# 2018 – 4th Quarter Report

# Support for Conducting Systems & Performance Audits of Clean Air Status and Trends Network (CASTNET) Sites and National Atmospheric Deposition Program (NADP) Monitoring Stations - II

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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

BLM Bureau of Land Management

CASTNET Clean Air Status and Trends Network
CMAQ Community Multiscale Air Quality

DAS data acquisition system

DC direct current

deg degree

DVM digital voltmeter

ECCC Environment and Climate Change Canada

EEMS Environmental, Engineering & Measurement Services, Inc.

EPA U.S. Environmental Protection Agency
ESC Environmental Systems Corporation

FSA Field Systems Audit FSAD Field Site Audit Database

GPS geographical positioning system

lpm liters per minute
MLM Multilayer Model
m/s meters per second

mv millivolt

NIST National Institute of Standards and Technology
NOAA National Oceanic and Atmospheric Administration

NPS National Park Service
PE Performance Evaluation

QAPP Quality Assurance Project Plan SOP standard operating procedure

TDEP Total Deposition

TEI Thermo Environmental Instruments
USNO United States Naval Observatory

V volts

WRR World Radiation Reference
WSO Wyoming State Office

## 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 and other forms of atmospheric pollution using a continuous collection filter aggregated over a one week period. 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. Total deposition is assessed using the NADP's Total Deposition Hybrid Method (TDEP; EPA, 2015c; Schwede and Lear, 2014), which combines data from established ambient monitoring networks and chemical-transport models. To estimate dry deposition, ambient measurement data from CASTNET and other networks were merged with dry deposition rates and flux output from the Community Multiscale Air Quality (CMAQ) modeling system.

As of December 2018, the network is comprised of 95 active rural sampling sites across the United States and Canada, cooperatively operated by the Environmental Protection Agency (EPA), the National Park Service (NPS), Environment and Climate Change Canada (ECCC), Bureau of Land Management – Wyoming State Office (BLM-WSO) and several independent partners. Wood is responsible for operating the EPA and ECCC sponsored sites, and Air Resource Specialist, Inc. (ARS) is responsible for operating the NPS and BLM-WSO 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. Two EPA sponsored sites that are operated by Wood continue to operate meteorological sensors. Those sites are BEL116 and BVL130. PND165 and four sites sponsored by BLM-WSO also operate meteorological sensors. The NPS operates meteorological sensors at many of their air quality monitoring sites. The meteorological sensors at one NPS CASTNET site (ACA416) and one EPA site (BEL116) were audited during this reporting period.

Some or all of the additional monitored variables, NOy, CO, and SO<sub>2</sub> have been added to the EPA sponsored sites BVL130, HWF187, PND165, PNF126, GRS420, MAC426, and ROM206. Those variables at sites BVL130, MAC426, GRS420, and PNF126 were audited during this reporting period. Results of those audits were distributed immediately following the performance evaluations.

Table 1. Performance Audit Challenge and Acceptance Criteria

Sensor Paramet		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	Response Distilled water spray mist Positiv	
Surface Wetness	Sensitivity	1% decade resistance	N/A
Temperature	Accuracy	Comparison to 3 NIST measured baths (~ 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

Sensor	Parameter	Audit Challenge	Acceptance Criteria
Wind Direction	Response Threshold	Starting torque tested with torque gauge	< 10 g-cm Climatronics; < 20 g-cm R.M. Young
Wind Speed	Accuracy	Shaft rotational speed generated and measured with certified synchronous motor	$\leq \pm 0.5$ mps below 5.0 mps input; $\leq \pm 5.0\%$ 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	$\leq$ ± 5.0% of designated rate
Ozone	Slope	Linear regression of multi-	$0.9000 \le m \le 1.1000$
Ozone	Intercept	point test gas concentration as	$-5.0 \text{ ppb} \le \text{b} \le 5.0 \text{ ppb}$
Ozone	Correlation Coefficient	measured with a certified transfer standard	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 2018

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 2018. 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
HWF187	FSA	EPA	10/1/2018	Huntington Wildlife Forest
HOW191	FSA	EPA	10/2/2018	Howland
HOW191	O <sub>3</sub> PE	EPA	10/2/2018	Howland
HOW191	Flow	EPA	10/2/2018	Howland
ACA416	MET	NPS / ME DEP	10/3/2018	Acadia NP
ACA416	O <sub>3</sub> PE	NPS / ME DEP	10/3/2018	Acadia NP
ASH135	FSA	EPA	10/4/2018	Ashland
ASH135	O <sub>3</sub> PE	EPA	10/4/2018	Ashland
ASH135	Flow	EPA	10/4/2018	Ashland
WST109	FSA	EPA	10/9/2018	Woodstock
WST109	O <sub>3</sub> PE	EPA	10/9/2018	Woodstock
WST109	Flow	EPA	10/9/2018	Woodstock
DEN417	FSA	NPS	10/10/2018	Denali NP
DEN417	O <sub>3</sub> PE	NPS	10/10/2018	Denali NP

Side ID	Audit Type	Sponsor	Site Visit Date	Station Name
DEN417	Flow	NPS	10/10/2018	Denali NP
RED004	FSA	EPA	10/22/2018	Red Lake Nation
RED004	Flow	EPA	10/22/2018	Red Lake Nation
SAL133	FSA	EPA	10/27/2018	Salamonie Reservoir
SAL133	O <sub>3</sub> PE	EPA	10/27/2018	Salamonie Reservoir
SAL133	Flow	EPA	10/27/2018	Salamonie Reservoir
CAT175	FSA	EPA	11/7/2018	Claryville
CAT175	Flow	EPA	11/7/2018	Claryville
ABT147	FSA	EPA	11/8/2018	Abington
ABT147	O <sub>3</sub> PE	EPA	11/8/2018	Abington
ABT147	Flow	EPA	11/8/2018	Abington
PNF126	FSA	EPA	11/15/2018	Cranberry
PNF126	O <sub>3</sub> PE	EPA	11/15/2018	Cranberry
PNF126	Flow	EPA	11/15/2018	Cranberry
BEL116	FSA	EPA	11/17/2018	Beltsville
BEL116	O <sub>3</sub> PE	EPA	11/17/2018	Beltsville
BEL116	Flow	EPA	11/17/2018	Beltsville
BEL116	Met	EPA	11/17/2018	Beltsville
DUK008	FSA	EPA	12/5/2018	Duke Forest
DUK008	Flow	EPA	12/5/2018	Duke Forest
COW137	FSA	EPA	12/7/2018	Coweeta

Side ID	Audit Type	<u>Sponsor</u>	Site Visit Date	Station Name
COW137	O <sub>3</sub> PE	EPA	12/7/2018	Coweeta
COW137	Flow	EPA	12/7/2018	Coweeta

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). One site (LRL117) was visited twice to confirm the TTP results. Only one TTP audit (11/10) was entered into AQS.

**Table 3. TTP Pollutant PE Visits** 

Side ID	PE Audit Type	Sponsor	Site Visit Date	Station Name
VIN140	O <sub>3</sub>	EPA	10/18/2018	Vincennes
ALH157	O <sub>3</sub>	EPA	10/19/2018	Alhambra
LRL117	O <sub>3</sub>	EPA	10/19/2018	Laurel Hill St. Park
STK138	O <sub>3</sub>	EPA	10/20/2018	Stockton
VOY413	O <sub>3</sub>	NPS	10/23/2018	Voyageurs NP
SAN189	O <sub>3</sub>	EPA	10/26/2018	Santee Sioux
OXF122	O <sub>3</sub>	EPA	10/28/2018	Oxford
LRL117	O <sub>3</sub>	EPA	11/10/2018	Laurel Hill St. Park
BVL130	O <sub>3</sub>	EPA	11/11/2018	Bondville
BVL130	$SO_2$	EPA	11/11/2018	Bondville
BVL130	СО	EPA	11/11/2018	Bondville
BVL130	NOy	EPA	11/11/2018	Bondville
MAC426	O <sub>3</sub>	NPS	11/13/2018	Mammoth Cave NP

Side ID	PE Audit Type	Sponsor	Site Visit Date	Station Name
MAC426	NOy	NPS	11/13/2018	Mammoth Cave NP
DCP114	O <sub>3</sub>	EPA	11/14/2018	Deer Creek St. Park
GRS420	NOy	NPS	11/14/2018	Great Smoky Mountains NP - Look Rock
GRS420	O <sub>3</sub>	NPS	11/14/2018	Great Smoky Mountains NP - Look Rock
PNF126	NOy	EPA	11/15/2018	Cranberry
BWR139	O <sub>3</sub>	EPA	11/16/2018	Blackwater NWR
SHN418	O <sub>3</sub>	NPS	11/19/2018	Shenandoah NP - Big Meadows
WSP144	O <sub>3</sub>	EPA	12/1/2018	Washington Crossing
QAK172	O <sub>3</sub>	EPA	12/4/2018	Quaker City
CND125	O <sub>3</sub>	EPA	12/5/2018	Candor

## 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 3 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 (PO) operates and administers the three precipitation chemistry networks (NTN, MDN and AIRMON), two atmospheric concentration networks (AMNet and AMON), two analytical laboratories, the Wisconsin State Lab of Hygiene (WSLH) located at the University of Wisconsin in Madison and the Mercury Analytical Laboratory (HAL) located at 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 2018

This report presents the NADP sites surveyed during the fourth quarter (October through December) of 2018. The station names and dates of the surveys are presented in Table 4.

**Table 4. Sites Surveyed – Fourth Quarter 2018** 

Side ID	<u>Network</u>	<u>Visit Date</u>	Station Name
NY20	AMoN	10/1/2018	Huntington Wildlife
AK96	MDN/NTN	10/8/2018	Toolik Field Station
AK02	NTN	10/12/2018	Juneau
AK98	MDN	10/13/2018	Kodiak
BC23	NTN	10/15/2018	Lakelse Lake
BC24	NTN	10/15/2018	Port Edward
BC22	NTN	10/16/2018	Haul Road Station
IN22	AMoN	10/18/2018	Southwest Purdue Agriculture Center
IL46	AMoN	10/19/2018	Alhambra
IL37	AMoN	10/20/2018	Stockton
MN06	MDN	10/24/2018	Leech Lake
IN34	MDN	10/26/2018	Indiana Dunes National Lakeshore
NE98	MDN/AMoN	10/26/2018	Santee
IN20	AMoN	10/27/2018	Roush Lake
ОН09	AMoN	10/28/2018	Oxford
NY98	AMoN	11/4/2018	Whiteface Mountain
SD08	NTN	11/5/2018	Cottonwood
NY91	AMoN	11/7/2018	Claryville
CT15	AMoN	11/8/2018	Abington
PA97	AMoN	11/10/2018	Laurel Hill
IL11	AMoN	11/11/2018	Bondville
OH02	MDN/AMoN	11/12/2018	Athens Super Site
CO01	NTN	11/13/2018	Las Animas Fish Hatchery

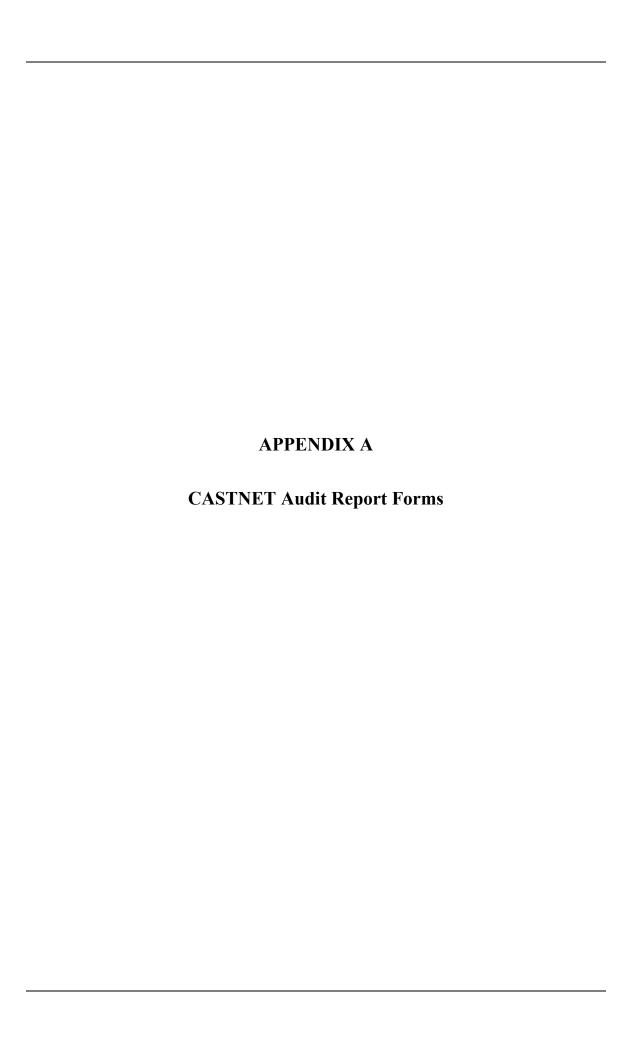
Side ID	Network	Visit Date	Station Name
OH16	MDN	11/13/2018	Northeast Ohio Regional Sewer District
OH52	MDN	11/13/2018	South Bass Island
CO21	NTN	11/14/2018	Manitou
OH17	NTN	11/14/2018	Delaware
OH54	AMoN	11/14/2018	Deer Creek State Park
CO00	NTN	11/15/2018	Alamosa
NC02	AMoN	11/15/2018	Cranberry
MD06	AMoN	11/16/2018	Blackwater NWR
MD99	AMoN	11/20/2018	Beltsville
NJ98	AMoN	12/1/2018	Washington Crossing
ОН99	AMoN	12/4/2018	Quaker City
IN21	MDN	12/5/2018	City Falls State Park
NC26	AMoN	12/5/2018	Candor
NC30	AMoN	12/5/2018	Duke Forest
NC25	NTN / AMoN	12/6/2018	Coweeta

## 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.



# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
НО	W191-Eric I	Hebert-10/02/2018				
1	10/2/2018	DAS	Campbell	000419	CR3000	2527
2	10/2/2018	elevation	Elevation	none	none	none
3	10/2/2018	Filter pack flow pump	Thomas	06021	107CAB18B	060400022648
4	10/2/2018	Flow Rate	Apex	000645	AXMC105LPMDPCV	illegible
5	10/2/2018	Infrastructure	Infrastructure	none	none	none
6	10/2/2018	Modem	Raven	06470	H4222-C	0808311250
7	10/2/2018	Ozone	ThermoElectron Inc	000616	49i A1NAA	1009241781
8	10/2/2018	Ozone Standard	ThermoElectron Inc	000372	49i A3NAA	0726124684
9	10/2/2018	Shelter Temperature	Campbell	none	107-L	none
10	10/2/2018	siting criteria	Siting Criteria	none	none	None
11	10/2/2018	Temperature	RM Young	missing	41342	missing
12	10/2/2018	Zero air pump	Werther International	06908	C 70/4	000821900

#### **DAS Data Form** 0.02 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2527 HOW191 Eric Hebert 10/02/2018 DAS Primary Das Date: 10/2 /2018 **Audit Date** 10/2 /2018 Datel **Parameter** DAS Mfg 12:05:30 Das Time: 12:05:29 **Audit Time** Tfer Desc. Source generator (D 4000392 **Serial Number** Das Day: 275 **Audit Day** 275 Tfer ID 01321 **Low Channel: High Channel: Avg Diff: Avg Diff: Max Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0001 0.0001 0.0001 0.0001 1/22/2015 1.00000 **Cert Date** CorrCoff Fluke **Parameter** DAS Mfg **Serial Number** 86590148 Tfer Desc. DVM 01310 Tfer ID 1.00000 0.00000 **Slope Intercept** 1/24/2018 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output **DAS** Output InputUnit OutputUnit Difference 0.0000 0.0000 0.0000 0.0000 V V 7 0.1000 0.0999 0.1000 0.00017 0.3000 0.3000 0.2999 V V -0.0001 7 0.5000 0.5000 0.4999 V V -0.0001 7 0.7000 V V 0.0000 0.6999 0.6999 7 V V 0.9000 0.8999 0.8999 0.00007 0.9999 V V -0.0001 1.0000 1.0000

# Flow Data Form

Ifg	Serial Nun	nber Ta S	ite	Tec	hnician	Site Visit I	Date Paran	neter	Owner ID
pex	illegible		HOW191	Eric	Hebert	10/02/2018	Flow F	Rate	000645
				]	Mfg	BIOS	I	Parameter Flo	ow Rate
					Serial Number	122974	Г	fer Desc. Bl	OS 220-H
				,	Γfer ID	01416			
					Slope	1	00178 <b>Int</b>	ercept	0.00161
					_				
				•	Cert Date	7/13	3/2018 <b>Co</b>	rrCoff	1.00000
AS 1:		DAS 2:			Cal Factor Z	ero	-0.	03	
Avg % Diff:	A Max % Di	A Avg %I	Dif A Max	% <b>Di</b>	Cal Factor F	ull Scale	0.	99	
0.00%	0.00%				Rotometer R	eading:		0	
Desc.	Test type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	II PctDifference
primary	pump off	0.000	0.000	0.01	0.000	-0.02	l/m	l/m	
primary	leak check	0.000	0.000	0.02	0.000	-0.01	l/m	l/m	
primary	test pt 1	1.530	1.530	1.53	0.000	1.53	l/m	l/m	0.00%
primary	test pt 2	1.532	1.530	1.53	0.000	1.53	l/m	l/m	0.00%
primary	test pt 3	1.534	1.530	1.53	0.000	1.53	1/m	1/m	0.00%
Sensor Compo	nent Leak Tes	st		Condition	ı		Statu	pass	
Sensor Compo	nent Tubing C	ondition		Condition	Good		Statu	pass	
Sensor Compo	onent Filter Pos	osition		Condition	Good		Status pass		
Sensor Compo	nent Rotomete	er Condition		Condition	N/A		Status pass		
Sensor Compo	onent Moisture	Moisture Present		Condition	No moisture present		Statu	pass	
Sensor Compo	onent Filter Dis	tance		Condition	3.5 cm		Statu	pass	
Sensor Component Filter Depth			Condition	3.0 cm		Statu	pass		
Sensor Component Filter Azimuth		Condition	360 deg		Statu	pass			
Sensor Component System Memo			Condition	1	Status pass				

# **Ozone Data Form**

ThermoElectron Inc	000616   r ozone   Ozone primary stan   0.07166   1.00000     AbsDif
Intercept	0.07166 1.00000 AbsDif -0.41
Cert Date   9/14/2018   CorrCoff   Site   Site Unit   RelPerDif	1.00000 AbsDif -0.41
A Avg % Diff: A Max % Di         Cert Date         9/14/2018         CorrCoff           UseDescription ConcGroup Tfer Raw Tfer Corr Site Site Unit Primary 1 0.79 0.71 0.30 ppb         Site Unit RelPerDif           primary 2 16.38 16.25 16.01 ppb         16.01 ppb         1.97           primary 3 35.12 34.93 34.25 ppb         -1.97           primary 4 68.36 68.07 66.48 ppb         -2.36           primary 5 112.29 111.86 109.00 ppb         -2.59           Sensor Component Sample Train Condition Good           Sensor Component Inlet Filter Condition           Condition Clean         Condition Status pass           Sensor Component Inlet Filter Condition	AbsDif -0.41
primary         1         0.79         0.71         0.30         ppb           primary         2         16.38         16.25         16.01         ppb           primary         3         35.12         34.93         34.25         ppb         -1.97           primary         4         68.36         68.07         66.48         ppb         -2.36           primary         5         112.29         111.86         109.00         ppb         -2.59           Sensor Component         Sample Train         Condition         Good         Status         pass           Sensor Component         22.5 degree rule         Condition         Clean         Status         pass	-0.41
primary         2         16.38         16.25         16.01         ppb           primary         3         35.12         34.93         34.25         ppb         -1.97           primary         4         68.36         68.07         66.48         ppb         -2.36           primary         5         112.29         111.86         109.00         ppb         -2.59           Sensor Component         Sample Train         Condition         Good         Status         pass           Sensor Component         22.5 degree rule         Condition         Clean         Status         pass	
primary         3         35.12         34.93         34.25         ppb         -1.97           primary         4         68.36         68.07         66.48         ppb         -2.36           primary         5         112.29         111.86         109.00         ppb         -2.59           Sensor Component         Sample Train         Condition         Good         Status         pass           Sensor Component         22.5 degree rule         Condition         Clean         Status         pass           Sensor Component         Inlet Filter Condition         Clean         Status         pass	-0.24
primary         4         68.36         68.07         66.48         ppb         -2.36           primary         5         112.29         111.86         109.00         ppb         -2.59           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	
primary 5 112.29 111.86 109.00 ppb -2.59  Sensor Component Sample Train Condition Good Status pass  Sensor Component 22.5 degree rule Condition Status pass  Sensor Component Inlet Filter Condition Clean Status pass	
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       22.5 degree rule       Condition       Status pass         Sensor Component       Inlet Filter Condition       Condition       Clean       Status pass	
Sensor Component Inlet Filter Condition Clean Status pass	
Sensor Component Battery Backup Condition N/A Status pass	
Sensor Component Editory Editory	
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 80.1 kHz Status pass	
Sensor Component Cell A Noise Condition 11.0 ppb Status Fail	
Sensor Component Cell A Flow Condition 0.71 lpm Status pass	
Sensor Component Cell A Pressure Condition 707.7 mmHg Status pass	
Sensor Component Cell A Tmp. Condition 33.0 C Status pass	
Sensor Component Cell B Freq. Condition 80.9 kHz Status pass	
Sensor Component Cell B Noise Condition 6.8 ppb Status Fail	
Sensor Component Cell B Flow Condition 0.70 lpm Status pass	
Sensor Component Cell B Pressure Condition 708.0 mmHg Status pass	
Sensor Component Cell B Tmp. Condition N/A Status pass	
Sensor Component Line Loss Condition Not tested Status pass	
Sensor Component System Memo Condition Status pass	

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg RM Young HOW191 Eric Hebert 10/02/2018 Temperature missing missing Parameter Temperature Mfg Extech Tfer Desc. RTD H232679 **Serial Number** 01228 **Tfer ID** -0.09210 **Slope** 1.00757 **Intercept DAS 1: DAS 2:** 2/13/2018 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.03 0.07 Test type OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. InputTmpRaw InputTmpCorr. primary Temp Low Range 0.01 0.10 0.000 0.1 $\mathbf{C}$ 25.90 C Temp Mid Range 26.00 0.000 26.0 0.07 primary 0.000 C primary Temp High Range 48.39 48.12 48.1 -0.03 Condition Clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** 10/02/2018 Shelter Temperature Campbell HOW191 Eric Hebert none none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperatur Abs Avg Err **Abs Max Er** Abs Avg Err **Abs Max Er** Tfer Desc. RTD H232679 **Serial Number** 0.77 1.03 01228 **Tfer ID** 1.00757 -0.09210 Slope Intercept 2/13/2018 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	24.47	24.38	0.000	24.9	C	0.49
primary	Temp Mid Range	23.94	23.85	0.000	24.9	С	1.03
primary	Temp Mid Range	24.46	24.37	0.000	25.2	C	0.8
Sensor Con	nponent System Memo		Condition		Status	pass	

## **Infrastructure Data For** Site Visit Date 10/02/2018 HOW191 Technician Eric Hebert Site ID **Shelter Make Shelter Model Shelter Size** custom custom 800 cuft Sensor Component | Sample Tower Type **Condition** Other Status pass Sensor Component | Conduit **Condition** N/A Status pass **Sensor Component** Met Tower **Condition** Good Status pass **Condition** Installed **Sensor Component** Moisture Trap **Status** pass Sensor Component | Power Cables **Condition** Good **Status** pass Sensor Component | Shelter Temp Control **Condition** Functioning **Status** pass **Condition** Not installed Status Fail Sensor Component Rotometer Sensor Component | Sample Tower **Condition** Good Status pass

**Condition** Good

**Condition** Good

**Condition** Good

**Condition** Good

**Condition** Good

**Condition** Good

Condition 1/4 teflon

Status pass

Status pass

Status pass

Status pass

Status pass

**Status** pass

Status pass

Sensor Component | Shelter Condition

Sensor Component | Shelter Door

Sensor Component | Shelter Roof

Sensor Component | Shelter Floor

Sensor Component | Signal Cable

**Sensor Component** Tubing Type

Sensor Component | Sample Train

# **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	l Problem
Ozone This analyzer diagnostic	HOW191 check is outside	Eric Hebert the manufacturer's	10/02/2018 recommended	Cell B Noise value.	ThermoElectron	3597		
Ozone This analyzer diagnostic	HOW191	Eric Hebert	10/02/2018 recommended	Cell A Noise value.	ThermoElectron	3597		

# **Field Systems Comments**

1 Parameter: SiteOpsProcComm

The site operator reported that gloves are not consistently used to handle the filter pack.

2 Parameter: SitingCriteriaCom

The CASTNET filter pack at this location is located above a tree canopy at approximately 23.5 meters from the ground. This is an AmeriFlux site which is approximately 2.5 km to the SW of the HOW132 CASTNET site.

3 Parameter: ShelterCleanNotes

The custom built shelter is clean and organized.

4 Parameter: MetSensorComme

Other than a temperature sensor located at the CASTNET filter location the meteorological instrumentation is being operated by the University of Maine and AmeriFlux.

#### **Field Systems Data Form** F-02058-1500-S1-rev002 HOW191 Site Visit Date 10/02/2018 Site ID Technician Eric Hebert Howland **USGS Map** EPA Site Sponsor (agency) Map Scale University of ME **Operating Group Map Date** AQS# R.M. Young **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude **Deposition Measurement** dry **QAPP** Longitude Woodland - mixed Land Use **QAPP Elevation Meters** flat, gently rolling Terrain **QAPP Declination** Yes Conforms to MLM **OAPP Declination Date** 45.203963 **Site Telephone Audit Latitude** -68.740041 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 68 Penobscot -17 County **Audit Declination** Howland, ME City, State **Present** Fire Extinguisher ✓ New in 2015 Zip Code Eastern **First Aid Kit** Time Zone **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **✓** Primary Op. E-mail **Climbing Belt Backup Operator Security Fence V** Backup Op. Phone # **Secure Shelter** Stable Entry Step Backup Op. E-mail Shelter Working Room ✓ Make Model custom 800 cuft custom **Shelter Size ✓** Notes The custom built shelter is clean and organized. **Shelter Clean**

**✓** Notes

Arrange for site visit and access with the site operator.

Site OK

**Driving Directions** 

# Field Systems Data Form

F-02058-1500-S2-rev002

Site ID HOW191 Technician Eric Hebert Site Visit Date 10/02/2018

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		$ lap{\checkmark}$
Secondary road, lightly traveled	200 m		$ lap{\checkmark}$
Feedlot operations	500 m		✓
Intensive agricultural ops (including aerial spraying)	500 m		ightharpoons
Limited agricultural operations	200 m		lacksquare
Large parking lot	200 m		lacksquare
Small parking lot	100 m		lacksquare
Tree line	50 m		lacksquare
Obstacles to wind	10 times obstacle height		

Siting Distances OK 🔽

**Siting Criteria Comment** 

The CASTNET filter pack at this location is located above a tree canopy at approximately 23.5 meters from the ground. This is an AmeriFlux site which is approximately 2.5 km to the SW of the HOW132 CASTNET site.

Fi	eld Systems Data Form		F-02058-1500-S3-rev002
Site	HOW191 Technician Eric Hebert		Site Visit Date 10/02/2018
1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	<b>✓</b>	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)	<b>✓</b>	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?	<b>✓</b>	
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)	<b>✓</b>	
6	Is the solar radiation sensor plumb?	<b>✓</b>	N/A
7	Is it sited to avoid shading, or any artificial or reflected light?	<b>✓</b>	N/A
8	Is the rain gauge plumb?	✓	N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	<b>✓</b>	N/A
10	Is the surface wetness sensor sited with the grid surface facing north?	✓	N/A
11	Is it inclined approximately 30 degrees?	<b>✓</b>	N/A
	ovide any additional explanation (photograph or sketch if necoural or man-made, that may affect the monitoring parameter		rry) regarding conditions listed above, or any other features,

Other than a temperature sensor located at the CASTNET filter location the meteorological instrumentation is being operated by the University of Maine and AmeriFlux.

Fie	ld Systems Data Form		F-02058-1500-S4-rev002
Site	ID HOW191 Technician Eric Hebert		Site Visit Date 10/02/2018
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	<b>✓</b>	Temperature only
2	Are all the meteorological sensors operational online, and reporting data?	<b>✓</b>	Temperature only
3	Are the shields for the temperature and RH sensors clean?	<b>✓</b>	
4	Are the aspirated motors working?	<b>✓</b>	N/A
5	Is the solar radiation sensor's lens clean and free of scratches?	<b>✓</b>	N/A
6	Is the surface wetness sensor grid clean and undamaged?	<b>✓</b>	N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	<b>✓</b>	
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	✓	
	de any additional explanation (photograph or sketch if necesseal or man-made, that may affect the monitoring parameters:	sary	regarding conditions listed above, or any other features,

## Field Systems Data Form F-02058-1500-S5-rev002 HOW191 Technician | Eric Hebert Site Visit Date 10/02/2018 Site ID Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E **✓** Do the sample inlets have at least a 270 degree arc of unrestricted airflow? 23.5 meters above ground Are the sample inlets 3 - 15 meters above the ground? ✓ Above canopy Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and maintenance **~** Do the analyzers and equipment appear to be in good condition and well maintained? **~** Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. 1/4 teflon by 40 meters Describe dry dep sample tube. 1/4 teflon by 40 meters At inlet only Are in-line filters used in the ozone sample line? (if ves indicate location) **~** Are sample lines clean, free of kinks, moisture, and obstructions? **V** Is the zero air supply desiccant unsaturated? ✓ Flow line only Are there moisture traps in the sample lines?

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:

**✓** 

Is there a rotometer in the dry deposition filter line, and is it

clean?

# Field Systems Data Form

F-02058-1500-S6-rev002

Site	ID	HOW191	Technician	Eric Hebert		Site Visi	t Date 10/02/201	8	
	DAC			<b>4</b>		. J t 4			
	DAS, sei	nsor translators, and	peripheral equi	<u>oment operation</u>	ns ar	<u>id maintena</u>	<u>nce</u>		
1		OAS instruments appointained?	ear to be in good	condition and	<b>✓</b>				
2		he components of the backup, etc)	e DAS operations	al? (printers,	✓				
3		nalyzer and sensor si g protection circuitry		hrough	<b>✓</b>	Met sensors	only		
4									
5	Are the	signal leads connecte	d to the correct l	DAS channel?	<b>✓</b>				
6	Are the grounde	DAS, sensor translated?	ors, and shelter <b>j</b>	oroperly	<b>✓</b>				
7	Does the	e instrument shelter h	nave a stable pow	ver source?	<b>✓</b>				
8	Is the in	strument shelter tem	perature control	led?	<b>✓</b>				
9	Is the m	et tower stable and g	rounded?			<b>Stable</b>		Grounded	
10	Is the sa	mple tower stable an	d grounded?			_ 		<u> </u>	
11	Tower c	omments?				24 meter wa	lk-up tower		
		additional explanationan-made, that may a				y) regarding	g conditions listed	d above, or a	any other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 HOW191 Technician | Eric Hebert Site Visit Date 10/02/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? N/A Yes No Yes No N/A **✓** Wind speed sensor **Data logger V** Wind direction sensor **V Data logger** ✓ **V** Temperature sensor Strip chart recorder **V V** Relative humidity sensor Computer **V** Solar radiation sensor **V** Modem П **V V Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V V Humidity sensor translator** Surge protector П П **V V UPS Solar radiation translator ~ V** Tipping bucket rain gauge Lightning protection device ~ $\checkmark$ **Shelter heater** Ozone analyzer ~ **✓** 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 V V SSRF V V Site Ops Manual V V HASP Field Ops Manual Calibration Reports V V** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current?

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 HOW191 Technician | Eric Hebert Site Visit Date 10/02/2018 Site ID Site operation procedures Has the site operator attended a formal CASTNET training ✓ course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **V** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? 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 ✓ V** Semiannually **Multipoint Calibrations V V** Weekly **Visual Inspections V** N/A Translator Zero/Span Tests (climatronics) **✓ V** N/A **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **QC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests Manual Precision Level Test ✓ V** Weekly **Analyzer Diagnostics Tests ~** Monthly **In-line Filter Replacement (at inlet)** N/A In-line Filter Replacement (at analyze **V** Weekly Sample Line Check for Dirt/Water **V** Weekly **Zero Air Desiccant Check** Unknown Do multi-point calibration gases go through the complete sample train including all filters? **✓**

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:

**✓** 

SSRF, call-in

Do automatic and manual z/s/p gasses go through the

Are the automatic and manual z/s/p checks monitored and

complete sample train including all filters?

reported? If yes, how?

## Field Systems Data Form F-02058-1500-S9-rev002 HOW191 Technician Eric Hebert Site Visit Date 10/02/2018 Site ID Site operation procedures Is the filter pack being changed every Tuesday as scheduled? ✓ Filter changed mornings Are the Site Status Report Forms being completed and filed correctly? No longer required Are data downloads and backups being performed as scheduled? **✓** SSRF Are general observations being made and recorded? How? **~** Are site supplies on-hand and replenished in a timely fashion? SSRF Are sample flow rates recorded? How? Are samples sent to the lab on a regular schedule in a timely fashion? **✓** Clean gloves on and off Are filters protected from contamination during handling and shipping? How? **~** Are the site conditions reported regularly to the field operations manager or staff? **QC Check Performed Compliant Frequency V** ✓ Semiannually **Multi-point MFC Calibrations** Weekly **V** Flow System Leak Checks **Filter Pack Inspection V ✓** Weekly **Flow Rate Setting Checks V ✓** Weekly **Visual Check of Flow Rate Rotometer** ✓ Semiannually **V In-line Filter Inspection/Replacement ✓** Weekly 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 site operator reported that gloves are not consistently used to handle the filter pack.

# Field Systems Data Form

# F-02058-1500-S10-rev002

Site ID HOW191 Technician Eric Hebert Site Visit Date 10/02/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR3000	2527	000419
elevation	Elevation	none	none	none
Filter pack flow pump	Thomas	107CAB18B	060400022648	06021
Flow Rate	Apex	AXMC105LPMDPC	illegible	000645
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4222-C	0808311250	06470
Ozone	ThermoElectron Inc	49i A1NAA	1009241781	000616
Ozone Standard	ThermoElectron Inc	49i A3NAA	0726124684	000372
Shelter Temperature	Campbell	107-L	none	none
siting criteria	Siting Criteria	none	None	none
Temperature	RM Young	41342	missing	missing
Zero air pump	Werther International	C 70/4	000821900	06908

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
A C	416-Eric H	lebert-10/03/2018				
1	10/3/2018	Computer	Hewlett Packard	none	8460p	CNU20941M6
2	10/3/2018	DAS	Environmental Sys Corp	none	8832	A3506K
3	10/3/2018	Elevation	Elevation	None	1	None
4	10/3/2018	F460 translator	Climatronics	none	100163	683
5	10/3/2018	Infrastructure	Infrastructure	none	none	none
6	10/3/2018	Mainframe	Climatronics	01342	100081	1288
7	10/3/2018	Met tower	Climatronics	none	unknown	illegible
8	10/3/2018	Ozone	ThermoElectron Inc	90744	49C	49C-74536-376
9	10/3/2018	Ozone Standard	ThermoElectron Inc	none	49i PSA2AB	1009941498
10	10/3/2018	Precipitation	Climatronics	01322	100508-2	illegible
11	10/3/2018	Relative Humidity	Rotronic	none	MP 601A	67857
12	10/3/2018	Sample Tower	Aluma Tower	none	В	AT-71103-7I-3
13	10/3/2018	Shelter Temperature	Agilaire	none	Unknown	None
14	10/3/2018	Shield (2 meter)	Climatronics	none	100325	illegible
15	10/3/2018	Siting Criteria	Siting Criteria	None	1	None
16	10/3/2018	Solar Radiation	Licor	none	LI-200	PY16746
17	10/3/2018	Temperature Translator	Climatronics	03630	100088-2	401
18	10/3/2018	Wind Direction	Climatronics	none	100076	illegible
19	10/3/2018	Wind Speed	Climatronics	none	100075	illegible
20	10/3/2018	Zero air pump	ThermoElectron Inc	none	111	111-30215-237

#### **DAS Data Form** 1.33 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg **Environmental Sys** A3506K ACA416 Eric Hebert 10/03/2018 DAS Primary Das Date: 10/3 /2018 **Audit Date** 10/3 /2018 Datel Parameter DAS Mfg 8:30:00 8:31:20 Das Time: **Audit Time** Tfer Desc. Source generator (D 4000392 **Serial Number** 276 Das Day: 276 **Audit Day** Tfer ID 01321 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0003 0.0004 0.0003 0.0004 1/22/2015 1.00000 **Cert Date** CorrCoff Fluke **Parameter** DAS Mfg **Serial Number** 86590148 Tfer Desc. DVM 01310 Tfer ID 1.00000 0.00000 **Slope Intercept** 1/24/2018 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 13 0.0000 0.0000 0.0000 0.0000 V V 13 0.1000 0.1000 0.0997 -0.0003 13 0.3000 0.3000 0.2997 V V -0.0003 13 0.5000 0.5000 0.4998 V V -0.00020.7000 V V -0.0004 13 0.7001 0.6997 V V 13 0.9000 0.9001 0.8997 -0.0004 13 V V -0.0004 1.0000 1.0001 0.9997

# **Ozone Data Form**

Mfg		Serial Number	er Ta	Site	T	Гесŀ	nnician	Site Visit Date	Parame	eter	Owner ?	ID
ThermoElec	ctron Inc	49C-74536-3	76	ACA416		Eric	Hebert	10/03/2018	Ozone		90744	
Slope: Intercept CorrCoff	Intercept 0.62233 Intercept				Mfg Serial Number				Parameter ozone  Tfer Desc. Ozone primary sta		ry stan	
						1	lfer ID	01115				
DAS 1:			<b>AS 2:</b>			S	Slope	1.0032	0 Inter	rcept	0.0	7166
	Diff: A N	Max % Di A 0.0%	Avg %	Dif A M	ax % Di		Cert Date	9/14/201	8 Cori	·Coff	1.0	0000
												-
UseDescr	1	ConcGroup		Raw	Tfer Corr	•	Site	Site Unit	RelPer	Dif	AbsDif	
prima prima	•	2	_	0.43 4.55	-0.50 14.43		0.11	ppb ppb			0.61	
prima	•	3		5.48	35.29		37.93	ppb		7.21	1.13	
prima	-	4		9.96	69.66		73.97	ppb		6		
prima	-	5		9.97	109.54		115.70	ppb		5.47		
Sensor C	ompone	nt Sample Tra	in		Condi	tion	Good		Status	pass		
Sensor C	ompone	nt 22.5 degree	rule		Condi	tion	1		Status	pass		
Sensor C	ompone	nt Inlet Filter C	ondition	n	Condi	tion	Clean		Status	pass		
Sensor C	ompone	nt Battery Bac	kup		Condi	tion	N/A		Status	pass		
Sensor C	ompone	nt Offset			Condi	tion	-0.1		Status	pass		
Sensor C	ompone	nt Span			Condi	tion	1.096		Status	pass		
Sensor C	ompone	nt Zero Voltag	е		Condi	tion	-0.0004		Status	pass		
Sensor C	ompone	nt Fullscale Vo	ltage		Condi	tion	10.0000		Status	pass		
Sensor C	ompone	nt Cell A Freq.			Condi	tion	73.6 kHz		Status	pass		
Sensor C	ompone	nt Cell A Noise	)		Condi	tion	0.4 ppb		Status	pass		
Sensor C	ompone	nt Cell A Flow			Condi	tion	0.73 lpm		Status	pass	s	
Sensor C	ompone	nt Cell A Press	sure		Condi	tion	739.0 mmHg		Status	pass		
Sensor C	ompone	nt Cell A Tmp.			Condi	tion	36.3 C		Status	pass	ass	
Sensor C	ompone	nt Cell B Freq.			Condi	tion	78.2 kHz		Status	pass		
Sensor C	ompone	nt Cell B Noise	)		Condi	tion	0.4 ppb		Status pass			
Sensor C	ompone	nt Cell B Flow			Condi	tion	0.71 lpm		Status	pass		
Sensor C	ompone	nt Cell B Press	sure		Condi	tion	738.5 mmHg		Status pass			
Sensor C	ompone	nt Cell B Tmp.			Condi	tion	N/A		Status pass			
Sensor C	ompone	nt Line Loss			Condi	tion	Not tested		Status	Pass		
Sensor C	ompone	nt System Mei	mo		Condi	tion	1		Status	pass		

#### **Wind Speed Data Form** Mfg Serial Number Ta **Technician** Site Visit Date Parameter Owner ID ACA416 Wind Speed Climatronics illegible Eric Hebert 10/03/2018 none Parameter wind speed Mfg RM Young Climatronics Mfg CA04013 Tfer Desc. wind speed motor (h **Serial Number** 683 **SN/Owner ID** none 01253 Tfer ID F460 translator **Parameter** 1.00000 0.00000 **Slope Intercept** 22003 Prop or Cups SN 0.2 **to** 0.2 **Prop or Cups Torque Cert Date** 7/11/2018 CorrCoff 1.00000 **Prop Correction Fact** N/A **DAS 1: DAS 2:** Low Range Low Range **High Range High Range** 0.32 8.25% Abs Avg Err 0.56 26.24% Abs Max Er Out V UseDescription: Input Device Input RPM Input m/s DAS m/s Diff/ % Diff Diff WsM 0.20 0.0 0.0 -0.18 primary 0 none 01253 50 1.40 0.0 2.0 0.56 primary 2.57 0.0 2.9 0.36 01253 100 primary 01253 170 4.22 0.0 4.0 -0.18 primary 0.0 5.9 primary 01253 250 6.10 -2.72% 11.97 0.0 12.4 3.76% primary 01253 500 primary 01253 800 19.02 0.0 19.0 -0.26% 2000 47.22 -26.24% 01253 0.0 34.8 primary Sensor Component | Condition **Condition** Good Status pass Sensor Component Prop or Cups Condition Condition Good **Status** pass Sensor Component | Sensor Heater Condition Unable to test Status pass Status pass **Sensor Component** Torque **Condition** Sensor Component | Sensor Plumb **Condition** Plumb Status pass Sensor Component | System Memo **Condition** Status pass

## **Wind Direction Data Form**

Climatronics   illegible   ACA416   Eric Hebert   10/03/2018   Wind Direction   none	
SN/Owner ID   683	
Parameter	
Vane SN:         1491         C. A. Align. deg. true:         Slope         1.00000         Intercept         0.0000           Vane Torque         5         to         12         1         Serial Number         1.00000         Intercept         0.0000           Mfg         Ushikata         Parameter wind direction         Serial Number         191832         Tfer Desc. transit           Slope         1.00000         Intercept         0.0000           Cert Date         5/10/2018         Corr Coff         1.0000           Cert Date         5/10/2018         Corr Coff         1.0000           Abs Avg Err         3.8         1.9	neel
Vane SN: 1491         C. A. Align. deg. true:           VaneTorque         5         to         12         1         Slope         1.00000         Intercept         0.0000           Mfg         Ushikata         Parameter wind direction         Mfg         Ushikata         Parameter wind direction           Serial Number         191832         Tfer Desc. transit           Tfer ID         01272           Slope         1.00000         Intercept         0.0000           Cert Date         5/10/2018         Corr Coff         1.0000           DAS 1:         DAS 2:           Orientation         Linearity:         Orientation         Linearity:           Abs Avg Err         3.8         1.9         Linearity:           Abs Max Er         6         6         Input Raw         Linearity         Output V         Output Deg.         Difference         Change         Error           UseDescription         TferID         Input Raw         Linearity         Output V         Output Deg.         Difference         Change         Error           primary         01252         45         0.0000         357         3         46.2         ####################################	
VaneTorque   5   to   12   1     Cert Date   4/26/2013   CorrCoff   1.0000	00
Mfg         Ushikata         Parameter wind direction           Serial Number         191832         Tfer Desc. transit           Tfer ID         01272           Slope         1.00000         Intercept         0.0000           Cert Date         5/10/2018         CorrCoff         1.0000           Abs Avg Err         3.8         1.9           Abs Max Er         6	_
Serial Number   191832   Tfer Desc. transit	,0
Tfer ID	
Slope	
DAS 1:   DAS 2:   Orientation   Linearity:   Orientation   Linearity:   Output V   Output Deg.   Difference   Change   Error   Primary   O1252   O   ✓   O.0000   357   3   46.2   ##########   Primary   O1252   90   ✓   O.0000   84   6   45.4   #########   Primary   O1252   135   ✓   O.0000   127   8   43.6   ###################################	
DAS 1:         DAS 2:           Orientation         Linearity:         Orientation         Linearity:           Abs Avg Err         3.8         1.9	00
Orientation Abs Avg Err         3.8         1.9         Linearity:           Abs Max Er         6         6         Output V         Output Deg.         Difference         Change         Error           primary         01252         0         ✓         0.0000         357         3         46.2         ####################################	)0
Orientation Abs Avg Err         3.8         1.9         Linearity:           Abs Max Er         6         6         Output V         Output Deg.         Difference         Change         Error           primary         01252         0         ✓         0.0000         357         3         46.2         ####################################	
Abs Max Er         6         6           UseDescription         TferID         Input Raw         Linearity         Output V         Output Deg.         Difference         Change         Error           primary         01252         0         ✓         0.0000         357         3         46.2 ####################################	
UseDescription         TferID         Input Raw         Linearity         Output V         Output Deg.         Difference         Change         Error           primary         01252         0         ✓         0.0000         357         3         46.2 ####################################	
primary         01252         0         ✓         0.0000         357         3         46.2 ####################################	
primary         01252         0         ✓         0.0000         357         3         46.2 ####################################	
primary         01252         90         ✓         0.0000         84         6         45.4         ####################################	
primary 01252 135 🗹 0.0000 127 8 43.6 ###########	
• •	
primary 01252 180 🗾 0,0000 178 2 50.6 ####################################	
primary 01232 180	
primary 01252 225 🗹 0.0000 221 4 43.7 ###########	
primary 01252 270 🗹 0.0000 266 4 44.3 ###########	
primary 01252 315 🗹 0.0000 311 4 45.3 ####################################	
primary 01272 90	
primary 01272 180	
primary 01272 270	
primary 01272 360	
Sensor Component Condition Condition Good Status pass	
Sensor Component Mast Condition Good Status pass	
Sensor Component Sensor Heater Condition Unable to test 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 **Technician** Site Visit Date Parameter Mfg Serial Number Ta Site **Owner ID** Climatronics ACA416 Eric Hebert 10/03/2018 Temperature2meter none missing Parameter Temperature Mfg Extech Climatronics Mfg Tfer Desc. RTD **Serial Number** H232679 03630 **SN/Owner ID** 01228 Tfer ID Temperature Translator **Parameter Slope** 1.00757 **Intercept** -0.09210 **DAS 1: DAS 2:** 2/13/2018 1.00000 CorrCoff Abs Avg Err **Abs Max Er Abs Avg Err** Abs Max Er **Cert Date** 0.14 0.26 InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit UseDescription Test type Difference primary Temp Low Rang -0.06 0.03 0.0000 $0.05\,\mathrm{C}$ 0.02 Temp Mid Rang 26.79 26.68 0.0000 26.42 C -0.26 primary primary Temp High Rang 49.28 49.00 0.0000 49.13 C 0.13 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 Status pass **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Solar Radiation Data Form** Serial Number Ta **Technician** Site Visit Date Parameter Owner ID Mfg PY16746 ACA416 Eric Hebert 10/03/2018 Solar Radiation Licor none Mfg **Eppley** Parameter solar radiation Tfer Desc. SR transfer translat 10765 **Serial Number** 01246 Tfer ID 0.00000 **Slope** 1.00000 **Intercept DAS 1: DAS 2:** 2/14/2018 1.00000 % Diff of Avg %Diff of Max %Diff of Avg %Diff of Max Cert Date CorrCoff Parameter solar radiation Mfg **Eppley** Tfer Desc. SR transfer sensor **Serial Number** 34341F3 Tfer ID 01245 1.00000 0.00000 **Slope Intercept Cert Date** 2/14/2018 CorrCoff 1.00000 2.7% 0.0% 0.0% 0.8% UseDescription Measure Date MeasureTime Tfer Raw Tfer Corr DAS w/m2 PctDifference primary 10/3/2018 11:00 318 318 323 1.5% 12:00 332 3.4% 10/3/2018 332 343 primary primary 10/3/2018 13:00 376 376 366 -2.7% 218 primary 10/3/2018 14:00 218 222 1.7% 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** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg ACA416 Eric Hebert 10/03/2018 Relative Humidity Rotronic 67857 none Mfg Rotronic **Parameter** Relative Humidity Tfer Desc. Hygroclip 124432 **Serial Number** 01225 Tfer ID **Slope** 1.00237 **Intercept** -1.36077 **Cert Date** 10/3/2018 0.99714 CorrCoff **DAS 1: DAS 2:** Low Range **High Range** Low Range **High Range** 2.4 **Abs Avg Err** 3.7 **Abs Max Er** UseDesc. Test type Device Input RH GTL Raw RH Corr. DAS Volts DAS %RH Difference Hygroclip 32.5 2.0 primary RH Low Range 32.8 32.8 0.0000 34.8 49.8 3.7 primary RH Low Range Hygroclip 52.9 52.9 0.000056.6 primary RH Low Range Hygroclip 75.3 75.0 75.3 0.0000 76.8 1.5 Condition Clean Status pass Sensor Component | RH Filter 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 Status pass Condition

# **Precipitation Data Form**

Mfg	S	erial Number T	a S	Site		Те	chnician		Site	Visit Date	Paramo	eter	Owner ID
Climatronics	il	llegible		ACA416		Eı	ric Hebert		10/0	03/2018	Precipit	ation	01322
							Mfg		PMF	)	Pa	rameter	Precipitation
DAS 1:		DAS	2:				Serial Nun	nber	Non	е	Tf	er Desc. 2	50ml graduate
<b>A Avg % Diff</b> 6.0%		<b>x % Di</b>	g %I	Dif A N	Iax % Di		Tfer ID		0124	49			
							Slope			1.0000	0 Inte	rcept	0.00000
							Cert Date			4/26/201	3 Corr	rCoff	1.00000
UseDesc.	Test t	ype TferVolu	me :	Iteration	TimePerT	ip	Eq.Ht	DAS	eng	Eq.HtUnit	OSE Ur	nit TferUn	its PctDifference
primary	test 1	231.5		1	10 sec		5.00	4.	70	mm	mm	ml	-6.0%
primary	test 2	231.5		2	10 sec		5.00	4.	70	mm	mm	ml	-6.0%
Sensor Com	ponent	Properly Sited			Cond	litio	on 45 degre	e rule			Status	pass	
Sensor Com	ponent	Gauge Drain S	reen	1	Cond	litio	Not installed				Status	pass	
Sensor Com	ponent	Funnel Clean			Cond	litio	tion Clean				Status pass		
Sensor Com	ponent	Condition			Cond	litio	Good				Status pass		
Sensor Com	ponent	Gauge Screen			Cond	litio	on Installed				Status	pass	
Sensor Com	ponent	Gauge Clean			Cond	litio	Clean				Status	pass	
Sensor Com	ponent	Level			Cond	litio	Level				Status	pass	
Sensor Com	ponent	Sensor Heater			Cond	litio	Unable to test				Status	pass	
Sensor Com	ponent	System Memo			Cond	litio	on				Status	pass	

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** ACA416 10/03/2018 Shelter Temperature Agilaire None Eric Hebert none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperatur Abs Avg Err **Abs Max Er** Abs Avg Err **Abs Max Er** Tfer Desc. RTD H232679 **Serial Number** 0.28 0.39 01228 **Tfer ID** 1.00757 -0.09210 Slope Intercept 2/13/2018 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	24.44	24.35	0.000	24.4	C	0.05
primary	Temp Mid Range	24.48	24.39	0.000	24.0	С	-0.39
primary	Temp Mid Range	24.38	24.29	0.000	23.9	С	-0.39
Sensor Con	ponent System Memo	<u> </u>	Condition		Status	pass	

### **Infrastructure Data For** Site Visit Date 10/03/2018 ACA416 Technician Eric Hebert Site ID **Shelter Make Shelter Model Shelter Size** Custom Unknown Unknown Sensor Component | Sample Tower Type **Condition** Type B Status pass **Condition** Good Sensor Component | Conduit Status pass **Sensor Component** Met Tower **Condition** Good Status pass **Condition** N/A **Sensor Component** Moisture Trap **Status** pass Sensor Component | Power Cables **Condition** Good **Status** pass Sensor Component | Shelter Temp Control **Condition** Functioning **Status** pass **Condition** Installed Status pass Sensor Component Rotometer 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

**Condition** Good

**Condition** Good

**Condition** Good

Condition 3/8 teflon

Status pass

Status pass

Status pass

Status pass

Sensor Component | Shelter Floor

Sensor Component | Signal Cable

**Sensor Component** Tubing Type

Sensor Component | Sample Train

## **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: SiteOpsProcedures

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

### 3 Parameter: ShelterCleanNotes

The shelter is new, clean and well organized.

### 4 Parameter: PollAnalyzerCom

New sample lines have been installed in the new shelter.

### 5 Parameter: MetSensorComme

The wind speed sensor response at the high speed test was much lower than expected. This condition has been observed during previous audits.

### 6 Parameter: MetOpMaintCom

The sensor signal cables are beginning to show signs of wear.

#### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 10/03/2018 ACA416 Technician Eric Hebert Site ID Salsbury Cove **USGS Map** NPS/EPA Site Sponsor (agency) Map Scale NPS/MEDEP **Operating Group Map Date** 23-009-0103 AQS# Climatronics **Meteorological Type** Ozone, SO2, NOx, NOy, PM, VOC **Air Pollutant Analyzer QAPP** Latitude 44.3770 dry, wet, Hg **QAPP** Longitude -68.2610 **Deposition Measurement** Costal, woodland - mixed 158 Land Use **QAPP Elevation Meters Terrain** rolling **QAPP Declination** No Conforms to MLM **OAPP Declination Date** (432) 288-9322 44.377086 **Site Telephone Audit Latitude** Route 233 **Audit Longitude** -68.2608 Site Address 1 Site Address 2 **Audit Elevation** 153 Hancock -16.4 County **Audit Declination** Bar Harbor, ME City, State **Present** Fire Extinguisher ✓ 04609 Inspected Aug 2017 Zip Code Eastern First Aid Kit Time Zone **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **Climbing Belt** Primary Op. E-mail **Security Fence Backup Operator V Secure Shelter** Backup Op. Phone # Stable Entry Step Backup Op. E-mail Shelter Working Room ✓ Make Model Unknown Custom **Shelter Size** Unknown **✓** Notes The shelter is new, clean and well organized. Shelter Clean **✓** Notes Site OK From Bangor go east on 1A to Ellsworth. From Ellsworth take route 3 east to Bar Harbor. At the west edge of town, **Driving Directions**

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

CILL TIP	A C A 44 C	m 1 · ·	المنام الماسية	G14 T71 14 TD 4	40/00/0040
Site ID	ACA416	Technician	Епс нереп	Site Visit Date	10/03/2018

Potential Interferent	Minimum Distance From Measurement Apparatus	Distance	Pass = Checked
Large Point Source of SO2 or NOx	20 to 40 km		<u> </u>
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		$\checkmark$
Secondary road, lightly traveled	200 m		<b>~</b>
Feedlot operations	500 m		<b>~</b>
Intensive agricultural ops (including aerial spraying)	500 m		$\checkmark$
Limited agricultural operations	200 m		<b>~</b>
Large parking lot	200 m		$\checkmark$
Small parking lot	100 m		✓
Tree line	50 m	25 m	
Obstacles to wind	10 times obstacle height		<b>✓</b>

Siting	<b>Distances OK</b>	<b>✓</b>
Siting	Criteria Com	nent

	Systems Data Form	
Site ID	ACA416 Technician Eric Hebert	Site Visit Date 10/03/2018
	wind speed and direction sensors sited so as to avoid ng influenced by obstructions?	
(i.e. hori	wind sensors mounted so as to minimize tower effects wind sensors should be mounted atop the tower or on izontally extended boom >2x the max diameter of the er into the prevailing wind)	a
3 Are	the tower and sensors plumb?	
	the temperature shields pointed north or positioned to id radiated heat sources such as buildings, walls, etc?	
conc surf	temperature and RH sensors sited to avoid unnatural ditions? (i.e. ground below sensors should be natural face and not steeply sloped. Ridges, hollows, and areas ading water should be avoided)	
6 Is th	ne solar radiation sensor plumb?	
7 Is it	sited to avoid shading, or any artificial or reflected t?	
8 Is th	ne rain gauge plumb?	
	sited to avoid sheltering effects from buildings, trees, ers, etc?	45 degree rule violation
	he surface wetness sensor sited with the grid surface ng north?	
11 Is it	inclined approximately 30 degrees?	
	any additional explanation (photograph or sketch if n or man-made, that may affect the monitoring parameter	ecessary) regarding conditions listed above, or any other features,

The wind speed sensor response at the high speed test was much lower than expected. This condition has been observed during previous audits.

Fic	eld Sys	tems Data Fo	rm		F-02058-1500-S4-rev002					
Site	e ID	ACA416	Technician Eric Heber	rt	Site Visit Date 10/03/2018					
1		meterological sensor , and well maintained	rs appear to be intact, in § !?	good 🗸						
2	Are all th reporting		ors operational online, a	nd 🗸						
3	Are the sl	nields for the tempera	nture and RH sensors clea	an?						
4	Are the as	spirated motors work	ring?	<b>✓</b>						
5	Is the sola scratches	ar radiation sensor's l ?	ens clean and free of	✓						
6	Is the sur	face wetness sensor g	rid clean and undamaged	d? 🔽						
7		ensor signal and powe , and well maintained	er cables intact, in good	<b>✓</b>						
8		ensor signal and powe elements and well ma	er cable connections proteintained?	ected 🗹						
			photograph or sketch if incident the monitoring parame		egarding conditions listed above, or any other features,					
The	sensor sign	al cables are beginning	to show signs of wear.							

## Field Systems Data Form F-02058-1500-S5-rev002 ACA416 Technician | Eric Hebert Site Visit Date 10/03/2018 Site ID Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E **~** Do the sample inlets have at least a 270 degree arc of unrestricted airflow? **~** Are the sample inlets 3 - 15 meters above the ground? **~** Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and maintenance **~** Do the analyzers and equipment appear to be in good condition and well maintained? **V** Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. 3/8 teflon by 12 meters Describe dry dep sample tube. 3/8 teflon by 12 meters At inlet only Are in-line filters used in the ozone sample line? (if ves indicate location) **~** Are sample lines clean, free of kinks, moisture, and obstructions? **V** Is the zero air supply desiccant unsaturated? **~** Are there moisture traps in the sample lines? ✓ Clean and dry 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:

New sample lines have been installed in the new shelter.

# Field Systems Data Form

## F-02058-1500-S6-rev002

Site	e <b>ID</b>	ACA416	Technician	Eric Hebert		Site Vis	it Date 10/03/201	8	
	DAS, se	nsor translators, and	peripheral equi	oment operation	ns and	maintena	ince		
				_			<u>ince</u>		
1	Do the I well mai	OAS instruments appeintained?	ar to be in good	condition and					
2		he components of the backup, etc)	DAS operation	al? (printers,					
3		nalyzer and sensor sig g protection circuitry		through	<b>✓</b>				
4		signal connections prointained?	otected from the	e weather and	<b>✓</b>				
5	Are the	signal leads connected	to the correct	DAS channel?	<b>✓</b>				
6	Are the grounde	DAS, sensor translated?	rs, and shelter	properly	<b>✓</b>				
7	Does the	e instrument shelter h	ave a stable pov	ver source?	<b>✓</b>				
8	Is the in	strument shelter temp	oerature contro	led?	<b>✓</b>				
9	Is the m	et tower stable and gr	ounded?			Stable		Grounded	
10	Is the sa	mple tower stable and	l grounded?			V V		<b>✓</b>	
11	Tower c	omments?						V	
		additional explanatio nan-made, that may af				) regardin	g conditions listed	d above, or a	ny other features,
па	urar VI II	am-maue, mat may al	icet the monito	ing parameters	7.				

#### **Field Systems Data Form** F-02058-1500-S7-rev002 ACA416 Technician | Eric Hebert Site Visit Date 10/03/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No Yes N/A Yes No N/A $\overline{\mathbf{V}}$ **V** Wind speed sensor **Data logger ✓** $\checkmark$ Wind direction sensor П **Data logger V** $\checkmark$ П Temperature sensor Strip chart recorder **V** П **V** Relative humidity sensor Computer **V V** Solar radiation sensor Modem **~** П ~ **Printer** Surface wetness sensor $\checkmark$ П **V** Wind sensor translator Zero air pump **V V** Filter flow pump **Temperature translator** $\checkmark$ $\checkmark$ П **Humidity sensor translator Surge protector V V UPS Solar radiation translator V V** Tipping bucket rain gauge **Lightning protection device** ~ **✓ Shelter heater** Ozone analyzer $\checkmark$ ~ Filter pack flow controller Shelter air conditioner $\checkmark$ Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V ✓** Dataview **SSRF ✓ V V V Site Ops Manual** June 2000 **HASP Field Ops Manual Calibration Reports V V** Ozone z/s/p Control Charts Preventive maintenance schedul **V** Is the station log properly completed during every site visit? ✓ Dataview Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and

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:

current?

#### **Field Systems Data Form** F-02058-1500-S8-rev002 ACA416 Technician Eric Hebert Site Visit Date 10/03/2018 Site ID Site operation procedures Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET Trained on-site by ARS during site installation training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **V** schedule? Operator procedures are very good for filter replacement Are the standard CASTNET operational procedures being flollowed by the site operator? 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 ✓ V** Semiannually by MEDEP **Multipoint Calibrations V V** Weekly **Visual Inspections ✓ V** Semiannually Translator Zero/Span Tests (climatronics) **✓ V** Monthly **Manual Rain Gauge Test ✓ V** Weekly **Confirm Reasonableness of Current Values** Not performed **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **Compliant OC Check Performed** Frequency **Multi-point Calibrations V V** Monthly **V V Automatic Zero/Span Tests** Weekly **V V** Weekly Manual Zero/Span Tests **V ~** Weekly **Automatic Precision Level Tests V Manual Precision Level Test** Weekly **V Analyzer Diagnostics Tests** Weekly **V** Monthly **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Sample Line Check for Dirt/Water Weekly **~** Weekly **Zero Air Desiccant Check ✓** Do multi-point calibration gases go through the complete sample train including all filters?

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:

**✓** 

✓

Results are recorded weekly on a checklist

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

Do automatic and manual z/s/p gasses go through the

Are the automatic and manual z/s/p checks monitored and

complete sample train including all filters?

reported? If yes, how?

### Field Systems Data Form F-02058-1500-S9-rev002 ACA416 Technician Eric Hebert Site Visit Date 10/03/2018 Site ID **Site operation procedures** Is the filter pack being changed every Tuesday as scheduled? ✓ Filter changed morinings, 90% Flow and general observation sections only Are the Site Status Report Forms being completed and filed correctly? No longer required Are data downloads and backups being performed as scheduled? **✓** SSRF Are general observations being made and recorded? How? **V** Are site supplies on-hand and replenished in a timely fashion? SSRF Are sample flow rates recorded? How? Are samples sent to the lab on a regular schedule in a timely fashion? **✓** Clean gloves on and off Are filters protected from contamination during handling and shipping? How? Are the site conditions reported regularly to the field operations manager or staff? QC Check Performed **Frequency Compliant V** ✓ Semiannually **Multi-point MFC Calibrations** Weekly **V** Flow System Leak Checks ■ Not performed **Filter Pack Inspection** Weekly **V Flow Rate Setting Checks** Weekly **V Visual Check of Flow Rate Rotometer** ✓ As needed **V In-line Filter Inspection/Replacement** ☐ Not performed 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:

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 10/03/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	8460p	CNU20941M6	none
DAS	Environmental Sys Corp	8832	A3506K	none
Elevation	Elevation	1	None	None
F460 translator	Climatronics	100163	683	none
Infrastructure	Infrastructure	none	none	none
Mainframe	Climatronics	100081	1288	01342
Met tower	Climatronics	unknown	illegible	none
Ozone	ThermoElectron Inc	49C	49C-74536-376	90744
Ozone Standard	ThermoElectron Inc	49i PSA2AB	1009941498	none
Precipitation	Climatronics	100508-2	illegible	01322
Relative Humidity	Rotronic	MP 601A	67857	none
Sample Tower	Aluma Tower	В	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
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 V	isit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
ASH1	!35-Eric H	lebert-10/04/2018				
1	10/4/2018	Computer	Dell	07070	Inspiron 15	Unknown
2	10/4/2018	DAS	Campbell	000634	CR3000	4933
3	10/4/2018	Elevation	Elevation	None	1	None
4	10/4/2018	Filter pack flow pump	Thomas	01449	107CA110	118700000595
5	10/4/2018	Flow Rate	Apex	000649	AXMC105LPMDPCV	illegible
6	10/4/2018	Infrastructure	Infrastructure	none	none	none
7	10/4/2018	Modem	Raven	06471	H4222-C	0808311148
8	10/4/2018	Ozone	ThermoElectron Inc	000730	49i A1NAA	1105347325
9	10/4/2018	Ozone Standard	ThermoElectron Inc	000442	49i A3NAA	CM08200018
10	10/4/2018	Sample Tower	Aluma Tower	03536	Α	none
11	10/4/2018	Shelter Temperature	Campbell	none	107-L	none
12	10/4/2018	Siting Criteria	Siting Criteria	None	1	None
13	10/4/2018	Temperature	RM Young	06389	41342	13994
14	10/4/2018	Zero air pump	Werther International	06923	C 70/4	000836208

#### **DAS Data Form** 0.07 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 4933 ASH135 Eric Hebert 10/04/2018 DAS Primary Das Date: 10/4 /2018 **Audit Date** 10/4 /2018 Datel Parameter DAS Mfg 11:16:00 Das Time: **Audit Time** 11:15:56 Tfer Desc. Source generator (D 4000392 **Serial Number** Das Day: 277 **Audit Day** 277 Tfer ID 01321 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0001 0.0000 0.0001 0.0000 1/22/2015 1.00000 **Cert Date** CorrCoff Fluke **Parameter** DAS Mfg **Serial Number** 86590148 Tfer Desc. DVM 01310 Tfer ID 1.00000 0.00000 **Slope Intercept** 1/24/2018 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output **DAS** Output InputUnit OutputUnit Difference 0.0000 0.0000 0.0000 0.0000 V V 7 0.1000 0.1000 0.1000 0.00007 0.3000 0.3000 0.3001 V V 0.0001 7 0.5000 0.5001 V V 0.00000.5001 7 0.7000 0.7001 V V 0.0000 0.7001 V V 7 0.9000 0.9002 0.9002 0.00007 V V 1.0000 1.0003 1.0004 0.0001

## Flow Data Form

Mfg	Se	erial Nun	nber Ta	Site	Teo	echnician Site Visit		Date Paran	neter	Owner ID
Apex	il	illegible		ASH135		Eric Hebert		10/04/2018 Flow F		000649
						Mfg	BIOS	I	Parameter Flo	w Rate
						Serial Number	122974	7	fer Desc. Blo	OS 220-H
						Tfer ID	01416			
						Tiel ID	01410		_	
						Slope	1	.00178 Int	ercept	0.0016
						Cert Date	7/1	3/2018 <b>Co</b>	rrCoff	1.0000
DAS 1:			DAS 2:		L	Cal Factor Z	ero	-0.	03	
A Avg % Diff: A Max % Di A Avg % Dif A Max			x % Di	Cal Factor F	ull Scale	0.	98			
1.10% 1.32%				Rotometer R	eading:	1.	45			
Desc.	Te	st type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	PctDifference
primary	pump	off	0.000	0.000	0.01	0.000	-0.02	1/m	1/m	
primary	leak c	heck	0.000	0.000	0.00	0.000	-0.02	1/m	1/m	
primary	test p	: 1	1.525	1.520	1.52	0.000	1.50	1/m	1/m	-1.32%
primary	test p	2	1.526	1.520	1.52	0.000	1.50	1/m	l/m	-1.32%
primary	test p	: 3	1.524	1.520	1.53	0.000	1.51	1/m	1/m	-0.66%
<b>Sensor Comp</b>	onent	Leak Tes	t		Conditio	n		Statu	pass	
Sensor Comp	onent	Tubing C	ondition		Condition Good		Sta		us pass	
Sensor Comp	onent	Filter Pos	sition	Cor		n Good		Statu	pass	
Sensor Comp	onent	Rotomete	er Conditio	n	Conditio	n Clean and dry	Status		s pass	
Sensor Comp	onent	Moisture	Present		Conditio	n No moisture p	esent Status P		pass	
Sensor Comp	onent	Filter Dist	tance		Conditio	n 2.0 cm		Statu	ıs pass	
Sensor Component Filter Depth		Conditio	ondition 4.5 cm		Status					
Sensor Comp	onent	Filter Azir	muth		Conditio	tion 315 deg		Status		
Sensor Comp	onent	System N	/lemo		Conditio	n		Statu	pass	

## **Ozone Data Form**

Mfg	Serial Numbe	er Ta Site	Teo	chnician	Site Visit Date	Parameter		Owner ID	
ThermoElectron Inc	1105347325	ASH13	5 Eri	c Hebert	10/04/2018	Ozone		000730	
Intercept 0		rcept	0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180930075 01115			ozone  Ozone primary	stan
DAS 1: A Avg % Diff: A M		AS 2: Avg %Dif A	. Max % Di	Slope	1.0032	20 Inter	cept	0.071	166
0.0%	0.0%	Avg /vDii A	A WIGA 70 DI	Cert Date	9/14/20	18 Corr	Coff	1.000	)00
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPer	Dif	AbsDif	
primary	1	-0.74	-0.80	-0.28	ppb			0.52	
primary	3	14.39 33.98	14.27 33.80	13.83 33.19	ppb		-1.82	-0.44	
primary primary	4	69.86	69.56	67.86	ppb ppb		-1.82		
primary	5	111.19	110.76	108.40	ppb		-2.15		
Sensor Componen	Sample Tra	in	Condition	Good		Status	pass		1
Sensor Componen			Condition			Status			]
Sensor Componen	Inlet Filter C	Inlet Filter Condition		Clean		Status pass			
Sensor Componen	t Battery Bac	kup	Conditio	n N/A		Status	pass		
Sensor Componen	Offset		Conditio	n -0.10		Status	pass		
Sensor Componen	t Span		Condition	Condition 1.019			pass		
Sensor Componen	t Zero Voltag	е	Condition	Condition N/A			pass		
Sensor Componen	t Fullscale Vo	ltage	Condition	n N/A		Status	pass		
Sensor Componen	t Cell A Freq.	Cell A Freq.		n 103.4 kHz		Status	pass		]
Sensor Componen	t Cell A Noise	Cell A Noise		0.8 ppb		Status pass			
Sensor Componen	t Cell A Flow	Cell A Flow		0.70 lpm	Status pas		pass		]
Sensor Componen	t Cell A Press	sure		715.7 mmHg		Status			
Sensor Componen		Cell A Tmp.		34.3 C		Status	pass		
Sensor Componen				87.0 kHz		Status			
Sensor Componen		)		0.9 ppb		Status pass			
Sensor Component Cell B Flow			0.72 lpm		Status				
Sensor Componen				716.6 mmHg		Status			
Sensor Componen			Condition N/A			Status			
Sensor Componen				Not tested		Status			
Sensor Componen	t System Mer	no	Condition	on		Status	pass		

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg RM Young ASH135 Eric Hebert 10/04/2018 Temperature 06389 13994 Mfg Extech Parameter Temperature Tfer Desc. RTD H232679 **Serial Number** 01228 Tfer ID -0.09210 **Slope** 1.00757 **Intercept DAS 1: DAS 2:** 2/13/2018 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.07 0.13 Test type OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. InputTmpRaw InputTmpCorr. primary Temp Low Range 0.11 0.20 0.000 0.2 C -0.02 C Temp Mid Range 26.32 26.21 0.000 26.3 0.06 primary C primary Temp High Range 46.65 46.39 0.000 46.3 -0.13 Condition Moderately clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** 10/04/2018 Shelter Temperature Campbell ASH135 Eric Hebert none none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperatur Abs Avg Err **Abs Max Er** Abs Avg Err **Abs Max Er** Tfer Desc. RTD H232679 **Serial Number** 0.60 0.66 01228 **Tfer ID** 1.00757 -0.09210 Slope Intercept 2/13/2018 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	22.70	22.62	0.000	23.3	C	0.66
primary	Temp Mid Range	22.40	22.32	0.000	23.0	С	0.63
primary	Temp Mid Range	22.90	22.82	0.000	23.3	C	0.5
Sensor Con	nponent System Memo		Condition		Status	pass	

### **Infrastructure Data For**

Site I	ID AS	H135	Technician	Eric Hebert	Site Visit Date	10/04/2018	
Sł	nelter Make		Shelter Model		Shelter Size		
Ek	kto		8810 (s/n 2149-	17)	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
<b>Sensor Component</b>	Shelter Door	Condition	Good	Status	pass
<b>Sensor Component</b>	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 met tower has been removed and the 10 meter temperature sensor is mounted in a naturally aspirated shield on the sample tower.

2 Parameter: SiteOpsProcedures

The ozone inlet filter is replaced and the sample train is leak tested once each month.

3 Parameter: SitingCriteriaCom

The evergreen plantation previously 20 meters south of the site has been harvested.

4 Parameter: ShelterCleanNotes

The shelter is in fair condition, clean, and very well organized. Rot is beginning at the bottom of the walls and floor.

#### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 10/04/2018 Technician Eric Hebert ASH135 Site ID Squa Pan **USGS Map EPA** Site Sponsor (agency) Map Scale private **Operating Group Map Date** 23-003-9991 AQS# R.M. Young **Meteorological Type** 46.6039 **Air Pollutant Analyzer** Ozone **QAPP** Latitude dry **QAPP** Longitude -68.4142 **Deposition Measurement** 235 Land Use agriculture, woodland - mixed **QAPP Elevation Meters** gently rolling 18.7 **Terrain QAPP Declination** Marginally 2/22/2006 Conforms to MLM **OAPP Declination Date** (207) 435-6482 46.603832 **Site Telephone Audit Latitude** Radar Road -68.413227 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 231 Aroostook -18.2 County **Audit Declination** Ashland, ME City, State **Present** Fire Extinguisher 04732 New in 2015 Zip Code Eastern **First Aid Kit** Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **V Climbing Belt** Primary Op. E-mail **Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Step Backup Op. E-mail Shelter Working Room ✓ Make Model 8810 (s/n 2149-17) Ekto **Shelter Size** 640 cuft **✓** Notes The shelter is in fair condition, clean, and very well organized. Rot is beginning at the bottom of the Shelter Clean walls and floor. **✓** Notes Site OK

From I-95 take exit #286 which is route 212. Take route 212 west to route 11. Turn north on route 11 and continue

toward Ashland. Approximately 2 miles south of Ashland turn left (west) on Goding Road at the DEP sign. The site

is approximately 1.5 miles straight on Goding Rd. (go straight at the 90 deg curve).

**Driving Directions** 

## Field Systems Data Form

F-02058-1500-S2-rev002

Site ID ASH135 Technician Eric Hebert Site Visit Date 10/04/2018

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	30 m	
Tree line	50 m		✓
Obstacles to wind	10 times obstacle height		<b>V</b>

Siting Distances OK

**Siting Criteria Comment** 

The evergreen plantation previously 20 meters south of the site has been harvested.

### **Field Systems Data Form** F-02058-1500-S3-rev002 Technician Eric Hebert Site Visit Date 10/04/2018 Site ID ASH135 ✓ N/A Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? **✓** N/A 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 Are the tower and sensors plumb? Are the temperature shields pointed north or positioned to Pointed south to avoid building avoid radiated heat sources such as buildings, walls, etc? **V** 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) **✓** N/A Is the solar radiation sensor plumb? N/A Is it sited to avoid shading, or any artificial or reflected light? **✓** N/A Is the rain gauge plumb? ✓ N/A 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

✓ N/A

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,

facing north?

11 Is it inclined approximately 30 degrees?

natural or man-made, that may affect the monitoring parameters:

Fie	eld Systems Data Form		F-02058-1500-S4-rev002
Site	ID ASH135 Technician Eric Hebert		Site Visit Date 10/04/2018
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	<b>✓</b>	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?	<b>✓</b>	N/A
5	Is the solar radiation sensor's lens clean and free of scratches?	<b>✓</b>	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?	<b>✓</b>	
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	✓	
	de any additional explanation (photograph or sketch if necestal or man-made, that may affect the monitoring parameters:		regarding conditions listed above, or any other features,

## Field Systems Data Form F-02058-1500-S5-rev002 ASH135 Technician | Eric Hebert Site Visit Date 10/04/2018 Site ID Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E **~** Do the sample inlets have at least a 270 degree arc of unrestricted airflow? **~** Are the sample inlets 3 - 15 meters above the ground? **~** Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and maintenance **~** Do the analyzers and equipment appear to be in good condition and well maintained? **~** Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. 1/4 teflon by 12 meters Describe dry dep sample tube. 3/8 teflon by 12 meters At inlet only Are in-line filters used in the ozone sample line? (if ves indicate location) **~** Are sample lines clean, free of kinks, moisture, and obstructions? **V** Is the zero air supply desiccant unsaturated? Flow line only Are there moisture traps in the sample lines? Is there a rotometer in the dry deposition filter line, and is it Clean and dry 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**

natural or man-made, that may affect the monitoring parameters:

F-02058-1500-S6-rev002

Site	e ID	ASH135	Technician	Eric Hebert		Site Visit Date	10/04/2018		
	DAS, se	nsor translators, and p	peripheral equi	oment operation	ns ai	nd maintenance			
1		OAS instruments appe ntained?	ar to be in good	condition and	<b>✓</b>				
2		he components of the backup, etc)	al? (printers,						
3		nalyzer and sensor sig g protection circuitry?	hrough	Met sensors only					
4		signal connections prontained?	tected from the	weather and	✓				
5	Are the	signal leads connected	to the correct l	DAS channel?	<b>✓</b>				
6	Are the grounde	DAS, sensor translato d?	rs, and shelter <sub>l</sub>	properly	<b>✓</b>				
7	Does the	e instrument shelter ha	ave a stable pow	ver source?	<b>✓</b>				
8	Is the in	strument shelter temp	erature control	led?	<b>✓</b>				
9	Is the m	et tower stable and gr	ounded?			Stable		Grounded	
10	Is the sa	mple tower stable and	grounded?			<b>✓</b>			
11	Tower c	omments?							
Pro	Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,								

The met tower has been removed and the 10 meter temperature sensor is mounted in a naturally aspirated shield on the sample tower.

#### **Field Systems Data Form** F-02058-1500-S7-rev002 ASH135 Technician | Eric Hebert Site Visit Date 10/04/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No N/A Yes Yes No N/A **✓ ✓** Wind speed sensor **Data logger V** Wind direction sensor **V Data logger** ✓ **V** П Temperature sensor Strip chart recorder **✓ V** Relative humidity sensor Computer **✓** П Solar radiation sensor **V** Modem П **V V Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V ~ Humidity sensor translator Surge protector** П **V ~ UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device** ~ **✓ Shelter heater** Ozone analyzer ~ **✓** 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 V ✓ SSRF ✓ V ✓ V Site Ops Manual** June 2007 **V HASP V** Oct 2015 **Field Ops Manual Calibration Reports V ✓** Ozone z/s/p Control Charts Preventive maintenance schedul **V** Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? 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:

Are ozone z/s/p control charts properly completed and

current?

#### **Field Systems Data Form** F-02058-1500-S8-rev002 ASH135 Technician Eric Hebert Site Visit Date 10/04/2018 Site ID Site operation procedures Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? 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 ✓ V** N/A **Multipoint Calibrations V V** Weekly **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **OC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V** Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests V Manual Precision Level Test V V** Weekly **Analyzer Diagnostics Tests V V** Monthly **In-line Filter Replacement (at inlet) V V** N/A In-line Filter Replacement (at analyze **V V** Weekly Sample Line Check for Dirt/Water **~ V** Weekly **Zero Air Desiccant Check** Unknown Do multi-point calibration gases go through the complete sample train including all filters? **✓** Do automatic and manual z/s/p gasses go through the complete sample train including all filters? **✓** SSRF, call-in Are the automatic and manual z/s/p checks monitored and reported? If yes, how?

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 once each month.

FI	eld Systems Data Form		F-02058-1500-59-rev002					
Site	ASH135 Tec	hnician Eric Hebert		Site Visit Date	10/04/2018			
	Site operation procedures							
1	Is the filter pack being changed every	y Tuesday as scheduled?	<b>V</b>	Filter changed morinings				
2	Are the Site Status Report Forms becorrectly?	ing completed and filed	<b>✓</b>					
3	Are data downloads and backups be scheduled?	ing performed as		No longer required				
4	Are general observations being made	<b>✓</b>	SSRF					
5	Are site supplies on-hand and replen fashion?	<b>✓</b>						
6	6 Are sample flow rates recorded? How?			SSRF, call-in				
7	Are samples sent to the lab on a regulation?	lar schedule in a timely	<b>✓</b>					
8	Are filters protected from contamina and shipping? How?	tion during handling	<b>✓</b>	Clean gloves on and off				
9	Are the site conditions reported reguloperations manager or staff?	larly to the field	✓					
QC	Check Performed	Frequency			Compliant			
N	Aulti-point MFC Calibrations	<b>✓</b> Semiannually			<b>✓</b>			
F	Flow System Leak Checks Weekly				<b>✓</b>			
I	Filter Pack Inspection							
I	Flow Rate Setting Checks Weekly				✓			
1	Visual Check of Flow Rate Rotometer   ✓ Weekly				✓			
Ι	n-line Filter Inspection/Replacement	✓ Semiannually			$\checkmark$			
S	ample Line Check for Dirt/Water	Weekly			$\checkmark$			
	ride any additional explanation (photo ral or man-made, that may affect the			y) regarding conditi	ons listed above, or a	ny other features,		

# Field Systems Data Form

### F-02058-1500-S10-rev002

Site ID

ASH135

Technician Eric Hebert

Site Visit Date 10/04/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07070
DAS	Campbell	CR3000	4933	000634
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA110	118700000595	01449
Flow Rate	Apex	AXMC105LPMDPC	illegible	000649
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4222-C	0808311148	06471
Ozone	ThermoElectron Inc	49i A1NAA	1105347325	000730
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200018	000442
Sample Tower	Aluma Tower	A	none	03536
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	13994	06389
Zero air pump	Werther International	C 70/4	000836208	06923

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
WSZ	Г109-Korey	Devins-10/08/2018				
1	10/8/2018	Computer	Dell	07027	Inspiron 15	FX2MC12
2	10/8/2018	DAS	Campbell	000427	CR3000	2526
3	10/8/2018	Elevation	Elevation	None	1	None
4	10/8/2018	Filter pack flow pump	Thomas	00857	107CA118	00001610787
5	10/8/2018	Flow Rate	Apex	000848	AXMC105LPMDPCV	illegible
6	10/8/2018	Infrastructure	Infrastructure	none	none	none
7	10/8/2018	Modem	Raven	06598	V4221-V	0844349943
8	10/8/2018	Ozone	ThermoElectron Inc	000611	49i A1NAA	1009241795
9	10/8/2018	Ozone Standard	ThermoElectron Inc	000696	49i A3NAA	1030244812
10	10/8/2018	Sample Tower	Aluma Tower	000825	В	unknown
11	10/8/2018	Shelter Temperature	Campbell	none	107-L	none
12	10/8/2018	Siting Criteria	Siting Criteria	None	1	None
13	10/8/2018	Temperature	RM Young	04317	41342	4014
14	10/8/2018	Zero air pump	Werther International	06934	P 70/4	000821881

### **DAS Data Form** 0.03 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2526 WST109 Korey Devins 10/08/2018 DAS Primary Das Date: 10/8 /2018 **Audit Date** 10/8 /2018 Datel Parameter DAS Mfg 12:54:58 12:55:00 Das Time: **Audit Time** Tfer Desc. Source generator (D 4000392 **Serial Number** Das Day: 281 **Audit Day** 281 Tfer ID 01321 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0002 0.0001 0.0002 0.0001 1/22/2015 1.00000 **Cert Date** CorrCoff Fluke **Parameter** DAS Mfg **Serial Number** 86590148 Tfer Desc. DVM 01310 Tfer ID 1.00000 0.00000 **Slope Intercept** 1/24/2018 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output **DAS** Output InputUnit OutputUnit Difference 0.0000 0.0000 0.0000 0.0000 V V 7 0.1000 0.1000 0.1000 0.00007 0.3000 0.3000 0.3000 V V 0.0000 7 0.5000 0.5000 0.5000 V V 0.00007 0.7000 V V -0.0001 0.7000 0.6999 7 V V 0.9000 0.9000 0.8999 -0.0001 7 0.9999 V V -0.0002 1.0000 1.0001

# Flow Data Form

Mfg	Serial Nun		Site		chnician		Date Paran		Owner ID
Apex	illegible		WST109	Ko	Korey Devins 10/08/2		Flow R	ate	000848
					Mfg BIOS		P	arameter Flo	w Rate
					Serial Number	122974	Т	fer Desc. Blo	OS 220-H
					Tfer ID	01416			
					G1	1	00178 Into		0.0016
					Slope			ercept	
					Cert Date	7/13	3/2018 Co	rCoff	1.0000
DAS 1:		DAS 2:			Cal Factor Z	ero		0	
A Avg % Diff:	A Max % Di	A Avg %I	Dif A Max	x % Di	Cal Factor F	ull Scale	1.0	)1	
0.44%	0.66%				Rotometer R	leading:	1	.5	
Desc.	Test type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	PctDifferenc
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	1/m	1/m	
primary	test pt 1	1.510	1.510	1.50	0.000	1.50	1/m	l/m	-0.669
primary	test pt 2	1.511	1.510	1.50	0.000	1.51	1/m	1/m	0.009
primary	test pt 3	1.512	1.510	7	0.000	1.50	l/m	1/m	-0.669
Sensor Comp	onent Leak Tes	ST		Conditio	n		Status	pass	
Sensor Comp	onent Tubing C	ondition		Conditio	tion Good		Status	pass	
Sensor Compo	onent Filter Pos	sition		Conditio	Good		Status	pass	
Sensor Comp	onent Rotomete	er Condition	l	Conditio	Clean and dry		Status	pass	
Sensor Compo	onent Moisture	Present		Conditio	n See comments	3	Status	pass	
Sensor Compo	onent Filter Dis	tance		Conditio	4.5 cm		Status	Status pass	
Sensor Component Filter Depth			Conditio	n 0.5 cm		Status	Status pass		
Sensor Component Filter Azimuth		Conditio	n 150 deg		Status	pass			
Sensor Component System Memo		Conditio	on		Status	pass			

# **Ozone Data Form**

Mfg	5	Serial Numbe	r Ta Sit	te	Tec	chnician	Site Visit Date	Parameter		Owner ID	
ThermoElec	tron Inc	1009241795	W	/ST109	Ko	rey Devins	10/08/2018	Ozone		000611	
Slope: Intercept				0.00000			ThermoElectron	ThermoElectron Inc Parameter		ozone Ozone primary si	tan
CorrCoff	0.		Coff	0.00000		Tfer ID	01115		d Desc.	Ozono primary o	tu.i
DAS 1:		D	AS 2:					0 Total	4	0.0716	26
A Avg % D	iff: A M		Avg %Di	if A Max %	6 Di	Slope	1.0032		•		
0.0	)%	0.0%				Cert Date	9/14/201	8 Corr	Coff	1.0000	)0
UseDescri	ption	ConcGroup	Tfer R	aw Tfe	er Corr	Site	Site Unit	RelPerl	Dif	AbsDif	
primai		1	-0.54		0.60	0.49	ppb			1.09	
primai	•	2	15.13		5.01	15.71	ppb		-0.12	0.7	
primai primai	-	3 4	34.81 67.22		4.62 6.93	34.58 65.16	ppb ppb		-0.12		
primai	•	5	111.1		10.70	106.80	ppb		-3.59		
	•	t Sample Trai				Good		Status			
Sensor Co	omponen	t 22.5 degree	rule		Conditio	on		Status	pass		
Sensor Co	omponen	Inlet Filter C	ondition		Conditio	Clean		Status	pass		
Sensor Co	omponen	Battery Back	кир		Condition N/A			Status pass			
Sensor Co	omponen	Offset			Condition -0.20		Status pass		pass		
Sensor Co	omponen	t Span			Condition 0.992			Status	pass		
Sensor Co	omponen	Zero Voltage	Э		Conditio	ondition N/A		Status	pass		
Sensor Co	omponen	t Fullscale Vo	ltage		Conditio	ondition N/A		Status	pass		
Sensor Co	omponen	t Cell A Freq.			Conditio	96.5 kHz		Status	pass		
Sensor Co	omponen	t Cell A Noise	)		Conditio	0.9 ppb		Status	pass		
Sensor Co	omponen	t Cell A Flow			Conditio	0.70 lpm		Status	pass		
Sensor Co	omponen	Cell A Press	sure		Conditio	726.2 mmHg		Status	pass		
Sensor Co	omponen	Cell A Tmp.			Conditio	32.0 C		Status	pass		
Sensor Co	omponen	Cell B Freq.			Conditio	98.0 kHz		Status	pass		
Sensor Co	omponen	t Cell B Noise	)		Conditio	1.1 ppb		Status	pass		
Sensor Co	omponen	onent Cell B Flow				0.70 lpm		Status	pass		
Sensor Co	ensor Component Cell B Pressure			Conditio	727.1 mmHg		Status	pass			
Sensor Co	omponent Cell B Tmp.			Conditio			Status				
Sensor Co	omponen	t Line Loss			Conditio	Not tested		Status			
Sensor Co	omponen	t System Mer	no		Conditio	on		Status	pass		

### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Korey Devins RM Young 4014 WST109 10/08/2018 Temperature 04317 Mfg Extech Parameter Temperature Tfer Desc. RTD H232679 **Serial Number** 01228 **Tfer ID** -0.09210 **Slope** 1.00757 **Intercept DAS 1: DAS 2:** 2/13/2018 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.07 0.13 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range -0.11 -0.02 0.000 0.0 $\mathbf{C}$ 0.05 C Temp Mid Range 24.22 24.13 0.000 24.0 -0.13 primary 49.1 C -0.04 primary Temp High Range 49.45 49.17 0.000 Condition Moderately clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** WST109 Korey Devins 10/08/2018 Shelter Temperature Campbell none none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperatur Abs Avg Err **Abs Max Er** Abs Avg Err **Abs Max Er** Tfer Desc. RTD H232679 **Serial Number** 0.42 0.64 01228 **Tfer ID** 1.00757 -0.09210 Slope Intercept 2/13/2018 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	25.24	25.14	0.000	25.0	C	-0.18
primary	Temp Mid Range	27.96	27.84	0.000	27.2	С	-0.64
primary	Temp Mid Range	26.18	26.07	0.000	25.6	С	-0.44
Sensor Component System Memo Condition Status pass							

### **Infrastructure Data For**

Site ID	WST109	Technician Korey De	vins Site Visit Date 10/08/2018
Shelter	Make	Shelter Model	Shelter Size
Ekto		8810 (s/n 2149-16)	640 cuft
es organismo	621 EAST 19 MILE		

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	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	WST109	Korey Devins	10/08/2018	Moisture Present	Apex	4450		
				_				

The filter sample tubing has drops of moisture in low sections outside the shelter.

# **Field Systems Comments**

1 Parameter: SiteOpsProcedures

Ozone sample train leak checks are being conducted every two weeks.

2 Parameter: SitingCriteriaCom

The site is in a small clearing surrounded by mountain forest.

3 Parameter: SiteOKNotes

State of NH Department of Environmental Services contact is Tom Fazzina (603) 271-0911 and tfazzina@DES.state.NH.US

4 Parameter: MetSensorComme

The temperature sensor is now mounted in a naturally aspirated shield on the sample tower.

### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 10/08/2018 WST109 Technician Korey Devins Site ID Woodstock **USGS Map EPA** Site Sponsor (agency) Map Scale IES/USFS **Operating Group Map Date** 33-009-9991 AQS# R.M. Young **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude 43.9446 -71.7008 dry, wet **QAPP** Longitude **Deposition Measurement** woodland - mixed 258 Land Use **QAPP Elevation Meters** complex 15.9 **Terrain QAPP Declination** No 12/28/2004 Conforms to MLM **OAPP Declination Date** (603) 726-4935 43.944519 **Site Telephone Audit Latitude** 234 Mirror Lake Road -71.700787 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 255 -15.3 Grafton County **Audit Declination** Campton, NH City, State **Present** Fire Extinguisher 03223 New in 2015 Zip Code Eastern **First Aid Kit** Time Zone ✓ **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **Climbing Belt** Primary Op. E-mail **Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Step Backup Op. E-mail Shelter Working Room ✓ Make Model 8810 (s/n 2149-16) Ekto **Shelter Size** 640 cuft **✓** Notes Shelter Clean **✓** Notes Site OK State of NH Department of Environmental Services contact is Tom Fazzina (603) 271-0911 and tfazzina@DES.state.NH.US

From I-93 take exit 30 and go south on route 3 for approximately 2 miles. Turn right on Mirror Lake road and

continue to the end of the road. The site is through the gate on the right.

**Driving Directions** 

# Field Systems Data Form

F-02058-1500-S2-rev002

Site ID	WST109	Technician	Korey Devins	Site Visit Date	10/08/2018
Site ID	VV31109	1 ecimician	Itoley Devills	Site visit Date	10/00/2010

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		$\checkmark$
Tree line	50 m	10 - 30 m	
Obstacles to wind	10 times obstacle height		✓

Siting Distances OK
<b>Siting Criteria Comment</b>

The site is in a small clearing surrounded by mountain forest.

### **Field Systems Data Form** F-02058-1500-S3-rev002 Site Visit Date 10/08/2018 WST109 Site ID Technician Korey Devins ✓ N/A Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? **✓** N/A 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 Are the tower and sensors plumb? Are the temperature shields pointed north or positioned to Temperature only avoid radiated heat sources such as buildings, walls, etc? Temperature only 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) **✓** N/A Is the solar radiation sensor plumb? N/A Is it sited to avoid shading, or any artificial or reflected light? **✓** N/A Is the rain gauge plumb? ✓ N/A 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?

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:

✓ N/A

The temperature sensor is now mounted in a naturally aspirated shield on the sample tower.

11 Is it inclined approximately 30 degrees?

Fie	eld Sys	tems Data Fo	orm		F-02058-1500-S4-rev002
Site	e ID	WST109	Technician Korey Devins		Site Visit Date 10/08/2018
1		e meterological sensor , and well maintained	rs appear to be intact, in good	<b>✓</b>	Temperature only
2	Are all th	- C	sors operational online, and	<b>✓</b>	Temperature only
3	Are the sl	hields for the temper	ature and RH sensors clean?	<b>✓</b>	Moderately clean
4	Are the a	spirated motors worl	xing?	<b>✓</b>	N/A
5	Is the sola scratches		lens clean and free of	<b>✓</b>	N/A
6	Is the sur	face wetness sensor g	rid clean and undamaged?	<b>✓</b>	N/A
7		ensor signal and pow , and well maintained	er cables intact, in good	✓	
8		ensor signal and pow elements and well ma	er cable connections protecte intained?	d ✓	
			(photograph or sketch if neco		regarding conditions listed above, or any other features,

### Field Systems Data Form F-02058-1500-S5-rev002 WST109 Technician Korey Devins Site Visit Date 10/08/2018 Site ID Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E **~** Do the sample inlets have at least a 270 degree arc of unrestricted airflow? **~** Are the sample inlets 3 - 15 meters above the ground? **~** Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and maintenance **~** Do the analyzers and equipment appear to be in good condition and well maintained? **~** Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. 1/4 teflon by 15 meters Describe dry dep sample tube. 3/8 teflon by 15 meters At inlet only Are in-line filters used in the ozone sample line? (if ves indicate location) **✓** Moisture in tubing only Are sample lines clean, free of kinks, moisture, and obstructions? **V** Is the zero air supply desiccant unsaturated? Flow line only Are there moisture traps in the sample lines? Is there a rotometer in the dry deposition filter line, and is it 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:

clean?

# Field Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	WST109	Technician	Korey Devins		Site Vis	it Date 10/08/201	8	
	DAS se	ensor translators, and	nerinheral equi	nment operation	าร ๑า	nd maintena	nce		
				_		<u> </u>	inee_		
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?				<b>✓</b>	Met sensors	only		
4		signal connections prointained?	otected from the	e weather and	<b>✓</b>				
5	Are the	signal leads connected	d to the correct	DAS channel?	<b>✓</b>				
6	Are the ground	DAS, sensor translateded?	ors, and shelter	properly	<b>✓</b>				
7	Does th	e instrument shelter h	ave a stable pov	ver source?	<b>~</b>				
8	Is the ir	nstrument shelter temp	perature contro	lled?	<b>✓</b>				
9	Is the m	net tower stable and gr	ounded?			Stable		Grounded	
10	Is the sa	ample tower stable and	d grounded?			V			
11	Tower o	comments?				Met tower re	emoved	_	
Dur	wide er-	additional armlanatic	n (nhotograph	on alzotok if na sa	ago-	w) nogowdin	a conditions lists	l above on a	any other feetings
		additional explanation nan-made, that may a				y) regarding	g continuons listed	i above, or a	my other features,

### **Field Systems Data Form** F-02058-1500-S7-rev002 WST109 Technician Korey Devins Site Visit Date 10/08/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No N/A Yes Yes No N/A **✓ ✓** Wind speed sensor **Data logger V** Wind direction sensor **V Data logger V V** П Temperature sensor Strip chart recorder **✓ V** Relative humidity sensor Computer **V** Solar radiation sensor **V** Modem П **V V Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V V Humidity sensor translator Surge protector** П **V V UPS Solar radiation translator V ~** Tipping bucket rain gauge **Lightning protection device** ~ **✓ Shelter heater** Ozone analyzer ~ **✓** 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 V V SSRF ✓ V ✓ V Site Ops Manual** Oct 2014 **V HASP V** Oct 2014 **✓ V Field Ops Manual** Oct 2014 **Calibration Reports V V** Ozone z/s/p Control Charts **V** Preventive maintenance schedul **V** Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? 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:

Are ozone z/s/p control charts properly completed and

current?

### **Field Systems Data Form** F-02058-1500-S8-rev002 WST109 Technician Korey Devins Site Visit Date 10/08/2018 Site ID Site operation procedures The site operator was trained by the previous operator, who was Has the site operator attended a formal CASTNET training trained by the previous operator course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **V** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? 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 ✓ V** Semiannually **Multipoint Calibrations V V** Weekly **Visual Inspections V** N/A Translator Zero/Span Tests (climatronics) **✓ V** N/A **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **Compliant OC Check Performed** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** As needed Manual Zero/Span Tests **V ~** Daily **Automatic Precision Level Tests V Manual Precision Level Test** As needed **V V** Weekly **Analyzer Diagnostics Tests V** Every 2 weeks **In-line Filter Replacement (at inlet) V V** In-line Filter Replacement (at analyze N/A **V V** Sample Line Check for Dirt/Water Weekly **~ V** Every 2 weeks **Zero Air Desiccant Check** Unknown Do multi-point calibration gases go through the complete sample train including all filters?

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:

**✓** 

**✓** 

logbook, call-in

Ozone sample train leak checks are being conducted every two weeks.

Do automatic and manual z/s/p gasses go through the

Are the automatic and manual z/s/p checks monitored and

complete sample train including all filters?

reported? If yes, how?

Fi	eld Sy	stems Data Form	l			F-02058-1	500-S9-rev002		
Site	e ID	WST109 Te	chnician Korey Devins		Site Visit Date	10/08/2018			
	Site ope	eration procedures							
1	Is the fi	lter pack being changed eve	ry Tuesday as scheduled	l? ✓	Filter changed mori	nings			
2	Are the	Site Status Report Forms by?	eing completed and filed	<b>✓</b>					
3	Are dat	a downloads and backups beed?	eing performed as		No longer required				
4	Are gen	eral observations being mad	de and recorded? How?	✓	SSRF, logbook				
5	Are site	supplies on-hand and reple?	nished in a timely	<b>✓</b>					
6	6 Are sample flow rates recorded? How?				SSRF, logbook, call-in				
7	Are san	nples sent to the lab on a reg	gular schedule in a timely	y 🗸					
8		ers protected from contamin pping? How?	nation during handling	✓	Clean gloves on an	d off			
9		site conditions reported reg ons manager or staff?	gularly to the field	✓					
QC	Check P	erformed	Frequency			Compliant			
N	Multi-poi	nt MFC Calibrations	Semiannually			✓			
I	Flow Syst	em Leak Checks	Weekly			✓			
I	Filter Pack Inspection								
I	Flow Rate Setting Checks					✓			
1	Visual Check of Flow Rate Rotometer ✓ Weekly					✓			
I	In-line Filter Inspection/Replacement    ✓ Semiannually				✓				
5	Sample L	ine Check for Dirt/Water	Weekly			✓			
		additional explanation (phot an-made, that may affect the			y) regarding conditi	ions listed above, or	any other features,		

# Field Systems Data Form

### F-02058-1500-S10-rev002

Site ID

WST109

Technician Korey Devins

Site Visit Date 10/08/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	FX2MC12	07027
DAS	Campbell	CR3000	2526	000427
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA118	00001610787	00857
Flow Rate	Apex	AXMC105LPMDPC	illegible	000848
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0844349943	06598
Ozone	ThermoElectron Inc	49i A1NAA	1009241795	000611
Ozone Standard	ThermoElectron Inc	49i A3NAA	1030244812	000696
Sample Tower	Aluma Tower	В	unknown	000825
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	4014	04317
Zero air pump	Werther International	P 70/4	000821881	06934

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
DE	N417-Martii	n Valvur-10/10/2018				
1	10/10/2018	Computer	Hewlett Packard	none	ProBook	5CB22906R7
2	10/10/2018	DAS	Environmental Sys Corp	90600	8816	2274
3	10/10/2018	Elevation	Elevation	None	1	None
4	10/10/2018	Filter pack flow pump	Thomas	none	107CAB18B	099800009754
5	10/10/2018	Flow Rate	Tylan	90966	FC280SAV	AW9706011
6	10/10/2018	Infrastructure	Infrastructure	none	none	none
7	10/10/2018	Mainframe	Climatronics	none	100081	1293
8	10/10/2018	Mainframe power supply	Climatronics	none	101074	685
9	10/10/2018	Met tower	Glen Martin Engineering	none	unknown	none
10	10/10/2018	MFC power supply	Tylan	90967	RO-32	FP9706004
11	10/10/2018	Modem	US Robotics	none	33.6 fax modem	unknown
12	10/10/2018	Ozone	ThermoElectron Inc	90778	49C	49C-77033-384
13	10/10/2018	Ozone Standard	ThermoElectron Inc	none	49C	49C-71310-368
14	10/10/2018	Printer	Canon	none	PC425	unknown
15	10/10/2018	Sample Tower	Aluma Tower	none	В	AT-71102-7I-5
16	10/10/2018	Shelter Temperature	ARS	none	none	006
17	10/10/2018	Siting Criteria	Siting Criteria	None	1	None
18	10/10/2018	Temperature2meter	RM Young	none	41342	018533
19	10/10/2018	Zero air pump	Werther International	none	PC70/4	526281

### **DAS Data Form DAS Time Max Error:** 2.67 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg **Environmental Sys** 2274 **DEN417** Martin Valvur 10/10/2018 DAS Primary Das Date: 10/10/2018 **Audit Date** 10/10/2018 HY **Parameter** DAS Mfg 7:22:45 7:20:05 Das Time: **Audit Time** Tfer Desc. Source generator (D 12010039329 **Serial Number** Das Day: 283 **Audit Day** 283 Tfer ID 01322 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0002 0.0002 0.0002 0.0002 6/15/2014 1.00000 **Cert Date** CorrCoff Fluke **Parameter** DAS Mfg **Serial Number** 95740243 Tfer Desc. DVM 01312 Tfer ID 1.00000 0.00000 **Slope Intercept** 2/14/2018 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output **DAS** Output InputUnit OutputUnit Difference 0.0000 -0.0004 -0.0002 0.0002 V V 7 0.1000 0.1000 0.1001 0.0001 7 0.3000 0.3000 0.2999 V V -0.0001 7 0.5000 0.4997 0.4999 V V 0.00027 0.7000 V V 0.0001 0.7001 0.7002 V V 7 0.9000 0.8996 0.8998 0.00027 0.9995 0.9997 V V 1.0000 0.0002

# Flow Data Form

<b>vIfg</b> 		rial Nun W970601		DEN417 Marti		hnician rtin Valvur	tin Valvur 10/10/2018		ate	Owner ID 90966
ı yıarı	yian pinorodon jezinin									
Mfg	Tylan					Mfg	BIOS	P	arameter Flo	w Rate
		06004	90967			Serial Number	148613	148613 <b>Tf</b>		OS 220-H
		ower sup	anly		1	Tfer ID	01421			
Parameter	IVII O F	JOWEI Sup	Эріу							
					i	Slope	0.	.98450 Inte	ercept	0.10300
						Cert Date	3/	1/2018 Co	rCoff	1.00000
DAS 1:			DAS 2:			Cal Factor Z	ero	0.23	34	
A Avg % Diff:	A Max	x % Di	A Avg %I	Dif A Max	: % Di	Cal Factor F	ull Scale	5.58	39	
1.93%		2.07%				Rotometer R	eading:	3.1		
Desc.	Tes	st type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	l PctDifference
primary	pump	off	0.000	0.000	-0.24	0.0000	0.03	l/m	1/m	
primary	leak c	heck	0.000	0.000	-0.22	0.0000	0.05	l/m	1/m	
primary	test pt	1	3.013	2.960	2.59	0.0000	3.01	l/m	1/m	1.72%
primary	test pt		3.013	2.960	2.59	0.0000	3.02	l/m	1/m	1.99%
primary	test pt	3	3.010	2.950	2.59	0.0000	0.0000 3.01		1/m	2.07%
Sensor Comp	onent [	Leak Tes	t		Condition	n			pass	
Sensor Comp	onent	Tubing C	ondition	ndition		Good		Status pass		
Sensor Comp	onent	Filter Pos	sition		Condition	Poor		Status	Fail	
Sensor Comp	onent [	Rotomete	er Condition		Condition	Clean and dry		Status	pass	
Sensor Comp	onent	Moisture	Present		Condition	Condition No moisture present			pass	
Sensor Comp	onent	Filter Dist	tance		Condition	5.0 cm		Status	Pass	
Sensor Comp	onent	Filter Dep	oth		Condition	-0.5 cm		Status	Fail	
Sensor Component		Filter Azimuth			Condition	n 10 deg	Status		pass	
Sensor Component		t System Memo			Condition	n	Status		pass	

# **Ozone Data Form**

Mfg	Serial Number	r Ta Site	7	<b>Fechnician</b>	Site Visit Date	Parame	eter	Owner ID
ThermoElectron Inc	ThermoElectron Inc 49C-77033-384 DEN417		17	Martin Valvur	10/10/2018	Ozone		90778
Intercept -1.	00467 Slope 05102 Inter 99995 Corr	cept	0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID	ThermoElectron 0517112167 01113			ozone Ozone primary stan
DAS 1:	DA	AS 2:		Slope	1.004	70 <b>Inte</b> i	rcept	0.08880
A Avg % Diff: A Ma	0.0% A A	Avg %Dif	A Max % Di	Cert Date	6/12/20		·Coff	1.00000
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPer	Dif	AbsDif
primary	1	1.50	1.40	0.10	ppb			-1.3
primary	2	14.50	14.34	13.80	ppb			-0.54
primary	3 4	34.90 65.10	34.64 64.70	34.50 63.87	ppb		-0.4	
primary primary	5	107.10	106.51	105.80	ppb ppb		-0.67	
Sensor Component				tion Good	PPC	Status		
Sensor Component			Condi			Status		
Sensor Component	Sensor Component Inlet Filter Condition		Condi	tion Clean		Status pass		
Sensor Component	Battery Back	cup	Condi	tion N/A		Status	pass	
Sensor Component	Offset		Condi	tion 0.50		Status	pass	
Sensor Component	Span		Condi	tion 1.014		Status	pass	
Sensor Component	Zero Voltage	)	Condi	tion -0.0002	Status	pass		
Sensor Component	Fullscale Vol	ltage	Condi	tion 0.9998	Status	pass		
Sensor Component	Cell A Freq.		Condi	tion 116.1 kHz		Status	pass	
Sensor Component	Cell A Noise		Condi	tion 0.8 ppb		Status	pass	
Sensor Component	Cell A Flow		Condi	tion 0.64 lpm		Status	pass	
Sensor Component	Cell A Press	ure	Condi	tion 682.7 mmHg		Status	Status pass	
Sensor Component	Cell A Tmp.		Condi	<b>tion</b> 33.8 C		Status	pass	
Sensor Component	Cell B Freq.		Condi	tion 85.1 kHz		Status	pass	
Sensor Component	Cell B Noise			tion 0.4 ppb		Status		
Sensor Component				tion 0.65 lpm		Status	pass	
Sensor Component	Cell B Press	ure		tion 682.1 mmHg		Status	pass	
Sensor Component	Cell B Tmp.			tion N/A		Status	pass	
Sensor Component	Line Loss		Condi	tion Not tested		Status	pass	
Sensor Component	System Mem	no	Condi	tion		Status	pass	

### 2 Meter Temperature Data Form Calc. Difference Serial Number Ta **Technician** Site Visit Date Parameter Mfg Site **Owner ID** DEN417 Martin Valvur 10/10/2018 RM Young 018533 Temperature2meter none Mfg Fluke **Parameter** Temperature Tfer Desc. RTD 3275143 **Serial Number** 01229 Tfer ID **Slope** 0.99986 **Intercept** -0.01977 **DAS 1: DAS 2:** 1/24/2018 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.18 0.26 Test type UseDescription InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit Difference 0.0000 primary Temp Low Rang 0.00 0.02 -0.11 C -0.13 Temp Mid Rang 21.80 21.82 0.0000 21.66 C -0.16 primary primary Temp High Rang 45.45 45.48 0.0000 45.22 C -0.26 Sensor Component | Properly Sited **Condition** Properly sited **Status** pass Condition Clean Sensor Component | Shield **Status** pass Condition Functioning Status pass Sensor Component Blower Sensor Component Blower Status Switch Status pass **Condition** N/A Sensor Component | System Memo Status pass Condition

### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Martin Valvur ARS 006 DEN417 10/10/2018 Shelter Temperature none **DAS 1: DAS 2:** Mfg Fluke Parameter Shelter Temperatur Abs Avg Err Abs Max Er **Abs Avg Err** Abs Max Er Tfer Desc. RTD 3275143 **Serial Number** 0.58 0.97 01229 **Tfer ID** -0.01977 **Slope** 0.99986 Intercept 1/24/2018 1.00000 **Cert Date** CorrCoff OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. 0.000primary Temp Mid Range 24.22 24.2424.9 C 0.63 24.79 0.000 C 0.13 Temp Mid Range 24.81 24.9

23.82

Condition

0.000

C

Status pass

24.8

0.97

23.80

primary primary

Temp Mid Range

Sensor Component | System Memo

# Site ID DEN417 Technician Martin Valvur Site Visit Date 10/10/2018 Shelter Make Shelter Model Shelter Size Ekto 8814

Sensor Component	Sample Tower Type	Condition	Туре В	Status	pass
<b>Sensor Component</b>	Conduit	Condition	Good	Status	pass
<b>Sensor Component</b>	Met Tower	Condition	Good	Status	pass
<b>Sensor Component</b>	Moisture Trap	Condition	Installed	Status	pass
<b>Sensor Component</b>	Power Cables	Condition	Good	Status	pass
<b>Sensor Component</b>	Shelter Temp Control	Condition	Functioning	Status	pass
<b>Sensor Component</b>	Rotometer	Condition	Installed	Status	pass
<b>Sensor Component</b>	Sample Tower	Condition	Good	Status	pass
<b>Sensor Component</b>	Shelter Condition	Condition	Good	Status	pass
<b>Sensor Component</b>	Shelter Door	Condition	Good	Status	pass
<b>Sensor Component</b>	Shelter Roof	Condition	Good	Status	pass
<b>Sensor Component</b>	Shelter Floor	Condition	Good	Status	pass
<b>Sensor Component</b>	Signal Cable	Condition	Good	Status	pass
<b>Sensor Component</b>	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.	Hazar	d Problem
Flow Rate	DEN417	Martin Valvur	10/10/2018	Filter Position	Tylan	3168		
The filter attachment plat	te is mounted too	low in the enclosu	re resulting in t	he filter being expo	sed to wind-drive	n rain and in the	standard 2	eometric

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 operator uses one gloved hand, and the same glove, to remove and install the filter pack. Leak checks are performed when the ambient temperature is above  $-10 \, \text{C}$ .

2 Parameter: ShelterCleanNotes

The shelter is in good condition, clean, neat, and very well organized.

### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 10/10/2018 DEN417 Technician | Martin Valvur Site ID Healy C-4 **USGS Map** NPS/EPA Site Sponsor (agency) Map Scale NPS **Operating Group Map Date** 02-068-0003 AQS# Climatronics **Meteorological Type** ozone, IMPROVE **Air Pollutant Analyzer QAPP** Latitude dry, wet **Deposition Measurement QAPP** Longitude woodland - mixed Land Use **QAPP Elevation Meters** complex **Terrain QAPP Declination** No Conforms to MLM **OAPP Declination Date** (907) 683-9638 63.7232 **Site Telephone Audit Latitude** mile 238 Parks Highway -148.9676 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 663 Denali Borough 19.3 County **Audit Declination** Denali Park, AK City, State **Present** Fire Extinguisher 99755 Zip Code Alaska Time Zone First Aid Kit Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **~ Climbing Belt** Primary Op. E-mail **Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Step Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8814 Ekto **Shelter Size** 896 cuft **✓** Notes The shelter is in good condition, clean, neat, and very well organized. Shelter Clean **✓** Notes Site OK From either Anchorage or Fairbanks, take the Parks Highway (route 3) north or south respectively. Just south of the **Driving Directions** town of Healy turn west into Denali National Park. The road is well marked. Continue on the park road a few miles to the Park Headquarters. The site is approximately 100 yards up a residential road on the opposite side of the street

from the headquarters parking lot.

# Field Systems Data Form

F-02058-1500-S2-rev002

Site ID DEN417 Technician Martin Valvur Site Visit Date 10/10/2018

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	20 - 30 m	
Obstacles to wind	10 times obstacle height		<b>V</b>

Siting	<b>Distances OK</b>	<b>✓</b>
Siting	Criteria Comn	nen

Fie	eld Systems Data Form		F-02058-1500-S3-rev002
Site	DEN417 Technician Martin Valvur		Site Visit Date 10/10/2018
1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	<b>✓</b>	N/A
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			N/A
3	tower into the prevailing wind) Are the tower and sensors plumb?	<b>✓</b>	N/A
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?	<b>✓</b>	
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)	<b>✓</b>	
6	Is the solar radiation sensor plumb?	<b>✓</b>	N/A
7	Is it sited to avoid shading, or any artificial or reflected light?	<b>✓</b>	N/A
8	Is the rain gauge plumb?	✓	N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	<b>✓</b>	N/A
10	Is the surface wetness sensor sited with the grid surface facing north?	✓	N/A
11	Is it inclined approximately 30 degrees?	<b>✓</b>	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:

Fic	ld Systems Data Form		F-02058-1500-S4-rev002
Site	ID DEN417 Technician Martin Valvur		Site Visit Date 10/10/2018
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	<b>✓</b>	Temperature only
2	Are all the meteorological sensors operational online, and reporting data?	<b>✓</b>	Temperature only
3	Are the shields for the temperature and RH sensors clean?	<b>✓</b>	
4	Are the aspirated motors working?	<b>✓</b>	
5	Is the solar radiation sensor's lens clean and free of scratches?	<b>✓</b>	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?	<b>✓</b>	
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	✓	
	de any additional explanation (photograph or sketch if neces al or man-made, that may affect the monitoring parameters:		) regarding conditions listed above, or any other features,

Fi	eld Systems Data Form	F-02058-1500-S5-rev002										
Site	ID DEN417 Technician Martin Valvur		Site Visit Date 10/10/2018									
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?	<b>✓</b>										
2	Are the sample inlets 3 - 15 meters above the ground?	<b>✓</b>										
3	Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees?	, <b>v</b>										
	Pollutant analyzers and deposition equipment operations and maintenance											
1	Do the analyzers and equipment appear to be in good condition and well maintained?	<b>✓</b>										
2	Are the analyzers and monitors operational, on-line, and reporting data?	<b>✓</b>										
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)	<b>✓</b>	At inlet only									
6	Are sample lines clean, free of kinks, moisture, and obstructions?	<b>✓</b>										
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 DEN417 Technician Martin Valvur Site Visit Date 10/10/2018

Site	e ID	DEN417	Technician	Martin Valvur		Site Visi	it Date 10/10/201	8				
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	Are the signal leads connected to the correct DAS channel?										
6		Are the DAS, sensor translators, and shelter properly grounded?										
7	Does the	Does the instrument shelter have a stable power source?			<b>✓</b>							
8	Is the in	Is the instrument shelter temperature controlled?										
					L	Stable	]	Grounded	]			
9	Is the met tower stable and grounded?											
10	Ic the co	mnla towar stable and	d grounded?			✓		<b>✓</b>				
10	is the sa	Is the sample tower stable and grounded?				<b>✓</b>		<b>✓</b>				
11	Tower o	omments?			_							
					L							
	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 DEN417 Technician | Martin Valvur Site Visit Date 10/10/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? N/A Yes No Yes No N/A **✓** Wind speed sensor **Data logger V** Wind direction sensor **V Data logger** ✓ **V** Temperature sensor Strip chart recorder **V V** Relative humidity sensor Computer **V** Solar radiation sensor **V** Modem ✓ П **V Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V V Humidity sensor translator Surge protector** П П **V V UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device** ~ **✓ Shelter heater** Ozone analyzer **V** $\checkmark$ Filter pack flow controller Shelter air conditioner $\checkmark$ Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V ✓** Dataview **SSRF V ✓ V V Site Ops Manual HASP Field Ops Manual Calibration Reports ✓ V V** Ozone z/s/p Control Charts **V** Dataview Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? Dataview Are ozone z/s/p control charts properly completed and current? 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 DEN417 Technician | Martin Valvur Site Visit Date 10/10/2018 Site ID Site operation procedures Site operator trained on-site by ARS employee Has the site operator attended a formal CASTNET training ✓ course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? 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 ✓ V** Semiannually **Multipoint Calibrations V V** Weekly **Visual Inspections ✓ V** N/A Translator Zero/Span Tests (climatronics) **✓ V** Monthly **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **QC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** Monthly Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests Manual Precision Level Test ✓ V** Alarm values only **Analyzer Diagnostics Tests ~ V** Quarterly **In-line Filter Replacement (at inlet) V V** N/A In-line Filter Replacement (at analyze Sample Line Check for Dirt/Water

Ze	ro Air Desiccant Check	lly	<u> </u>
1	Do multi-point calibration gases go through the complete sample train including all filters?	<b>✓</b>	Unknown
2		<b>✓</b>	
3	Are the automatic and manual z/s/p checks monitored and reported? If yes, how?	<b>✓</b>	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 DEN417 Technician | Martin Valvur Site Visit Date 10/10/2018 Site ID **Site operation procedures** Is the filter pack being changed every Tuesday as scheduled? ✓ Filter changed various times Are the Site Status Report Forms being completed and filed correctly? No longer required Are data downloads and backups being performed as scheduled? **✓** SSRF Are general observations being made and recorded? How? **~** Are site supplies on-hand and replenished in a timely fashion? SSRF Are sample flow rates recorded? How? Are samples sent to the lab on a regular schedule in a timely fashion? **✓** One set of gloves only Are filters protected from contamination during handling and shipping? How? Are the site conditions reported regularly to the field operations manager or staff? **QC Check Performed Compliant Frequency V** ✓ Semiannually **Multi-point MFC Calibrations** Weekly **V** Flow System Leak Checks Weekly **V Filter Pack Inspection V ✓** Weekly **Flow Rate Setting Checks V** Weekly **Visual Check of Flow Rate Rotometer** ✓ As needed **V 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,

The site operator uses one gloved hand, and the same glove, to remove and install the filter pack. Leak checks are performed when the

natural or man-made, that may affect the monitoring parameters:

ambient temperature is above -10 C.

### F-02058-1500-S10-rev002

Site ID DEN417 Technician Martin Valvur Site Visit Date 10/10/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	ProBook	5CB22906R7	none
DAS	Environmental Sys Corp	8816	2274	90600
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18B	099800009754	none
Flow Rate	Tylan	FC280SAV	AW9706011	90966
Infrastructure	Infrastructure	none	none	none
Mainframe	Climatronics	100081	1293	none
Mainframe power supply	Climatronics	101074	685	none
Met tower	Glen Martin Engineering	unknown	none	none
MFC power supply	Tylan	RO-32	FP9706004	90967
Modem	US Robotics	33.6 fax modem	unknown	none
Ozone	ThermoElectron Inc	49C	49C-77033-384	90778
Ozone Standard	ThermoElectron Inc	49C	49C-71310-368	none
Printer	Canon	PC425	unknown	none
Sample Tower	Aluma Tower	В	AT-71102-7I-5	none
Shelter Temperature	ARS	none	006	none
Siting Criteria	Siting Criteria	1	None	None
Temperature2meter	RM Young	41342	018533	none
Zero air pump	Werther International	PC70/4	526281	none

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
REL	0004-Sandy	Grenville-10/22/2018				
1	10/22/2018	DAS	Campbell	none	CR850	28383
2	10/22/2018	elevation	Elevation	none	none	none
3	10/22/2018	Filter pack flow pump	Thomas	none	1420 VP	42624821
4	10/22/2018	Flow Rate	Apex	000857	AXMC105LPMDPCV	150623
5	10/22/2018	Infrastructure	Infrastructure	none	none	none
6	10/22/2018	Modem	Sierra wireless	07000	unknown	unknown
7	10/22/2018	Sample Tower	Aluma Tower	000813	В	unknown
8	10/22/2018	siting criteria	Siting Criteria	none	none	None
9	10/22/2018	Temperature	RM Young	06986	41342	024087

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 28383 RED004 Sandy Grenville 10/22/2018 DAS Primary Das Date: 10/22/2018 **Audit Date** 10/22/2018 Datel Parameter DAS Mfg 7:51:00 7:51:00 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** Das Day: 295 **Audit Day** 295 Tfer ID 01320 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0021 0.0017 0.0021 0.0017 2/13/2012 1.00000 **Cert Date** CorrCoff Fluke **Parameter** DAS Mfg **Serial Number** 95740135 Tfer Desc. DVM 01311 Tfer ID 1.00000 0.00000 Slope **Intercept** 2/13/2018 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 0.0000 -0.0001 -0.0013 -0.0012 V V 7 0.1000 0.0998 0.0978 -0.0020 7 0.3000 0.2997 0.2976 V V -0.0021 7 0.5000 0.4980 V V -0.0015 0.4995 7 0.7000 V V -0.0018 0.6995 0.6977 V V 7 0.9000 0.8993 0.8974 -0.0019 7 0.9992 0.9980 V V -0.0012 1.0000

### Flow Data Form

pex	150623	3	RED004	San	dy Grenville	ly Grenville 10/22/2018		ate	000857
<u>'</u>					•				
				Mfg		BIOS	P	arameter Flo	w Rate
				5	Serial Number		T	fer Desc. Blo	OS 220-H
					lfer ID	01414			
					Slope	1.	00055 Inte	ercept	-0.0157
					_			-	
					Cert Date	2/2	1/2018 <b>Cor</b>	rCoff	1.0000
AS 1:		DAS 2:			Cal Factor Z	ero	-0.01	7	
Avg % Diff:	A Max % I	i A Avg %I	Dif A Max	% Di	Cal Factor F	ull Scale	1.00	)4	
1.52% 1.63%					Rotometer R	eading:	2.	.9	
Desc.	Test typ	e Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit (	OutputSignal	I PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.02	1/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.01	1/m	l/m	
primary	test pt 1	3.050	3.060	2.96	0.000	3.01	l/m	l/m	-1.639
primary	test pt 2	3.036	3.050	2.96	0.000	3.01	1/m	l/m	-1.319
primary	test pt 3	3.041	3.060	2.96	0.000	3.01	1/m	l/m	-1.639
Sensor Compo	onent Leak	Test		Condition	1		Status	Pass	
Sensor Compo	onent Tubir	g Condition		Condition	Good		Status	pass	
Sensor Compo	onent Filter	Position		Condition	Good		Status	pass	
Sensor Compo	onent Rotor	neter Condition	l	Condition	Clean and dry		Status	pass	
Sensor Compo	onent Moist	ure Present		Condition	No moisture pr	resent	Status	pass	
Sensor Compo				Condition	3.2 cm		Status		
Sensor Comp				Condition			Status	pass	
Sensor Compo				Condition			Status		
Sensor Component Syst						Status			

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young 024087 RED004 10/22/2018 Temperature 06986 Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 **Tfer ID** 0.09168 **Slope** 1.00798 **Intercept DAS 1: DAS 2:** 2/13/2018 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 1.38 2.24 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.12 0.03 0.000 0.0 C -0.07 25.47 C -2.24 Temp Mid Range 25.76 0.000 23.2 primary 0.000 C -1.82 primary Temp High Range 48.80 48.32 46.5 Condition Clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

### **Infrastructure Data For** RED004 Technician Sandy Grenville Site Visit Date 10/22/2018 Site ID **Shelter Make Shelter Model Shelter Size** Sensor Component | Sample Tower Type Status pass **Condition** Type B Status pass Sensor Component | Conduit **Condition** N/A **Sensor Component** Met Tower **Condition** N/A Status pass **Sensor Component** Moisture Trap **Condition** Not installed **Status** pass **Condition** Good Sensor Component | Power Cables **Status** pass Sensor Component | Shelter Temp Control **Condition** N/A **Status** pass **Condition** Installed Sensor Component Rotometer 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 Condition 3/8 teflon Status pass **Sensor Component** Tubing Type Sensor Component | Sample Train **Condition** Good Status pass

# **Field Systems Comments**

1 Parameter: DocumentationCo

There is no site logbook and all manuals are kept electronically since the site is a small footprint site with no place to store hardcopies.

2 Parameter: SitingCriteriaCom

The site has been cleared approximately 8 meters around the base of the tower. Herbicide was used.

3 Parameter: ShelterCleanNotes

Small footprint site with enclosure for instruments only. No shelter.

### F-02058-1500-S1-rev002 Field Systems Data Form RED004 Technician Sandy Grenville Site Visit Date 10/22/2018 Site ID **USGS Map EPA** Site Sponsor (agency) **Map Scale** Red Lake Nation / AMEC **Operating Group Map Date** AQS# R.M. Young **Meteorological Type** Air Pollutant Analyzer **QAPP** Latitude **Deposition Measurement QAPP** Longitude **Land Use QAPP Elevation Meters Terrain QAPP Declination** Conforms to MLM **OAPP Declination Date** 47.86382 **Site Telephone Audit Latitude** -94.83535 Site Address 1 **Audit Longitude** Site Address 2 374 **Audit Elevation** Beltrami County **Audit Declination** Redby, MN City, State **Present** Fire Extinguisher 56670 Zip Code Central First Aid Kit Time Zone **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # Primary Op. E-mail **Climbing Belt Backup Operator Security Fence** Backup Op. Phone # **Secure Shelter** Stable Entry Step Backup Op. E-mail Shelter Working Room Model **Shelter Size** Notes Small footprint site with enclosure for instruments only. No shelter. **Shelter Clean ✓** Notes Site OK

**Driving Directions** 

F-02058-1500-S2-rev002

Site ID RED004 Technician Sandy Grenville Site Visit Date 10/22/2018

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		lacksquare
Intensive agricultural ops (including aerial spraying)	500 m		lacksquare
Limited agricultural operations	200 m		✓
Large parking lot	200 m		ightharpoons
Small parking lot	100 m		ightharpoons
Tree line	50 m		ightharpoons
Obstacles to wind	10 times obstacle height		<b>~</b>

Siting Distances OK ✓

**Siting Criteria Comment** 

The site has been cleared approximately 8 meters around the base of the tower. Herbicide was used.

Fie	eld Systems Data Form		F-02058-1500-S3-rev002
Site	RED004 Technician Sandy Grenville	е	Site Visit Date 10/22/2018
1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	<b>✓</b>	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)	<b>V</b>	N/A
3	Are the tower and sensors plumb?	<b>✓</b>	N/A
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?	<b>✓</b>	
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)	f	
6	Is the solar radiation sensor plumb?	<b>✓</b>	N/A
7	Is it sited to avoid shading, or any artificial or reflected light?	<b>✓</b>	N/A
8	Is the rain gauge plumb?	✓	N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	<b>✓</b>	N/A
10	Is the surface wetness sensor sited with the grid surface facing north?	✓	N/A

✓ 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:

11 Is it inclined approximately 30 degrees?

Fic	eld Systems Dat	a Form		F-02058-1500-S4-rev002
Site	e ID RED004	Technician Sandy Gre	enville	Site Visit Date 10/22/2018
1	Do all the meterological condition, and well main	sensors appear to be intact, in a	good 🗸	Temperature only
2	Are all the meteorologic reporting data?	al sensors operational online, a	nd 🔽	Temperature only
3	Are the shields for the to	emperature and RH sensors clea	an? ✓	
4	Are the aspirated motor	s working?	✓	N/A
5	Is the solar radiation ser scratches?	nsor's lens clean and free of	✓	N/A
6	Is the surface wetness se	nsor grid clean and undamaged	<b>d?</b> ✓	N/A
7	Are the sensor signal and condition, and well main	d power cables intact, in good tained?	<b>✓</b>	
8	Are the sensor signal and from the elements and w	d power cable connections prot vell maintained?	tected 🔽	
		nation (photograph or sketch if may affect the monitoring parame		regarding conditions listed above, or any other features,

### Field Systems Data Form F-02058-1500-S5-rev002 RED004 Technician Sandy Grenville Site Visit Date 10/22/2018 Site ID Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E **~** Do the sample inlets have at least a 270 degree arc of unrestricted airflow? **~** Are the sample inlets 3 - 15 meters above the ground? **~** Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and maintenance **~** Do the analyzers and equipment appear to be in good condition and well maintained? **~** Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. N/A Describe dry dep sample tube. 3/8 teflon by 8 meters ✓ N/A Are in-line filters used in the ozone sample line? (if ves indicate location) **✓** Are sample lines clean, free of kinks, moisture, and obstructions? ✓ N/A Is the zero air supply desiccant unsaturated? Are there moisture traps in the sample lines? **✓** 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:

F-02058-1500-S6-rev002

Site	· ID	RED004		Technician	Sandy Grenville		Site Vis	sit Date 10/22/201	18	
	DAS so	ncar translatare	and r	parinharal aqui	nment anerotic	ทธ คา	nd maintans	nco		
	DAS, SC	iisor translators	, anu j	beripheral equi				ance		
1			s appe	ar to be in good	d condition and	✓				
2			of the	DAS operation	al? (printers,	<b>✓</b>				
3	grounded?					<b>✓</b>				
4			ons pro	tected from the	e weather and	<b>✓</b>				
5	Are the	DAS, sensor translators, and peripheral equipment of the DAS instruments appear to be in good conceived maintained?  Are all the components of the DAS operational? (prodem, backup, etc)  Do the analyzer and sensor signal leads pass through ighting protection circuitry?  Are the signal connections protected from the weatwell maintained?  Are the signal leads connected to the correct DAS. Are the DAS, sensor translators, and shelter proper grounded?  Does the instrument shelter have a stable power so as the instrument shelter temperature controlled?  Is the met tower stable and grounded?  Tower comments?				<b>✓</b>				
6	Does the instrument shelter have a stable power source		properly	<b>✓</b>						
7	Does the	e instrument she	elter ha	ave a stable pov	wer source?	<b>✓</b>				
8	Is the in	strument shelte	r temp	erature contro	lled?	<b>✓</b>	N/A			
9	Is the m	et tower stable :	and gr	ounded?			Stable		Grounded	
10	Is the sa	mple tower stat	ole and	grounded?						
11	Tower c	comments?								
					or sketch if nece oring parameter		ry) regardin	g conditions liste	d above, or a	any other features,

#### RED004 Technician Sandy Grenville Site Visit Date 10/22/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? Yes No N/A No N/A Yes **✓** Wind speed sensor **Data logger V V** Wind direction sensor **Data logger** ✓ **V** П Temperature sensor Strip chart recorder **V V** Relative humidity sensor Computer **V** Solar radiation sensor **V** Modem П **V V** Surface wetness sensor **Printer V V** Wind sensor translator Zero air pump **V Temperature translator V** Filter flow pump **V Humidity sensor translator V Surge protector** П **V V UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device V V Shelter heater** Ozone analyzer **✓ V** 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 ✓ V ✓ V Site Ops Manual** Oct 2014 **V HASP V** Oct 2014 **V Field Ops Manual V** Oct 2014 **Calibration Reports** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? No Logbook Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? N/A Are ozone z/s/p control charts properly completed and current? 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 site logbook and all manuals are kept electronically since the site is a small footprint site with no place to store hardcopies.

F-02058-1500-S7-rev002

**Field Systems Data Form** 

### F-02058-1500-S8-rev002

Site	e ID	RED004	Technicia	Sa	andy Grenville		Site Visit Date 10/22/	2018	
1	Has the	eration procedures e site operator attended ? If yes, when and who		STN	NET training	<b>✓</b>	Trained by AMEC technicia	an during site ins	stallation
2	Has the	e backup operator atte g course? If yes, when	nded a forma						
3	Is the si schedule	te visited regularly on e?	the required	Гues	sday	<b>✓</b>			
4	flollowed by the site operator?								
5	Is the si the requ	te operator(s) knowled nired site activities? (in	geable of, and cluding docu	l abl ment	le to perform tation)	<b>✓</b>			
	Are reg	ular operational QA/Q	C checks per	form	ned on meteor	rolo	gical instruments?		
QC	Check F	Performed			Frequency			Compliant	
Mu	lltipoint (	Calibrations		<b>✓</b>	Semiannuall	у		<b>✓</b>	
Vis	ual Inspe	ections		<b>/</b>	Weekly			<b>✓</b>	
Tra	anslator Z	Zero/Span Tests (clima	tronics)		N/A			<b>✓</b>	
Ma	nual Rai	n Gauge Test			N/A			✓	
Co	Confirm Reasonableness of Current Values			<b>✓</b>	Weekly				
Tes	Test Surface Wetness Response				N/A			✓	
	Are reg	ular operational QA/Q	C checks per	form	ned on the ozo	one :	analyzer?		
QC	Check F	Performed			Frequency			Compliant	
Mu	lti-point	Calibrations			N/A			<b>✓</b>	
Au	tomatic Z	Zero/Span Tests			N/A			<b>✓</b>	
Ma	nual Zer	o/Span Tests			N/A			<b>✓</b>	
Au	tomatic <b>F</b>	Precision Level Tests			N/A			<b>✓</b>	
Ma	nual Pre	cision Level Test			N/A				
An	alyzer Di	agnostics Tests			N/A			<b>✓</b>	
In-	line Filte	r Replacement (at inle	t)		N/A			✓	
In-	line Filte	r Replacement (at ana	lyze		N/A			$\checkmark$	
Sar	nple Line	e Check for Dirt/Water	r		N/A			<b>✓</b>	
Zer	co Air De	siccant Check			N/A			✓	
1		ti-point calibration gas train including all filte		the	complete	<b>✓</b>	N/A		
2	Do auto	matic and manual z/s/jee sample train including	p gasses go th	roug	gh the	<b>✓</b>	N/A		
3	Are the	automatic and manuad? If yes, how?		mon	itored and	<b>✓</b>	N/A		
	-	additional explanation an-made, that may aff					y) regarding conditions lis	sted above, or a	ny other features,

### Field Systems Data Form F-02058-1500-S9-rev002 RED004 Technician Sandy Grenville Site Visit Date 10/22/2018 Site ID Site operation procedures Is the filter pack being changed every Tuesday as scheduled? ✓ Filter changed various times Are the Site Status Report Forms being completed and filed correctly? No longer required Are data downloads and backups being performed as scheduled? **✓** SSRF Are general observations being made and recorded? How? **~** Are site supplies on-hand and replenished in a timely fashion? SSRF Are sample flow rates recorded? How? Are samples sent to the lab on a regular schedule in a timely fashion? **✓** Clean gloves on and off Are filters protected from contamination during handling and shipping? How? **~** Are the site conditions reported regularly to the field operations manager or staff? **QC Check Performed Compliant Frequency V** ✓ Semiannually **Multi-point MFC Calibrations** Weekly **V** Flow System Leak Checks **Filter Pack Inspection V ✓** Weekly **Flow Rate Setting Checks V ✓** Weekly **Visual Check of Flow Rate Rotometer** ✓ Semiannually **V In-line Filter Inspection/Replacement ✓** Weekly 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:

### F-02058-1500-S10-rev002

Site ID RED004 Technician Sandy Grenville Site Visit Date 10/22/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR850	28383	none
elevation	Elevation	none	none	none
Filter pack flow pump	Thomas	1420 VP	42624821	none
Flow Rate	Apex	AXMC105LPMDPC	150623	000857
Infrastructure	Infrastructure	none	none	none
Modem	Sierra wireless	unknown	unknown	07000
Sample Tower	Aluma Tower	В	unknown	000813
siting criteria	Siting Criteria	none	None	none
Temperature	RM Young	41342	024087	06986

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
SAL	.133-Sandy	Grenville-10/27/2018				
1	10/27/2018	Computer	Dell	07014	Inspiron 15	OF3WC8
2	10/27/2018	DAS	Campbell	000351	CR3000	2129
3	10/27/2018	Elevation	Elevation	None	1	None
4	10/27/2018	Filter pack flow pump	Thomas	00765	107CA110	0000141
5	10/27/2018	Flow Rate	Apex	000549	AXMC105LPMDPCV	illegible
6	10/27/2018	Infrastructure	Infrastructure	none	none	none
7	10/27/2018	Modem	Raven	06612	H4223-C	0844355815
8	10/27/2018	Ozone	ThermoElectron Inc	000628	49i A3NAA	1009241788
9	10/27/2018	Ozone Standard	ThermoElectron Inc	000215	49i A3NAA	0622717856
10	10/27/2018	Sample Tower	Aluma Tower	none	В	AT-51065-5-G-A
11	10/27/2018	Shelter Temperature	Campbell	none	107-L	none
12	10/27/2018	Siting Criteria	Siting Criteria	None	1	None
13	10/27/2018	Temperature	RM Young	06410	41342	14043
14	10/27/2018	Zero air pump	Werther International	06935	C 70/4	000829172

#### **DAS Data Form** 0 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2129 SAL133 Sandy Grenville 10/27/2018 DAS Primary Das Date: 10/27/2018 **Audit Date** 10/27/2018 Datel Parameter DAS Mfg 13:49:00 Das Time: 13:49:00 **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** 300 Das Day: 300 **Audit Day** Tfer ID 01320 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0002 0.0001 0.0002 0.0001 2/13/2012 1.00000 **Cert Date** CorrCoff Fluke **Parameter** DAS Mfg **Serial Number** 95740135 Tfer Desc. DVM 01311 Tfer ID 1.00000 0.00000 **Slope Intercept** 2/13/2018 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 0.0000 0.0000 0.0000 0.0000 V V 7 0.1000 0.0999 0.0999 0.00007 0.3000 0.2997 0.2997 V V 0.0000 7 0.5000 0.4995 V V -0.0001 0.4996 7 0.7000 V V 0.0000 0.6995 0.6995 7 V V 0.9000 0.8994 0.8993 -0.0001 7 0.9993 0.9991 V V -0.0002 1.0000

### Flow Data Form

<b>Ifg</b>  pex	Se	illegible		SAL133		ndy Grenville	Site Visit I	B Flow R	ate	000549	
F		-9				-	BIOS		arameter Flo		
					Mfg		P	arameter 110			
					3	Serial Number		T	fer Desc. BIC	Desc. BIOS 220-H	
					,	Гfer ID	01414				
						Slope	1.	00055 Inte	ercept	-0.0157	
						Cert Date	2/2	1/2018 Cor	rCoff	1.0000	
DAS 1:			DAS 2:		L	Cal Factor Z	ero	0.0	16		
A Avg % Diff:	A Max		A Avg %I	Dif A Max	% Di	Cal Factor F		1.0			
4.67% 5.10%						Rotometer R	eading:	1	.4		
Desc.	Tes	t type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignall	PctDifference	
primary	pump		0.000	0.000	-0.08	0.000	-0.02	1 1			
primary	leak cl	neck	0.000	0.000	-0.03	0.000	0.15	l/m	1/m		
primary	test pt	1	1.553	1.570	1.45	0.000	1.50	1/m	l/m	-4.46%	
primary	test pt	2	1.552	1.570	1.45	0.000	1.50	1/m	1/m	-4.46%	
primary	test pt	3	1.557	1.570	1.45	0.000	1.49	1/m	1/m	-5.10%	
Sensor Compo	onent	Leak Test	t		Condition	1		Status	pass		
Sensor Compo	onent	Tubing Co	ondition		Condition	Good		Status	tus pass		
Sensor Compo	onent	Filter Pos	ition		Condition	Good		Status	pass		
Sensor Compo	onent	Rotomete	r Condition		Condition	Clean and dry		Status	pass		
Sensor Compo	onent	Moisture I	Present		Condition	No moisture p	resent	Status	pass		
Sensor Compo	onent	Filter Dist	ance		Condition	2.5 cm		Status	pass		
Sensor Compo	onent	Filter Dep	th		Condition	3.0 cm		Status	pass		
Sensor Compo	onent	Filter Azin	nuth		Condition	180 deg		Status	pass		
Sensor Component System Memo		Condition	ondition			Status pass					

### **Ozone Data Form**

Mfg	Serial Number	r Ta Site	Т	<b>Cechnician</b>	Site Visit Date	Paramete	or Owner ID
ThermoElectron Inc	1009241788	SAL133		Sandy Grenville	10/27/2018	Ozone	000628
Intercept -0.	04441 Slope 41066 Inter 00000 Corr	cept 0	.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180030022 01114		Desc. Ozone primary stan
DAS 1: A Avg % Diff: A Ma 0.0%		AS 2: Avg %Dif A	Max % Di	Slope Cert Date	1.0029		
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDi	f AbsDif
primary	1	0.33	0.21	-0.32	ppb		-0.53
primary	2	15.87	15.71	16.19	ppb		0.48
primary	3	35.10	34.88	36.01	ppb		3.19
primary primary	5	68.14 109.28	67.83 108.85	70.35 113.30	ppb ppb		3.65 4.01
Sensor Componen				tion Good	ppo	Status pa	
Sensor Componen			Condi			Status pa	
Sensor Componen	Inlet Filter Co	ondition	Condi	tion Clean		Status pa	ass
Sensor Componen	Battery Back	шр	Condi	tion N/A		Status pa	ass
Sensor Componen	Offset		Condi	tion 0.000		Status pa	ass
Sensor Componen	Span		Condi	Condition 1.058		Status pa	ass
Sensor Componen	Zero Voltage	<b>;</b>	Condi	tion N/A		Status pa	ass
Sensor Componen	Fullscale Vol	ltage	Condi	tion N/A		Status pa	ass
Sensor Componen	Cell A Freq.		Condi	98.4 kHz		Status pa	ass
Sensor Componen	Cell A Noise		Condi	tion 0.7 ppb		Status pa	ass
Sensor Componen	Cell A Flow		Condi	tion 0.66 lpm		Status pa	ass
Sensor Componen	Cell A Press	ure	Condi	tion 693.6 mmHg		Status pa	ass
Sensor Componen	Cell A Tmp.		Condi	29.8 C		Status pa	ass
Sensor Componen	Cell B Freq.		Condi	tion 105.4 kHz		Status pa	ass
Sensor Componen	Cell B Noise		Condi	tion 0.7 ppb		Status pa	ass
Sensor Componen	Cell B Flow		Condi	0.64 lpm		Status pa	ass
Sensor Componen	Cell B Press	ure	Condi	694.2 mmHg		Status pa	ass
Sensor Componen	Cell B Tmp.		Condi	tion N/A		Status pa	ass
Sensor Componen	Line Loss		Condi	Not tested		Status pa	ass
Sensor Componen	System Mem	10	Condi	tion		Status pa	ass

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young 14043 SAL133 10/27/2018 Temperature 06410 Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 **Tfer ID** 0.09168 **Slope** 1.00798 **Intercept DAS 1: DAS 2:** 2/13/2018 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.06 0.14 Test type OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. InputTmpRaw InputTmpCorr. primary Temp Low Range 0.12 0.03 0.000 0.2 $\mathbf{C}$ 0.14 C -0.02 Temp Mid Range 25.13 24.84 0.000 24.8 primary 47.99 48.0 C -0.03 primary Temp High Range 48.46 0.000 Condition Moderately clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Sandy Grenville 10/27/2018 Shelter Temperature Campbell SAL133 none none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperatur Abs Avg Err **Abs Max Er** Abs Avg Err **Abs Max Er** Tfer Desc. RTD H232734 **Serial Number** 0.65 1.12 01227 **Tfer ID** 1.00798 0.09168 Slope Intercept 2/13/2018 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	19.29	19.05	0.000	19.4	C	0.32
primary	Temp Mid Range	23.90	23.62	0.000	22.5	С	-1.12
primary	Temp Mid Range	20.30	20.05	0.000	20.6	C	0.5
Sensor Con	nponent System Memo		Condition		Status	pass	

### **Infrastructure Data For**

Site ID	SAL133	Technician	Sandy Grenville	Site Visit Date	10/27/2018
---------	--------	------------	-----------------	-----------------	------------

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	Good	Status	pass
Sensor Component	Shelter Roof	Condition	Fair	Status	pass
Sensor Component	Shelter Floor	Condition	Fair	Status	pass
Sensor Component	Signal Cable	Condition	Fair	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 inlet filter is replaced and a zero/span/precision test is performed every two weeks.

2 Parameter: SitingCriteriaCom

The site is located next to a field usually planted with corn or soy beans.

3 Parameter: ShelterCleanNotes

The shelter is in fair condition and there is evidence of a leak in the shelter roof and ants are present. It is clean, neat, and well organized.

4 Parameter: MetOpMaintCom

The temperature signal cable is showing signs of wear.

### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 10/27/2018 SAL133 Technician Sandy Grenville Site ID **USGS Map** Lagro **EPA** Site Sponsor (agency) Map Scale private **Operating Group Map Date** 18-169-9991 AQS# Climatronics **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude dry **QAPP** Longitude **Deposition Measurement** Land Use agriculture **QAPP Elevation Meters** flat **Terrain QAPP Declination** Yes Conforms to MLM **OAPP Declination Date** (260) 782-2428 40.816038 **Site Telephone Audit Latitude** Hamilton Road -85.661407 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 250 Wabash County **Audit Declination** Lagro, IN City, State **Present** Fire Extinguisher 46941 New in 2015 Zip Code Eastern **First Aid Kit** Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **~ Climbing Belt** Primary Op. E-mail **Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Step Backup Op. E-mail Shelter Working Room ✓ Make Model 8810 Ekto **Shelter Size** 640 cuft **✓** Notes The shelter is in fair condition and there is evidence of a leak in the shelter roof and ants are Shelter Clean present. It is clean, neat, and well organized. **✓** Notes Site OK

From Huntington, IN take route 9 south a few miles to Division Road. Turn right (west) on Division and continue

next road, Hamilton or 725E. The site is about 1 mile on the right.

several miles to S 750 E, turn left (south). Turn right (west) at the first intersection (E 50 S). Turn left (south) at the

**Driving Directions** 

F-02058-1500-S2-rev002

Site ID SAL133 Sandy Grenville Site Visit Date 10/27/2018

Potential Interferent	Minimum Distance From Measurement Apparatus	Distance	Pass = Checked
Large Point Source of SO2 or NOx	20 to 40 km		<u> </u>
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	20 m	
Large parking lot	200 m		✓
Small parking lot	100 m		ightharpoons
Tree line	50 m		lacksquare
Obstacles to wind	10 times obstacle height		✓

Siting Distances OK

**Siting Criteria Comment** 

The site is located next to a field usually planted with corn or soy beans.

Fie	eld Sy	stems Data Fo	rm			F-02058-1500-S3	-rev002
Site	·	SAL133	F	Sandy Grenville		Site Visit Date 10/27/2018	
1		l speed and direction s luenced by obstruction		as to avoid	<b>✓</b>	N/A	
2	(i.e. wind horizont	l sensors mounted so a l sensors should be mo ally extended boom >2 to the prevailing wind	ounted atop the 2x the max dian	tower or on a	✓	N/A	
3	Are the	ower and sensors plui	mb?		<b>✓</b>	N/A	
4		temperature shields po diated heat sources su		•	<b>✓</b>		
5	condition surface a	perature and RH sensons? (i.e. ground below and not steeply sloped. water should be avoid	sensors should Ridges, hollow	be natural	<b>✓</b>		
6	Is the so	ar radiation sensor pl	umb?		<b>✓</b>	N/A	
7	Is it sited light?	l to avoid shading, or a	any artificial or	reflected	<b>✓</b>	N/A	
8	Is the ra	in gauge plumb?			✓	N/A	
9	Is it sited towers, o	l to avoid sheltering ef etc?	fects from build	lings, trees,	✓	N/A	
10	Is the su	rface wetness sensor si	ited with the ori	id surface	<b>✓</b>	N/A	

✓ 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:

facing north?

11 Is it inclined approximately 30 degrees?

Field Systems Data Form								F-02058-1500-S4-rev002
Site	e <b>ID</b>	SAL133		Technicia	an Sandy	/ Grenville		Site Visit Date 10/27/2018
1 Do all the meterological sensors appear to be intact, in good condition, and well maintained?				be intact	✓	Temperature only		
2 Are all the meteorological sensors operational online, and reporting data?						<b>✓</b>	Temperature only	
3	Are the	shields for the t	tempera	ture and R	H sensors	s clean?	<b>✓</b>	
4	Are the	aspirated moto	rs work	ing?			<b>✓</b>	N/A
5	Is the so	olar radiation sees?	ensor's l	ens clean ai	nd free of		<b>✓</b>	N/A
6	Is the surface wetness sensor grid clean and undamaged?					aged?	<b>✓</b>	N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?					od	<b>✓</b>	Signs of wear
8		sensor signal are elements and			nections <sub>]</sub>	protected	✓	
		additional expla an-made, that m					ary)	regarding conditions listed above, or any other features,
The t	temperatu	ure signal cable is	showin	g signs of w	ear.			

### Field Systems Data Form F-02058-1500-S5-rev002 SAL133 Technician Sandy Grenville Site Visit Date 10/27/2018 Site ID Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E **~** Do the sample inlets have at least a 270 degree arc of unrestricted airflow? **~** Are the sample inlets 3 - 15 meters above the ground? **~** Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and maintenance **~** Do the analyzers and equipment appear to be in good condition and well maintained? **~** Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. 1/4 teflon by 15 meters Describe dry dep sample tube. 3/8 teflon by 15 meters At inlet only Are in-line filters used in the ozone sample line? (if ves indicate location) **~** Are sample lines clean, free of kinks, moisture, and obstructions? **V** Is the zero air supply desiccant unsaturated? Flow line only Are there moisture traps in the sample lines?

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:

Clean and dry

Is there a rotometer in the dry deposition filter line, and is it

clean?

## F-02058-1500-S6-rev002

Site	ID	SAL133	Technician Sandy	Grenville	Site Vis	it <b>Date</b> 10/27/201	18	
	DAS, s	ensor translators, and	l peripheral equipment	operations a	nd maintena	<u>nce</u>		
1			pear to be in good condi	_				
		aintained?	car to be in good condi-					
2		the components of the hackup, etc)	e DAS operational? (pri	inters,				
3		analyzer and sensor s ng protection circuitr	signal leads pass through y?	h 🗸	Met sensors	only		
4		e signal connections p aintained?	rotected from the weath	er and				
5	Are the	e signal leads connecte	ed to the correct DAS ch	nannel?				
6	Are the		tors, and shelter proper	ly 🗸				
7	Does tl	he instrument shelter	have a stable power sou	rce?				
8	Is the i	nstrument shelter ten	perature controlled?	<b>✓</b>				
9	Is the r	net tower stable and §	grounded?		Stable		Grounded	
10	Is the s	sample tower stable ar	nd grounded?					
11	Tower	comments?			<b>V</b>			
Pro	vide an	y additional explanati	on (photograph or skete	ch if necessa	ry) regardin	g conditions liste	d above, or a	ny other features,
nat	ural or	man-made, that may	affect the monitoring pa	rameters:				
Site	· ID	SAL133	Technician Sandy	Grenville	Site Vis	it Date 10/27/201	18	
	DAS, sensor translators, and peripheral equipment operations and maintenance							

#### **Field Systems Data Form** F-02058-1500-S7-rev002 SAL133 Technician Sandy Grenville Site Visit Date 10/27/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? Yes No N/A No N/A Yes **✓** Wind speed sensor **Data logger V V** Wind direction sensor **Data logger** ✓ П **V** Temperature sensor Strip chart recorder **V V** Relative humidity sensor Computer **V** Solar radiation sensor **V** Modem П **V V** Surface wetness sensor **Printer V V** Wind sensor translator Zero air pump **V Temperature translator V** Filter flow pump $\checkmark$ **V Humidity sensor translator Surge protector** П **V UPS V Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device V** П **V Shelter heater** Ozone analyzer ~ **✓** Filter pack flow controller Shelter air conditioner **V** Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF V V V Site Ops Manual V HASP V** Feb 2014 **Field Ops Manual Calibration Reports V V** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and ~ current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current? 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: Technician Sandy Grenville SAL133 Site Visit Date 10/27/2018 Site ID

**Documentation** 

## F-02058-1500-S8-rev002

Site	ID SAL133 Technic	an Sa	ndy Grenville	Site Visit Date 10/27/20	018					
1	Site operation procedures  Has the site operator attended a formal course? If yes, when and who instructed		ET training 🗹	Trained on-site by ESE empl	oyee (JBA)					
2	Has the backup operator attended a forr training course? If yes, when and who in	nal CA								
3	Is the site visited regularly on the require schedule?									
4										
5	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	<b>Check Performed</b>		Frequency		Compliant					
_	ltipoint Calibrations	<b>✓</b>	Semiannually		<b>✓</b>					
	ual Inspections	<b>✓</b>	Weekly		<b>✓</b>					
	anslator Zero/Span Tests (climatronics)		N/A		<b>✓</b>					
	nual Rain Gauge Test	<b>✓</b>	N/A		<b>✓</b>					
	nfirm Reasonableness of Current Values	<b>✓</b>	Weekly		<b>✓</b>					
	t Surface Wetness Response	<b>✓</b>	N/A		<b>✓</b>					
103	Are regular operational QA/QC checks p			nalvzer?						
				<del>,</del>						
$\mathbf{OC}$	<b>Check Performed</b>		Frequency		Compliant					
_	lti-point Calibrations	<b>✓</b>	Semiannually		$\checkmark$					
Mu		<b>✓</b>	Semiannually Daily		<ul><li>✓</li><li>✓</li></ul>					
Mu Aut	lti-point Calibrations comatic Zero/Span Tests									
Mu Aut Ma	lti-point Calibrations	<b>✓</b>			✓					
Mu Aut Ma Aut	Iti-point Calibrations comatic Zero/Span Tests nual Zero/Span Tests comatic Precision Level Tests		Daily		<b>✓</b>					
Mu Aut Ma Aut Ma	Iti-point Calibrations comatic Zero/Span Tests nual Zero/Span Tests comatic Precision Level Tests nual Precision Level Test		Daily  Daily		<ul><li>✓</li><li>✓</li><li>✓</li></ul>					
Mu Aut Ma Aut Ma Ana	Iti-point Calibrations comatic Zero/Span Tests nual Zero/Span Tests comatic Precision Level Tests nual Precision Level Test alyzer Diagnostics Tests	<b>Y Y O</b>	Daily							
Mu Aut Ma Aut Ma Ana In-l	Iti-point Calibrations comatic Zero/Span Tests nual Zero/Span Tests comatic Precision Level Tests nual Precision Level Test alyzer Diagnostics Tests ine Filter Replacement (at inlet)		Daily  Daily  Weekly  Every 2 weeks							
Mu Aut Ma Aut Ma Ana In-l	Iti-point Calibrations comatic Zero/Span Tests nual Zero/Span Tests comatic Precision Level Tests nual Precision Level Test alyzer Diagnostics Tests ine Filter Replacement (at inlet) ine Filter Replacement (at analyze	<ul><li>&gt;</li><li>&gt;</li><li>&gt;</li><li>&gt;</li></ul>	Daily Daily Weekly Every 2 weeks N/A							
Mu Aut Ma Aut Ma Ana In-l In-l San	Iti-point Calibrations comatic Zero/Span Tests nual Zero/Span Tests comatic Precision Level Tests nual Precision Level Test alyzer Diagnostics Tests ine Filter Replacement (at inlet) ine Filter Replacement (at analyze nple Line Check for Dirt/Water	<ul><li>Y</li><li>Y</li><li>Y</li><li>Y</li><li>Y</li></ul>	Daily  Daily  Weekly  Every 2 weeks  N/A  Weekly							
Mu Aut Ma Aut Ma Ana In-l In-l San	Iti-point Calibrations comatic Zero/Span Tests nual Zero/Span Tests comatic Precision Level Tests nual Precision Level Test alyzer Diagnostics Tests ine Filter Replacement (at inlet) ine Filter Replacement (at analyze		Daily  Daily  Weekly  Every 2 weeks  N/A  Weekly  Weekly	Unknown						
Mu Aut Ma Aut Ma Ana In-l In-l San Zer	Iti-point Calibrations comatic Zero/Span Tests nual Zero/Span Tests comatic Precision Level Tests nual Precision Level Test alyzer Diagnostics Tests ine Filter Replacement (at inlet) ine Filter Replacement (at analyze nple Line Check for Dirt/Water to Air Desiccant Check	✓ ✓ ✓ ✓ ✓ ✓ ✓	Daily  Daily  Weekly  Every 2 weeks  N/A  Weekly  Weekly  Complete	Unknown						
Mu Aut Ma Aut Ma Ana In-l In-l San Zer	Iti-point Calibrations comatic Zero/Span Tests nual Zero/Span Tests comatic Precision Level Tests nual Precision Level Test alyzer Diagnostics Tests ine Filter Replacement (at inlet) ine Filter Replacement (at analyze nple Line Check for Dirt/Water o Air Desiccant Check  Do multi-point calibration gases go throu sample train including all filters? Do automatic and manual z/s/p gasses go complete sample train including all filters	y y y y throug	Daily  Daily  Weekly  Every 2 weeks  N/A  Weekly  Weekly  complete							
Mu Aut Ma Aut Ma Ana In-l In-l San Zer	Iti-point Calibrations comatic Zero/Span Tests nual Zero/Span Tests comatic Precision Level Tests nual Precision Level Test alyzer Diagnostics Tests ine Filter Replacement (at inlet) ine Filter Replacement (at analyze nple Line Check for Dirt/Water o Air Desiccant Check  Do multi-point calibration gases go throu sample train including all filters? Do automatic and manual z/s/p gasses go	y y y y throug	Daily  Daily  Weekly  Every 2 weeks  N/A  Weekly  Weekly  complete	Unknown  SSRF, logbook, call-in						
Mu Aut Ma Aut Ma Ana In-l In-l San Zer 1 2 3	Iti-point Calibrations comatic Zero/Span Tests nual Zero/Span Tests comatic Precision Level Tests nual Precision Level Test alyzer Diagnostics Tests ine Filter Replacement (at inlet) ine Filter Replacement (at analyze nple Line Check for Dirt/Water o Air Desiccant Check  Do multi-point calibration gases go throu sample train including all filters? Do automatic and manual z/s/p gasses go complete sample train including all filters Are the automatic and manual z/s/p check reported? If yes, how?	y y y gh the throug ? xs mon	Daily  Daily  Weekly  Every 2 weeks  N/A  Weekly  Weekly  complete  h the  itored and	SSRF, logbook, call-in						
Mu Aut Ma Aut Ma Ana In-l In-l San Zer 1 2 3	Iti-point Calibrations comatic Zero/Span Tests nual Zero/Span Tests comatic Precision Level Tests nual Precision Level Test alyzer Diagnostics Tests ine Filter Replacement (at inlet) ine Filter Replacement (at analyze nple Line Check for Dirt/Water o Air Desiccant Check  Do multi-point calibration gases go throus sample train including all filters? Do automatic and manual z/s/p gasses go complete sample train including all filters Are the automatic and manual z/s/p check reported? If yes, how?	y y y y gh the throug ? xs mon	Daily  Daily  Weekly  Every 2 weeks  N/A  Weekly  weekly  complete  h the  itored and  ketch if necessary  parameters:	SSRF, logbook, call-in ) regarding conditions liste						
Mu Aut Ma Aut Ma Ana In-l In-l San Zer 1 2 3	Iti-point Calibrations comatic Zero/Span Tests nual Zero/Span Tests comatic Precision Level Tests nual Precision Level Test alyzer Diagnostics Tests ine Filter Replacement (at inlet) ine Filter Replacement (at analyze nple Line Check for Dirt/Water o Air Desiccant Check  Do multi-point calibration gases go throu sample train including all filters? Do automatic and manual z/s/p gasses go complete sample train including all filters Are the automatic and manual z/s/p check reported? If yes, how?	y y y y gh the throug ? xs mon	Daily  Daily  Weekly  Every 2 weeks  N/A  Weekly  weekly  complete  h the  itored and  ketch if necessary  parameters:	SSRF, logbook, call-in ) regarding conditions liste						

FI	ela Sy	stems Data For	m			F-02058-1500-59-rev002			
Site	e ID	SAL133	Technician	Sandy Grenville		Site Visit Date	10/27/2018		
	Site oper	ration procedures							
1	Is the fil	ter pack being changed	every Tuesda	y as scheduled?	<b>V</b>	Filter changed afternoons			
2	Are the correctly	Site Status Report Form y?	s being comp	leted and filed	<b>✓</b>				
3	Are data schedule	a downloads and backuped?	s being perfo	ormed as		No longer required			
4	Are gen	eral observations being r	nade and rec	orded? How?	<b>✓</b>	SSRF, logbook			
5	Are site fashion?	supplies on-hand and re	plenished in	a timely	<b>✓</b>				
6	Are sam	ple flow rates recorded?	How?		<b>✓</b>	SSRF, call-in			
7	Are sam fashion?	ples sent to the lab on a	regular sche	lule in a timely	<b>✓</b>				
8		ers protected from contain ping? How?	mination dur	ing handling	<b>✓</b>	Clean gloves on and off			
9		site conditions reported ons manager or staff?	regularly to (	he field	✓				
QC	Check Pe	erformed	Freq	uency			Compliant		
N	Aulti-poir	nt MFC Calibrations	<b>✓</b> Sem	iannually			✓		
F	Tow Syste	em Leak Checks	Wee	kly			<b>✓</b>		
F	ilter Pacl	k Inspection							
F	low Rate	<b>Setting Checks</b>	✓ Wee				<b>V</b>		
V	isual Ch	eck of Flow Rate Rotomo					<b>V</b>		
I	n-line Filt	ter Inspection/Replacem		iannually					
S	ample Li	ne Check for Dirt/Water	<b>✓</b> Wee	kly			✓		
		dditional explanation (pan-made, that may affect				y) regarding condit	ions listed above, or a	any other features,	
Site	e ID	SAL133	Technician	Sandy Grenville		Site Visit Date	10/27/2018		

Site operation procedures

## F-02058-1500-S10-rev002

Site ID

SAL133

Technician Sandy Grenville

Site Visit Date 10/27/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	OF3WC8	07014
DAS	Campbell	CR3000	2129	000351
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA110	0000141	00765
Flow Rate	Apex	AXMC105LPMDPC	illegible	000549
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4223-C	0844355815	06612
Ozone	ThermoElectron Inc	49i A3NAA	1009241788	000628
Ozone Standard	ThermoElectron Inc	49i A3NAA	0622717856	000215
Sample Tower	Aluma Tower	В	AT-51065-5-G-A	none
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	14043	06410
Zero air pump	Werther International	C 70/4	000829172	06935

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number				
CAT	CAT175-Eric Hebert-11/07/2018									
1	11/7/2018	DAS	Campbell	000412	CR3000	2532				
2	11/7/2018	Elevation	Elevation	None	1	None				
3	11/7/2018	Filter pack flow pump	Brailsford	none	TD-4X2N	1016				
4	11/7/2018	Flow Rate	Apex	000644	AXMC105LPMDPCV	illegible				
5	11/7/2018	Infrastructure	Infrastructure	none	none	none				
6	11/7/2018	Modem	Raven	06660	V4221-V	0918425101				
7	11/7/2018	Sample Tower	Aluma Tower	666359	В	none				
8	11/7/2018	Shield (10 meter)	RM Young	none	41003	none				
9	11/7/2018	Siting Criteria	Siting Criteria	None	1	None				
10	11/7/2018	Temperature	RM Young	06409	41342VO	14042				
11	11/7/2018	UPS	ProSine	04576	1000w	unknown				

## Flow Data Form

<b>Ifg</b>	Serial Nun	nber Ta	Site	Tecl	nnician	Site Visit I	ate Param	eter	Owner ID
рех	illegible		CAT175	Eric	Hebert	11/07/2018	Flow R	ate	000644
			Mfg BIOS		P	arameter Flo	w Rate		
				5	Serial Number	122974	Т	fer Desc. BIC	S 220-H
				r	Γfer ID	01416			
						1	00178 Inte		0.0016
					Slope			ercept	
					Cert Date	7/13	3/2018 Cor	rCoff	1.0000
DAS 1:		DAS 2:			Cal Factor Z	ero	-0.01	3	
A Avg % Diff:	A Max % Di	A Avg %I	Dif A Max	% Di	Cal Factor F	ull Scale	1.00	)1	
0.99%	1.18%				Rotometer R	eading:	1.	.5	
Desc.	Test type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignall	PctDifference
primary	pump off	0.000	0.000	0.01	0.000	0.00			
primary	leak check	0.000	0.000	0.01	0.000	-0.01	1/m	1/m	
primary	test pt 1	1.520	1.520	1.49	0.000	1.50	1/m	1/m	-1.18%
primary primary	test pt 2 test pt 3	1.515 1.520	1.510 1.520	1.49	0.000	1.50	1/m 1/m	1/m 1/m	-0.60% -1.18%
	onent Leak Tes		1.320	Condition	_	1.50	Status		-1.16/0
•				_					
Sensor Compo	onent Tubing C	ondition		Condition	Good		Status	pass	
Sensor Compo	onent Filter Pos	sition		Condition	Good		Status	pass	
Sensor Compo	onent Rotomete	er Condition		Condition	Clean and dry		Status	pass	
	onent Moisture				See comments	Status pass			
Sensor Compo	onent Filter Dis	tance		Condition	7.0 cm		Status	pass	
Sensor Component Filter Depth Condition 3.5 cm						Status	pass		
Sensor Compo	Sensor Component Filter Azimuth Condition 180 deg				Status	pass			
Sensor Component System Memo			Condition		Status	Status pass			

### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg RM Young 14042 CAT175 Eric Hebert 11/07/2018 Temperature 06409 Mfg Extech Parameter Temperature Tfer Desc. RTD H232679 **Serial Number** 01228 **Tfer ID** -0.09210 **Slope** 1.00757 **Intercept DAS 1: DAS 2:** 2/13/2018 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.15 0.16 UseDesc. Test type InputTmpRaw InputTmpCorr. OutputTmpSignal | OutputSignalEng | OSE Unit | Difference primary Temp Low Range -0.05 0.04 0.000 -0.1 $\mathbf{C}$ -0.16 C -0.12 Temp Mid Range 25.98 25.88 0.000 25.8 primary 42.5 C -0.16 primary Temp High Range 42.87 42.64 0.000 Condition Moderately clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

## **Infrastructure Data For**

Si	te ID	CAT175	Technician	Eric Hebert	Site Visit Date	11/07/2018	
	Shelter M	ake	Shelter Model	She	lter Size		
8	Ekto		8810 (s/n 1977-	1) 640	cuft		

Sensor Component	Sample Tower Type	Condition	Type B	Status	pass
Sensor Component	Conduit	Condition	N/A	Status	pass
<b>Sensor Component</b>	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	Poor	Status	Fail
Sensor Component	Shelter Door	Condition	Poor	Status	Fail
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

# **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg Serial No.		Hazard Problem	
Flow Rate	CAT175	Eric Hebert	11/07/2018	Moisture Present	Apex	4212		

The filter sample tubing has drops of moisture in low sections outside the shelter.

## **Field Systems Comments**

## 1 Parameter: SiteOpsProcComm

The SSRF forms are not complete.

### 2 Parameter: DasComments

The shelter is not temperature controlled. The site is solar and DC battery powered. The met tower has been removed and the temperature is being measured from the sample tower at 10 meters above ground.

## 3 Parameter: DocumentationCo

The site copies of the SSRF are no longer kept onsite.

## 4 Parameter: ShelterCleanNotes

The shelter is seriously deteriorated with rot and mold on the floor and walls. There are many unused and possibly depleted batteries stored in the shelter. The vegetation has been allowed to grow. The shelter roof has been repaired.

## 5 Parameter: PollAnalyzerCom

Ozone monitoring is no longer being conducted at the site.

Field Systems Da	ata Form	1	F-02058-1500-S1-rev002		
Site ID CAT175	Technician Eric Hebert	Site Visit Date 11/0	7/2018		
			Q1 311		
Site Sponsor (agency)	EPA	USGS Map	Claryville		
<b>Operating Group</b>	private	Map Scale			
AQS#		Map Date			
Meteorological Type	R.M. Young				
Air Pollutant Analyzer	Ozone	<b>QAPP</b> Latitude	41.9423		
<b>Deposition Measurement</b>	dry	<b>QAPP</b> Longitude	-74.5519		
Land Use	woodland - mixed	<b>QAPP Elevation Meters</b>	765		
Terrain	complex	<b>QAPP Declination</b>	13.5		
Conforms to MLM	No	<b>QAPP Declination Date</b>	2/22/2006		
Site Telephone	(845) 798-0947	Audit Latitude	41.942325		
Site Address 1	Wildcat Mt. Road	<b>Audit Longitude</b>	-74.551999		
Site Address 2		<b>Audit Elevation</b>	754		
County	Ulster	<b>Audit Declination</b>	-13.2		
City, State	Claryville, NY	Present			
Zip Code	12725	Fire Extinguisher	New in 2015		
Time Zone	Eastern	First Aid Kit			
<b>Primary Operator</b>		Safety Glasses			
Primary Op. Phone #		Safety Hard Hat			
Primary Op. E-mail		Climbing Belt			
<b>Backup Operator</b>		Security Fence			
Backup Op. Phone #		Secure Shelter			
Backup Op. E-mail		Stable Entry Step 🗹			
<b>Shelter Working Room</b> ✓	Make Ekto M	<b>lodel</b> 8810 (s/n 1977-1)	Shelter Size 640 cuft		
Shelter Clean		batteries stored in the shelter.	floor and walls. There are many The vegetation has been allowed to		
Site OK ✓	Notes				
Road bridge	Liberty, NY go west on route 52 toward G 19 to Claryville. Stay on 19 through Clar e at the far end of town. Bear right and fo rk and turn left at the first house on the le	yville and turn left on Wildcat M llow the semi-paved road for at	It Road immediately after crossing the bout 0.7 miles to the fork. Go right at		

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Site ID CAT175 Eric Hebert Site Visit Date 11/07/2018

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		<b>V</b>

Siting	<b>Distances OK</b>	<b>✓</b>
Siting	Criteria Comr	nen

Fic	eld Systems Data Form		F-02058-1500-S3-rev002
Site	CAT175 Technician Eric Hebert		Site Visit Date 11/07/2018
1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	<b>✓</b>	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?	<b>✓</b>	N/A
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?	<b>✓</b>	
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)	<b>✓</b>	
6	Is the solar radiation sensor plumb?	<b>✓</b>	N/A
7	Is it sited to avoid shading, or any artificial or reflected light?	<b>✓</b>	N/A
8	Is the rain gauge plumb?	✓	N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	<b>✓</b>	N/A
10	Is the surface wetness sensor sited with the grid surface facing north?	<b>✓</b>	N/A
11	Is it inclined approximately 30 degrees?	<b>✓</b>	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:

Fie	eld Sy	ystems Data	Foi	rm			F-02058-1500-S4-rev002
Site	e ID	CAT175		Technician	Eric Hebert		Site Visit Date 11/07/2018
1		the meterological son, and well main			intact, in good	<b>✓</b>	Temperature only
2 Are all the meteorological sensors operational online, and reporting data?						<b>✓</b>	Temperature only
3	Are the	e shields for the te	mperat	ture and RH s	ensors clean?	✓	
4	Are the	e aspirated motors	worki	ng?		<b>✓</b>	Natural aspiration
5	Is the s	olar radiation sen	sor's le	ens clean and f	ree of	<b>✓</b>	N/A
6	Is the s	urface wetness sei	nsor gr	id clean and u	ndamaged?	✓	N/A
7		e sensor signal and on, and well main			, in good	✓	N/A
8		e sensor signal and ne elements and w			tions protected	✓	N/A
		additional explana an-made, that ma				sary)	regarding conditions listed above, or any other features,

## Field Systems Data Form F-02058-1500-S5-rev002 CAT175 Technician | Eric Hebert Site Visit Date 11/07/2018 Site ID Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E **~** Do the sample inlets have at least a 270 degree arc of unrestricted airflow? **~** Are the sample inlets 3 - 15 meters above the ground? **~** Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and maintenance Ozone not measured Do the analyzers and equipment appear to be in good condition and well maintained? **~** Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. N/A Describe dry dep sample tube. 3/8 teflon by 18 meters N/A Are in-line filters used in the ozone sample line? (if ves indicate location) **~** Are sample lines clean, free of kinks, moisture, and obstructions? N/A Is the zero air supply desiccant unsaturated? Are there moisture traps in the sample lines? Is there a rotometer in the dry deposition filter line, and is it ✓ Clean and dry 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:

Ozone monitoring is no longer being conducted at the site.

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Site	e ID	CAT175	Technician	Eric Hebert		Site Visit Date	11/07/2018				
	DAS gor	nsor translators, and p	norinhoral ogui	nment energies	20 O.	ad maintananaa					
	DAS, Sei	usor translators, and	beripheral equi	pinent operation	15 a1	iu maintenance					
1		OAS instruments appendanced?	ar to be in good	l condition and	<b>✓</b>						
2		he components of the backup, etc)	DAS operation	al? (printers,	<b>✓</b>						
3		nalyzer and sensor sig g protection circuitry		through	<b>✓</b>	Met sensors only					
4		signal connections pro ntained?	otected from the	e weather and	<b>✓</b>						
5	Are the	signal leads connected	to the correct	DAS channel?	<b>✓</b>						
6	Are the grounde	DAS, sensor translated?	rs, and shelter	properly	<b>✓</b>						
7	Does the	e instrument shelter h	ave a stable pov	ver source?		Solar power					
8	Is the ins	strument shelter temp	oerature contro	lled?		Shelter not temperature controlled					
9	Is the mo	et tower stable and gr	ounded?			Stable	(	Grounded	]		
10	Is the sa	mple tower stable and	l grounded?					<u> </u>			
11	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 shelter is not temperature controlled. The site is solar and DC battery powered. The met tower has been removed and the temperature is being measured from the sample tower at 10 meters above ground.

#### **Field Systems Data Form** F-02058-1500-S7-rev002 CAT175 Technician | Eric Hebert Site Visit Date 11/07/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? N/A Yes No No N/A Yes **✓** Wind speed sensor **Data logger V V** Wind direction sensor **Data logger V V** П Temperature sensor Strip chart recorder **V V** Relative humidity sensor Computer **V** П Solar radiation sensor **V** Modem П **V V Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V V Humidity sensor translator Surge protector ✓** П П **V UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device** $\checkmark$ **V Shelter heater** Ozone analyzer **V V** 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 V V SSRF ✓ V ✓ Site Ops Manual** Oct 2001 **V HASP ✓** Oct 2015 **Field Ops Manual Calibration Reports** Ozone z/s/p Control Charts N/A Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Not present Are the Site Status Report Forms being completed and current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? N/A Are ozone z/s/p control charts properly completed and current? 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 copies of the SSRF are no longer kept onsite.

### **Field Systems Data Form** F-02058-1500-S8-rev002 CAT175 Technician | Eric Hebert Site Visit Date 11/07/2018 Site ID Site operation procedures Trained by previous operator Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **V** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? 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 ✓ V** Semiannually **Multipoint Calibrations V V** Weekly **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test ✓ V** Weekly **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **QC Check Performed Compliant** Frequency **Multi-point Calibrations V** N/A **V** N/A **Automatic Zero/Span Tests V** N/A Manual Zero/Span Tests **V** N/A **Automatic Precision Level Tests V** N/A **Manual Precision Level Test V** N/A **Analyzer Diagnostics Tests ~** N/A **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V** N/A Sample Line Check for Dirt/Water **~** N/A **Zero Air Desiccant Check** N/A Do multi-point calibration gases go through the complete sample train including all filters? Do automatic and manual z/s/p gasses go through the N/A

N/A

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,

complete sample train including all filters?

reported? If yes, how?

Are the automatic and manual z/s/p checks monitored and

natural or man-made, that may affect the monitoring parameters:

Field Systems Data Form			F-02058-1500-S9-rev002			
Site ID CAT175 Tec	chnician Eric Hebert		Site Visit Date	11/07/2018		
Site operation procedures						
1 Is the filter pack being changed ever	y Tuesday as scheduled	<b>?</b> ✓	Filter changed morn	ings 95% of the time		
2 Are the Site Status Report Forms be correctly?						
3 Are data downloads and backups be scheduled?	ing performed as		No longer required			
4 Are general observations being made	e and recorded? How?					
5 Are site supplies on-hand and replen fashion?	<b>✓</b>					
6 Are sample flow rates recorded? Ho	w?	<b>✓</b>	Logbook only			
7 Are samples sent to the lab on a regulation?						
8 Are filters protected from contamina and shipping? How?	ation during handling	✓	Clean gloves on and off			
9 Are the site conditions reported regularized operations manager or staff?	ularly to the field	✓				
QC Check Performed	Frequency			Compliant		
<b>Multi-point MFC Calibrations</b>	✓ Semiannually			<b>✓</b>		
Flow System Leak Checks	Weekly			<b>✓</b>		
Filter Pack Inspection	Not performed					
Flow Rate Setting Checks	✓ Weekly			<b>✓</b>		
Visual Check of Flow Rate Rotometer	✓ Weekly			<b>✓</b>		
In-line Filter Inspection/Replacement				<b>✓</b>		
Sample Line Check for Dirt/Water	✓ Weekly			$\checkmark$		
Provide any additional explanation (photo natural or man-made, that may affect the			) regarding condition	ons listed above, or ar	ny other features,	

The SSRF forms are not complete.

## F-02058-1500-S10-rev002

Site ID CAT175 Technician Eric Hebert Site Visit Date 11/07/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR3000	2532	000412
Elevation	Elevation	1	None	None
Filter pack flow pump	Brailsford	TD-4X2N	1016	none
Flow Rate	Apex	AXMC105LPMDPC	illegible	000644
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0918425101	06660
Sample Tower	Aluma Tower	В	none	666359
Shield (10 meter)	RM Young	41003	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VO	14042	06409
UPS	ProSine	1000w	unknown	04576

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
ABT	147-Eric H	ebert-11/08/2018				
1	11/8/2018	Computer	Dell	07023	Inspiron 15	5C4MC12
2	11/8/2018	DAS	Campbell	000413	CR3000	2519
3	11/8/2018	Elevation	Elevation	None	1	None
4	11/8/2018	Filter pack flow pump	Thomas	02974	107CAB18	0493002469
5	11/8/2018	Flow Rate	Apex	000550	AXMC105LPMDPCV	50740
6	11/8/2018	Infrastructure	Infrastructure	none	none	none
7	11/8/2018	Modem	Raven	06609	H4223-C	0844356221
8	11/8/2018	Ozone	ThermoElectron Inc	000627	49i A1NAA	1009241772
9	11/8/2018	Ozone Standard	ThermoElectron Inc	000449	49i A3NAA	CM08200025
10	11/8/2018	Sample Tower	Aluma Tower	000017	В	AT-61152-A-H8-C
11	11/8/2018	Shelter Temperature	Campbell	none	107-L	none
12	11/8/2018	Siting Criteria	Siting Criteria	None	1	None
13	11/8/2018	Temperature	RM Young	04692	41342	6706
14	11/8/2018	Zero air pump	Werther International	06930	P 70/4	000829168

#### **DAS Data Form DAS Time Max Error:** 0.02 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2519 ABT147 Eric Hebert 11/08/2018 DAS Primary Das Date: 11/8 /2018 **Audit Date** 11/8 /2018 Datel **Parameter** DAS Mfg 13:55:30 Das Time: 13:55:31 **Audit Time** Tfer Desc. Source generator (D 4000392 **Serial Number** Das Day: 312 **Audit Day** 312 Tfer ID 01321 **Low Channel: High Channel: Avg Diff: Avg Diff: Max Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0001 0.0001 0.0001 0.0001 1/22/2015 1.00000 **Cert Date** CorrCoff Fluke **Parameter** DAS Mfg **Serial Number** 86590148 Tfer Desc. DVM 01310 Tfer ID 1.00000 0.00000 **Slope Intercept** 1/24/2018 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 0.0000 0.0000 -0.0001 -0.0001 V V 7 0.1000 0.1000 0.0999 -0.0001 7 0.3000 0.3000 0.2999 V V -0.0001 7 0.5000 0.5000 0.4999 V V -0.0001 7 0.7000 V V -0.0001 0.7000 0.6999 7 V V 0.9000 0.9000 0.8999 -0.0001 7 0.9999 V V -0.0001 1.0000 1.0000

## Flow Data Form

Mfg	Serial Nun	nber Ta	lite	Tec	hnician	Site Visit I	Date Paran	neter	Owner ID
Apex	50740		ABT147	Erio	Hebert	11/08/2018 Flow		Rate	000550
					Mfg	BIOS		arameter Flo	w Rate
				i	Serial Number	Serial Number 122974		fer Desc. BIC	OS 220-H
				1	Tfer ID	01416			
					Slope	1.	00178 Int	ercept	0.0016
					Cert Date	7/13	3/2018 <b>Co</b>	rrCoff	1.0000
DAS 1:		DAS 2:		L	Cal Factor Z	ero	0.0	16	
A Avg % Diff:	A Max % Di	A Avg %I	Dif A Max	% <b>Di</b>	Cal Factor F	ull Scale	0.99	97	
26.11%	26.11%				Rotometer R	eading:		2	
Desc.	Test type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	Output S E InputUnit (		PctDifference
primary	pump off	0.000	0.000	-0.44	0.000	-0.42	1/m	l/m	
primary	leak check	0.000	0.000	-0.17	0.000	-0.15	1/m	1/m	
primary	test pt 1	2.032	2.030	1.51	0.000	1.50	1/m	l/m	-26.11%
primary	test pt 2	2.034	2.030	1.51	0.000	1.50	1/m	1/m	-26.11%
primary	test pt 3	2.033	2.030	1.51	0.000	1.50	l/m	l/m	-26.11%
<b>Sensor Comp</b>	onent Leak Tes	st		Condition	1		Status pass		
Sensor Comp	onent Tubing C	ondition		Condition	Good		Status pass		
Sensor Comp	onent Filter Pos	sition		Condition	Good		Status pass		
Sensor Comp	onent Rotomet	er Condition		Condition	Clean and dry		Status	pass	
Sensor Comp	onent Moisture	Present		Condition	See comments	3	Status	pass	
Sensor Comp	onent Filter Dis	tance		Condition	4.5 cm		Status	pass	
Sensor Comp	onent Filter De	pth		Condition	1.5 cm		Status	pass	
Sensor Comp	onent Filter Azi	muth		Condition	240 deg	S		Pass	
Songar Comp	onent System N	t System Memo Con		Condition	ion		Status	pass	

## **Ozone Data Form**

Mfg S	Serial Numbe	r Ta Site	Т	<b>Technician</b>	Site Visit Date	Parame	eter	Owner ID
ThermoElectron Inc	1009241772	ABT14	7	Eric Hebert	11/08/2018	Ozone		000627
Intercept 0.4	00265 Slope 47031 Inter 99995 Corr		0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID				ozone Ozone primary stan
DAS 1:	DA	AS 2:		Slope	1.003	20 <b>Inte</b> i	cept	0.07166
A Avg % Diff: A Ma	0.0% A	Avg %Dif	A Max % Di	Cert Date	9/14/20		_	1.00000
UseDescription (	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPer	Dif	AbsDif
primary	1	-0.53	-0.59	0.24	ppb			0.83
primary	2	14.28	14.16	14.18	ppb			0.02
primary	3	34.94	34.75	35.08	ppb		0.95	
primary	5	66.32	66.03	67.22	ppb		1.79 0.52	
primary					ppb	G		
Sensor Component			Condi	<b>tion</b> Good		Status		
Sensor Component	22.5 degree	rule	Condi	tion		Status	pass	
Sensor Component	Inlet Filter C	ondition	Condi	tion Clean		Status	pass	
Sensor Component	Battery Back	кир	Condi	tion Not functioning	9	Status	Fail	
Sensor Component	Offset		Condi	<b>tion</b> 0.10		Status	pass	
Sensor Component	Span		Condi	tion 1.008		Status	pass	
Sensor Component	Zero Voltage	)	Condi	tion N/A	Status	pass		
Sensor Component	Fullscale Vo	ltage	Condi	tion N/A		Status	pass	
Sensor Component	Cell A Freq.		Condi	tion 90.0 kHz		Status	pass	
Sensor Component	Cell A Noise		Condi	tion 1.4 ppb		Status	pass	
Sensor Component	Cell A Flow		Condi	tion 0.71 lpm		Status	pass	
Sensor Component	Cell A Press	ure	Condi	tion 721.0 mmHg		Status	pass	
Sensor Component	Cell A Tmp.		Condi	<b>tion</b> 31.8 C		Status	pass	
Sensor Component	Cell B Freq.		Condi	tion 90.2 kHz		Status	pass	
Sensor Component	Cell B Noise		Condi	tion 0.90 ppb		Status	pass	
Sensor Component	Cell B Flow		Condi	tion 0.68 lpm		Status	pass	
Sensor Component	Cell B Press	ure	Condi	tion 722.0 mmHg		Status	pass	
Sensor Component	Cell B Tmp.		Condi	tion N/A		Status	pass	
Sensor Component	Line Loss		Condi	Not tested		Status	pass	
Sensor Component	System Men	no	Condi	tion		Status	pass	

### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg RM Young 6706 ABT147 Eric Hebert 11/08/2018 Temperature 04692 Mfg Extech Parameter Temperature Tfer Desc. RTD H232679 **Serial Number** 01228 **Tfer ID** -0.09210 **Slope** 1.00757 **Intercept DAS 1: DAS 2:** 2/13/2018 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.11 0.16 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range -0.01 0.08 0.000 0.1 $\mathbf{C}$ -0.03 C Temp Mid Range 22.63 22.55 0.000 22.4 -0.13 primary 49.27 C -0.16 primary Temp High Range 48.99 0.000 48.8 Condition Moderately clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** 11/08/2018 Shelter Temperature Campbell ABT147 Eric Hebert none none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperatur Abs Avg Err **Abs Max Er** Abs Avg Err **Abs Max Er** Tfer Desc. RTD H232679 **Serial Number** 0.14 0.17 01228 **Tfer ID** 1.00757 -0.09210 Slope Intercept 2/13/2018 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	27.49	27.37	0.000	27.5	C	0.1
primary	Temp Mid Range	27.92	27.80	0.000	27.6	С	-0.17
primary	Temp Mid Range	28.02	27.90	0.000	27.7	С	-0.16
Sensor Component System Memo Condition Status pass							

## **Infrastructure Data For**

Site ID ABT147 Technician Eric Hebert Site Visit Date 11/08/2018

Shelter Make	Shelter Model	Shelter Size	
Ekto	8810 (s/n 2149-9)	640 cuft	

Sensor Component	Sample Tower Type	Condition	Type B	Status	pass
Sensor Component	Conduit	Condition	N/A	Status	pass
<b>Sensor Component</b>	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

# **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard Problem
Flow Rate	ABT147	Eric Hebert	11/08/2018	Moisture Present	Apex	3683	
				_			

The filter sample tubing has drops of moisture in low sections outside the shelter.

# **Field Systems Comments**

1 Parameter: SiteOpsProcComm

The site operator reported that the "filter time off" field on the SSRF form should be the time that the filter is removed from the tower rather than the time that the filter flow pump is turned off.

2 Parameter: DasComments

The met tower has been removed.

3 Parameter: DocumentationCo

All site instrument manuals are on the site computer desktop folder.

4 Parameter: SitingCriteriaCom

Manure is routinely spread on the hay fields surrounding the site during the summer.

5 Parameter: ShelterCleanNotes

The shelter is clean and well organized.

6 Parameter: MetSensorComme

Temperature mounted in naturally aspirated shield on sample tower.

### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 11/08/2018 Technician Eric Hebert ABT147 Site ID Hampton **USGS Map EPA** Site Sponsor (agency) Map Scale private **Operating Group Map Date** 09-015-9991 AQS# R.M. Young **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude 41.8402 **QAPP** Longitude dry, wet -72.0111 **Deposition Measurement** 209 Land Use agriculture, woodland - mixed **QAPP Elevation Meters** 14.8 **Terrain** rolling **QAPP Declination** Marginally 2/22/2006 Conforms to MLM **OAPP Declination Date** (860) 974-2273 41.84046 **Site Telephone Audit Latitude** 80 Ayers Road **Audit Longitude** -72.010368 Site Address 1 Site Address 2 **Audit Elevation** 202 Windham -14.5 County **Audit Declination** Abington, CT City, State **Present** Fire Extinguisher 06230 New in 2015 Zip Code Eastern First Aid Kit Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **Climbing Belt** Primary Op. E-mail **Security Fence Backup Operator V Secure Shelter** Backup Op. Phone # Stable Entry Step Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 (s/n 2149-9) Ekto **Shelter Size** 640 cuft **✓** Notes The shelter is clean and well organized. Shelter Clean **✓** Notes Site OK From Hartford take I-84 east to exit 69. Continue on route 74 east to route 44. Take route 44 east to Abington. At **Driving Directions** the traffic light in Abington, turn right (south) on route 97. Continue approximately 1.3 miles to Ayers Road which will be on the left. Ayers Road is a single lane paved road. The site is through the gate at the end of the road, in the

field at the top of the hill past the barn.

F-02058-1500-S2-rev002

Site ID ABT147 Technician Eric Hebert Site Visit Date 11/08/2018

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		<b>~</b>

Siting Distances OK ✓

**Siting Criteria Comment** 

Manure is routinely spread on the hay fields surrounding the site during the summer.

Fi	eld Sy	stems Data F	orm				F-020	58-1	500-S	3-rev002
Site	e ID	ABT147	Technician	Eric Hebert		Site Visit Date	11/08/2018			
1		d speed and direction fluenced by obstruction		as to avoid	<b>✓</b>	N/A				
2	(i.e. win	d sensors mounted so d sensors should be matally extended boom > ato the prevailing wind	ounted atop the 2x the max dia	e tower or on a	<b>✓</b>	N/A				
3		tower and sensors plu			<b>✓</b>	N/A				
4	4 Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?				<b>✓</b>					
5	conditio surface	perature and RH sen ns? (i.e. ground belov and not steeply sloped g water should be avo	sensors should I. Ridges, hollov	l be natural	<b>✓</b>					
6	Is the so	lar radiation sensor p	lumb?		<b>✓</b>	N/A				
7	Is it site light?	d to avoid shading, or	any artificial o	r reflected	<b>✓</b>	N/A				
8	Is the ra	nin gauge plumb?			✓	N/A				
9	Is it site towers,	d to avoid sheltering o	effects from bui	ldings, trees,	<b>✓</b>	N/A				
10	Is the su facing n	rface wetness sensor orth?	sited with the g	rid surface	✓	N/A				
11	Is it inc	lined approximately 3	30 degrees?		<b>✓</b>	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:

Temperature mounted in naturally aspirated shield on sample tower.

Fi	eld Systems Data Form		F-02058-1500-S4-rev002
Site	ABT147 Technician Eric Hebert		Site Visit Date 11/08/2018
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	<b>✓</b>	N/A
2	Are all the meteorological sensors operational online, and reporting data?	<b>✓</b>	N/A
3	Are the shields for the temperature and RH sensors clean?	<b>✓</b>	
4	Are the aspirated motors working?	<b>✓</b>	N/A
5	Is the solar radiation sensor's lens clean and free of scratches?	<b>✓</b>	N/A
6	Is the surface wetness sensor grid clean and undamaged?	<b>✓</b>	N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	<b>✓</b>	
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	<b>✓</b>	
	ide any additional explanation (photograph or sketch if neces ral or man-made, that may affect the monitoring parameters:		) regarding conditions listed above, or any other features,

## Field Systems Data Form F-02058-1500-S5-rev002 ABT147 Technician | Eric Hebert Site Visit Date 11/08/2018 Site ID Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E **~** Do the sample inlets have at least a 270 degree arc of unrestricted airflow? **~** Are the sample inlets 3 - 15 meters above the ground? **~** Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and maintenance **~** Do the analyzers and equipment appear to be in good condition and well maintained? **~** Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. 1/4 teflon by 15 meters Describe dry dep sample tube. 3/8 teflon by 15 meters At inlet only Are in-line filters used in the ozone sample line? (if ves indicate location) **✓** Moisture in tubing only Are sample lines clean, free of kinks, moisture, and obstructions? **V** Is the zero air supply desiccant unsaturated? Flow line only Are there moisture traps in the sample lines? Is there a rotometer in the dry deposition filter line, and is it Clean and dry 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:

F-02058-1500-S6-rev002

Site	e ID	ABT147	Technician [	Eric Hebert		Site Visi	it Date	11/08/2018				
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?					only					
4		Are the signal connections protected from the weather and well maintained?										
5	Are the	Are the signal leads connected to the correct DAS channel?										
6	Are the DAS, sensor translators, and shelter properly grounded?											
7	Does the	e instrument shelter h	ave a stable powe	er source?	✓							
8	Is the in	strument shelter temp	perature controll	ed?	<b>✓</b>							
9	Is the m	et tower stable and gr	ounded?			Stable		Grounded	i			
10	Is the sample tower stable and grounded?											
11	Tower c	comments?				Met tower re	moved					
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 met tower has been removed.												

#### **Field Systems Data Form** F-02058-1500-S7-rev002 ABT147 Technician | Eric Hebert Site Visit Date 11/08/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? Yes No N/A Yes No N/A **✓ ✓** Wind speed sensor **Data logger V V** Wind direction sensor **Data logger V V** П Temperature sensor Strip chart recorder **✓ V** Relative humidity sensor Computer **V** Solar radiation sensor **V** Modem П **V V Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V V Humidity sensor translator Surge protector** П **V V UPS Solar radiation translator V ~** Tipping bucket rain gauge **Lightning protection device** ~ **V Shelter heater** Ozone analyzer ~ **✓** Filter pack flow controller Shelter air conditioner **V** Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF ✓ V ✓ V Site Ops Manual** Sept 2016 **V HASP ✓** Sept 2016 **Field Ops Manual V Calibration Reports ✓** Nov 2018 Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current? 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:

All site instrument manuals are on the site computer desktop folder.

### **Field Systems Data Form** F-02058-1500-S8-rev002 ABT147 Technician | Eric Hebert Site Visit Date 11/08/2018 Site ID Site operation procedures Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **V** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? 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 ✓ V** N/A **Multipoint Calibrations V V** Weekly **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **QC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** As needed Manual Zero/Span Tests **V ~** Daily **Automatic Precision Level Tests V Manual Precision Level Test** As needed **V V** Weekly **Analyzer Diagnostics Tests ~** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Weekly Sample Line Check for Dirt/Water **~ V** Weekly **Zero Air Desiccant Check** Unknown Do multi-point calibration gases go through the complete sample train including all filters? **✓** Do automatic and manual z/s/p gasses go through the

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:

✓

SSRF, logbook, call-in

complete sample train including all filters?

reported? If yes, how?

Are the automatic and manual z/s/p checks monitored and

### Field Systems Data Form F-02058-1500-S9-rev002 ABT147 Technician Eric Hebert Site Visit Date 11/08/2018 Site ID **Site operation procedures** Is the filter pack being changed every Tuesday as scheduled? Filter changed morinings Are the Site Status Report Forms being completed and filed correctly? No longer required Are data downloads and backups being performed as scheduled? SSRF, logbook Are general observations being made and recorded? How? **V** Are site supplies on-hand and replenished in a timely fashion? SSRF, logbook, call-in Are sample flow rates recorded? How? Are samples sent to the lab on a regular schedule in a timely fashion? **✓** Clean gloves on and off Are filters protected from contamination during handling and shipping? How? **~** Are the site conditions reported regularly to the field operations manager or staff? Compliant QC Check Performed **Frequency V** ✓ Semiannually **Multi-point MFC Calibrations** Weekly **V** Flow System Leak Checks **Filter Pack Inspection V ✓** Weekly **Flow Rate Setting Checks V ✓** Weekly **Visual Check of Flow Rate Rotometer V** ✓ Semiannually **In-line Filter Inspection/Replacement ✓** 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:

Sample Line Check for Dirt/Water

The site operator reported that the "filter time off" field on the SSRF form should be the time that the filter is removed from the tower rather than the time that the filter flow pump is turned off.

## F-02058-1500-S10-rev002

Site ID

ABT147

Technician Eric Hebert

Site Visit Date 11/08/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID	
Computer	Dell	Inspiron 15	5C4MC12	07023	
DAS	Campbell	CR3000	2519	000413	
Elevation	Elevation	1	None	None	
Filter pack flow pump	Thomas	107CAB18	0493002469	02974	
Flow Rate	Apex	AXMC105LPMDPC	50740	000550	
Infrastructure	Infrastructure	none	none	none	
Modem	Raven	H4223-C	0844356221	06609	
Ozone	ThermoElectron Inc	49i A1NAA	1009241772	000627	
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200025	000449	
Sample Tower	Aluma Tower	В	AT-61152-A-H8-C	000017	
Shelter Temperature	Campbell	107-L	none	none	
Siting Criteria	Siting Criteria	1	None	None	
Temperature	RM Young	41342	6706	04692	
Zero air pump	Werther International	P 70/4	000829168	06930	

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
PNI	F126-Eric H	lebert-11/15/2018				
1	11/15/2018	Computer	Dell	0759	Inspiron 15	Unknown
2	11/15/2018	DAS	Campbell	illegible	CR3000	3817
3	11/15/2018	Elevation	Elevation	None	1	None
4	11/15/2018	Filter pack flow pump	Thomas	06030	107CAB18	060400022677
5	11/15/2018	Flow Rate	Apex	000655	AXMC105LPMDPCV	illegible
6	11/15/2018	Infrastructure	Infrastructure	none	none	none
7	11/15/2018	Modem	Raven	06597	V4221-V	0844349884
8	11/15/2018	Ozone	ThermoElectron Inc	000741	49i A1NAA	1105347316
9	11/15/2018	Ozone Standard	ThermoElectron Inc	000363	49i A3NAA	0726124691
10	11/15/2018	Sample Tower	Aluma Tower	000178	В	none
11	11/15/2018	Shelter Temperature	Campbell	none	107-L	none
12	11/15/2018	Siting Criteria	Siting Criteria	None	1	None
13	11/15/2018	Temperature	RM Young	04687	41342	6701
14	11/15/2018	Zero air pump	Werther International	06885	C 70/4	000814270
15	11/15/2018	Zero air pump	Teledyne	000774	701H	610

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 3817 PNF126 Eric Hebert 11/15/2018 DAS Primary Das Date: 11/15/2018 **Audit Date** 11/15/2018 Mfg Datel Parameter DAS 10:48:00 10:48:00 Das Time: **Audit Time** Tfer Desc. Source generator (D 4000392 **Serial Number** 319 Das Day: 319 **Audit Day** Tfer ID 01321 **Low Channel: High Channel: Avg Diff: Avg Diff: Max Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0001 0.0001 0.0001 0.0001 1/22/2015 1.00000 **Cert Date** CorrCoff Fluke **Parameter** DAS Mfg **Serial Number** 86590148 Tfer Desc. DVM 01310 Tfer ID 1.00000 0.00000 **Slope Intercept** 1/24/2018 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 0.0000 0.0000 0.0000 0.0000 V V 7 0.1000 0.1000 0.0999 -0.0001 7 0.3000 0.3001 0.3000 V V -0.0001 7 0.5000 0.5001 V V 0.00000.5001 7 0.7000 V V 0.0000 0.7001 0.7001 7 V V 0.9000 0.9002 0.9001 -0.0001 7 V V -0.0001 1.0000 1.0002 1.0001

### Flow Data Form

Mfg		legible	iber Ta				Date Paran		Owner ID		
pex	ex			PNF126	Eri	c Hebert	11/15/2018	Flow F	Rate	000655	
				Mfg BIOS		I	Parameter Flo	w Rate			
	Serial Number 122974				7	fer Desc. BIC	S 220-H				
	<b>Tfer ID</b> 01416										
Slope 1.0017				00178 Ind	oroont	0.0016					
						Slope			ercept		
						Cert Date	7/13	3/2018 <b>Co</b>	rrCoff	1.0000	
DAS 1:			DAS 2:		_	Cal Factor Z	ero		0		
A Avg % Diff: A Max % Di A Avg % Dif A Max			: % <b>Di</b>	Cal Factor F	ull Scale	1.	02				
0.00% 0.00%				Rotometer R	eading:	1.	55				
Desc.	Te	st type	_	Input Corr_	MfcDisp.	OutputSignal	-	InputUnit	OutputSignall	PctDifference	
primary	pump		0.000	0.000	0.00		0.000 0.00		1/m		
primary	leak c		0.000	0.000	0.00	0.000	0.00	l/m	l/m		
primary	test pt		1.507	1.500	1.48	0.000	1.50	l/m	1/m	0.00%	
primary	test pt		1.504	1.500	1.47	0.000	1.50	1/m 1/m	1/m	0.00%	
primary	test pt		1.501	1.500			1.50		1/m	0.00%	
Sensor Compo	onent	Leak Tes	t		Conditio	n		Statu	pass		
Sensor Compo	onent	Tubing C	ubing Condition		Conditio	n Good	Good		Status pass		
Sensor Compo	onent	Filter Pos	ition		Conditio	<b>n</b> Good	Good		Status pass		
Sensor Compo	onent	Rotomete	er Condition	າ	Conditio	n Clean and dry		Statu	Status pass		
Sensor Compo	onent	Moisture	Present		Conditio	n See comments	3	Statu	Status pass		
Sensor Compo	onent	Filter Dist	tance		Conditio	n 2.5 cm		Statu	pass		
Sensor Compo	onent	Filter Dep	oth		Conditio	<b>n</b> 4.5 cm		Statu	pass		
Sensor Compe	onent	Filter Azir	muth		Conditio	n 90 deg		Status pass			
Sensor Component System Memo			Conditio	on		Status pass					

## **Ozone Data Form**

Mfg	Serial Numb	er Ta Site	Т	<b>'echnician</b>	Site Visit Date	Parameter	Owner ID
ThermoElectron Ir	1105347316	PNF12	6	Eric Hebert	11/15/2018	Ozone	000741
Slope: Intercept CorrCoff	Intercept -0.33327 Intercept		0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180930075 01115		eter ozone esc. Ozone primary sta
DAS 1: A Avg % Diff: A		AS 2: Avg %Dif A	A Max % Di	Slope	1.0032		
0.0%	0.0%			Cert Date	9/14/201	8 CorrCof	f 1.00000
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.26	0.18	-0.93	ppb		-1.11
primary primary	3	14.73 35.67	14.61 35.48	14.46 36.53	ppb ppb	2.9	-0.15
primary	4	69.11	68.81	69.34	ppb	0.7	
primary	5	108.11	107.69	108.00	ppb	0.2	
Sensor Compo	Sample Tra	ain	Condi	tion Good		Status pass	3
Sensor Compo	22.5 degree	e rule	Condi	tion		Status pass	S
Sensor Compo	nent Inlet Filter (	Condition	Condi	tion Clean		Status pass	6
Sensor Compo	nent Battery Bac	ckup	Condi	tion N/A		Status pass	6
Sensor Compo	nent Offset		Condi	<b>0.40</b>		Status pass	S
Sensor Compo	nent Span		Condi	1.003		Status pass	S
Sensor Compo	zero Voltag	je	Condi	tion N/A		Status pass	3
Sensor Compo	rent Fullscale V	oltage	Condi	Condition N/A		Status pass	3
Sensor Compo	Cell A Freq		Condi	Condition 78.6 kHz		Status pass	3
Sensor Compo	cell A Nois	е	Condi	lition 0.8 ppb		Status pass	3
Sensor Compo	Cell A Flow	1	Condi	0.63 lpm		Status pass	6
Sensor Compon	Cell A Pres	sure	Condi	624.7 mmHg		Status pass	3
Sensor Compo	cell A Tmp		Condi	33.5 C		Status pass	3
Sensor Compon	Cell B Freq		Condi	tion 108.4 kHz		Status pass	3
Sensor Compo	Cell B Nois	е	Condi	1.5 ppb		Status pass	3
Sensor Compo	Sensor Component Cell B Flow			0.68 lpm		Status pass	3
Sensor Compo	Sensor Component Cell B Pressure		Condi	625.3 mmHg		Status pass	3
Sensor Compo	ensor Component Cell B Tmp.			tion N/A		Status pass	
Sensor Compo	nent Line Loss		Condi	Not tested		Status pass	3
Sensor Compo	System Me	mo	Condi	tion		Status pass	3

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg RM Young 6701 PNF126 Eric Hebert 11/15/2018 Temperature 04687 Mfg Extech Parameter Temperature Tfer Desc. RTD H232679 **Serial Number** 01228 **Tfer ID** -0.09210 **Slope** 1.00757 **Intercept DAS 1: DAS 2:** 2/13/2018 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.10 0.18 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range -0.12-0.03 0.000 0.0 $\mathbf{C}$ 0.06 C Temp Mid Range 26.64 26.53 0.000 26.5 -0.05 primary 0.000 C -0.18 primary Temp High Range 49.26 48.98 48.8 Condition Clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** 11/15/2018 Shelter Temperature Campbell PNF126 Eric Hebert none none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperatur Abs Avg Err **Abs Max Er** Abs Avg Err **Abs Max Er** Tfer Desc. RTD H232679 **Serial Number** 0.05 0.07 01228 **Tfer ID** 1.00757 -0.09210 Slope Intercept 2/13/2018 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference		
primary	Temp Mid Range	23.83	23.74	0.000	23.7	C	-0.02		
primary	Temp Mid Range	23.85	23.76	0.000	23.8	С	0.05		
primary	Temp Mid Range	23.38	23.30	0.000	23.4	C	0.07		
Sensor Con	nponent System Memo		Condition		Status pass				

### **Infrastructure Data For**

it Date 11/15/2018
ze

Sensor Component	Sample Tower Type	Condition	Type B	Status	pass
<b>Sensor Component</b>	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	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	PNF126	Eric Hebert	11/15/2018	Moisture Present	Apex	4015	
				_			

The filter sample tubing has drops of moisture in low sections outside the shelter.

## **Field Systems Comments**

1 Parameter: SiteOpsProcComm

The site operator was not available for the systems audit. The reported information was obtained from the site log and site documentation.

2 Parameter: DasComments

The sample towers are not grounded.

3 Parameter: SitingCriteriaCom

The site is in a mountain bowl. The wind pattern from this site would be expected to follow up and down slope patterns. The site is also located in a hay field which is cut 2 or 3 times per year.

4 Parameter: ShelterCleanNotes

The shelter is in fair condition.

#### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 11/15/2018 PNF126 Technician Eric Hebert Site ID Carvers Gap **USGS Map EPA** Site Sponsor (agency) Map Scale USFS/private **Operating Group Map Date** 37-011-9991 AQS# R.M. Young **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude **Deposition Measurement** dry **QAPP** Longitude woodland - mixed **Land Use QAPP Elevation Meters** complex **Terrain QAPP Declination** No Conforms to MLM **OAPP Declination Date** 8287331643 36.105435 **Site Telephone Audit Latitude** end of paved road -82.045015 Site Address 1 **Audit Longitude** Roaring Creek Road Site Address 2 **Audit Elevation** 1216 Avery -6.3 County **Audit Declination** , NC City, State **Present** Fire Extinguisher ✓ 28657 New in 2015 Zip Code Eastern **First Aid Kit** Time Zone **~ Primary Operator Safety Glasses** Primary Op. Phone # Safety Hard Hat **Climbing Belt** Primary Op. E-mail **✓ Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Step Backup Op. E-mail Shelter Working Room ✓ Make Model 8810 Ekto **Shelter Size** 640 cuft **✓** Notes The shelter is in fair condition. Shelter Clean **✓** Notes

From Hwy 19E north of Plumb tree, turn west onto Roaring Creek Road. Follow the road to end of pavement always

bearing right, and continue 200 meters. Site is off dirt road in the field on the right.

Site OK

**Driving Directions** 

### Field Systems Data Form

F-02058-1500-S2-rev002

Site ID PNF126 Eric Hebert Site Visit Date 11/15/2018

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		ightharpoons
Feedlot operations	500 m		✓
Intensive agricultural ops (including aerial spraying)	500 m		✓
Limited agricultural operations	200 m	5 m	
Large parking lot	200 m		lacksquare
Small parking lot	100 m		lacksquare
Tree line	50 m		lacksquare
Obstacles to wind	10 times obstacle height		<b>~</b>

**Siting Criteria Comment** 

The site is in a mountain bowl. The wind pattern from this site would be expected to follow up and down slope patterns. The site is also located in a hay field which is cut 2 or 3 times per year.

Fi	eld Sy	stems Data Fo	rm				F-0205	8-150	0-S3-rev0	02
Site	e ID	PNF126	Technician	Eric Hebert		Site Visit Date	11/15/2018			
1 Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?					<b>✓</b>	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)				tower or on a	✓	N/A				
3	•				<b>✓</b>	N/A				
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?				<b>✓</b>					
5	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)			be natural	<b>✓</b>					
6	Is the so	lar radiation sensor pl	lumb?		<b>✓</b>	N/A				
7	Is it sited light?	d to avoid shading, or	any artificial o	r reflected	<b>✓</b>	N/A				
8	Is the ra	in gauge plumb?			✓	N/A				
9	Is it sited towers, o	d to avoid sheltering eletc?	ffects from buil	dings, trees,	<b>✓</b>	N/A				
10	Is the su facing n	rface wetness sensor sorth?	ited with the gr	rid surface	<b>✓</b>	N/A				
11	Is it inc	lined approximately 30	0 degrees?		<b>✓</b>	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:

Fic	eld Systems Data Form		F-02058-1500-S4-rev002
Site	PNF126 Technician Eric Hebert		Site Visit Date 11/15/2018
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	<b>✓</b>	Temperature only
2	Are all the meteorological sensors operational online, and reporting data?	<b>✓</b>	Temperature only
3	Are the shields for the temperature and RH sensors clean?	<b>✓</b>	
4	Are the aspirated motors working?	<b>✓</b>	N/A
5	Is the solar radiation sensor's lens clean and free of scratches?	<b>✓</b>	N/A
6	Is the surface wetness sensor grid clean and undamaged?	<b>✓</b>	N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	<b>✓</b>	
8	Are the sensor signal and power cable connections protected from the elements and well maintained?		
	ide any additional explanation (photograph or sketch if necestral or man-made, that may affect the monitoring parameters		regarding conditions listed above, or any other features,

### Field Systems Data Form F-02058-1500-S5-rev002 PNF126 Technician | Eric Hebert Site Visit Date 11/15/2018 Site ID Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E **~** Do the sample inlets have at least a 270 degree arc of unrestricted airflow? **~** Are the sample inlets 3 - 15 meters above the ground? **~** Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and maintenance **~** Do the analyzers and equipment appear to be in good condition and well maintained? **~** Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. 1/4 teflon by 12 meters Describe dry dep sample tube. 3/8 teflon by 12 meters At inlet only Are in-line filters used in the ozone sample line? (if ves indicate location) **✓** Are sample lines clean, free of kinks, moisture, and obstructions? **V** Is the zero air supply desiccant unsaturated? Flow line only Are there moisture traps in the sample lines? Is there a rotometer in the dry deposition filter line, and is it Clean and dry 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	e ID	PNF126	Technician	Eric Hebert		Site Vis	it Date 11/15/201	8	
	DAS ser	nsor translators, and	nerinheral equi	oment operation	ทธ ๑า	nd maintens	nce		
				_		iu mamicha	<del>ince</del>		
1	Do the I well mai	OAS instruments appentained?	ear to be in good	condition and	<b>✓</b>				
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?				<b>✓</b>				
6	Are the DAS, sensor translators, and shelter properly grounded?				<b>✓</b>				
7	Does the instrument shelter have a stable power source?				<b>✓</b>				
8	Is the instrument shelter temperature controlled?			<b>✓</b>					
9	Is the m	et tower stable and gr	ounded?			Stable		Grounded	
10	Is the sa	mple tower stable and	l grounded?						
						<b>✓</b>			
11	Tower c	omments?				Met tower re	emoved		
		additional explanatio an-made, that may a				y) regardin	g conditions listed	d above, or a	any other features,
The	sample t	owers are not grounded	d.						

#### **Field Systems Data Form** F-02058-1500-S7-rev002 PNF126 Technician | Eric Hebert Site Visit Date 11/15/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? N/A Yes No Yes No N/A **✓ ✓** Wind speed sensor **Data logger V** Wind direction sensor **V Data logger V V** П Temperature sensor Strip chart recorder **✓ V** Relative humidity sensor Computer П **V** Solar radiation sensor **V** Modem П **V V Printer** Surface wetness sensor ✓ **V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V V Humidity sensor translator Surge protector** П **V V UPS Solar radiation translator ~ V** Tipping bucket rain gauge Lightning protection device ~ **V Shelter heater** Ozone analyzer **V ✓** 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 V V SSRF ✓ V ✓ Site Ops Manual** Oct 2001 **V V HASP** Oct 2015 **✓ Field Ops Manual V** Oct 2015 **Calibration Reports** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Minimal information Ozone checks on filter off date Are the Site Status Report Forms being completed and current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab?

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:

Are ozone z/s/p control charts properly completed and

current?

Control charts not used

### **Field Systems Data Form** F-02058-1500-S8-rev002 PNF126 Technician | Eric Hebert Site Visit Date 11/15/2018 Site ID Site operation procedures Trained in Gainesville in 1987 Has the site operator attended a formal CASTNET training ✓ course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **V** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? 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? **Compliant QC Check Performed Frequency V ✓** Semiannually **Multipoint Calibrations ✓ V** Weekly **Visual Inspections V** N/A Translator Zero/Span Tests (climatronics) **✓ V** N/A **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? OC Check Performed Compliant Frequency

QC Check I citorined	Frequency		Compilant
<b>Multi-point Calibrations</b>	Semiannual	lly	✓
Automatic Zero/Span Tests	<b>✓</b> Daily		$\checkmark$
Manual Zero/Span Tests			
<b>Automatic Precision Level Tests</b>	<b>✓</b> Daily		$\checkmark$
<b>Manual Precision Level Test</b>			
<b>Analyzer Diagnostics Tests</b>	Weekly		✓
In-line Filter Replacement (at inlet)	✓ Monthly		✓
In-line Filter Replacement (at analyze			✓
Sample Line Check for Dirt/Water	✓ Weekly		✓
Zero Air Desiccant Check	Weekly		✓
1 Do multi-point calibration gases go thro sample train including all filters?	ugh the complete	Unknown	
2 Do automatic and manual z/s/p gasses go	o through the	<b>✓</b>	
complete sample train including all filter			
3 Are the automatic and manual z/s/p checreported? If yes, how?	cks monitored and	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 PNF126 Technician Eric Hebert Site Visit Date 11/15/2018 Site ID Site operation procedures Is the filter pack being changed every Tuesday as scheduled? Filter changed mornings Ozone checks on filter off date Are the Site Status Report Forms being completed and filed correctly? No longer required Are data downloads and backups being performed as scheduled? **✓** SSRF Are general observations being made and recorded? How? Are site supplies on-hand and replenished in a timely fashion? SSRF, call-in Are sample flow rates recorded? How? Are samples sent to the lab on a regular schedule in a timely fashion? ✓ One set of gloves only Are filters protected from contamination during handling and shipping? How? **~** Are the site conditions reported regularly to the field operations manager or staff? **QC Check Performed Compliant Frequency V** ✓ Semiannually **Multi-point MFC Calibrations** Weekly **V** Flow System Leak Checks **Filter Pack Inspection V ✓** Weekly **Flow Rate Setting Checks V ✓** Weekly **Visual Check of Flow Rate Rotometer** ✓ Semiannually **V In-line Filter Inspection/Replacement ✓** Weekly 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 site operator was not available for the systems audit. The reported information was obtained from the site log and site documentation.

# Field Systems Data Form

### F-02058-1500-S10-rev002

Site ID

PNF126

Technician Eric Hebert

Site Visit Date 11/15/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	0759
DAS	Campbell	CR3000	3817	illegible
Elevation	Elevation	<u> </u> 1	None	None
Filter pack flow pump	Thomas	107CAB18	060400022677	06030
Flow Rate	Apex	AXMC105LPMDPC	illegible	000655
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0844349884	06597
Ozone	ThermoElectron Inc	49i A1NAA	1105347316	000741
Ozone Standard	ThermoElectron Inc	49i A3NAA	0726124691	000363
Sample Tower	Aluma Tower	В	none	000178
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	6701	04687
Zero air pump	Teledyne	701H	610	000774
Zero air pump	Werther International	C 70/4	000814270	06885

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
BEI	L116-Eric H	ebert-11/17/2018				
1	11/17/2018	Computer	Dell	07005	Inspiron 15	Unknown
2	11/17/2018	DAS	Campbell	000341	CR3000	2120
3	11/17/2018	Elevation	Elevation	None	1	None
4	11/17/2018	Filter pack flow pump	Thomas	02755	107CAB18	1192001881
5	11/17/2018	Flow Rate	Apex	000596	AXMC105LPMDPCV	illegible
6	11/17/2018	Infrastructure	Infrastructure	none	none	none
7	11/17/2018	Met tower	Universal Tower	06484	unknown	none
8	11/17/2018	Modem	Raven	06475	H4222-C	0808311155
9	11/17/2018	Ozone	ThermoElectron Inc	000684	49i A1NAA	1030244795
10	11/17/2018	Ozone Standard	ThermoElectron Inc	000373	49i A3NAA	0726124685
11	11/17/2018	Precipitation	Texas Electronics	06332	TR-525i-HT	43527-807
12	11/17/2018	Relative Humidity	Vaisala	06010	HMP50UA	A1040002
13	11/17/2018	Sample Tower	Aluma Tower	000127	В	none
14	11/17/2018	Shelter Temperature	Campbell	none	107-L	44281
15	11/17/2018	Shield (10 meter)	RM Young	05042	Aspirated 43408	none
16	11/17/2018	Shield (2 meter)	RM Young	05041	Aspirated 43408	none
17	11/17/2018	Siting Criteria	Siting Criteria	None	1	None
18	11/17/2018	Solar Radiation	Licor	06959	LI-200	illegible
19	11/17/2018	Solar Radiation Translator	RM Young	03412	70101-X	none
20	11/17/2018	Surface Wetness	RM Young	04608	58101	none
21	11/17/2018	Temperature	RM Young	06308	41342VO	12533
22	11/17/2018	Temperature2meter	RM Young	05045	41342VO	9641
23	11/17/2018	Wind Direction	RM Young	04405	AQ05305	35870wdr
24	11/17/2018	Wind Speed	RM Young	04405	AQ05305	35870wsp
25	11/17/2018	Zero air pump	Werther International	06913	C 70/4	000829178

#### **DAS Data Form** 0.05 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2120 BEL116 Eric Hebert 11/17/2018 DAS Primary Das Date: 11/17/2018 **Audit Date** 11/17/2018 Datel Parameter DAS Mfg 10:00:03 10:00:00 Das Time: **Audit Time** Tfer Desc. Source generator (D 4000392 **Serial Number** Das Day: 321 **Audit Day** 321 Tfer ID 01321 **Low Channel: High Channel: Avg Diff: Avg Diff: Max Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0001 0.0000 0.0001 0.0000 1/22/2015 1.00000 **Cert Date** CorrCoff Fluke **Parameter** DAS Mfg **Serial Number** 86590148 Tfer Desc. DVM 01310 Tfer ID 1.00000 0.00000 **Slope Intercept** 1/24/2018 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output **DAS** Output InputUnit OutputUnit Difference 0.0000 0.0000 0.0000 0.0000 V V 7 0.1000 0.1000 0.1000 0.00007 0.3000 0.3001 0.3001 V V 0.0000 7 0.5000 0.5001 V V 0.00000.5001 7 0.7000 V V 0.0000 0.7002 0.7002 V V 7 0.9000 0.9003 0.9002 -0.0001 7 V V -0.0001 1.0000 1.0003 1.0002

### Flow Data Form

<b>Afg</b>	Serial Nun	nber Ta S	Site	Tec	hnician	Site Visit I	Date Param	ieter	Owner ID
рех	illegible		BEL116	Eric	Hebert	11/17/2018	Flow R	ate	000596
				]	Mfg	BIOS	P	arameter Flo	ow Rate
					Serial Number	122974	Т	fer Desc. Bl	OS 220-H
				,	Tfer ID	01416			
					Slope	1.	00178 <b>Int</b> e	ercept	0.0016
					Cert Date	7/13		rCoff	1.0000
DAS 1:		DAS 2:			Cal Factor Z		0.0	_	
A Avg % Diff:		A Avg %I	Dif A Max	: % Di	Cal Factor F		1.0		
1.12%	1.35%				Rotometer R	leading:	1	.5	
Desc.	Test type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	I PctDifference
primary	pump off	0.000	0.000	-0.05	0.000	-0.01	1/m	1/m	
primary	leak check	0.000	0.000	-0.03	0.000	0.01	1/m	1/m	
primary	test pt 1	1.485	1.480	1.49	0.000	1.50	1/m	1/m	1.35%
primary	test pt 2	1.488	1.480	1.49	0.000	1.50	1/m	1/m	1.35%
primary	test pt 3	1.490	1.490	1.49	0.000	1.50	1/m	1/m	0.67%
Sensor Compo	onent Leak Tes	st		Condition	1		Status	pass	
Sensor Compo	onent Tubing C	ondition		Condition	Good		Status	pass	
Sensor Compo	onent Filter Pos	sition		Condition	Good		Status	pass	
Sensor Compo	onent Rotomete	er Condition		Condition	Clean and dry		Status	pass	
Sensor Compo	onent Moisture	Present		Condition	No moisture p	resent	Status	pass	
Sensor Compo	onent Filter Dis	tance		Condition	6.0 cm		Status	pass	
Sensor Compo	onent Filter Dep	oth		Condition	2.5 cm		Status	`\	
Sensor Compe	onent Filter Azi	muth		Condition	180 deg		Status	pass	
Sensor Compo	onent System N	Memo		Condition	1		Status	pass	

### **Ozone Data Form**

Mfg	Serial Numbe	r Ta Site	T	echnician	Site Visit Date	Parame	ter Owner ID
ThermoElectron Inc	1030244795	BEL116	E	Eric Hebert	11/17/2018	Ozone	000684
Intercept -0.	99399 Slope 56529 Inter 00000 Corr	rcept	.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180930075 01115		rameter ozone er Desc. Ozone primary stan
DAS 1: A Avg % Diff: A Ma 0.0%		AS 2: Avg %Dif A	Max % Di	Slope Cert Date	1.0032		
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerI	Dif AbsDif
primary	1	-0.06	-0.13	-0.72	ppb		-0.59
primary	2	14.50	14.38	13.80	ppb		-0.58
primary	3	36.45	36.26	35.35	ppb		-2.54
primary primary	5	68.53 111.91	68.23 111.48	67.38 110.20	ppb ppb		-1.25 -1.15
Sensor Component				tion Good	ppo		
Sensor Component			Condit			Status Status	
Sensor Component	Inlet Filter C	ondition	Condit	t <b>ion</b> Clean		Status	pass
Sensor Component	Battery Back	кир	Condi	tion N/A		Status	pass
Sensor Component	Offset		Condi	tion -0.10		Status	pass
Sensor Component	Span		Condit	1.017		Status	pass
Sensor Component	Zero Voltage	e	Condi	tion N/A		Status	pass
Sensor Component	Fullscale Vo	ltage	Condit	tion N/A		Status	pass
Sensor Component	Cell A Freq.		Condit	tion 101.1 kHz		Status	pass
Sensor Component	Cell A Noise	;	Condit	tion 1.8 ppb		Status	pass
Sensor Component	Cell A Flow		Condit	tion 0.62 lpm		Status	pass
Sensor Component	Cell A Press	ure	Condit	717.2 mmHg		Status	pass
Sensor Component	Cell A Tmp.		Condit	32.4 C		Status	pass
Sensor Component	Cell B Freq.		Condi	92.9 kHz		Status	pass
Sensor Component	Cell B Noise		Condi	2.1 ppb		Status	pass
Sensor Component	Cell B Flow		Condit	0.56 lpm		Status	pass
Sensor Component	Cell B Press	ure	Condit	717.9 mmHg		Status	pass
Sensor Component	Cell B Tmp.		Condit	tion N/A		Status	pass
Sensor Component	Line Loss		Condit	Not tested		Status	pass
Sensor Component	System Men	no	Condit	tion		Status	pass

#### **Wind Speed Data Form** Mfg Serial Number Ta **Technician** Site Visit Date Parameter Owner ID Wind Speed 04405 RM Young BEL116 Eric Hebert 11/17/2018 35870wsp Parameter wind speed Mfg RM Young CA04013 Tfer Desc. wind speed motor (I **Serial Number** 01254 Tfer ID 1.00000 0.00000 **Slope Intercept** 65736 Prop or Cups SN 0.5 **to** 0.6 **Prop or Cups Torque Cert Date** 7/11/2018 **CorrCoff** 1.00000 **Prop Correction Fact** 0.0512 Parameter wind speed Mfg RM Young CA04013 Tfer Desc. wind speed motor (h **Serial Number** 01253 Tfer ID 1.00000 0.00000 **Slope Intercept** 7/11/2018 1.00000 **Cert Date** CorrCoff **DAS 1: DAS 2:** Low Range **High Range** Low Range **High Range** 0.05 0.00% Abs Avg Err 0.19 0.00% Abs Max Er UseDescription: Input RPM Out V Diff/ % Diff Diff WsM Input Device Input m/s DAS m/s 0 0.20 0.0 0.0 -0.19primary none 01254 200 1.02 0.0 1.0 0.00 primary primary 01254 400 2.05 0.0 2.1 0.00 4.10 0.0 4.1 0.00 01254 800 primary 6.1 primary 01254 1200 6.14 0.0 0.00% 12.29 0.0 12.3 0.00% primary 01254 2400 01254 4000 20.48 0.0 20.5 0.00% primary primary 01254 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

**Condition** N/A

**Condition** Plumb

Condition

**Condition** 

**Status** pass

**Status** pass

**Status** pass

Status pass

Sensor Component | Sensor Heater

Sensor Component | Sensor Plumb

**Sensor Component** System Memo

Sensor Component | Torque

## **Wind Direction Data Form**

Mfg	Serial Nu	nber Ta	Site		7	Гесhnician		Site Visit Date Paramet		eter Owner ID		D	
RM Young	35870wdr		BEL11	6		Eric Hebert		11/17/20	18 W	ind D	irection	04405	
						Mfg		RM Young	g	Pa	arameter[	wind direction	
						Serial Nur	nber	None		Tí	fer Desc.	wind direction	wheel
						Tfer ID		01252					
Vane SN:	N/A	C. A	. Align.	deg. tru	ıe:	Slope			1.00000	Inte	rcept	0.00	000
VaneTorque	8 <b>to</b>	12			80	Cert Date		4/	26/2013	Cor	rCoff	1.00	000
						Mfg		Ushikata		Pa	arameter	wind direction	
						Serial Nur	nber	191832		Tí	fer Desc.	transit	
						Tfer ID		01272					
						Slope			1.00000	Inte	rcept	0.00	000
						Cert Date		5/	10/2018		rCoff	1.00	000
	DAS 1:			DAS 2:		L							
	Orientation	Linearit	y:	Orienta	tion	Linearity:							
Abs Avg Err	3.5		0.9										
Abs Max Er	5		2										
UseDescription	on TferID	Ir	put Rav	v Lin	earity	Output V	Out	out Deg.	Differen	ce	Change	Error	
primary	01252		0		<b>v</b>	0.000		355		5		###########	
primary	01252		45		<b>✓</b>	0.000		40		6	44.5	-0.5	
primary	01252		90		<b>✓</b>	0.000		85		5	45.2	###########	
primary	01252		135		<b>✓</b>	0.000		129		6	44.3	###########	
primary	01252		180		<b>✓</b>	0.000		175		5	46.2	###########	
primary	01252		225		<b>✓</b>	0.000		222		4	46.3	###########	
primary	01252		270		<b>✓</b>	0.000		268		2	46		
primary	01252		315		<b>✓</b>	0.000		312		3	44.6	##########	
primary	01272		90			0.000		85		5		5	
primary	01272		180			0.000		175		5		5	
primary	01272		270			0.000		268		2		2	
primary	01272		360			0.000		2		2		2	
Sensor Com	ponent Conditio	n			Condi	<b>tion</b> Good			Si	tatus	pass		
Sensor Com	ponent Mast				Condi	tion Good			Si	tatus	pass		
Sensor Com	ponent Sensor I	Heater			Condi	tion N/A			Si	tatus	pass		
Sensor Com	ponent Sensor F	Plumb			Condi	tion Plumb			Si	tatus	pass		
Sensor Com	ponent Torque				Condi	tion			Si	tatus	pass		
Sensor Com	ponent Vane Co	ndition			Condi	tion Good			S	tatus	pass		
Sensor Com	ponent System	Memo			Condi	tion			St	tatus	pass		

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg RM Young 12533 BEL116 Eric Hebert 11/17/2018 Temperature 06308 Mfg Extech Parameter Temperature Tfer Desc. RTD H232679 **Serial Number** 01228 **Tfer ID** -0.09210 **Slope** 1.00757 **Intercept DAS 1: DAS 2:** 2/13/2018 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.41 0.72 Test type UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal | OutputSignalEng | OSE Unit | Difference primary Temp Low Range 0.19 0.28 0.000 0.36 $\mathbf{C}$ 0.08 22.94 C Temp Mid Range 23.02 0.000 22.50 -0.44 primary C -0.72 primary Temp High Range 49.17 48.89 0.000 48.17 Sensor Component | Shield Status pass **Condition** Moderately clean Sensor Component Blower **Condition** Functioning **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

#### 2 Meter Temperature Data Form Calc. Difference Serial Number Ta **Technician** Site Visit Date Parameter Mfg Site **Owner ID** BEL116 05045 RM Young 9641 Eric Hebert 11/17/2018 Temperature2meter Parameter Temperature Mfg Extech H232679 Tfer Desc. RTD **Serial Number** 01228 Tfer ID **Slope** 1.00757 **Intercept** -0.09210 **DAS 1: DAS 2:** 2/13/2018 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.09 0.15 Test type Difference UseDescription InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit primary Temp Low Rang 0.19 0.28 0.000 0.18 C -0.1 22.79 C Temp Mid Rang 23.02 22.94 0.000 -0.15 primary primary Temp High Rang 49.17 48.89 0.000 48.90 C 0.01 Sensor Component | Properly Sited **Condition** Properly sited **Status** pass Sensor Component | Shield Condition | Moderately clean **Status** pass Status pass Sensor Component Blower **Condition** Functioning Sensor Component Blower Status Switch Status pass **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Humidity Data Form** Serial Number Ta **Technician** Site Visit Date Parameter **Owner ID** Mfg Site BEL116 Eric Hebert 11/17/2018 Relative Humidity 06010 Vaisala A1040002 Mfg Rotronic Parameter Relative Humidity Tfer Desc. Hygroclip 124432 **Serial Number** 01225 **Tfer ID Slope** 0.94752 **Intercept** -0.38371 **Cert Date** 11/17/2018 0.99971 CorrCoff **DAS 1: DAS 2:** Low Range **High Range** Low Range **High Range** 3.4 **Abs Avg Err** 5.0 **Abs Max Er** UseDesc. Test type Device Input RH GTL Raw RH Corr. DAS Volts DAS %RH Difference Hygroclip 30.4 0.000 4.0 primary RH Low Range 32.8 32.8 36.8 50.3 0.000 -1.1 primary RH Low Range Hygroclip 52.9 52.9 51.8 primary RH Low Range Hygroclip 75.3 70.7 75.3 0.000 80.3 5.0 Status pass Sensor Component | RH Filter **Condition** Moderately clean 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 Status pass Condition

#### **Solar Radiation Data Form** Serial Number Ta **Technician** Site Visit Date Parameter Owner ID Mfg Eric Hebert Solar Radiation Licor illegible BEL116 11/17/2018 06959 Mfg **Eppley** Parameter solar radiation RM Young Mfg Tfer Desc. SR transfer translat 10765 **Serial Number** 03412 **SN/Owner ID** none 01246 Tfer ID **Parameter** Solar Radiation Translator **Slope** 1.00000 **Intercept** 0.00000 **DAS 1: DAS 2:** 2/14/2018 1.00000 Cert Date CorrCoff % Diff of Avg %Diff of Max %Diff of Avg %Diff of Max Parameter solar radiation Mfg **Eppley** Tfer Desc. SR transfer sensor **Serial Number** 34341F3 Tfer ID 01245 1.00000 0.00000 **Slope Intercept Cert Date** 2/14/2018 CorrCoff 1.00000 3.7% 0.0% 4.5% 0.0% MeasureTime Tfer Raw Tfer Corr DAS w/m2 PctDifference UseDescription Measure Date primary 11/17/2018 12:00 384 384 393 2.3% 13:00 494 494 3.7% 11/17/2018 512 primary primary 11/17/2018 14:00 453 453 479 5.7% 329 349 primary 11/17/2018 15:00 328 6.5% 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	S	erial Number Ta	Site	,	Tec	hnician		Site	Visit Date	Paramo	eter		Owner ID
Texas Electron	ics 4	3527-807	BEL116		Eric	c Hebert		11/	17/2018	Precipit	ation		06332
						Mfg		PMF	)	Pa	rame	ter Pre	ecipitation
<b>DAS 1:</b>		<b>DAS 2:</b>				Serial Nun	ber	Non	е	Tf	er De	sc. 25	Oml graduate
	: A Ma	x % Di A Avg	%Dif A	Max % Di	,	Tfer ID		0124	19				
2.0%		4.0%				~ <del>-</del>			4 0000				0.00000
						Slope		L	1.0000	Inte	rcept		0.00000
						Cert Date			4/26/201	3 Cori	rCoff		1.00000
UseDesc.	Test t	ype TferVolum	Iteration	TimePerTi	in	Eq.Ht	DAS	leng	Fa HtUnit	OSE Ur	it Tfa	erI Init	s PctDifference
	test 1	231.5	1	12 sec	IP	0.50		52	in	in	110 110	ml	4.0%
1 -	test 2	231.5	2	12 sec		0.50	0	50	in	in		ml	0.0%
Sensor Com	ponent	Properly Sited		Cond	itio	n 45 degree	e rule			Status	pass		
Sensor Com	ponent	Gauge Drain Scre	en	Cond	itio	n Installed				Status	pass		
Sensor Com	ponent	Funnel Clean		Cond	itio	n Clean				Status	pass		
Sensor Com	ponent	Condition		Cond	itio	Good				Status	pass		
Sensor Com	ponent	Gauge Screen		Cond	itio	n Installed				Status	Fail		
Sensor Com	ponent	Gauge Clean		Cond	itio	n Moderate	ly cle	an		Status	pass		
Sensor Com	ponent	Level		Cond	itio	n Level				Status	pass		
Sensor Com	ponent	Sensor Heater		Cond	itio	n unable to	test			Status	pass		
Sensor Com	ponent	System Memo		Cond	itio	n				Status	pass		

### **Surface Wetness Data Form**

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	none	BEL116	Eric Hebert	11/17/2018	Surface Wetness	04608

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

### **✓** Manual Test Pass

UseDescription	Test Type	Tfer kOhms	OutputSignal	DAS eng	OutputSignalEngUni	TferUnits	OutputSignalUnit
primary	wet	N/A	1.015	1.01	V	N/A	V
primary	dry	N/A	0.003	0.01	V	N/A	V

Sensor Component	Properly Sited	<b>Condition</b>	Properly sited	Status	pass
Sensor Component	Grid Clean	Condition	Clean	Status	pass
Sensor Component	Grid Angle	Condition	about 45 deg	Status	pass
<b>Sensor Component</b>	Grid Orientation	Condition	North	Status	pass
Sensor Component	Grid Condition	<b>Condition</b>	air	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 44281 BEL116 Eric Hebert 11/17/2018 Shelter Temperature none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperatur Abs Avg Err Abs Max Er **Abs Avg Err** Abs Max Er Tfer Desc. RTD H232679 **Serial Number** 0.11 0.11 01228 **Tfer ID** 1.00757 -0.09210 **Slope** Intercept 2/13/2018 CorrCoff 1.00000 **Cert Date** InputTmpCorr. OutputTmpSignal | OutputSignalEng | OSE Unit | Difference | UseDesc. Test type InputTmpRaw primary Temp Mid Range 26.31 0.000 26.20 26.1 $\mathbf{C}$ -0.11 C Temp Mid Range 26.26 26.15 0.000 26.1 -0.1 primary Sensor Component | System Memo Status pass Condition

### **Infrastructure Data For** Site Visit Date 11/17/2018 BEL116 Technician Eric Hebert Site ID **Shelter Make Shelter Model Shelter Size** Unknown Unknown Unknown Sensor Component | Sample Tower Type Status pass **Condition** Type B **Condition** Good Sensor Component | Conduit Status pass **Sensor Component** Met Tower **Condition** Good Status pass **Condition** Installed **Sensor Component** Moisture Trap **Status** pass **Condition** Good Sensor Component | Power Cables **Status** pass Sensor Component | Shelter Temp Control **Condition** Functioning **Status** pass **Condition** Installed Status pass Sensor Component Rotometer

**Condition** Good

**Condition** Fair

**Condition** Good

**Condition** Good

**Condition** Poor

**Condition** Fair

Condition 3/8 teflon

**Condition** Good

Status pass

Status pass

Status pass

Status pass

**Status** Fail

Status pass

Status pass

Status pass

Sensor Component | Sample Tower

Sensor Component | Shelter Door

Sensor Component | Shelter Roof

Sensor Component | Shelter Floor

Sensor Component | Signal Cable

**Sensor Component** Tubing Type

Sensor Component | Sample Train

Sensor Component | Shelter Condition

## **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Precipitation	BEL116	Eric Hebert	11/17/2018	Sensor Heater	Texas Electronic	2408		
The tipping bucket to the performance a	0 0	rires were found to be	e interfering with	h the operation of th	ne tipping mechanis	sm. The conditi	ion was corr	ected prior
Precipitation	BEL116	Eric Hebert	11/17/2018	Properly Sited	Texas Electronic	2408		
Objects violate the	45 degree rule for th	he tipping bucket rai	n gage.					
Temperature	BEL116	Eric Hebert	11/17/2018	System Memo	RM Young	2405		
The sensor signal ca	hles are showing si	ions of wear						

# **Field Systems Comments**

1 Parameter: SitingCriteriaCom

The site is located between Washington DC and Baltimore, MD near a major transportation corridor. Although the site surroundings are woodland and agriculture, the region surrounding the research center is densely populated and urban.

2 Parameter: MetSensorComme

The trees are beginning to encroach on the lower temperature sensor.

3 Parameter: MetOpMaintCom

The outer insulation of both temperature sensor signal cables is broken. The 10 meter temperature sensor signal cable has been spliced.

Field Systems	Data For	rm			F-02058	-1500-S1-rev002
Site ID BEL116		Technician Eric Heb	ert	Site Visit Date	11/17/2018	
Site Sponsor (agency)	EPA			USGS Map	Laurel	
<b>Operating Group</b>	BARC/priv	/ate		Map Scale		
AQS#	24-033-99			Map Date		
Meteorological Type	R.M. Your	na				
Air Pollutant Analyze		D2, NOy, NOx, CO, Hg		QAPP Latitude	39.0283	
Deposition Measuren				QAPP Longitude	-76.8175	
Land Use	urban - ag			QAPP Elevation Mete		
Terrain Terrain	flat	rioditaro		QAPP Declination	11.25	
Conforms to MLM	No			QAPP Declination Da		
					2/23/2000	
Site Telephone	(301) 474			Audit Latitude		39.028177
Site Address 1	BARC old	airport		Audit Longitude		-76.817127
Site Address 2	Springfield	d Road		Audit Elevation		47
County	Prince Ge	orge's		<b>Audit Declination</b>	-11	
City, State	Laurel, MI	ס		Prese	ent	
Zip Code	20708			Fire Extinguisher	New in 2015	i
Time Zone	Eastern			First Aid Kit		
<b>Primary Operator</b>				Safety Glasses		
Primary Op. Phone	ŧ			Safety Hard Hat		
Primary Op. E-mail				Climbing Belt		
<b>Backup Operator</b>				Security Fence		
Backup Op. Phone #				Secure Shelter		
Backup Op. E-mail				Stable Entry Step		
Shelter Working Roo	m Make	Unknown	Mod	del Unknown	Shelter Si	<b>Unknown</b>
Shelter Clean	<b>✓</b> Notes					
Site OK	<b>✓</b> Notes					
	0.5 miles and tur	ore - Washington Parkwa n right (south) onto Spri on the right of the dirt roa	ngfield R	Road. Continue approxi	mately 0.8 miles ar	east for approximately and look for a gate on the

## Field Systems Data Form

F-02058-1500-S2-rev002

Site ID BEL116 Technician Eric Hebert Site Visit Date 11/17/2018

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	25 km	
City 10,000 to 50,000 population	10 km		<b>✓</b>
City 1,000 to 10,000 population	5 km		<b>✓</b>
Major highway, airport or rail yard	2 km		<b>✓</b>
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 between Washington DC and Baltimore, MD near a major transportation corridor. Although the site surroundings are woodland and agriculture, the region surrounding the research center is densely populated and urban.

Fic	eld Sy	stems Data F	orm				8-1500-S3-rev00	
Site	e ID	BEL116	Technician	Eric Hebert		Site Visit Date	11/17/2018	
1		nd speed and direction afluenced by obstructi		as to avoid	<b>✓</b>			
2	(i.e. win	nd sensors mounted so ad sensors should be natially extended boom > not the prevailing wind	ounted atop the 2x the max diar	e tower or on a	<b>✓</b>			
3		tower and sensors plu			<b>✓</b>			
4		temperature shields padiated heat sources s			<b>✓</b>			
5	condition surface	nperature and RH sen ons? (i.e. ground below and not steeply sloped g water should be avo	v sensors should l. Ridges, hollov	be natural	<b>✓</b>			
6	Is the so	olar radiation sensor p	lumb?		<b>✓</b>			
7	Is it site light?	ed to avoid shading, or	any artificial o	r reflected	<b>✓</b>			
8	Is the ra	ain gauge plumb?			<b>✓</b>			
9	Is it site towers,	ed to avoid sheltering o	effects from buil	dings, trees,	<b>✓</b>			
10	Is the su facing n	urface wetness sensor north?	sited with the gr	id surface	<b>✓</b>			
11	Is it inc	clined approximately 3	30 degrees?		<b>✓</b>	About 45 degrees		
		additional explanation				y) regarding condi	itions listed abo	ve, or any other features,

The trees are beginning to encroach on the lower temperature sensor.

Fic	eld Systems Data Form	F-02058-1500-S4-rev002
Site	ID BEL116 Technician Eric Hebert	Site Visit Date 11/17/2018
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?	Signs of wear
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	d 🗹
	de any additional explanation (photograph or sketch if nece ral or man-made, that may affect the monitoring parameters	essary) regarding conditions listed above, or any other features,
The o	uter insulation of both temperature sensor signal cables is broke	n. The 10 meter temperature sensor signal cable has been spliced.

### Field Systems Data Form F-02058-1500-S5-rev002 BEL116 Technician | Eric Hebert Site Visit Date 11/17/2018 Site ID Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E **~** Do the sample inlets have at least a 270 degree arc of unrestricted airflow? **~** Are the sample inlets 3 - 15 meters above the ground? **~** Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and maintenance **~** Do the analyzers and equipment appear to be in good condition and well maintained? **~** Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. 1/4 teflon by 15 meters Describe dry dep sample tube. 3/8 teflon by 15 meters At inlet only Are in-line filters used in the ozone sample line? (if ves indicate location) **~** Are sample lines clean, free of kinks, moisture, and obstructions? **V** Is the zero air supply desiccant unsaturated? Flow line only Are there moisture traps in the sample lines? Is there a rotometer in the dry deposition filter line, and is it Clean and dry 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	S	stems	D	ata	F	orm
			_	-	_	

F-02058-1500-S6-rev002

Site	e ID	BEL116	Technician	Eric Hebert		Site Vis	it Date 11/17/201	8	
	DAC a	ensor translators, and	norinhoral aqui	nment energies	ng 61	nd maintana	200		
	DAS, S	ensor translators, and	peripheral equi	pinent operation	us ai	<u>10 mamtena</u>	ince		
1		DAS instruments appaintained?	ear to be in good	condition and	<b>✓</b>				
2		the components of the n, backup, etc)	e DAS operation	al? (printers,	<b>✓</b>				
3		analyzer and sensor s ng protection circuitry		through	✓	Met sensors	only		
4		e signal connections praintained?	otected from the	e weather and	✓				
5	Are the	e signal leads connecte	d to the correct	DAS channel?	<b>✓</b>				
6	Are the	e DAS, sensor translat led?	ors, and shelter	properly	<b>✓</b>				
7	Does tl	ne instrument shelter l	nave a stable pov	ver source?	<b>✓</b>				
8	Is the i	nstrument shelter tem	perature control	lled?	<b>✓</b>				
9	Is the I	net tower stable and g	rounded?			Stable		<b>Grounded</b>	
10	Is the s	sample tower stable an	d grounded?			<b>✓</b>		<b>✓</b>	
11	Tower	comments?							
		y additional explanati man-made, that may a				y) regardin	g conditions listed	l above, or a	nny other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 BEL116 Technician | Eric Hebert Site Visit Date 11/17/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No Yes N/A No N/A Yes $\overline{\mathbf{V}}$ Wind speed sensor **Data logger V** Wind direction sensor $\checkmark$ **Data logger V** $\checkmark$ П Temperature sensor Strip chart recorder **✓** П Relative humidity sensor Computer **V V** Solar radiation sensor Modem П **~** П **V Printer** Surface wetness sensor $\checkmark$ П **V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V V Humidity sensor translator Surge protector** П $\checkmark$ **V UPS Solar radiation translator** П $\checkmark$ **V** Tipping bucket rain gauge **Lightning protection device** ~ **✓ Shelter heater** Ozone analyzer **V ✓** 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 V V SSRF ✓ V ✓ V Site Ops Manual** Feb 2014 **V HASP V** Oct 2015 **✓ Field Ops Manual** Oct 2015 **V Calibration Reports V V** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current? 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 BEL116 Technician | Eric Hebert Site Visit Date 11/17/2018 Site ID Site operation procedures Trained by previous site operator Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **✓** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? 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 ✓ V** Semiannually **Multipoint Calibrations V V** Weekly **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** Weekly **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values V V** Weekly **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **QC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests Manual Precision Level Test V V** Weekly **Analyzer Diagnostics Tests ~** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Weekly Sample Line Check for Dirt/Water **~ V** Weekly **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?

	Unknown
<b>✓</b>	

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:

Fi	eld Sy	stems Data Form	ı		F-02058-1500-S9-rev002				
Site	e <b>ID</b>	BEL116 Te	echnician Eric Hebert		Site Visit Date	11/17/2018			
	Site ope	ration procedures							
1	Is the fil	ter pack being changed eve	ery Tuesday as scheduled	l? ✓	Filter changed morn	nings			
2	Are the correctly	Site Status Report Forms b	eing completed and filed	<b>✓</b>					
3	Are data	a downloads and backups bed?	eing performed as		No longer required				
4	Are gen	eral observations being mad	de and recorded? How?	<b>✓</b>	SSRF				
5	Are site fashion?	supplies on-hand and reple	enished in a timely	<b>✓</b>					
6	Are sam	ple flow rates recorded? H	ow?	<b>✓</b>	SSRF, call-in				
7	Are sam	pples sent to the lab on a reg	gular schedule in a timel	y 🗸					
8		ers protected from contaminoping? How?	nation during handling	<b>✓</b>	Clean glove on and off				
9		site conditions reported reg ons manager or staff?	gularly to the field	<b>✓</b>					
QC	Check Po	erformed	Frequency			Compliant			
N	Aulti-poir	nt MFC Calibrations	✓ Semiannually			✓			
F	Flow Syste	em Leak Checks	✓ Weekly			$\checkmark$			
F	Filter Pack Inspection								
F	Flow Rate Setting Checks Weekly				✓				
7	Visual Check of Flow Rate Rotometer  Weekly				✓				
I	In-line Filter Inspection/Replacement Semiannually				✓				
S	Sample Li	ne Check for Dirt/Water	Weekly			✓			
		dditional explanation (photon-made, that may affect the			y) regarding conditi	ons listed above, or any other features,			

# Field Systems Data Form

## F-02058-1500-S10-rev002

Site ID

BEL116

Technician Eric Hebert

Site Visit Date 11/17/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07005
DAS	Campbell	CR3000	2120	000341
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	1192001881	02755
Flow Rate	Apex	AXMC105LPMDPC	illegible	000596
Infrastructure	Infrastructure	none	none	none
Met tower	Universal Tower	unknown	none	06484
Modem	Raven	H4222-C	0808311155	06475
Ozone	ThermoElectron Inc	49i A1NAA	1030244795	000684
Ozone Standard	ThermoElectron Inc	49i A3NAA	0726124685	000373
Precipitation	Texas Electronics	TR-525i-HT	43527-807	06332
Relative Humidity	Vaisala	HMP50UA	A1040002	06010
Sample Tower	Aluma Tower	В	none	000127
Shelter Temperature	Campbell	107-L	44281	none
Shield (10 meter)	RM Young	Aspirated 43408	none	05042
Shield (2 meter)	RM Young	Aspirated 43408	none	05041
Siting Criteria	Siting Criteria	1	None	None
Solar Radiation	Licor	LI-200	illegible	06959
Solar Radiation Translator	RM Young	70101-X	none	03412
Surface Wetness	RM Young	58101	none	04608
Temperature	RM Young	41342VO	12533	06308
Temperature2meter	RM Young	41342VO	9641	05045
Wind Direction	RM Young	AQ05305	35870wdr	04405
Wind Speed	RM Young	AQ05305	35870wsp	04405
Zero air pump	Werther International	C 70/4	000829178	06913

# Site Inventory by Site Visit

Site V	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
DUK	7008-Eric F	Hebert-12/05/2018				
1	12/5/2018	DAS	Campbell	000818	CR850	29012
2	12/5/2018	Flow Rate	Apex	000664	AXMC105LPMDPCV	illegible
3	12/5/2018	Modem	Sierra wireless	06998	GX440	Unknown
4	12/5/2018	Temperature	RM Young	06987	41342VC	024331

# Flow Data Form

Mfg Apex	Serial Nun		DUK008	Tec	Eric Hebert		Param Flow R		<b>Owner ID</b> 000664
		Mfg		BIOS		arameter Flo			
					Serial Number	122974	T	fer Desc. BIG	JS 220-H
					Tfer ID	01416			
					Slope	1.	00178 Inte	ercept	0.00161
					Cert Date	7/13	3/2018 Cor	rCoff	1.00000
DAS 1:		DAS 2:			Cal Factor Z	ero		0	
A Avg % Diff:	A Max % Di	A Avg %I	Dif A Max	: % Di	Cal Factor F	ull Scale		0	
1.35%	1.35%				Rotometer R	eading:	1.4	·5	
Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	l PctDifference
primary	pump off	0.000	0.000	0.01	0.000	0.01	1/m	l/m	
primary	leak check	0.000	0.000	0.01	0.000	0.01	1/m	1/m	4.050
primary primary	test pt 1 test pt 2	1.484 1.487	1.480 1.480	1.50	0.000	1.50	1/m 1/m	1/m 1/m	1.35% 1.35%
primary	test pt 2	1.487	1.480	1.50	0.000	1.50	1/m	1/m	1.35%
	nent Leak Tes			Condition			Status		
Sensor Compo	nent Tubing C	Tubing Condition		Condition	Good	Status		pass	
Sensor Compo	onent Filter Pos	Filter Position		Condition	Good	Status		pass	
Sensor Compo	nent Rotomete	er Condition		Condition	Clean and dry		Status	pass	
Sensor Compo	onent Moisture	Present		Condition	No moisture p	resent	Status	pass	
Sensor Compo	onent Filter Dis	tance		Condition	4.0 cm	Status	pass		
Sensor Component Filter Depth			Condition	1.5 cm	Status	pass			
Sensor Compo	onent Filter Azi	muth		Condition	180 deg	Status	pass		
Sensor Component System Memo		Condition	on		Status	pass			

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg RM Young 024331 **DUK008** Eric Hebert 12/05/2018 Temperature 06987 Mfg Extech Parameter Temperature Tfer Desc. RTD H232679 **Serial Number** 01228 Tfer ID -0.09210 **Slope** 1.00757 **Intercept DAS 1: DAS 2:** 2/13/2018 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.52 0.72 UseDesc. Test type InputTmpRaw InputTmpCorr. OutputTmpSignal | OutputSignalEng | OSE Unit | Difference primary Temp Low Range 0.10 0.19 0.000 0.0 $\mathbf{C}$ -0.17 C -0.72 Temp Mid Range 25.71 25.61 0.000 24.9 primary C primary Temp Mid Range 25.55 25.45 0.000 24.9 -0.55 47.24 C -0.66 primary Temp High Range 47.51 0.00046.6 Condition Clean Status pass **Sensor Component** Shield **Sensor Component** Blower Condition N/A Status pass Sensor Component Blower Status Switch **Condition** N/A Status pass Status pass **Sensor Component** System Memo Condition

# **Field Systems Comments**

### 1 Parameter: DasComments

All measurements (temperature and flow rate) are being made above tree canopy approximately 30 meters above ground. There are no CASTNET ozone measurements at this time. The site is considered a small footprint site with logger and flow system on the walk-up tower.

### 2 Parameter: DocumentationCo

The site operator was completing the SSRF observation section on the day of filter removal rather than the installation day.

### 3 Parameter: SitingCriteriaCom

The station measurements are being mace above the tree canopy in the Duke Experimental Forest near Durham, NC.

### 4 Parameter: ShelterCleanNotes

The shelter is custom built and in very good condition.

#### F-02058-1500-S1-rev002 Field Systems Data Form Site Visit Date 12/05/2018 **DUK008** Site ID Technician Eric Hebert **USGS Map EPA** Site Sponsor (agency) **Map Scale** EPA **Operating Group Map Date** AQS# **Meteorological Type** Air Pollutant Analyzer **QAPP** Latitude **Deposition Measurement QAPP** Longitude **Land Use QAPP Elevation Meters** Terrain **QAPP Declination** Conforms to MLM **OAPP Declination Date** 35.9745 **Site Telephone Audit Latitude** -79.099 Site Address 1 **Audit Longitude** Site Address 2 164 **Audit Elevation** Orange **Audit Declination** County NC City, State **Present** Fire Extinguisher ✓ Zip Code **V** Eastern Time Zone First Aid Kit **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **✓** Primary Op. E-mail **Climbing Belt ✓ Backup Operator Security Fence V** Backup Op. Phone # **Secure Shelter** Stable Entry Step Backup Op. E-mail Shelter Working Room ✓ Make Custom Model Unknown **Shelter Size ✓** Notes The shelter is custom built and in very good condition. **Shelter Clean ✓** Notes Site OK

**Driving Directions** 

# Field Systems Data Form

F-02058-1500-S2-rev002

Site ID DUK008 Technician Eric Hebert Site Visit Date 12/05/2018

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		lacksquare
Intensive agricultural ops (including aerial spraying)	500 m		lacksquare
Limited agricultural operations	200 m		✓
Large parking lot	200 m		ightharpoons
Small parking lot	100 m		ightharpoons
Tree line	50 m		ightharpoons
Obstacles to wind	10 times obstacle height		<b>~</b>

Siting Distances OK ✓

**Siting Criteria Comment** 

The station measurements are being mace above the tree canopy in the Duke Experimental Forest near Durham, NC.

### **Field Systems Data Form** F-02058-1500-S3-rev002 Technician Eric Hebert Site Visit Date 12/05/2018 Site ID **DUK008** ✓ N/A Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? **✓** N/A 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) **~** Are the tower and sensors plumb? Are the temperature shields pointed north or positioned to Temperature only avoid radiated heat sources such as buildings, walls, etc? Temperature only 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) **✓** N/A Is the solar radiation sensor plumb? N/A Is it sited to avoid shading, or any artificial or reflected light? **✓** N/A Is the rain gauge plumb? ✓ N/A 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

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,

11 Is it inclined approximately 30 degrees?

natural or man-made, that may affect the monitoring parameters:

Fie	eld Sy	ystems Data	Form			F-02058-1500-S4-rev002
Site	e ID	DUK008	Technician	Eric Hebert		Site Visit Date 12/05/2018
1		the meterological se on, and well mainta		e intact, in good	<b>~</b>	Temperature only
2		the meteorologicaling data?	sensors operation	al online, and	<b>✓</b>	Temperature only
3	Are the	e shields for the tem	perature and RH	sensors clean?	<b>✓</b>	Temperature only
4	Are the	e aspirated motors v	working?		<b>✓</b>	N/A
5	Is the s	solar radiation senso nes?	or's lens clean and	free of	<b>✓</b>	N/A
6	Is the s	surface wetness sens	sor grid clean and	undamaged?	<b>✓</b>	N/A
7		e sensor signal and j on, and well mainta		t, in good	<b>✓</b>	
8		e sensor signal and p he elements and wel		ctions protected	<b>✓</b>	
		additional explanat an-made, that may			ary)	regarding conditions listed above, or any other features,

### Field Systems Data Form F-02058-1500-S5-rev002 DUK008 Technician | Eric Hebert Site Visit Date 12/05/2018 Site ID Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E **✓** Do the sample inlets have at least a 270 degree arc of unrestricted airflow? 30 meters above ground Are the sample inlets 3 - 15 meters above the ground? **~** Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and maintenance **✓** N/A Do the analyzers and equipment appear to be in good condition and well maintained? **✓** N/A Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. N/A Describe dry dep sample tube. 1/4 teflon by 5 meters ✓ N/A Are in-line filters used in the ozone sample line? (if ves indicate location) **~** Are sample lines clean, free of kinks, moisture, and obstructions? ✓ N/A Is the zero air supply desiccant unsaturated? **✓** N/A Are there moisture traps in the sample lines? **✓** 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	e ID	DUK008	Technician	Eric Hebert		Site Visit Da	12/05/201	8	
	DAS, se	ensor translators, and p	eripheral equi	pment operatio	ns ar	nd maintenance			
1		DAS instruments appearintained?	ar to be in good	d condition and	<b>✓</b>				
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	e instrument shelter ha	ive a stable pov	wer source?	<b>✓</b>				
8	Is the in	strument shelter temp	erature contro	lled?	<b>✓</b>	N/A			
9	Is the met tower stable and grounded?					Stable		Grounded	
10	Is the sa	ample tower stable and	grounded?						
11	1 Tower comments?							_	
						L			

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:

All measurements (temperature and flow rate) are being made above tree canopy approximately 30 meters above ground. There are no CASTNET ozone measurements at this time. The site is considered a small footprint site with logger and flow system on the walk-up tower.

#### DUK008 Technician | Eric Hebert Site Visit Date 12/05/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? Yes No N/A No N/A Yes **✓** Wind speed sensor **Data logger V V** Wind direction sensor **Data logger** ✓ **V** П Temperature sensor Strip chart recorder **V V** Relative humidity sensor Computer **V** П Solar radiation sensor **V** Modem П **V V Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V V Humidity sensor translator Surge protector** П **V V UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device V V Shelter heater** Ozone analyzer **✓ V** 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 HASP Field Ops Manual Calibration Reports** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? There is no site logbook Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? N/A Are ozone z/s/p control charts properly completed and current? 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 operator was completing the SSRF observation section on the day of filter removal rather than the installation day.

F-02058-1500-S7-rev002

**Field Systems Data Form** 

#### **Field Systems Data Form** F-02058-1500-S8-rev002 DUK008 Technician | Eric Hebert Site Visit Date 12/05/2018 Site ID Site operation procedures Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **V** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? 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 ✓** N/A **Multipoint Calibrations V** П N/A **Visual Inspections ✓** N/A Translator Zero/Span Tests (climatronics) **✓** N/A **Manual Rain Gauge Test V** Daily **Confirm Reasonableness of Current Values V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **QC Check Performed Compliant** Frequency **Multi-point Calibrations V** N/A **V** N/A **Automatic Zero/Span Tests V** N/A Manual Zero/Span Tests **V** N/A **Automatic Precision Level Tests** N/A **Manual Precision Level Test V** N/A **Analyzer Diagnostics Tests** $\checkmark$ N/A **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V** N/A Sample Line Check for Dirt/Water ✓ N/A **Zero Air Desiccant Check** N/A Do multi-point calibration gases go through the complete sample train including all filters? Do automatic and manual z/s/p gasses go through the N/A complete sample train including all filters?

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:

Are the automatic and manual z/s/p checks monitored and

reported? If yes, how?

✓ N/A

Fi	eld Systems Data F	orm				F-02058-1500-S9-rev0	02
Site	e ID DUK008	Techni	cian Eric Hebert		Site Visit Date	12/05/2018	
	Site operation procedures						
1	Is the filter pack being chang	ed every T	uesday as scheduled	? ✓			
2 Are the Site Status Report Forms being completed and filed correctly?							
3	Are data downloads and back scheduled?	xups being	performed as		No longer required		
4	Are general observations being made and recorded? How?			<b>✓</b>	SSRF		
5	5 Are site supplies on-hand and replenished in a timely fashion?						
6	6 Are sample flow rates recorded? How?				SSRF		
7	Are samples sent to the lab or fashion?	ı a regular	schedule in a timely	<b>✓</b>			
8	Are filters protected from con and shipping? How?	ntaminatio	n during handling	✓	Clean gloves on and	d off	
9	Are the site conditions report operations manager or staff?	ed regular	ly to the field	✓	email		-
QC	Check Performed		Frequency			Compliant	
N	Multi-point MFC Calibrations	<b>✓</b>	Semiannually			<b>✓</b>	
	Flow System Leak Checks Weekly					✓	
F	Filter Pack Inspection						
F	Flow Rate Setting Checks Weekly					✓	
7	Visual Check of Flow Rate Rotometer ✓ Weekly					✓	
I	In-line Filter Inspection/Replacement Semiannually					✓	
S	Sample Line Check for Dirt/Water   ✓ Weekly					$\checkmark$	
	vide any additional explanation Iral or man-made, that may aff				r) regarding conditi	ons listed above, or any other features,	

# Field Systems Data Form

# F-02058-1500-S10-rev002

Site ID	DUK008	Technician	Eric Hebert	Site Visit Date	12/05/2018
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**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR850	29012	000818
Flow Rate	Apex	AXMC105LPMDPC	illegible	000664
Modem	Sierra wireless	GX440	Unknown	06998
Temperature	RM Young	41342VC	024331	06987

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
CO	W137-Sandy	Grenville-12/06/2018				
1	12/6/2018	Computer	Dell	07049	Inspiron 15	1K2MC12
2	12/6/2018	DAS	Campbell	000401	CR3000	2529
3	12/6/2018	elevation	Elevation	none	1	None
4	12/6/2018	Filter pack flow pump	Thomas	02758	107CAB18	001871
5	12/6/2018	Flow Rate	Apex	000467	AXMC105LPMDPCV	43973
6	12/6/2018	Infrastructure	Infrastructure	none	none	none
7	12/6/2018	Modem	Raven	06806	V4221-V	0936444095
8	12/6/2018	Ozone	ThermoElectron Inc	000726	49i A1NAA	1105347314
9	12/6/2018	Ozone Standard	ThermoElectron Inc	000441	49i A3NAA	CM08200017
10	12/6/2018	Sample Tower	Aluma Tower	03499	A	none
11	12/6/2018	Shelter Temperature	Campbell	none	107-L	none
12	12/6/2018	Siting Criteria	Siting Criteria	None	1	None
13	12/6/2018	Temperature	RM Young	02934	41342	none
14	12/6/2018	UPS	APC	none	650	unknown
15	12/6/2018	Zero air pump	Werther International	06940	C 70/4	000821897

#### **DAS Data Form** 0.02 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2529 COW137 Sandy Grenville 12/06/2018 DAS Primary Das Date: 12/6 /2018 **Audit Date** 12/6 /2018 Datel Parameter DAS Mfg 15:59:20 15:59:21 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** Das Day: 340 **Audit Day** 340 Tfer ID 01320 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0005 0.0001 0.0005 0.0001 2/13/2012 1.00000 **Cert Date** CorrCoff Fluke **Parameter** DAS Mfg **Serial Number** 95740135 Tfer Desc. DVM 01311 Tfer ID 1.00000 0.00000 **Slope Intercept** 2/13/2018 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 0.0000 -0.0001 0.0000 0.0001 V V 7 0.1000 0.0998 0.0999 0.0001 7 0.3000 0.2996 0.2997 V V 0.0001 7 0.5000 0.4995 0.4990 V V -0.0005 7 0.7000 V V 0.0000 0.6994 0.6994 7 V V 0.9000 0.8993 0.8992 -0.0001 7 1.0000 0.9992 0.9991 V V -0.0001

#### Flow Data Form **Technician** Site Visit Date Parameter Owner ID Mfg Serial Number Ta Site COW137 Sandy Grenville 000467 Apex 43973 12/06/2018 Flow Rate Mfg BIOS **Parameter** Flow Rate Tfer Desc. BIOS 220-H **Serial Number** 01414 Tfer ID **Slope** 1.00055 **Intercept** -0.01570 2/21/2018 1.00000 CorrCoff **Cert Date** 0 **DAS 1: DAS 2: Cal Factor Zero** 1 **Cal Factor Full Scale** A Avg % Diff: A Max % Di A Avg %Dif A Max % Di 2.60% 3.23% 1.6 **Rotometer Reading:** Test type Input l/m Input Corr MfcDisp. OutputSignal Output S E InputUnit OutputSignal PctDifference Desc. primary pump off 0.000 0.000 0.01 0.000 0.01 1/m1/m 0.01 1/m leak check 0.000 0.000 0.000 -0.01 1/mprimary primary test pt 1 1.514 1.530 1.50 0.000 1.50 1/m 1/m-1.96% 1.532 1.550 1.51 0.000 1.50 1/m1/m -3.23% primary test pt 2 1.530 1.540 1.50 0.000 1.50 1/m -2.60% test pt 3 1/m primary Sensor Component Leak Test **Status** pass Condition Sensor Component Tubing Condition Condition Good **Status** pass

**Condition** Good

Condition 5.0 cm

Condition 0.5 cm

Condition 360 deg

**Condition** 

Condition Clean and dry

**Condition** No moisture present

**Status** pass

**Status** pass

**Status** pass

**Status** pass

**Status** pass

Status pass

Status pass

Sensor Component | Filter Position

Sensor Component Rotometer Condition

Sensor Component | Moisture Present

Sensor Component | Filter Distance

Sensor Component | Filter Depth

Sensor Component | Filter Azimuth

**Sensor Component** System Memo

# **Ozone Data Form**

Mfg	S	erial Numbe	er Ta Site		Tec	chnician	Site Visit Date	Parame	eter	Owner 1	ID
ThermoElectron Inc 1105347314 COW137		W137	Sandy Grenville		12/06/2018 Ozor			000726			
Intercept -0.12425 Intercept 0		0.0000 0.0000 0.0000	Serial Number				rameter er Desc	r ozone Ozone primar	y stan		
DAS 1:		<b>D</b> A	AS 2:			Slope	1.0029	00 Inter	rcept	0.10	0980
		A Max	% Di	Cert Date	9/7/201	- 18 Cori	·Coff	1.00	0000		
0.0%		0.0%									'
UseDescription	C	ConcGroup	Tfer Ray	w T	fer Corr	Site	Site Unit	RelPer	Dif	AbsDif	
primary		2	0.27 16.57		0.15	0.07	ppb			-0.08	
primary primary		3	35.52		35.30	35.13	ppb ppb		-0.48	-0.29	
primary		4	67.78		67.47	67.53	ppb		0.09		
primary		5	111.68		111.24	110.90	ppb		-0.31		
Sensor Compo	nent	Sample Trai	in		Conditio	Good		Status	pass		
Sensor Compo	nent	22.5 degree	rule		Condition	on		Status	pass		
Sensor Component		Inlet Filter Condition		Conditio	Clean		Status	pass			
Sensor Component		Battery Backup		Condition Not functioning		9	Status Fail				
Sensor Compo	nent	Offset	Offset		Condition 0.02			Status	pass		
Sensor Compo	nent	Span			Conditio	n 1.020		Status	pass		
Sensor Compo	nent	Zero Voltage	е		Conditio		Status	pass			
Sensor Compo	nent	Fullscale Vo	ltage		Conditio	N/A		Status	pass		
Sensor Compo	nent	Cell A Freq.			Conditio	109.3 kHz		Status pass			
Sensor Compo	nent	Cell A Noise	)		Conditio	0.6 ppb		Status	pass		
Sensor Compo	nent	Cell A Flow			Conditio	0.63 lpm	Status pass		pass		
Sensor Compo	nent	Cell A Press	sure		Conditio	673.2 mmHg	673.2 mmHg		pass		
Sensor Compo	nent	Cell A Tmp.			Condition 36.2 C			Status	pass		
Sensor Component Cell B Freq.			Conditio	86.8 kHz		Status	pass				
Sensor Component Cell B Noise			-	0.4 ppb		Status	pass				
Sensor Component Cell B Flow		-	0.62 lpm		Status pas						
Sensor Component Cell B Pressure		-	673.8 mmHg		Status						
Sensor Compo	nent	Cell B Tmp.			Conditio			Status	pass		
Sensor Compo	nent	Line Loss			Conditio	Not tested		Status	pass		
Sensor Compo	nent	System Mer	no	Sensor Component System Memo				Status	pass		

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young COW137 12/06/2018 Temperature 02934 none Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 **Tfer ID** 0.09168 **Slope** 1.00798 **Intercept DAS 1: DAS 2:** 2/13/2018 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.07 0.10 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.17 0.08 0.000 0.2 $\mathbf{C}$ 0.1 C -0.02 Temp Mid Range 25.05 24.76 0.000 24.7 primary 48.97 48.49 0.000 48.4 C -0.09 primary Temp High Range Status Fail Sensor Component | Shield **Condition** Dirty Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** COW137 Sandy Grenville 12/06/2018 Shelter Temperature Campbell none none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperatur Abs Avg Err **Abs Max Er** Abs Avg Err **Abs Max Er** Tfer Desc. RTD H232734 **Serial Number** 1.08 1.16 01227 **Tfer ID** 1.00798 0.09168 Slope Intercept 2/13/2018 CorrCoff 1.00000 **Cert Date**

primary         Temp Mid Range         26.66         26.36         0.000         25.2         C         -1.12           primary         Temp Mid Range         27.23         26.92         0.000         26.0         C         -0.97	UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary Temp Mid Range 27.23 26.92 0.000 26.0 C -0.97	primary	Temp Mid Range	17.18	16.95	0.000	18.1	C	1.16
	primary	Temp Mid Range	26.66	26.36	0.000	25.2	C	-1.12
Surgery Company System Mome	primary	Temp Mid Range	27.23	26.92	0.000	26.0	С	-0.97
Sensor Component System Memo Condition Status pass	Sensor Com	ponent System Memo	).	Condition		Status	pass	

### **Infrastructure Data For**

Site ID	COW137	Technician Sandy	Grenville Site Visit Date 12/06/2018	
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
<b>Sensor Component</b>	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	Fair	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 met tower has been removed and a new sample tower has been installed.

2 Parameter: SitingCriteriaCom

Construction was completed on new building with a parking lot, in October 2004. The parking area is within 60 meters of the site.

3 Parameter: ShelterCleanNotes

The shelter walls and floor have been replaced since the previous audit. There are some wet spots from an apparent leak near the north and south walls.

#### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 12/06/2018 COW137 Technician Sandy Grenville Site ID **Prentiss USGS Map** EPA/USFS Site Sponsor (agency) Map Scale USFS **Operating Group Map Date** 37-113-9991 AQS# Climatronics **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude **Deposition Measurement** dry, wet **QAPP** Longitude woodland - mixed Land Use **QAPP Elevation Meters** complex **Terrain QAPP Declination** No Conforms to MLM **OAPP Declination Date** 8283697919 35.060527 **Site Telephone Audit Latitude** Southeastern Forest Experiment Statio -83.43034 Site Address 1 **Audit Longitude** 3160 Coweeta Lab Road Site Address 2 **Audit Elevation** 683 Macon -5.1 County **Audit Declination** , NC City, State **Present** Fire Extinguisher ✓ 28763 New in 2015 Zip Code Eastern **First Aid Kit** Time Zone **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # Primary Op. E-mail **Climbing Belt Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Step Backup Op. E-mail Shelter Working Room ✓ Make Model 8810 Ekto **Shelter Size** 640 cuft

from an apparent leak near the north and south walls.

The shelter walls and floor have been replaced since the previous audit. There are some wet spots

**✓** Notes

**✓** Notes

Shelter Clean

**Driving Directions** 

Site OK

# Field Systems Data Form

F-02058-1500-S2-rev002

Site ID COW137 Technician Sandy Grenville Site Visit Date 12/06/2018

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	60 m	
Tree line	50 m	40 m	
Obstacles to wind	10 times obstacle height		✓

Siting Distances OK **✓** 

**Siting Criteria Comment** 

Construction was completed on new building with a parking lot, in October 2004. The parking area is within 60 meters of the site.

Fie	eld Systems Data Form		F-02058-1500-S3-rev002
Site	COW137 Technician Sandy Grenville		Site Visit Date 12/06/2018
1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	<b>✓</b>	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)	<b>✓</b>	N/A
3	Are the tower and sensors plumb?	<b>✓</b>	N/A
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?	<b>✓</b>	
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)	<b>✓</b>	
6	Is the solar radiation sensor plumb?	<b>✓</b>	N/A
7	Is it sited to avoid shading, or any artificial or reflected light?	<b>✓</b>	N/A
8	Is the rain gauge plumb?	✓	N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	<b>✓</b>	N/A
10	Is the surface wetness sensor sited with the grid surface facing north?	<b>✓</b>	N/A

✓ 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:

11 Is it inclined approximately 30 degrees?

Fie	eld Systems Data Form		F-02058-1500-S4-rev002
Site	Technician Sandy Grenville		Site Visit Date 12/06/2018
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	<b>✓</b>	Temperature only
2	Are all the meteorological sensors operational online, and reporting data?	<b>✓</b>	Temperature only
3	Are the shields for the temperature and RH sensors clean?	<b>✓</b>	
4	Are the aspirated motors working?	<b>✓</b>	
5	Is the solar radiation sensor's lens clean and free of scratches?	<b>✓</b>	N/A
6	Is the surface wetness sensor grid clean and undamaged?	<b>✓</b>	N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	<b>✓</b>	
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	<b>✓</b>	
	de any additional explanation (photograph or sketch if neces al or man-made, that may affect the monitoring parameters:		regarding conditions listed above, or any other features,

### Field Systems Data Form F-02058-1500-S5-rev002 COW137 Technician Sandy Grenville Site Visit Date 12/06/2018 Site ID Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E **~** Do the sample inlets have at least a 270 degree arc of unrestricted airflow? **~** Are the sample inlets 3 - 15 meters above the ground? **~** Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and maintenance **~** Do the analyzers and equipment appear to be in good condition and well maintained? **~** Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. 1/4 teflon by 12 meters Describe dry dep sample tube. 3/8 teflon by 12 meters At inlet only Are in-line filters used in the ozone sample line? (if ves indicate location) **~** Are sample lines clean, free of kinks, moisture, and obstructions? **V** Is the zero air supply desiccant unsaturated? Flow line only Are there moisture traps in the sample lines? Is there a rotometer in the dry deposition filter line, and is it Clean and dry 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	e ID	COW137	Technician	Sandy Grenville		Site Vis	it Date 12/06/201	8	
	DAS e	ensor translators, and	narinharal aqui	nmant anaratio	nc oi	nd maintana	nca		
	DAS, S	ensor translators, and	peripheral equi	oment operation	us a	<u>iu mamiena</u>	ince		
1		DAS instruments app aintained?	ear to be in good	condition and	<b>✓</b>				
2		the components of the n, backup, etc)	e DAS operations	al? (printers,	<b>✓</b>				
3		analyzer and sensor sing protection circuitry		through	<b>✓</b>	Met sensors	only		
4		e signal connections pr aintained?	otected from the	e weather and	<b>✓</b>				
5	Are the signal leads connected to the correct DAS channel?				<b>✓</b>				
6	6 Are the DAS, sensor translators, and shelter properly grounded?								
7	Does th	he instrument shelter l	nave a stable pov	ver source?	<b>✓</b>				
8	Is the i	instrument shelter tem	perature control	led?	<b>✓</b>				
9	Is the I	met tower stable and g	rounded?			Stable		Grounded	
10	Is the s	sample tower stable an	d grounded?			<b>✓</b>		V	
11	Tower	comments?				Met tower re	emoved		
Duc	wide en	v additional avalance	on (nhotograph	on skatab if need	veco.	y) rogandin	a conditions lister	d above or	nny othor footunes
		y additional explanation man-made, that may a				y) regarding	g conumons usted	a above, of a	my other reatures,
The	e met tov	ver has been removed a	nd a new sample	tower has been i	insta	lled.			

#### **Field Systems Data Form** F-02058-1500-S7-rev002 COW137 Technician Sandy Grenville Site Visit Date 12/06/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? N/A Yes No No N/A Yes **✓** Wind speed sensor **Data logger V** Wind direction sensor **V Data logger** ✓ **V** Temperature sensor Strip chart recorder **V V** Relative humidity sensor Computer **V** Solar radiation sensor **V** Modem П **V V Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V** $\checkmark$ **~ Humidity sensor translator Surge protector** П **V ~ UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device** ~ **✓ Shelter heater** Ozone analyzer $\checkmark$ ~ 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 V ✓ SSRF ✓ V ✓ Site Ops Manual** Feb 2014 **HASP V** Feb 2014 **Field Ops Manual Calibration Reports V ✓** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Minimal information Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current?

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 COW137 Technician Sandy Grenville Site Visit Date 12/06/2018 Site ID Site operation procedures Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **V** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? 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 ✓ V** Semiannually **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **QC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** As needed Manual Zero/Span Tests **V ~** Daily **Automatic Precision Level Tests V Manual Precision Level Test** As needed **V V** Weekly **Analyzer Diagnostics Tests ~** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Weekly Sample Line Check for Dirt/Water **~ V** Weekly **Zero Air Desiccant Check ✓** Do multi-point calibration gases go through the complete sample train including all filters?

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:

Do automatic and manual z/s/p gasses go through the

Are the automatic and manual z/s/p checks monitored and

complete sample train including all filters?

reported? If yes, how?

**✓** 

✓

Call-in only

Field Systems L	ata Form		F-02058-1500-89-rev002					
Site ID COW137	Techi	nician Sandy Grenville		Site Visit Date	12/06/2018			
Site operation proce	<u>edures</u>							
1 Is the filter pack be	ng changed every	Tuesday as scheduled	<b>V</b>	Filter changed morr	nings			
2 Are the Site Status correctly?	Report Forms bein	g completed and filed	<b>✓</b>					
3 Are data downloads scheduled?	and backups bein	g performed as		No longer required				
4 Are general observa	tions being made a	and recorded? How?	<b>✓</b>	SSRF				
5 Are site supplies on fashion?	hand and replenis	hed in a timely	<b>✓</b>					
6 Are sample flow rat	Are sample flow rates recorded? How?				-in			
7 Are samples sent to fashion?	the lab on a regula	r schedule in a timely	✓					
8 Are filters protected and shipping? How		on during handling	<b>✓</b>	Clean gloves on and off				
9 Are the site condition operations manager		rly to the field	✓					
QC Check Performed		Frequency			Compliant			
Multi-point MFC Cal	ibrations	Semiannually			<b>✓</b>			
Flow System Leak Ch	ecks	Weekly			✓			
Filter Pack Inspection								
Flow Rate Setting Che	ecks	Weekly			✓			
Visual Check of Flow	Visual Check of Flow Rate Rotometer				✓			
In-line Filter Inspection	In-line Filter Inspection/Replacement				$\checkmark$			
Sample Line Check for	r Dirt/Water	Weekly			$\checkmark$			
Provide any additional exnatural or man-made, tha				regarding conditi	ons listed above, or a	ny other features,		

## Field Systems Data Form

### F-02058-1500-S10-rev002

Site ID

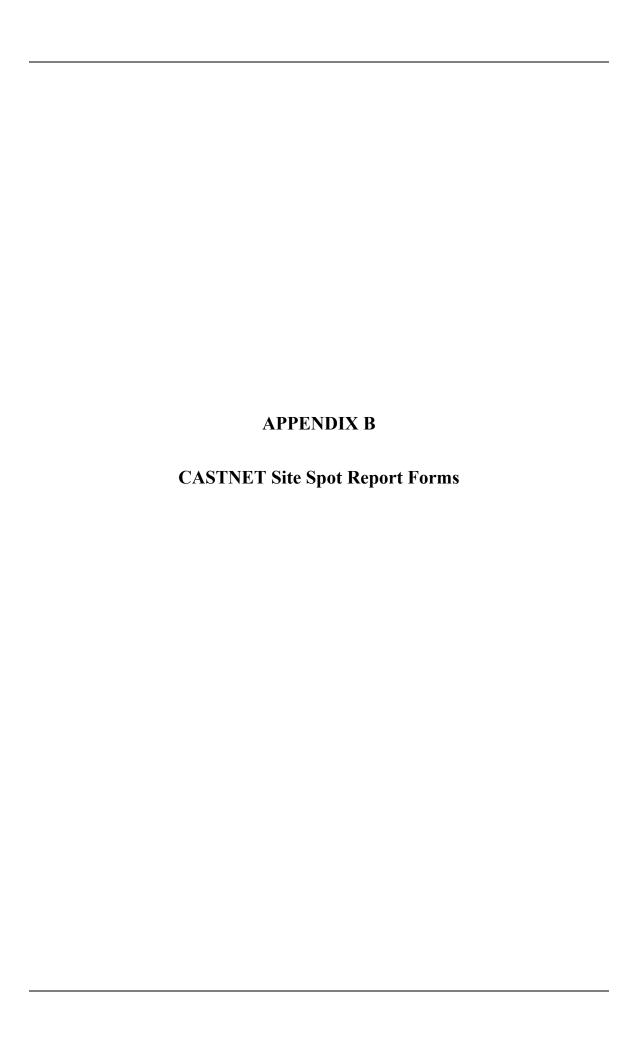
COW137

Technician Sandy Grenville

Site Visit Date 12/06/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	1K2MC12	07049
DAS	Campbell	CR3000	2529	000401
elevation	Elevation	1	None	none
Filter pack flow pump	Thomas	107CAB18	001871	02758
Flow Rate	Apex	AXMC105LPMDPC	43973	000467
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0936444095	06806
Ozone	ThermoElectron Inc	49i A1NAA	1105347314	000726
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200017	000441
Sample Tower	Aluma Tower	A	none	03499
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	none	02934
UPS	APC	650	unknown	none
Zero air pump	Werther International	C 70/4	000821897	06940



**Data Compiled:** 4/1/2019 6:50:06 PM

SiteVisitDate Site Technician

11/08/2018 ABT147 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	3	0.11	c	P
2	Temperature max error	P	4	0.5	3	0.16	c	P
3	Ozone Slope	P	0	1.1	4	1.00265	unitless	P
4	Ozone Intercept	P	0	5	4	0.47031	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99995	unitless	P
6	Ozone % difference avg	P	7	10	4	0.9	%	P
7	Ozone Absolute Difference g1	P	7	3	1	0.83	ppb	P
8	Ozone Absolute Difference g2	P	7	1.5	1	0.02	ppb	P
9	Ozone % difference max	P	7	10	4	1.8	%	P
10	Flow Rate average % difference	P	10	5	4	26.11	%	Fail
11	Flow Rate max % difference	P	10	5	4	26.11	%	Fail
12	DAS Voltage average error	P	7	0.003	56	0.0001	V	P
13	Shelter Temperature average error	P	5	2	15	0.14	c	P
14	Shelter Temperature max error	P	5	2	15	0.17	c	P

11/08/2018

ABT147

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: SiteOpsProcComm

The site operator reported that the "filter time off" field on the SSRF form should be the time that the filter is removed from the tower rather than the time that the filter flow pump is turned off.

2 Parameter: DasComments

The met tower has been removed.

3 Parameter: DocumentationCo

All site instrument manuals are on the site computer desktop folder.

4 Parameter: SitingCriteriaCom

Manure is routinely spread on the hay fields surrounding the site during the summer.

5 Parameter: ShelterCleanNotes

The shelter is clean and well organized.

6 Parameter: MetSensorComme

Temperature mounted in naturally aspirated shield on sample tower.

Data Compiled:

4/2/2019 10:58:31 AM

SiteVisitDate Site Technician

10/03/2018 ACA416 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.14	c	P
2	Temperature2meter max error	P	5	0.5	3	0.26	c	P
3	Wind Speed average error below 5m/s in m/s	P	3	0.5	8	0.32	m/s	P
4	Wind Speed max error below 5m/s in m/s	P	3	0.5	8	0.56	m/s	Fail
5	Wind Speed average % difference above 5 m/s	P	3	5	8	8.2	%	Fail
6	Wind Speed max % difference above 5 m/s	P	3	5	8	26.2	%	Fail
7	Wind Speed Torque average error	P	3	0.5	1	0.20	g-cm	P
8	Wind Speed Torque max error	P	3	0.5	1	0.2	g-cm	P
9	Wind Direction Input Deg True average error (de	P	2	5	8	3.8	degrees	P
10	Wind Direction Input Deg True max error (deg)	P	2	5	8	6	degrees	Fail
11	Wind Direction Linearity average error (deg)	P	2	5	16	1.9	degrees	P
12	Wind Direction Linearity max error (deg)	P	2	5	16	6	degrees	Fail
13	Wind Direction Torque average error	P	2	30	1	8	g-cm	P
14	Wind Direction Torque max error	P	2	30	1	12	g-cm	P
15	Relative Humidity average below 85%	P	6	10	6	2.4	%	P
16	Relative Humidity max below 85%	P	6	10	6	3.7	%	P
17	Solar Radiation % diff of avg	P	9	10	16	0.80	%	P
18	Solar Radiation % diff of max STD value	P	9	10	16	2.7	%	P
19	Precipitation average % difference	P	1	10	2	6.0	%	P
20	Precipitation max % difference	P	1	10	2	6.0	%	P
21	Ozone Slope	P	0	1.1	4	1.05148	unitless	P
22	Ozone Intercept	P	0	5	4	0.62233	ppb	P
23	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
24	Ozone % difference avg	P	7	10	4	6.8	%	P
25	Ozone Absolute Difference g1	P	7	3	1	0.61	ppb	P
26	Ozone Absolute Difference g2	P	7	1.5	1	1.15	ppb	P
27	Ozone % difference max	P	7	10	4	8.0	%	P
28	DAS Voltage average error	P	13	0.003	7	0.0003	V	P
29	Shelter Temperature average error	P	5	2	6	0.28	c	P
30	Shelter Temperature max error	P	5	2	6	0.39	c	P

SiteVisitDate	Site	Technician

10/03/2018 ACA416

Eric Hebert

### **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: SiteOpsProcedures

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

3 Parameter: ShelterCleanNotes

The shelter is new, clean and well organized.

4 Parameter: PollAnalyzerCom

New sample lines have been installed in the new shelter.

5 Parameter: MetSensorComme

The wind speed sensor response at the high speed test was much lower than expected. This condition has been observed during previous audits.

6 Parameter: MetOpMaintCom

The sensor signal cables are beginning to show signs of wear.

**Data Compiled:** 3/13/2019 8:24:06 PM

SiteVisitDate Site Technician

10/20/2018 ALH157 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.98941	unitless	P
2	Ozone Intercept	P	0	5	4	0.29214	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99997	unitless	P
4	Ozone % difference avg	P	7	10	4	0.8	%	P
5	Ozone Absolute Difference g1	P	7	3	1	0.13	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.05	ppb	P
7	Ozone % difference max	P	7	10	4	1.2	%	P

Data Compiled:

4/2/2019 11:21:13 AM

SiteVisitDate Site Technician

10/04/2018 ASH135 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	18	0.07	c	P
2	Temperature max error	P	4	0.5	18	0.13	c	P
3	Ozone Slope	P	0	1.1	4	0.97553	unitless	P
4	Ozone Intercept	P	0	5	4	0.19571	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99998	unitless	P
6	Ozone % difference avg	P	7	10	4	2.4	%	P
7	Ozone Absolute Difference g1	P	7	3	1	0.52	ppb	P
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.44	ppb	P
9	Ozone % difference max	P	7	10	4	3.1	%	P
10	Flow Rate average % difference	P	10	5	2	1.1	%	P
11	Flow Rate max % difference	P	10	5	2	1.32	%	P
12	DAS Voltage average error	P	7	0.003	28	0.0000	V	P
13	Shelter Temperature average error	P	5	2	18	0.60	c	P
14	Shelter Temperature max error	P	5	2	18	0.66	c	P

SiteVisitDate	Site	Technician

10/04/2018

**ASH135** 

Eric Hebert

## **Field Systems Comments**

1 Parameter: DasComments

The met tower has been removed and the 10 meter temperature sensor is mounted in a naturally aspirated shield on the sample tower.

2 Parameter: SiteOpsProcedures

The ozone inlet filter is replaced and the sample train is leak tested once each month.

3 Parameter: SitingCriteriaCom

The evergreen plantation previously 20 meters south of the site has been harvested.

4 Parameter: ShelterCleanNotes

The shelter is in fair condition, clean, and very well organized. Rot is beginning at the bottom of the walls and floor.

Data Compiled:

4/1/2019 8:14:21 PM

SiteVisitDate Site Technician

11/17/2018 BEL116 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.09	c	P
2	Temperature2meter max error	P	5	0.5	3	0.15	c	P
3	Surface Wetness Wetness Sensor		0		1	0		
4	Wind Speed average error below 5m/s in m/s	P	3	0.5	12	0.05	m/s	P
5	Wind Speed max error below 5m/s in m/s	P	3	0.5	12	0.19	m/s	P
6	Wind Speed average % difference above 5 m/s	P	3	5	12	0.0	%	P
7	Wind Speed max % difference above 5 m/s	P	3	5	12	0.0	%	P
8	Wind Speed Torque average error	P	3	0.5	1	0.55	g-cm	Fail
9	Wind Speed Torque max error	P	3	0.5	1	0.6	g-cm	Fail
10	Wind Direction Input Deg True average error (de	P	2	5	12	3.5	degrees	P
11	Wind Direction Input Deg True max error (deg)	P	2	5	12	5	degrees	P
12	Wind Direction Linearity average error (deg)	P	2	5	24	0.9	degrees	P
13	Wind Direction Linearity max error (deg)	P	2	5	24	2	degrees	P
14	Wind Direction Torque average error	P	2	30	1	10	g-cm	P
15	Wind Direction Torque max error	P	2	30	1	12	g-cm	P
16	Temperature average error	P	4	0.5	18	0.41	c	P
17	Temperature max error	P	4	0.5	18	0.72	c	Fail
18	Relative Humidity average below 85%	P	6	10	6	3.4	%	P
19	Relative Humidity max below 85%	P	6	10	6	5.0	%	P
20	Solar Radiation % diff of avg	P	9	10	4	4.48	%	P
21	Solar Radiation % diff of max STD value	P	9	10	4	3.7	%	P
22	Precipitation average % difference	P	1	10	2	2.0	%	P
23	Precipitation max % difference	P	1	10	2	4.0	%	P
24	Ozone Slope	P	0	1.1	4	0.99399	unitless	P
25	Ozone Intercept	P	0	5	4	-0.56529	ppb	P
26	Ozone correlation	P	0	0.995	4	1.00000	unitless	P
27	Ozone % difference avg	P	7	10	4	2.2	%	P
28	Ozone Absolute Difference g1	P	7	3	1	-0.59	ppb	P
29	Ozone Absolute Difference g2	P	7	1.5	1	-0.58	ppb	P
30	Ozone % difference max	P	7	10	4	4.0	%	P
31	Flow Rate average % difference	P	10	5	4	1.12	%	P
32	Flow Rate max % difference	P	10	5	4	1.35	%	P
33	DAS Voltage average error	P	7	0.003	70	0.0000	V	P

Site	VisitDate	Site	Technician						
11/17	7/2018	BEL116	Eric Hebert		_				
3	4 Surface V	Wetness Response	P	12	0.5	1	1.01		P
3:	5 Shelter T	emperature average error	P	5	2	12	0.10	c	P
3	Shelter T	emperature max error	P	5	2	12	0.11	c	P

11/17/2018

BEL116

Eric Hebert

### **Field Performance Comments**

1 Parameter: Precipitation SensorComponent: Sensor Heater CommentCode 108

The tipping bucket rain gauge heater wires were found to be interfering with the operation of the tipping mechanism. The condition was corrected prior to the performance audit.

2 Parameter: Precipitation SensorComponent: Properly Sited CommentCode 193

Objects violate the 45 degree rule for the tipping bucket rain gage.

3 Parameter: Temperature SensorComponent: System Memo CommentCode 4

The sensor signal cables are showing signs of wear.

### **Field Systems Comments**

1 Parameter: SitingCriteriaCom

The site is located between Washington DC and Baltimore, MD near a major transportation corridor. Although the site surroundings are woodland and agriculture, the region surrounding the research center is densely populated and urban.

2 Parameter: MetSensorComme

The trees are beginning to encroach on the lower temperature sensor.

3 Parameter: MetOpMaintCom

The outer insulation of both temperature sensor signal cables is broken. The 10 meter temperature sensor signal cable has been spliced.

**Data Compiled:** 3/14/2019 11:23:11 AM

SiteVisitDate Site Technician

11/11/2018 BVL130 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.98685	unitless	P
2	Ozone Intercept	P	0	5	4	-0.87873	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
4	Ozone % difference avg	P	7	10	4	3.6	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-0.98	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.83	ppb	P
7	Ozone % difference max	P	7	10	4	5.8	%	P

**Data Compiled:** 3/14/2019 11:56:00 AM

SiteVisitDate Site Technician

11/16/2018 BWR139 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.03497	unitless	P
2	Ozone Intercept	P	0	5	4	-1.85768	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99998	unitless	P
4	Ozone % difference avg	P	7	10	4	3.4	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-1.81	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-1.39	ppb	P
7	Ozone % difference max	P	7	10	4	10.2	%	Fail

Data Compiled:

4/1/2019 5:45:57 PM

SiteVisitDate Site Technician

11/07/2018 CAT175 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	18	0.15	c	P
2	Temperature max error	P	4	0.5	18	0.16	c	P
3	Flow Rate average % difference	P	10	5	4	0.99	%	P
4	Flow Rate max % difference	P	10	5	4	1.18	%	P

11/07/2018

CAT175

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: SiteOpsProcComm

The SSRF forms are not complete.

2 Parameter: DasComments

The shelter is not temperature controlled. The site is solar and DC battery powered. The met tower has been removed and the temperature is being measured from the sample tower at 10 meters above ground.

3 Parameter: DocumentationCo

The site copies of the SSRF are no longer kept onsite.

4 Parameter: ShelterCleanNotes

The shelter is seriously deteriorated with rot and mold on the floor and walls. There are many unused and possibly depleted batteries stored in the shelter. The vegetation has been allowed to grow. The shelter roof has been repaired.

5 Parameter: PollAnalyzerCom

Ozone monitoring is no longer being conducted at the site.

**Data Compiled:** 3/14/2019 12:51:32 PM

SiteVisitDate Site Technician

12/05/2018 CND125 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.97813	unitless	P
2	Ozone Intercept	P	0	5	4	-0.17465	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99997	unitless	P
4	Ozone % difference avg	P	7	10	4	2.1	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-0.49	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.07	ppb	P
7	Ozone % difference max	P	7	10	4	3.2	%	P

Data Compiled:

3/23/2019 1:17:57 PM

SiteVisitDate Site Technician

12/06/2018 COW137 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	12	0.07	c	P
2	Temperature max error	P	4	0.5	12	0.10	c	P
3	Ozone Slope	P	0	1.1	4	0.99914	unitless	P
4	Ozone Intercept	P	0	5	4	-0.12425	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 Absolute Difference g1	P	7	3	1	-0.08	ppb	P
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.29	ppb	P
9	Ozone % difference max	P	7	10	4	1.8	%	P
10	Flow Rate average % difference	P	10	5	6	2.59	%	P
11	Flow Rate max % difference	P	10	5	6	3.23	%	P
12	DAS Voltage average error	P	7	0.003	63	0.0001	V	P
13	Shelter Temperature average error	P	5	2	15	1.08	c	P
14	Shelter Temperature max error	P	5	2	15	1.16	c	P

SiteVisitDate	Site	Technician
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12/06/2018

COW137

Sandy Grenville

## **Field Systems Comments**

1 Parameter: DasComments

The met tower has been removed and a new sample tower has been installed.

2 Parameter: SitingCriteriaCom

Construction was completed on new building with a parking lot, in October 2004. The parking area is within 60 meters of the site.

3 Parameter: ShelterCleanNotes

The shelter walls and floor have been replaced since the previous audit. There are some wet spots from an apparent leak near the north and south walls

**Data Compiled:** 3/14/2019 11:44:52 AM

SiteVisitDate Site Technician

11/14/2018 DCP114 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.01609	unitless	P
2	Ozone Intercept	P	0	5	4	0.37187	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99997	unitless	P
4	Ozone % difference avg	P	7	10	4	3.6	%	P
5	Ozone Absolute Difference g1	P	7	3	1	0.01	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	1.17	ppb	P
7	Ozone % difference max	Р	7	10	4	8.0	%	P

Data Compiled:

4/2/2019 9:53:46 AM

SiteVisitDate Site Technician

10/10/2018 DEN417 Martin Valvur

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	0.26	c	P
3	Ozone Slope	P	0	1.1	4	1.00467	unitless	P
4	Ozone Intercept	P	0	5	4	-1.05102	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99995	unitless	P
6	Ozone % difference avg	P	7	10	4	1.5	%	P
7	Ozone Absolute Difference g1	P	7	3	1	-1.3	ppb	P
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.54	ppb	P
9	Ozone % difference max	P	7	10	4	3.8	%	P
10	Flow Rate average % difference	P	10	5	8	1.93	%	P
11	Flow Rate max % difference	P	10	5	8	2.07	%	P
12	DAS Voltage average error	P	7	0.003	70	0.0002	V	P
13	Shelter Temperature average error	P	5	2	18	0.58	c	P
14	Shelter Temperature max error	P	5	2	18	0.97	c	P

SiteVisitDate	Site	Technician

10/10/2018

**DEN417** 

Martin Valvur

### **Field Performance Comments**

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**

Parameter: SiteOpsProcComm

The site operator uses one gloved hand, and the same glove, to remove and install the filter pack. Leak checks are performed when the ambient temperature is above -10 C.

Parameter: ShelterCleanNotes

The shelter is in good condition, clean, neat, and very well organized.

Data Compiled: 4/2

4/2/2019 12:35:57 PM

SiteVisitDate Site Technician

12/05/2018 DUK008 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	4	0.53	c	Fail
2	Temperature max error	P	4	0.5	4	0.72	c	Fail
3	Flow Rate average % difference	P	10	5	2	1.35	%	P
4	Flow Rate max % difference	P	10	5	2	1.35	%	P

SiteVisitDate	Site	Technician

12/05/2018 DUK008

Eric Hebert

## **Field Systems Comments**

1 Parameter: DasComments

All measurements (temperature and flow rate) are being made above tree canopy approximately 30 meters above ground. There are no CASTNET ozone measurements at this time. The site is considered a small footprint site with logger and flow system on the walk-up tower.

2 Parameter: DocumentationCo

The site operator was completing the SSRF observation section on the day of filter removal rather than the installation day.

3 Parameter: SitingCriteriaCom

The station measurements are being mace above the tree canopy in the Duke Experimental Forest near Durham, NC.

4 Parameter: ShelterCleanNotes

The shelter is custom built and in very good condition.

**Data Compiled:** 3/14/2019 11:40:19 AM

SiteVisitDate Site Technician

11/14/2018 GRS420 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.96669	unitless	P
2	Ozone Intercept	P	0	5	4	-0.34372	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99997	unitless	P
4	Ozone % difference avg	P	7	10	4	4.1	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-0.28	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.59	ppb	P
7	Ozone % difference max	P	7	10	4	4.6	%	P

**Data Compiled:** 4/2/2019 10:24:53 AM

SiteVisitDate Site Technician

10/02/2018 HOW191 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.03	c	P
2	Temperature max error	P	4	0.5	6	0.07	c	P
3	Ozone Slope	P	0	1.1	4	0.97614	unitless	P
4	Ozone Intercept	P	0	5	4	-0.04959	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
6	Ozone % difference avg	P	7	10	4	2.1	%	P
7	Ozone Absolute Difference g1	P	7	3	1	-0.41	ppb	P
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.24	ppb	P
9	Ozone % difference max	P	7	10	4	2.6	%	P
10	Flow Rate average % difference	P	10	5	6	0.00	%	P
11	Flow Rate max % difference	P	10	5	6	0.00	%	P
12	DAS Voltage average error	P	7	0.003	56	0.0001	V	P
13	Shelter Temperature average error	P	5	2	12	0.77	c	P
14	Shelter Temperature max error	P	5	2	12	1.03	c	P

10/02/2018

HOW191

Eric Hebert

### **Field Performance Comments**

1 Parameter: Ozone SensorComponent: Cell B Noise CommentCode 99

This analyzer diagnostic check is outside the manufacturer's recommended value.

2 Parameter: Ozone SensorComponent: Cell A Noise CommentCode 99

This analyzer diagnostic check is outside the manufacturer's recommended value.

### **Field Systems Comments**

1 Parameter: SiteOpsProcComm

The site operator reported that gloves are not consistently used to handle the filter pack.

2 Parameter: SitingCriteriaCom

The CASTNET filter pack at this location is located above a tree canopy at approximately 23.5 meters from the ground. This is an AmeriFlux site which is approximately 2.5 km to the SW of the HOW132 CASTNET site.

3 Parameter: ShelterCleanNotes

The custom built shelter is clean and organized.

4 Parameter: MetSensorComme

Other than a temperature sensor located at the CASTNET filter location the meteorological instrumentation is being operated by the University of Maine and AmeriFlux.

**Data Compiled:** 3/14/2019 11:16:39 AM

SiteVisitDate Site Technician

11/10/2018 LRL117 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.99021	unitless	P
2	Ozone Intercept	P	0	5	4	-0.71289	ppb	P
3	Ozone correlation	P	0	0.995	4	1.00000	unitless	P
4	Ozone % difference avg	P	7	10	4	2.8	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-0.83	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.63	ppb	P
7	Ozone % difference max	P	7	10	4	4.5	%	P

**Data Compiled:** 3/14/2019 11:29:54 AM

SiteVisitDate Site Technician

11/13/2018 MAC426 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.99643	unitless	P
2	Ozone Intercept	P	0	5	4	-0.55514	ppb	P
3	Ozone correlation	P	0	0.995	4	1.00000	unitless	P
4	Ozone % difference avg	P	7	10	4	2.0	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-0.54	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.63	ppb	P
7	Ozone % difference max	P	7	10	4	4.0	%	P

**Data Compiled:** 3/14/2019 10:58:30 AM

SiteVisitDate Site Technician

10/28/2018 OXF122 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.01638	unitless	P
2	Ozone Intercept	P	0	5	4	-0.2987	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
4	Ozone % difference avg	P	7	10	4	1.1	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-0.2	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.17	ppb	P
7	Ozone % difference max	P	7	10	4	1.4	%	P

Data Compiled:

4/1/2019 7:23:57 PM

SiteVisitDate Site Technician

11/15/2018 PNF126 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.10	c	P
2	Temperature max error	P	4	0.5	6	0.18	c	P
3	Ozone Slope	P	0	1.1	4	1.01013	unitless	P
4	Ozone Intercept	P	0	5	4	-0.33327	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99988	unitless	P
6	Ozone % difference avg	P	7	10	4	1.3	%	P
7	Ozone Absolute Difference g1	P	7	3	1	-1.11	ppb	P
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.15	ppb	P
9	Ozone % difference max	P	7	10	4	3.0	%	P
10	Flow Rate average % difference	P	10	5	4	0.00	%	P
11	Flow Rate max % difference	P	10	5	4	0.00	%	P
12	DAS Voltage average error	P	7	0.003	70	0.0001	V	P
13	Shelter Temperature average error	P	5	2	15	0.05	c	P
14	Shelter Temperature max error	P	5	2	15	0.07	c	P

11/15/2018

PNF126

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: SiteOpsProcComm

The site operator was not available for the systems audit. The reported information was obtained from the site log and site documentation.

2 Parameter: DasComments

The sample towers are not grounded.

3 Parameter: SitingCriteriaCom

The site is in a mountain bowl. The wind pattern from this site would be expected to follow up and down slope patterns. The site is also located in a hay field which is cut 2 or 3 times per year.

4 Parameter: ShelterCleanNotes

The shelter is in fair condition.

**Data Compiled:** 3/14/2019 12:43:11 PM

SiteVisitDate Site Technician

12/04/2018 QAK172 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.99049	unitless	P
2	Ozone Intercept	P	0	5	4	0.12281	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99998	unitless	P
4	Ozone % difference avg	P	7	10	4	0.7	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-0.08	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.05	ppb	P
7	Ozone % difference max	P	7	10	4	1.0	%	P

Data Compiled:

3/20/2019 4:48:23 PM

SiteVisitDate Site Technician

10/22/2018 RED004 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	9	1.38	c	Fail
2	Temperature max error	P	4	0.5	9	2.24	c	Fail
3	Flow Rate average % difference	P	10	5	2	1.53	%	P
4	Flow Rate max % difference	P	10	5	2	1.63	%	P
5	DAS Voltage average error	P	7	0.003	14	0.0017	V	P

SiteVisitDate	Site	Technician

10/22/2018

RED004

Sandy Grenville

### **Field Systems Comments**

1 Parameter: DocumentationCo

There is no site logbook and all manuals are kept electronically since the site is a small footprint site with no place to store hardcopies.

2 Parameter: SitingCriteriaCom

The site has been cleared approximately 8 meters around the base of the tower. Herbicide was used.

3 Parameter: ShelterCleanNotes

Small footprint site with enclosure for instruments only. No shelter.

Data Compiled:

4/1/2019 4:44:02 PM

SiteVisitDate Site Technician

10/27/2018 SAL133 Sandy Grenville

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	1.04441	unitless	P
4	Ozone Intercept	P	0	5	4	-0.41066	ppb	P
5	Ozone correlation	P	0	0.995	4	1.00000	unitless	P
6	Ozone % difference avg	P	7	10	4	3.5	%	P
7	Ozone Absolute Difference g1	P	7	3	1	-0.53	ppb	P
8	Ozone Absolute Difference g2	P	7	1.5	1	0.48	ppb	P
9	Ozone % difference max	P	7	10	4	4.1	%	P
10	Flow Rate average % difference	P	10	5	4	4.67	%	P
11	Flow Rate max % difference	P	10	5	4	5.1	%	Fail
12	DAS Voltage average error	P	7	0.003	63	0.0001	V	P
13	Shelter Temperature average error	P	5	2	15	0.65	c	P
14	Shelter Temperature max error	P	5	2	15	1.12	c	P

SiteVisitDate	Site	Technician
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10/27/2018

SAL133

Sandy Grenville

### **Field Systems Comments**

1 Parameter: SiteOpsProcedures

The ozone inlet filter is replaced and a zero/span/precision test is performed every two weeks.

2 Parameter: SitingCriteriaCom

The site is located next to a field usually planted with corn or soy beans.

3 Parameter: ShelterCleanNotes

The shelter is in fair condition and there is evidence of a leak in the shelter roof and ants are present. It is clean, neat, and well organized.

4 Parameter: MetOpMaintCom

The temperature signal cable is showing signs of wear.

**Data Compiled:** 3/14/2019 10:42:11 AM

SiteVisitDate Site Technician

10/26/2018 SAN189 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.98377	unitless	P
2	Ozone Intercept	P	0	5	4	-1.01678	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99983	unitless	P
4	Ozone % difference avg	P	7	10	4	4.1	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-1.9	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-1.2	ppb	P
7	Ozone % difference max	P	7	10	4	8.5	%	P

**Data Compiled:** 3/14/2019 12:29:52 PM

SiteVisitDate Site Technician

11/19/2018 SHN418 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.98746	unitless	P
2	Ozone Intercept	P	0	5	4	0.55993	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99998	unitless	P
4	Ozone % difference avg	P	7	10	4	1.8	%	P
5	Ozone Absolute Difference g1	P	7	3	1	0.35	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	0.78	ppb	P
7	Ozone % difference max	P	7	10	4	5.6	%	P

**Data Compiled:** 3/14/2019 9:57:57 AM

SiteVisitDate Site Technician

10/25/2018 STK138 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	0.97103	unitless	P
2	Ozone Intercept	P	0	5	4	0.13936	ppb	P
3	Ozone correlation	P	0	0.995	4	1.00000	unitless	P
4	Ozone % difference avg	P	7	10	4	2.4	%	P
5	Ozone Absolute Difference g1	P	7	3	1	0.07	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.24	ppb	P
7	Ozone % difference max	P	7	10	4	2.8	%	P

#### **Field Performance Comments**

1 Parameter: Ozone SensorComponent: Cell B Flow CommentCode 99

This analyzer diagnostic check is outside the manufacturer's recommended value.

**Data Compiled:** 3/13/2019 7:33:13 PM

SiteVisitDate Site Technician

10/19/2018 VIN140 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.01647	unitless	P
2	Ozone Intercept	P	0	5	4	0.04168	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99998	unitless	P
4	Ozone % difference avg	P	7	10	4	1.8	%	P
5	Ozone Absolute Difference g2	P	7	1.5	1	0.22	ppb	P
6	Ozone % difference max	P	7	10	4	2.4	%	P

Data Compiled: 3/13/2

3/13/2019 8:32:44 PM

SiteVisitDate Site Technician

10/23/2018 VOY413 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.00442	unitless	P
2	Ozone Intercept	P	0	5	4	-0.24024	ppb	P
3	Ozone correlation	P	0	0.995	4	1.00000	unitless	P
4	Ozone % difference avg	P	7	10	4	0.3	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-0.25	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.1	ppb	P
7	Ozone % difference max	P	7	10	4	0.6	%	P

**Data Compiled:** 3/14/2019 12:35:06 PM

SiteVisitDate Site Technician

12/01/2018 WSP144 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.99263	unitless	P
2	Ozone Intercept	P	0	5	4	-1.43695	ppb	P
3	Ozone correlation	P	0	0.995	4	1.00000	unitless	P
4	Ozone % difference avg	P	7	10	4	4.8	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-1.56	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-1.5	ppb	P
7	Ozone % difference max	P	7	10	4	9.8	%	P

Data Compiled:

4/2/2019 11:38:08 AM

SiteVisitDate Site Technician

10/08/2018 WST109 Korey Devins

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	9	0.07	c	P
2	Temperature max error	P	4	0.5	9	0.13	c	P
3	Ozone Slope	P	0	1.1	4	0.95382	unitless	P
4	Ozone Intercept	P	0	5	4	1.30927	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
6	Ozone % difference avg	P	7	10	4	2.7	%	P
7	Ozone Absolute Difference g1	P	7	3	1	1.09	ppb	P
8	Ozone Absolute Difference g2	P	7	1.5	1	0.70	ppb	P
9	Ozone % difference max	P	7	10	4	4.7	%	P
10	Flow Rate average % difference	P	10	5	2	0.44	%	P
11	Flow Rate max % difference	P	10	5	2	0.66	%	P
12	DAS Voltage average error	P	7	0.003	56	0.0001	V	P
13	Shelter Temperature average error	P	5	2	15	0.42	c	P
14	Shelter Temperature max error	P	5	2	15	0.64	c	P

SiteVisitDate	Site	Technician

10/08/2018

WST109

Korey Devins

#### **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 train leak checks are being conducted every two weeks.

2 Parameter: SitingCriteriaCom

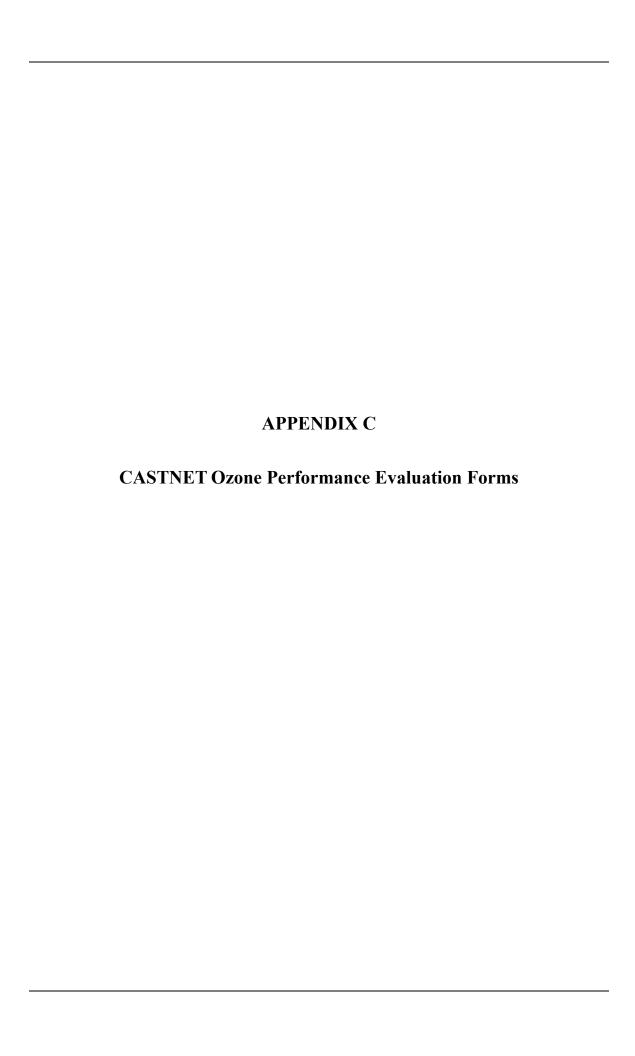
The site is in a small clearing surrounded by mountain forest.

3 Parameter: SiteOKNotes

State of NH Department of Environmental Services contact is Tom Fazzina (603) 271-0911 and tfazzina@DES.state.NH.US

4 Parameter: MetSensorComme

The temperature sensor is now mounted in a naturally aspirated shield on the sample tower.



Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
VIN	140-Sandy	Grenville-10/19/2018				
1	10/19/2018	DAS	Campbell	000358	CR3000	2136
2	10/19/2018	Ozone	ThermoElectron Inc	000740	49i A1NAA	1105347311
3	10/19/2018	Ozone Standard	ThermoElectron Inc	000546	49i A3NAA	0929938239
4	10/19/2018	Zero air pump	Werther International	06906	C 70/4	000821908

Mfg	Serial Number	er Ta Site	Te	chnician	<b>Site Visit Date</b>	Paramet	ter	Owner II	D
ThermoElectron Inc	1105347311	VIN140	Sa	andy Grenville	10/19/2018	Ozone		000740	
Intercept		rcept	0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180030022 01114		rameter[ er Desc. [	ozone Ozone primary	/ stan
DAS 1:		AS 2:		Slope	1.0029	00 Inter	cept	0.10	980
A Avg % Diff: A N		Avg %Dif A	Max % Di	Cert Date	9/7/201	18 Corre	Coff	1.00	0000
0.0%	0.0%								
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerI	Dif	AbsDif	
primary primary	2	0.10 16.16	0.00	-0.11 16.22	ppb ppb			-0.11	
primary	3	35.23	35.01	35.72	ppb		2.01	0.22	
primary	4	67.41	67.10	68.68	ppb		2.33		
primary	5	107.71	107.28	108.80	ppb		1.41		
Sensor Compone	nt Sample Tra	in	Conditi	Good		Status	pass		7
Sensor Compone	nt 22.5 degree	rule	Conditi	on		Status	pass		
Sensor Compone	nt Inlet Filter C	ondition	Conditi	on Clean		Status	pass		
Sensor Compone	nt Battery Bac	kup	Conditi	Not functioning	g	Status	Fail		
Sensor Compone	nt Offset		Conditi	on 0.10		Status	pass		
Sensor Compone	nt Span		Conditi	on 1.026		Status	pass		
Sensor Compone	nt Zero Voltag	е	Conditi	on N/A		Status	pass		
Sensor Compone	nt Fullscale Vo	ltage	Conditi	on N/A		Status	pass		
Sensor Compone	nt Cell A Freq.		Conditi	on 105.3 kHz		Status	pass		
Sensor Compone	nt Cell A Noise	)	Condition	<b>on</b> 0.8 ppb		Status	pass		
Sensor Compone	nt Cell A Flow		Condition	<b>on</b> 0.71 lpm		Status	pass		
Sensor Compone	nt Cell A Press	sure	Conditi	707.4 mmHg		Status	pass		
Sensor Compone	nt Cell A Tmp.		Conditi	on 31.7 C		Status	pass		
Sensor Compone	nt Cell B Freq.		Conditi	97.8 kHz		Status	pass		
Sensor Compone	nt Cell B Noise	)	Conditi	0.6 ppb		Status	pass		
Sensor Compone	nt Cell B Flow		Conditi	0.70 lpm		Status	pass		
Sensor Compone	nt Cell B Press	sure	Conditi	707.9 mmHg		Status	pass		
Sensor Compone	nt Cell B Tmp.		Conditi	on N/A		Status	pass		
Sensor Compone	nt Line Loss		Conditi	Not tested		Status	pass		
Sensor Compone	nt System Mer	no	Conditi	on		Status	pass		

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
ALE	I157-Sandy	Grenville-10/20/2018				
1	10/20/2018	DAS	Campbell	000428	CR3000	2534
2	10/20/2018	Ozone	ThermoElectron Inc	000615	49i A1NAA	1009241787
3	10/20/2018	Ozone Standard	ThermoElectron Inc	000329	49i A3NAA	0622717853
4	10/20/2018	Zero air pump	Werther International	06910	C 70/4	000829160

		Serial Numbe	er Ta	Site	Te	chnician	<b>Site Visit Date</b>	Parame	eter	Owner ID	
ThermoElectro	n Inc	1009241787		ALH157	Sa	andy Grenville	10/20/2018	Ozone		000615	
Slope:	0.2		rcept [	0.00000 0.00000 0.00000	0	Mfg Serial Number Tfer ID	ThermoElectron 1180030022 01114			er ozone c. Ozone primary s	tan
DAS 1: A Avg % Diff 0.0%			AS 2: Avg %l	Dif A Max	% Di	Slope Cert Date	1.0029		rcept rCoff	0.1098	
UseDescripti primary primary primary primary	on (	ConcGroup  1 2 3 4	0. 16. 36.	13 .34 .60	Cer Corr 0.02 16.18 36.38 67.91	Site 0.15 16.13 36.83 67.34	Site Unit ppb ppb ppb ppb	RelPer	1.23 -0.84	AbsDif 0.13 -0.05	
primary		5		3.55	08.12	107.20	ppb		-0.85		
Sensor Com	ponent	22.5 degree	rule		Conditio			Status Status	pass		
Sensor Com				1		Clean		Status			
Sensor Com	ponent	Battery Bac	kup		Conditio			Status	pass		
Sensor Com	ponent	Offset			Conditio	on 0.20		Status	pass		
Sensor Com	ponent	Span			Conditio	<b>1</b> .000		Status	pass		
Sensor Com	ponent	Zero Voltag	e		Conditio	n N/A		Status	pass		
Sensor Com	ponent	Fullscale Vo	oltage		Conditio	n N/A		Status	pass		
Sensor Com						n 104.1 kHz		Status			
Sensor Com	•		)			0.9 ppb		Status			
Sensor Com	ponent	Cell A Flow				0.69 lpm		Status	pass		
Sensor Com	ponent	Cell A Press	sure		Conditio	717.7 mmHg		Status	pass		
Sensor Com	ponent	Cell A Tmp.			Conditio	31.7 C		Status	pass		
Sensor Com	ponent	Cell B Freq.			Conditio	98.2 kHz		Status	pass		
Sensor Com	ponent	Cell B Noise	)		Conditio	0.9 ppb		Status	pass		
Sensor Com						0.71 lpm		Status	pass		
Sensor Com			sure			718.3 mmHg		Status			
Sensor Com					Conditio			Status			
	•										
Sensor Com	•					Not tested		Status			
Sensor Com	ponent	System Mei	mo		Condition	on		Status	pass		

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
VOY	/413-Sandy	Grenville-10/23/2018				
1	10/23/2018	DAS	Environmental Sys Corp	90632	8816	2505
2	10/23/2018	Ozone	ThermoElectron Inc	90730	49C	49C-70522-366
3	10/23/2018	Ozone Standard	ThermoElectron Inc	90569	49C	49C-59260-322
4	10/23/2018	Zero air pump	Twin Tower Engineering	90719	TT70/E4	526294

Mfg	Serial Number	r Ta Site	Т	<b>Technician</b>	Site Visit Date	Paramete	er Owner ID
ThermoElectron Inc	49C-70522-36	VOY413		Sandy Grenville	10/23/2018	Ozone	90730
Intercept -0.	000442 Slope 24024 Inter 00000 Corr	cept	.00000 .00000	Mfg Serial Number Tfer ID	ThermoElectron 1180030022 01114		Desc. Ozone primary stan
DAS 1: A Avg % Diff: A Ma 0.0%		AS 2: Avg %Dif A	Max % Di	Slope Cert Date	9/7/201		
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDi	if AbsDif
primary	1	0.36	0.24	-0.01	ppb		-0.25
primary	2	15.91	15.75	15.65	ppb		-0.1
primary	3	34.92	34.70	34.56	ppb		-0.4
primary primary	5	66.76 109.56	66.45	66.47 109.40	ppb ppb		0.03
Sensor Componen				tion Good	рро	Status p	
Sensor Componen  Sensor Componen			Condi			Status pa	
Sensor Componen	Inlet Filter Co	ondition	Condi	tion Clean		Status pa	ass
Sensor Componen	Battery Back	кир	Condi	tion N/A		Status pa	ass
Sensor Componen	t Offset		Condi	tion 0.40		Status pa	ass
Sensor Componen	Span		Condi	tion 1.009		Status pa	ass
Sensor Componen	Zero Voltage	)	Condi	tion Not tested		Status pa	ass
Sensor Componen	t Fullscale Vol	Itage	Condi	tion Not tested		Status pa	ass
Sensor Componen	t Cell A Freq.		Condi	tion 72.1 kHz		Status pa	ass
Sensor Componen	t Cell A Noise		Condi	tion 1.2 ppb		Status pa	ass
Sensor Componen	t Cell A Flow		Condi	tion 0.89 lpm		Status pa	ass
Sensor Componen	t Cell A Press	ure	Condi	tion 712.6 mmHg		Status pa	ass
Sensor Componen	t Cell A Tmp.		Condi	<b>tion</b> 29.4 C		Status pa	ass
Sensor Componen	t Cell B Freq.		Condi	tion 91.0 kHz		Status pa	ass
Sensor Componen	t Cell B Noise		Condi	tion 1.3 ppb		Status pa	ass
Sensor Componen	t Cell B Flow		Condi	tion 0.80 lpm		Status pa	ass
Sensor Componen	t Cell B Press	ure	Condi	tion 713.0 mmHg		Status pa	ass
Sensor Componen	Cell B Tmp.		Condi	tion N/A		Status pa	ass
Sensor Componen	Line Loss		Condi	Not tested		Status pa	ass
Sensor Componen	t System Mem	no	Condi	tion		Status pa	ass

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
STK	138-Sandy	Grenville-10/25/2018				
1	10/25/2018	DAS	Campbell	000349	CR3000	2128
2	10/25/2018	Ozone	ThermoElectron Inc	000625	49i A1NAA	1009241797
3	10/25/2018	Ozone Standard	ThermoElectron Inc	000688	49i A3NAA	1030244817
4	10/25/2018	Zero air pump	Werther International	06915	C 70/4	000829162

Mfg		Serial Number	er Ta Site	<u>,                                    </u>	<b>Technician</b>	Site Visit Date	Parameter	Owner ID
ThermoElec	ctron Inc	1009241797	STK138	3	Sandy Grenville	10/25/2018	Ozone	000625
Slope: Intercept CorrCoff	(		rcept	0.00000	Mfg Serial Number	ThermoElectron 1180030022 01114		ter ozone  Ozone primary stan
DAS 1:			AS 2:	35 0/ 31	Tfer ID Slope	1.0029	00 Intercept	0.10980
A Avg % I	Oiff: A N O%	0.0%	Avg %Dif A	Max % Di	Cert Date	9/7/201	CorrCoff	1.00000
			Tfor Dow	Tfer Corr	r Site	Site Unit	RelPerDif	AbsDif
UseDescr	-	ConcGroup 1	Tfer Raw 0.21	0.09	0.16	ppb	KeiPerDii	0.07
prima	•	2	16.04	15.88	15.64	ppb		-0.24
prima	ry	3	35.23	35.01	34.09	ppb	-2.66	
prima	-	4	67.36	67.05	65.32	ppb	-2.61	
prima		5	110.11	109.68	106.60	ppb	-2.85	
Sensor C	ompone	nt Sample Tra	ın	Condi	ition Good		Status pass	
Sensor C	ompone	nt 22.5 degree	rule	Condi	ition		Status pass	
Sensor C	ompone	nt Inlet Filter C	Condition	Condi	ition Clean		Status pass	
Sensor C	ompone	nt Battery Bac	kup	Condi	ition N/A		Status pass	
Sensor C	ompone	nt Offset		Condi	<b>ition</b> 0.10		Status pass	
Sensor C	ompone	nt Span		Condi	<b>ition</b> 1.003		Status pass	
Sensor C	ompone	nt Zero Voltag	е	Condi	ition N/A		Status pass	
Sensor C	ompone	nt Fullscale Vo	oltage	Condi	ition N/A		Status pass	
Sensor C	ompone	nt Cell A Freq.		Condi	ition 113.5 kHz		Status pass	
Sensor C	ompone	nt Cell A Noise	9	Condi	ition 0.6 ppb		Status pass	
Sensor C	ompone	nt Cell A Flow		Condi	ition 0.70 lpm		Status pass	
Sensor C	ompone	nt Cell A Press	sure	Condi	ition 689.4 mmHg		Status pass	
Sensor C	ompone	nt Cell A Tmp.		Condi	ition 32.4 C		Status pass	
Sensor C	ompone	nt Cell B Freq.		Condi	ition 100.1 kHz		Status pass	
Sensor C	ompone	nt Cell B Noise	Э	Condi	o.9 ppb		Status pass	
Sensor C	ompone	nt Cell B Flow		Condi	ition 0.00 lpm		Status Fail	
Sensor C	ompone	nt Cell B Press	sure	Condi	ition 689.9 mmHg		Status pass	
Sensor C	ompone	nt Cell B Tmp.		Condi	ition N/A		Status pass	
Sensor C	ompone	nt Line Loss		Condi	ition Not tested		Status pass	
Sensor C	ompone	nt System Mei	mo	Condi	ition		Status pass	

### **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	l Problem
Ozone	STK138	Sandy Grenville	10/25/2018	Cell B Flow	ThermoElectron	3361		

This analyzer diagnostic check is outside the manufacturer's recommended value.

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
SAN	189-Martin	Valvur-10/26/2018				
1	10/26/2018	DAS	Campbell	000360	CR3000	2138
2	10/26/2018	Ozone	ThermoElectron Inc	000729	49i A1NAA	1105347323
3	10/26/2018	Ozone Standard	ThermoElectron Inc	000367	49i A3NAA	0726124683
4	10/26/2018	Zero air pump	Werther International	06875	C 70/4	000814272

Mfg	Serial Numbe	er Ta Site	7	<b>Technician</b>	Site Visit Date	Parame	ter	Owner ID
ThermoElectron Inc	1105347323	SAN189	)	Martin Valvur	10/26/2018	Ozone		000729
Intercept -1		rcept	0.00000	Mfg Serial Number Tfer ID	ThermoElectron 0517112167 01113			ozone Ozone primary stan
DAS 1: A Avg % Diff: A M		AS 2: Avg %Dif A	Max % Di	Slope	1.0047	'0 Inter	cept	0.08880
0.0%	0.0%	Avg 70Dii A	Max 70 Di	Cert Date	6/12/201	Corr	Coff	1.00000
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerl	Dif	AbsDif
primary	1	0.50	0.40	-1.50	ppb			-1.9
primary	2	14.20	14.04	12.84	ppb		2.02	-1.2
primary primary	4	34.39 65.70	34.14 65.30	33.19 64.18	ppb ppb		-2.82 -1.73	
primary	5	113.21	112.59	109.00	ppb		-3.24	
Sensor Componer			<u> </u>	tion Good	FF ·	Status		
Sensor Componer			Condi			Status		
Sensor Componer				tion Clean		Status		
Sensor Componer				tion N/A		Status		
Sensor Componer		•		tion 0.10		Status		
Sensor Componer				tion 1.012		Status		
Sensor Componer	zero Voltage	e		tion N/A		Status	pass	
Sensor Componer	Fullscale Vo	ltage		tion N/A		Status	pass	
Sensor Componer	Cell A Freq.		Condi	tion 98.3 kHz		Status	pass	
Sensor Componer	Cell A Noise	)	Condi	tion 0.8 ppb		Status	pass	
Sensor Componer	Cell A Flow		Condi	tion 0.69 lpm		Status	pass	
Sensor Componer	Cell A Press	sure	Condi	tion 692.8 mmHg		Status	pass	
Sensor Componer	Cell A Tmp.		Condi	tion 32.5 C		Status	pass	
Sensor Componer	Cell B Freq.		Condi	tion 89.3 kHz		Status	pass	
Sensor Componer	Cell B Noise	)	Condi	tion 0.6 ppb		Status	pass	
Sensor Componer	Cell B Flow		Condi	tion 0.65 lpm		Status	pass	
Sensor Componer	Cell B Press	sure	Condi	tion 692.2 mmHg		Status	pass	
Sensor Componer	Cell B Tmp.		Condi	tion N/A		Status	pass	
Sensor Componer	Line Loss		Condi	tion Not tested		Status	pass	
Sensor Componer	System Mer	no	Condi	tion		Status	pass	

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
OXF	F122-Sandy	Grenville-10/28/2018				
1	10/28/2018	DAS	Campbell	000425	CR3000	2528
2	10/28/2018	Ozone	ThermoElectron Inc	000610	49i A1NAA	1009241778
3	10/28/2018	Ozone Standard	ThermoElectron Inc	000545	49i A3NAA	0929938241
4	10/28/2018	Zero air pump	Werther International	06911	PC70/4	000829167

Mfg	Serial Number	er Ta Site	Te	chnician	Site Visit Date	Parame	ter	Owner I	D
ThermoElectron Inc	1009241778	OXF12	2 S	andy Grenville	10/28/2018	Ozone		000610	
Intercept		rcept	0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180030022 01114		rameter er Desc.	ozone Ozone primary	y stan
DAS 1:		AS 2:		Slope	1.0029	90 Inter	cept	0.10	980
A Avg % Diff: A N		Avg %Dif A	Max % Di	Cert Date	9/7/20	18 <b>Corr</b>	Coff	1.00	0000
0.0%	0.0%								
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerI	Dif	AbsDif	
primary	2	0.23	0.11	-0.09 15.96	ppb			-0.2	
primary primary	3	35.67	35.45	35.86	ppb ppb		1.15	-0.17	
primary	4	68.58	68.27	68.91	ppb		0.93		
primary	5	110.24	109.81	111.40	ppb		1.44		
Sensor Compone	nt Sample Tra	in	Conditi	on Good		Status	pass		7
Sensor Compone	nt 22.5 degree	rule	Conditi	on		Status	pass		
Sensor Compone	nt Inlet Filter C	Condition	Conditi	on Clean		Status	pass		
Sensor Compone	nt Battery Bac	kup	Conditi	on N/A		Status	pass		
Sensor Compone	nt Offset		Conditi	on 0.10		Status	pass		
Sensor Compone	nt Span		Conditi	on 1.030		Status	pass		
Sensor Compone	nt Zero Voltag	е	Condition	on N/A		Status	pass		
Sensor Compone	nt Fullscale Vo	oltage	Conditi	on N/A		Status	pass		
Sensor Compone	nt Cell A Freq.		Conditi	on 106.7 kHz		Status	pass		
Sensor Compone	nt Cell A Noise	9	Conditi	on 0.9 ppb		Status	pass		
Sensor Compone	nt Cell A Flow		Conditi	<b>on</b> 0.71 lpm		Status	pass		
Sensor Compone	nt Cell A Press	sure	Conditi	on 686.3 mmHg		Status	pass		
Sensor Compone	nt Cell A Tmp.			on 33.2 C		Status	pass		
Sensor Compone	nt Cell B Freq.		Conditi	on 96.8 kHz		Status	pass		
Sensor Compone	nt Cell B Noise			on 1.3 ppb		Status	pass		
Sensor Compone				on 0.71 lpm		Status	pass		
Sensor Compone	nt Cell B Press	sure		on 686.9 mmHg		Status	pass		
Sensor Compone	nt Cell B Tmp.		Conditi	on N/A		Status	pass		
Sensor Compone	nt Line Loss		Conditi	on Not tested		Status	pass		
Sensor Compone	nt System Mer	no	Conditi	on		Status	pass		

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
LRL	.117-Eric H	ebert-11/10/2018				
1	11/10/2018	DAS	Campbell	000344	CR300	2123
2	11/10/2018	Ozone	ThermoElectron Inc	000701	49i A1NAA	1030244808
3	11/10/2018	Ozone Standard	ThermoElectron Inc	000444	49i A3NAA	CM08200020
4	11/10/2018	Zero air pump	Werther International	06904	C 70/4	000821901

Mfg	S	erial Numbe	r Ta Si	ite	Te	chnician	Site Visit Date	Parame	ter	Owner 1	ID
ThermoElectror	n Inc 1	1030244808	L	RL117	Er	ric Hebert	11/10/2018	Ozone		000701	
Slope: Intercept CorrCoff	-0.7		e:	0.0000 0.0000 0.0000	00	Mfg Serial Number Tfer ID	ThermoElectron 1180930075 01115		rametei er Desc.	ozone Ozone primar	y stan
DAS 1: A Avg % Diff:	: A Ma	x % Di A	AS 2: Avg %D	oif A Max	: % Di	Slope Cert Date	1.0032		•		7166 0000
0.0%		0.0%				Cert Date	0/11/201	Corr	Con	1.0	
UseDescription	on C	ConcGroup	Tfer F		fer Corr	Site	Site Unit	RelPerl	Dif	AbsDif	
primary		2	0.7		0.63	-0.20 13.33	ppb			-0.83	
primary primary		3	36.0		35.88	34.72	ppb ppb		-3.29	-0.03	
primary		4	70.1		69.86	68.42	ppb		-2.08		
primary		5	113.	63	113.19	111.40	ppb		-1.59		
Sensor Com	ponent	Sample Trai	n		Condition	on Good		Status	pass		
Sensor Com	ponent	22.5 degree	rule		Condition	on		Status	pass		
Sensor Com	ponent	Inlet Filter C	ondition		Condition	on Moderately cle	an	Status	pass		
Sensor Com	ponent	Battery Back	kup		Condition	on N/A		Status	pass		
Sensor Com	ponent	Offset			Condition	on -0.10		Status	pass		
Sensor Com	ponent	Span			Condition	on 1.011		Status	pass		
Sensor Com	ponent	Zero Voltage	9		Condition	on N/A		Status	pass		
Sensor Com	ponent	Fullscale Vo	Itage		Condition	on N/A		Status	pass		
Sensor Com	ponent	Cell A Freq.			Condition	on 115.6 kHz		Status	pass		
Sensor Com	ponent	Cell A Noise	<b>!</b>		Condition	on 0.8 ppb		Status	pass		
Sensor Com	ponent	Cell A Flow			Condition	on 0.67 lpm		Status	pass		
Sensor Com	ponent	Cell A Press	ure		Condition	<b>on</b> 695.8 mmHg		Status	pass		
Sensor Com	ponent	Cell A Tmp.			Condition	on 32.5 C		Status	pass		
Sensor Com	ponent	Cell B Freq.			Condition	on 84.8 kHz		Status	pass		
Sensor Comp	ponent	Cell B Noise			Condition	<b>on</b> 0.6 ppb		Status	pass		
Sensor Comp	ponent	Cell B Flow			Condition	<b>on</b> 0.67 lpm		Status	pass		
Sensor Comp	ponent	Cell B Press	ure		Condition	on 696.4 mmHg		Status	pass		
Sensor Comp	ponent	Cell B Tmp.			Condition	on N/A		Status	pass		
Sensor Comp	ponent	Line Loss			Condition	on Not tested		Status	pass		
Sensor Com	ponent	System Mer	no		Condition	on		Status	pass		
		·			=						

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
BVL	.130-Eric H	lebert-11/11/2018				
1	11/11/2018	DAS	Campbell	000424	CR3000	2539
2	11/11/2018	Ozone	ThermoElectron Inc	000739	49i A1NAA	1105347318
3	11/11/2018	Ozone Standard	ThermoElectron Inc	000512	49i A3NAA	0922236890
4	11/11/2018	Zero air pump	Werther International	06926	PC70/4	000836218

Mfg	S	erial Numbe	er Ta Site		Te	chnician	Site Visit Date	Paramo	eter	Owner l	ID
ThermoElectron I	nc 1	105347318	BVL1	30	Er	ic Hebert	11/11/2018	Ozone		000739	
Slope: Intercept CorrCoff	-0.8		rcept	0.0000	0	Mfg Serial Number Tfer ID	ThermoElectron 1180930075 01115		ramete er Desc	r ozone Ozone primar	y stan
DAS 1:		D	AS 2:			Slope	1.0032	20 Inte	rcept	0.07	7166
A Avg % Diff: A	Ma		Avg %Dif	A Max	% Di	Cert Date	9/14/201	18 Cori	rCoff	1.00	0000
0.0%		0.0%									
UseDescription	C	ConcGroup	Tfer Raw	Ti	fer Corr	Site	Site Unit	RelPer	Dif	AbsDif	
primary		1	0.53		0.45	-0.53	ppb			-0.98	
primary		3	14.36 35.35		14.24 35.16	13.41 33.86	ppb		-3.77	-0.83	
primary primary		4	70.67	_	70.37	68.20	ppb ppb		-3.17		
primary		5	114.23		113.79	111.60	ppb		-1.94		
Sensor Compo	nent	Sample Trai	in			Good		Status	pass		
Sensor Compo					Condition			Status			
Sensor Compo	nent	Inlet Filter C	ondition		Condition	Moderately cle	ean	Status	pass		
Sensor Compo	nent	Battery Back	kup		Condition	N/A		Status	pass		
Sensor Compo	nent	Offset			Conditio	on 0.10		Status	pass		
Sensor Compo	nent	Span			Condition	on 1.015		Status	pass		
Sensor Compo	nent	Zero Voltage	е		Conditio	on N/A		Status	pass		
Sensor Compo	nent	Fullscale Vo	ltage		Condition	N/A		Status	pass		
Sensor Compo	nent	Cell A Freq.			Condition	on 103.5 kHz		Status	pass		
Sensor Compo	nent	Cell A Noise	)		Condition	0.9 ppb		Status	pass		
Sensor Compo	nent	Cell A Flow			Condition	0.67 lpm		Status	pass		
Sensor Compo	nent	Cell A Press	sure		Condition	728.1 mmHg		Status	pass		
Sensor Compo	nent	Cell A Tmp.			-	35.3 C		Status	pass		
Sensor Compo						94.0 kHz		Status	pass		
Sensor Compo			<b></b>		-	0.4 ppb		Status			
Sensor Compo						0.73 lpm		Status			
Sensor Compo	nent	Cell B Press	sure			729.1 mmHg		Status			
Sensor Compo					Condition			Status			
Sensor Compo					Condition	Not tested		Status	pass		
Sensor Compo	nent	System Mer	no		Condition	on		Status	pass		

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
MA	C426-Eric I	Hebert-11/13/2018				
1	11/13/2018	DAS	Environmental Sys Corp	none	8832	unknown4
2	11/13/2018	Ozone	ThermoElectron Inc	none	49i A3NAA	1030745085
3	11/13/2018	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	1015543061
4	11/13/2018	Zero air pump	Werther International	none	PC70/4	606489

Mfg S	Serial Numbe	r Ta Site	Т	echnician	Site Visit Date	Paramete	er Owner ID
ThermoElectron Inc	1030745085	MAC426	E	Eric Hebert	11/13/2018	Ozone	none
Intercept -0.	99643 Slope 55514 Inter 00000 Corr	cept 0	.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180930075 01115		ozone  Desc. Ozone primary stan
DAS 1: A Avg % Diff: A Ma 0.0%		AS 2: Avg %Dif A	Max % Di	Slope Cert Date	1.0032 9/14/201		
UseDescription (	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerD	if AbsDif
primary	1	0.90	0.82	0.28	ppb		-0.54
primary	2	15.94	15.81	15.18	ppb		-0.63
primary	3	37.20	37.00	36.31	ppb		1.88
primary primary	5	68.63 114.80	68.33 114.36	67.53	ppb ppb		1.18 0.84
Sensor Component				ion Good	рро	Status p	
Sensor Component			Condit			Status P	
Sensor Component	Inlet Filter Co	ondition	Condit	ion Clean		Status p	ass
Sensor Component	Battery Back	кир	Condit	ion N/A		Status p	ass
Sensor Component	Offset		Condit	ion -0.50		Status p	ass
Sensor Component	Span		Condit	ion 1.020		Status p	ass
Sensor Component	Zero Voltage	e	Condit	ion N/A		Status p	ass
Sensor Component	Fullscale Vo	Itage	Condit	ion N/A		Status P	ass
Sensor Component	Cell A Freq.		Condit	ion 136.3 kHz		Status p	ass
Sensor Component	Cell A Noise	1	Condit	ion 0.8 ppb		Status p	ass
Sensor Component	Cell A Flow		Condit	ion 0.81 lpm		Status p	ass
Sensor Component	Cell A Press	ure	Condit	ion 736.5 mmHg		Status p	ass
Sensor Component	Cell A Tmp.		Condit	ion 32.8 C		Status p	ass
Sensor Component	Cell B Freq.		Condit	ion 112.1 kHz		Status p	ass
Sensor Component	Cell B Noise		Condit	ion 0.6 ppb		Status p	ass
Sensor Component	Cell B Flow		Condit	ion 0.81 lpm		Status p	ass
Sensor Component	Cell B Press	ure	Condit	ion 737.4 mmHg		Status p	ass
Sensor Component	Cell B Tmp.			ion N/A		Status p	ass
Sensor Component	Line Loss		Condit	ion Not tested		Status p	ass
Sensor Component	System Men	no	Condit	ion		Status p	ass

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
DCF	P114-Sandy	Grenville-11/14/2018				
1	11/14/2018	DAS	Campbell	000345	CR3000	2124
2	11/14/2018	Ozone	ThermoElectron Inc	000702	49i A1NAA	1030244799
3	11/14/2018	Ozone Standard	ThermoElectron Inc	000515	49i A3NAA	0922236891
4	11/14/2018	Zero air pump	Werther International	06939	PC70/4	000829175

Mfg		Serial Numb	er Ta S	Site	Tec	chnician	Site Visit Date	Paramo	eter	Owner ID	
ThermoElect	ron Inc	1030244799		DCP114	Sa	andy Grenville	11/14/2018	Ozone		000702	
Slope: Intercept CorrCoff			rcept rCoff	0.00000 0.00000 0.00000		Mfg Serial Number Tfer ID	ThermoElectron 1180030022 01114			er ozone c. Ozone primary st	tan
DAS 1: A Avg % Di			AS 2: Avg %I	Dif A Max %	% Di	Slope Cert Date	1.0029		rcept Coff	0.1098	
UseDescrip primary primary primary	y y	ConcGroup  1 2 3 4	Tfer 10.4 14. 34. 68.	41 ( .75 1 .54 3	er Corr 0.29 4.59 4.33 88.07	Site 0.30 15.76 35.13 69.44	Site Unit ppb ppb ppb ppb	RelPer	2.3 1.99	AbsDif 0.01 1.17	
primary		5	111		11.41	113.60	ppb		1.95		
Sensor Co	mpone	nt Sample Tra	rule		Conditio			Status Status	pass		
	_	Inlet Filter (				Clean		Status			
Sensor Co	mpone	nt Battery Bac	kup		Conditio	n N/A		Status	pass		
Sensor Co	mpone	ont Offset			Conditio	<b>n</b> -0.10		Status	pass		
Sensor Co	mpone	nt Span			Conditio	n 1.028		Status	pass		
Sensor Co	mpone	zero Voltag	е		Conditio	N/A		Status	pass		
Sensor Co	mpone	nt Fullscale Vo	oltage		Conditio	n N/A		Status	pass		
	_	nt Cell A Freq				101.4 kHz		Status	pass		
	_	nt Cell A Noise				0.8 ppb		Status			
	•	nt Cell A Flow				0.69 lpm		Status			
	_	nt Cell A Pres				721.3 mmHg		Status			
	•										
	•	nt Cell A Tmp				27.9 C		Status			
	•	nt Cell B Freq				on 105.2 kHz		Status			
Sensor Co	mpone	Cell B Noise	9			0.6 ppb		Status	pass		
Sensor Co	mpone	nt Cell B Flow			Conditio	0.69 lpm		Status	pass		
Sensor Co	mpone	nt Cell B Pres	sure		Conditio	721.0 mmHg		Status	pass		
Sensor Co	mpone	cell B Tmp			Conditio	n N/A		Status	pass		
Sensor Co	mpone	nt Line Loss			Conditio	Not tested		Status	pass		
Sensor Co	mpone	nt System Me	mo		Conditio			Status			
	•										

Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
GRS420-Eric	Hebert-11/14/2018				
1 11/14/2018	DAS	Environmental Sys Corp	none	8832	A4115K
2 11/14/2018	Ozone	ThermoElectron Inc	none	49i A3NAA	1023943903
3 11/14/2018	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	1130450193
4 11/14/2018	Zero air pump	Werther International	none	PC70/4	531385

Mfg	Serial Numbe	er Ta Site	Te	chnician	Site Visit Date	Parame	eter	Owner II	D
ThermoElectron Inc	1023943903	GRS42	0 Er	ic Hebert	11/14/2018	Ozone		none	
Intercept -0.		rcept	0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180930075 01115			r ozone  Ozone primary	v stan
DAS 1:		AS 2:		Slope	1.0032	20 <b>Inte</b> r	rcept	0.07	166
A Avg % Diff: A M	0.0% A	Avg %Dif A	Max % Di	Cert Date	9/14/20	18 Corr	·Coff	1.000	000
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPer	Dif	AbsDif	
primary	1	0.04	-0.03	-0.31	ppb			-0.28	
primary	2	14.57	14.45	13.86	ppb			-0.59	
primary	3	36.90	36.71	35.07	ppb		-4.57		
primary	5	68.59 113.42	68.29 112.98	65.12	ppb		-4.75 -3.4		
primary			<u></u>		ppb	<b>a</b>			
Sensor Componen	Sample Tra	<u>in</u>	Condition	Good		Status	pass		
Sensor Componen	22.5 degree	rule	Condition	on		Status	pass		
Sensor Componen	Inlet Filter C	Condition	Condition	Clean		Status	pass		
Sensor Componen	Battery Bac	kup	Condition	N/A		Status	pass		
Sensor Componen	Offset		Condition	0.000		Status	pass		
Sensor Componen	Span		Condition	0.979		Status	pass		
Sensor Componen	Zero Voltag	е	Condition	N/A		Status	pass		
Sensor Componen	Fullscale Vo	oltage	Condition	N/A		Status	pass		
Sensor Componen	Cell A Freq.		Condition	95.9 kHz		Status	pass		
Sensor Componen	Cell A Noise	)	Condition	0.5 ppb		Status	pass		
Sensor Componen	Cell A Flow		Condition	0.65 lpm		Status	pass		
Sensor Componen	Cell A Press	sure	Condition	684.6 mmHg		Status	pass		
Sensor Componen	Cell A Tmp.		Condition	31.5 C		Status	pass		
Sensor Componen	Cell B Freq.		Condition	98.6 kHz		Status	pass		
Sensor Componen	Cell B Noise	9	Condition	0.6 ppb		Status	pass		
Sensor Componen	Cell B Flow		Condition	0.69 lpm		Status	pass		
Sensor Componen	Cell B Press	sure	Condition	685.2 mmHg		Status	pass		
Sensor Componen	Cell B Tmp.		Condition	N/A		Status	pass		
Sensor Componen	Line Loss		Condition	Not tested		Status	pass		
Sensor Componen	System Mer	no	Condition	on		Status	pass		

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
BWI	R139-Eric F	Hebert-11/16/2018				
1	11/16/2018	DAS	Campbell	000431	CR3000	2536
2	11/16/2018	Ozone	ThermoElectron Inc	000618	49i A1NAA	1009241789
3	11/16/2018	Ozone Standard	ThermoElectron Inc	000697	49i A3NAA	1030244814
4	11/16/2018	Zero air pump	Werther International	06877	C 70/4	000815258

Mfg	Serial Number	er Ta Site	Te	chnician	Site Visit Date	Parame	ter	Owner I	D
ThermoElectron Inc	1009241789	BWR13	9 E	ric Hebert	11/16/2018	Ozone		000618	
Intercept		rcept	0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180930075 01115		rameter er Desc.	ozone Ozone primar	y stan
DAS 1:	D	AS 2:		Slope	1.0032	20 Inter	cept	0.07	7166
A Avg % Diff: A N		Avg %Dif A	Max % Di	Cert Date	9/14/201	18 Corr	Coff	1.00	0000
0.0%	0.0%								
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerl	Dif	AbsDif	
primary	1	0.06	-0.01	-1.82	ppb			-1.81	
primary primary	3	13.73 34.84	13.61 34.65	12.22 34.19	ppb ppb		-1.34	-1.39	
primary	4	68.62	68.32	68.42	ppb		0.15		
primary	5	112.86	112.42	114.70	ppb		2.01		
Sensor Componer	nt Sample Tra	in	Conditi	on Good		Status	pass	,	
Sensor Componer	22.5 degree	rule	Conditi	on		Status	pass		
Sensor Componer	nt Inlet Filter C	Condition	Conditi	on Moderately cle	ean	Status	pass		
Sensor Componer	nt Battery Bac	kup	Conditi	on N/A		Status	pass		
Sensor Componer	offset Offset		Conditi	on 0.10		Status	pass		
Sensor Componer	Span		Conditi	on 1.048		Status	pass		
Sensor Componer	nt Zero Voltag	е	Conditi	on N/A		Status	pass		
Sensor Componer	rullscale Vo	oltage	Conditi	on N/A		Status	pass		
Sensor Componer	Cell A Freq.		Conditi	on 98.9 kHz		Status	pass		
Sensor Componer	cell A Noise	)	Conditi	<b>on</b> 0.6 ppb		Status pass			
Sensor Componer	cell A Flow		Conditi	on 0.69 lpm		Status	pass		
Sensor Componer	Cell A Press	sure	Conditi	726.4 mmHg		Status	pass		
Sensor Componer	Cell A Tmp.		Conditi	on 31.3 C		Status	pass		
Sensor Componer	Cell B Freq.		Conditi	on 100.8 kHz		Status	pass		
Sensor Componer	Cell B Noise	)	Conditi	<b>on</b> 0.9 ppb		Status	pass		
Sensor Componer	Cell B Flow		Conditi	0.69 lpm		Status	pass		
Sensor Componer	Cell B Press	sure	Conditi	on 727.3 mmHg		Status	pass		
Sensor Componer	Cell B Tmp.		Conditi			Status	pass		
Sensor Componer	Line Loss		Conditi	on Not tested		Status pass			
Sensor Componer	System Mer	mo	Conditi	on		Status	pass		

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
SHN	1418-Eric H	lebert-11/19/2018				
1	11/19/2018	DAS	Environmental Sys Corp	90658	8816	2643
2	11/19/2018	Ozone	ThermoElectron Inc	none	49i A3NAA	0903334535
3	11/19/2018	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	CM08460009
4	11/19/2018	Zero air pump	Werther International	none	C 70/4	000855578

Mfg		Serial Number	er Ta	Site	Te	chnician	Site Visit Date	Paramo	eter	Owner ID	•
ThermoElec	ctron Inc	0903334535		SHN418	Er	ic Hebert	11/19/2018	Ozone		none	
Slope: Intercept CorrCoff	(		oe: [ rcept [ rCoff [	0.000 0.000 0.000	000	Mfg Serial Number	ThermoElectron			ozone Ozone primary s	stan
DAS 1:			AS 2:			Tfer ID	01115	10 T4	4	0.071	ee
A Avg % I		Max % Di A		Dif A Max	x % Di	Slope Cert Date	9/14/201		rcept Coff	1.000	
0.0	0%	0.0%									
UseDescr	1	ConcGroup			Tfer Corr	Site	Site Unit	RelPer	Dif	AbsDif	
prima	•	1		.05	-0.61 13.93	-0.26 14.71	ppb			0.35	
prima prima	•	3		.62	33.44	33.54	ppb ppb		0.3	0.78	
prima	-	4		7.54	67.25	66.71	ppb		-0.81		
prima	-	5	108	8.80	108.38	107.70	ppb		-0.63		
Sensor C	ompone	nt Sample Tra	in		Condition	Good		Status	pass		
Sensor C	ompone	nt 22.5 degree	rule		Condition	on		Status	pass		
Sensor C	ompone	nt Inlet Filter C	Condition	1	Condition	Clean		Status	pass		
Sensor C	ompone	nt Battery Bac	kup		Condition	on N/A		Status	pass		
Sensor C	ompone	nt Offset			Condition	on -0.10		Status	pass		
Sensor C	ompone	nt Span			Condition	on 0.995		Status	pass		
Sensor C	ompone	nt Zero Voltag	е		Condition	0.0007		Status	pass		
Sensor C	ompone	nt Fullscale Vo	oltage		Condition	1.0005		Status	pass		
Sensor C	ompone	nt Cell A Freq.			Condition	88.8 kHz		Status	pass		
Sensor C	ompone	nt Cell A Noise	9		Condition	0.9 ppb		Status	pass		
Sensor C	ompone	nt Cell A Flow			Condition	0.63 lpm		Status	pass		
Sensor C	ompone	nt Cell A Press	sure		Condition	658.4 mmHg		Status	pass		
Sensor C	ompone	nt Cell A Tmp.			Condition	on 34.2 C		Status	pass		
Sensor C	ompone	nt Cell B Freq.			Condition	99.8 kHz		Status	pass		
Sensor C	ompone	nt Cell B Noise	9		Condition	0.8 ppb		Status	pass		
Sensor C	ompone	nt Cell B Flow			Condition	0.65 lpm		Status	pass		
Sensor C	ompone	nt Cell B Press	sure		Condition	657.8 mmHg		Status pass			
Sensor C	ompone	nt Cell B Tmp.			Condition	N/A		Status pass			
Sensor C	ompone	nt Line Loss			Condition	Not tested		Status	pass		
Sensor C	ompone	nt System Mei	mo		Condition	on		Status	pass		

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
WSP	144-Eric H	Hebert-12/01/2018				
1	12/1/2018	DAS	Campbell	000430	CR3000	2525
2	12/1/2018	Ozone	ThermoElectron Inc	000734	49i A1NAA	1105347317
3	12/1/2018	Ozone Standard	ThermoElectron Inc	000543	49i A3NAA	0929938240
4	12/1/2018	Zero air pump	Werther International	06880	C 70/4	000814273

Slope: Intercept CorrCoff  DAS 1: A Avg % Diff: A 0.0%  UseDescription primary primary primary primary	0.99263 -1.43695 1.00000	Slope: Intercep CorrCo	t T	0.00000 0.00000 0.00000	N	Hebert	ThermoElectron	Ozone Inc Pa	rameto	000734	
Intercept CorrCoff  DAS 1: A Avg % Diff: A 0.0%  UseDescription primary primary primary	-1.43695 1.00000 Max % L	Intercep CorrCo	t T	0.00000		<u> </u>	ThermoElectron	Inc Pa	ramete	ozone	
A Avg % Diff: A 0.0%  UseDescription primary primary primary			:				1180930075			ozone Ozone primary stan	
UseDescription primary primary primary	0.0			Max % Di	S	Ffer ID Slope Cert Date	01115 1.0032 9/14/201		•		7166
primary primary primary		%				Cert Bute					
primary primary	ConcG	roup 7	fer Raw	Tfer Cor	r	Site	Site Unit	RelPer	Dif	AbsDif	
primary	2		0.45	0.37			ppb ppb			-1.56 -1.5	
nrimary	3		37.61	37.41			ppb		-4.71	1.5	
primary	4		68.06	67.77			ppb		-2.6		
primary	5		116.46	116.01		-	ppb		-2.1		
Sensor Compo	nent Samp	le Train		Cond	lition	Good		Status	pass		
Sensor Compo	nent 22.5	degree rule		Cond	lition	1		Status	pass		
Sensor Compo	nent Inlet I	ilter Cond	tion	Cond	lition	Clean		Status	pass		
Sensor Compo	nent Batte	ry Backup		Cond	lition	N/A		Status	pass		
Sensor Compo	nent Offse	t		Cond	lition	0.000		Status	pass		
Sensor Compo	nent Span			Cond	lition	1.021		Status	pass		
Sensor Compo	nent Zero	Voltage		Cond	lition	N/A		Status	pass		
Sensor Compo	nent Fullso	ale Voltag	Э	Cond	lition	N/A		Status	pass		
Sensor Compo	nent Cell A	Freq.		Cond	lition	107.6 kHz		Status	pass		
Sensor Compo	nent Cell A	Noise		Cond	lition	0.8 ppb		Status	pass		
Sensor Compo	nent Cell A	Flow		Cond	lition	0.73 lpm		Status	pass		
Sensor Compo	nent Cell A	Pressure		Cond	lition	733.3 mmHg		Status	pass		
Sensor Compo	nent Cell A	Tmp.		Cond	lition	34.7 C		Status	pass		
Sensor Compo	nent Cell E	3 Freq.		Cond	lition	96.4 kHz		Status	pass		
Sensor Compo	nent Cell E	8 Noise		Cond	lition	0.6 ppb		Status	pass		
Sensor Compo	nent Cell E	3 Flow		Cond	lition	0.70 lpm		Status	pass		
Sensor Compo	nent Cell E	3 Pressure		Cond	lition	732.7 mmHg		Status	pass		
Sensor Compo	nent Cell E	3 Tmp.		Cond	lition	N/A		Status pass			
Sensor Compo	nent Line I	oss		Cond	lition	Not tested		Status	pass		
Sensor Compo	nent Syste	m Memo		Cond	lition	1		Status	pass		

Site \	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
QAK	172-Sandy	Grenville-12/04/2018				
1	12/4/2018	DAS	Campbell	000418	CR3000	2518
2	12/4/2018	Ozone	ThermoElectron Inc	000683	49i A1NAA	1030244798
3	12/4/2018	Ozone Standard	ThermoElectron Inc	000368	49i A3NAA	0726124682
4	12/4/2018	Zero air pump	Werther International	06870	PC70/4	000814278

Mfg	S	erial Numbe	r Ta Sit	te	Teo	chnician	Site Visit Date	Parame	eter	Owner I	(D
ThermoElect	ron Inc	1030244798	Q	AK172	Sa	indy Grenville	12/04/2018	Ozone		000683	
Slope:		99049 <b>Slop</b>		0.00000	-	Mfg	ThermoElectron		ramete		
Intercept CorrCoff			cept	0.00000	<u> </u>	Serial Number	1180030022	Tf	er Desc	Ozone primary	y stan
Correon		COLI	Con	0.00000	J	Tfer ID	01114				
DAS 1:		<b>D</b> A	AS 2:			Slope	1.0029	0 Inter	cept	0.10	0980
A Avg % Di			Avg %Di	if A Max %	6 Di	Cert Date	9/7/201	8 Corr	·Coff	1.00	0000
0.09	%	0.0%				Cert Bute		Corr	Con		
UseDescrip		ConcGroup	Tfer R		er Corr	Site	Site Unit	RelPer	Dif	AbsDif	
primary		1	0.40		0.28	0.20	ppb			-0.08	
primary primary		3	15.6 34.40		5.45 4.19	15.40 34.40	ppb ppb		0.61	-0.05	
primary		4	66.98		6.67	66.00	ppb		-1.01		
primary		5	111.4	40 1	10.96	110.00	ppb		-0.87		
Sensor Co	mponent	Sample Trai	n		Conditio	Good		Status	pass		
Sensor Co	mponent	22.5 degree	rule		Conditio	on		Status	pass		
Sensor Co	mponent	Inlet Filter C	ondition		Conditio	Clean		Status	pass		
Sensor Co	mponent	Battery Back	kup		Conditio	n N/A		Status	pass		
Sensor Co	mponent	Offset			Conditio	on 0.10		Status	pass		
Sensor Co	mponent	Span			Conditio	n 1.001		Status	pass		
Sensor Co	mponent	Zero Voltage	9		Conditio	n N/A		Status	pass		
Sensor Co	mponent	Fullscale Vo	Itage		Conditio	N/A		Status	pass		
Sensor Co	mponent	Cell A Freq.			Conditio	97.3 kHz		Status pass			
Sensor Co	mponent	Cell A Noise	)		Conditio	1.0 ppb		Status pass			
Sensor Co	mponent	Cell A Flow			Conditio	0.70 lpm		Status	pass		
Sensor Co	mponent	Cell A Press	ure		Conditio	687.9 mmHg		Status	pass		
Sensor Co	mponent	Cell A Tmp.			Conditio	26.5 C		Status	pass		
Sensor Co	mponent	Cell B Freq.			Conditio	96.6 kHz		Status	pass		
Sensor Co	mponent	Cell B Noise			Conditio	0.9 ppb		Status	pass		
Sensor Co	mponent	Cell B Flow			Conditio	0.73 lpm		Status	pass		
Sensor Co	mponent	Cell B Press	ure		Conditio	687.3 mmHg		Status	pass		
Sensor Co	mponent	Cell B Tmp.			Conditio	N/A		Status pass			
Sensor Co	mponent	Line Loss			Conditio	Not tested		Status pass			
Sensor Co	mponent	System Men	no		Conditio	on		Status	pass		

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
CND	0125-Eric F	Hebert-12/05/2018				
1	12/5/2018	DAS	Campbell	000499	CR3000	3816
2	12/5/2018	Ozone	ThermoElectron Inc	000692	49i A1NAA	1030244803
3	12/5/2018	Ozone Standard	ThermoElectron Inc	000376	49i A3NAA	0726124693
4	12/5/2018	Zero air pump	Werther International	06868	C 70/4	000814284

Mfg	Serial Numbe	er Ta Site	7	Гесhnician	Site Visit Date	Parame	eter	Owner ID	)
ThermoElectron Inc	1030244803	CND12	5	Eric Hebert	12/05/2018	Ozone		000692	
Intercept -0		rcept	0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180930075 01115			ozone Ozone primary	stan
DAS 1:	<b>D</b> A	AS 2:		Slope	1.0032	0 Inter	cept	0.071	166
A Avg % Diff: A M	0.0% A	Avg %Dif A	Max % Di	Cert Date	9/14/201	8 Corr	Coff	1.000	)00
	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerl	Dif	AbsDif	
primary	1	-0.04	-0.11	-0.60	ppb	Keirei	DII	-0.49	
primary	2	14.97	14.85	14.78	ppb			-0.07	
primary	3	38.66	38.46	37.23	ppb		-3.25		
primary	4	68.04	67.75	66.31	ppb		-2.15		
primary	5	113.50	113.06	110.30	ppb		-2.47		
Sensor Componen	Sample Trai	'n	Condi	Good		Status	pass		
Sensor Componen	22.5 degree	rule	Condi	ition		Status	pass		
Sensor Componen	Inlet Filter C	ondition	Condi	<b>tion</b> Dirty		Status	Fail		
Sensor Componer	Battery Back	kup	Condi	tion N/A		Status	pass		
Sensor Componer	Offset		Condi	-0.20		Status	pass		
Sensor Componer	Span		Condi	1.003		Status	pass		
Sensor Componen	Zero Voltage	Э	Condi	tion N/A		Status	pass		
Sensor Componer	Fullscale Vo	ltage	Condi	ition N/A		Status	pass		
Sensor Componen	Cell A Freq.		Condi	92.7 kHz		Status	pass		
Sensor Componer	Cell A Noise	)	Condi	0.4 ppb		Status	pass		
Sensor Componen	Cell A Flow		Condi	0.72 lpm		Status	pass		
Sensor Componer	Cell A Press	sure	Condi	714.3 mmHg		Status	pass		
Sensor Componer	Cell A Tmp.		Condi	36.1 C		Status	pass		
Sensor Componer	Cell B Freq.		Condi	100.5 kHz		Status	pass		
Sensor Componen	Cell B Noise	)	Condi	0.6 ppb		Status	pass		
Sensor Componen	Cell B Flow		Condi	0.71 lpm		Status	pass		
Sensor Componen	Cell B Press	sure	Condi	713.7 mmHg		Status	pass		
Sensor Componen	Cell B Tmp.			N/A		Status	pass		
Sensor Componer	Line Loss		Condi	Not tested		Status	pass		
Sensor Componen	System Mer	no	Condi	tion		Status	pass		