** Sandy Grenville **Site Visit Date** 10/30/2017

| | | | |
|---|---|---|---|
| 1 | Do all the meterological sensors appear to be intact, in good condition, and well maintained? | ☑ | |
| 2 | Are all the meteorological sensors operational online, and reporting data? | ☑ | |
| 3 | Are the shields for the temperature and RH sensors clean? | ☑ | |
| 4 | Are the aspirated motors working? | ☑ | N/A |
| 5 | Is the solar radiation sensor's lens clean and free of scratches? | ☑ | N/A |
| 6 | Is the surface wetness sensor grid clean and undamaged? | ☑ | N/A |
| 7 | Are the sensor signal and power cables intact, in good condition, and well maintained? | ☑ | N/A |
| 8 | Are the sensor signal and power cable connections protected from the elements and well maintained? | ☑ | N/A |

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

# Field Systems Data Form F-02058-1500-S5-rev002

**Site ID** VIN140 **Technician** Sandy Grenville **Site Visit Date** 10/30/2017

**Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E**

| | | | |
|---|---|---|---|
| 1 | Do the sample inlets have at least a 270 degree arc of unrestricted airflow? | ☑ | |
| 2 | Are the sample inlets 3 - 15 meters above the ground? | ☑ | |
| 3 | Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? | ☑ | |

**Pollutant analyzers and deposition equipment operations and maintenance**

| | | | |
|---|---|---|---|
| 1 | Do the analyzers and equipment appear to be in good condition and well maintained? | ☑ | |
| 2 | Are the analyzers and monitors operational, on-line, and reporting data? | ☑ | |
| 3 | Describe ozone sample tube. | | 1/4 teflon by 18 meters |
| 4 | Describe dry dep sample tube. | | 3/8 teflon by 18 meters |
| 5 | Are in-line filters used in the ozone sample line? (if yes indicate location) | ☑ | At inlet only |
| 6 | Are sample lines clean, free of kinks, moisture, and obstructions? | ☑ | |
| 7 | Is the zero air supply desiccant unsaturated? | ☑ | |
| 8 | Are there moisture traps in the sample lines? | ☑ | Flow line only |
| 9 | Is there a rotometer in the dry deposition filter line, and is it clean? | ☑ | Clean and dry |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

# F-02058-1500-S6-rev002

**Site ID** VIN140 **Technician** Sandy Grenville **Site Visit Date** 10/30/2017

## DAS, sensor translators, and peripheral equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the DAS instruments appear to be in good condition and well maintained? | ☑ | |
| 2 | Are all the components of the DAS operational? (printers, modem, backup, etc) | ☑ | |
| 3 | Do the analyzer and sensor signal leads pass through lightning protection circuitry? | ☑ | Met sensors only |
| 4 | Are the signal connections protected from the weather and well maintained? | ☑ | |
| 5 | Are the signal leads connected to the correct DAS channel? | ☑ | |
| 6 | Are the DAS, sensor translators, and shelter properly grounded? | ☑ | |
| 7 | Does the instrument shelter have a stable power source? | ☑ | |
| 8 | Is the instrument shelter temperature controlled? | ☑ | |

| | | Stable | Grounded |
|---|---|---|---|
| 9 | Is the met tower stable and grounded? | ☐ | ☐ |
| 10 | Is the sample tower stable and grounded? | ☑ | ☐ |

11 Tower comments? ground wire broken

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The sample tower ground wire is broken.

# Field Systems Data Form

**F-02058-1500-S7-rev002**

**Site ID** VIN140 **Technician** Sandy Grenville **Site Visit Date** 10/30/2017

## Documentation

### Does the site have the required instrument and equipment manuals?

| | Yes | No | N/A | | Yes | No | N/A |
|---|---|---|---|---|---|---|---|
| Wind speed sensor | ☐ | ☐ | ☑ | Data logger | ☐ | ☑ | ☐ |
| Wind direction sensor | ☐ | ☐ | ☑ | Data logger | ☐ | ☐ | ☑ |
| Temperature sensor | ☐ | ☑ | ☐ | Strip chart recorder | ☐ | ☐ | ☑ |
| Relative humidity sensor | ☐ | ☐ | ☑ | Computer | ☐ | ☑ | ☐ |
| Solar radiation sensor | ☐ | ☐ | ☑ | Modem | ☑ | ☐ | ☐ |
| Surface wetness sensor | ☐ | ☐ | ☑ | Printer | ☐ | ☐ | ☑ |
| Wind sensor translator | ☐ | ☐ | ☑ | Zero air pump | ☑ | ☐ | ☐ |
| Temperature translator | ☐ | ☐ | ☑ | Filter flow pump | ☐ | ☑ | ☐ |
| Humidity sensor translator | ☐ | ☐ | ☑ | Surge protector | ☐ | ☐ | ☑ |
| Solar radiation translator | ☐ | ☐ | ☑ | UPS | ☐ | ☐ | ☑ |
| Tipping bucket rain gauge | ☐ | ☐ | ☑ | Lightning protection device | ☐ | ☐ | ☑ |
| Ozone analyzer | ☐ | ☑ | ☐ | Shelter heater | ☐ | ☑ | ☐ |
| Filter pack flow controller | ☑ | ☐ | ☐ | Shelter air conditioner | ☐ | ☑ | ☐ |
| Filter pack MFC power supply | ☐ | ☐ | ☑ | | | | |

### Does the site have the required and most recent QC documents and report forms?

| | Present | | Current |
|---|---|---|---|
| Station Log | ☑ | | ☑ |
| SSRF | ☑ | | ☑ |
| Site Ops Manual | ☑ | Feb 2014 | ☑ |
| HASP | ☑ | Feb 2014 | ☑ |
| Field Ops Manual | ☑ | Oct 2001 | ☑ |
| Calibration Reports | ☐ | | ☐ |
| Ozone z/s/p Control Charts | ☐ | | ☐ |
| Preventive maintenance schedul | ☐ | | ☐ |

| | | | |
|---|---|---|---|
| 1 | Is the station log properly completed during every site visit? | ☑ | |
| 2 | Are the Site Status Report Forms being completed and current? | ☑ | |
| 3 | Are the chain-of-custody forms properly used to document sample transfer to and from lab? | ☑ | |
| 4 | Are ozone z/s/p control charts properly completed and current? | ☐ | Control charts not used |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form F-02058-1500-S8-rev002

**Site ID** VIN140 **Technician** Sandy Grenville **Site Visit Date** 10/30/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ | Trained by the previous site operator |
| 2 | Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ | |
| 3 | Is the site visited regularly on the required Tuesday schedule? | ☑ | |
| 4 | Are the standard CASTNET operational procedures being flollowed by the site operator? | ☑ | |
| 5 | Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation) | ☑ | |

## Are regular operational QA/QC checks performed on meteorological instruments?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multipoint Calibrations | ☑ | Semiannually | ☑ |
| Visual Inspections | ☑ | N/A | ☑ |
| Translator Zero/Span Tests (climatronics) | ☐ | N/A | ☑ |
| Manual Rain Gauge Test | ☑ | N/A | ☑ |
| Confirm Reasonableness of Current Values | ☑ | N/A | ☑ |
| Test Surface Wetness Response | ☑ | N/A | ☑ |

## Are regular operational QA/QC checks performed on the ozone analyzer?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point Calibrations | ☑ | Semiannually | ☑ |
| Automatic Zero/Span Tests | ☑ | Daily | ☑ |
| Manual Zero/Span Tests | ☑ | As needed | ☑ |
| Automatic Precision Level Tests | ☑ | Daily | ☑ |
| Manual Precision Level Test | ☑ | As needed | ☑ |
| Analyzer Diagnostics Tests | ☑ | Weekly | ☑ |
| In-line Filter Replacement (at inlet) | ☑ | Every 2 weeks | ☑ |
| In-line Filter Replacement (at analyze | ☐ | N/A | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |
| Zero Air Desiccant Check | ☑ | Weekly | ☑ |

| | | | |
|---|---|---|---|
| 1 | Do multi-point calibration gases go through the complete sample train including all filters? | ☐ | Unknown |
| 2 | Do automatic and manual z/s/p gasses go through the complete sample train including all filters? | ☑ | |
| 3 | Are the automatic and manual z/s/p checks monitored and reported? If yes, how? | ☑ | Logbook, call-in |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

# F-02058-1500-S9-rev002

**Site ID** VIN140

**Technician** Sandy Grenville

**Site Visit Date** 10/30/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Is the filter pack being changed every Tuesday as scheduled? | ☑ | Filter changed morinings |
| 2 | Are the Site Status Report Forms being completed and filed correctly? | ☑ | |
| 3 | Are data downloads and backups being performed as scheduled? | ☐ | No longer required |
| 4 | Are general observations being made and recorded? How? | ☑ | SSRF |
| 5 | Are site supplies on-hand and replenished in a timely fashion? | ☑ | |
| 6 | Are sample flow rates recorded? How? | ☑ | SSRF, logbook, call-in |
| 7 | Are samples sent to the lab on a regular schedule in a timely fashion? | ☑ | |
| 8 | Are filters protected from contamination during handling and shipping? How? | ☑ | Clean gloves on and off |
| 9 | Are the site conditions reported regularly to the field operations manager or staff? | ☑ | |

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point MFC Calibrations | ☑ | Semiannually | ☑ |
| Flow System Leak Checks | ☑ | Weekly | ☑ |
| Filter Pack Inspection | ☐ | | ☐ |
| Flow Rate Setting Checks | ☑ | Weekly | ☑ |
| Visual Check of Flow Rate Rotometer | ☑ | Weekly | ☑ |
| In-line Filter Inspection/Replacement | ☑ | Semiannually | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S10-rev002

**Site ID** VIN140 **Technician** Sandy Grenville **Site Visit Date** 10/30/2017

**Site Visit Sensors**

| Parameter | Manufacturer | Model | S/N | Client ID |
|---|---|---|---|---|
| Computer | Dell | Inspiron 15 | 6K2MC12 | 07040 |
| DAS | Campbell | CR3000 | 2136 | 000358 |
| Elevation | Elevation | 1 | None | None |
| Filter pack flow pump | Thomas | 107CAB18 | 060300019956 | 04920 |
| Flow Rate | Apex | AXMC105LPMDPC | 43974 | 000465 |
| Infrastructure | Infrastructure | none | none | none |
| Modem | Raven | V4221-V | 0808338875 | 06461 |
| Ozone | ThermoElectron Inc | 49i A1NAA | 1105347311 | 000740 |
| Ozone Standard | ThermoElectron Inc | 49i A3NAA | 0929938239 | 000546 |
| Sample Tower | Aluma Tower | B | none | 000137 |
| Shelter Temperature | Campbell | 107-L | none | none |
| Siting Criteria | Siting Criteria | 1 | None | None |
| Temperature | RM Young | 41342 | 6701 | 04687 |
| Zero air pump | Werther International | C 70/4 | 000821908 | 06906 |

# *Site Inventory by Site Visit*

*BVL130-Eric Hebert-11/09/2017*

| ***Site Visit Date*** | | ***Parameter*** | ***Mfg*** | ***Owner ID*** | ***Model Number*** | ***Serial Number*** |
|---|---|---|---|---|---|---|
| 1 | 11/9/2017 | CO | Teledyne | 000760 | T300U | 87 |
| 2 | 11/9/2017 | Computer | Dell | 07073 | Inspiron 15 | B94MC12 |
| 3 | 11/9/2017 | DAS | Campbell | 000424 | CR3000 | 2539 |
| 4 | 11/9/2017 | Elevation | Elevation | None | 1 | None |
| 5 | 11/9/2017 | Filter pack flow pump | Thomas | 04860 | 107CAB18 | 060300019995 |
| 6 | 11/9/2017 | Flow Rate | Apex | 000595 | AXMC105LPMDPCV | illegible |
| 7 | 11/9/2017 | Infrastructure | Infrastructure | none | none | none |
| 8 | 11/9/2017 | Met tower | Climatronics | 02738 | 14 inch taper | none |
| 9 | 11/9/2017 | Modem | Raven | 06610 | H4223-C | 0844355827 |
| 10 | 11/9/2017 | Noy | Teledyne | 000805 | T200U | 110 |
| 11 | 11/9/2017 | Ozone | ThermoElectron Inc | 000739 | 49i A1NAA | 1105347318 |
| 12 | 11/9/2017 | Ozone Standard | ThermoElectron Inc | 000512 | 49i A3NAA | 0922236890 |
| 13 | 11/9/2017 | Precipitation | Climatronics | 02704 | 100508-2 | illegible |
| 14 | 11/9/2017 | Relative Humidity | Vaisala | 07117 | HMP45A | 850853 |
| 15 | 11/9/2017 | Sample Tower | Aluma Tower | 000182 | B | unknown |
| 16 | 11/9/2017 | Shelter Temperature | Campbell | none | 107-L | unknown |
| 17 | 11/9/2017 | Shield (10 meter) | RM Young | 06206 | Aspirated 43408 | none |
| 18 | 11/9/2017 | Shield (2 meter) | RM Young | 06635 | Aspirated 43408 | none |
| 19 | 11/9/2017 | Siting Criteria | Siting Criteria | None | 1 | None |
| 20 | 11/9/2017 | SO2 | Teledyne | 000787 | T100U | 94 |
| 21 | 11/9/2017 | Solar Radiation | Licor | 04566 | LI-200 | PY10653 |
| 22 | 11/9/2017 | Solar Radiation Translator | RM Young | 04340 | 70101-X | none |
| 23 | 11/9/2017 | Surface Wetness | RM Young | 06153 | 58101 | none |
| 24 | 11/9/2017 | Temperature | RM Young | 04690 | 41342 | 6704 |
| 25 | 11/9/2017 | Temperature2meter | RM Young | 06404 | 41342 | 14037 |
| 26 | 11/9/2017 | Wind Direction | RM Young | 04866 | AQ05305 | 58322wdr |
| 27 | 11/9/2017 | Wind Speed | RM Young | 04866 | AQ05305 | 58322wsp |
| 28 | 11/9/2017 | Zero air pump | Werther International | 06926 | PC70/4 | 000836218 |

| Site | Visit Date | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| 29 | 11/9/2017 | Zero air pump | Teledyne | 000759 | 701H | 576 |

# DAS Data Form

**DAS Time Max Error:** 0

| Mfg | Serial Number | Site | Technician | Site Visit Date | Parameter | Use Desc. |
|---|---|---|---|---|---|---|
| Campbell | 2539 | BVL130 | Eric Hebert | 11/09/2017 | DAS | Primary |

**Das Date:** 11/10/2017
**Das Time:** 9:30:00
**Das Day:** 314

**Audit Date** 11/10/2017
**Audit Time** 9:30:00
**Audit Day** 314

| **Low Channel:** | | **High Channel:** | |
|---|---|---|---|
| **Avg Diff:** | **Max Diff:** | **Avg Diff:** | **Max Diff:** |
| 0.0000 | 0.0001 | 0.0000 | 0.0001 |

**Mfg** Datel
**Parameter** DAS
**Serial Number** 4000392
**Tfer Desc.** Source generator (D
**Tfer ID** 01321
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 1/22/2015
**CorrCoff** 1.00000

**Mfg** Fluke
**Parameter** DAS
**Serial Number** 86590148
**Tfer Desc.** DVM
**Tfer ID** 01310
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 2/23/2017
**CorrCoff** 1.00000

| Channel | Input | DVM Output | DAS Output | InputUnit | OutputUnit | Difference |
|---|---|---|---|---|---|---|
| 7 | 0.0000 | 0.0000 | 0.0000 | V | V | 0.0000 |
| 7 | 0.1000 | 0.1000 | 0.1000 | V | V | 0.0000 |
| 7 | 0.3000 | 0.3000 | 0.3000 | V | V | 0.0000 |
| 7 | 0.5000 | 0.5000 | 0.5001 | V | V | 0.0001 |
| 7 | 0.7000 | 0.7001 | 0.7001 | V | V | 0.0000 |
| 7 | 0.9000 | 0.9001 | 0.9001 | V | V | 0.0000 |
| 7 | 1.0000 | 1.0001 | 1.0002 | V | V | 0.0001 |

# Flow Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Apex | illegible | BVL130 | Eric Hebert | 11/09/2017 | Flow Rate | 000595 |

**Mfg** BIOS
**Parameter** Flow Rate
**Serial Number** 122974
**Tfer Desc.** BIOS 220-H
**Tfer ID** 01416
**Slope** 1.00732
**Intercept** -0.02202
**Cert Date** 3/8/2017
**CorrCoff** 0.99970

**DAS 1:**

**DAS 2:**

| A Avg % Diff: | A Max % Di | A Avg %Dif | A Max % Di |
|---|---|---|---|
| 2.60% | 2.60% | | |

**Cal Factor Zero** 0.01
**Cal Factor Full Scale** 0.94
**Rotometer Reading:** 1.45

| Desc. | Test type | Input l/m | Input Corr_ | MfcDisp. | OutputSignal | Output S E | InputUnit | OutputSignalI | PctDifference |
|---|---|---|---|---|---|---|---|---|---|
| primary | pump off | 0.000 | 0.000 | 0.00 | 0.000 | 0.01 | l/m | l/m | |
| primary | leak check | 0.000 | 0.000 | 0.01 | 0.000 | 0.02 | l/m | l/m | |
| primary | test pt 1 | 1.527 | 1.540 | 1.61 | 0.000 | 1.50 | l/m | l/m | -2.60% |
| primary | test pt 2 | 1.529 | 1.540 | 1.61 | 0.000 | 1.50 | l/m | l/m | -2.60% |
| primary | test pt 3 | 1.529 | 1.540 | 1.61 | 0.000 | 1.50 | l/m | l/m | -2.60% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Leak Test | **Condition** | | **Status** | pass |
| **Sensor Component** | Tubing Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Filter Position | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Rotometer Condition | **Condition** | Clean and dry | **Status** | pass |
| **Sensor Component** | Moisture Present | **Condition** | No moisture present | **Status** | pass |
| **Sensor Component** | Filter Distance | **Condition** | 3.0 cm | **Status** | pass |
| **Sensor Component** | Filter Depth | **Condition** | 3.0 cm | **Status** | pass |
| **Sensor Component** | Filter Azimuth | **Condition** | 225 deg | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1105347318 | BVL130 | Eric Hebert | 11/09/2017 | Ozone | 000739 |

| | | | |
|---|---|---|---|
| **Slope:** | 0.99042 | **Slope:** | 0.00000 |
| **Intercept** | -0.28650 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99999 | **CorrCoff** | 0.00000 |

**DAS 1:** **DAS 2:**

| A Avg % Diff: | A Max % Di | A Avg %Dif | A Max % Di |
|---|---|---|---|
| 1.3% | 1.4% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 0517112167 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01113 | | |
| **Slope** | 1.00504 | **Intercept** | 0.32915 |
| **Cert Date** | 9/12/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.35 | 0.02 | -0.60 | ppb | |
| primary | 2 | 13.69 | 13.29 | 13.11 | ppb | -1.35% |
| primary | 3 | 37.42 | 36.90 | 36.44 | ppb | -1.25% |
| primary | 4 | 68.36 | 67.68 | 66.77 | ppb | -1.34% |
| primary | 5 | 109.21 | 108.33 | 106.90 | ppb | -1.32% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.10 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.015 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 106.8 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.66 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 724.8 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 36.7 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 94.5 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.69 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 725.4 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Wind Speed Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 58322wsp | BVL130 | Eric Hebert | 11/09/2017 | Wind Speed | 04866 |

|  |  |  |  |
|---|---|---|---|
| **Mfg** | RM Young | **Parameter** | wind speed |
| **Serial Number** |  | **Tfer Desc.** | wind speed motor (h |
| **Tfer ID** | 01262 |  |  |
| **Slope** | 1.00000 | **Intercept** | 0.00000 |
| **Cert Date** | 1/26/2017 | **CorrCoff** | 1.00000 |

**Prop or Cups SN** 68622

**Prop or Cups Torque** 0.3 **to** 0.4

**Prop Correction Fact** 0.0512

|  | DAS 1: |  | DAS 2: |  |
|---|---|---|---|---|
|  | Low Range | High Range | Low Range | High Range |
| **Abs Avg Err** | 0.06 | 0.00% |  |  |
| **Abs Max Er** | 0.20 | 0.00% |  |  |

| UseDescription: | Input Device | Input RPM | Input m/s | Out V | DAS m/s | Diff/ %Diff | Diff | WsM |
|---|---|---|---|---|---|---|---|---|
| primary | none | 0 | 0.20 | 0.0 | 0.0 |  | -0.20 |  |
| primary | 01262 | 200 | 1.02 | 0.0 | 1.0 |  | 0.00 |  |
| primary | 01262 | 400 | 2.05 | 0.0 | 2.1 |  | 0.00 |  |
| primary | 01262 | 800 | 4.10 | 0.0 | 4.1 |  | -0.02 |  |
| primary | 01262 | 1200 | 6.14 | 0.0 | 6.1 | 0.00% |  |  |
| primary | 01262 | 2400 | 12.29 | 0.0 | 12.3 | 0.00% |  |  |
| primary | 01262 | 4000 | 20.48 | 0.0 | 20.5 | 0.00% |  |  |
| primary | 01262 | 9400 | 48.13 | 0.0 | 48.1 | 0.00% |  |  |

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| **Sensor Component** | Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Prop or Cups Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Sensor Heater | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Torque | **Condition** |  | **Status** | pass |
| **Sensor Component** | Sensor Plumb | **Condition** | Plumb | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** |  | **Status** | pass |

# Wind Direction Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 58322wdr | BVL130 | Eric Hebert | 11/09/2017 | Wind Direction | 04866 |

| | | | |
|---|---|---|---|
| **Mfg** | RM Young | **Parameter** | wind direction |
| **Serial Number** | None | **Tfer Desc.** | wind direction wheel |
| **Tfer ID** | 01458 | | |
| **Slope** | 1.00000 | **Intercept** | 0.00000 |
| **Cert Date** | 1/1/2017 | **CorrCoff** | 1.00000 |
| **Mfg** | Ushikata | **Parameter** | wind direction |
| **Serial Number** | 191832 | **Tfer Desc.** | transit |
| **Tfer ID** | 01272 | | |
| **Slope** | 1.00000 | **Intercept** | 0.00000 |
| **Cert Date** | 2/8/2017 | **CorrCoff** | 1.00000 |

**Vane SN:** N/A

**C. A. Align. deg. true:** 180

**VaneTorque** 10 **to** 12

| | **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|---|
| | **Orientation** | **Linearity:** | **Orientation** | **Linearity:** |
| **Abs Avg Err** | 2.0 | 0.9 | | |
| **Abs Max Er** | 3 | 2 | | |

| UseDescription | TferID | Input Raw | Linearity | Output V | Output Deg. | Difference | Change | Error |
|---|---|---|---|---|---|---|---|---|
| primary | 01458 | 0 | ☑ | 0.000 | 1 | 1 | 43.8 | -1.2 |
| primary | 01458 | 45 | ☑ | 0.000 | 46 | 1 | 44.2 | -0.7 |
| primary | 01458 | 90 | ☑ | 0.000 | 91 | 1 | 45.2 | 0.1 |
| primary | 01458 | 135 | ☑ | 0.000 | 136 | 1 | 45.5 | 0.5 |
| primary | 01458 | 180 | ☑ | 0.000 | 183 | 3 | 46.9 | 1.8 |
| primary | 01458 | 225 | ☑ | 0.000 | 229 | 4 | 46.1 | 1.1 |
| primary | 01458 | 270 | ☑ | 0.000 | 273 | 3 | 43.8 | -1.1 |
| primary | 01458 | 315 | ☑ | 0.000 | 318 | 3 | 44.5 | -0.5 |
| primary | 01272 | 90 | ☐ | 0.000 | 91 | 1 | | 1 |
| primary | 01272 | 180 | ☐ | 0.000 | 183 | 3 | | 3 |
| primary | 01272 | 270 | ☐ | 0.000 | 273 | 3 | | 3 |
| primary | 01272 | 360 | ☐ | 0.000 | 1 | 1 | | 1 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Mast | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Sensor Heater | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Sensor Plumb | **Condition** | Plumb | **Status** | pass |
| **Sensor Component** | Torque | **Condition** | | **Status** | pass |
| **Sensor Component** | Vane Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Temperature Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 6704 | BVL130 | Eric Hebert | 11/09/2017 | Temperature | 04690 |

**Mfg** Extech
**Parameter** Temperature
**Serial Number** H232679
**Tfer Desc.** RTD
**Tfer ID** 01228
**Slope** 1.00656
**Intercept** -0.03341
**Cert Date** 2/4/2017
**CorrCoff** 1.00000

**DAS 1:**

**DAS 2:**

| Abs Avg Err | Abs Max Er | Abs Avg Err | Abs Max Er |
|---|---|---|---|
| 0.13 | 0.16 | | |

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Low Range | -0.08 | -0.05 | 0.000 | 0.08 | C | 0.13 |
| primary | Temp Mid Range | 25.95 | 25.81 | 0.000 | 25.72 | C | -0.09 |
| primary | Temp High Range | 49.12 | 48.83 | 0.000 | 48.67 | C | -0.16 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Shield | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# 2 Meter Temperature Data Form

Calc. Difference

| **Mfg** | **Serial Number Ta** | **Site** | **Technician** | **Site Visit Date** | **Parameter** | **Owner ID** |
|---|---|---|---|---|---|---|
| RM Young | 14037 | BVL130 | Eric Hebert | 11/09/2017 | Temperature2meter | 06404 |

| | | | |
|---|---|---|---|
| **Mfg** | Extech | **Parameter** | Temperature |
| **Serial Number** | H232679 | **Tfer Desc.** | RTD |
| **Tfer ID** | 01228 | | |
| **Slope** | 1.00656 | **Intercept** | -0.03341 |
| **Cert Date** | 2/4/2017 | **CorrCoff** | 1.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **Abs Avg Err** | **Abs Max Er** | **Abs Avg Err** | **Abs Max Er** |
| 0.2 | 0.28 | | |

| UseDescription | Test type | InputTmpRaw | InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Low Rang | -0.08 | -0.05 | 0.000 | 0.23 | C | 0.28 |
| primary | Temp Mid Rang | 25.95 | 25.81 | 0.000 | 25.72 | C | -0.09 |
| primary | Temp High Rang | 49.12 | 48.83 | 0.000 | 48.61 | C | -0.22 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Properly Sited | **Condition** | Properly sited | **Status** | pass |
| **Sensor Component** | Shield | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Humidity Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Vaisala | 850853 | BVL130 | Eric Hebert | 11/09/2017 | Relative Humidity | 07117 |

| | | | |
|---|---|---|---|
| **Mfg** | Rotronic | **Parameter** | Relative Humidity |
| **Serial Number** | 124432 | **Tfer Desc.** | Hygroclip |
| **Tfer ID** | 01225 | | |
| **Slope** | 0.87488 | **Intercept** | 5.14795 |
| **Cert Date** | 10/10/2017 | **CorrCoff** | 0.99493 |

| | DAS 1: | | DAS 2: | |
|---|---|---|---|---|
| | **Low Range** | **High Range** | **Low Range** | **High Range** |
| **Abs Avg Err** | 15.1 | | | |
| **Abs Max Er** | 24.9 | | | |

| UseDesc. | Test type | Device | Input RH | GTL Raw | RH Corr. | DAS Volts | DAS %RH | Difference |
|---|---|---|---|---|---|---|---|---|
| primary | RH Low Range | Hygroclip | 32.8 | 36.5 | 32.8 | 0.000 | 45.8 | 13.0 |
| primary | RH Low Range | Hygroclip | 52.9 | 57.4 | 52.9 | 0.000 | 65.9 | 13.0 |
| primary | RH Low Range | Hygroclip | 75.3 | 76.1 | 75.3 | 0.000 | 100.2 | 24.9 |
| primary | RH Low Range | Ambient | | 29.8 | 29.0 | 0.000 | 38.6 | 9.6 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | RH Filter | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Shield | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Solar Radiation Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Licor | PY10653 | BVL130 | Eric Hebert | 11/09/2017 | Solar Radiation | 04566 |

| | | |
|---|---|---|
| **Mfg** | RM Young | |
| **SN/Owner ID** | none | 04340 |
| **Parameter** | Solar Radiation Translator | |

| | | | |
|---|---|---|---|
| **Mfg** | Eppley | **Parameter** | solar radiation |
| **Serial Number** | 10765 | **Tfer Desc.** | SR transfer translat |
| **Tfer ID** | 01246 | | |
| **Slope** | 1.00000 | **Intercept** | 0.00000 |
| **Cert Date** | 2/10/2017 | **CorrCoff** | 1.00000 |
| **Mfg** | Eppley | **Parameter** | solar radiation |
| **Serial Number** | 34341F3 | **Tfer Desc.** | SR transfer sensor |
| **Tfer ID** | 01245 | | |
| **Slope** | 1.00000 | **Intercept** | 0.00000 |
| **Cert Date** | 2/10/2017 | **CorrCoff** | 1.00000 |

| DAS 1: | | DAS 2: | |
|---|---|---|---|
| % Diff of Avg | %Diff of Max | %Diff of Avg | %Diff of Max |
| 8.5% | 10.1% | 0.0% | 0.0% |

| UseDescription | Measure Date | MeasureTime | Tfer Raw | Tfer Corr | DAS w/m2 | PctDifference |
|---|---|---|---|---|---|---|
| primary | 11/10/2017 | 10:00 | 415 | 415 | 371 | -10.6% |
| primary | 11/10/2017 | 11:00 | 540 | 540 | 481 | -11.0% |
| primary | 11/10/2017 | 12:00 | 588 | 588 | 529 | -10.1% |
| primary | 11/10/2017 | 13:00 | 549 | 549 | 502 | -8.7% |
| primary | 11/10/2017 | 14:00 | 456 | 456 | 423 | -7.2% |
| primary | 11/10/2017 | 15:00 | 326 | 326 | 310 | -4.8% |
| primary | 11/10/2017 | 16:00 | 134 | 134 | 138 | 2.8% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sensor Clean | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Sensor Level | **Condition** | Level | **Status** | pass |
| **Sensor Component** | Properly Sited | **Condition** | Properly sited | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Precipitation Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Climatronics | illegible | BVL130 | Eric Hebert | 11/09/2017 | Precipitation | 02704 |

**Mfg** PMP
**Parameter** Precipitation
**Serial Number** EW-06134-50
**Tfer Desc.** 250ml graduate
**Tfer ID** 01250
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 9/5/2005
**CorrCoff** 1.00000

| DAS 1: |  | DAS 2: |  |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 1.0% | 2.0% |  |  |

| UseDesc. | Test type | TferVolume | Iteration | TimePerTip | Eq.Ht | DAS eng | Eq.HtUnit | OSE Unit | TferUnits | PctDifference |
|---|---|---|---|---|---|---|---|---|---|---|
| primary | test 1 | 231.5 | 1 | 10 sec | 0.50 | 0.51 | in | in | ml | 2.0% |
| primary | test 2 | 231.5 | 2 | 10 sec | 0.50 | 0.50 | in | in | ml | 0.0% |

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| **Sensor Component** | Properly Sited | **Condition** | 45 degree rule | **Status** | pass |
| **Sensor Component** | Gauge Drain Screen | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Funnel Clean | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Gauge Screen | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Gauge Clean | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Level | **Condition** | Level | **Status** | pass |
| **Sensor Component** | Sensor Heater | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** |  | **Status** | pass |

# Surface Wetness Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | none | BVL130 | Eric Hebert | 11/09/2017 | Surface Wetness | 06153 |

**Mfg** Ohmite

**Parameter** surface wetness

**Serial Number** 296-1200

**Tfer Desc.** decade box

**Tfer ID** 01210

**Slope** 1.00000

**Intercept** 0.00000

**Cert Date** 1/4/2011

**CorrCoff** 1.00000

☑ **Manual Test Pass**

| UseDescription | Test Type | Tfer kOhms | OutputSignal | DAS eng | OutputSignalEngUni | TferUnits | OutputSignalUnit |
|---|---|---|---|---|---|---|---|
| primary | dry | N/A | 0.000 | 0.01 | V | N/A | V |
| primary | wet | N/A | 0.000 | 1.01 | V | N/A | V |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Properly Sited | **Condition** | Properly sited | **Status** | pass |
| **Sensor Component** | Grid Clean | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Grid Angle | **Condition** | About 30 deg | **Status** | pass |
| **Sensor Component** | Grid Orientation | **Condition** | North | **Status** | pass |
| **Sensor Component** | Grid Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Grid Type | **Condition** | Grid without holes | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Shelter Temperature Data For

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Campbell | unknown | BVL130 | Eric Hebert | 11/09/2017 | Shelter Temperature | none |

**DAS 1:**

| Abs Avg Err | Abs Max Er |
|---|---|
| 0.27 | 0.54 |

**DAS 2:**

| Abs Avg Err | Abs Max Er |
|---|---|
|  |  |

**Mfg** Extech

**Parameter** Shelter Temperatur

**Serial Number** H232679

**Tfer Desc.** RTD

**Tfer ID** 01228

**Slope** 1.00656

**Intercept** -0.03341

**Cert Date** 2/4/2017

**CorrCoff** 1.00000

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Mid Range | 24.66 | 24.53 | 0.000 | 24.0 | C | -0.54 |
| primary | Temp Mid Range | 25.55 | 25.42 | 0.000 | 25.4 | C | -0.07 |
| primary | Temp Mid Range | 24.38 | 24.25 | 0.000 | 24.1 | C | -0.19 |

**Sensor Component** System Memo

**Condition**

**Status** pass

## Infrastructure Data For

**Site ID** BVL130 **Technician** Eric Hebert **Site Visit Date** 11/09/2017

| **Shelter Make** | **Shelter Model** | **Shelter Size** |
|---|---|---|
| Ekto | 8810 (s/n 2140-1) | 640 cuft |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Tower Type | **Condition** | Type B | **Status** | pass |
| **Sensor Component** | Conduit | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Met Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Moisture Trap | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Power Cables | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Temp Control | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Rotometer | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Sample Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Condition | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Shelter Door | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Shelter Roof | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Floor | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Signal Cable | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Tubing Type | **Condition** | 3/8 teflon | **Status** | pass |
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |

# Field Systems Comments

1 **Parameter:** SiteOpsProcedures

Ozone and NCORE sample line filters are replaced, and the sample lines are leaked tested, every 2 weeks.

2 **Parameter:** SitingCriteriaCom

The site is located in an agricultural and atmospheric research center.  There are crops within 50 meters.

3 **Parameter:** ShelterCleanNotes

The shelter is somewhat cluttered but is improved since the previous audit visit.

4 **Parameter:** MetSensorComme

The tipping bucket rain gage is mounted near the meteorological tower and in violation of the 45 degree rule.

# Field Systems Data Form

**F-02058-1500-S1-rev002**

**Site ID** BVL130 **Technician** Eric Hebert **Site Visit Date** 11/09/2017

| | | | | |
|---|---|---|---|---|
| **Site Sponsor (agency)** | EPA | **USGS Map** | | Bondville |
| **Operating Group** | ISWS | **Map Scale** | | |
| **AQS #** | 17-019-1001 | **Map Date** | | |
| **Meteorological Type** | Climatronics | | | |
| **Air Pollutant Analyzer** | Ozone, IMPROVE | **QAPP Latitude** | | 40.0520 |
| **Deposition Measurement** | dry, wet, Hg | **QAPP Longitude** | | -88.3725 |
| **Land Use** | agricultural | **QAPP Elevation Meters** | | 212 |
| **Terrain** | flat | **QAPP Declination** | | -2.1 |
| **Conforms to MLM** | Yes | **QAPP Declination Date** | | 9/16/2005 |
| **Site Telephone** | (217) 863-2602 | **Audit Latitude** | | 40.052021 |
| **Site Address 1** | Bondville Road Research Station | **Audit Longitude** | | -88.372481 |
| **Site Address 2** | | **Audit Elevation** | | 213 |
| **County** | Champaign | **Audit Declination** | | -2.9 |
| **City, State** | Seymour, IL | | **Present** | |
| **Zip Code** | 61875 | **Fire Extinguisher** | ☑ | New in 2015 |
| **Time Zone** | Central | **First Aid Kit** | ☑ | |
| **Primary Operator** | | **Safety Glasses** | ☐ | |
| **Primary Op. Phone #** | | **Safety Hard Hat** | ☑ | |
| **Primary Op. E-mail** | | **Climbing Belt** | ☑ | |
| **Backup Operator** | | **Security Fence** | ☐ | |
| **Backup Op. Phone #** | | **Secure Shelter** | ☑ | |
| **Backup Op. E-mail** | | **Stable Entry Step** | ☑ | |

**Shelter Working Room** ☑ **Make** Ekto **Model** 8810 (s/n 2140-1) **Shelter Size** 640 cuft

**Shelter Clean** ☑ **Notes** The shelter is somewhat cluttered but is improved since the previous audit visit.

**Site OK** ☑ **Notes**

**Driving Directions** From Champaign take I-57 south to exit 229, route CR 18. Go west on CR 18 approximately 2.5 miles and turn right (north) on CR 500E. Continue approximately 1.7 miles to the Bondville Road Research Center on the left. The site is visible in the field on the right.

# Field Systems Data Form

F-02058-1500-S2-rev002

**Site ID** BVL130 **Technician** Eric Hebert **Site Visit Date** 11/09/2017

| Potential Interferent | Minimum Distance From Measurement Apparatus | Distance | Pass = Checked |
|---|---|---|---|
| Large Point Source of SO2 or NOx | 20 to 40 km | | ☑ |
| Major industrial complex | 10 to 20 km | | ☑ |
| City > 50,000 population | 40 km | | ☑ |
| City 10,000 to 50,000 population | 10 km | | ☑ |
| City 1,000 to 10,000 population | 5 km | | ☑ |
| Major highway, airport or rail yard | 2 km | | ☑ |
| Secondary road, heavily traveled | 500 m | | ☑ |
| Secondary road, lightly traveled | 200 m | | ☑ |
| Feedlot operations | 500 m | | ☑ |
| Intensive agricultural ops (including aerial spraying) | 500 m | | ☑ |
| Limited agricultural operations | 200 m | 50 m | ☐ |
| Large parking lot | 200 m | | ☑ |
| Small parking lot | 100 m | | ☑ |
| Tree line | 50 m | | ☑ |
| Obstacles to wind | 10 times obstacle height | | ☑ |

**Siting Distances OK** ☑

**Siting Criteria Comment**

The site is located in an agricultural and atmospheric research center.  There are crops within 50 meters.

# Field Systems Data Form

**F-02058-1500-S3-rev002**

**Site ID** BVL130 **Technician** Eric Hebert **Site Visit Date** 11/09/2017

| | | | |
|---|---|---|---|
| 1 | **Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?** | ☑ | |
| 2 | **Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind)** | ☑ | |
| 3 | **Are the tower and sensors plumb?** | ☑ | |
| 4 | **Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?** | ☑ | |
| 5 | **Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)** | ☑ | |
| 6 | **Is the solar radiation sensor plumb?** | ☑ | |
| 7 | **Is it sited to avoid shading, or any artificial or reflected light?** | ☑ | |
| 8 | **Is the rain gauge plumb?** | ☑ | |
| 9 | **Is it sited to avoid sheltering effects from buildings, trees, towers, etc?** | ☐ | Violation of 45 degree rule |
| 10 | **Is the surface wetness sensor sited with the grid surface facing north?** | ☑ | |
| 11 | **Is it  inclined approximately 30 degrees?** | ☑ | |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The tipping bucket rain gage is mounted near the meteorological tower and in violation of the 45 degree rule.

# Field Systems Data Form

F-02058-1500-S4-rev002

**Site ID** BVL130 **Technician** Eric Hebert **Site Visit Date** 11/09/2017

| | | | |
|---|---|---|---|
| 1 | Do all the meterological sensors appear to be intact, in good condition, and well maintained? | ☑ | |
| 2 | Are all the meteorological sensors operational online, and reporting data? | ☑ | |
| 3 | Are the shields for the temperature and RH sensors clean? | ☑ | |
| 4 | Are the aspirated motors working? | ☑ | |
| 5 | Is the solar radiation sensor's lens clean and free of scratches? | ☑ | |
| 6 | Is the surface wetness sensor grid clean and undamaged? | ☑ | |
| 7 | Are the sensor signal and power cables intact, in good condition, and well maintained? | ☑ | |
| 8 | Are the sensor signal and power cable connections protected from the elements and well maintained? | ☑ | |

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

# Field Systems Data Form

F-02058-1500-S5-rev002

**Site ID** BVL130 **Technician** Eric Hebert **Site Visit Date** 11/09/2017

## Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E

| | | | |
|---|---|---|---|
| 1 | Do the sample inlets have at least a 270 degree arc of unrestricted airflow? | ☑ | |
| 2 | Are the sample inlets 3 - 15 meters above the ground? | ☑ | |
| 3 | Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? | ☑ | |

## Pollutant analyzers and deposition equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the analyzers and equipment appear to be in good condition and well maintained? | ☑ | |
| 2 | Are the analyzers and monitors operational, on-line, and reporting data? | ☑ | |
| 3 | Describe ozone sample tube. | | 1/4 teflon by 12 meters |
| 4 | Describe dry dep sample tube. | | 3/8 teflon by 12 meters |
| 5 | Are in-line filters used in the ozone sample line? (if yes indicate location) | ☑ | At inlet only |
| 6 | Are sample lines clean, free of kinks, moisture, and obstructions? | ☑ | |
| 7 | Is the zero air supply desiccant unsaturated? | ☑ | |
| 8 | Are there moisture traps in the sample lines? | ☑ | flow, SO2, and CO line only |
| 9 | Is there a rotometer in the dry deposition filter line, and is it clean? | ☑ | Clean and dry |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S6-rev002

**Site ID** BVL130

**Technician** Eric Hebert

**Site Visit Date** 11/09/2017

## DAS, sensor translators, and peripheral equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the DAS instruments appear to be in good condition and well maintained? | ☑ | |
| 2 | Are all the components of the DAS operational? (printers, modem, backup, etc) | ☑ | |
| 3 | Do the analyzer and sensor signal leads pass through lightning protection circuitry? | ☑ | Met sensors only |
| 4 | Are the signal connections protected from the weather and well maintained? | ☑ | |
| 5 | Are the signal leads connected to the correct DAS channel? | ☑ | |
| 6 | Are the DAS, sensor translators, and shelter properly grounded? | ☑ | |
| 7 | Does the instrument shelter have a stable power source? | ☑ | |
| 8 | Is the instrument shelter temperature controlled? | ☑ | |

| | | Stable | Grounded |
|---|---|---|---|
| 9 | Is the met tower stable and grounded? | ☑ | ☑ |
| 10 | Is the sample tower stable and grounded? | ☑ | ☑ |

11 Tower comments?

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

# Field Systems Data Form

## F-02058-1500-S7-rev002

**Site ID** BVL130 **Technician** Eric Hebert **Site Visit Date** 11/09/2017

### Documentation

### Does the site have the required instrument and equipment manuals?

| | Yes | No | N/A |
|---|---|---|---|
| Wind speed sensor | ☑ | ☐ | ☐ |
| Wind direction sensor | ☑ | ☐ | ☐ |
| Temperature sensor | ☑ | ☐ | ☐ |
| Relative humidity sensor | ☐ | ☑ | ☐ |
| Solar radiation sensor | ☑ | ☐ | ☐ |
| Surface wetness sensor | ☐ | ☑ | ☐ |
| Wind sensor translator | ☐ | ☐ | ☑ |
| Temperature translator | ☐ | ☐ | ☑ |
| Humidity sensor translator | ☐ | ☐ | ☑ |
| Solar radiation translator | ☐ | ☑ | ☐ |
| Tipping bucket rain gauge | ☑ | ☐ | ☐ |
| Ozone analyzer | ☑ | ☐ | ☐ |
| Filter pack flow controller | ☐ | ☑ | ☐ |
| Filter pack MFC power supply | ☐ | ☑ | ☐ |

| | Yes | No | N/A |
|---|---|---|---|
| Data logger | ☐ | ☑ | ☐ |
| Data logger | ☐ | ☐ | ☑ |
| Strip chart recorder | ☐ | ☐ | ☑ |
| Computer | ☑ | ☐ | ☐ |
| Modem | ☐ | ☑ | ☐ |
| Printer | ☐ | ☑ | ☐ |
| Zero air pump | ☐ | ☑ | ☐ |
| Filter flow pump | ☐ | ☑ | ☐ |
| Surge protector | ☐ | ☐ | ☑ |
| UPS | ☐ | ☑ | ☐ |
| Lightning protection device | ☐ | ☐ | ☑ |
| Shelter heater | ☐ | ☑ | ☐ |
| Shelter air conditioner | ☐ | ☑ | ☐ |

### Does the site have the required and most recent QC documents and report forms?

| | Present | | Current |
|---|---|---|---|
| Station Log | ☑ | | ☐ |
| SSRF | ☑ | | ☑ |
| Site Ops Manual | ☑ | Nov 2014 | ☑ |
| HASP | ☑ | Nov 2014 | ☑ |
| Field Ops Manual | ☑ | | ☑ |
| Calibration Reports | ☑ | | ☑ |
| Ozone z/s/p Control Charts | ☐ | | ☐ |
| Preventive maintenance schedul | ☐ | | ☐ |

| | | | |
|---|---|---|---|
| 1 | Is the station log properly completed during every site visit? | ☑ | |
| 2 | Are the Site Status Report Forms being completed and current? | ☑ | |
| 3 | Are the chain-of-custody forms properly used to document sample transfer to and from lab? | ☑ | |
| 4 | Are ozone z/s/p control charts properly completed and current? | ☐ | Control charts not used |

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

# Field Systems Data Form

F-02058-1500-S8-rev002

**Site ID** BVL130 **Technician** Eric Hebert **Site Visit Date** 11/09/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? | ☑ | at ESE in 1986 |
| 2 | Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ | |
| 3 | Is the site visited regularly on the required Tuesday schedule? | ☑ | |
| 4 | Are the standard CASTNET operational procedures being flollowed by the site operator? | ☑ | |
| 5 | Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation) | ☑ | |

## Are regular operational QA/QC checks performed on meteorological instruments?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multipoint Calibrations | ☑ | Semiannually | ☑ |
| Visual Inspections | ☑ | Daily | ☑ |
| Translator Zero/Span Tests (climatronics) | ☐ | N/A | ☑ |
| Manual Rain Gauge Test | ☑ | Weekly | ☑ |
| Confirm Reasonableness of Current Values | ☑ | Weekly | ☑ |
| Test Surface Wetness Response | ☑ | Weekly | ☑ |

## Are regular operational QA/QC checks performed on the ozone analyzer?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point Calibrations | ☑ | Semiannually | ☑ |
| Automatic Zero/Span Tests | ☑ | Daily | ☑ |
| Manual Zero/Span Tests | ☑ | As needed | ☑ |
| Automatic Precision Level Tests | ☑ | Daily | ☑ |
| Manual Precision Level Test | ☑ | As needed | ☑ |
| Analyzer Diagnostics Tests | ☑ | Weekly | ☑ |
| In-line Filter Replacement (at inlet) | ☑ | Every 2 weeks | ☑ |
| In-line Filter Replacement (at analyze | ☐ | N/A | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |
| Zero Air Desiccant Check | ☑ | Weekly | ☑ |

| | | | |
|---|---|---|---|
| 1 | Do multi-point calibration gases go through the complete sample train including all filters? | ☐ | Unknown |
| 2 | Do automatic and manual z/s/p gasses go through the complete sample train including all filters? | ☑ | |
| 3 | Are the automatic and manual z/s/p checks monitored and reported? If yes, how? | ☑ | SSRF, call-in |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

Ozone and NCORE sample line filters are replaced, and the sample lines are leaked tested, every 2 weeks.

# Field Systems Data Form

F-02058-1500-S9-rev002

**Site ID** BVL130

**Technician** Eric Hebert

**Site Visit Date** 11/09/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Is the filter pack being changed every Tuesday as scheduled? | ☑ | Filter changed morinings |
| 2 | Are the Site Status Report Forms being completed and filed correctly? | ☑ | |
| 3 | Are data downloads and backups being performed as scheduled? | ☐ | No longer required |
| 4 | Are general observations being made and recorded? How? | ☑ | SSRF |
| 5 | Are site supplies on-hand and replenished in a timely fashion? | ☑ | |
| 6 | Are sample flow rates recorded? How? | ☑ | SSRF, call-in |
| 7 | Are samples sent to the lab on a regular schedule in a timely fashion? | ☑ | |
| 8 | Are filters protected from contamination during handling and shipping? How? | ☑ | Clean gloves on and off |
| 9 | Are the site conditions reported regularly to the field operations manager or staff? | ☑ | |

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point MFC Calibrations | ☑ | Semiannually | ☑ |
| Flow System Leak Checks | ☑ | Weekly | ☑ |
| Filter Pack Inspection | ☐ | | ☐ |
| Flow Rate Setting Checks | ☑ | Weekly | ☑ |
| Visual Check of Flow Rate Rotometer | ☑ | Weekly | ☑ |
| In-line Filter Inspection/Replacement | ☐ | Semiannually | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

# F-02058-1500-S10-rev002

**Site ID** BVL130 **Technician** Eric Hebert **Site Visit Date** 11/09/2017

## Site Visit Sensors

| Parameter | Manufacturer | Model | S/N | Client ID |
|---|---|---|---|---|
| CO | Teledyne | T300U | 87 | 000760 |
| Computer | Dell | Inspiron 15 | B94MC12 | 07073 |
| DAS | Campbell | CR3000 | 2539 | 000424 |
| Elevation | Elevation | 1 | None | None |
| Filter pack flow pump | Thomas | 107CAB18 | 060300019995 | 04860 |
| Flow Rate | Apex | AXMC105LPMDPC | illegible | 000595 |
| Infrastructure | Infrastructure | none | none | none |
| Met tower | Climatronics | 14 inch taper | none | 02738 |
| Modem | Raven | H4223-C | 0844355827 | 06610 |
| Noy | Teledyne | T200U | 110 | 000805 |
| Ozone | ThermoElectron Inc | 49i A1NAA | 1105347318 | 000739 |
| Ozone Standard | ThermoElectron Inc | 49i A3NAA | 0922236890 | 000512 |
| Precipitation | Climatronics | 100508-2 | illegible | 02704 |
| Relative Humidity | Vaisala | HMP45A | 850853 | 07117 |
| Sample Tower | Aluma Tower | B | unknown | 000182 |
| Shelter Temperature | Campbell | 107-L | unknown | none |
| Shield (10 meter) | RM Young | Aspirated 43408 | none | 06206 |
| Shield (2 meter) | RM Young | Aspirated 43408 | none | 06635 |
| Siting Criteria | Siting Criteria | 1 | None | None |
| SO2 | Teledyne | T100U | 94 | 000787 |
| Solar Radiation | Licor | LI-200 | PY10653 | 04566 |
| Solar Radiation Translator | RM Young | 70101-X | none | 04340 |
| Surface Wetness | RM Young | 58101 | none | 06153 |
| Temperature | RM Young | 41342 | 6704 | 04690 |
| Temperature2meter | RM Young | 41342 | 14037 | 06404 |
| Wind Direction | RM Young | AQ05305 | 58322wdr | 04866 |
| Wind Speed | RM Young | AQ05305 | 58322wsp | 04866 |
| Zero air pump | Teledyne | 701H | 576 | 000759 |
| Zero air pump | Werther International | PC70/4 | 000836218 | 06926 |

# Site Inventory by Site Visit

| Site Visit Date | | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *MAC426-Eric Hebert-11/13/2017* | | | | | | |
| 1 | 11/13/2017 | Computer | Hewlett Packard | none | 6560 b | 5CB1520H70 |
| 2 | 11/13/2017 | DAS | Environmental Sys Corp | 3027 | 8832 | A3027 |
| 3 | 11/13/2017 | Elevation | Elevation | None | 1 | None |
| 4 | 11/13/2017 | Filter pack flow pump | Thomas | none | 107CAB18B | 070000012920 |
| 5 | 11/13/2017 | Flow Rate | Tylan | none | FC280 | AW02213005 |
| 6 | 11/13/2017 | Infrastructure | Infrastructure | none | none | none |
| 7 | 11/13/2017 | Met tower | Climatronics | none | illegible | illegible |
| 8 | 11/13/2017 | MFC power supply | Tylan | 03677 | RO-32 | illegible |
| 9 | 11/13/2017 | Ozone | ThermoElectron Inc | none | 49i A3NAA | 1030745085 |
| 10 | 11/13/2017 | Ozone Standard | ThermoElectron Inc | none | 49i A1NAA | 1015543061 |
| 11 | 11/13/2017 | Sample Tower | Aluma Tower | none | B | none |
| 12 | 11/13/2017 | Shelter Temperature | ARS | 60 | none | none |
| 13 | 11/13/2017 | Siting Criteria | Siting Criteria | None | 1 | None |
| 14 | 11/13/2017 | Temperature2meter | RM Young | none | 41342 | 15104 |
| 15 | 11/13/2017 | Zero air pump | Werther International | none | PC70/4 | 606489 |

# DAS Data Form

**DAS Time Max Error:** 2.38

| Mfg | Serial Number | Site | Technician | Site Visit Date | Parameter | Use Desc. |
|---|---|---|---|---|---|---|
| Environmental Sys | A3027 | MAC426 | Eric Hebert | 11/13/2017 | DAS | Primary |

**Das Date:** 11/13/2017
**Das Time:** 9:38:23
**Das Day:** 317

**Audit Date** 11/13/2017
**Audit Time** 9:36:00
**Audit Day** 317

**Low Channel:**

| Avg Diff: | Max Diff: |
|---|---|
| 0.0001 | 0.0002 |

**High Channel:**

| Avg Diff: | Max Diff: |
|---|---|
| 0.0001 | 0.0002 |

**Mfg** Datel
**Parameter** DAS
**Serial Number** 4000392
**Tfer Desc.** Source generator (D
**Tfer ID** 01321
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 1/22/2015
**CorrCoff** 1.00000

**Mfg** Fluke
**Parameter** DAS
**Serial Number** 86590148
**Tfer Desc.** DVM
**Tfer ID** 01310
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 2/23/2017
**CorrCoff** 1.00000

| Channel | Input | DVM Output | DAS Output | InputUnit | OutputUnit | Difference |
|---|---|---|---|---|---|---|
| 16 | 0.0000 | 0.0000 | 0.0000 | V | V | 0.0000 |
| 16 | 0.1000 | 0.1000 | 0.0998 | V | V | -0.0002 |
| 16 | 0.3000 | 0.3000 | 0.3001 | V | V | 0.0001 |
| 16 | 0.5000 | 0.5001 | 0.5000 | V | V | -0.0001 |
| 16 | 0.7000 | 0.7001 | 0.7002 | V | V | 0.0001 |
| 16 | 0.9000 | 0.9002 | 0.9003 | V | V | 0.0001 |
| 16 | 1.0000 | 1.0002 | 1.0004 | V | V | 0.0002 |

# Flow Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Tylan | AW02213005 | MAC426 | Eric Hebert | 11/13/2017 | Flow Rate | none |

| | | |
|---|---|---|
| **Mfg** | Tylan | |
| **SN/Owner ID** | illegible | 03677 |
| **Parameter** | MFC power supply | |

| | | | |
|---|---|---|---|
| **Mfg** | BIOS | **Parameter** | Flow Rate |
| **Serial Number** | 122974 | **Tfer Desc.** | BIOS 220-H |
| **Tfer ID** | 01416 | | |
| **Slope** | 1.00732 | **Intercept** | -0.02202 |
| **Cert Date** | 3/8/2017 | **CorrCoff** | 0.99970 |

| DAS 1: | | DAS 2: | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 6.61% | 6.61% | | |

**Cal Factor Zero** 0.065

**Cal Factor Full Scale** 11.16

**Rotometer Reading:** 1.6

| Desc. | Test type | Input l/m | Input Corr_ | MfcDisp. | OutputSignal | Output S E | InputUnit | OutputSignalI | PctDifference |
|---|---|---|---|---|---|---|---|---|---|
| primary | pump off | 0.000 | 0.000 | -0.15 | 0.0000 | -0.07 | l/m | l/m | |
| primary | leak check | 0.000 | 0.000 | -0.14 | 0.0000 | -0.06 | l/m | l/m | |
| primary | test pt 1 | 1.644 | 1.650 | 1.32 | 0.0000 | 1.54 | l/m | l/m | -6.61% |
| primary | test pt 2 | 1.643 | 1.650 | 1.32 | 0.0000 | 1.54 | l/m | l/m | -6.61% |
| primary | test pt 3 | 1.638 | 1.650 | 1.32 | 0.0000 | 1.54 | l/m | l/m | -6.61% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Leak Test | **Condition** | | **Status** | pass |
| **Sensor Component** | Tubing Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Filter Position | **Condition** | Poor | **Status** | pass |
| **Sensor Component** | Rotometer Condition | **Condition** | Clean and dry | **Status** | pass |
| **Sensor Component** | Moisture Present | **Condition** | No moisture present | **Status** | pass |
| **Sensor Component** | Filter Distance | **Condition** | 6.5 cm | **Status** | pass |
| **Sensor Component** | Filter Depth | **Condition** | -3.0 cm | **Status** | pass |
| **Sensor Component** | Filter Azimuth | **Condition** | 235 deg | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1030745085 | MAC426 | Eric Hebert | 11/13/2017 | Ozone | none |

| | | | |
|---|---|---|---|
| **Slope:** | 0.98285 | **Slope:** | 0.00000 |
| **Intercept** | 0.16574 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99998 | **CorrCoff** | 0.00000 |

**DAS 1:** **DAS 2:**

| A Avg % Diff: | A Max % Di | A Avg %Dif | A Max % Di |
|---|---|---|---|
| 1.8% | 2.4% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 0517112167 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01113 | | |
| **Slope** | 1.00504 | **Intercept** | 0.32915 |
| **Cert Date** | 9/12/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.51 | 0.17 | 0.09 | ppb | |
| primary | 2 | 14.89 | 14.48 | 14.83 | ppb | 2.42% |
| primary | 3 | 37.93 | 37.41 | 36.82 | ppb | -1.58% |
| primary | 4 | 68.40 | 67.72 | 66.57 | ppb | -1.70% |
| primary | 5 | 108.99 | 108.11 | 106.50 | ppb | -1.49% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | -0.10 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.009 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 108.1 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.8 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.73 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 740.4 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 33.9 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 85.4 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.90 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 739.5 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# 2 Meter Temperature Data Form

Calc. Difference

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 15104 | MAC426 | Eric Hebert | 11/13/2017 | Temperature2meter | none |

**Mfg** Extech
**Parameter** Temperature
**Serial Number** H232679
**Tfer Desc.** RTD
**Tfer ID** 01228
**Slope** 1.00656
**Intercept** -0.03341
**Cert Date** 2/4/2017
**CorrCoff** 1.00000

| DAS 1: Abs Avg Err | DAS 1: Abs Max Er | DAS 2: Abs Avg Err | DAS 2: Abs Max Er |
|---|---|---|---|
| 0.2 | 0.25 | | |

| UseDescription | Test type | InputTmpRaw | InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Low Rang | 0.07 | 0.10 | 0.0000 | 0.25 | C | 0.15 |
| primary | Temp Mid Rang | 26.12 | 25.98 | 0.0000 | 25.73 | C | -0.25 |
| primary | Temp High Rang | 49.80 | 49.51 | 0.0000 | 49.30 | C | -0.21 |

| Sensor Component | | Condition | | Status | |
|---|---|---|---|---|---|
| Sensor Component | Properly Sited | Condition | Properly sited | Status | pass |
| Sensor Component | Shield | Condition | Moderately clean | Status | pass |
| Sensor Component | Blower | Condition | Functioning | Status | pass |
| Sensor Component | Blower Status Switch | Condition | N/A | Status | pass |
| Sensor Component | System Memo | Condition | | Status | pass |

# Shelter Temperature Data For

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ARS | none | MAC426 | Eric Hebert | 11/13/2017 | Shelter Temperature | 60 |

**DAS 1:**

| Abs Avg Err | Abs Max Er |
|---|---|
| 0.29 | 0.51 |

**DAS 2:**

| Abs Avg Err | Abs Max Er |
|---|---|
| | |

**Mfg** Extech

**Parameter** Shelter Temperatur

**Serial Number** H232679

**Tfer Desc.** RTD

**Tfer ID** 01228

**Slope** 1.00656

**Intercept** -0.03341

**Cert Date** 2/4/2017

**CorrCoff** 1.00000

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Mid Range | 25.06 | 24.93 | 0.000 | 25.4 | C | 0.51 |
| primary | Temp Mid Range | 25.63 | 25.50 | 0.000 | 25.7 | C | 0.18 |
| primary | Temp Mid Range | 25.67 | 25.54 | 0.000 | 25.7 | C | 0.18 |

**Sensor Component** System Memo

**Condition**

**Status** pass

## Infrastructure Data For

**Site ID** MAC426 **Technician** Eric Hebert **Site Visit Date** 11/13/2017

| **Shelter Make** | **Shelter Model** | **Shelter Size** |
|---|---|---|
| custom | N/A | 1536 cuft |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Tower Type | **Condition** | Type B | **Status** | pass |
| **Sensor Component** | Conduit | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Met Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Moisture Trap | **Condition** | Not installed | **Status** | pass |
| **Sensor Component** | Power Cables | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Temp Control | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Rotometer | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Sample Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Door | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Roof | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Floor | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Signal Cable | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Tubing Type | **Condition** | 3/8 teflon | **Status** | pass |
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |

# Site Visit Comments

| Parameter | Site | Technician | S.V. Date | Component | Mfg | Serial No. | Hazard | Problem |
|---|---|---|---|---|---|---|---|---|
| Flow Rate | MAC426 | Eric Hebert | 11/13/2017 | Filter Position | Tylan | 4410 | ☐ | ☑ |

The filter attachment plate is mounted too low in the enclosure resulting in the filter being exposed to wind-driven rain and in the standard geometric orientation.

# Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operators are very knowledgeable with air quality monitoring. They are doing a very good job with site activities and filter handling.

2 **Parameter:** SitingCriteriaCom

Bowling Green is within 40 km of the site. The site is in a hay field which is harvested twice per year. The area to the west and south is comprised of livestock farms including cattle and poultry.

3 **Parameter:** ShelterCleanNotes

The shelter is well maintained, clean, neat, and well organized.

# Field Systems Data Form

## F-02058-1500-S1-rev002

| | | | | | |
|---|---|---|---|---|---|
| **Site ID** | MAC426 | **Technician** | Eric Hebert | **Site Visit Date** | 11/13/2017 |

| | | | |
|---|---|---|---|
| **Site Sponsor (agency)** | NPS | **USGS Map** | Rhoda |
| **Operating Group** | NPS | **Map Scale** | |
| **AQS #** | 21-061-0501 | **Map Date** | |
| **Meteorological Type** | Climatronics | | |
| **Air Pollutant Analyzer** | Ozone, SO2, NOy, Hg, IMPROVE, PM | **QAPP Latitude** | 37.2806 |
| **Deposition Measurement** | dry, wet, Hg | **QAPP Longitude** | -86.2639 |
| **Land Use** | agriculture, woodland - mixed | **QAPP Elevation Meters** | 236 |
| **Terrain** | rolling | **QAPP Declination** | 3 |
| **Conforms to MLM** | Marginally | **QAPP Declination Date** | 12/27/2004 |
| **Site Telephone** | (270) 758-2136 | **Audit Latitude** | 37.131794 |
| **Site Address 1** | Alfred Cook Road | **Audit Longitude** | -86.142953 |
| **Site Address 2** | | **Audit Elevation** | 230 |
| **County** | Edmonson | **Audit Declination** | -4.0 |

| | | | | |
|---|---|---|---|---|
| | | | **Present** | |
| **City, State** | Smiths Grove, KY | | | |
| **Zip Code** | 42171 | **Fire Extinguisher** | ☑ | inspected March 2011 |
| **Time Zone** | Eastern | **First Aid Kit** | ☑ | |
| **Primary Operator** | | **Safety Glasses** | ☐ | |
| **Primary Op. Phone #** | | **Safety Hard Hat** | ☐ | |
| **Primary Op. E-mail** | | **Climbing Belt** | ☑ | |
| **Backup Operator** | | **Security Fence** | ☑ | |
| **Backup Op. Phone #** | | **Secure Shelter** | ☑ | |
| **Backup Op. E-mail** | | **Stable Entry Step** | ☑ | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Shelter Working Room** | ☑ | **Make** | custom | **Model** | N/A | **Shelter Size** | 1536 cuft |
| **Shelter Clean** | ☑ | **Notes** | The shelter is well maintained, clean, neat, and well organized. | | | | |
| **Site OK** | ☑ | **Notes** | | | | | |

**Driving Directions** From Bowling Green go east on 31W. Turn left (north) on 442 toward Pig. At the stop sign in Pig, turn right on route 259, or Brownsville Road. Continue approximately 1 mile, just past two churches (one on each side of the road). Take the 2nd left past the church on the left onto Chaumount Road. Then take the first left onto Doyle Road. Continue straight onto Alfred Cook Road. The site will be on the left approximately 0.6 miles.

# Field Systems Data Form

F-02058-1500-S2-rev002

**Site ID** MAC426 **Technician** Eric Hebert **Site Visit Date** 11/13/2017

| Potential Interferent | Minimum Distance From Measurement Apparatus | Distance | Pass = Checked |
|---|---|---|---|
| Large Point Source of SO2 or NOx | 20 to 40 km | | ☑ |
| Major industrial complex | 10 to 20 km | | ☑ |
| City > 50,000 population | 40 km | 35 km | ☐ |
| City 10,000 to 50,000 population | 10 km | | ☑ |
| City 1,000 to 10,000 population | 5 km | | ☑ |
| Major highway, airport or rail yard | 2 km | | ☑ |
| Secondary road, heavily traveled | 500 m | | ☑ |
| Secondary road, lightly traveled | 200 m | | ☑ |
| Feedlot operations | 500 m | | ☑ |
| Intensive agricultural ops (including aerial spraying) | 500 m | | ☑ |
| Limited agricultural operations | 200 m | 10 m | ☐ |
| Large parking lot | 200 m | | ☑ |
| Small parking lot | 100 m | | ☑ |
| Tree line | 50 m | | ☑ |
| Obstacles to wind | 10 times obstacle height | | ☑ |

**Siting Distances OK** ☑

**Siting Criteria Comment**

Bowling Green is within 40 km of the site. The site is in a hay field which is harvested twice per year. The area to the west and south is comprised of livestock farms including cattle and poultry.

# Field Systems Data Form

**F-02058-1500-S3-rev002**

**Site ID** MAC426 **Technician** Eric Hebert **Site Visit Date** 11/13/2017

| | | | |
|---|---|---|---|
| 1 | Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? | ☑ | N/A |
| 2 | Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) | ☑ | N/A |
| 3 | Are the tower and sensors plumb? | ☑ | N/A |
| 4 | Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? | ☑ | |
| 5 | Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) | ☑ | |
| 6 | Is the solar radiation sensor plumb? | ☑ | N/A |
| 7 | Is it sited to avoid shading, or any artificial or reflected light? | ☑ | N/A |
| 8 | Is the rain gauge plumb? | ☑ | N/A |
| 9 | Is it sited to avoid sheltering effects from buildings, trees, towers, etc? | ☑ | N/A |
| 10 | Is the surface wetness sensor sited with the grid surface facing north? | ☑ | N/A |
| 11 | Is it inclined approximately 30 degrees? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S4-rev002

**Site ID** MAC426 **Technician** Eric Hebert **Site Visit Date** 11/13/2017

| | | | |
|---|---|---|---|
| 1 | Do all the meterological sensors appear to be intact, in good condition, and well maintained? | ☑ | 2 meter Temperature only |
| 2 | Are all the meteorological sensors operational online, and reporting data? | ☑ | 2 meter Temperature only |
| 3 | Are the shields for the temperature and RH sensors clean? | ☑ | |
| 4 | Are the aspirated motors working? | ☑ | |
| 5 | Is the solar radiation sensor's lens clean and free of scratches? | ☑ | N/A |
| 6 | Is the surface wetness sensor grid clean and undamaged? | ☑ | N/A |
| 7 | Are the sensor signal and power cables intact, in good condition, and well maintained? | ☑ | |
| 8 | Are the sensor signal and power cable connections protected from the elements and well maintained? | ☑ | |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S5-rev002

**Site ID** MAC426 **Technician** Eric Hebert **Site Visit Date** 11/13/2017

## Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E

| | | | |
|---|---|---|---|
| 1 | Do the sample inlets have at least a 270 degree arc of unrestricted airflow? | ☑ | |
| 2 | Are the sample inlets 3 - 15 meters above the ground? | ☑ | |
| 3 | Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? | ☑ | |

## Pollutant analyzers and deposition equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the analyzers and equipment appear to be in good condition and well maintained? | ☑ | |
| 2 | Are the analyzers and monitors operational, on-line, and reporting data? | ☑ | |
| 3 | Describe ozone sample tube. | | 1/4 teflon by 10 meters |
| 4 | Describe dry dep sample tube. | | 3/8 teflon by 12 meters |
| 5 | Are in-line filters used in the ozone sample line? (if yes indicate location) | ☑ | At inlet only |
| 6 | Are sample lines clean, free of kinks, moisture, and obstructions? | ☑ | |
| 7 | Is the zero air supply desiccant unsaturated? | ☑ | |
| 8 | Are there moisture traps in the sample lines? | ☑ | |
| 9 | Is there a rotometer in the dry deposition filter line, and is it clean? | ☑ | Clean and dry |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S6-rev002

**Site ID** MAC426 **Technician** Eric Hebert **Site Visit Date** 11/13/2017

## DAS, sensor translators, and peripheral equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the DAS instruments appear to be in good condition and well maintained? | ☑ | |
| 2 | Are all the components of the DAS operational? (printers, modem, backup, etc) | ☑ | |
| 3 | Do the analyzer and sensor signal leads pass through lightning protection circuitry? | ☑ | Met sensors only |
| 4 | Are the signal connections protected from the weather and well maintained? | ☑ | |
| 5 | Are the signal leads connected to the correct DAS channel? | ☑ | |
| 6 | Are the DAS, sensor translators, and shelter properly grounded? | ☑ | |
| 7 | Does the instrument shelter have a stable power source? | ☑ | |
| 8 | Is the instrument shelter temperature controlled? | ☑ | |

| | | Stable | Grounded |
|---|---|---|---|
| 9 | Is the met tower stable and grounded? | ☑ | ☑ |
| 10 | Is the sample tower stable and grounded? | ☑ | ☑ |
| 11 | Tower comments? | | |

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

# Field Systems Data Form F-02058-1500-S7-rev002

**Site ID** MAC426 **Technician** Eric Hebert **Site Visit Date** 11/13/2017

## Documentation

### Does the site have the required instrument and equipment manuals?

| | Yes | No | N/A | | Yes | No | N/A |
|---|---|---|---|---|---|---|---|
| Wind speed sensor | ☑ | ☐ | ☐ | Data logger | ☑ | ☐ | ☐ |
| Wind direction sensor | ☑ | ☐ | ☐ | Data logger | ☐ | ☐ | ☑ |
| Temperature sensor | ☑ | ☐ | ☐ | Strip chart recorder | ☐ | ☐ | ☑ |
| Relative humidity sensor | ☐ | ☑ | ☐ | Computer | ☐ | ☑ | ☐ |
| Solar radiation sensor | ☑ | ☐ | ☐ | Modem | ☐ | ☑ | ☐ |
| Surface wetness sensor | ☐ | ☑ | ☐ | Printer | ☐ | ☑ | ☐ |
| Wind sensor translator | ☑ | ☐ | ☐ | Zero air pump | ☐ | ☑ | ☐ |
| Temperature translator | ☐ | ☑ | ☐ | Filter flow pump | ☐ | ☑ | ☐ |
| Humidity sensor translator | ☐ | ☐ | ☑ | Surge protector | ☐ | ☐ | ☑ |
| Solar radiation translator | ☑ | ☐ | ☐ | UPS | ☐ | ☐ | ☑ |
| Tipping bucket rain gauge | ☑ | ☐ | ☐ | Lightning protection device | ☐ | ☑ | ☐ |
| Ozone analyzer | ☑ | ☐ | ☐ | Shelter heater | ☐ | ☑ | ☐ |
| Filter pack flow controller | ☑ | ☐ | ☐ | Shelter air conditioner | ☑ | ☐ | ☐ |
| Filter pack MFC power supply | ☑ | ☐ | ☐ | | | | |

### Does the site have the required and most recent QC documents and report forms?

| | Present | | Current |
|---|---|---|---|
| Station Log | ☑ | DataView2 | ☑ |
| SSRF | ☑ | | ☑ |
| Site Ops Manual | ☑ | | ☑ |
| HASP | ☐ | | ☐ |
| Field Ops Manual | ☐ | | ☐ |
| Calibration Reports | ☑ | | ☑ |
| Ozone z/s/p Control Charts | ☐ | | ☐ |
| Preventive maintenance schedul | ☐ | | ☐ |

| | | | |
|---|---|---|---|
| 1 | Is the station log properly completed during every site visit? | ☑ | DataView |
| 2 | Are the Site Status Report Forms being completed and current? | ☑ | |
| 3 | Are the chain-of-custody forms properly used to document sample transfer to and from lab? | ☑ | |
| 4 | Are ozone z/s/p control charts properly completed and current? | ☐ | Control charts not used |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

**F-02058-1500-S8-rev002**

**Site ID** MAC426 **Technician** Eric Hebert **Site Visit Date** 11/13/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? | ☑ | Receives training every 6 months during calibration visits |
| 2 | Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? | ☑ | Receives training every 6 months during calibration visits |
| 3 | Is the site visited regularly on the required Tuesday schedule? | ☑ | |
| 4 | Are the standard CASTNET operational procedures being flollowed by the site operator? | ☑ | |
| 5 | Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation) | ☑ | |

## Are regular operational QA/QC checks performed on meteorological instruments?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multipoint Calibrations | ☑ | Semiannually | ☑ |
| Visual Inspections | ☑ | Weekly | ☑ |
| Translator Zero/Span Tests (climatronics) | ☐ | N/A | ☑ |
| Manual Rain Gauge Test | ☑ | Monthly | ☑ |
| Confirm Reasonableness of Current Values | ☑ | Weekly | ☑ |
| Test Surface Wetness Response | ☑ | N/A | ☑ |

## Are regular operational QA/QC checks performed on the ozone analyzer?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point Calibrations | ☑ | Semiannually | ☑ |
| Automatic Zero/Span Tests | ☑ | Daily | ☑ |
| Manual Zero/Span Tests | ☑ | Monthly | ☑ |
| Automatic Precision Level Tests | ☑ | Daily | ☑ |
| Manual Precision Level Test | ☐ | N/A | ☑ |
| Analyzer Diagnostics Tests | ☑ | Alarm values only | ☑ |
| In-line Filter Replacement (at inlet) | ☑ | Monthly | ☑ |
| In-line Filter Replacement (at analyze | ☐ | N/A | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |
| Zero Air Desiccant Check | ☑ | Weekly | ☑ |

| | | | |
|---|---|---|---|
| 1 | Do multi-point calibration gases go through the complete sample train including all filters? | ☑ | |
| 2 | Do automatic and manual z/s/p gasses go through the complete sample train including all filters? | ☑ | |
| 3 | Are the automatic and manual z/s/p checks monitored and reported? If yes, how? | ☑ | DataView |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S9-rev002

**Site ID** MAC426 **Technician** Eric Hebert **Site Visit Date** 11/13/2017

**Site operation procedures**

| | | | |
|---|---|---|---|
| 1 | Is the filter pack being changed every Tuesday as scheduled? | ☑ | Filter changed various times |
| 2 | Are the Site Status Report Forms being completed and filed correctly? | ☑ | |
| 3 | Are data downloads and backups being performed as scheduled? | ☐ | No longer required |
| 4 | Are general observations being made and recorded? How? | ☑ | SSRF, logbook |
| 5 | Are site supplies on-hand and replenished in a timely fashion? | ☑ | |
| 6 | Are sample flow rates recorded? How? | ☑ | SSRF |
| 7 | Are samples sent to the lab on a regular schedule in a timely fashion? | ☑ | |
| 8 | Are filters protected from contamination during handling and shipping? How? | ☑ | Clean gloves on and off |
| 9 | Are the site conditions reported regularly to the field operations manager or staff? | ☐ | |

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point MFC Calibrations | ☑ | Semiannually | ☑ |
| Flow System Leak Checks | ☑ | Weekly | ☑ |
| Filter Pack Inspection | ☐ | | ☐ |
| Flow Rate Setting Checks | ☑ | Weekly | ☑ |
| Visual Check of Flow Rate Rotometer | ☑ | Weekly | ☑ |
| In-line Filter Inspection/Replacement | ☑ | Semiannually and as needed | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The site operators are very knowledgeable with air quality monitoring. They are doing a very good job with site activities and filter handling.

# Field Systems Data Form

F-02058-1500-S10-rev002

**Site ID** MAC426 **Technician** Eric Hebert **Site Visit Date** 11/13/2017

**Site Visit Sensors**

| Parameter | Manufacturer | Model | S/N | Client ID |
|---|---|---|---|---|
| Computer | Hewlett Packard | 6560 b | 5CB1520H70 | none |
| DAS | Environmental Sys Corp | 8832 | A3027 | 3027 |
| Elevation | Elevation | 1 | None | None |
| Filter pack flow pump | Thomas | 107CAB18B | 070000012920 | none |
| Flow Rate | Tylan | FC280 | AW02213005 | none |
| Infrastructure | Infrastructure | none | none | none |
| Met tower | Climatronics | illegible | illegible | none |
| MFC power supply | Tylan | RO-32 | illegible | 03677 |
| Ozone | ThermoElectron Inc | 49i A3NAA | 1030745085 | none |
| Ozone Standard | ThermoElectron Inc | 49i A1NAA | 1015543061 | none |
| Sample Tower | Aluma Tower | B | none | none |
| Shelter Temperature | ARS | none | none | 60 |
| Siting Criteria | Siting Criteria | 1 | None | None |
| Temperature2meter | RM Young | 41342 | 15104 | none |
| Zero air pump | Werther International | PC70/4 | 606489 | none |

# *Site Inventory by Site Visit*

| Site Visit Date | | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *GRS420-Eric Hebert-11/15/2017* | | | | | | |
| 1 | 11/15/2017 | Computer | Hewlett Packard | none | 6730b | USH01700BY |
| 2 | 11/15/2017 | DAS | Environmental Sys Corp | none | 8832 | A4115K |
| 3 | 11/15/2017 | Elevation | Elevation | None | 1 | None |
| 4 | 11/15/2017 | Filter pack flow pump | Thomas | 02488 | 107CAB18 | 1089005307 |
| 5 | 11/15/2017 | flow rate | Tylan | none | FC280SAV | AW9706012 |
| 6 | 11/15/2017 | Infrastructure | Infrastructure | none | none | none |
| 7 | 11/15/2017 | Met tower | Rohn | none | unknown | none |
| 8 | 11/15/2017 | MFC power supply | Tylan | 03944 | RO-32 | FP9605010 |
| 9 | 11/15/2017 | Modem | US Robotics | none | V.92 | unknown |
| 10 | 11/15/2017 | Ozone | ThermoElectron Inc | none | 49i A3NAA | 1023943903 |
| 11 | 11/15/2017 | Ozone Standard | ThermoElectron Inc | none | 49i A1NAA | 1130450193 |
| 12 | 11/15/2017 | Sample Tower | Aluma Tower | 90945 | B | none |
| 13 | 11/15/2017 | Shelter Temperature | ARS | none | none | none |
| 14 | 11/15/2017 | Siting Criteria | Siting Criteria | None | 1 | None |
| 15 | 11/15/2017 | Temperature2meter | RM Young | none | 41342 | 7297 |
| 16 | 11/15/2017 | Zero air pump | Werther International | none | PC70/4 | 531385 |

# DAS Data Form

**DAS Time Max Error:** 0.72

| Mfg | Serial Number | Site | Technician | Site Visit Date | Parameter | Use Desc. |
|---|---|---|---|---|---|---|
| Environmental Sys | A4115K | GRS420 | Eric Hebert | 11/15/2017 | DAS | Primary |

**Das Date:** 11/15/2017
**Das Time:** 8:32:00
**Das Day:** 319

**Audit Date** 11/15/2017
**Audit Time** 8:32:43
**Audit Day** 319

**Low Channel:**

**High Channel:**

| Low Channel Avg Diff: | Low Channel Max Diff: | High Channel Avg Diff: | High Channel Max Diff: |
|---|---|---|---|
| 0.0000 | 0.0001 | 0.0000 | 0.0001 |

**Mfg** Datel
**Parameter** DAS
**Serial Number** 4000392
**Tfer Desc.** Source generator (D
**Tfer ID** 01321
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 1/22/2015
**CorrCoff** 1.00000

**Mfg** Fluke
**Parameter** DAS
**Serial Number** 86590148
**Tfer Desc.** DVM
**Tfer ID** 01310
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 2/23/2017
**CorrCoff** 1.00000

| Channel | Input | DVM Output | DAS Output | InputUnit | OutputUnit | Difference |
|---|---|---|---|---|---|---|
| 2 | 0.0000 | 0.0000 | -0.0001 | V | V | -0.0001 |
| 2 | 0.1000 | 0.1000 | 0.0999 | V | V | -0.0001 |
| 2 | 0.3000 | 0.3000 | 0.3000 | V | V | 0.0000 |
| 2 | 0.5000 | 0.5001 | 0.5001 | V | V | 0.0000 |
| 2 | 0.7000 | 0.7001 | 0.7001 | V | V | 0.0000 |
| 2 | 0.9000 | 0.9002 | 0.9001 | V | V | -0.0001 |
| 2 | 1.0000 | 1.0002 | 1.0002 | V | V | 0.0000 |

# Flow Data Form

| **Mfg** | **Serial Number Ta** | **Site** | **Technician** | **Site Visit Date** | **Parameter** | **Owner ID** |
|---|---|---|---|---|---|---|
| Tylan | AW9706012 | GRS420 | Eric Hebert | 11/15/2017 | flow rate | none |

**Mfg** Tylan

**SN/Owner ID** FP9605010 03944

**Parameter** MFC power supply

**Mfg** BIOS

**Parameter** Flow Rate

**Serial Number** 122974

**Tfer Desc.** BIOS 220-H

**Tfer ID** 01416

**Slope** 1.00732

**Intercept** -0.02202

**Cert Date** 3/8/2017

**CorrCoff** 0.99970

**DAS 1:**

**DAS 2:**

| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
|---|---|---|---|
| 0.24% | 0.46% | | |

**Cal Factor Zero** 0

**Cal Factor Full Scale** 0

**Rotometer Reading:** 3.05

| Desc. | Test type | Input l/m | Input Corr_ | MfcDisp. | OutputSignal | Output S E | InputUnit | OutputSignalI | PctDifference |
|---|---|---|---|---|---|---|---|---|---|
| primary | pump off | 0.000 | 0.000 | -0.42 | 0.0000 | 0.00 | l/m | l/m | |
| primary | leak check | 0.000 | 0.000 | -0.41 | 0.0000 | 0.00 | l/m | l/m | |
| primary | test pt 1 | 3.014 | 3.010 | 2.38 | 0.0000 | 3.01 | l/m | l/m | -0.13% |
| primary | test pt 2 | 3.014 | 3.010 | 2.38 | 0.0000 | 3.01 | l/m | l/m | -0.13% |
| primary | test pt 3 | 3.015 | 3.020 | 2.38 | 0.0000 | 3.01 | l/m | l/m | -0.46% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Leak Test | **Condition** | | **Status** | pass |
| **Sensor Component** | Tubing Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Filter Position | **Condition** | Poor | **Status** | pass |
| **Sensor Component** | Rotometer Condition | **Condition** | Clean and dry | **Status** | pass |
| **Sensor Component** | Moisture Present | **Condition** | No moisture present | **Status** | pass |
| **Sensor Component** | Filter Distance | **Condition** | 5.0 cm | **Status** | pass |
| **Sensor Component** | Filter Depth | **Condition** | -0.5 cm | **Status** | pass |
| **Sensor Component** | Filter Azimuth | **Condition** | 270 deg | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1023943903 | GRS420 | Eric Hebert | 11/15/2017 | Ozone | none |

| | | | |
|---|---|---|---|
| **Slope:** | 1.00748 | **Slope:** | 0.00000 |
| **Intercept** | 0.18955 | **Intercept** | 0.00000 |
| **CorrCoff** | 1.00000 | **CorrCoff** | 0.00000 |

**DAS 1:** **DAS 2:**

| A Avg % Diff: | A Max % Di | A Avg %Dif | A Max % Di |
|---|---|---|---|
| 1.0% | 1.2% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 0517112167 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01113 | | |
| **Slope** | 1.00504 | **Intercept** | 0.32915 |
| **Cert Date** | 9/12/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | -0.07 | -0.39 | -0.03 | ppb | |
| primary | 2 | 15.40 | 14.99 | 15.10 | ppb | 0.73% |
| primary | 3 | 35.05 | 34.54 | 34.95 | ppb | 1.19% |
| primary | 4 | 67.11 | 66.44 | 67.17 | ppb | 1.10% |
| primary | 5 | 106.07 | 105.21 | 106.20 | ppb | 0.94% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.000 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.010 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 87.7 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.9 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.67 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 685.5 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 33.0 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 94.8 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.70 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 684.6 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# 2 Meter Temperature Data Form

Calc. Difference

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 7297 | GRS420 | Eric Hebert | 11/15/2017 | Temperature2meter | none |

| | | | |
|---|---|---|---|
| **Mfg** | Extech | **Parameter** | Temperature |
| **Serial Number** | H232679 | **Tfer Desc.** | RTD |
| **Tfer ID** | 01228 | | |
| **Slope** | 1.00656 | **Intercept** | -0.03341 |
| **Cert Date** | 2/4/2017 | **CorrCoff** | 1.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **Abs Avg Err** | **Abs Max Er** | **Abs Avg Err** | **Abs Max Er** |
| 0.22 | 0.3 | | |

| UseDescription | Test type | InputTmpRaw | InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Low Rang | -0.09 | -0.06 | 0.0000 | 0.24 | C | 0.3 |
| primary | Temp Mid Rang | 25.99 | 25.85 | 0.0000 | 25.72 | C | -0.13 |
| primary | Temp High Rang | 48.72 | 48.44 | 0.0000 | 48.22 | C | -0.22 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Properly Sited | **Condition** | See comments | **Status** | pass |
| **Sensor Component** | Shield | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Shelter Temperature Data For

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ARS | none | GRS420 | Eric Hebert | 11/15/2017 | Shelter Temperature | none |

**DAS 1:**

| Abs Avg Err | Abs Max Er |
|---|---|
| 1.05 | 1.65 |

**DAS 2:**

| Abs Avg Err | Abs Max Er |
|---|---|
| | |

**Mfg** Extech

**Parameter** Shelter Temperatur

**Serial Number** H232679

**Tfer Desc.** RTD

**Tfer ID** 01228

**Slope** 1.00656

**Intercept** -0.03341

**Cert Date** 2/4/2017

**CorrCoff** 1.00000

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Mid Range | 21.10 | 21.00 | 0.000 | 22.4 | C | 1.4 |
| primary | Temp Mid Range | 22.30 | 22.19 | 0.000 | 22.1 | C | -0.1 |
| primary | Temp Mid Range | 24.85 | 24.72 | 0.000 | 23.1 | C | -1.65 |

**Sensor Component** System Memo

**Condition**

**Status** pass

## Infrastructure Data For

**Site ID** GRS420 **Technician** Eric Hebert **Site Visit Date** 11/15/2017

| Shelter Make | Shelter Model | Shelter Size |
|---|---|---|
| Ekto | 8810 (s/n 2961-1) | 640 cuft |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Tower Type | **Condition** | Type B | **Status** | pass |
| **Sensor Component** | Conduit | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Met Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Moisture Trap | **Condition** | Not installed | **Status** | pass |
| **Sensor Component** | Power Cables | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Temp Control | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Rotometer | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Sample Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Condition | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Shelter Door | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Roof | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Floor | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Signal Cable | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Tubing Type | **Condition** | 3/8 teflon | **Status** | pass |
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |

# Site Visit Comments

| Parameter | Site | Technician | S.V. Date | Component | Mfg | Serial No. | Hazard | Problem |
|---|---|---|---|---|---|---|---|---|
| Temperature2meter | GRS420 | Eric Hebert | 11/15/2017 | Properly Sited | RM Young | 4413 | ☐ | ☑ |

The lower (two meter temperature sensor) shield is not mounted at 2 meters above the ground as stated in the QAPP.

# Field Systems Comments

**1** **Parameter:** SiteOpsProcedures

The ozone sample train is leak-tested each week after the inlet filter is changed.

**2** **Parameter:** SitingCriteriaCom

The site is located on a ridge top with the sampling height at the tops of the trees on the ridge. The site is within 40 km of Knoxville and other major sources.

**3** **Parameter:** MetSensorComme

The temperature sensor has been relocated from 10 meters to approximately 3.9 meters above the ground.

**4** **Parameter:** ShelterCleanNotes

The shelter is in good condition, clean, neat, and well organized.

# Field Systems Data Form

F-02058-1500-S1-rev002

**Site ID** GRS420 **Technician** Eric Hebert **Site Visit Date** 11/15/2017

| | | | | |
|---|---|---|---|---|
| **Site Sponsor (agency)** | NPS | **USGS Map** | | Blockhouse |
| **Operating Group** | NPS | **Map Scale** | | |
| **AQS #** | 47-009-0101 | **Map Date** | | |
| **Meteorological Type** | R.M. Young | | | |
| **Air Pollutant Analyzer** | Ozone, Hg, SO2, NOx, PM2.5, PM10, | **QAPP Latitude** | | 35.6331 |
| **Deposition Measurement** | dry | **QAPP Longitude** | | -83.9422 |
| **Land Use** | woodland - mixed | **QAPP Elevation Meters** | | 793 |
| **Terrain** | complex (ridge-top) | **QAPP Declination** | | |
| **Conforms to MLM** | No | **QAPP Declination Date** | | |
| **Site Telephone** | | **Audit Latitude** | | 35.633482 |
| **Site Address 1** | Look Rock | **Audit Longitude** | | -83.941606 |
| **Site Address 2** | Foothills Parkway | **Audit Elevation** | | 801 |
| **County** | Blount | **Audit Declination** | | 5.5 |
| **City, State** | Maryville, TN | | **Present** | |
| **Zip Code** | 37803 | **Fire Extinguisher** | ☑ | inspected Aug 2017 |
| **Time Zone** | Eastern | **First Aid Kit** | ☑ | |
| **Primary Operator** | | **Safety Glasses** | ☑ | |
| **Primary Op. Phone #** | | **Safety Hard Hat** | ☑ | |
| **Primary Op. E-mail** | | **Climbing Belt** | ☑ | |
| **Backup Operator** | | **Security Fence** | ☑ | |
| **Backup Op. Phone #** | | **Secure Shelter** | ☑ | |
| **Backup Op. E-mail** | | **Stable Entry Step** | ☑ | |

**Shelter Working Room** ☑ **Make** Ekto **Model** 8810 (s/n 2961-1) **Shelter Size** 640 cuft

**Shelter Clean** ☑ **Notes** The shelter is in good condition, clean, neat, and well organized.

**Site OK** ☑ **Notes**

**Driving Directions** From Maryville proceed east on 321 and turn right (south) onto the Foothills Parkway. Continue approximately 11 miles. Just before reaching the Look Rock parking area and trail, turn right on a gravel road through a locked NPS gate. The site is approximately 200 meters up the trail on the right.

# Field Systems Data Form

F-02058-1500-S2-rev002

**Site ID** GRS420 **Technician** Eric Hebert **Site Visit Date** 11/15/2017

| Potential Interferent | Minimum Distance From Measurement Apparatus | Distance | Pass = Checked |
|---|---|---|---|
| Large Point Source of SO2 or NOx | 20 to 40 km | | ☑ |
| Major industrial complex | 10 to 20 km | | ☑ |
| City > 50,000 population | 40 km | 35 km | ☐ |
| City 10,000 to 50,000 population | 10 km | | ☑ |
| City 1,000 to 10,000 population | 5 km | | ☑ |
| Major highway, airport or rail yard | 2 km | | ☑ |
| Secondary road, heavily traveled | 500 m | | ☑ |
| Secondary road, lightly traveled | 200 m | | ☑ |
| Feedlot operations | 500 m | | ☑ |
| Intensive agricultural ops (including aerial spraying) | 500 m | | ☑ |
| Limited agricultural operations | 200 m | | ☑ |
| Large parking lot | 200 m | | ☑ |
| Small parking lot | 100 m | | ☑ |
| Tree line | 50 m | 20 m | ☐ |
| Obstacles to wind | 10 times obstacle height | | ☑ |

**Siting Distances OK** ☐

**Siting Criteria Comment**

The site is located on a ridge top with the sampling height at the tops of the trees on the ridge.  The site is within 40 km of Knoxville and other major sources.

# Field Systems Data Form

F-02058-1500-S3-rev002

**Site ID** GRS420 **Technician** Eric Hebert **Site Visit Date** 11/15/2017

| | | | |
|---|---|---|---|
| 1 | Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? | ☑ | N/A |
| 2 | Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) | ☑ | N/A |
| 3 | Are the tower and sensors plumb? | ☑ | N/A |
| 4 | Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? | ☑ | |
| 5 | Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) | ☑ | |
| 6 | Is the solar radiation sensor plumb? | ☑ | N/A |
| 7 | Is it sited to avoid shading, or any artificial or reflected light? | ☑ | N/A |
| 8 | Is the rain gauge plumb? | ☑ | N/A |
| 9 | Is it sited to avoid sheltering effects from buildings, trees, towers, etc? | ☑ | N/A |
| 10 | Is the surface wetness sensor sited with the grid surface facing north? | ☑ | N/A |
| 11 | Is it inclined approximately 30 degrees? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The temperature sensor has been relocated from 10 meters to approximately 3.9 meters above the ground.

# Field Systems Data Form

F-02058-1500-S4-rev002

**Site ID** GRS420 **Technician** Eric Hebert **Site Visit Date** 11/15/2017

| | | | |
|---|---|---|---|
| 1 | Do all the meterological sensors appear to be intact, in good condition, and well maintained? | ☑ | |
| 2 | Are all the meteorological sensors operational online, and reporting data? | ☑ | |
| 3 | Are the shields for the temperature and RH sensors clean? | ☑ | |
| 4 | Are the aspirated motors working? | ☑ | |
| 5 | Is the solar radiation sensor's lens clean and free of scratches? | ☑ | N/A |
| 6 | Is the surface wetness sensor grid clean and undamaged? | ☑ | N/A |
| 7 | Are the sensor signal and power cables intact, in good condition, and well maintained? | ☑ | |
| 8 | Are the sensor signal and power cable connections protected from the elements and well maintained? | ☑ | |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S5-rev002

**Site ID** GRS420 **Technician** Eric Hebert **Site Visit Date** 11/15/2017

## Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E

| | | | |
|---|---|---|---|
| 1 | Do the sample inlets have at least a 270 degree arc of unrestricted airflow? | ☑ | |
| 2 | Are the sample inlets 3 - 15 meters above the ground? | ☑ | |
| 3 | Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? | ☑ | |

## Pollutant analyzers and deposition equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the analyzers and equipment appear to be in good condition and well maintained? | ☑ | |
| 2 | Are the analyzers and monitors operational, on-line, and reporting data? | ☑ | |
| 3 | Describe ozone sample tube. | | 1/4 teflon by 12 meters |
| 4 | Describe dry dep sample tube. | | 3/8 teflon by 12 meters |
| 5 | Are in-line filters used in the ozone sample line? (if yes indicate location) | ☑ | At inlet only |
| 6 | Are sample lines clean, free of kinks, moisture, and obstructions? | ☑ | |
| 7 | Is the zero air supply desiccant unsaturated? | ☑ | |
| 8 | Are there moisture traps in the sample lines? | ☐ | |
| 9 | Is there a rotometer in the dry deposition filter line, and is it clean? | ☑ | |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S6-rev002

**Site ID** GRS420 **Technician** Eric Hebert **Site Visit Date** 11/15/2017

## DAS, sensor translators, and peripheral equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the DAS instruments appear to be in good condition and well maintained? | ☑ | |
| 2 | Are all the components of the DAS operational? (printers, modem, backup, etc) | ☑ | |
| 3 | Do the analyzer and sensor signal leads pass through lightning protection circuitry? | ☑ | Met sensors only |
| 4 | Are the signal connections protected from the weather and well maintained? | ☑ | |
| 5 | Are the signal leads connected to the correct DAS channel? | ☑ | |
| 6 | Are the DAS, sensor translators, and shelter properly grounded? | ☑ | |
| 7 | Does the instrument shelter have a stable power source? | ☑ | |
| 8 | Is the instrument shelter temperature controlled? | ☑ | |

| | | Stable | Grounded |
|---|---|---|---|
| 9 | Is the met tower stable and grounded? | ☑ | ☑ |
| 10 | Is the sample tower stable and grounded? | ☑ | ☑ |

11 Tower comments? Sample tower grounded to shelter, and slightly bent at hinge.

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

**F-02058-1500-S7-rev002**

**Site ID** GRS420 **Technician** Eric Hebert **Site Visit Date** 11/15/2017

## Documentation

### Does the site have the required instrument and equipment manuals?

| | Yes | No | N/A | | Yes | No | N/A |
|---|---|---|---|---|---|---|---|
| Wind speed sensor | ☑ | ☐ | ☐ | Data logger | ☑ | ☐ | ☐ |
| Wind direction sensor | ☑ | ☐ | ☐ | Data logger | ☐ | ☐ | ☑ |
| Temperature sensor | ☑ | ☐ | ☐ | Strip chart recorder | ☐ | ☐ | ☑ |
| Relative humidity sensor | ☑ | ☐ | ☐ | Computer | ☐ | ☑ | ☐ |
| Solar radiation sensor | ☑ | ☐ | ☐ | Modem | ☐ | ☑ | ☐ |
| Surface wetness sensor | ☐ | ☐ | ☑ | Printer | ☐ | ☑ | ☐ |
| Wind sensor translator | ☐ | ☐ | ☑ | Zero air pump | ☐ | ☑ | ☐ |
| Temperature translator | ☐ | ☐ | ☑ | Filter flow pump | ☐ | ☑ | ☐ |
| Humidity sensor translator | ☐ | ☐ | ☑ | Surge protector | ☐ | ☐ | ☑ |
| Solar radiation translator | ☐ | ☑ | ☐ | UPS | ☑ | ☐ | ☐ |
| Tipping bucket rain gauge | ☑ | ☐ | ☐ | Lightning protection device | ☐ | ☐ | ☑ |
| Ozone analyzer | ☑ | ☐ | ☐ | Shelter heater | ☐ | ☑ | ☐ |
| Filter pack flow controller | ☐ | ☑ | ☐ | Shelter air conditioner | ☑ | ☐ | ☐ |
| Filter pack MFC power supply | ☑ | ☐ | ☐ | | | | |

### Does the site have the required and most recent QC documents and report forms?

| | Present | | Current |
|---|---|---|---|
| Station Log | ☑ | Dataview | ☑ |
| SSRF | ☑ | | ☑ |
| Site Ops Manual | ☑ | | ☑ |
| HASP | ☑ | | ☑ |
| Field Ops Manual | ☑ | | ☑ |
| Calibration Reports | ☑ | 10/30/2016 | ☐ |
| Ozone z/s/p Control Charts | ☐ | | ☐ |
| Preventive maintenance schedul | ☐ | | ☐ |

| | | | |
|---|---|---|---|
| 1 | Is the station log properly completed during every site visit? | ☑ | Dataview |
| 2 | Are the Site Status Report Forms being completed and current? | ☑ | Flow & observation sections |
| 3 | Are the chain-of-custody forms properly used to document sample transfer to and from lab? | ☑ | |
| 4 | Are ozone z/s/p control charts properly completed and current? | ☐ | Control charts not used |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form F-02058-1500-S8-rev002

**Site ID** GRS420 **Technician** Eric Hebert **Site Visit Date** 11/15/2017

## Site operation procedures

|  |  |  |  |
|---|---|---|---|
| 1 | Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ |  |
| 2 | Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ |  |
| 3 | Is the site visited regularly on the required Tuesday schedule? | ☑ |  |
| 4 | Are the standard CASTNET operational procedures being flollowed by the site operator? | ☑ |  |
| 5 | Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation) | ☑ |  |

## Are regular operational QA/QC checks performed on meteorological instruments?

| QC Check Performed |  | Frequency | Compliant |
|---|---|---|---|
| Multipoint Calibrations | ☑ | Semiannually | ☑ |
| Visual Inspections | ☑ | Weekly | ☑ |
| Translator Zero/Span Tests (climatronics) | ☐ | N/A | ☑ |
| Manual Rain Gauge Test | ☑ | Monthly | ☑ |
| Confirm Reasonableness of Current Values | ☑ | Weekly | ☑ |
| Test Surface Wetness Response | ☑ | N/A | ☑ |

## Are regular operational QA/QC checks performed on the ozone analyzer?

| QC Check Performed |  | Frequency | Compliant |
|---|---|---|---|
| Multi-point Calibrations | ☑ | Semiannually | ☑ |
| Automatic Zero/Span Tests | ☑ | Daily | ☑ |
| Manual Zero/Span Tests | ☑ | Weekly | ☑ |
| Automatic Precision Level Tests | ☑ | Daily | ☑ |
| Manual Precision Level Test | ☐ |  | ☑ |
| Analyzer Diagnostics Tests | ☑ | Alarm values only | ☑ |
| In-line Filter Replacement (at inlet) | ☑ | Weekly | ☑ |
| In-line Filter Replacement (at analyze | ☐ | N/A | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |
| Zero Air Desiccant Check | ☑ | As needed | ☑ |

|  |  |  |  |
|---|---|---|---|
| 1 | Do multi-point calibration gases go through the complete sample train including all filters? | ☑ |  |
| 2 | Do automatic and manual z/s/p gasses go through the complete sample train including all filters? | ☑ |  |
| 3 | Are the automatic and manual z/s/p checks monitored and reported? If yes, how? | ☑ | Dataview |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The ozone sample train is leak-tested each week after the inlet filter is changed.

# Field Systems Data Form

## F-02058-1500-S9-rev002

**Site ID** GRS420 **Technician** Eric Hebert **Site Visit Date** 11/15/2017

**Site operation procedures**

| | | | |
|---|---|---|---|
| 1 | Is the filter pack being changed every Tuesday as scheduled? | ☑ | Filter changed morinings in winter, changed in afternoon in summer |
| 2 | Are the Site Status Report Forms being completed and filed correctly? | ☐ | |
| 3 | Are data downloads and backups being performed as scheduled? | ☐ | No longer required |
| 4 | Are general observations being made and recorded? How? | ☑ | SSRF |
| 5 | Are site supplies on-hand and replenished in a timely fashion? | ☑ | |
| 6 | Are sample flow rates recorded? How? | ☑ | SSRF |
| 7 | Are samples sent to the lab on a regular schedule in a timely fashion? | ☑ | |
| 8 | Are filters protected from contamination during handling and shipping? How? | ☑ | Clean gloves on and off |
| 9 | Are the site conditions reported regularly to the field operations manager or staff? | ☐ | |

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point MFC Calibrations | ☑ | Semiannually | ☑ |
| Flow System Leak Checks | ☑ | Weekly | ☑ |
| Filter Pack Inspection | ☐ | | ☐ |
| Flow Rate Setting Checks | ☑ | Weekly | ☑ |
| Visual Check of Flow Rate Rotometer | ☑ | Weekly | ☑ |
| In-line Filter Inspection/Replacement | ☑ | As needed | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

**F-02058-1500-S10-rev002**

**Site ID** GRS420 **Technician** Eric Hebert **Site Visit Date** 11/15/2017

## Site Visit Sensors

| Parameter | Manufacturer | Model | S/N | Client ID |
|---|---|---|---|---|
| Computer | Hewlett Packard | 6730b | USH01700BY | none |
| DAS | Environmental Sys Corp | 8832 | A4115K | none |
| Elevation | Elevation | 1 | None | None |
| Filter pack flow pump | Thomas | 107CAB18 | 1089005307 | 02488 |
| flow rate | Tylan | FC280SAV | AW9706012 | none |
| Infrastructure | Infrastructure | none | none | none |
| Met tower | Rohn | unknown | none | none |
| MFC power supply | Tylan | RO-32 | FP9605010 | 03944 |
| Modem | US Robotics | V.92 | unknown | none |
| Ozone | ThermoElectron Inc | 49i A3NAA | 1023943903 | none |
| Ozone Standard | ThermoElectron Inc | 49i A1NAA | 1130450193 | none |
| Sample Tower | Aluma Tower | B | none | 90945 |
| Shelter Temperature | ARS | none | none | none |
| Siting Criteria | Siting Criteria | 1 | None | None |
| Temperature2meter | RM Young | 41342 | 7297 | none |
| Zero air pump | Werther International | PC70/4 | 531385 | none |

# *Site Inventory by Site Visit*

*CND125-Sandy Grenville-11/19/2017*

| *Site Visit Date* | | *Parameter* | *Mfg* | *Owner ID* | *Model Number* | *Serial Number* |
|---|---|---|---|---|---|---|
| 1 | 11/19/2017 | Computer | Dell | 07015 | Inspiron 15 | BQ3MC12 |
| 2 | 11/19/2017 | DAS | Campbell | 000847 | CR3000 | 11444 |
| 3 | 11/19/2017 | Elevation | Elevation | None | 1 | None |
| 4 | 11/19/2017 | Filter pack flow pump | Thomas | 01235 | 107CA18 | illegible |
| 5 | 11/19/2017 | Flow Rate | Apex | 000838 | AXMC105LPMDPCV | 54781 |
| 6 | 11/19/2017 | Infrastructure | Infrastructure | none | none | none |
| 7 | 11/19/2017 | Modem | Raven | 06596 | V4221-V | 0844350327 |
| 8 | 11/19/2017 | Ozone | ThermoElectron Inc | 000692 | 49i A1NAA | 1030244803 |
| 9 | 11/19/2017 | Ozone Standard | ThermoElectron Inc | 000376 | 49i A3NAA | 0726124693 |
| 10 | 11/19/2017 | Sample Tower | Aluma Tower | 03495 | A | none |
| 11 | 11/19/2017 | Shelter Temperature | Campbell | none | 107-L | none |
| 12 | 11/19/2017 | Siting Criteria | Siting Criteria | None | 1 | None |
| 13 | 11/19/2017 | Temperature | RM Young | 06402 | 41342VC | 14035 |
| 14 | 11/19/2017 | Zero air pump | Werther International | 06868 | C 70/4 | 000814284 |

# DAS Data Form

**DAS Time Max Error:** 0.02

| **Mfg** | **Serial Number** | **Site** | **Technician** | **Site Visit Date** | **Parameter** | **Use Desc.** |
|---|---|---|---|---|---|---|
| Campbell | 11444 | CND125 | Sandy Grenville | 11/19/2017 | DAS | Primary |

| | | | |
|---|---|---|---|
| **Das Date:** | 11/19/2017 | **Audit Date** | 11/19/2017 |
| **Das Time:** | 17:19:10 | **Audit Time** | 17:19:11 |
| **Das Day:** | 323 | **Audit Day** | 323 |

| **Low Channel:** | | **High Channel:** | |
|---|---|---|---|
| **Avg Diff:** | **Max Diff:** | **Avg Diff:** | **Max Diff:** |
| 0.0000 | 0.0001 | 0.0000 | 0.0001 |

| | | | |
|---|---|---|---|
| **Mfg** | Datel | **Parameter** | DAS |
| **Serial Number** | 15510194 | **Tfer Desc.** | Source generator (D |
| **Tfer ID** | 01320 | | |
| **Slope** | 1.00000 | **Intercept** | 0.00000 |
| **Cert Date** | 2/13/2012 | **CorrCoff** | 1.00000 |
| **Mfg** | Fluke | **Parameter** | DAS |
| **Serial Number** | 95740135 | **Tfer Desc.** | DVM |
| **Tfer ID** | 01311 | | |
| **Slope** | 1.00000 | **Intercept** | 0.00000 |
| **Cert Date** | 1/23/2017 | **CorrCoff** | 1.00000 |

| Channel | Input | DVM Output | DAS Output | InputUnit | OutputUnit | Difference |
|---|---|---|---|---|---|---|
| 7 | 0.0000 | 0.0000 | 0.0000 | V | V | 0.0000 |
| 7 | 0.1000 | 0.0999 | 0.0999 | V | V | 0.0000 |
| 7 | 0.3000 | 0.2997 | 0.2997 | V | V | 0.0000 |
| 7 | 0.5000 | 0.4996 | 0.4996 | V | V | 0.0000 |
| 7 | 0.7000 | 0.6995 | 0.6994 | V | V | -0.0001 |
| 7 | 0.9000 | 0.8994 | 0.8993 | V | V | -0.0001 |
| 7 | 1.0000 | 0.9993 | 0.9992 | V | V | -0.0001 |

# Flow Data Form

| **Mfg** | **Serial Number Ta** | **Site** | **Technician** | **Site Visit Date** | **Parameter** | **Owner ID** |
|---|---|---|---|---|---|---|
| Apex | 54781 | CND125 | Sandy Grenville | 11/19/2017 | Flow Rate | 000838 |

| | | | |
|---|---|---|---|
| **Mfg** | BIOS | **Parameter** | Flow Rate |
| **Serial Number** | 103471 | **Tfer Desc.** | nexus |
| **Tfer ID** | 01420 | | |
| **Slope** | 0.99825 | **Intercept** | 0.00497 |
| **Cert Date** | 2/7/2017 | **CorrCoff** | 0.99991 |
| **Mfg** | BIOS | **Parameter** | Flow Rate |
| **Serial Number** | 103424 | **Tfer Desc.** | BIOS cell |
| **Tfer ID** | 01410 | | |
| **Slope** | 0.99825 | **Intercept** | 0.00497 |
| **Cert Date** | 2/7/2017 | **CorrCoff** | 0.99991 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 1.96% | 1.96% | | |

**Cal Factor Zero** -0.01

**Cal Factor Full Scale** 1

**Rotometer Reading:** 1.35

| Desc. | Test type | Input l/m | Input Corr_ | MfcDisp. | OutputSignal | Output S E | InputUnit | OutputSignalI | PctDifference |
|---|---|---|---|---|---|---|---|---|---|
| primary | pump off | 0.000 | 0.000 | 0.00 | 0.000 | -0.02 | l/m | l/m | |
| primary | leak check | 0.000 | 0.000 | -0.01 | 0.000 | 0.00 | l/m | l/m | |
| primary | test pt 1 | 1.530 | 1.530 | 1.50 | 0.000 | 1.50 | l/m | l/m | -1.96% |
| primary | test pt 2 | 1.529 | 1.530 | 1.50 | 0.000 | 1.50 | l/m | l/m | -1.96% |
| primary | test pt 3 | 1.533 | 1.530 | 1.50 | 0.000 | 1.50 | l/m | l/m | -1.96% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Leak Test | **Condition** | | **Status** | pass |
| **Sensor Component** | Tubing Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Filter Position | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Rotometer Condition | **Condition** | Clean and dry | **Status** | pass |
| **Sensor Component** | Moisture Present | **Condition** | No moisture present | **Status** | pass |
| **Sensor Component** | Filter Distance | **Condition** | 4.5 cm | **Status** | pass |
| **Sensor Component** | Filter Depth | **Condition** | 1.0 cm | **Status** | pass |
| **Sensor Component** | Filter Azimuth | **Condition** | 120 deg | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1030244803 | CND125 | Sandy Grenville | 11/19/2017 | Ozone | 000692 |

**Slope:** 0.99229
**Intercept** 0.44188
**CorrCoff** 0.99999

**Slope:** 0.00000
**Intercept** 0.00000
**CorrCoff** 0.00000

**DAS 1:**

**A Avg % Diff:** 1.3%
**A Max % Di** 4.6%

**DAS 2:**

**A Avg %Dif**
**A Max % Di**

**Mfg** ThermoElectron Inc
**Parameter** ozone
**Serial Number** 517112175
**Tfer Desc.** Ozone primary stan
**Tfer ID** 01111
**Slope** 1.00250
**Intercept** 0.45870
**Cert Date** 3/21/2017
**CorrCoff** 1.00000

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.34 | -0.11 | 0.20 | ppb | |
| primary | 2 | 14.99 | 14.49 | 15.15 | ppb | 4.55% |
| primary | 3 | 34.99 | 34.44 | 34.36 | ppb | -0.23% |
| primary | 4 | 68.01 | 67.38 | 67.36 | ppb | -0.03% |
| primary | 5 | 110.04 | 109.30 | 108.90 | ppb | -0.37% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | -0.20 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.003 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 87.1 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.7 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.67 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 724.4 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 34.5 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 95.3 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.66 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 724.4 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Temperature Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 14035 | CND125 | Sandy Grenville | 11/19/2017 | Temperature | 06402 |

**Mfg** Extech
**Parameter** Temperature
**Serial Number** H232734
**Tfer Desc.** RTD
**Tfer ID** 01227
**Slope** 1.00759
**Intercept** 0.14754
**Cert Date** 2/4/2017
**CorrCoff** 1.00000

**DAS 1:**

**DAS 2:**

| Abs Avg Err | Abs Max Er | Abs Avg Err | Abs Max Er |
|---|---|---|---|
| 0.06 | 0.14 | | |

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Low Range | 0.22 | 0.07 | 0.000 | 0.1 | C | 0.02 |
| primary | Temp Mid Range | 25.40 | 25.06 | 0.000 | 25.0 | C | -0.03 |
| primary | Temp High Range | 48.15 | 47.64 | 0.000 | 47.5 | C | -0.14 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Shield | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Shelter Temperature Data For

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Campbell | none | CND125 | Sandy Grenville | 11/19/2017 | Shelter Temperature | none |

**DAS 1:**

| Abs Avg Err | Abs Max Er |
|---|---|
| 0.72 | 1.16 |

**DAS 2:**

| Abs Avg Err | Abs Max Er |
|---|---|
| | |

**Mfg** Extech

**Parameter** Shelter Temperatur

**Serial Number** H232734

**Tfer Desc.** RTD

**Tfer ID** 01227

**Slope** 1.00759

**Intercept** 0.14754

**Cert Date** 2/4/2017

**CorrCoff** 1.00000

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Mid Range | 21.31 | 21.00 | 0.000 | 22.2 | C | 1.16 |
| primary | Temp Mid Range | 21.51 | 21.20 | 0.000 | 21.7 | C | 0.5 |
| primary | Temp Mid Range | 19.52 | 19.23 | 0.000 | 19.7 | C | 0.49 |

**Sensor Component** System Memo

**Condition**

**Status** pass

## Infrastructure Data For

**Site ID** CND125 **Technician** Sandy Grenville **Site Visit Date** 11/19/2017

| Shelter Make | Shelter Model | Shelter Size |
|---|---|---|
| Ekto | 8810 | 640 cuft |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Tower Type | **Condition** | Type A | **Status** | pass |
| **Sensor Component** | Conduit | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Met Tower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Moisture Trap | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Power Cables | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Temp Control | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Rotometer | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Sample Tower | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Shelter Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Door | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Roof | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Floor | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Signal Cable | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Tubing Type | **Condition** | 3/8 teflon | **Status** | pass |
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |

# Field Systems Comments

**1** **Parameter:** SitingCriteriaCom

The land owner maintains a pine tree forest on the property within 50 meters of the site. The trees were planted just before the site was installed in 1990 and will be harvested in the near future.

**2** **Parameter:** ShelterCleanNotes

The shelter is well maintained, clean and well organized.

**3** **Parameter:** MetOpMaintCom

The temperature sensor is mounted on the sample tower in a naturally aspirated shield.

# Field Systems Data Form

F-02058-1500-S1-rev002

**Site ID** CND125

**Technician** Sandy Grenville

**Site Visit Date** 11/19/2017

**Site Sponsor (agency)** EPA

**Operating Group** private

**AQS #** 37-123-9991

**Meteorological Type** Climatronics

**Air Pollutant Analyzer** Ozone

**Deposition Measurement** dry, Hg, PM2.5, PM10

**Land Use** woodland

**Terrain** rolling

**Conforms to MLM** Marginally

**Site Telephone**

**Site Address 1** 136 Perry Drive

**Site Address 2**

**County** Montgomery

**City, State** Candor, NC

**Zip Code** 27229

**Time Zone** Eastern

**Primary Operator**

**Primary Op. Phone #**

**Primary Op. E-mail**

**Backup Operator**

**Backup Op. Phone #**

**Backup Op. E-mail**

**USGS Map**

**Map Scale**

**Map Date**

**QAPP Latitude**

**QAPP Longitude**

**QAPP Elevation Meters**

**QAPP Declination**

**QAPP Declination Date**

**Audit Latitude** 35.26333

**Audit Longitude** -79.83754

**Audit Elevation** 172

**Audit Declination** -8

| | Present | |
|---|---|---|
| **Fire Extinguisher** | ☑ | New in 2015 |
| **First Aid Kit** | ☑ | |
| **Safety Glasses** | ☑ | |
| **Safety Hard Hat** | ☑ | |
| **Climbing Belt** | ☐ | |
| **Security Fence** | ☐ | |
| **Secure Shelter** | ☑ | |
| **Stable Entry Step** | ☑ | |

**Shelter Working Room** ☑ **Make** Ekto **Model** 8810 **Shelter Size** 640 cuft

**Shelter Clean** ☑ **Notes** The shelter is well maintained, clean and well organized.

**Site OK** ☑ **Notes**

**Driving Directions** From Greensboro take Hwy 220 (future I-73) south to Candor. Exit at 211 west to Candor. At the traffic light turn left (south) onto 220 south and 731 west. Continue approximately 1.3 miles which will take you out of town. Bear right onto 731 west at the split. Take an immediate right onto McCallum Rd. (there is a sign for E-KU-SUMEE at the intersection). Continue approximately 5.4 miles to Perry Drive which is on the left. Turn left onto the gravel road and follow it to the end. The site is behind the house, drive around the grapevines on the left.

# Field Systems Data Form

F-02058-1500-S2-rev002

**Site ID** CND125 **Technician** Sandy Grenville **Site Visit Date** 11/19/2017

| Potential Interferent | Minimum Distance From Measurement Apparatus | Distance | Pass = Checked |
|---|---|---|---|
| Large Point Source of SO2 or NOx | 20 to 40 km | | ☑ |
| Major industrial complex | 10 to 20 km | | ☑ |
| City > 50,000 population | 40 km | | ☑ |
| City 10,000 to 50,000 population | 10 km | | ☑ |
| City 1,000 to 10,000 population | 5 km | | ☑ |
| Major highway, airport or rail yard | 2 km | | ☑ |
| Secondary road, heavily traveled | 500 m | | ☑ |
| Secondary road, lightly traveled | 200 m | | ☑ |
| Feedlot operations | 500 m | | ☑ |
| Intensive agricultural ops (including aerial spraying) | 500 m | | ☑ |
| Limited agricultural operations | 200 m | | ☑ |
| Large parking lot | 200 m | | ☑ |
| Small parking lot | 100 m | | ☑ |
| Tree line | 50 m | 40 m | ☐ |
| Obstacles to wind | 10 times obstacle height | | ☑ |

**Siting Distances OK** ☑

**Siting Criteria Comment**

The land owner maintains a pine tree forest on the property within 50 meters of the site. The trees were planted just before the site was installed in 1990 and will be harvested in the near future.

# Field Systems Data Form F-02058-1500-S3-rev002

**Site ID** CND125 **Technician** Sandy Grenville **Site Visit Date** 11/19/2017

| | | | |
|---|---|---|---|
| 1 | **Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?** | ☑ | N/A |
| 2 | **Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind)** | ☑ | N/A |
| 3 | **Are the tower and sensors plumb?** | ☑ | N/A |
| 4 | **Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?** | ☑ | |
| 5 | **Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)** | ☑ | |
| 6 | **Is the solar radiation sensor plumb?** | ☑ | N/A |
| 7 | **Is it sited to avoid shading, or any artificial or reflected light?** | ☑ | N/A |
| 8 | **Is the rain gauge plumb?** | ☑ | N/A |
| 9 | **Is it sited to avoid sheltering effects from buildings, trees, towers, etc?** | ☑ | N/A |
| 10 | **Is the surface wetness sensor sited with the grid surface facing north?** | ☑ | N/A |
| 11 | **Is it inclined approximately 30 degrees?** | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S4-rev002

**Site ID** CND125

**Technician** Sandy Grenville

**Site Visit Date** 11/19/2017

| | | | |
|---|---|---|---|
| 1 | Do all the meterological sensors appear to be intact, in good condition, and well maintained? | ☑ | |
| 2 | Are all the meteorological sensors operational online, and reporting data? | ☑ | |
| 3 | Are the shields for the temperature and RH sensors clean? | ☑ | |
| 4 | Are the aspirated motors working? | ☑ | N/A |
| 5 | Is the solar radiation sensor's lens clean and free of scratches? | ☑ | N/A |
| 6 | Is the surface wetness sensor grid clean and undamaged? | ☑ | N/A |
| 7 | Are the sensor signal and power cables intact, in good condition, and well maintained? | ☑ | N/A |
| 8 | Are the sensor signal and power cable connections protected from the elements and well maintained? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The temperature sensor is mounted on the sample tower in a naturally aspirated shield.

# Field Systems Data Form

F-02058-1500-S5-rev002

**Site ID** CND125 **Technician** Sandy Grenville **Site Visit Date** 11/19/2017

## Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E

| | | | |
|---|---|---|---|
| 1 | Do the sample inlets have at least a 270 degree arc of unrestricted airflow? | ☑ | |
| 2 | Are the sample inlets 3 - 15 meters above the ground? | ☑ | |
| 3 | Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? | ☑ | |

## Pollutant analyzers and deposition equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the analyzers and equipment appear to be in good condition and well maintained? | ☑ | |
| 2 | Are the analyzers and monitors operational, on-line, and reporting data? | ☑ | |
| 3 | Describe ozone sample tube. | | 1/4 teflon by 12 meters |
| 4 | Describe dry dep sample tube. | | 3/8 teflon by 12 meters |
| 5 | Are in-line filters used in the ozone sample line? (if yes indicate location) | ☑ | At inlet only |
| 6 | Are sample lines clean, free of kinks, moisture, and obstructions? | ☑ | |
| 7 | Is the zero air supply desiccant unsaturated? | ☑ | |
| 8 | Are there moisture traps in the sample lines? | ☑ | Flow line only |
| 9 | Is there a rotometer in the dry deposition filter line, and is it clean? | ☑ | Clean and dry |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

**F-02058-1500-S6-rev002**

**Site ID** CND125 **Technician** Sandy Grenville **Site Visit Date** 11/19/2017

## DAS, sensor translators, and peripheral equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the DAS instruments appear to be in good condition and well maintained? | ☑ | |
| 2 | Are all the components of the DAS operational? (printers, modem, backup, etc) | ☑ | |
| 3 | Do the analyzer and sensor signal leads pass through lightning protection circuitry? | ☑ | |
| 4 | Are the signal connections protected from the weather and well maintained? | ☑ | Met sensors only |
| 5 | Are the signal leads connected to the correct DAS channel? | ☑ | |
| 6 | Are the DAS, sensor translators, and shelter properly grounded? | ☑ | |
| 7 | Does the instrument shelter have a stable power source? | ☑ | |
| 8 | Is the instrument shelter temperature controlled? | ☑ | |

| | | Stable | Grounded |
|---|---|---|---|
| 9 | Is the met tower stable and grounded? | ☐ | ☐ |
| 10 | Is the sample tower stable and grounded? | ☑ | ☐ |

11 Tower comments?

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

# Field Systems Data Form

F-02058-1500-S7-rev002

**Site ID** CND125 **Technician** Sandy Grenville **Site Visit Date** 11/19/2017

## Documentation

### Does the site have the required instrument and equipment manuals?

| | Yes | No | N/A | | Yes | No | N/A |
|---|---|---|---|---|---|---|---|
| Wind speed sensor | ☐ | ☐ | ☑ | Data logger | ☐ | ☑ | ☐ |
| Wind direction sensor | ☐ | ☐ | ☑ | Data logger | ☐ | ☐ | ☑ |
| Temperature sensor | ☐ | ☑ | ☐ | Strip chart recorder | ☐ | ☐ | ☑ |
| Relative humidity sensor | ☐ | ☐ | ☑ | Computer | ☑ | ☐ | ☐ |
| Solar radiation sensor | ☐ | ☐ | ☑ | Modem | ☐ | ☑ | ☐ |
| Surface wetness sensor | ☐ | ☐ | ☑ | Printer | ☐ | ☐ | ☑ |
| Wind sensor translator | ☐ | ☐ | ☑ | Zero air pump | ☐ | ☑ | ☐ |
| Temperature translator | ☐ | ☐ | ☑ | Filter flow pump | ☐ | ☑ | ☐ |
| Humidity sensor translator | ☐ | ☐ | ☑ | Surge protector | ☐ | ☐ | ☑ |
| Solar radiation translator | ☐ | ☐ | ☑ | UPS | ☐ | ☐ | ☑ |
| Tipping bucket rain gauge | ☐ | ☐ | ☑ | Lightning protection device | ☐ | ☐ | ☑ |
| Ozone analyzer | ☑ | ☐ | ☐ | Shelter heater | ☐ | ☑ | ☐ |
| Filter pack flow controller | ☐ | ☑ | ☐ | Shelter air conditioner | ☐ | ☑ | ☐ |
| Filter pack MFC power supply | ☐ | ☐ | ☑ | | | | |

### Does the site have the required and most recent QC documents and report forms?

| | Present | | Current |
|---|---|---|---|
| Station Log | ☑ | | ☑ |
| SSRF | ☑ | | ☑ |
| Site Ops Manual | ☑ | Feb 2014 | ☑ |
| HASP | ☑ | Feb 2014 | ☑ |
| Field Ops Manual | ☐ | | ☐ |
| Calibration Reports | ☑ | | ☑ |
| Ozone z/s/p Control Charts | ☐ | | ☐ |
| Preventive maintenance schedul | ☐ | | ☐ |

| | | | |
|---|---|---|---|
| 1 | Is the station log properly completed during every site visit? | ☑ | |
| 2 | Are the Site Status Report Forms being completed and current? | ☑ | |
| 3 | Are the chain-of-custody forms properly used to document sample transfer to and from lab? | ☑ | |
| 4 | Are ozone z/s/p control charts properly completed and current? | ☐ | Control charts not used |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

**F-02058-1500-S8-rev002**

**Site ID** CND125 **Technician** Sandy Grenville **Site Visit Date** 11/19/2017

## Site operation procedures

|  |  |  |  |
|---|---|---|---|
| 1 | Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? | ☑ |  |
| 2 | Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ |  |
| 3 | Is the site visited regularly on the required Tuesday schedule? | ☑ |  |
| 4 | Are the standard CASTNET operational procedures being flollowed by the site operator? | ☑ |  |
| 5 | Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation) | ☑ |  |

## Are regular operational QA/QC checks performed on meteorological instruments?

| QC Check Performed |  | Frequency | Compliant |
|---|---|---|---|
| Multipoint Calibrations | ☑ | N/A | ☑ |
| Visual Inspections | ☑ | N/A | ☑ |
| Translator Zero/Span Tests (climatronics) | ☑ | N/A | ☑ |
| Manual Rain Gauge Test | ☑ | N/A | ☑ |
| Confirm Reasonableness of Current Values | ☑ | N/A | ☑ |
| Test Surface Wetness Response | ☑ | N/A | ☑ |

## Are regular operational QA/QC checks performed on the ozone analyzer?

| QC Check Performed |  | Frequency | Compliant |
|---|---|---|---|
| Multi-point Calibrations | ☑ | Semiannually | ☑ |
| Automatic Zero/Span Tests | ☑ | Daily | ☑ |
| Manual Zero/Span Tests | ☑ | As needed | ☑ |
| Automatic Precision Level Tests | ☑ | Daily | ☑ |
| Manual Precision Level Test | ☑ | As needed | ☑ |
| Analyzer Diagnostics Tests | ☑ | Weekly | ☑ |
| In-line Filter Replacement (at inlet) | ☑ | Every 2 weeks | ☑ |
| In-line Filter Replacement (at analyze | ☐ | N/A | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |
| Zero Air Desiccant Check | ☑ | Weekly | ☑ |

|  |  |  |  |
|---|---|---|---|
| 1 | Do multi-point calibration gases go through the complete sample train including all filters? | ☐ | Unknown |
| 2 | Do automatic and manual z/s/p gasses go through the complete sample train including all filters? | ☑ |  |
| 3 | Are the automatic and manual z/s/p checks monitored and reported? If yes, how? | ☑ | Logbook, call-in |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form F-02058-1500-S9-rev002

**Site ID** CND125 **Technician** Sandy Grenville **Site Visit Date** 11/19/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Is the filter pack being changed every Tuesday as scheduled? | ☑ | Filter changed mornings |
| 2 | Are the Site Status Report Forms being completed and filed correctly? | ☑ | |
| 3 | Are data downloads and backups being performed as scheduled? | ☐ | No longer required |
| 4 | Are general observations being made and recorded? How? | ☑ | SSRF, logbook |
| 5 | Are site supplies on-hand and replenished in a timely fashion? | ☑ | |
| 6 | Are sample flow rates recorded? How? | ☑ | SSRF, logbook, call-in |
| 7 | Are samples sent to the lab on a regular schedule in a timely fashion? | ☑ | |
| 8 | Are filters protected from contamination during handling and shipping? How? | ☑ | Clean gloves on and off |
| 9 | Are the site conditions reported regularly to the field operations manager or staff? | ☑ | |

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point MFC Calibrations | ☑ | Semiannually | ☑ |
| Flow System Leak Checks | ☑ | Weekly | ☑ |
| Filter Pack Inspection | ☐ | | ☐ |
| Flow Rate Setting Checks | ☑ | Weekly | ☑ |
| Visual Check of Flow Rate Rotometer | ☑ | Weekly | ☑ |
| In-line Filter Inspection/Replacement | ☑ | Semiannually | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S10-rev002

**Site ID** CND125 **Technician** Sandy Grenville **Site Visit Date** 11/19/2017

**Site Visit Sensors**

| Parameter | Manufacturer | Model | S/N | Client ID |
|---|---|---|---|---|
| Computer | Dell | Inspiron 15 | BQ3MC12 | 07015 |
| DAS | Campbell | CR3000 | 11444 | 000847 |
| Elevation | Elevation | 1 | None | None |
| Filter pack flow pump | Thomas | 107CA18 | illegible | 01235 |
| Flow Rate | Apex | AXMC105LPMDPC | 54781 | 000838 |
| Infrastructure | Infrastructure | none | none | none |
| Modem | Raven | V4221-V | 0844350327 | 06596 |
| Ozone | ThermoElectron Inc | 49i A1NAA | 1030244803 | 000692 |
| Ozone Standard | ThermoElectron Inc | 49i A3NAA | 0726124693 | 000376 |
| Sample Tower | Aluma Tower | A | none | 03495 |
| Shelter Temperature | Campbell | 107-L | none | none |
| Siting Criteria | Siting Criteria | 1 | None | None |
| Temperature | RM Young | 41342VC | 14035 | 06402 |
| Zero air pump | Werther International | C 70/4 | 000814284 | 06868 |

# Site Inventory by Site Visit

| Site | Visit Date | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *BWR139-Eric Hebert-11/27/2017* | | | | | | |
| 1 | 11/27/2017 | Computer | Dell | 000321 | D520 | unknown |
| 2 | 11/27/2017 | DAS | Campbell | 000431 | CR3000 | 2536 |
| 3 | 11/27/2017 | Elevation | Elevation | None | 1 | None |
| 4 | 11/27/2017 | Filter pack flow pump | Thomas | 06031 | 107CAB18 | 608102A |
| 5 | 11/27/2017 | Flow Rate | Apex | 000670 | AXMC105LPMDPCV | 54758 |
| 6 | 11/27/2017 | Infrastructure | Infrastructure | none | none | none |
| 7 | 11/27/2017 | Modem | Raven | 06456 | V4221-V | 0808507415 |
| 8 | 11/27/2017 | Ozone | ThermoElectron Inc | 000618 | 49i A1NAA | 1009241789 |
| 9 | 11/27/2017 | Ozone Standard | ThermoElectron Inc | 000697 | 49i A3NAA | 1030244814 |
| 10 | 11/27/2017 | Sample Tower | Aluma Tower | missing | B | none |
| 11 | 11/27/2017 | Shelter Temperature | Campbell | none | 107-L | none |
| 12 | 11/27/2017 | Siting Criteria | Siting Criteria | None | 1 | None |
| 13 | 11/27/2017 | Temperature | RM Young | 04315 | 41342 | 4012 |
| 14 | 11/27/2017 | Zero air pump | Werther International | 06877 | C 70/4 | 000815258 |

# DAS Data Form

**DAS Time Max Error:** 0.03

| Mfg | Serial Number | Site | Technician | Site Visit Date | Parameter | Use Desc. |
|---|---|---|---|---|---|---|
| Campbell | 2536 | BWR139 | Eric Hebert | 11/27/2017 | DAS | Primary |

**Das Date:** 11/27/2017
**Das Time:** 11:30:02
**Das Day:** 331

**Audit Date** 11/27/2017
**Audit Time** 11:30:00
**Audit Day** 331

| **Low Channel:** | | **High Channel:** | |
|---|---|---|---|
| **Avg Diff:** | **Max Diff:** | **Avg Diff:** | **Max Diff:** |
| 0.0000 | 0.0001 | 0.0000 | 0.0001 |

**Mfg** Datel
**Parameter** DAS
**Serial Number** 4000392
**Tfer Desc.** Source generator (D
**Tfer ID** 01321
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 1/22/2015
**CorrCoff** 1.00000

**Mfg** Fluke
**Parameter** DAS
**Serial Number** 86590148
**Tfer Desc.** DVM
**Tfer ID** 01310
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 2/23/2017
**CorrCoff** 1.00000

| Channel | Input | DVM Output | DAS Output | InputUnit | OutputUnit | Difference |
|---|---|---|---|---|---|---|
| 7 | 0.0000 | 0.0000 | 0.0000 | V | V | 0.0000 |
| 7 | 0.1000 | 0.1000 | 0.1001 | V | V | 0.0001 |
| 7 | 0.3000 | 0.3005 | 0.3004 | V | V | -0.0001 |
| 7 | 0.5000 | 0.5005 | 0.5005 | V | V | 0.0000 |
| 7 | 0.7000 | 0.7008 | 0.7008 | V | V | 0.0000 |
| 7 | 0.9000 | 0.9013 | 0.9013 | V | V | 0.0000 |
| 7 | 1.0000 | 1.0011 | 1.0012 | V | V | 0.0001 |

# Flow Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Apex | 54758 | BWR139 | Eric Hebert | 11/27/2017 | Flow Rate | 000670 |

| | | | |
|---|---|---|---|
| **Mfg** | BIOS | **Parameter** | Flow Rate |
| **Serial Number** | 122974 | **Tfer Desc.** | BIOS 220-H |
| **Tfer ID** | 01416 | | |
| **Slope** | 1.00732 | **Intercept** | -0.02202 |
| **Cert Date** | 3/8/2017 | **CorrCoff** | 0.99970 |

| DAS 1: | | DAS 2: | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 2.60% | 2.60% | | |

**Cal Factor Zero** -0.02

**Cal Factor Full Scale** 0.99

**Rotometer Reading:** 1.5

| Desc. | Test type | Input l/m | Input Corr_ | MfcDisp. | OutputSignal | Output S E | InputUnit | OutputSignalI | PctDifference |
|---|---|---|---|---|---|---|---|---|---|
| primary | pump off | 0.000 | 0.000 | 0.01 | 0.000 | -0.01 | l/m | l/m | |
| primary | leak check | 0.000 | 0.000 | 0.01 | 0.000 | -0.01 | l/m | l/m | |
| primary | test pt 1 | 1.532 | 1.540 | 1.51 | 0.000 | 1.50 | l/m | l/m | -2.60% |
| primary | test pt 2 | 1.532 | 1.540 | 1.51 | 0.000 | 1.50 | l/m | l/m | -2.60% |
| primary | test pt 3 | 1.531 | 1.540 | 1.51 | 0.000 | 1.50 | l/m | l/m | -2.60% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Leak Test | **Condition** | | **Status** | pass |
| **Sensor Component** | Tubing Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Filter Position | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Rotometer Condition | **Condition** | Clean and dry | **Status** | pass |
| **Sensor Component** | Moisture Present | **Condition** | See comments | **Status** | pass |
| **Sensor Component** | Filter Distance | **Condition** | 5.0 cm | **Status** | pass |
| **Sensor Component** | Filter Depth | **Condition** | 4.0 cm | **Status** | pass |
| **Sensor Component** | Filter Azimuth | **Condition** | 15 deg | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1009241789 | BWR139 | Eric Hebert | 11/27/2017 | Ozone | 000618 |

| | | | |
|---|---|---|---|
| **Slope:** | 1.02079 | **Slope:** | 0.00000 |
| **Intercept** | -0.55573 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99995 | **CorrCoff** | 0.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 0.8% | 2.0% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 0517112167 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01113 | | |
| **Slope** | 1.00504 | **Intercept** | 0.32915 |
| **Cert Date** | 9/12/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | -0.11 | -0.43 | -0.76 | ppb | |
| primary | 2 | 15.21 | 14.80 | 14.65 | ppb | -1.01% |
| primary | 3 | 32.63 | 32.13 | 32.15 | ppb | 0.06% |
| primary | 4 | 67.86 | 67.19 | 67.35 | ppb | 0.24% |
| primary | 5 | 108.36 | 107.48 | 109.60 | ppb | 1.97% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.10 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.048 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 101.3 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.69 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 733.0 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 31.0 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 102.0 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.8 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.70 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 734.0 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Temperature Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 4012 | BWR139 | Eric Hebert | 11/27/2017 | Temperature | 04315 |

| | | | |
|---|---|---|---|
| **Mfg** | Extech | **Parameter** | Temperature |
| **Serial Number** | H232679 | **Tfer Desc.** | RTD |
| **Tfer ID** | 01228 | | |
| **Slope** | 1.00656 | **Intercept** | -0.03341 |
| **Cert Date** | 2/4/2017 | **CorrCoff** | 1.00000 |

| **DAS 1:** Abs Avg Err | Abs Max Er | **DAS 2:** Abs Avg Err | Abs Max Er |
|---|---|---|---|
| 0.11 | 0.25 | | |

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Low Range | -0.01 | 0.02 | 0.000 | 0.3 | C | 0.25 |
| primary | Temp Mid Range | 27.24 | 27.10 | 0.000 | 27.2 | C | 0.06 |
| primary | Temp High Range | 49.24 | 48.95 | 0.000 | 48.9 | C | -0.01 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Shield | **Condition** | Moderately clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Shelter Temperature Data For

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Campbell | none | BWR139 | Eric Hebert | 11/27/2017 | Shelter Temperature | none |

**DAS 1:**

| Abs Avg Err | Abs Max Er |
|---|---|
| 1.43 | 1.96 |

**DAS 2:**

| Abs Avg Err | Abs Max Er |
|---|---|
|  |  |

**Mfg** Extech

**Parameter** Shelter Temperatur

**Serial Number** H232679

**Tfer Desc.** RTD

**Tfer ID** 01228

**Slope** 1.00656

**Intercept** -0.03341

**Cert Date** 2/4/2017

**CorrCoff** 1.00000

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Mid Range | 20.80 | 20.70 | 0.000 | 22.7 | C | 1.96 |
| primary | Temp Mid Range | 21.64 | 21.53 | 0.000 | 23.0 | C | 1.43 |
| primary | Temp Mid Range | 23.10 | 22.98 | 0.000 | 23.9 | C | 0.89 |

**Sensor Component** System Memo

**Condition**

**Status** pass

## Infrastructure Data For

**Site ID** BWR139 **Technician** Eric Hebert **Site Visit Date** 11/27/2017

| Shelter Make | Shelter Model | Shelter Size |
|---|---|---|
| Ekto | 8810 | 640 cuft |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Tower Type | **Condition** | Type B | **Status** | pass |
| **Sensor Component** | Conduit | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Met Tower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Moisture Trap | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Power Cables | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Temp Control | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Rotometer | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Sample Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Condition | **Condition** | Poor | **Status** | Fail |
| **Sensor Component** | Shelter Door | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Shelter Roof | **Condition** | Poor | **Status** | Fail |
| **Sensor Component** | Shelter Floor | **Condition** | Poor | **Status** | Fail |
| **Sensor Component** | Signal Cable | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Tubing Type | **Condition** | 3/8 teflon | **Status** | pass |
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |

# Site Visit Comments

| Parameter | Site | Technician | S.V. Date | Component | Mfg | Serial No. | Hazard | Problem |
|---|---|---|---|---|---|---|---|---|
| Flow Rate | BWR139 | Eric Hebert | 11/27/2017 | Moisture Present | Apex | 3906 | ☐ | ☐ |

The filter sample tubing has drops of moisture in low sections outside the shelter.

# Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The ozone sample train is leak checked every two weeks following the inlet filter change.

2 **Parameter:** SitingCriteriaCom

Very light agriculture activities near site, not harvested, just to provide food for wildlife.

3 **Parameter:** ShelterCleanNotes

The shelter is showing signs of deterioration with leaks and rot at bottom of walls.

# Field Systems Data Form

**F-02058-1500-S1-rev002**

**Site ID** BWR139 **Technician** Eric Hebert **Site Visit Date** 11/27/2017

| | | | |
|---|---|---|---|
| **Site Sponsor (agency)** | EPA | **USGS Map** | |
| **Operating Group** | BNWR/private | **Map Scale** | |
| **AQS #** | 24-019-9991 | **Map Date** | |
| **Meteorological Type** | R.M. Young | | |
| **Air Pollutant Analyzer** | Ozone | **QAPP Latitude** | |
| **Deposition Measurement** | dry | **QAPP Longitude** | |
| **Land Use** | woodlands - mixed, wetlands | **QAPP Elevation Meters** | |
| **Terrain** | flat | **QAPP Declination** | |
| **Conforms to MLM** | Yes | **QAPP Declination Date** | |
| **Site Telephone** | | **Audit Latitude** | 38.444971 |
| **Site Address 1** | Blackwater Nat Wildlife Refuge | **Audit Longitude** | -76.111274 |
| **Site Address 2** | 2145 Key Wallace Dr. | **Audit Elevation** | 1 |
| **County** | Dorchester | **Audit Declination** | -11.2 |

| | | | | |
|---|---|---|---|---|
| **City, State** | Cambridge, MD | | **Present** | |
| **Zip Code** | 21613 | **Fire Extinguisher** | ☑ | dated 2015 |
| **Time Zone** | Eastern | **First Aid Kit** | ☑ | |
| **Primary Operator** | | **Safety Glasses** | ☑ | |
| **Primary Op. Phone #** | | **Safety Hard Hat** | ☑ | |
| **Primary Op. E-mail** | | **Climbing Belt** | ☑ | |
| **Backup Operator** | | **Security Fence** | ☐ | |
| **Backup Op. Phone #** | | **Secure Shelter** | ☑ | |
| **Backup Op. E-mail** | | **Stable Entry Step** | ☑ | |

**Shelter Working Room** ☑ **Make** Ekto **Model** 8810 **Shelter Size** 640 cuft

**Shelter Clean** ☑ **Notes** The shelter is showing signs of deterioration with leaks and rot at bottom of walls.

**Site OK** ☑ **Notes**

**Driving Directions** From I95 take route 50 east to Cambridge, MD. At mile marker 81 turn right on Woods Rd. Continue approximately 1 mile to the stop sign, turn right onto SR 16 west. Continue approximately 1.7 miles, past the school, and turn left onto Egypt Road. Continue approximately 7.1 miles to the stop sign. Turn right onto Key Wallace Drive towards the visitors center. Continue approximately 0.8 mile to the gate on the left. The site will be visible.

# Field Systems Data Form

F-02058-1500-S2-rev002

**Site ID** BWR139 **Technician** Eric Hebert **Site Visit Date** 11/27/2017

| Potential Interferent | Minimum Distance From Measurement Apparatus | Distance | Pass = Checked |
|---|---|---|---|
| Large Point Source of SO2 or NOx | 20 to 40 km | | ☑ |
| Major industrial complex | 10 to 20 km | | ☑ |
| City > 50,000 population | 40 km | | ☑ |
| City 10,000 to 50,000 population | 10 km | | ☑ |
| City 1,000 to 10,000 population | 5 km | | ☑ |
| Major highway, airport or rail yard | 2 km | | ☑ |
| Secondary road, heavily traveled | 500 m | | ☑ |
| Secondary road, lightly traveled | 200 m | | ☑ |
| Feedlot operations | 500 m | | ☑ |
| Intensive agricultural ops (including aerial spraying) | 500 m | | ☑ |
| Limited agricultural operations | 200 m | 10 m | ☐ |
| Large parking lot | 200 m | | ☑ |
| Small parking lot | 100 m | | ☑ |
| Tree line | 50 m | | ☑ |
| Obstacles to wind | 10 times obstacle height | | ☑ |

**Siting Distances OK** ☑

**Siting Criteria Comment**

Very light agriculture activities near site, not harvested, just to provide food for wildlife.

# Field Systems Data Form

**F-02058-1500-S3-rev002**

**Site ID** BWR139 **Technician** Eric Hebert **Site Visit Date** 11/27/2017

| | | | |
|---|---|---|---|
| 1 | Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? | ☑ | N/A |
| 2 | Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) | ☑ | N/A |
| 3 | Are the tower and sensors plumb? | ☑ | N/A |
| 4 | Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? | ☑ | |
| 5 | Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) | ☑ | |
| 6 | Is the solar radiation sensor plumb? | ☑ | N/A |
| 7 | Is it sited to avoid shading, or any artificial or reflected light? | ☑ | N/A |
| 8 | Is the rain gauge plumb? | ☑ | N/A |
| 9 | Is it sited to avoid sheltering effects from buildings, trees, towers, etc? | ☑ | N/A |
| 10 | Is the surface wetness sensor sited with the grid surface facing north? | ☑ | N/A |
| 11 | Is it inclined approximately 30 degrees? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S4-rev002

**Site ID** BWR139 **Technician** Eric Hebert **Site Visit Date** 11/27/2017

| | | | |
|---|---|---|---|
| 1 | Do all the meterological sensors appear to be intact, in good condition, and well maintained? | ☑ | |
| 2 | Are all the meteorological sensors operational online, and reporting data? | ☑ | |
| 3 | Are the shields for the temperature and RH sensors clean? | ☑ | Moderately clean |
| 4 | Are the aspirated motors working? | ☑ | N/A |
| 5 | Is the solar radiation sensor's lens clean and free of scratches? | ☑ | N/A |
| 6 | Is the surface wetness sensor grid clean and undamaged? | ☑ | N/A |
| 7 | Are the sensor signal and power cables intact, in good condition, and well maintained? | ☑ | N/A |
| 8 | Are the sensor signal and power cable connections protected from the elements and well maintained? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S5-rev002

**Site ID** BWR139 **Technician** Eric Hebert **Site Visit Date** 11/27/2017

## Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E

| | | | |
|---|---|---|---|
| 1 | Do the sample inlets have at least a 270 degree arc of unrestricted airflow? | ☑ | |
| 2 | Are the sample inlets 3 - 15 meters above the ground? | ☑ | |
| 3 | Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? | ☑ | |

## Pollutant analyzers and deposition equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the analyzers and equipment appear to be in good condition and well maintained? | ☑ | |
| 2 | Are the analyzers and monitors operational, on-line, and reporting data? | ☑ | |
| 3 | Describe ozone sample tube. | | 1/4 teflon by 12 meters |
| 4 | Describe dry dep sample tube. | | 3/8 teflon by 12 meters |
| 5 | Are in-line filters used in the ozone sample line? (if yes indicate location) | ☑ | At inlet only |
| 6 | Are sample lines clean, free of kinks, moisture, and obstructions? | ☑ | |
| 7 | Is the zero air supply desiccant unsaturated? | ☑ | |
| 8 | Are there moisture traps in the sample lines? | ☑ | Flow line only |
| 9 | Is there a rotometer in the dry deposition filter line, and is it clean? | ☑ | Clean and dry |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S6-rev002

**Site ID** BWR139 **Technician** Eric Hebert **Site Visit Date** 11/27/2017

## DAS, sensor translators, and peripheral equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the DAS instruments appear to be in good condition and well maintained? | ☑ | |
| 2 | Are all the components of the DAS operational? (printers, modem, backup, etc) | ☑ | |
| 3 | Do the analyzer and sensor signal leads pass through lightning protection circuitry? | ☑ | Met sensors only |
| 4 | Are the signal connections protected from the weather and well maintained? | ☑ | |
| 5 | Are the signal leads connected to the correct DAS channel? | ☑ | |
| 6 | Are the DAS, sensor translators, and shelter properly grounded? | ☑ | |
| 7 | Does the instrument shelter have a stable power source? | ☑ | |
| 8 | Is the instrument shelter temperature controlled? | ☑ | |

| | | Stable | Grounded |
|---|---|---|---|
| 9 | Is the met tower stable and grounded? | ☐ | ☐ |
| 10 | Is the sample tower stable and grounded? | ☑ | ☑ |

11 Tower comments? Met tower removed

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

# Field Systems Data Form

**F-02058-1500-S7-rev002**

**Site ID** BWR139 **Technician** Eric Hebert **Site Visit Date** 11/27/2017

## Documentation

### Does the site have the required instrument and equipment manuals?

| | Yes | No | N/A |
|---|---|---|---|
| Wind speed sensor | ☐ | ☐ | ☑ |
| Wind direction sensor | ☐ | ☐ | ☑ |
| Temperature sensor | ☑ | ☐ | ☐ |
| Relative humidity sensor | ☐ | ☐ | ☑ |
| Solar radiation sensor | ☐ | ☐ | ☑ |
| Surface wetness sensor | ☐ | ☐ | ☑ |
| Wind sensor translator | ☐ | ☐ | ☑ |
| Temperature translator | ☐ | ☐ | ☑ |
| Humidity sensor translator | ☐ | ☐ | ☑ |
| Solar radiation translator | ☐ | ☐ | ☑ |
| Tipping bucket rain gauge | ☐ | ☐ | ☑ |
| Ozone analyzer | ☑ | ☐ | ☐ |
| Filter pack flow controller | ☑ | ☐ | ☐ |
| Filter pack MFC power supply | ☐ | ☐ | ☑ |

| | Yes | No | N/A |
|---|---|---|---|
| Data logger | ☐ | ☑ | ☐ |
| Data logger | ☐ | ☐ | ☑ |
| Strip chart recorder | ☐ | ☐ | ☑ |
| Computer | ☑ | ☐ | ☐ |
| Modem | ☐ | ☑ | ☐ |
| Printer | ☐ | ☐ | ☑ |
| Zero air pump | ☐ | ☑ | ☐ |
| Filter flow pump | ☐ | ☑ | ☐ |
| Surge protector | ☐ | ☑ | ☐ |
| UPS | ☐ | ☑ | ☐ |
| Lightning protection device | ☐ | ☐ | ☑ |
| Shelter heater | ☐ | ☑ | ☐ |
| Shelter air conditioner | ☑ | ☐ | ☐ |

### Does the site have the required and most recent QC documents and report forms?

| | Present | | Current |
|---|---|---|---|
| Station Log | ☑ | | ☑ |
| SSRF | ☑ | | ☑ |
| Site Ops Manual | ☑ | | ☑ |
| HASP | ☐ | | ☐ |
| Field Ops Manual | ☐ | | ☐ |
| Calibration Reports | ☐ | | ☐ |
| Ozone z/s/p Control Charts | ☐ | | ☐ |
| Preventive maintenance schedul | ☐ | | ☐ |

| | | | |
|---|---|---|---|
| 1 | Is the station log properly completed during every site visit? | ☑ | |
| 2 | Are the Site Status Report Forms being completed and current? | ☑ | |
| 3 | Are the chain-of-custody forms properly used to document sample transfer to and from lab? | ☑ | |
| 4 | Are ozone z/s/p control charts properly completed and current? | ☐ | Control charts not used |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S8-rev002

**Site ID** BWR139

**Technician** Eric Hebert

**Site Visit Date** 11/27/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ | |
| 2 | Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ | |
| 3 | Is the site visited regularly on the required Tuesday schedule? | ☑ | |
| 4 | Are the standard CASTNET operational procedures being flollowed by the site operator? | ☑ | |
| 5 | Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation) | ☑ | |

## Are regular operational QA/QC checks performed on meteorological instruments?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multipoint Calibrations | ☑ | N/A | ☑ |
| Visual Inspections | ☑ | N/A | ☑ |
| Translator Zero/Span Tests (climatronics) | ☐ | N/A | ☑ |
| Manual Rain Gauge Test | ☑ | N/A | ☑ |
| Confirm Reasonableness of Current Values | ☑ | N/A | ☑ |
| Test Surface Wetness Response | ☑ | N/A | ☑ |

## Are regular operational QA/QC checks performed on the ozone analyzer?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point Calibrations | ☑ | Semiannually | ☑ |
| Automatic Zero/Span Tests | ☑ | Daily | ☑ |
| Manual Zero/Span Tests | ☐ | | ☑ |
| Automatic Precision Level Tests | ☑ | Daily | ☑ |
| Manual Precision Level Test | ☐ | | ☑ |
| Analyzer Diagnostics Tests | ☑ | Weekly | ☑ |
| In-line Filter Replacement (at inlet) | ☑ | Every 2 weeks | ☑ |
| In-line Filter Replacement (at analyze | ☐ | N/A | ☑ |
| Sample Line Check for Dirt/Water | ☐ | Weekly | ☑ |
| Zero Air Desiccant Check | ☑ | Weekly | ☑ |

| | | | |
|---|---|---|---|
| 1 | Do multi-point calibration gases go through the complete sample train including all filters? | ☐ | Unknown |
| 2 | Do automatic and manual z/s/p gasses go through the complete sample train including all filters? | ☑ | |
| 3 | Are the automatic and manual z/s/p checks monitored and reported? If yes, how? | ☑ | SSRF, logbook, call-in |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The ozone sample train is leak checked every two weeks following the inlet filter change.

# Field Systems Data Form

F-02058-1500-S9-rev002

**Site ID** BWR139

**Technician** Eric Hebert

**Site Visit Date** 11/27/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Is the filter pack being changed every Tuesday as scheduled? | ☑ | Filter changed mornings 90% |
| 2 | Are the Site Status Report Forms being completed and filed correctly? | ☑ | |
| 3 | Are data downloads and backups being performed as scheduled? | ☐ | No longer required |
| 4 | Are general observations being made and recorded? How? | ☑ | SSRF, logbook |
| 5 | Are site supplies on-hand and replenished in a timely fashion? | ☑ | |
| 6 | Are sample flow rates recorded? How? | ☑ | SSRF, logbook, call-in |
| 7 | Are samples sent to the lab on a regular schedule in a timely fashion? | ☑ | |
| 8 | Are filters protected from contamination during handling and shipping? How? | ☑ | Clean gloves on and off |
| 9 | Are the site conditions reported regularly to the field operations manager or staff? | ☑ | |

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point MFC Calibrations | ☑ | Semiannually | ☑ |
| Flow System Leak Checks | ☑ | Weekly | ☑ |
| Filter Pack Inspection | ☐ | | ☐ |
| Flow Rate Setting Checks | ☑ | Weekly | ☑ |
| Visual Check of Flow Rate Rotometer | ☑ | Weekly | ☑ |
| In-line Filter Inspection/Replacement | ☑ | Semiannually | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S10-rev002

**Site ID** BWR139 **Technician** Eric Hebert **Site Visit Date** 11/27/2017

**Site Visit Sensors**

| Parameter | Manufacturer | Model | S/N | Client ID |
|---|---|---|---|---|
| Computer | Dell | D520 | unknown | 000321 |
| DAS | Campbell | CR3000 | 2536 | 000431 |
| Elevation | Elevation | 1 | None | None |
| Filter pack flow pump | Thomas | 107CAB18 | 608102A | 06031 |
| Flow Rate | Apex | AXMC105LPMDPC | 54758 | 000670 |
| Infrastructure | Infrastructure | none | none | none |
| Modem | Raven | V4221-V | 0808507415 | 06456 |
| Ozone | ThermoElectron Inc | 49i A1NAA | 1009241789 | 000618 |
| Ozone Standard | ThermoElectron Inc | 49i A3NAA | 1030244814 | 000697 |
| Sample Tower | Aluma Tower | B | none | missing |
| Shelter Temperature | Campbell | 107-L | none | none |
| Siting Criteria | Siting Criteria | 1 | None | None |
| Temperature | RM Young | 41342 | 4012 | 04315 |
| Zero air pump | Werther International | C 70/4 | 000815258 | 06877 |

# Site Inventory by Site Visit

| | Site Visit Date | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|

*BFT142-Sandy Grenville-11/27/2017*

| | Site Visit Date | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| 1 | 11/27/2017 | Computer | Dell | 07007 | Inspiron 15 | Unknown |
| 2 | 11/27/2017 | DAS | Campbell | 000498 | CR3000 | 3815 |
| 3 | 11/27/2017 | Elevation | Elevation | None | 1 | None |
| 4 | 11/27/2017 | Filter pack flow pump | Thomas | 00808 | 107CA18 | 00002460587 |
| 5 | 11/27/2017 | Flow Rate | Apex | 000463 | AXMC105LPMDPCV | 42230 |
| 6 | 11/27/2017 | Infrastructure | Infrastructure | none | none | none |
| 7 | 11/27/2017 | Modem | Raven | 06383 | V4221-V | 0802325832 |
| 8 | 11/27/2017 | Ozone | ThermoElectron Inc | 000685 | 49i A1NAA | 1030244789 |
| 9 | 11/27/2017 | Ozone Standard | ThermoElectron Inc | 000453 | 49i A3NAA | CM08200027 |
| 10 | 11/27/2017 | Sample Tower | Aluma Tower | 000632 | B | unknown |
| 11 | 11/27/2017 | Shelter Temperature | Campbell | none | 107-L | none |
| 12 | 11/27/2017 | Siting Criteria | Siting Criteria | None | 1 | None |
| 13 | 11/27/2017 | Temperature | RM Young | 04444 | 41342VO | 4542 |
| 14 | 11/27/2017 | Zero air pump | Werther International | 06897 | C 70/4 | 000821893 |

# DAS Data Form

**DAS Time Max Error:** 0

| Mfg | Serial Number | Site | Technician | Site Visit Date | Parameter | Use Desc. |
|---|---|---|---|---|---|---|
| Campbell | 3815 | BFT142 | Sandy Grenville | 11/27/2017 | DAS | Primary |

**Das Date:** 11/27/2017
**Das Time:** 13:31:49
**Das Day:** 331

**Audit Date** 11/27/2017
**Audit Time** 13:31:49
**Audit Day** 331

**Low Channel:**

**Avg Diff:** 0.0000
**Max Diff:** 0.0001

**High Channel:**

**Avg Diff:** 0.0000
**Max Diff:** 0.0001

**Mfg** Datel
**Parameter** DAS
**Serial Number** 15510194
**Tfer Desc.** Source generator (D
**Tfer ID** 01320
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 2/13/2012
**CorrCoff** 1.00000

**Mfg** Fluke
**Parameter** DAS
**Serial Number** 95740135
**Tfer Desc.** DVM
**Tfer ID** 01311
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 1/23/2017
**CorrCoff** 1.00000

| Channel | Input | DVM Output | DAS Output | InputUnit | OutputUnit | Difference |
|---|---|---|---|---|---|---|
| 7 | 0.0000 | 0.0000 | 0.0001 | V | V | 0.0001 |
| 7 | 0.1000 | 0.0999 | 0.0999 | V | V | 0.0000 |
| 7 | 0.3000 | 0.2997 | 0.2997 | V | V | 0.0000 |
| 7 | 0.5000 | 0.4996 | 0.4996 | V | V | 0.0000 |
| 7 | 0.7000 | 0.6995 | 0.6995 | V | V | 0.0000 |
| 7 | 0.9000 | 0.8994 | 0.8993 | V | V | -0.0001 |
| 7 | 1.0000 | 0.9992 | 0.9992 | V | V | 0.0000 |

# Flow Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Apex | 42230 | BFT142 | Sandy Grenville | 11/27/2017 | Flow Rate | 000463 |

|  |  |  |  |
|---|---|---|---|
| **Mfg** | BIOS | **Parameter** | Flow Rate |
| **Serial Number** | 103471 | **Tfer Desc.** | nexus |
| **Tfer ID** | 01420 |  |  |
| **Slope** | 0.99825 | **Intercept** | 0.00497 |
| **Cert Date** | 2/7/2017 | **CorrCoff** | 0.99991 |
| **Mfg** | BIOS | **Parameter** | Flow Rate |
| **Serial Number** | 103424 | **Tfer Desc.** | BIOS cell |
| **Tfer ID** | 01410 |  |  |
| **Slope** | 0.99825 | **Intercept** | 0.00497 |
| **Cert Date** | 2/7/2017 | **CorrCoff** | 0.99991 |

| **DAS 1:** |  | **DAS 2:** |  |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 0.89% | 1.34% |  |  |

**Cal Factor Zero** 0

**Cal Factor Full Scale** 1

**Rotometer Reading:** 0

| Desc. | Test type | Input l/m | Input Corr_ | MfcDisp. | OutputSignal | Output S E | InputUnit | OutputSignalI | PctDifference |
|---|---|---|---|---|---|---|---|---|---|
| primary | pump off | 0.000 | 0.000 | 0.00 | 0.000 | 0.00 | l/m | l/m |  |
| primary | leak check | 0.000 | 0.000 | 0.00 | 0.000 | -0.01 | l/m | l/m |  |
| primary | test pt 1 | 1.491 | 1.490 | 1.51 | 0.000 | 1.50 | l/m | l/m | 0.67% |
| primary | test pt 2 | 1.490 | 1.490 | 1.51 | 0.000 | 1.51 | l/m | l/m | 1.34% |
| primary | test pt 3 | 1.489 | 1.490 | 1.51 | 0.000 | 1.50 | l/m | l/m | 0.67% |

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| **Sensor Component** | Leak Test | **Condition** |  | **Status** | pass |
| **Sensor Component** | Tubing Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Filter Position | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Rotometer Condition | **Condition** | Clean and dry | **Status** | pass |
| **Sensor Component** | Moisture Present | **Condition** | No moisture present | **Status** | pass |
| **Sensor Component** | Filter Distance | **Condition** | 3.5 cm | **Status** | pass |
| **Sensor Component** | Filter Depth | **Condition** | 0.5 cm | **Status** | pass |
| **Sensor Component** | Filter Azimuth | **Condition** | 180 deg | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** |  | **Status** | pass |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1030244789 | BFT142 | Sandy Grenville | 11/27/2017 | Ozone | 000685 |

| | | | |
|---|---|---|---|
| **Slope:** | 0.98365 | **Slope:** | 0.00000 |
| **Intercept** | 0.45817 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99999 | **CorrCoff** | 0.00000 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Mfg** | ThermoElectron Inc | | | | | **Parameter** | ozone |
| **Serial Number** | 517112175 | | | | | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01111 | | | | | | |
| **Slope** | 1.00250 | | | | | **Intercept** | 0.45870 |
| **Cert Date** | 3/21/2017 | | | | | **CorrCoff** | 1.00000 |

**DAS 1:** **DAS 2:**

| A Avg % Diff: | A Max % Di | A Avg %Dif | A Max % Di |
|---|---|---|---|
| 0.8% | 1.2% | | |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.02 | -0.43 | 0.28 | ppb | |
| primary | 2 | 15.00 | 14.50 | 14.57 | ppb | 0.48% |
| primary | 3 | 35.00 | 34.45 | 34.17 | ppb | -0.81% |
| primary | 4 | 68.02 | 67.39 | 66.76 | ppb | -0.93% |
| primary | 5 | 110.00 | 109.26 | 108.00 | ppb | -1.15% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | -0.10 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 0.999 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 91.3 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 1.3 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.70 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 728.8 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 33.3 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 91.8 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.7 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.71 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 729.4 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Temperature Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 4542 | BFT142 | Sandy Grenville | 11/27/2017 | Temperature | 04444 |

| | | | |
|---|---|---|---|
| **Mfg** | Extech | **Parameter** | Temperature |
| **Serial Number** | H232734 | **Tfer Desc.** | RTD |
| **Tfer ID** | 01227 | | |
| **Slope** | 1.00759 | **Intercept** | 0.14754 |
| **Cert Date** | 2/4/2017 | **CorrCoff** | 1.00000 |

| DAS 1: | | DAS 2: | |
|---|---|---|---|
| **Abs Avg Err** | **Abs Max Er** | **Abs Avg Err** | **Abs Max Er** |
| 0.18 | 0.30 | | |

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Low Range | 0.22 | 0.07 | 0.000 | 0.2 | C | 0.1 |
| primary | Temp Mid Range | 25.64 | 25.30 | 0.000 | 25.0 | C | -0.3 |
| primary | Temp High Range | 47.81 | 47.30 | 0.000 | 47.2 | C | -0.15 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Shield | **Condition** | Moderately clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Shelter Temperature Data For

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Campbell | none | BFT142 | Sandy Grenville | 11/27/2017 | Shelter Temperature | none |

**DAS 1:**

| Abs Avg Err | Abs Max Er |
|---|---|
| 0.22 | 0.32 |

**DAS 2:**

| Abs Avg Err | Abs Max Er |
|---|---|
| | |

**Mfg** Extech

**Parameter** Shelter Temperatur

**Serial Number** H232734

**Tfer Desc.** RTD

**Tfer ID** 01227

**Slope** 1.00759

**Intercept** 0.14754

**Cert Date** 2/4/2017

**CorrCoff** 1.00000

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Mid Range | 27.80 | 27.44 | 0.000 | 27.4 | C | -0.04 |
| primary | Temp Mid Range | 26.16 | 25.82 | 0.000 | 25.5 | C | -0.32 |
| primary | Temp Mid Range | 28.28 | 27.92 | 0.000 | 27.6 | C | -0.3 |

**Sensor Component** System Memo

**Condition**

**Status** pass

## Infrastructure Data For

**Site ID** BFT142 **Technician** Sandy Grenville **Site Visit Date** 11/27/2017

| **Shelter Make** | **Shelter Model** | **Shelter Size** |
|---|---|---|
| Ekto | 8810 | 640 cuft |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Tower Type | **Condition** | Type B | **Status** | pass |
| **Sensor Component** | Conduit | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Met Tower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Moisture Trap | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Power Cables | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Temp Control | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Rotometer | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Sample Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Condition | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Shelter Door | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Shelter Roof | **Condition** | Poor | **Status** | Fail |
| **Sensor Component** | Shelter Floor | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Signal Cable | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Tubing Type | **Condition** | 3/8 teflon | **Status** | pass |
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |

# Field Systems Comments

**1** **Parameter:** DasComments

The sample tower is attached to the shelter. The sample tower is not grounded.

**2** **Parameter:** SitingCriteriaCom

The site is surrounded by a corn/soy bean field, within a large-scale commercial agriculture operation.

**3** **Parameter:** ShelterCleanNotes

The shelter roof is leaking. There are buckets on the counter to catch the rain water.

**4** **Parameter:** MetOpMaintCom

The meteorological tower has been removed and the temperature sensor is installed in a naturally aspirated shield on the sample tower.

# Field Systems Data Form

**F-02058-1500-S1-rev002**

**Site ID** BFT142 **Technician** Sandy Grenville **Site Visit Date** 11/27/2017

| | | | |
|---|---|---|---|
| **Site Sponsor (agency)** | EPA | **USGS Map** | Williston |
| **Operating Group** | UNC-IMS | **Map Scale** | |
| **AQS #** | 37-031-9991 | **Map Date** | |
| **Meteorological Type** | R.M. Young | | |
| **Air Pollutant Analyzer** | Ozone | **QAPP Latitude** | |
| **Deposition Measurement** | dry, wet | **QAPP Longitude** | |
| **Land Use** | agriculture | **QAPP Elevation Meters** | |
| **Terrain** | flat | **QAPP Declination** | |
| **Conforms to MLM** | Yes | **QAPP Declination Date** | |
| **Site Telephone** | | **Audit Latitude** | 34.884668 |
| **Site Address 1** | Open Grounds Farm | **Audit Longitude** | -76.620666 |
| **Site Address 2** | 100 Nelson Bay Rd. | **Audit Elevation** | 5.3 |
| **County** | Carteret | **Audit Declination** | -9.9 |

| | | | | |
|---|---|---|---|---|
| | | | **Present** | |
| **City, State** | Beaufort, NC | | | |
| **Zip Code** | 28516 | **Fire Extinguisher** | ☑ | Inspected July 2000 |
| **Time Zone** | Eastern | **First Aid Kit** | ☑ | |
| **Primary Operator** | | **Safety Glasses** | ☑ | |
| **Primary Op. Phone #** | | **Safety Hard Hat** | ☑ | |
| **Primary Op. E-mail** | | **Climbing Belt** | ☐ | |
| **Backup Operator** | | **Security Fence** | ☐ | |
| **Backup Op. Phone #** | | **Secure Shelter** | ☐ | |
| **Backup Op. E-mail** | | **Stable Entry Step** | ☑ | |

**Shelter Working Room** ☑ **Make** Ekto **Model** 8810 **Shelter Size** 640 cuft

**Shelter Clean** ☑ **Notes** The shelter roof is leaking. There are buckets on the counter to catch the rain water.

**Site OK** ☑ **Notes**

**Driving Directions** From I-95 take highway 70 east through Morehead City and over the bridge. Continue through Beaufort staying on route 70 east. At East Carteret High School, route 70 turns to the right at a traffic light. Continue straight through the light on Merrimon Rd. (SR 1300), do not follow 70 to the right. Open Grounds Farm will be on the right approximately 6 miles on Merrimon Rd. Sign in at the guard house. Continue on the dirt road into the farm. Turn left at the first dirt road. The site will be visible in the corner of the field. Follow the dirt road around the field to the site.

# Field Systems Data Form

F-02058-1500-S2-rev002

**Site ID** BFT142 **Technician** Sandy Grenville **Site Visit Date** 11/27/2017

| Potential Interferent | Minimum Distance From Measurement Apparatus | Distance | Pass = Checked |
|---|---|---|---|
| Large Point Source of SO2 or NOx | 20 to 40 km | | ☑ |
| Major industrial complex | 10 to 20 km | | ☑ |
| City > 50,000 population | 40 km | | ☑ |
| City 10,000 to 50,000 population | 10 km | | ☑ |
| City 1,000 to 10,000 population | 5 km | | ☑ |
| Major highway, airport or rail yard | 2 km | | ☑ |
| Secondary road, heavily traveled | 500 m | | ☑ |
| Secondary road, lightly traveled | 200 m | | ☑ |
| Feedlot operations | 500 m | | ☑ |
| Intensive agricultural ops (including aerial spraying) | 500 m | 20 m | ☐ |
| Limited agricultural operations | 200 m | | ☑ |
| Large parking lot | 200 m | | ☑ |
| Small parking lot | 100 m | | ☑ |
| Tree line | 50 m | | ☑ |
| Obstacles to wind | 10 times obstacle height | | ☑ |

**Siting Distances OK** ☑

**Siting Criteria Comment**

The site is surrounded by a corn/soy bean field, within a large-scale commercial agriculture operation.

# Field Systems Data Form

F-02058-1500-S3-rev002

**Site ID** BFT142 **Technician** Sandy Grenville **Site Visit Date** 11/27/2017

| | | | |
|---|---|---|---|
| 1 | Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? | ☑ | N/A |
| 2 | Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) | ☑ | N/A |
| 3 | Are the tower and sensors plumb? | ☑ | N/A |
| 4 | Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? | ☑ | |
| 5 | Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) | ☑ | |
| 6 | Is the solar radiation sensor plumb? | ☑ | N/A |
| 7 | Is it sited to avoid shading, or any artificial or reflected light? | ☑ | N/A |
| 8 | Is the rain gauge plumb? | ☑ | N/A |
| 9 | Is it sited to avoid sheltering effects from buildings, trees, towers, etc? | ☑ | N/A |
| 10 | Is the surface wetness sensor sited with the grid surface facing north? | ☑ | N/A |
| 11 | Is it inclined approximately 30 degrees? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S4-rev002

**Site ID** BFT142

**Technician** Sandy Grenville

**Site Visit Date** 11/27/2017

| | | | |
|---|---|---|---|
| 1 | Do all the meterological sensors appear to be intact, in good condition, and well maintained? | ☑ | |
| 2 | Are all the meteorological sensors operational online, and reporting data? | ☑ | |
| 3 | Are the shields for the temperature and RH sensors clean? | ☑ | |
| 4 | Are the aspirated motors working? | ☑ | N/A |
| 5 | Is the solar radiation sensor's lens clean and free of scratches? | ☑ | N/A |
| 6 | Is the surface wetness sensor grid clean and undamaged? | ☑ | N/A |
| 7 | Are the sensor signal and power cables intact, in good condition, and well maintained? | ☑ | N/A |
| 8 | Are the sensor signal and power cable connections protected from the elements and well maintained? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The meteorological tower has been removed and the temperature sensor is installed in a naturally aspirated shield on the sample tower.

# Field Systems Data Form

F-02058-1500-S5-rev002

**Site ID** BFT142 **Technician** Sandy Grenville **Site Visit Date** 11/27/2017

## Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E

| | | | |
|---|---|---|---|
| 1 | Do the sample inlets have at least a 270 degree arc of unrestricted airflow? | ☑ | |
| 2 | Are the sample inlets 3 - 15 meters above the ground? | ☑ | |
| 3 | Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? | ☑ | |

## Pollutant analyzers and deposition equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the analyzers and equipment appear to be in good condition and well maintained? | ☑ | |
| 2 | Are the analyzers and monitors operational, on-line, and reporting data? | ☑ | |
| 3 | Describe ozone sample tube. | | 1/4 teflon by 10 meters |
| 4 | Describe dry dep sample tube. | | 3/8 teflon by 10 meters |
| 5 | Are in-line filters used in the ozone sample line? (if yes indicate location) | ☑ | At inlet only |
| 6 | Are sample lines clean, free of kinks, moisture, and obstructions? | ☑ | |
| 7 | Is the zero air supply desiccant unsaturated? | ☑ | |
| 8 | Are there moisture traps in the sample lines? | ☑ | Flow line only |
| 9 | Is there a rotometer in the dry deposition filter line, and is it clean? | ☑ | Clean and dry |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form F-02058-1500-S6-rev002

**Site ID** BFT142 **Technician** Sandy Grenville **Site Visit Date** 11/27/2017

**DAS, sensor translators, and peripheral equipment operations and maintenance**

| | | | |
|---|---|---|---|
| 1 | Do the DAS instruments appear to be in good condition and well maintained? | ☑ | |
| 2 | Are all the components of the DAS operational? (printers, modem, backup, etc) | ☑ | |
| 3 | Do the analyzer and sensor signal leads pass through lightning protection circuitry? | ☑ | Met sensors only |
| 4 | Are the signal connections protected from the weather and well maintained? | ☑ | |
| 5 | Are the signal leads connected to the correct DAS channel? | ☑ | |
| 6 | Are the DAS, sensor translators, and shelter properly grounded? | ☑ | |
| 7 | Does the instrument shelter have a stable power source? | ☑ | |
| 8 | Is the instrument shelter temperature controlled? | ☑ | |

| | | Stable | Grounded |
|---|---|---|---|
| 9 | Is the met tower stable and grounded? | ☐ | ☐ |
| 10 | Is the sample tower stable and grounded? | ☑ | ☐ |
| 11 | Tower comments? | Met tower removed. | |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The sample tower is attached to the shelter.  The sample tower is not grounded.

# Field Systems Data Form F-02058-1500-S7-rev002

**Site ID** BFT142 **Technician** Sandy Grenville **Site Visit Date** 11/27/2017

## Documentation

### Does the site have the required instrument and equipment manuals?

| | Yes | No | N/A | | Yes | No | N/A |
|---|---|---|---|---|---|---|---|
| Wind speed sensor | ☐ | ☐ | ☑ | Data logger | ☐ | ☑ | ☐ |
| Wind direction sensor | ☐ | ☐ | ☑ | Data logger | ☐ | ☐ | ☑ |
| Temperature sensor | ☐ | ☑ | ☐ | Strip chart recorder | ☐ | ☐ | ☑ |
| Relative humidity sensor | ☐ | ☐ | ☑ | Computer | ☐ | ☑ | ☐ |
| Solar radiation sensor | ☐ | ☐ | ☑ | Modem | ☐ | ☑ | ☐ |
| Surface wetness sensor | ☐ | ☐ | ☑ | Printer | ☐ | ☐ | ☑ |
| Wind sensor translator | ☐ | ☐ | ☑ | Zero air pump | ☐ | ☑ | ☐ |
| Temperature translator | ☐ | ☐ | ☑ | Filter flow pump | ☐ | ☑ | ☐ |
| Humidity sensor translator | ☐ | ☐ | ☑ | Surge protector | ☐ | ☐ | ☑ |
| Solar radiation translator | ☐ | ☐ | ☑ | UPS | ☐ | ☐ | ☑ |
| Tipping bucket rain gauge | ☐ | ☐ | ☑ | Lightning protection device | ☐ | ☐ | ☑ |
| Ozone analyzer | ☐ | ☑ | ☐ | Shelter heater | ☐ | ☑ | ☐ |
| Filter pack flow controller | ☐ | ☑ | ☐ | Shelter air conditioner | ☐ | ☑ | ☐ |
| Filter pack MFC power supply | ☐ | ☐ | ☑ | | | | |

### Does the site have the required and most recent QC documents and report forms?

| | Present | | Current |
|---|---|---|---|
| Station Log | ☑ | | ☑ |
| SSRF | ☑ | | ☑ |
| Site Ops Manual | ☑ | Oct 2001 | ☐ |
| HASP | ☐ | | ☐ |
| Field Ops Manual | ☑ | Oct 2001 | ☐ |
| Calibration Reports | ☑ | | ☐ |
| Ozone z/s/p Control Charts | ☐ | | ☐ |
| Preventive maintenance schedul | ☐ | | ☐ |

| | | | |
|---|---|---|---|
| 1 | Is the station log properly completed during every site visit? | ☑ | |
| 2 | Are the Site Status Report Forms being completed and current? | ☑ | |
| 3 | Are the chain-of-custody forms properly used to document sample transfer to and from lab? | ☑ | |
| 4 | Are ozone z/s/p control charts properly completed and current? | ☐ | Control charts not used |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form F-02058-1500-S8-rev002

**Site ID** BFT142 **Technician** Sandy Grenville **Site Visit Date** 11/27/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? | ☑ | |
| 2 | Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ | |
| 3 | Is the site visited regularly on the required Tuesday schedule? | ☑ | |
| 4 | Are the standard CASTNET operational procedures being flollowed by the site operator? | ☑ | |
| 5 | Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation) | ☑ | |

## Are regular operational QA/QC checks performed on meteorological instruments?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multipoint Calibrations | ☑ | N/A | ☑ |
| Visual Inspections | ☑ | N/A | ☑ |
| Translator Zero/Span Tests (climatronics) | ☐ | N/A | ☑ |
| Manual Rain Gauge Test | ☑ | N/A | ☑ |
| Confirm Reasonableness of Current Values | ☑ | N/A | ☑ |
| Test Surface Wetness Response | ☑ | N/A | ☑ |

## Are regular operational QA/QC checks performed on the ozone analyzer?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point Calibrations | ☑ | Semiannually | ☑ |
| Automatic Zero/Span Tests | ☐ | Daily | ☑ |
| Manual Zero/Span Tests | ☑ | As needed | ☑ |
| Automatic Precision Level Tests | ☐ | Daily | ☑ |
| Manual Precision Level Test | ☑ | As needed | ☑ |
| Analyzer Diagnostics Tests | ☑ | Weekly | ☑ |
| In-line Filter Replacement (at inlet) | ☑ | Every 2 weeks | ☑ |
| In-line Filter Replacement (at analyze | ☐ | N/A | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |
| Zero Air Desiccant Check | ☑ | As needed | ☑ |

| | | | |
|---|---|---|---|
| 1 | Do multi-point calibration gases go through the complete sample train including all filters? | ☑ | |
| 2 | Do automatic and manual z/s/p gasses go through the complete sample train including all filters? | ☑ | |
| 3 | Are the automatic and manual z/s/p checks monitored and reported? If yes, how? | ☑ | SSRF, call-in |

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

# Field Systems Data Form

**F-02058-1500-S9-rev002**

**Site ID** BFT142

**Technician** Sandy Grenville

**Site Visit Date** 11/27/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Is the filter pack being changed every Tuesday as scheduled? | ☑ | Filter changed morinings |
| 2 | Are the Site Status Report Forms being completed and filed correctly? | ☑ | |
| 3 | Are data downloads and backups being performed as scheduled? | ☐ | No longer required |
| 4 | Are general observations being made and recorded? How? | ☑ | SSRF |
| 5 | Are site supplies on-hand and replenished in a timely fashion? | ☑ | |
| 6 | Are sample flow rates recorded? How? | ☑ | SSRF, logbook, call-in |
| 7 | Are samples sent to the lab on a regular schedule in a timely fashion? | ☑ | |
| 8 | Are filters protected from contamination during handling and shipping? How? | ☑ | Clean gloves on and off |
| 9 | Are the site conditions reported regularly to the field operations manager or staff? | ☑ | |

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point MFC Calibrations | ☑ | Semiannually | ☑ |
| Flow System Leak Checks | ☑ | Weekly | ☑ |
| Filter Pack Inspection | ☐ | | ☐ |
| Flow Rate Setting Checks | ☑ | Weekly | ☑ |
| Visual Check of Flow Rate Rotometer | ☑ | Weekly | ☑ |
| In-line Filter Inspection/Replacement | ☑ | Semiannually | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

# F-02058-1500-S10-rev002

**Site ID** BFT142 **Technician** Sandy Grenville **Site Visit Date** 11/27/2017

**Site Visit Sensors**

| Parameter | Manufacturer | Model | S/N | Client ID |
|---|---|---|---|---|
| Computer | Dell | Inspiron 15 | Unknown | 07007 |
| DAS | Campbell | CR3000 | 3815 | 000498 |
| Elevation | Elevation | 1 | None | None |
| Filter pack flow pump | Thomas | 107CA18 | 00002460587 | 00808 |
| Flow Rate | Apex | AXMC105LPMDPC | 42230 | 000463 |
| Infrastructure | Infrastructure | none | none | none |
| Modem | Raven | V4221-V | 0802325832 | 06383 |
| Ozone | ThermoElectron Inc | 49i A1NAA | 1030244789 | 000685 |
| Ozone Standard | ThermoElectron Inc | 49i A3NAA | CM08200027 | 000453 |
| Sample Tower | Aluma Tower | B | unknown | 000632 |
| Shelter Temperature | Campbell | 107-L | none | none |
| Siting Criteria | Siting Criteria | 1 | None | None |
| Temperature | RM Young | 41342VO | 4542 | 04444 |
| Zero air pump | Werther International | C 70/4 | 000821893 | 06897 |

# Site Inventory by Site Visit

| Site Visit Date | | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *WSP144-Eric Hebert-11/28/2017* | | | | | | |
| 1 | 11/28/2017 | Computer | Dell | 07037 | Inspiron 15 | Unknown |
| 2 | 11/28/2017 | DAS | Campbell | 000430 | CR3000 | 2525 |
| 3 | 11/28/2017 | Elevation | Elevation | None | 1 | None |
| 4 | 11/28/2017 | Filter pack flow pump | Thomas | 00087 | 107CA110 | 83403-10 |
| 5 | 11/28/2017 | Flow Rate | Apex | 000639 | AXMC105LPMDPCV | 54780 |
| 6 | 11/28/2017 | Infrastructure | Infrastructure | none | none | none |
| 7 | 11/28/2017 | Modem | Raven | 06454 | V4221-V | 0808338332 |
| 8 | 11/28/2017 | Ozone | ThermoElectron Inc | 000734 | 49i A1NAA | 1105347317 |
| 9 | 11/28/2017 | Ozone Standard | ThermoElectron Inc | 000543 | 49i A3NAA | 0929938240 |
| 10 | 11/28/2017 | Sample Tower | Aluma Tower | 000126 | B | none |
| 11 | 11/28/2017 | Shelter Temperature | Campbell | none | 107-L | none |
| 12 | 11/28/2017 | Siting Criteria | Siting Criteria | None | 1 | None |
| 13 | 11/28/2017 | Temperature | RM Young | 06387 | 41342VC | 13960 |
| 14 | 11/28/2017 | Zero air pump | Werther International | 06880 | C 70/4 | 000814273 |

# DAS Data Form

**DAS Time Max Error:** 0.03

| Mfg | Serial Number | Site | Technician | Site Visit Date | Parameter | Use Desc. |
|---|---|---|---|---|---|---|
| Campbell | 2525 | WSP144 | Eric Hebert | 11/28/2017 | DAS | Primary |

**Das Date:** 11/28/2017
**Das Time:** 12:27:32
**Das Day:** 332

**Audit Date** 11/28/2017
**Audit Time** 12:27:30
**Audit Day** 332

**Low Channel:**
**Avg Diff:** 0.0000
**Max Diff:** 0.0000

**High Channel:**
**Avg Diff:** 0.0000
**Max Diff:** 0.0000

**Mfg** Datel
**Parameter** DAS
**Serial Number** 4000392
**Tfer Desc.** Source generator (D
**Tfer ID** 01321
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 1/22/2015
**CorrCoff** 1.00000

**Mfg** Fluke
**Parameter** DAS
**Serial Number** 86590148
**Tfer Desc.** DVM
**Tfer ID** 01310
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 2/23/2017
**CorrCoff** 1.00000

| Channel | Input | DVM Output | DAS Output | InputUnit | OutputUnit | Difference |
|---|---|---|---|---|---|---|
| 7 | 0.0000 | 0.0000 | 0.0000 | V | V | 0.0000 |
| 7 | 0.1000 | 0.1000 | 0.1000 | V | V | 0.0000 |
| 7 | 0.3000 | 0.3002 | 0.3002 | V | V | 0.0000 |
| 7 | 0.5000 | 0.5003 | 0.5003 | V | V | 0.0000 |
| 7 | 0.7000 | 0.7004 | 0.7004 | V | V | 0.0000 |
| 7 | 0.9000 | 0.9005 | 0.9005 | V | V | 0.0000 |
| 7 | 1.0000 | 1.0006 | 1.0006 | V | V | 0.0000 |

# Flow Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Apex | 54780 | WSP144 | Eric Hebert | 11/28/2017 | Flow Rate | 000639 |

**Mfg** BIOS
**Parameter** Flow Rate
**Serial Number** 122974
**Tfer Desc.** BIOS 220-H
**Tfer ID** 01416
**Slope** 1.00732
**Intercept** -0.02202
**Cert Date** 3/8/2017
**CorrCoff** 0.99970

**DAS 1:**

**DAS 2:**

| A Avg % Diff: | A Max % Di | A Avg %Dif | A Max % Di |
|---|---|---|---|
| 1.54% | 1.97% | | |

**Cal Factor Zero** -0.01
**Cal Factor Full Scale** 1.01
**Rotometer Reading:** 1.3

| Desc. | Test type | Input l/m | Input Corr_ | MfcDisp. | OutputSignal | Output S E | InputUnit | OutputSignalI | PctDifference |
|---|---|---|---|---|---|---|---|---|---|
| primary | pump off | 0.000 | 0.000 | 0.00 | 0.000 | -0.01 | l/m | l/m | |
| primary | leak check | 0.000 | 0.000 | 0.00 | 0.000 | 0.10 | l/m | l/m | |
| primary | test pt 1 | 1.504 | 1.510 | 1.48 | 0.000 | 1.49 | l/m | l/m | -1.32% |
| primary | test pt 2 | 1.503 | 1.510 | 1.48 | 0.000 | 1.49 | l/m | l/m | -1.32% |
| primary | test pt 3 | 1.507 | 1.520 | 1.48 | 0.000 | 1.49 | l/m | l/m | -1.97% |

**Sensor Component** Leak Test **Condition** **Status** pass
**Sensor Component** Tubing Condition **Condition** Good **Status** pass
**Sensor Component** Filter Position **Condition** Good **Status** pass
**Sensor Component** Rotometer Condition **Condition** Clean and dry **Status** pass
**Sensor Component** Moisture Present **Condition** See comments **Status** pass
**Sensor Component** Filter Distance **Condition** 4.5 cm **Status** pass
**Sensor Component** Filter Depth **Condition** 3.5 cm **Status** pass
**Sensor Component** Filter Azimuth **Condition** 270 deg **Status** pass
**Sensor Component** System Memo **Condition** **Status** pass

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1105347317 | WSP144 | Eric Hebert | 11/28/2017 | Ozone | 000734 |

| | | | |
|---|---|---|---|
| **Slope:** | 0.97433 | **Slope:** | 0.00000 |
| **Intercept** | -0.75095 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99999 | **CorrCoff** | 0.00000 |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 0517112167 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01113 | | |
| **Slope** | 1.00504 | **Intercept** | 0.32915 |
| **Cert Date** | 9/12/2017 | **CorrCoff** | 1.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 5.3% | 8.9% | | |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.29 | -0.03 | -0.47 | ppb | |
| primary | 2 | 15.74 | 15.33 | 13.96 | ppb | -8.94% |
| primary | 3 | 33.78 | 33.28 | 31.53 | ppb | -5.26% |
| primary | 4 | 68.38 | 67.70 | 65.17 | ppb | -3.74% |
| primary | 5 | 110.35 | 109.46 | 106.00 | ppb | -3.16% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.40 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.045 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 102.7 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.9 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.73 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 736.3 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 37.2 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 100.9 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.71 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 737.2 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Temperature Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 13960 | WSP144 | Eric Hebert | 11/28/2017 | Temperature | 06387 |

|  |  |  |  |
|---|---|---|---|
| **Mfg** | Extech | **Parameter** | Temperature |
| **Serial Number** | H232679 | **Tfer Desc.** | RTD |
| **Tfer ID** | 01228 |  |  |
| **Slope** | 1.00656 | **Intercept** | -0.03341 |
| **Cert Date** | 2/4/2017 | **CorrCoff** | 1.00000 |

| **DAS 1:** |  | **DAS 2:** |  |
|---|---|---|---|
| **Abs Avg Err** | **Abs Max Er** | **Abs Avg Err** | **Abs Max Er** |
| 0.22 | 0.33 |  |  |

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Low Range | -0.07 | -0.04 | 0.000 | 0.3 | C | 0.33 |
| primary | Temp Mid Range | 22.55 | 22.44 | 0.000 | 22.3 | C | -0.13 |
| primary | Temp High Range | 46.51 | 46.24 | 0.000 | 46.0 | C | -0.21 |

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| **Sensor Component** | Shield | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** |  | **Status** | pass |

# Shelter Temperature Data For

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Campbell | none | WSP144 | Eric Hebert | 11/28/2017 | Shelter Temperature | none |

| DAS 1: | | DAS 2: | |
|---|---|---|---|
| Abs Avg Err | Abs Max Er | Abs Avg Err | Abs Max Er |
| 1.10 | 1.99 | | |

**Mfg** Extech

**Parameter** Shelter Temperatur

**Serial Number** H232679

**Tfer Desc.** RTD

**Tfer ID** 01228

**Slope** 1.00656

**Intercept** -0.03341

**Cert Date** 2/4/2017

**CorrCoff** 1.00000

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Mid Range | 21.83 | 21.72 | 0.000 | 23.7 | C | 1.99 |
| primary | Temp Mid Range | 26.08 | 25.94 | 0.000 | 25.3 | C | -0.61 |
| primary | Temp Mid Range | 25.40 | 25.27 | 0.000 | 26.0 | C | 0.71 |

**Sensor Component** System Memo

**Condition**

**Status** pass

## Infrastructure Data For

**Site ID** WSP144 **Technician** Eric Hebert **Site Visit Date** 11/28/2017

| Shelter Make | Shelter Model | Shelter Size |
|---|---|---|
| Ekto | 8810 | 640 cuft |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Tower Type | **Condition** | Type B | **Status** | pass |
| **Sensor Component** | Conduit | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Met Tower | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Moisture Trap | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Power Cables | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Temp Control | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Rotometer | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Sample Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Door | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Roof | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Floor | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Signal Cable | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Tubing Type | **Condition** | 3/8 teflon | **Status** | pass |
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |

# Site Visit Comments

| Parameter | Site | Technician | S.V. Date | Component | Mfg | Serial No. | Hazard | Problem |
|---|---|---|---|---|---|---|---|---|
| Flow Rate | WSP144 | Eric Hebert | 11/28/2017 | Moisture Present | Apex | 3875 | ☐ | ☐ |

The filter sample tubing has drops of moisture in low sections outside the shelter.

# Field Systems Comments

**1** **Parameter:** SiteOpsProcedures

Ozone sample line leak-checks are conducted every two weeks.

**2** **Parameter:** SitingCriteriaCom

The city of Trenton, estimated population greater than 85,000, is within 20 km of the site.

**3** **Parameter:** ShelterCleanNotes

The shelter is in good condition, clean, very neat, and well organized.

# Field Systems Data Form

# F-02058-1500-S1-rev002

**Site ID** WSP144 **Technician** Eric Hebert **Site Visit Date** 11/28/2017

| | | | |
|---|---|---|---|
| **Site Sponsor (agency)** | EPA | **USGS Map** | Pennington |
| **Operating Group** | NJDEP / WCRC | **Map Scale** | |
| **AQS #** | 34-021-9991 | **Map Date** | |
| **Meteorological Type** | R.M. Young | | |
| **Air Pollutant Analyzer** | Ozone | **QAPP Latitude** | |
| **Deposition Measurement** | dry, PM2.5, PM10 | **QAPP Longitude** | |
| **Land Use** | woodland, urban agriculture | **QAPP Elevation Meters** | |
| **Terrain** | rolling | **QAPP Declination** | |
| **Conforms to MLM** | Marginally | **QAPP Declination Date** | |
| **Site Telephone** | | **Audit Latitude** | 40.312303 |
| **Site Address 1** | WCRC-FA | **Audit Longitude** | -74.872663 |
| **Site Address 2** | Church Rd. | **Audit Elevation** | 59 |
| **County** | Mercer | **Audit Declination** | -12.5 |

| | | | | |
|---|---|---|---|---|
| **City, State** | Titusville, NJ | | **Present** | |
| **Zip Code** | 08560 | **Fire Extinguisher** | ☑ | dated 2015 |
| **Time Zone** | Eastern | **First Aid Kit** | ☑ | |
| **Primary Operator** | | **Safety Glasses** | ☑ | |
| **Primary Op. Phone #** | | **Safety Hard Hat** | ☑ | |
| **Primary Op. E-mail** | | **Climbing Belt** | ☐ | |
| **Backup Operator** | | **Security Fence** | ☑ | |
| **Backup Op. Phone #** | | **Secure Shelter** | ☑ | |
| **Backup Op. E-mail** | | **Stable Entry Step** | ☑ | |

**Shelter Working Room** ☑ **Make** Ekto **Model** 8810 **Shelter Size** 640 cuft

**Shelter Clean** ☑ **Notes** The shelter is in good condition, clean, very neat, and well organized.

**Site OK** ☑ **Notes**

**Driving Directions** From Philadelphia take I-95 north. Cross the Delaware River into New Jersey and take the first exit, route 29 north, just over the bridge. Continue approximately 4 miles through the traffic light at the intersection of 546 and through the park. Turn right onto Church road at the traffic light. Continue approximately 0.5 miles to the gate for the WCRC-FA on the right. The combination to the lock is 1903. Continue through the gate up the gravel road to the top of the hill and turn right along the edge of the field. Follow the gravel road to the site in the chain-link fenced area.

# Field Systems Data Form F-02058-1500-S2-rev002

**Site ID** WSP144 **Technician** Eric Hebert **Site Visit Date** 11/28/2017

| Potential Interferent | Minimum Distance From Measurement Apparatus | Distance | Pass = Checked |
|---|---|---|---|
| Large Point Source of SO2 or NOx | 20 to 40 km | | ☑ |
| Major industrial complex | 10 to 20 km | | ☑ |
| City > 50,000 population | 40 km | 20 km | ☐ |
| City 10,000 to 50,000 population | 10 km | | ☑ |
| City 1,000 to 10,000 population | 5 km | | ☑ |
| Major highway, airport or rail yard | 2 km | | ☑ |
| Secondary road, heavily traveled | 500 m | | ☑ |
| Secondary road, lightly traveled | 200 m | | ☑ |
| Feedlot operations | 500 m | | ☑ |
| Intensive agricultural ops (including aerial spraying) | 500 m | | ☑ |
| Limited agricultural operations | 200 m | | ☑ |
| Large parking lot | 200 m | | ☑ |
| Small parking lot | 100 m | | ☑ |
| Tree line | 50 m | | ☑ |
| Obstacles to wind | 10 times obstacle height | | ☑ |

**Siting Distances OK** ☐

**Siting Criteria Comment**

The city of Trenton, estimated population greater than 85,000, is within 20 km of the site.

# Field Systems Data Form

F-02058-1500-S3-rev002

**Site ID** WSP144 **Technician** Eric Hebert **Site Visit Date** 11/28/2017

| | | | |
|---|---|---|---|
| 1 | Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? | ☑ | N/A |
| 2 | Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) | ☑ | N/A |
| 3 | Are the tower and sensors plumb? | ☑ | N/A |
| 4 | Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? | ☑ | |
| 5 | Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) | ☑ | |
| 6 | Is the solar radiation sensor plumb? | ☑ | N/A |
| 7 | Is it sited to avoid shading, or any artificial or reflected light? | ☑ | N/A |
| 8 | Is the rain gauge plumb? | ☑ | N/A |
| 9 | Is it sited to avoid sheltering effects from buildings, trees, towers, etc? | ☑ | N/A |
| 10 | Is the surface wetness sensor sited with the grid surface facing north? | ☑ | N/A |
| 11 | Is it inclined approximately 30 degrees? | ☑ | N/A |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S4-rev002

**Site ID** WSP144 **Technician** Eric Hebert **Site Visit Date** 11/28/2017

| | | | |
|---|---|---|---|
| 1 | Do all the meterological sensors appear to be intact, in good condition, and well maintained? | ☑ | |
| 2 | Are all the meteorological sensors operational online, and reporting data? | ☑ | |
| 3 | Are the shields for the temperature and RH sensors clean? | ☑ | |
| 4 | Are the aspirated motors working? | ☑ | |
| 5 | Is the solar radiation sensor's lens clean and free of scratches? | ☑ | N/A |
| 6 | Is the surface wetness sensor grid clean and undamaged? | ☑ | N/A |
| 7 | Are the sensor signal and power cables intact, in good condition, and well maintained? | ☑ | |
| 8 | Are the sensor signal and power cable connections protected from the elements and well maintained? | ☑ | |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S5-rev002

**Site ID** WSP144 **Technician** Eric Hebert **Site Visit Date** 11/28/2017

## Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E

| | | | |
|---|---|---|---|
| 1 | Do the sample inlets have at least a 270 degree arc of unrestricted airflow? | ☑ | |
| 2 | Are the sample inlets 3 - 15 meters above the ground? | ☑ | |
| 3 | Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? | ☑ | |

## Pollutant analyzers and deposition equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the analyzers and equipment appear to be in good condition and well maintained? | ☑ | |
| 2 | Are the analyzers and monitors operational, on-line, and reporting data? | ☑ | |
| 3 | Describe ozone sample tube. | | 1/4 teflon by 12 meters |
| 4 | Describe dry dep sample tube. | | 3/8 teflon by 12 meters |
| 5 | Are in-line filters used in the ozone sample line? (if yes indicate location) | ☑ | At inlet only |
| 6 | Are sample lines clean, free of kinks, moisture, and obstructions? | ☑ | |
| 7 | Is the zero air supply desiccant unsaturated? | ☑ | |
| 8 | Are there moisture traps in the sample lines? | ☑ | Flow line only |
| 9 | Is there a rotometer in the dry deposition filter line, and is it clean? | ☑ | Clean and dry |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

**F-02058-1500-S6-rev002**

**Site ID** WSP144 **Technician** Eric Hebert **Site Visit Date** 11/28/2017

## DAS, sensor translators, and peripheral equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the DAS instruments appear to be in good condition and well maintained? | ☑ | |
| 2 | Are all the components of the DAS operational? (printers, modem, backup, etc) | ☑ | |
| 3 | Do the analyzer and sensor signal leads pass through lightning protection circuitry? | ☑ | Met sensors only |
| 4 | Are the signal connections protected from the weather and well maintained? | ☑ | |
| 5 | Are the signal leads connected to the correct DAS channel? | ☑ | |
| 6 | Are the DAS, sensor translators, and shelter properly grounded? | ☑ | |
| 7 | Does the instrument shelter have a stable power source? | ☑ | |
| 8 | Is the instrument shelter temperature controlled? | ☑ | |

| | | Stable | Grounded |
|---|---|---|---|
| 9 | Is the met tower stable and grounded? | ☐ | ☐ |
| 10 | Is the sample tower stable and grounded? | ☑ | ☑ |

11 Tower comments? Met tower removed

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form F-02058-1500-S7-rev002

**Site ID** WSP144 **Technician** Eric Hebert **Site Visit Date** 11/28/2017

## Documentation

### Does the site have the required instrument and equipment manuals?

| | Yes | No | N/A | | Yes | No | N/A |
|---|---|---|---|---|---|---|---|
| Wind speed sensor | ☐ | ☐ | ☑ | Data logger | ☐ | ☑ | ☐ |
| Wind direction sensor | ☐ | ☐ | ☑ | Data logger | ☐ | ☐ | ☑ |
| Temperature sensor | ☑ | ☐ | ☐ | Strip chart recorder | ☐ | ☐ | ☑ |
| Relative humidity sensor | ☐ | ☐ | ☑ | Computer | ☑ | ☐ | ☐ |
| Solar radiation sensor | ☐ | ☐ | ☑ | Modem | ☐ | ☑ | ☐ |
| Surface wetness sensor | ☐ | ☐ | ☑ | Printer | ☐ | ☐ | ☑ |
| Wind sensor translator | ☐ | ☐ | ☑ | Zero air pump | ☐ | ☑ | ☐ |
| Temperature translator | ☐ | ☐ | ☑ | Filter flow pump | ☐ | ☑ | ☐ |
| Humidity sensor translator | ☐ | ☐ | ☑ | Surge protector | ☐ | ☐ | ☑ |
| Solar radiation translator | ☐ | ☐ | ☑ | UPS | ☐ | ☑ | ☐ |
| Tipping bucket rain gauge | ☐ | ☐ | ☑ | Lightning protection device | ☐ | ☐ | ☑ |
| Ozone analyzer | ☑ | ☐ | ☐ | Shelter heater | ☐ | ☑ | ☐ |
| Filter pack flow controller | ☑ | ☐ | ☐ | Shelter air conditioner | ☑ | ☐ | ☐ |
| Filter pack MFC power supply | ☐ | ☐ | ☑ | | | | |

### Does the site have the required and most recent QC documents and report forms?

| | Present | | Current |
|---|---|---|---|
| Station Log | ☑ | | ☑ |
| SSRF | ☑ | | ☑ |
| Site Ops Manual | ☑ | Oct 2011 | ☑ |
| HASP | ☑ | Oct 2011 | ☑ |
| Field Ops Manual | ☑ | | ☑ |
| Calibration Reports | ☐ | | ☐ |
| Ozone z/s/p Control Charts | ☐ | | ☐ |
| Preventive maintenance schedul | ☐ | | ☐ |

| | | | |
|---|---|---|---|
| 1 | Is the station log properly completed during every site visit? | ☑ | |
| 2 | Are the Site Status Report Forms being completed and current? | ☑ | |
| 3 | Are the chain-of-custody forms properly used to document sample transfer to and from lab? | ☑ | |
| 4 | Are ozone z/s/p control charts properly completed and current? | ☐ | Control charts not used |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S8-rev002

**Site ID** WSP144 **Technician** Eric Hebert **Site Visit Date** 11/28/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? | ☑ | |
| 2 | Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? | ☑ | |
| 3 | Is the site visited regularly on the required Tuesday schedule? | ☑ | |
| 4 | Are the standard CASTNET operational procedures being flollowed by the site operator? | ☑ | |
| 5 | Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation) | ☑ | |

## Are regular operational QA/QC checks performed on meteorological instruments?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multipoint Calibrations | ☑ | N/A | ☑ |
| Visual Inspections | ☑ | N/A | ☑ |
| Translator Zero/Span Tests (climatronics) | ☐ | N/A | ☑ |
| Manual Rain Gauge Test | ☑ | N/A | ☑ |
| Confirm Reasonableness of Current Values | ☑ | N/A | ☑ |
| Test Surface Wetness Response | ☑ | N/A | ☑ |

## Are regular operational QA/QC checks performed on the ozone analyzer?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point Calibrations | ☑ | Semiannually | ☑ |
| Automatic Zero/Span Tests | ☑ | Daily | ☑ |
| Manual Zero/Span Tests | ☐ | | ☑ |
| Automatic Precision Level Tests | ☑ | Daily | ☑ |
| Manual Precision Level Test | ☐ | | ☑ |
| Analyzer Diagnostics Tests | ☑ | Weekly | ☑ |
| In-line Filter Replacement (at inlet) | ☑ | Every 2 weeks | ☑ |
| In-line Filter Replacement (at analyze | ☐ | N/A | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |
| Zero Air Desiccant Check | ☑ | Weekly | ☑ |

| | | | |
|---|---|---|---|
| 1 | Do multi-point calibration gases go through the complete sample train including all filters? | ☐ | Unknown |
| 2 | Do automatic and manual z/s/p gasses go through the complete sample train including all filters? | ☑ | |
| 3 | Are the automatic and manual z/s/p checks monitored and reported? If yes, how? | ☑ | SSRF, logbook, call-in |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

Ozone sample line leak-checks are conducted every two weeks.

# Field Systems Data Form

**F-02058-1500-S9-rev002**

**Site ID** WSP144 **Technician** Eric Hebert **Site Visit Date** 11/28/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Is the filter pack being changed every Tuesday as scheduled? | ☑ | Filter changed morinings |
| 2 | Are the Site Status Report Forms being completed and filed correctly? | ☑ | |
| 3 | Are data downloads and backups being performed as scheduled? | ☐ | No longer required |
| 4 | Are general observations being made and recorded? How? | ☑ | SSRF, logbook |
| 5 | Are site supplies on-hand and replenished in a timely fashion? | ☑ | |
| 6 | Are sample flow rates recorded? How? | ☑ | SSRF, logbook, call-in |
| 7 | Are samples sent to the lab on a regular schedule in a timely fashion? | ☑ | |
| 8 | Are filters protected from contamination during handling and shipping? How? | ☑ | Clean gloves on and off |
| 9 | Are the site conditions reported regularly to the field operations manager or staff? | ☑ | |

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point MFC Calibrations | ☑ | Semiannually | ☑ |
| Flow System Leak Checks | ☑ | Weekly | ☑ |
| Filter Pack Inspection | ☑ | Weekly | ☑ |
| Flow Rate Setting Checks | ☑ | Weekly | ☑ |
| Visual Check of Flow Rate Rotometer | ☑ | Weekly | ☑ |
| In-line Filter Inspection/Replacement | ☑ | Semiannually | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S10-rev002

**Site ID** WSP144 **Technician** Eric Hebert **Site Visit Date** 11/28/2017

**Site Visit Sensors**

| Parameter | Manufacturer | Model | S/N | Client ID |
|---|---|---|---|---|
| Computer | Dell | Inspiron 15 | Unknown | 07037 |
| DAS | Campbell | CR3000 | 2525 | 000430 |
| Elevation | Elevation | 1 | None | None |
| Filter pack flow pump | Thomas | 107CA110 | 83403-10 | 00087 |
| Flow Rate | Apex | AXMC105LPMDPC | 54780 | 000639 |
| Infrastructure | Infrastructure | none | none | none |
| Modem | Raven | V4221-V | 0808338332 | 06454 |
| Ozone | ThermoElectron Inc | 49i A1NAA | 1105347317 | 000734 |
| Ozone Standard | ThermoElectron Inc | 49i A3NAA | 0929938240 | 000543 |
| Sample Tower | Aluma Tower | B | none | 000126 |
| Shelter Temperature | Campbell | 107-L | none | none |
| Siting Criteria | Siting Criteria | 1 | None | None |
| Temperature | RM Young | 41342VC | 13960 | 06387 |
| Zero air pump | Werther International | C 70/4 | 000814273 | 06880 |

# Site Inventory by Site Visit

*SHN418-Eric Hebert-11/29/2017*

| Site Visit Date | | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| 1 | 11/29/2017 | Computer | Hewlett Packard | none | 8460p | CNU13607B3 |
| 2 | 11/29/2017 | DAS | Environmental Sys Corp | 90658 | 8816 | 2643 |
| 3 | 11/29/2017 | Elevation | Elevation | None | 1 | None |
| 4 | 11/29/2017 | Filter pack flow pump | Thomas | 00443 | 107CA110 | 0288714888 |
| 5 | 11/29/2017 | flow rate | Tylan | 03942 | FC280 | AW9605202 |
| 6 | 11/29/2017 | Infrastructure | Infrastructure | none | none | none |
| 7 | 11/29/2017 | MFC power supply | Tylan | 03485 | RO-32 | FP9404009 |
| 8 | 11/29/2017 | Ozone | ThermoElectron Inc | none | 49i A3NAA | 0903334535 |
| 9 | 11/29/2017 | Ozone Standard | ThermoElectron Inc | none | 49i A1NAA | CM08460009 |
| 10 | 11/29/2017 | Sample Tower | Aluma Tower | 923307 | B | none |
| 11 | 11/29/2017 | Shelter Temperature | ARS | none | none | none |
| 12 | 11/29/2017 | Siting Criteria | Siting Criteria | None | 1 | None |
| 13 | 11/29/2017 | Temperature2meter | RM Young | none | 41342VC | 14265 |
| 14 | 11/29/2017 | Zero air pump | Werther International | none | C 70/4 | 000855578 |

# DAS Data Form

**DAS Time Max Error:** 1.42

| **Mfg** | **Serial Number** | **Site** | **Technician** | **Site Visit Date** | **Parameter** | **Use Desc.** |
|---|---|---|---|---|---|---|
| Environmental Sys | 2643 | SHN418 | Eric Hebert | 11/29/2017 | DAS | Primary |

**Das Date:** 11/29/2017
**Das Time:** 12:14:35
**Das Day:** 333

**Audit Date** 11/29/2017
**Audit Time** 12:16:00
**Audit Day** 333

**Low Channel:**

**Avg Diff:** 0.0003
**Max Diff:** 0.0005

**High Channel:**

**Avg Diff:** 0.0003
**Max Diff:** 0.0005

**Mfg** Datel
**Parameter** DAS
**Serial Number** 4000392
**Tfer Desc.** Source generator (D
**Tfer ID** 01321
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 1/22/2015
**CorrCoff** 1.00000

**Mfg** Fluke
**Parameter** DAS
**Serial Number** 86590148
**Tfer Desc.** DVM
**Tfer ID** 01310
**Slope** 1.00000
**Intercept** 0.00000
**Cert Date** 2/23/2017
**CorrCoff** 1.00000

| Channel | Input | DVM Output | DAS Output | InputUnit | OutputUnit | Difference |
|---|---|---|---|---|---|---|
| 2 | 0.0000 | 0.0000 | 0.0000 | V | V | 0.0000 |
| 2 | 0.1000 | 0.1000 | 0.1001 | V | V | 0.0001 |
| 2 | 0.3000 | 0.3002 | 0.3003 | V | V | 0.0001 |
| 2 | 0.5000 | 0.5003 | 0.5005 | V | V | 0.0002 |
| 2 | 0.7000 | 0.7004 | 0.7008 | V | V | 0.0004 |
| 2 | 0.9000 | 0.9005 | 0.9010 | V | V | 0.0005 |
| 2 | 1.0000 | 1.0006 | 1.0011 | V | V | 0.0005 |

# Flow Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| Tylan | AW9605202 | SHN418 | Eric Hebert | 11/29/2017 | flow rate | 03942 |

| | | |
|---|---|---|
| **Mfg** | Tylan | |
| **SN/Owner ID** | FP9404009 | 03485 |
| **Parameter** | MFC power supply | |

| | | | |
|---|---|---|---|
| **Mfg** | BIOS | **Parameter** | Flow Rate |
| **Serial Number** | 122974 | **Tfer Desc.** | BIOS 220-H |
| **Tfer ID** | 01416 | | |
| **Slope** | 1.00732 | **Intercept** | -0.02202 |
| **Cert Date** | 3/8/2017 | **CorrCoff** | 0.99970 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 1.52% | 1.57% | | |

| | |
|---|---|
| **Cal Factor Zero** | -0.307 |
| **Cal Factor Full Scale** | 4.833 |
| **Rotometer Reading:** | 1.7 |

| Desc. | Test type | Input l/m | Input Corr_ | MfcDisp. | OutputSignal | Output S E | InputUnit | OutputSignalI | PctDifference |
|---|---|---|---|---|---|---|---|---|---|
| primary | pump off | 0.000 | 0.000 | 0.27 | 0.0000 | 0.00 | l/m | l/m | |
| primary | leak check | 0.000 | 0.000 | 0.28 | 0.0000 | 0.00 | l/m | l/m | |
| primary | test pt 1 | 1.524 | 1.530 | 1.75 | 0.0000 | 1.51 | l/m | l/m | -1.50% |
| primary | test pt 2 | 1.524 | 1.530 | 1.75 | 0.0000 | 1.51 | l/m | l/m | -1.57% |
| primary | test pt 3 | 1.524 | 1.530 | 1.75 | 0.0000 | 1.51 | l/m | l/m | -1.50% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Leak Test | **Condition** | | **Status** | pass |
| **Sensor Component** | Tubing Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Filter Position | **Condition** | Poor | **Status** | Fail |
| **Sensor Component** | Rotometer Condition | **Condition** | Clean and dry | **Status** | pass |
| **Sensor Component** | Moisture Present | **Condition** | No moisture present | **Status** | pass |
| **Sensor Component** | Filter Distance | **Condition** | 5.5 cm | **Status** | pass |
| **Sensor Component** | Filter Depth | **Condition** | -1.0 cm | **Status** | Fail |
| **Sensor Component** | Filter Azimuth | **Condition** | 270 deg | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 0903334535 | SHN418 | Eric Hebert | 11/29/2017 | Ozone | none |

| | | | |
|---|---|---|---|
| **Slope:** | 0.97938 | **Slope:** | 0.00000 |
| **Intercept** | -0.18335 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99997 | **CorrCoff** | 0.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 2.1% | 4.0% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 0517112167 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01113 | | |
| **Slope** | 1.00504 | **Intercept** | 0.32915 |
| **Cert Date** | 9/12/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.29 | -0.03 | -0.34 | ppb | |
| primary | 2 | 13.78 | 13.38 | 13.37 | ppb | -0.07% |
| primary | 3 | 34.61 | 34.10 | 32.74 | ppb | -3.99% |
| primary | 4 | 68.08 | 67.41 | 65.99 | ppb | -2.11% |
| primary | 5 | 110.22 | 109.34 | 106.90 | ppb | -2.23% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.40 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 0.984 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | 0.0003 | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | 1.0001 | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 95.7 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.7 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.65 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 663.4 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 34.8 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 108.0 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.8 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.67 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 663.1 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# 2 Meter Temperature Data Form

Calc. Difference

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| RM Young | 14265 | SHN418 | Eric Hebert | 11/29/2017 | Temperature2meter | none |

| | | | |
|---|---|---|---|
| **Mfg** | Extech | **Parameter** | Temperature |
| **Serial Number** | H232679 | **Tfer Desc.** | RTD |
| **Tfer ID** | 01228 | | |
| **Slope** | 1.00656 | **Intercept** | -0.03341 |
| **Cert Date** | 2/4/2017 | **CorrCoff** | 1.00000 |

| DAS 1: | | DAS 2: | |
|---|---|---|---|
| **Abs Avg Err** | **Abs Max Er** | **Abs Avg Err** | **Abs Max Er** |
| 0.18 | 0.27 | | |

| UseDescription | Test type | InputTmpRaw | InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Low Rang | 0.06 | 0.09 | 0.0000 | 0.24 | C | 0.15 |
| primary | Temp Mid Rang | 23.05 | 22.93 | 0.0000 | 22.82 | C | -0.11 |
| primary | Temp High Rang | 48.99 | 48.70 | 0.0000 | 48.43 | C | -0.27 |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Properly Sited | **Condition** | Properly sited | **Status** | pass |
| **Sensor Component** | Shield | **Condition** | Moderately clean | **Status** | pass |
| **Sensor Component** | Blower | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Blower Status Switch | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Shelter Temperature Data For

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ARS | none | SHN418 | Eric Hebert | 11/29/2017 | Shelter Temperature | none |

| DAS 1: |  | DAS 2: |  |
|---|---|---|---|
| Abs Avg Err | Abs Max Er | Abs Avg Err | Abs Max Er |
| 0.92 | 0.95 |  |  |

|  |  |  |  |
|---|---|---|---|
| **Mfg** | Extech | **Parameter** | Shelter Temperatur |
| **Serial Number** | H232679 | **Tfer Desc.** | RTD |
| **Tfer ID** | 01228 |  |  |
| **Slope** | 1.00656 | **Intercept** | -0.03341 |
| **Cert Date** | 2/4/2017 | **CorrCoff** | 1.00000 |

| UseDesc. | Test type | InputTmpRaw | InputTmpCorr. | OutputTmpSignal | OutputSignalEng | OSE Unit | Difference |
|---|---|---|---|---|---|---|---|
| primary | Temp Mid Range | 25.23 | 25.10 | 0.000 | 26.1 | C | 0.95 |
| primary | Temp Mid Range | 25.32 | 25.19 | 0.000 | 26.1 | C | 0.9 |

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| **Sensor Component** | System Memo | **Condition** |  | **Status** | pass |

## Infrastructure Data For

**Site ID** SHN418 **Technician** Eric Hebert **Site Visit Date** 11/29/2017

| **Shelter Make** | **Shelter Model** | **Shelter Size** |
|---|---|---|
| Ekto | 8814 | 896 cuft |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Tower Type | **Condition** | Type B | **Status** | pass |
| **Sensor Component** | Conduit | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Met Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Moisture Trap | **Condition** | Not installed | **Status** | pass |
| **Sensor Component** | Power Cables | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Temp Control | **Condition** | Functioning | **Status** | pass |
| **Sensor Component** | Rotometer | **Condition** | Installed | **Status** | pass |
| **Sensor Component** | Sample Tower | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Condition | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Door | **Condition** | Fair | **Status** | pass |
| **Sensor Component** | Shelter Roof | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Shelter Floor | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Signal Cable | **Condition** | Good | **Status** | pass |
| **Sensor Component** | Tubing Type | **Condition** | 3/8 teflon | **Status** | pass |
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |

# Site Visit Comments

| Parameter | Site | Technician | S.V. Date | Component | Mfg | Serial No. | Hazard | Problem |
|---|---|---|---|---|---|---|---|---|
| Flow Rate | SHN418 | Eric Hebert | 11/29/2017 | Filter Position | Tylan | 56 | ☐ | ☑ |

The filter attachment plate is mounted too low in the enclosure resulting in the filter being exposed to wind-driven rain and in the standard geometric orientation.

# Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The ozone inlet filter is replaced and the sample train is leak-tested every two weeks.

2 **Parameter:** ShelterCleanNotes

The shelter is in good condition, clean and well organized

# Field Systems Data Form

F-02058-1500-S1-rev002

**Site ID** SHN418 **Technician** Eric Hebert **Site Visit Date** 11/29/2017

| | | | |
|---|---|---|---|
| **Site Sponsor (agency)** | NPS/EPA | **USGS Map** | Big Meadows |
| **Operating Group** | NPS | **Map Scale** | |
| **AQS #** | 51-113-003 | **Map Date** | |
| **Meteorological Type** | Climatronics | | |
| **Air Pollutant Analyzer** | Ozone, PM2.5 | **QAPP Latitude** | |
| **Deposition Measurement** | dry, wet, Hg, IMPROVE | **QAPP Longitude** | |
| **Land Use** | woodland - mixed | **QAPP Elevation Meters** | |
| **Terrain** | complex | **QAPP Declination** | |
| **Conforms to MLM** | No | **QAPP Declination Date** | |
| **Site Telephone** | | **Audit Latitude** | 38.5231 |
| **Site Address 1** | Shenandoah National Park | **Audit Longitude** | -78.43471 |
| **Site Address 2** | 3655 US Hwy 211 East | **Audit Elevation** | 1068 |
| **County** | Madison | **Audit Declination** | -9.9 |
| **City, State** | Luray, VA | | |
| **Zip Code** | 22835 | **Fire Extinguisher** | ☑ Inspected Oct 2017 |
| **Time Zone** | Eastern | **First Aid Kit** | ☑ |
| **Primary Operator** | | **Safety Glasses** | ☐ |
| **Primary Op. Phone #** | | **Safety Hard Hat** | ☐ |
| **Primary Op. E-mail** | | **Climbing Belt** | ☑ |
| **Backup Operator** | | **Security Fence** | ☑ |
| **Backup Op. Phone #** | | **Secure Shelter** | ☑ |
| **Backup Op. E-mail** | | **Stable Entry Step** | ☑ |

**Present** applies to the check boxes in the right column.

**Shelter Working Room** ☑ **Make** Ekto **Model** 8814 **Shelter Size** 896 cuft

**Shelter Clean** ☑ **Notes** The shelter is in good condition, clean and well organized

**Site OK** ☑ **Notes**

**Driving Directions** Note: arrange for a "EB submaster" key 4 days in advance to be left at Big Meadows Visitor Center. From DC take 460 west to 29N to 33W to Skyline Drive North. Exit into Big Meadows Visitors Center. Go toward lodge and take the first right. Take the gravel road from the parking lot on the left to the site.

# Field Systems Data Form

F-02058-1500-S2-rev002

**Site ID** SHN418 **Technician** Eric Hebert **Site Visit Date** 11/29/2017

| Potential Interferent | Minimum Distance From Measurement Apparatus | Distance | Pass = Checked |
|---|---|---|---|
| Large Point Source of SO2 or NOx | 20 to 40 km | | ☑ |
| Major industrial complex | 10 to 20 km | | ☑ |
| City > 50,000 population | 40 km | | ☑ |
| City 10,000 to 50,000 population | 10 km | | ☑ |
| City 1,000 to 10,000 population | 5 km | | ☑ |
| Major highway, airport or rail yard | 2 km | | ☑ |
| Secondary road, heavily traveled | 500 m | | ☑ |
| Secondary road, lightly traveled | 200 m | | ☑ |
| Feedlot operations | 500 m | | ☑ |
| Intensive agricultural ops (including aerial spraying) | 500 m | | ☑ |
| Limited agricultural operations | 200 m | | ☑ |
| Large parking lot | 200 m | | ☑ |
| Small parking lot | 100 m | | ☑ |
| Tree line | 50 m | 10 - 30 m | ☐ |
| Obstacles to wind | 10 times obstacle height | | ☑ |

**Siting Distances OK** ☑

**Siting Criteria Comment**

# Field Systems Data Form

F-02058-1500-S3-rev002

**Site ID** SHN418 **Technician** Eric Hebert **Site Visit Date** 11/29/2017

|  |  |  |  |
|---|---|---|---|
| 1 | Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? | ☑ | N/A |
| 2 | Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) | ☑ | N/A |
| 3 | Are the tower and sensors plumb? | ☑ | N/A |
| 4 | Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? | ☑ |  |
| 5 | Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) | ☑ |  |
| 6 | Is the solar radiation sensor plumb? | ☑ | N/A |
| 7 | Is it sited to avoid shading, or any artificial or reflected light? | ☑ | N/A |
| 8 | Is the rain gauge plumb? | ☑ | N/A |
| 9 | Is it sited to avoid sheltering effects from buildings, trees, towers, etc? | ☑ | N/A |
| 10 | Is the surface wetness sensor sited with the grid surface facing north? | ☑ | N/A |
| 11 | Is it inclined approximately 30 degrees? | ☑ | N/A |

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

# Field Systems Data Form

F-02058-1500-S4-rev002

**Site ID** SHN418 **Technician** Eric Hebert **Site Visit Date** 11/29/2017

|  |  |  |  |
|---|---|---|---|
| 1 | Do all the meterological sensors appear to be intact, in good condition, and well maintained? | ☑ |  |
| 2 | Are all the meteorological sensors operational online, and reporting data? | ☑ |  |
| 3 | Are the shields for the temperature and RH sensors clean? | ☑ |  |
| 4 | Are the aspirated motors working? | ☑ |  |
| 5 | Is the solar radiation sensor's lens clean and free of scratches? | ☑ | N/A |
| 6 | Is the surface wetness sensor grid clean and undamaged? | ☑ | N/A |
| 7 | Are the sensor signal and power cables intact, in good condition, and well maintained? | ☑ |  |
| 8 | Are the sensor signal and power cable connections protected from the elements and well maintained? | ☑ |  |

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

# Field Systems Data Form

F-02058-1500-S5-rev002

**Site ID** SHN418 **Technician** Eric Hebert **Site Visit Date** 11/29/2017

## Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E

| | | | |
|---|---|---|---|
| 1 | Do the sample inlets have at least a 270 degree arc of unrestricted airflow? | ☑ | |
| 2 | Are the sample inlets 3 - 15 meters above the ground? | ☑ | |
| 3 | Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? | ☑ | |

## Pollutant analyzers and deposition equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the analyzers and equipment appear to be in good condition and well maintained? | ☑ | |
| 2 | Are the analyzers and monitors operational, on-line, and reporting data? | ☑ | |
| 3 | Describe ozone sample tube. | | 1/4 teflon by 15 meters |
| 4 | Describe dry dep sample tube. | | 3/8 teflon by 12 meters |
| 5 | Are in-line filters used in the ozone sample line? (if yes indicate location) | ☑ | At inlet only |
| 6 | Are sample lines clean, free of kinks, moisture, and obstructions? | ☑ | |
| 7 | Is the zero air supply desiccant unsaturated? | ☑ | |
| 8 | Are there moisture traps in the sample lines? | ☐ | |
| 9 | Is there a rotometer in the dry deposition filter line, and is it clean? | ☑ | Clean and dry |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

F-02058-1500-S6-rev002

**Site ID** SHN418 **Technician** Eric Hebert **Site Visit Date** 11/29/2017

## DAS, sensor translators, and peripheral equipment operations and maintenance

| | | | |
|---|---|---|---|
| 1 | Do the DAS instruments appear to be in good condition and well maintained? | ☑ | |
| 2 | Are all the components of the DAS operational? (printers, modem, backup, etc) | ☑ | |
| 3 | Do the analyzer and sensor signal leads pass through lightning protection circuitry? | ☑ | Met sensors only |
| 4 | Are the signal connections protected from the weather and well maintained? | ☑ | |
| 5 | Are the signal leads connected to the correct DAS channel? | ☑ | |
| 6 | Are the DAS, sensor translators, and shelter properly grounded? | ☑ | |
| 7 | Does the instrument shelter have a stable power source? | ☑ | |
| 8 | Is the instrument shelter temperature controlled? | ☑ | |

| | | Stable | Grounded |
|---|---|---|---|
| 9 | Is the met tower stable and grounded? | ☑ | ☑ |
| 10 | Is the sample tower stable and grounded? | ☑ | ☑ |

11 Tower comments?

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

# Field Systems Data Form

F-02058-1500-S7-rev002

**Site ID** SHN418 **Technician** Eric Hebert **Site Visit Date** 11/29/2017

## Documentation

### Does the site have the required instrument and equipment manuals?

| | Yes | No | N/A |
|---|---|---|---|
| Wind speed sensor | ☑ | ☐ | ☐ |
| Wind direction sensor | ☑ | ☐ | ☐ |
| Temperature sensor | ☑ | ☐ | ☐ |
| Relative humidity sensor | ☐ | ☑ | ☐ |
| Solar radiation sensor | ☑ | ☐ | ☐ |
| Surface wetness sensor | ☐ | ☐ | ☑ |
| Wind sensor translator | ☐ | ☐ | ☑ |
| Temperature translator | ☐ | ☐ | ☑ |
| Humidity sensor translator | ☐ | ☐ | ☑ |
| Solar radiation translator | ☐ | ☐ | ☑ |
| Tipping bucket rain gauge | ☑ | ☐ | ☐ |
| Ozone analyzer | ☑ | ☐ | ☐ |
| Filter pack flow controller | ☐ | ☑ | ☐ |
| Filter pack MFC power supply | ☐ | ☑ | ☐ |

| | Yes | No | N/A |
|---|---|---|---|
| Data logger | ☑ | ☐ | ☐ |
| Data logger | ☐ | ☐ | ☑ |
| Strip chart recorder | ☐ | ☐ | ☑ |
| Computer | ☐ | ☑ | ☐ |
| Modem | ☑ | ☐ | ☐ |
| Printer | ☐ | ☐ | ☑ |
| Zero air pump | ☐ | ☑ | ☐ |
| Filter flow pump | ☐ | ☑ | ☐ |
| Surge protector | ☐ | ☑ | ☐ |
| UPS | ☑ | ☐ | ☐ |
| Lightning protection device | ☐ | ☑ | ☐ |
| Shelter heater | ☐ | ☑ | ☐ |
| Shelter air conditioner | ☑ | ☐ | ☐ |

### Does the site have the required and most recent QC documents and report forms?

| | Present | | Current |
|---|---|---|---|
| Station Log | ☑ | Dataview | ☑ |
| SSRF | ☑ | | ☑ |
| Site Ops Manual | ☑ | | ☑ |
| HASP | ☑ | | ☐ |
| Field Ops Manual | ☑ | | ☐ |
| Calibration Reports | ☑ | 9/16/2015 | ☑ |
| Ozone z/s/p Control Charts | ☐ | | ☐ |
| Preventive maintenance schedul | ☐ | | ☐ |

| | | | |
|---|---|---|---|
| 1 | Is the station log properly completed during every site visit? | ☑ | Dataview |
| 2 | Are the Site Status Report Forms being completed and current? | ☑ | Flow section only |
| 3 | Are the chain-of-custody forms properly used to document sample transfer to and from lab? | ☑ | |
| 4 | Are ozone z/s/p control charts properly completed and current? | ☑ | Dataview |

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

# Field Systems Data Form

F-02058-1500-S8-rev002

**Site ID** SHN418 **Technician** Eric Hebert **Site Visit Date** 11/29/2017

## Site operation procedures

| | | | |
|---|---|---|---|
| 1 | Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ | |
| 2 | Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? | ☐ | |
| 3 | Is the site visited regularly on the required Tuesday schedule? | ☑ | |
| 4 | Are the standard CASTNET operational procedures being flollowed by the site operator? | ☑ | |
| 5 | Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation) | ☑ | |

## Are regular operational QA/QC checks performed on meteorological instruments?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multipoint Calibrations | ☑ | Semiannually | ☑ |
| Visual Inspections | ☑ | Weekly | ☑ |
| Translator Zero/Span Tests (climatronics) | ☐ | N/A | ☑ |
| Manual Rain Gauge Test | ☑ | N/A | ☑ |
| Confirm Reasonableness of Current Values | ☑ | Weekly | ☑ |
| Test Surface Wetness Response | ☑ | N/A | ☑ |

## Are regular operational QA/QC checks performed on the ozone analyzer?

| QC Check Performed | | Frequency | Compliant |
|---|---|---|---|
| Multi-point Calibrations | ☑ | Semiannually | ☑ |
| Automatic Zero/Span Tests | ☑ | Daily | ☑ |
| Manual Zero/Span Tests | ☑ | Every 2 weeks | ☑ |
| Automatic Precision Level Tests | ☑ | Daily | ☑ |
| Manual Precision Level Test | ☑ | Every 2 weeks | ☑ |
| Analyzer Diagnostics Tests | ☑ | Weekly | ☑ |
| In-line Filter Replacement (at inlet) | ☑ | Every 2 weeks | ☑ |
| In-line Filter Replacement (at analyze | ☐ | N/A | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☑ |
| Zero Air Desiccant Check | ☑ | Semiannually | ☑ |

| | | | |
|---|---|---|---|
| 1 | Do multi-point calibration gases go through the complete sample train including all filters? | ☑ | |
| 2 | Do automatic and manual z/s/p gasses go through the complete sample train including all filters? | ☑ | |
| 3 | Are the automatic and manual z/s/p checks monitored and reported? If yes, how? | ☑ | Dataview |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

The ozone inlet filter is replaced and the sample train is leak-tested every two weeks.

# Field Systems Data Form

F-02058-1500-S9-rev002

**Site ID** SHN418 **Technician** Eric Hebert **Site Visit Date** 11/29/2017

## Site operation procedures

|  |  |  |  |
|---|---|---|---|
| 1 | Is the filter pack being changed every Tuesday as scheduled? | ☑ | Filter changed morinings 90% |
| 2 | Are the Site Status Report Forms being completed and filed correctly? | ☑ |  |
| 3 | Are data downloads and backups being performed as scheduled? | ☐ | No longer required |
| 4 | Are general observations being made and recorded? How? | ☑ | SSRF |
| 5 | Are site supplies on-hand and replenished in a timely fashion? | ☑ |  |
| 6 | Are sample flow rates recorded? How? | ☑ | SSRF |
| 7 | Are samples sent to the lab on a regular schedule in a timely fashion? | ☑ |  |
| 8 | Are filters protected from contamination during handling and shipping? How? | ☑ | Clean gloves on and off |
| 9 | Are the site conditions reported regularly to the field operations manager or staff? | ☐ |  |

| QC Check Performed |  | Frequency | Compliant |
|---|---|---|---|
| Multi-point MFC Calibrations | ☑ | Semiannually | ☑ |
| Flow System Leak Checks | ☑ | Weekly | ☑ |
| Filter Pack Inspection | ☐ |  | ☐ |
| Flow Rate Setting Checks | ☑ | Weekly | ☑ |
| Visual Check of Flow Rate Rotometer | ☑ | Weekly | ☑ |
| In-line Filter Inspection/Replacement | ☑ | As needed | ☑ |
| Sample Line Check for Dirt/Water | ☑ | Weekly | ☐ |

**Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:**

# Field Systems Data Form

# F-02058-1500-S10-rev002

**Site ID** SHN418 **Technician** Eric Hebert **Site Visit Date** 11/29/2017

**Site Visit Sensors**

| Parameter | Manufacturer | Model | S/N | Client ID |
|---|---|---|---|---|
| Computer | Hewlett Packard | 8460p | CNU13607B3 | none |
| DAS | Environmental Sys Corp | 8816 | 2643 | 90658 |
| Elevation | Elevation | 1 | None | None |
| Filter pack flow pump | Thomas | 107CA110 | 0288714888 | 00443 |
| flow rate | Tylan | FC280 | AW9605202 | 03942 |
| Infrastructure | Infrastructure | none | none | none |
| MFC power supply | Tylan | RO-32 | FP9404009 | 03485 |
| Ozone | ThermoElectron Inc | 49i A3NAA | 0903334535 | none |
| Ozone Standard | ThermoElectron Inc | 49i A1NAA | CM08460009 | none |
| Sample Tower | Aluma Tower | B | none | 923307 |
| Shelter Temperature | ARS | none | none | none |
| Siting Criteria | Siting Criteria | 1 | None | None |
| Temperature2meter | RM Young | 41342VC | 14265 | none |
| Zero air pump | Werther International | C 70/4 | 000855578 | none |

# APPENDIX B

# CASTNET Site Spot Report Forms

# EEMS Spot Report

**Data Compiled:** 1/23/2018 5:23:03 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/10/2017 | ACA416 | Eric Hebert |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Temperature2meter average error | P | 5 | 0.5 | 3 | 0.20 | c | **P** |
| 2 | Temperature2meter max  error | P | 5 | 0.5 | 3 | 0.25 | c | **P** |
| 3 | Wind Speed average error below 5m/s in m/s | P | 3 | 0.5 | 4 | 0.18 | m/s | **P** |
| 4 | Wind Speed max error below 5m/s in m/s | P | 3 | 0.5 | 4 | 0.20 | m/s | **P** |
| 5 | Wind Speed average % difference above 5 m/s | P | 3 | 5 | 4 | 1.1 | % | **P** |
| 6 | Wind Speed max % difference above 5 m/s | P | 3 | 5 | 4 | 2.6 | % | **P** |
| 7 | Wind Speed Torque average error | P | 3 | 0.5 | 1 | 0.40 | g-cm | **P** |
| 8 | Wind Speed Torque max error | P | 3 | 0.5 | 1 | 0.4 | g-cm | **P** |
| 9 | Wind Direction Input Deg True average error (de | P | 2 | 5 | 4 | 3.5 | degrees | **P** |
| 10 | Wind Direction Input Deg True max error (deg) | P | 2 | 5 | 4 | 4 | degrees | **P** |
| 11 | Wind Direction Linearity average error (deg) | P | 2 | 5 | 8 | 1.8 | degrees | **P** |
| 12 | Wind Direction Linearity max error (deg) | P | 2 | 5 | 8 | 5 | degrees | **P** |
| 13 | Wind Direction Torque average error | P | 2 | 30 | 1 | 9 | g-cm | **P** |
| 14 | Wind Direction Torque max error | P | 2 | 30 | 1 | 10 | g-cm | **P** |
| 15 | Relative Humidity average below 85% | P | 6 | 10 | 8 | 2.6 | % | **P** |
| 16 | Relative Humidity max below 85% | P | 6 | 10 | 8 | 6.2 | % | **P** |
| 17 | Solar Radiation % diff of avg | P | 9 | 10 | 18 | 4.77 | % | **P** |
| 18 | Solar Radiation % diff of max STD value | P | 9 | 10 | 18 | 2.9 | % | **P** |
| 19 | Precipitation average % difference | P | 1 | 10 | 2 | 5.0 | % | **P** |
| 20 | Precipitation max  % difference | P | 1 | 10 | 2 | 6.0 | % | **P** |
| 21 | Ozone Slope | P | 0 | 1.1 | 4 | 1.02812 | unitless | **P** |
| 22 | Ozone Intercept | P | 0 | 5 | 4 | -0.51449 | ppb | **P** |
| 23 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99981 | unitless | **P** |
| 24 | Ozone % difference avg | P | 7 | 10 | 4 | 2.0 | % | **P** |
| 25 | Ozone % difference max | P | 7 | 10 | 4 | 4.2 | % | **P** |
| 26 | Flow Rate average % difference | P | 10 | 5 | 4 | 0.91 | % | **P** |
| 27 | Flow Rate max  % difference | P | 10 | 5 | 4 | 1.13 | % | **P** |
| 28 | DAS Voltage average error | P | 1 | 0.003 | 6 | 0.0000 | V | **P** |
| 29 | Surface Wetness Response | P | 12 | 100 | 1 | 100.4 |  | **P** |
| 30 | Shelter Temperature average error | P | 5 | 2 | 2 | 0.74 | c | **P** |
| 31 | Shelter Temperature max  error | P | 5 | 2 | 2 | 1.05 | c | **P** |

# Field Systems Comments

**1** **Parameter:** SiteOpsProcComm

This site is operated by both the NPS and the State of Maine DEP. It is not visited by ARS for semiannual calibration and maintenance visits. The site operator does not perform many of the routine checks conducted at other CASTNET sites, such as tip checks, wetness sensor tests, and visual checks of the blowers. The state of Maine personnel maintain the meteorological systems and the ozone monitor.

**2** **Parameter:** DasComments

The accuracy of the DAS was not tested due to poor wiring conditions at the logger and lack of wiring documentation. It was decided that it was safer not to disturb the signal connections. The sensors will be moved to the new logger in the near future.

**3** **Parameter:** SiteOpsProcedures

The meteorological and ozone instrument checks and maintenance are performed by the State of Maine DEP.

**4** **Parameter:** ShelterCleanNotes

The shelter is new, clean and well organized. Equipment is still being moved from the old shelter.

**5** **Parameter:** PollAnalyzerCom

New sample lines have been installed in the new shelter. The ozone inlet was not approved material but was replaced shortly after the audit.

**6** **Parameter:** MetOpMaintCom

The sensor signal cables are beginning to show signs of wear. Some are being replaced as instruments are installed in the new shelter.

# EEMS Spot Report

**Data Compiled:** 1/28/2018 2:45:33 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/27/2017 | ALH157 | Sandy Grenville |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Temperature average error | P | 4 | 0.5 | 6 | 0.12 | c | **P** |
| 2 | Temperature max error | P | 4 | 0.5 | 6 | 0.16 | c | **P** |
| 3 | Ozone Slope | P | 0 | 1.1 | 4 | 0.99956 | unitless | **P** |
| 4 | Ozone Intercept | P | 0 | 5 | 4 | -0.04828 | ppb | **P** |
| 5 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99996 | unitless | **P** |
| 6 | Ozone % difference avg | P | 7 | 10 | 4 | 0.7 | % | **P** |
| 7 | Ozone % difference max | P | 7 | 10 | 4 | 2.1 | % | **P** |
| 8 | Flow Rate average % difference | P | 10 | 5 | 6 | 1.01 | % | **P** |
| 9 | Flow Rate max % difference | P | 10 | 5 | 6 | 1.32 | % | **P** |
| 10 | DAS Voltage average error | P | 7 | 0.003 | 21 | 0.0001 | V | **P** |
| 11 | Shelter Temperature average error | P | 5 | 2 | 15 | 0.44 | c | **P** |
| 12 | Shelter Temperature max error | P | 5 | 2 | 15 | 0.67 | c | **P** |

| **SiteVisitDate** | **Site** | **Technician** |
|---|---|---|
| 10/27/2017 | ALH157 | Sandy Grenville |

# Field Systems Comments

**1** **Parameter:** SiteOpsProcComm

The backup site operator is not always consistently using gloves to handle the filter pack.

**2** **Parameter:** SitingCriteriaCom

The site is located on a privately operated farm which rotates corn and soy bean crops.

**3** **Parameter:** ShelterCleanNotes

The shelter floor is soft and deteriorating and many tiles are loose.  Walls have signs of leaks.

**4** **Parameter:** MetSensorComme

Met tower removed, temperature mounted in naturally aspirated shield on sample tower.

# EEMS Spot Report

**Data Compiled:** 1/24/2018 1:17:07 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/19/2017 | ANA115 | Sandy Grenville |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ozone Slope | P | 0 | 1.1 | 4 | 1.00596 | unitless | **P** |
| 2 | Ozone Intercept | P | 0 | 5 | 4 | 0.81566 | ppb | **P** |
| 3 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99995 | unitless | **P** |
| 4 | Ozone % difference avg | P | 7 | 10 | 4 | 3.1 | % | **P** |
| 5 | Ozone % difference max | P | 7 | 10 | 4 | 5.0 | % | **P** |

# EEMS Spot Report

**Data Compiled:** 1/26/2018 11:56:26 AM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/08/2017 | ARE128 | Sandy Grenville |

**Records with valid pass/fail criteria**

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ozone Slope | P | 0 | 1.1 | 4 | 0.99071 | unitless | **P** |
| 2 | Ozone Intercept | P | 0 | 5 | 4 | 0.45652 | ppb | **P** |
| 3 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99998 | unitless | **P** |
| 4 | Ozone % difference avg | P | 7 | 10 | 4 | 0.6 | % | **P** |
| 5 | Ozone % difference max | P | 7 | 10 | 4 | 1.4 | % | **P** |

# EEMS Spot Report

**Data Compiled:** 1/26/2018 2:16:18 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/13/2017 | ASH135 | Eric Hebert |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ozone Slope | P | 0 | 1.1 | 4 | 1.00608 | unitless | **P** |
| 2 | Ozone Intercept | P | 0 | 5 | 4 | 0.12752 | ppb | **P** |
| 3 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99995 | unitless | **P** |
| 4 | Ozone % difference avg | P | 7 | 10 | 4 | 1.2 | % | **P** |
| 5 | Ozone % difference max | P | 7 | 10 | 4 | 2.8 | % | **P** |

# EEMS Spot Report

**Data Compiled:** 1/24/2018 12:31:00 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 11/20/2017 | BEL116 | Eric Hebert |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ozone Slope | P | 0 | 1.1 | 4 | 1.01315 | unitless | **P** |
| 2 | Ozone Intercept | P | 0 | 5 | 4 | -0.98232 | ppb | **P** |
| 3 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99998 | unitless | **P** |
| 4 | Ozone % difference avg | P | 7 | 10 | 4 | 2.1 | % | **P** |
| 5 | Ozone % difference max | P | 7 | 10 | 4 | 5.3 | % | **P** |

# EEMS Spot Report

**Data Compiled:** 1/28/2018 8:28:05 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 11/27/2017 | BFT142 | Sandy Grenville |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Temperature average error | P | 4 | 0.5 | 9 | 0.18 | c | **P** |
| 2 | Temperature max  error | P | 4 | 0.5 | 9 | 0.30 | c | **P** |
| 3 | Ozone Slope | P | 0 | 1.1 | 4 | 0.98365 | unitless | **P** |
| 4 | Ozone Intercept | P | 0 | 5 | 4 | 0.45817 | ppb | **P** |
| 5 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99999 | unitless | **P** |
| 6 | Ozone % difference avg | P | 7 | 10 | 4 | 0.8 | % | **P** |
| 7 | Ozone % difference max | P | 7 | 10 | 4 | 1.2 | % | **P** |
| 8 | Flow Rate average % difference | P | 10 | 5 | 6 | 0.89 | % | **P** |
| 9 | Flow Rate max  % difference | P | 10 | 5 | 6 | 1.34 | % | **P** |
| 10 | DAS Voltage average error | P | 7 | 0.003 | 56 | 0.0000 | V | **P** |
| 11 | Shelter Temperature average error | P | 5 | 2 | 15 | 0.22 | c | **P** |
| 12 | Shelter Temperature max  error | P | 5 | 2 | 15 | 0.32 | c | **P** |

| SiteVisitDate | Site | Technician |
|---|---|---|
| 11/27/2017 | BFT142 | Sandy Grenville |

# Field Systems Comments

**1** **Parameter:** DasComments

The sample tower is attached to the shelter.  The sample tower is not grounded.

**2** **Parameter:** SitingCriteriaCom

The site is surrounded by a corn/soy bean field, within a large-scale commercial agriculture operation.

**3** **Parameter:** ShelterCleanNotes

The shelter roof is leaking.  There are buckets on the counter to catch the rain water.

**4** **Parameter:** MetOpMaintCom

The meteorological tower has been removed and the temperature sensor is installed in a naturally aspirated shield on the sample tower.

# EEMS Spot Report

**Data Compiled:** 1/28/2018 5:30:08 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 11/09/2017 | BVL130 | Eric Hebert |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Temperature2meter average error | P | 5 | 0.5 | 3 | 0.20 | c | **P** |
| 2 | Temperature2meter max  error | P | 5 | 0.5 | 3 | 0.28 | c | **P** |
| 3 | Wind Speed average error below 5m/s in m/s | P | 3 | 0.5 | 8 | 0.05 | m/s | **P** |
| 4 | Wind Speed max error below 5m/s in m/s | P | 3 | 0.5 | 8 | 0.20 | m/s | **P** |
| 5 | Wind Speed average % difference above 5 m/s | P | 3 | 5 | 8 | 0.0 | % | **P** |
| 6 | Wind Speed max % difference above 5 m/s | P | 3 | 5 | 8 | 0.0 | % | **P** |
| 7 | Wind Speed Torque average error | P | 3 | 0.5 | 1 | 0.35 | g-cm | **P** |
| 8 | Wind Speed Torque max error | P | 3 | 0.5 | 1 | 0.4 | g-cm | **P** |
| 9 | Wind Direction Input Deg True average error (de | P | 2 | 5 | 8 | 2.0 | degrees | **P** |
| 10 | Wind Direction Input Deg True max error (deg) | P | 2 | 5 | 8 | 3 | degrees | **P** |
| 11 | Wind Direction Linearity average error (deg) | P | 2 | 5 | 16 | 0.9 | degrees | **P** |
| 12 | Wind Direction Linearity max error (deg) | P | 2 | 5 | 16 | 2 | degrees | **P** |
| 13 | Wind Direction Torque average error | P | 2 | 30 | 1 | 11 | g-cm | **P** |
| 14 | Wind Direction Torque max error | P | 2 | 30 | 1 | 12 | g-cm | **P** |
| 15 | Temperature average error | P | 4 | 0.5 | 6 | 0.13 | c | **P** |
| 16 | Temperature max  error | P | 4 | 0.5 | 6 | 0.16 | c | **P** |
| 17 | Relative Humidity average below 85% | P | 6 | 10 | 4 | 15.1 | % | **Fail** |
| 18 | Relative Humidity max below 85% | P | 6 | 10 | 4 | 24.9 | % | **Fail** |
| 19 | Solar Radiation % diff of avg | P | 9 | 10 | 35 | 8.47 | % | **P** |
| 20 | Solar Radiation % diff of max STD value | P | 9 | 10 | 35 | 10.1 | % | **Fail** |
| 21 | Precipitation average % difference | P | 1 | 10 | 2 | 1.0 | % | **P** |
| 22 | Precipitation max  % difference | P | 1 | 10 | 2 | 2.0 | % | **P** |
| 23 | Ozone Slope | P | 0 | 1.1 | 4 | 0.99042 | unitless | **P** |
| 24 | Ozone Intercept | P | 0 | 5 | 4 | -0.2865 | ppb | **P** |
| 25 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99999 | unitless | **P** |
| 26 | Ozone % difference avg | P | 7 | 10 | 4 | 1.3 | % | **P** |
| 27 | Ozone % difference max | P | 7 | 10 | 4 | 1.4 | % | **P** |
| 28 | Flow Rate average % difference | P | 10 | 5 | 3 | 2.6 | % | **P** |
| 29 | Flow Rate max  % difference | P | 10 | 5 | 3 | 2.6 | % | **P** |
| 30 | DAS Voltage average error | P | 7 | 0.003 | 56 | 0.0000 | V | **P** |
| 31 | Surface Wetness Response | P | 12 | 0.5 | 1 | 1.01 |  | **P** |
| 32 | Shelter Temperature average error | P | 5 | 2 | 15 | 0.27 | c | **P** |
| 33 | Shelter Temperature max  error | P | 5 | 2 | 15 | 0.54 | c | **P** |

| SiteVisitDate | Site | Technician |
|---|---|---|
| 11/09/2017 | BVL130 | Eric Hebert |

# Field Systems Comments

1 **Parameter:** SiteOpsProcedures

Ozone and NCORE sample line filters are replaced, and the sample lines are leaked tested, every 2 weeks.

2 **Parameter:** SitingCriteriaCom

The site is located in an agricultural and atmospheric research center. There are crops within 50 meters.

3 **Parameter:** ShelterCleanNotes

The shelter is somewhat cluttered but is improved since the previous audit visit.

4 **Parameter:** MetSensorComme

The tipping bucket rain gage is mounted near the meteorological tower and in violation of the 45 degree rule.

# EEMS Spot Report

**Data Compiled:** 1/28/2018 8:45:08 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 11/27/2017 | BWR139 | Eric Hebert |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Temperature average error | P | 4 | 0.5 | 12 | 0.11 | c | **P** |
| 2 | Temperature max error | P | 4 | 0.5 | 12 | 0.25 | c | **P** |
| 3 | Ozone Slope | P | 0 | 1.1 | 4 | 1.02079 | unitless | **P** |
| 4 | Ozone Intercept | P | 0 | 5 | 4 | -0.55573 | ppb | **P** |
| 5 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99995 | unitless | **P** |
| 6 | Ozone % difference avg | P | 7 | 10 | 4 | 0.8 | % | **P** |
| 7 | Ozone % difference max | P | 7 | 10 | 4 | 2.0 | % | **P** |
| 8 | Flow Rate average % difference | P | 10 | 5 | 4 | 2.6 | % | **P** |
| 9 | Flow Rate max % difference | P | 10 | 5 | 4 | 2.6 | % | **P** |
| 10 | DAS Voltage average error | P | 7 | 0.003 | 56 | 0.0000 | V | **P** |
| 11 | Shelter Temperature average error | P | 5 | 2 | 15 | 1.43 | c | **P** |
| 12 | Shelter Temperature max error | P | 5 | 2 | 15 | 1.96 | c | **P** |

| SiteVisitDate | Site | Technician |
|---|---|---|
| 11/27/2017 | BWR139 | Eric Hebert |

# Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** Moisture Present **CommentCode** 72

The filter sample tubing has drops of moisture in low sections outside the shelter.

# Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The ozone sample train is leak checked every two weeks following the inlet filter change.

2 **Parameter:** SitingCriteriaCom

Very light agriculture activities near site, not harvested, just to provide food for wildlife.

3 **Parameter:** ShelterCleanNotes

The shelter is showing signs of deterioration with leaks and rot at bottom of walls.

# EEMS Spot Report

**Data Compiled:** 1/28/2018 6:41:25 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 11/19/2017 | CND125 | Sandy Grenville |

**Records with valid pass/fail criteria**

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Temperature average error | P | 4 | 0.5 | 9 | 0.06 | c | **P** |
| 2 | Temperature max error | P | 4 | 0.5 | 9 | 0.14 | c | **P** |
| 3 | Ozone Slope | P | 0 | 1.1 | 4 | 0.99229 | unitless | **P** |
| 4 | Ozone Intercept | P | 0 | 5 | 4 | 0.44188 | ppb | **P** |
| 5 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99999 | unitless | **P** |
| 6 | Ozone % difference avg | P | 7 | 10 | 4 | 1.3 | % | **P** |
| 7 | Ozone % difference max | P | 7 | 10 | 4 | 4.6 | % | **P** |
| 8 | Flow Rate average % difference | P | 10 | 5 | 4 | 1.96 | % | **P** |
| 9 | Flow Rate max % difference | P | 10 | 5 | 4 | 1.96 | % | **P** |
| 10 | DAS Voltage average error | P | 7 | 0.003 | 7 | 0.0000 | V | **P** |
| 11 | Shelter Temperature average error | P | 5 | 2 | 15 | 0.72 | c | **P** |
| 12 | Shelter Temperature max error | P | 5 | 2 | 15 | 1.16 | c | **P** |

| SiteVisitDate | Site | Technician |
|---|---|---|
| 11/19/2017 | CND125 | Sandy Grenville |

# Field Systems Comments

**1** **Parameter:** SitingCriteriaCom

The land owner maintains a pine tree forest on the property within 50 meters of the site. The trees were planted just before the site was installed in 1990 and will be harvested in the near future.

**2** **Parameter:** ShelterCleanNotes

The shelter is well maintained, clean and well organized.

**3** **Parameter:** MetOpMaintCom

The temperature sensor is mounted on the sample tower in a naturally aspirated shield.

# EEMS Spot Report

**Data Compiled:** 1/26/2018 12:25:57 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/11/2017 | CTH110 | Sandy Grenville |

**Records with valid pass/fail criteria**

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ozone Slope | P | 0 | 1.1 | 4 | 0.98668 | unitless | **P** |
| 2 | Ozone Intercept | P | 0 | 5 | 4 | 0.04910 | ppb | **P** |
| 3 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99999 | unitless | **P** |
| 4 | Ozone % difference avg | P | 7 | 10 | 4 | 1.3 | % | **P** |
| 5 | Ozone % difference max | P | 7 | 10 | 4 | 2.1 | % | **P** |

# Field Performance Comments

**1** **Parameter:** Ozone **SensorComponent:** Cell B Flow **CommentCode** 99

This analyzer diagnostic check is outside the manufacturer's recommended value.

# EEMS Spot Report

**Data Compiled:** 1/26/2018 3:47:45 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/24/2017 | DEN417 | Martin Valvur |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ozone Slope | P | 0 | 1.1 | 4 | 1.08821 | unitless | **P** |
| 2 | Ozone Intercept | P | 0 | 5 | 4 | -0.05394 | ppb | **P** |
| 3 | Ozone correlation | P | 0 | 0.995 | 4 | 1.00000 | unitless | **P** |
| 4 | Ozone % difference avg | P | 7 | 10 | 4 | 8.6 | % | **P** |
| 5 | Ozone % difference max | P | 7 | 10 | 4 | 8.9 | % | **P** |

# EEMS Spot Report

**Data Compiled:** 1/26/2018 5:27:49 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/04/2017 | DIN431 | Martin Valvur |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ozone Slope | P | 0 | 1.1 | 4 | 0.99511 | unitless | **P** |
| 2 | Ozone Intercept | P | 0 | 5 | 4 | -0.47792 | ppb | **P** |
| 3 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99999 | unitless | **P** |
| 4 | Ozone % difference avg | P | 7 | 10 | 4 | 2.1 | % | **P** |
| 5 | Ozone % difference max | P | 7 | 10 | 4 | 3.8 | % | **P** |

# EEMS Spot Report

**Data Compiled:** 1/28/2018 6:18:59 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 11/15/2017 | GRS420 | Eric Hebert |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Temperature2meter average error | P | 5 | 0.5 | 3 | 0.22 | c | **P** |
| 2 | Temperature2meter max error | P | 5 | 0.5 | 3 | 0.30 | c | **P** |
| 3 | Ozone Slope | P | 0 | 1.1 | 4 | 1.00748 | unitless | **P** |
| 4 | Ozone Intercept | P | 0 | 5 | 4 | 0.18955 | ppb | **P** |
| 5 | Ozone correlation | P | 0 | 0.995 | 4 | 1.00000 | unitless | **P** |
| 6 | Ozone % difference avg | P | 7 | 10 | 4 | 1.0 | % | **P** |
| 7 | Ozone % difference max | P | 7 | 10 | 4 | 1.2 | % | **P** |
| 8 | Flow Rate average % difference | P | 10 | 5 | 6 | 0.24 | % | **P** |
| 9 | Flow Rate max % difference | P | 10 | 5 | 6 | 0.46 | % | **P** |
| 10 | DAS Voltage average error | P | 2 | 0.003 | 35 | 0.0000 | V | **P** |
| 11 | Shelter Temperature average error | P | 5 | 2 | 18 | 1.05 | c | **P** |
| 12 | Shelter Temperature max error | P | 5 | 2 | 18 | 1.65 | c | **P** |

| SiteVisitDate | Site | Technician |
|---|---|---|
| 11/15/2017 | GRS420 | Eric Hebert |

# Field Performance Comments

**1** **Parameter:** Temperature2mete **SensorComponent:** Properly Sited **CommentCode** 142

The lower (two meter temperature sensor) shield is not mounted at 2 meters above the ground as stated in the QAPP.

# Field Systems Comments

**1** **Parameter:** SiteOpsProcedures

The ozone sample train is leak-tested each week after the inlet filter is changed.

**2** **Parameter:** SitingCriteriaCom

The site is located on a ridge top with the sampling height at the tops of the trees on the ridge. The site is within 40 km of Knoxville and other major sources.

**3** **Parameter:** ShelterCleanNotes

The shelter is in good condition, clean, neat, and well organized.

**4** **Parameter:** MetSensorComme

The temperature sensor has been relocated from 10 meters to approximately 3.9 meters above the ground.

# EEMS Spot Report

**Data Compiled:** 1/28/2018 11:33:51 AM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/03/2017 | GTH161 | Martin Valvur |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Temperature average error | P | 4 | 0.5 | 15 | 0.06 | c | **P** |
| 2 | Temperature max  error | P | 4 | 0.5 | 15 | 0.07 | c | **P** |
| 3 | Ozone Slope | P | 0 | 1.1 | 4 | 0.98580 | unitless | **P** |
| 4 | Ozone Intercept | P | 0 | 5 | 4 | 2.61367 | ppb | **P** |
| 5 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99987 | unitless | **P** |
| 6 | Ozone % difference avg | P | 7 | 10 | 4 | 4.5 | % | **P** |
| 7 | Ozone % difference max | P | 7 | 10 | 4 | 7.3 | % | **P** |
| 8 | Flow Rate average % difference | P | 10 | 5 | 3 | 0.33 | % | **P** |
| 9 | Flow Rate max  % difference | P | 10 | 5 | 3 | 0.33 | % | **P** |
| 10 | DAS Voltage average error | P | 7 | 0.003 | 49 | 0.0004 | V | **P** |
| 11 | Shelter Temperature average error | P | 5 | 2 | 15 | 0.69 | c | **P** |
| 12 | Shelter Temperature max  error | P | 5 | 2 | 15 | 1.55 | c | **P** |

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/03/2017 | GTH161 | Martin Valvur |

# Field Systems Comments

**1** **Parameter:** SiteOpsProcComm

Due to the remote location of the site, it can take up to a week to return the filter sample to the lab after it is removed from the tower in the winter.

**2** **Parameter:** ShelterCleanNotes

Some floor tiles are damaged.

**3** **Parameter:** MetSensorComme

The temperature sensor has been moved to the sample tower and mounted in a naturally aspirated shield facing south and over the shelter roof. The met tower has been removed.

**4** **Parameter:** MetOpMaintCom

The temperature signal cable is showing signs of wear.

# EEMS Spot Report

**Data Compiled:** 1/26/2018 1:58:47 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/12/2017 | HOW191 | Eric Hebert |

**Records with valid pass/fail criteria**

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ozone Slope | P | 0 | 1.1 | 4 | 0.99829 | unitless | **P** |
| 2 | Ozone Intercept | P | 0 | 5 | 4 | 0.15345 | ppb | **P** |
| 3 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99999 | unitless | **P** |
| 4 | Ozone % difference avg | P | 7 | 10 | 4 | 0.7 | % | **P** |
| 5 | Ozone % difference max | P | 7 | 10 | 4 | 1.4 | % | **P** |

# EEMS Spot Report

**Data Compiled:** 1/24/2018 2:10:39 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/20/2017 | HOX148 | Sandy Grenville |

**Records with valid pass/fail criteria**

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ozone Slope | P | 0 | 1.1 | 4 | 1.01745 | unitless | **P** |
| 2 | Ozone Intercept | P | 0 | 5 | 4 | -0.13909 | ppb | **P** |
| 3 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99999 | unitless | **P** |
| 4 | Ozone % difference avg | P | 7 | 10 | 4 | 1.4 | % | **P** |
| 5 | Ozone % difference max | P | 7 | 10 | 4 | 1.9 | % | **P** |

# EEMS Spot Report

**Data Compiled:** 1/26/2018 2:28:12 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/17/2017 | HWF187 | Eric Hebert |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ozone Slope | P | 0 | 1.1 | 4 | 0.98417 | unitless | **P** |
| 2 | Ozone Intercept | P | 0 | 5 | 4 | -0.06763 | ppb | **P** |
| 3 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99999 | unitless | **P** |
| 4 | Ozone % difference avg | P | 7 | 10 | 4 | 1.9 | % | **P** |
| 5 | Ozone % difference max | P | 7 | 10 | 4 | 2.3 | % | **P** |

# EEMS Spot Report

**Data Compiled:** 1/28/2018 5:57:06 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 11/13/2017 | MAC426 | Eric Hebert |

**Records with valid pass/fail criteria**

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Temperature2meter average error | P | 5 | 0.5 | 3 | 0.20 | c | **P** |
| 2 | Temperature2meter max  error | P | 5 | 0.5 | 3 | 0.25 | c | **P** |
| 3 | Ozone Slope | P | 0 | 1.1 | 4 | 0.98285 | unitless | **P** |
| 4 | Ozone Intercept | P | 0 | 5 | 4 | 0.16574 | ppb | **P** |
| 5 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99998 | unitless | **P** |
| 6 | Ozone % difference avg | P | 7 | 10 | 4 | 1.8 | % | **P** |
| 7 | Ozone % difference max | P | 7 | 10 | 4 | 2.4 | % | **P** |
| 8 | Flow Rate average % difference | P | 10 | 5 | 2 | 6.61 | % | **Fail** |
| 9 | Flow Rate max  % difference | P | 10 | 5 | 2 | 6.61 | % | **Fail** |
| 10 | DAS Voltage average error | P | 16 | 0.003 | 49 | 0.0001 | V | **P** |
| 11 | Shelter Temperature average error | P | 5 | 2 | 12 | 0.29 | c | **P** |
| 12 | Shelter Temperature max  error | P | 5 | 2 | 12 | 0.51 | c | **P** |

| SiteVisitDate | Site | Technician |
|---|---|---|
| 11/13/2017 | MAC426 | Eric Hebert |

# Field Performance Comments

**1** **Parameter:** Flow Rate **SensorComponent:** Filter Position **CommentCode** 71

The filter attachment plate is mounted too low in the enclosure resulting in the filter being exposed to wind-driven rain and in the standard geometric orientation.

# Field Systems Comments

**1** **Parameter:** SiteOpsProcComm

The site operators are very knowledgeable with air quality monitoring. They are doing a very good job with site activities and filter handling.

**2** **Parameter:** SitingCriteriaCom

Bowling Green is within 40 km of the site. The site is in a hay field which is harvested twice per year. The area to the west and south is comprised of livestock farms including cattle and poultry.

**3** **Parameter:** ShelterCleanNotes

The shelter is well maintained, clean, neat, and well organized.

# EEMS Spot Report

**Data Compiled:** 1/26/2018 3:37:50 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 11/16/2017 | PNF126 | Eric Hebert |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ozone Slope | P | 0 | 1.1 | 4 | 0.99614 | unitless | **P** |
| 2 | Ozone Intercept | P | 0 | 5 | 4 | -0.53512 | ppb | **P** |
| 3 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99997 | unitless | **P** |
| 4 | Ozone % difference avg | P | 7 | 10 | 4 | 2.3 | % | **P** |
| 5 | Ozone % difference max | P | 7 | 10 | 4 | 6.4 | % | **P** |

# EEMS Spot Report

**Data Compiled:** 1/28/2018 12:42:54 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/22/2017 | PRK134 | Sandy Grenville |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Temperature average error | P | 4 | 0.5 | 9 | 0.13 | c | **P** |
| 2 | Temperature max  error | P | 4 | 0.5 | 9 | 0.26 | c | **P** |
| 3 | Ozone Slope | P | 0 | 1.1 | 4 | 0.98190 | unitless | **P** |
| 4 | Ozone Intercept | P | 0 | 5 | 4 | 0.28944 | ppb | **P** |
| 5 | Ozone correlation | P | 0 | 0.995 | 4 | 1.00000 | unitless | **P** |
| 6 | Ozone % difference avg | P | 7 | 10 | 4 | 1.1 | % | **P** |
| 7 | Ozone % difference max | P | 7 | 10 | 4 | 1.6 | % | **P** |
| 8 | Flow Rate average % difference | P | 10 | 5 | 3 | 1.32 | % | **P** |
| 9 | Flow Rate max  % difference | P | 10 | 5 | 3 | 1.32 | % | **P** |
| 10 | DAS Voltage average error | P | 7 | 0.003 | 56 | 0.0000 | V | **P** |
| 11 | Shelter Temperature average error | P | 5 | 2 | 15 | 0.19 | c | **P** |
| 12 | Shelter Temperature max  error | P | 5 | 2 | 15 | 0.31 | c | **P** |

# Field Systems Comments

**1** **Parameter:** DasComments

The sample tower and guy wires have been replaced.

**2** **Parameter:** SitingCriteriaCom

Clover and Barley have been planted for hay within 20m of the site starting in 2008.

**3** **Parameter:** ShelterCleanNotes

The shelter is clean, neat, and well organized.

# EEMS Spot Report

**Data Compiled:** 1/26/2018 12:05:52 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/09/2017 | PSU106 | Sandy Grenville |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ozone Slope | P | 0 | 1.1 | 4 | 0.99541 | unitless | **P** |
| 2 | Ozone Intercept | P | 0 | 5 | 4 | 0.54301 | ppb | **P** |
| 3 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99998 | unitless | **P** |
| 4 | Ozone % difference avg | P | 7 | 10 | 4 | 0.8 | % | **P** |
| 5 | Ozone % difference max | P | 7 | 10 | 4 | 1.2 | % | **P** |

# EEMS Spot Report

**Data Compiled:** 1/26/2018 2:37:28 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/19/2017 | SAL133 | Eric Hebert |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ozone Slope | P | 0 | 1.1 | 4 | 1.01563 | unitless | **P** |
| 2 | Ozone Intercept | P | 0 | 5 | 4 | -0.44556 | ppb | **P** |
| 3 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99997 | unitless | **P** |
| 4 | Ozone % difference avg | P | 7 | 10 | 4 | 1.6 | % | **P** |
| 5 | Ozone % difference max | P | 7 | 10 | 4 | 3.3 | % | **P** |

# EEMS Spot Report

**Data Compiled:** 1/28/2018 9:18:18 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 11/29/2017 | SHN418 | Eric Hebert |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Temperature2meter average error | P | 5 | 0.5 | 3 | 0.18 | c | **P** |
| 2 | Temperature2meter max error | P | 5 | 0.5 | 3 | 0.27 | c | **P** |
| 3 | Ozone Slope | P | 0 | 1.1 | 4 | 0.97938 | unitless | **P** |
| 4 | Ozone Intercept | P | 0 | 5 | 4 | -0.18335 | ppb | **P** |
| 5 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99997 | unitless | **P** |
| 6 | Ozone % difference avg | P | 7 | 10 | 4 | 2.1 | % | **P** |
| 7 | Ozone % difference max | P | 7 | 10 | 4 | 4.0 | % | **P** |
| 8 | Flow Rate average % difference | P | 10 | 5 | 10 | 1.53 | % | **P** |
| 9 | Flow Rate max % difference | P | 10 | 5 | 10 | 1.57 | % | **P** |
| 10 | DAS Voltage average error | P | 2 | 0.003 | 7 | 0.0003 | V | **P** |
| 11 | Shelter Temperature average error | P | 5 | 2 | 12 | 0.92 | c | **P** |
| 12 | Shelter Temperature max error | P | 5 | 2 | 12 | 0.95 | c | **P** |

| **SiteVisitDate** | **Site** | **Technician** |
|---|---|---|
| 11/29/2017 | SHN418 | Eric Hebert |

# Field Performance Comments

**1** **Parameter:** Flow Rate **SensorComponent:** Filter Position **CommentCode** 71

The filter attachment plate is mounted too low in the enclosure resulting in the filter being exposed to wind-driven rain and in the standard geometric orientation.

# Field Systems Comments

**1** **Parameter:** SiteOpsProcedures

The ozone inlet filter is replaced and the sample train is leak-tested every two weeks.

**2** **Parameter:** ShelterCleanNotes

The shelter is in good condition, clean and well organized

# EEMS Spot Report

**Data Compiled:** 1/28/2018 2:03:06 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/25/2017 | STK138 | Sandy Grenville |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Temperature average error | P | 4 | 0.5 | 12 | 0.03 | c | **P** |
| 2 | Temperature max error | P | 4 | 0.5 | 12 | 0.04 | c | **P** |
| 3 | Ozone Slope | P | 0 | 1.1 | 4 | 1.01407 | unitless | **P** |
| 4 | Ozone Intercept | P | 0 | 5 | 4 | -0.0614 | ppb | **P** |
| 5 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99998 | unitless | **P** |
| 6 | Ozone % difference avg | P | 7 | 10 | 4 | 1.3 | % | **P** |
| 7 | Ozone % difference max | P | 7 | 10 | 4 | 2.4 | % | **P** |
| 8 | Flow Rate average % difference | P | 10 | 5 | 3 | 1.75 | % | **P** |
| 9 | Flow Rate max % difference | P | 10 | 5 | 3 | 1.96 | % | **P** |
| 10 | DAS Voltage average error | P | 7 | 0.003 | 56 | 0.0001 | V | **P** |
| 11 | Shelter Temperature average error | P | 5 | 2 | 15 | 1.11 | c | **P** |
| 12 | Shelter Temperature max error | P | 5 | 2 | 15 | 1.28 | c | **P** |

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/25/2017 | STK138 | Sandy Grenville |

# Field Systems Comments

**1** **Parameter:** SiteOpsProcedures

The ozone sample train is leak tested every 2 weeks.

**2** **Parameter:** SitingCriteriaCom

The site is located in a corn field on a cattle farm.  Corn is planted within 10 meters.

**3** **Parameter:** ShelterCleanNotes

The shelter is somewhat dirty and cluttered.  There are signs of leaks on the walls and floor rot.

# EEMS Spot Report

**Data Compiled:** 1/24/2018 2:21:08 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/20/2017 | UVL124 | Sandy Grenville |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ozone Slope | P | 0 | 1.1 | 4 | 0.98024 | unitless | **P** |
| 2 | Ozone Intercept | P | 0 | 5 | 4 | 0.26213 | ppb | **P** |
| 3 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99999 | unitless | **P** |
| 4 | Ozone % difference avg | P | 7 | 10 | 4 | 1.4 | % | **P** |
| 5 | Ozone % difference max | P | 7 | 10 | 4 | 1.9 | % | **P** |

# EEMS Spot Report

**Data Compiled:** 1/28/2018 4:22:15 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/30/2017 | VIN140 | Sandy Grenville |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Temperature average error | P | 4 | 0.5 | 3 | 0.08 | c | **P** |
| 2 | Temperature max  error | P | 4 | 0.5 | 3 | 0.10 | c | **P** |
| 3 | Ozone Slope | P | 0 | 1.1 | 4 | 0.99697 | unitless | **P** |
| 4 | Ozone Intercept | P | 0 | 5 | 4 | -0.04294 | ppb | **P** |
| 5 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99999 | unitless | **P** |
| 6 | Ozone % difference avg | P | 7 | 10 | 4 | 0.7 | % | **P** |
| 7 | Ozone % difference max | P | 7 | 10 | 4 | 2.2 | % | **P** |
| 8 | Flow Rate average % difference | P | 10 | 5 | 6 | 0.49 | % | **P** |
| 9 | Flow Rate max  % difference | P | 10 | 5 | 6 | 0.66 | % | **P** |
| 10 | DAS Voltage average error | P | 7 | 0.003 | 56 | 0.0001 | V | **P** |
| 11 | Shelter Temperature average error | P | 5 | 2 | 15 | 0.55 | c | **P** |
| 12 | Shelter Temperature max  error | P | 5 | 2 | 15 | 1.1 | c | **P** |

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/30/2017 | VIN140 | Sandy Grenville |

# Field Systems Comments

**1** **Parameter:** DasComments

The sample tower ground wire is broken.

**2** **Parameter:** SitingCriteriaCom

The site is in an agricultural research center with farm activities adjacent to the site. A train track is approximately 200 meters to the north.

**3** **Parameter:** ShelterCleanNotes

The shelter is in good condition and well maintained, however rot is beginning to form at the bottom of the walls.

**4** **Parameter:** MetSensorComme

The temperature sensor is mounted on the sample tower.

# EEMS Spot Report

**Data Compiled:** 1/28/2018 11:32:22 AM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/02/2017 | WFM007 | Eric Hebert |

**Records with valid pass/fail criteria**

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Temperature average error | P | 4 | 0.5 | 3 | 0.02 | c | **P** |
| 2 | Temperature max  error | P | 4 | 0.5 | 3 | 0.04 | c | **P** |
| 3 | Flow Rate average % difference | P | 10 | 5 | 2 | 0.77 | % | **P** |
| 4 | Flow Rate max  % difference | P | 10 | 5 | 2 | 0.99 | % | **P** |

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/02/2017 | WFM007 | Eric Hebert |

# Field Systems Comments

**1** **Parameter:** DasComments

The sample tower is approximately one meter in height mounted to and accessed directly from the roof of the facility.

**2** **Parameter:** DocumentationCo

There is no logbook onsite to record site visit information.

**3** **Parameter:** SitingCriteriaCom

The site is located at the summit of Whiteface Mountain on the roof of the ASRC facility with other monitoring instrumentation.

**4** **Parameter:** MetSensorComme

The temperature sensor is mounted approximately one meter above a black roof.

# EEMS Spot Report

**Data Compiled:** 1/28/2018 12:01:37 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/12/2017 | WNC429 | Martin Valvur |

**Records with valid pass/fail criteria**

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Temperature2meter average error | P | 5 | 0.5 | 3 | 0.15 | c | **P** |
| 2 | Temperature2meter max error | P | 5 | 0.5 | 3 | 0.31 | c | **P** |
| 3 | Ozone Slope | P | 0 | 1.1 | 4 | 0.96148 | unitless | **P** |
| 4 | Ozone Intercept | P | 0 | 5 | 4 | -0.00563 | ppb | **P** |
| 5 | Ozone correlation | P | 0 | 0.995 | 4 | 1.00000 | unitless | **P** |
| 6 | Ozone % difference avg | P | 7 | 10 | 4 | 3.7 | % | **P** |
| 7 | Ozone % difference max | P | 7 | 10 | 4 | 3.9 | % | **P** |
| 8 | Flow Rate average % difference | P | 10 | 5 | 9 | 1.01 | % | **P** |
| 9 | Flow Rate max % difference | P | 10 | 5 | 9 | 1.11 | % | **P** |
| 10 | DAS Voltage average error | P | 1 | 0.003 | 7 | 0.0003 | V | **P** |
| 11 | Shelter Temperature average error | P | 5 | 2 | 6 | 0.95 | c | **P** |
| 12 | Shelter Temperature max error | P | 5 | 2 | 6 | 1.74 | c | **P** |

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/12/2017 | WNC429 | Martin Valvur |

# Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** Filter Position **CommentCode** 71

The filter attachment plate is mounted too low in the enclosure resulting in the filter being exposed to wind-driven rain and in the standard geometric orientation.

# Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The general observations section of the SSRF is still not completed. Gloves are not used when handling the filter pack.

2 **Parameter:** SiteOpsProcedures

The ozone analyzer is operated by the state of South Dakota. There is no means for introducing routine test gas at the sample inlet and all routine checks are performed at the back of the analyzer. Audit test gas was introduced through the sample inlet flooding the glass manifold.

3 **Parameter:** DocumentationCo

Records of the routine checks performed by the state personnel are kept onsite in a logbook.

4 **Parameter:** ShelterCleanNotes

One shelter houses the gas analyzers and is in good condition and clean. The analyzer sample train is a glass manifold with an exhaust fan. The second shelter houses the flow system, met translator, and IMPROVE. It is older and not climate controlled.

5 **Parameter:** PollAnalyzerCom

The dry deposition filter is mounted low in the enclosure which changes the particle collection characteristics, and can allow precipitation to enter. The ozone sample train is a 3 meter glass manifold with a 1/4 inch Teflon tubing connection to the analyzer.

6 **Parameter:** MetOpMaintCom

The temperature sensor signal cable insulation is cracked and showing signs of extreme wear.

# EEMS Spot Report

**Data Compiled:** 1/28/2018 9:03:08 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 11/28/2017 | WSP144 | Eric Hebert |

## Records with valid pass/fail criteria

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Temperature average error | P | 4 | 0.5 | 9 | 0.22 | c | **P** |
| 2 | Temperature max error | P | 4 | 0.5 | 9 | 0.33 | c | **P** |
| 3 | Ozone Slope | P | 0 | 1.1 | 4 | 0.97433 | unitless | **P** |
| 4 | Ozone Intercept | P | 0 | 5 | 4 | -0.75095 | ppb | **P** |
| 5 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99999 | unitless | **P** |
| 6 | Ozone % difference avg | P | 7 | 10 | 4 | 5.3 | % | **P** |
| 7 | Ozone % difference max | P | 7 | 10 | 4 | 8.9 | % | **P** |
| 8 | Flow Rate average % difference | P | 10 | 5 | 4 | 1.54 | % | **P** |
| 9 | Flow Rate max % difference | P | 10 | 5 | 4 | 1.97 | % | **P** |
| 10 | DAS Voltage average error | P | 7 | 0.003 | 56 | 0.0000 | V | **P** |
| 11 | Shelter Temperature average error | P | 5 | 2 | 15 | 1.1 | c | **P** |
| 12 | Shelter Temperature max error | P | 5 | 2 | 15 | 1.99 | c | **P** |

| SiteVisitDate | Site | Technician |
|---|---|---|
| 11/28/2017 | WSP144 | Eric Hebert |

# Field Performance Comments

**1** **Parameter:** Flow Rate **SensorComponent:** Moisture Present **CommentCode** 72

The filter sample tubing has drops of moisture in low sections outside the shelter.

# Field Systems Comments

**1** **Parameter:** SiteOpsProcedures

Ozone sample line leak-checks are conducted every two weeks.

**2** **Parameter:** SitingCriteriaCom

The city of Trenton, estimated population greater than 85,000, is within 20 km of the site.

**3** **Parameter:** ShelterCleanNotes

The shelter is in good condition, clean, very neat, and well organized.

# APPENDIX C

## CASTNET Ozone Performance Evaluation Forms

# Site Inventory by Site Visit

| Site Visit Date | | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *DIN431-Martin Valvur-10/04/2017* | | | | | | |
| 1 | 10/4/2017 | DAS | Environmental Sys Corp | 90652 | 8816 | 2565 |
| 2 | 10/4/2017 | Ozone | ThermoElectron Inc | none | 49i A3NAA | 1211052490 |
| 3 | 10/4/2017 | Ozone Standard | ThermoElectron Inc | none | 49i A1NAA | CM08460050 |
| 4 | 10/4/2017 | Zero air pump | Werther International | none | PC70/4 | 531395 |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1211052490 | DIN431 | Martin Valvur | 10/04/2017 | Ozone | none |

| | | | |
|---|---|---|---|
| **Slope:** | 0.99511 | **Slope:** | 0.00000 |
| **Intercept** | -0.47792 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99999 | **CorrCoff** | 0.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 2.1% | 3.8% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 49CPS-70008-364 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01110 | | |
| **Slope** | 1.00801 | **Intercept** | -0.05199 |
| **Cert Date** | 9/11/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.31 | 0.35 | 0.03 | ppb | |
| primary | 2 | 15.31 | 15.23 | 14.65 | ppb | -3.81% |
| primary | 3 | 35.92 | 35.68 | 34.77 | ppb | -2.55% |
| primary | 4 | 65.27 | 64.80 | 64.10 | ppb | -1.08% |
| primary | 5 | 111.83 | 110.99 | 110.00 | ppb | -0.89% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | Span | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.68 lpm | **Status** | Pass |
| **Sensor Component** | Cell A Pressure | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.67 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# *Site Inventory by Site Visit*

| | Site Visit Date | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *ARE128-Sandy Grenville-10/08/2017* | | | | | | |
| 1 | 10/8/2017 | DAS | Campbell | 000400 | CR3000 | 2524 |
| 2 | 10/8/2017 | Ozone | ThermoElectron Inc | 000621 | 49i A1NAA | 1009241798 |
| 3 | 10/8/2017 | Ozone Standard | ThermoElectron Inc | 000199 | 49i A3NAA | 0607315737 |
| 4 | 10/8/2017 | Zero air pump | Werther International | 06866 | PC70/4 | 000815262 |

# Ozone Data Form

| **Mfg** | **Serial Number Ta** | **Site** | **Technician** | **Site Visit Date** | **Parameter** | **Owner ID** |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1009241798 | ARE128 | Sandy Grenville | 10/08/2017 | Ozone | 000621 |

| | | | |
|---|---|---|---|
| **Slope:** | 0.99071 | **Slope:** | 0.00000 |
| **Intercept** | 0.45652 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99998 | **CorrCoff** | 0.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 0.6% | 1.4% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 517112175 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01111 | | |
| **Slope** | 1.00250 | **Intercept** | 0.45870 |
| **Cert Date** | 3/21/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.01 | -0.44 | 0.38 | ppb | |
| primary | 2 | 15.02 | 14.52 | 14.72 | ppb | 1.38% |
| primary | 3 | 35.04 | 34.49 | 34.41 | ppb | -0.23% |
| primary | 4 | 68.05 | 67.42 | 66.97 | ppb | -0.67% |
| primary | 5 | 110.04 | 109.30 | 109.00 | ppb | -0.27% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.10 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.011 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 98.4 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 1.1 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.69 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 711.1 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 36.6 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 82.9 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.69 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 710.8 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# *Site Inventory by Site Visit*

| *Site Visit Date* | | *Parameter* | *Mfg* | *Owner ID* | *Model Number* | *Serial Number* |
|---|---|---|---|---|---|---|
| *PSU106-Sandy Grenville-10/09/2017* | | | | | | |
| 1 | 10/9/2017 | DAS | Campbell | 000407 | CR3000 | 2512 |
| 2 | 10/9/2017 | Ozone | ThermoElectron Inc | 000678 | 49i A1NAA | 1030244791 |
| 3 | 10/9/2017 | Ozone Standard | ThermoElectron Inc | 000434 | 49i A3NAA | CM08200010 |
| 4 | 10/9/2017 | Zero air pump | Werther International | 06921 | C 70/4 | 000836216 |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1030244791 | PSU106 | Sandy Grenville | 10/09/2017 | Ozone | 000678 |

| | | | |
|---|---|---|---|
| **Slope:** | 0.99541 | **Slope:** | 0.00000 |
| **Intercept** | 0.54301 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99998 | **CorrCoff** | 0.00000 |

**DAS 1:** **DAS 2:**

| A Avg % Diff: | A Max % Di | A Avg %Dif | A Max % Di |
|---|---|---|---|
| 0.8% | 1.2% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 517112175 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01111 | | |
| **Slope** | 1.00250 | **Intercept** | 0.45870 |
| **Cert Date** | 3/21/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.05 | -0.40 | 0.33 | ppb | |
| primary | 2 | 15.02 | 14.52 | 14.70 | ppb | 1.24% |
| primary | 3 | 35.05 | 34.50 | 34.80 | ppb | 0.87% |
| primary | 4 | 68.06 | 67.43 | 68.00 | ppb | 0.85% |
| primary | 5 | 110.34 | 109.60 | 109.50 | ppb | -0.09% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.40 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.006 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 98.3 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.8 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.68 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 696.8 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 34.5 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 99.8 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 1.1 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.67 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 696.5 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Site Inventory by Site Visit

| Site Visit Date | | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *CTH110-Sandy Grenville-10/11/2017* | | | | | | |
| 1 | 10/11/2017 | DAS | Campbell | 000415 | CR3000 | 2510 |
| 2 | 10/11/2017 | Ozone | ThermoElectron Inc | 000735 | 49i A1NAA | 1105347308 |
| 3 | 10/11/2017 | Ozone Standard | ThermoElectron Inc | 000447 | 49i A3NAA | CM08200023 |
| 4 | 10/11/2017 | Zero air pump | Werther International | 06864 | PC70/4 | 000815261 |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1105347308 | CTH110 | Sandy Grenville | 10/11/2017 | Ozone | 000735 |

| | | | |
|---|---|---|---|
| **Slope:** | 0.98668 | **Slope:** | 0.00000 |
| **Intercept** | 0.04910 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99999 | **CorrCoff** | 0.00000 |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 517112175 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01111 | | |
| **Slope** | 1.00250 | **Intercept** | 0.45870 |
| **Cert Date** | 3/21/2017 | **CorrCoff** | 1.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 1.3% | 2.1% | | |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.29 | -0.16 | -0.04 | ppb | |
| primary | 2 | 15.13 | 14.63 | 14.69 | ppb | 0.41% |
| primary | 3 | 35.12 | 34.57 | 33.86 | ppb | -2.05% |
| primary | 4 | 68.02 | 67.39 | 66.43 | ppb | -1.42% |
| primary | 5 | 110.01 | 109.27 | 108.00 | ppb | -1.16% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.40 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.024 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 100.0 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 1.0 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.54 lpm | **Status** | Pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 688.7 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 32.6 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 105.3 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 1.3 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.00 lpm | **Status** | Fail |
| **Sensor Component** | Cell B Pressure | **Condition** | 688.4 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Site Inventory by Site Visit

| Site Visit | Date | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *HOW191-Eric Hebert-10/12/2017* | | | | | | |
| 1 | 10/12/2017 | DAS | Campbell | 000419 | CR3000 | 2527 |
| 2 | 10/12/2017 | Ozone | ThermoElectron Inc | 000616 | 49i A1NAA | 1009241781 |
| 3 | 10/12/2017 | Ozone Standard | ThermoElectron Inc | 000372 | 49i A3NAA | 0726124684 |
| 4 | 10/12/2017 | Zero air pump | Werther International | 06908 | C 70/4 | 000821900 |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1009241781 | HOW191 | Eric Hebert | 10/12/2017 | Ozone | 000616 |

| | | | |
|---|---|---|---|
| **Slope:** | 0.99829 | **Slope:** | 0.00000 |
| **Intercept** | 0.15345 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99999 | **CorrCoff** | 0.00000 |

**DAS 1:** **DAS 2:**

| A Avg % Diff: | A Max % Di | A Avg %Dif | A Max % Di |
|---|---|---|---|
| 0.7% | 1.4% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 0517112167 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01113 | | |
| **Slope** | 1.00504 | **Intercept** | 0.32915 |
| **Cert Date** | 9/12/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.03 | -0.29 | -0.09 | ppb | |
| primary | 2 | 13.60 | 13.20 | 13.05 | ppb | -1.14% |
| primary | 3 | 34.71 | 34.20 | 34.67 | ppb | 1.37% |
| primary | 4 | 68.23 | 67.56 | 67.45 | ppb | -0.16% |
| primary | 5 | 113.13 | 112.23 | 112.20 | ppb | -0.03% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.20 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.007 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 97.2 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.69 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 707.1 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 34.8 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 96.7 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.70 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 707.4 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Site Inventory by Site Visit

| Site Visit | Date | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *ASH135-Eric Hebert-10/13/2017* | | | | | | |
| 1 | 10/13/2017 | DAS | Campbell | 000634 | CR3000 | 4933 |
| 2 | 10/13/2017 | Ozone | ThermoElectron Inc | 000730 | 49i A1NAA | 1105347325 |
| 3 | 10/13/2017 | Ozone Standard | ThermoElectron Inc | 000442 | 49i A3NAA | CM08200018 |
| 4 | 10/13/2017 | Zero air pump | Werther International | 06923 | C 70/4 | 000836208 |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1105347325 | ASH135 | Eric Hebert | 10/13/2017 | Ozone | 000730 |

| | | | |
|---|---|---|---|
| **Slope:** | 1.00608 | **Slope:** | 0.00000 |
| **Intercept** | 0.12752 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99995 | **CorrCoff** | 0.00000 |

**DAS 1:**

**DAS 2:**

| A Avg % Diff: | A Max % Di | A Avg %Dif | A Max % Di |
|---|---|---|---|
| 1.2% | 2.8% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 0517112167 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01113 | | |
| **Slope** | 1.00504 | **Intercept** | 0.32915 |
| **Cert Date** | 9/12/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.48 | 0.15 | -0.06 | ppb | |
| primary | 2 | 13.48 | 13.08 | 13.05 | ppb | -0.23% |
| primary | 3 | 35.01 | 34.50 | 35.46 | ppb | 2.78% |
| primary | 4 | 65.81 | 65.15 | 65.97 | ppb | 1.26% |
| primary | 5 | 110.44 | 109.55 | 110.00 | ppb | 0.41% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | -0.10 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.019 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 111.8 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 1.3 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.90 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 729.4 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 35.9 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 98.7 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.9 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.73 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 728.8 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# *Site Inventory by Site Visit*

| | Site Visit Date | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *HWF187-Eric Hebert-10/17/2017* | | | | | | |
| 1 | 10/17/2017 | DAS | Campbell | 000356 | CR3000 | 2134 |
| 2 | 10/17/2017 | Ozone | ThermoElectron Inc | 000700 | 49i A1NAA | 1030244793 |
| 3 | 10/17/2017 | Ozone Standard | ThermoElectron Inc | 000445 | 49i A3NAA | CM08200021 |
| 4 | 10/17/2017 | Zero air pump | Werther International | 06931 | C 70/4 | 000836212 |
| 5 | 10/17/2017 | Zero air pump | Teledyne | 000772 | 701H | 608 |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1030244793 | HWF187 | Eric Hebert | 10/17/2017 | Ozone | 000700 |

| | | | |
|---|---|---|---|
| **Slope:** | 0.98417 | **Slope:** | 0.00000 |
| **Intercept** | -0.06763 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99999 | **CorrCoff** | 0.00000 |

**DAS 1:** **DAS 2:**

| A Avg % Diff: | A Max % Di | A Avg %Dif | A Max % Di |
|---|---|---|---|
| 1.9% | 2.3% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 0517112167 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01113 | | |
| **Slope** | 1.00504 | **Intercept** | 0.32915 |
| **Cert Date** | 9/12/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.21 | -0.11 | -0.13 | ppb | |
| primary | 2 | 13.48 | 13.08 | 12.80 | ppb | -2.14% |
| primary | 3 | 37.89 | 37.37 | 36.52 | ppb | -2.27% |
| primary | 4 | 64.87 | 64.21 | 63.33 | ppb | -1.37% |
| primary | 5 | 110.03 | 109.15 | 107.30 | ppb | -1.69% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.10 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.011 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 94.9 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.5 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.63 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 705.3 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 36.9 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 92.5 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.67 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 704.8 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# *Site Inventory by Site Visit*

| *Site Visit Date* | | *Parameter* | *Mfg* | *Owner ID* | *Model Number* | *Serial Number* |
|---|---|---|---|---|---|---|
| *ANA115-Sandy Grenville-10/19/2017* | | | | | | |
| 1 | 10/19/2017 | DAS | Campbell | 000339 | CR3000 | 2118 |
| 2 | 10/19/2017 | Ozone | ThermoElectron Inc | 000899 | 49i A1NAA | 1030244804 |
| 3 | 10/19/2017 | Ozone Standard | ThermoElectron Inc | 000364 | 49i A3NAA | 0726124687 |
| 4 | 10/19/2017 | Zero air pump | Werther International | 06933 | C 70/4 | 000836202 |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1030244804 | ANA115 | Sandy Grenville | 10/19/2017 | Ozone | 000899 |

| | | | |
|---|---|---|---|
| **Slope:** | 1.00596 | **Slope:** | 0.00000 |
| **Intercept** | 0.81566 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99995 | **CorrCoff** | 0.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 3.1% | 5.0% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 517112175 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01111 | | |
| **Slope** | 1.00250 | **Intercept** | 0.45870 |
| **Cert Date** | 3/21/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.14 | -0.31 | 0.19 | ppb | |
| primary | 2 | 15.09 | 14.59 | 15.32 | ppb | 5.00% |
| primary | 3 | 35.10 | 34.55 | 35.93 | ppb | 3.99% |
| primary | 4 | 68.10 | 67.47 | 69.25 | ppb | 2.64% |
| primary | 5 | 111.10 | 110.36 | 111.40 | ppb | 0.94% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Moderately clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.000 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.043 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 95.5 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 1.6 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.69 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 703.5 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 33.5 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 91.7 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 1.4 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.68 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 702.9 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# *Site Inventory by Site Visit*

| *Site Visit Date* | | *Parameter* | *Mfg* | *Owner ID* | *Model Number* | *Serial Number* |
|---|---|---|---|---|---|---|
| *SAL133-Eric Hebert-10/19/2017* | | | | | | |
| 1 | 10/19/2017 | DAS | Campbell | 000351 | CR3000 | 2129 |
| 2 | 10/19/2017 | Ozone | ThermoElectron Inc | 000741 | 49i A1NAA | 1105347316 |
| 3 | 10/19/2017 | Ozone Standard | ThermoElectron Inc | 000370 | 49i A3NAA | 0726124689 |
| 4 | 10/19/2017 | Zero air pump | Werther International | 06935 | C 70/4 | 000829172 |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1105347316 | SAL133 | Eric Hebert | 10/19/2017 | Ozone | 000741 |

| | | | |
|---|---|---|---|
| **Slope:** | 1.01563 | **Slope:** | 0.00000 |
| **Intercept** | -0.44556 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99997 | **CorrCoff** | 0.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 1.6% | 3.3% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 0517112167 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01113 | | |
| **Slope** | 1.00504 | **Intercept** | 0.32915 |
| **Cert Date** | 9/12/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | -0.14 | -0.46 | -0.73 | ppb | |
| primary | 2 | 15.41 | 15.00 | 14.50 | ppb | -3.33% |
| primary | 3 | 35.88 | 35.37 | 35.81 | ppb | 1.24% |
| primary | 4 | 71.20 | 70.51 | 70.74 | ppb | 0.33% |
| primary | 5 | 114.48 | 113.57 | 115.10 | ppb | 1.35% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.10 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.050 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 103.2 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.58 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 718.0 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 35.4 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 101.5 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.57 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 717.4 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Site Inventory by Site Visit

| Site Visit Date | | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *UVL124-Sandy Grenville-10/20/2017* | | | | | | |
| 1 | 10/20/2017 | DAS | Campbell | 000347 | CR3000 | 2126 |
| 2 | 10/20/2017 | Ozone | ThermoElectron Inc | 000680 | 49i A1NAA | 1030244792 |
| 3 | 10/20/2017 | Ozone Standard | ThermoElectron Inc | 000362 | 49i A3NAA | 0726124686 |
| 4 | 10/20/2017 | Zero air pump | Werther International | 06936 | C 70/4 | 000829169 |

# EEMS Spot Report

**Data Compiled:** 1/24/2018 2:21:08 PM

| SiteVisitDate | Site | Technician |
|---|---|---|
| 10/20/2017 | UVL124 | Sandy Grenville |

**Records with valid pass/fail criteria**

| Line | Audited Parameter | DAS | Ch. # | Criteria +/- | Counts | QaResult | Units | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ozone Slope | P | 0 | 1.1 | 4 | 0.98024 | unitless | **P** |
| 2 | Ozone Intercept | P | 0 | 5 | 4 | 0.26213 | ppb | **P** |
| 3 | Ozone correlation | P | 0 | 0.995 | 4 | 0.99999 | unitless | **P** |
| 4 | Ozone % difference avg | P | 7 | 10 | 4 | 1.4 | % | **P** |
| 5 | Ozone % difference max | P | 7 | 10 | 4 | 1.9 | % | **P** |

# Site Inventory by Site Visit

| | Site Visit Date | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *HOX148-Sandy Grenville-10/20/2017* | | | | | | |
| 1 | 10/20/2017 | DAS | Campbell | 000426 | CR3000 | 2533 |
| 2 | 10/20/2017 | Ozone | ThermoElectron Inc | 000614 | 49i A1NAA | 1009241794 |
| 3 | 10/20/2017 | Ozone Standard | ThermoElectron Inc | 000438 | 49i A3NAA | CM08200014 |
| 4 | 10/20/2017 | Zero air pump | Werther International | 06938 | C 70/4 | 000829164 |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1009241794 | HOX148 | Sandy Grenville | 10/20/2017 | Ozone | 000614 |

| | | | |
|---|---|---|---|
| **Slope:** | 1.01745 | **Slope:** | 0.00000 |
| **Intercept** | -0.13909 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99999 | **CorrCoff** | 0.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 1.4% | 1.9% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 517112175 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01111 | | |
| **Slope** | 1.00250 | **Intercept** | 0.45870 |
| **Cert Date** | 3/21/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.29 | -0.16 | -0.41 | ppb | |
| primary | 2 | 15.67 | 15.17 | 15.30 | ppb | 0.86% |
| primary | 3 | 35.39 | 34.84 | 35.31 | ppb | 1.35% |
| primary | 4 | 68.18 | 67.55 | 68.86 | ppb | 1.94% |
| primary | 5 | 110.53 | 109.79 | 111.40 | ppb | 1.47% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.50 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.049 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 94.5 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.8 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.83 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 713.9 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 35.5 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 91.4 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.8 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.71 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 713.6 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Site Inventory by Site Visit

| Site Visit Date | | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *DEN417-Martin Valvur-10/24/2017* | | | | | | |
| 1 | 10/24/2017 | DAS | Environmental Sys Corp | 90600 | 8816 | 2274 |
| 2 | 10/24/2017 | Ozone | ThermoElectron Inc | 90778 | 49C | 49C-77033-384 |
| 3 | 10/24/2017 | Ozone Standard | ThermoElectron Inc | none | 49C | 49C-71310-368 |
| 4 | 10/24/2017 | Zero air pump | Werther International | none | PC70/4 | 526281 |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 49C-77033-384 | DEN417 | Martin Valvur | 10/24/2017 | Ozone | 90778 |

| | | | |
|---|---|---|---|
| **Slope:** | 1.08821 | **Slope:** | 0.00000 |
| **Intercept** | -0.05394 | **Intercept** | 0.00000 |
| **CorrCoff** | 1.00000 | **CorrCoff** | 0.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 8.6% | 8.9% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 49CPS-70008-364 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01110 | | |
| **Slope** | 1.00801 | **Intercept** | -0.05199 |
| **Cert Date** | 9/11/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.10 | 0.15 | 0.18 | ppb | |
| primary | 2 | 15.05 | 14.98 | 16.17 | ppb | 7.94% |
| primary | 3 | 35.14 | 34.91 | 38.03 | ppb | 8.94% |
| primary | 4 | 68.80 | 68.30 | 74.09 | ppb | 8.48% |
| primary | 5 | 110.70 | 109.87 | 119.60 | ppb | 8.86% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.5 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 0.997 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | 0.0004 | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | 1.0003 | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 99.5 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.5 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.66 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 687.1 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 32.1 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 74.7 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.5 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.68 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 686.5 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Site Inventory by Site Visit

| Site Visit Date | | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *PNF126-Eric Hebert-11/16/2017* | | | | | | |
| 1 | 11/16/2017 | DAS | Campbell | 000346 | CR3000 | 2125 |
| 2 | 11/16/2017 | Ozone | ThermoElectron Inc | 000746 | 49i A1NAA | 1105347315 |
| 3 | 11/16/2017 | Ozone Standard | ThermoElectron Inc | 000363 | 49i A3NAA | 0726124691 |
| 4 | 11/16/2017 | Zero air pump | Werther International | 06885 | C 70/4 | 000814270 |
| 5 | 11/16/2017 | Zero air pump | Teledyne | 000774 | 701H | 610 |

# Ozone Data Form

| **Mfg** | **Serial Number Ta** | **Site** | **Technician** | **Site Visit Date** | **Parameter** | **Owner ID** |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1105347315 | PNF126 | Eric Hebert | 11/16/2017 | Ozone | 000746 |

| | | | |
|---|---|---|---|
| **Slope:** | 0.99614 | **Slope:** | 0.00000 |
| **Intercept** | -0.53512 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99997 | **CorrCoff** | 0.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 2.3% | 6.4% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 0517112167 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01113 | | |
| **Slope** | 1.00504 | **Intercept** | 0.32915 |
| **Cert Date** | 9/12/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.53 | 0.19 | -0.27 | ppb | |
| primary | 2 | 15.49 | 15.08 | 14.12 | ppb | -6.37% |
| primary | 3 | 35.41 | 34.90 | 34.76 | ppb | -0.40% |
| primary | 4 | 69.93 | 69.25 | 68.12 | ppb | -1.63% |
| primary | 5 | 110.56 | 109.67 | 108.80 | ppb | -0.79% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | 0.10 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.064 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 92.7 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.8 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.70 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 686.2 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 37.7 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 105.1 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.9 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.64 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 685.6 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |

# Site Inventory by Site Visit

| Site Visit Date | | Parameter | Mfg | Owner ID | Model Number | Serial Number |
|---|---|---|---|---|---|---|
| *BEL116-Eric Hebert-11/20/2017* | | | | | | |
| 1 | 11/20/2017 | DAS | Campbell | 000341 | CR3000 | 2120 |
| 2 | 11/20/2017 | Ozone | ThermoElectron Inc | 000684 | 49i A1NAA | 1030244795 |
| 3 | 11/20/2017 | Ozone Standard | ThermoElectron Inc | 000373 | 49i A3NAA | 0726124685 |
| 4 | 11/20/2017 | Zero air pump | Werther International | 06913 | C 70/4 | 000829178 |

# Ozone Data Form

| Mfg | Serial Number Ta | Site | Technician | Site Visit Date | Parameter | Owner ID |
|---|---|---|---|---|---|---|
| ThermoElectron Inc | 1030244795 | BEL116 | Eric Hebert | 11/20/2017 | Ozone | 000684 |

| | | | |
|---|---|---|---|
| **Slope:** | 1.01315 | **Slope:** | 0.00000 |
| **Intercept** | -0.98232 | **Intercept** | 0.00000 |
| **CorrCoff** | 0.99998 | **CorrCoff** | 0.00000 |

| **DAS 1:** | | **DAS 2:** | |
|---|---|---|---|
| **A Avg % Diff:** | **A Max % Di** | **A Avg %Dif** | **A Max % Di** |
| 2.1% | 5.3% | | |

| | | | |
|---|---|---|---|
| **Mfg** | ThermoElectron Inc | **Parameter** | ozone |
| **Serial Number** | 0517112167 | **Tfer Desc.** | Ozone primary stan |
| **Tfer ID** | 01113 | | |
| **Slope** | 1.00504 | **Intercept** | 0.32915 |
| **Cert Date** | 9/12/2017 | **CorrCoff** | 1.00000 |

| UseDescription | ConcGroup | Tfer Raw | Tfer Corr | Site | Site Unit | PctDifference |
|---|---|---|---|---|---|---|
| primary | 1 | 0.23 | -0.09 | -1.03 | ppb | |
| primary | 2 | 15.50 | 15.09 | 14.29 | ppb | -5.30% |
| primary | 3 | 35.74 | 35.23 | 34.40 | ppb | -2.36% |
| primary | 4 | 67.03 | 66.36 | 66.72 | ppb | 0.54% |
| primary | 5 | 108.03 | 107.16 | 107.40 | ppb | 0.22% |

| | | | | | |
|---|---|---|---|---|---|
| **Sensor Component** | Sample Train | **Condition** | Good | **Status** | pass |
| **Sensor Component** | 22.5 degree rule | **Condition** | | **Status** | pass |
| **Sensor Component** | Inlet Filter Condition | **Condition** | Clean | **Status** | pass |
| **Sensor Component** | Battery Backup | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Offset | **Condition** | -0.10 | **Status** | pass |
| **Sensor Component** | Span | **Condition** | 1.017 | **Status** | pass |
| **Sensor Component** | Zero Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Fullscale Voltage | **Condition** | N/A | **Status** | pass |
| **Sensor Component** | Cell A Freq. | **Condition** | 103.7 kHz | **Status** | pass |
| **Sensor Component** | Cell A Noise | **Condition** | 0.8 ppb | **Status** | pass |
| **Sensor Component** | Cell A Flow | **Condition** | 0.83 lpm | **Status** | pass |
| **Sensor Component** | Cell A Pressure | **Condition** | 723.3 mmHg | **Status** | pass |
| **Sensor Component** | Cell A Tmp. | **Condition** | 32.1 C | **Status** | pass |
| **Sensor Component** | Cell B Freq. | **Condition** | 97.3 kHz | **Status** | pass |
| **Sensor Component** | Cell B Noise | **Condition** | 0.6 ppb | **Status** | pass |
| **Sensor Component** | Cell B Flow | **Condition** | 0.51 lpm | **Status** | pass |
| **Sensor Component** | Cell B Pressure | **Condition** | 722.7 mmHg | **Status** | pass |
| **Sensor Component** | Cell B Tmp. | **Condition** | | **Status** | pass |
| **Sensor Component** | Line Loss | **Condition** | Not tested | **Status** | pass |
| **Sensor Component** | System Memo | **Condition** | | **Status** | pass |