# 2018 – 3<sup>rd</sup> 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

**EPA Contract No. EP-W-18-005** 

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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 October 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. Six EPA sponsored sites that are operated by Wood continue to operate meteorological sensors. Those sites are BEL116, BVL130, CHE185, IRL141, PAL190, and PND165. Five 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 (CHC432) 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 ROM206, PND165, and HWF187 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	Parameter	Audit Challenge	Acceptance Criteria
Precipitation	Response	10 manual tips	1 DAS count per tip
Precipitation	Accuracy	2 introductions of known amounts of water	≤±10.0% of input amount
Relative Humidity	Accuracy	Compared to reference instrument or standard solution	≤±10.0% RH
Solar Radiation	Accuracy	Compared to WRR traceable standard	≤±10.0% of daytime average
Surface Wetness	Response	Distilled water spray mist	Positive response
Surface Wetness	Sensitivity	1% decade resistance	N/A
Temperature	Accuracy	Comparison to 3 NIST measured baths (~ 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	rod/grossarm or sighted to		≤±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		
Mass Flow Controller	Flow Rate	Comparison with Primary Standard	$\leq \pm 5.0\%$ of designated rate
Ozone	Slope	Linear regression of multi-	$0.9000 \le m \le 1.1000$
Ozone	Intercept	point test gas concentration as measured with a certified	$-5.0 \text{ ppb} \le b \le 5.0 \text{ ppb}$
Ozone	Correlation Coefficient	transfer standard	0.9950 ≤ r
Ozone	Percent Difference	Comparison with Level 2 standard concentration	$\leq \pm 15.1\%$ 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 Third Quarter 2018

This report consists of the systems and performance and other audit results from the CASTNET sites visited during the third quarter (July through September) 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
NPT006	FSA+Flow	EPA	7/3/2018	Nez Perce Tribe
CHC432	Met	NPS	8/6/2018	Chaco NHP
MEV405	FSA+Flow	NPS	8/7/2018	Mesa Verde NP
ARE128	FSA+Flow	EPA	8/18/2018	Arendtsville
MKG113	FSA+Flow	EPA	8/20/2018	M. K. Goddard St. Park
PSU106	FSA+Flow	EPA	8/20/2018	Penn State University
KEF112	FSA+Flow	EPA	8/21/2018	Kane Experimental Forest
ANA115	FSA+Flow	EPA	9/10/2018	Ann Arbor
UVL124	FSA+Flow	EPA	9/12/2018	Unionville
HOX148	FSA+Flow	EPA	9/13/2018	Hoxeyville
CTH110	FSA+Flow	EPA	9/25/2018	Connecticut Hill
HWF187	FSA+Flow	EPA	9/30/2018	Huntington Wildlife Forest

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

**Table 3. TTP Pollutant PE Visits** 

Side ID	PE Audit Type	Sponsor	Site Visit Date	Station Name	
NPT006	O <sub>3</sub>	EPA	7/3/2018	Nez Perce Tribe	
YEL408	O <sub>3</sub>	NPS	7/5/2018	Yellowstone NP	
GLR468	O <sub>3</sub>	NPS	7/6/2018	Glacier NP	
PND165	O <sub>3</sub>	EPA+WSO	7/23/2018	Pinedale	
PND165	NOy	EPA+WSO	7/24/2018	Pinedale	
PED108	O <sub>3</sub>	EPA	7/30/2018	Prince Edward	
VPI120	O <sub>3</sub>	EPA	7/31/2018	Horton Station	
PAR107	O <sub>3</sub>	EPA	8/1/2018	Parsons	
CKT136	O <sub>3</sub>	EPA	8/2/2018	Crockett	
MCK131	O <sub>3</sub>	EPA	8/3/2018	Mackville	
MCK231	O <sub>3</sub>	EPA	8/4/2018	Mackville	
CHC432	O <sub>3</sub>	NPS	8/6/2018	Chaco NHP	
MEV405	O <sub>3</sub>	NPS	8/7/2018	Mesa Verde NP	
ARE128	O <sub>3</sub>	EPA	8/18/2018	Arendtsville	
CDR119	O <sub>3</sub>	EPA	8/18/2018	Cedar Creek St. Park	
MKG113	O <sub>3</sub>	EPA	8/20/2018	M. K. Goddard St. Park	
PSU106	O <sub>3</sub>	EPA	8/20/2018	Penn State University	

Side ID	PE Audit Type	Sponsor	Site Visit Date	Station Name
ROM206	NOy	EPA	8/20/2018	Rocky Mountain NP
KEF112	$O_3$	EPA	8/21/2018	Kane Experimental Forest
CNT169	O <sub>3</sub>	EPA	8/30/2018	Centennial
ANA115	$O_3$	EPA	9/10/2018	Ann Arbor
UVL124	O <sub>3</sub>	EPA	9/12/2018	Unionville
HOX148	O <sub>3</sub>	EPA	9/13/2018	Hoxeyville
PRK134	O <sub>3</sub>	EPA	9/17/2018	Perkinstown
CTH110	O <sub>3</sub>	EPA	9/25/2018	Connecticut Hill
CRMO-VC	$O_3$	NPS	9/27/2018	Craters of the Moon
HWF187	O <sub>3</sub> +NOy	EPA	9/30/2018	Huntington Wildlife Forest

## 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 Third Quarter 2018

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

Table 4. Sites Surveyed – Third Quarter 2018

Side ID	<u>Network</u>	Visit Date	Station Name
AB32	NTN	9/7/2018	Fort Mackay
CO02	NTN	7/31/2018	Niwot Saddle
CO08	NTN	8/10/2018	Four Mile Park
CO88	AMoN	8/20/2018	Rocky Mountain Np
CO91	NTN	8/8/2018	Wolf Creek Pass
CO92	NTN	8/10/2018	Sunlight Peak
CO96	MDN / NTN	8/9/2018	Molas Pass
CO98	NTN	8/14/2018	Rocky Mountain Np-Loch Vale
CO99	MDN / NTN	8/7/2018	Mesa Verde National Park-Chapin Mesa
ID03	AMoN	9/27/2018	Craters of the Moon National Monument
ID07	AMoN	7/3/2018	Nez Perce Tribe
KY03	AMoN	8/4/2018	Mackville
MI09	MDN/NTN	9/14/2018	Douglas Lake
MI26	NTN	9/11/2018	Kellog Biological Station
MI48	MDN/NTN	9/15/2018	Seney National Wildlife Refuge-Headquarters
MI51	NTN/AMoN	9/12/2018	Unionville
MI52	AMoN	9/10/2018	Ann Arbor
MI53	NTN	9/11/2018	Wellston
MI95	AMoN	9/13/2018	Hoxeyville
MT00	NTN	9/11/2018	Little Bighorn Battlefield National Monument
MT96	NTN	7/17/2018	Poplar River
MT98	NTN	7/18/2018	Havre-Northern Agriculture Research Center
ND01	MDN	7/16/2018	Lostwood National Wildlife Refuge

Side ID	<u>Network</u>	<u>Visit Date</u>	Station Name	
NY67	AMoN	9/26/2018	Ithaca	
PA00	AMoN	8/18/2018	Arendtsville	
PA29	AMoN	8/21/2018	Kane Experimental Forest	
PA56	AMoN	8/20/2018	M. K. Goddard St. Park	
PA96	AMoN	8/22/2018	Penn State University	
SK20	NTN	9/10/2018	Cactus Lake	
SK21	NTN	9/5/2018	Hudson Bay	
SK27	MDN/AMoN	9/6/2018	Pinehouse	
SK30	NTN	9/4/2018	Weyburn	
SK31	NTN	9/9/2018	Fox Valley	
VA13	AMoN	7/31/2018	Horton Station	
VA24	AMoN	7/30/2018	Prince Edward	
WA24	NTN	7/2/2018	Palouse Conservation Farm	
WI10	MDN/NTN	9/17/2018	Potawatomi	
WI31	MDN	9/18/2018	Devil's Lake	
WI35	AMoN	9/17/2018	Perkinstown	
WV05	AMoN	8/1/2018	Cedar Creek State Park	
WV18	AMoN	8/1/2018	Parsons	
WY00	NTN	8/28/2018	Snowy Range	
WY02	NTN	7/26/2018	Sinks Canyon	
WY06	NTN/AMoN	7/24/2018	Pinedale	
WY94	NTN / AMoN	7/23/2018	Grand Tetons National Park	
WY95	NTN / AMoN	8/28/2018	Brooklyn Lake	
WY97	NTN	7/26/2018	South Pass City	

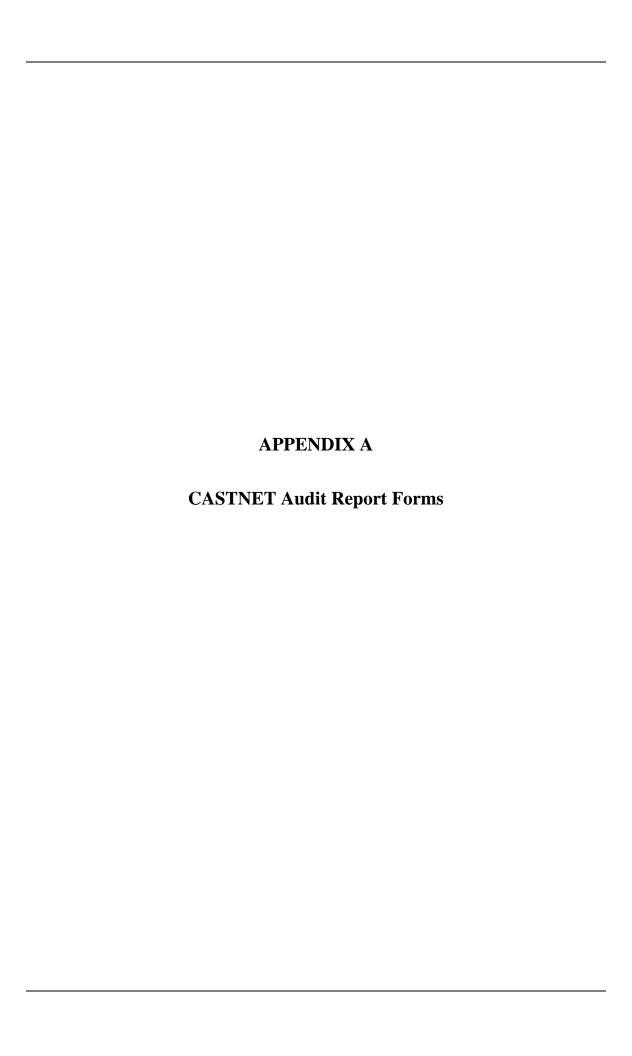
Side ID	<u>Network</u>	<u>Visit Date</u>	Station Name
WY97	NTN	9/28/2018	South Pass City
WY98	NTN	7/24/2018	Gypsum Creek

## 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
NP7	006-Martin	Valvur-07/03/2018				
1	7/3/2018	Computer	Dell	07065	Inspiron 15	1Y3MC12
2	7/3/2018	DAS	Campbell	none	CR850	28381
3	7/3/2018	DAS	Campbell	000353	CR3000	2131
4	7/3/2018	Filter pack flow pump	Permotec	none	BL30EB	432201630446
5	7/3/2018	Flow Rate	Apex	00854	AXMC105LPMDPCV	illegible
6	7/3/2018	Modem	Sierra wireless	06990	GX440	Unknown
7	7/3/2018	Ozone	ThermoElectron Inc	000612	49i A1NAA	1009241779
8	7/3/2018	Ozone Standard	ThermoElectron Inc	000448	49i A3NAA	CM08200024
9	7/3/2018	Sample Tower	Aluma Tower	000839	AT516D1	AT214153Z12
10	7/3/2018	Shelter Temperature	Campbell	none	107-L	none
11	7/3/2018	Temperature	RM Young	04681	41342VC	6695
12	7/3/2018	Zero air pump	Werther International	000626	PC 70/4	000815300

# Flow Data Form

Mfg	Se	erial Num	ber Ta S	ite	Tec	hnician	Site Visit I	Date Parar	neter	Owner ID
Apex	ill	egible	1	NPT006	Ма	rtin Valvur	07/03/2018	Flow F	Rate	00854
					-	Mfg	BIOS	]	Parameter Flo	ow Rate
						Serial Number	148613		Tfer Desc. Bl	OS 220-H
						Tfer ID	01421			
								00450 -		0.40000
						Slope	0.	98450 Int	ercept	0.10300
						Cert Date	3/	1/2018 <b>C</b> o	rrCoff	1.00000
DAS 1:			DAS 2:		L	Cal Factor Z	ero		0	
A Avg % Diff:	A Max		A Avg %I	Dif A Max	% <b>Di</b>	Cal Factor F			0	
1.66%		2.04%				Rotometer R	eading:		0	
Desc.	Tes	st type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	I PctDifference
primary	pump	off	0.000	0.000	0.00	0.000	0.00	1/m	l/m	
primary	leak c	heck	0.000	0.000	0.00	0.000	0.03	l/m	l/m	
primary	test pt		3.003	2.950	2.94	0.000	2.99 l/m		l/m	1.36%
primary	test pt		3.005	2.950	2.94	0.000	3.00	1/m	l/m	1.59%
primary	test pt	: 3	3.002	2.940	2.95	0.000	3.00	1/m	1/m	2.04%
Sensor Compo	onent	Leak Test	t		Condition	n		Statu	pass	
Sensor Compo	onent	Tubing Co	ondition	on		Good	Good		Status pass	
Sensor Compo	onent	Filter Posi	ition		Condition	Good		Status pass		
Sensor Compo	onent	Rotomete	r Condition		Condition	Clean and dry		Statu	s pass	
Sensor Compo	onent	Moisture I	Present		Condition	No moisture present		Statu	s pass	
Sensor Compo	onent	Filter Dista	ance		Condition	4.5 cm		Statu	s pass	
Sensor Compo	onent	Filter Dep	th		Condition	4.5 cm	4.5 cm		s pass	
Sensor Component Filter Azimuth		Condition	190 deg		Statu	s pass				
Sensor Component System Memo		Condition	n		Statu	s pass				

# **Ozone Data Form**

		Site	160	chnician		Site visit	Date Para	ameter	Owner ID	
ThermoElectron Inc 10	ThermoElectron Inc 1009241779		Ma	artin Valvı	ır	07/03/20	18 Ozoi	ne	000612	
Intercept -0.23	1.04884       Slope:       0.000         -0.23783       Intercept       0.000         0.99999       CorrCoff       0.000		Serial Number		ThermoEl 49CPS-70 01110	lectron Inc 0008-364	Paramet	ozone primary stan		
DAS 1: A Avg % Diff: A Max	DAS 2:  Mark Di A Avg %	Dif A Max %	0/4 <b>Di</b>	Slope			1.00801 I	ntercept	-0.05199	
4.0%	4.9%	DII A Wax /	/0 D1	Cert Da	te	9/	(11/2017 C	corrCoff	1.00000	
UseDescription	ConcGroup	Tfer Raw	Tfer	Corr	Si	te	Site Uni	t P	PctDifference	
primary	1	-0.02	0.0				opb			
primary	2	14.03	13.	97	14.	.67 p	opb		3.09%	
primary	3	33.01	32.		34.		ppb		4.24%	
primary	5	65.98 111.00	65. 110		68. 115	-	opb		4.00%	
primary		111.00			113	1.30 J	opb		4.83%	
Sensor Component	Sample Train		Conditio	on Good			Stat	pass		
Sensor Component 2	22.5 degree rule		Conditio	on			Stat	pass		
Sensor Component	Inlet Filter Condition	n	Conditio	on Clean		Status P		us pass	pass	
Sensor Component	Battery Backup		Condition N/A		Status pas		pass			
Sensor Component	Offset		Condition 0.1			Status pass				
Sensor Component	Span		Condition 1.019			Status pass				
Sensor Component	Zero Voltage	Condition		n N/A	n N/A		Stat	us pass		
Sensor Component	Fullscale Voltage		Condition N/A		Status F		us pass			
Sensor Component	Cell A Freq.		Conditio	Condition 101 kHz		Status pa		us pass		
Sensor Component	Cell A Noise		Condition 0.9 ppb		Status		us pass			
Sensor Component	Cell A Flow		Condition 0.66 lpm		Status		us pass			
Sensor Component	Cell A Pressure	Condition		on 660.2 mmHg		Stat	us pass			
Sensor Component	Cell A Tmp.		Conditio	ion 35.8 C		Stat	pass			
Sensor Component	Sensor Component Cell B Freq.		Conditio	ion 96.2 kHz			Status F			
Sensor Component	Sensor Component Cell B Noise		Conditio	0.8 ppb		Status		pass		
Sensor Component	Cell B Flow	Conditi		0.67 lpm		Stat	us pass			
Sensor Component	Cell B Pressure		Conditio	660.2	mmHg		Stat	pass		
Sensor Component	Cell B Tmp.		Conditio	on			Stat	pass		
Sensor Component	Line Loss		Conditio	Not te	sted		Stat	pass		
Sensor Component	System Memo		Conditio	on			Stat	pass		

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg RM Young NPT006 Martin Valvur 07/03/2018 Temperature 04681 6695 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 0.25 0.28 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.180.20 0.000 0.0 C -0.23 C Temp Mid Range 24.60 24.62 0.000 24.3 -0.28 primary 46.91 0.000 46.7 C -0.25 primary Temp High Range 46.88 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** Martin Valvur 07/03/2018 Shelter Temperature Campbell NPT006 none 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** 0.37 0.47 01229 **Tfer ID** 0.99986 -0.01977 Slope Intercept 1/24/2018 1.00000 **Cert Date** CorrCoff

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	24.48	24.50	0.000	25.0	C	0.47
primary	Temp Mid Range	25.03	25.05	0.000	0.000 24.9		-0.18
primary	Temp Mid Range	26.15	26.17	0.000	26.6	С	0.46
Sensor Component System Memo Condition Status pass							

# **Field Systems Comments**

1 Parameter: SitingCriteriaCom

Site is located in wooded mountainous area.

Field Systems Da	ata Form	]	F-02058-1500-S1-rev002
Site ID NPT006	Technician Martin Valvur	Site Visit Date 07/0	3/2018
Site Sponsor (agency)	EPA	USGS Map	
<b>Operating Group</b>	Nez Perce Tribe	Map Scale	
AQS#		Map Date	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone	QAPP Latitude	
<b>Deposition Measurement</b>	dry	QAPP Longitude	
Land Use		<b>QAPP Elevation Meters</b>	
Terrain		QAPP Declination	
Conforms to MLM		<b>QAPP Declination Date</b>	
Site Telephone		Audit Latitude	46.276031
Site Address 1		Audit Longitude	-116.020137
Site Address 2		Audit Elevation	965
County	Idaho	Audit Declination	14.0
City, State	Kamiah, ID		
Zip Code	83536	Present Fire Extinguisher ✓	In vehicle
Time Zone	Pacific	First Aid Kit	In vehicle
Primary Operator		Safety Glasses	
Primary Operator  Primary Op. Phone #		Safety Hard Hat	
•			
Primary Op. E-mail		Climbing Belt  Security Fence	
Backup Operator			
Backup Op. Phone #		200420 2404002	
Backup Op. E-mail Shelter Working Room  ✓	Make Ekto Mo	Stable Entry Step 🗹	Shelter Size
<u> </u>	Notes Notes	ouei	SHCILLI SIZC
	Notes Notes		
<b>Driving Directions</b> From	the town of Kamiah, travel east on route 1		
Wood	land drive. Travel approximately 7 miles	on Woodland Dr and look for th	ne road leading to the 140 foot tower.

# **Field Systems Data Form**

F-02058-1500-S2-rev002

Site ID NPT006 Technician Martin Valvur Site Visit Date 07/03/2018

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		lacksquare
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		ightharpoons
Tree line	50 m		✓
Obstacles to wind	10 times obstacle height		

**Siting Criteria Comment** 

Site is located in wooded mountainous area.

Fie	eld Systems Data Form		F-02058-1500-S3-rev002
Site	ID NPT006 Technician Martin Valvur		Site Visit Date 07/03/2018
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>V</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?	<b>✓</b> N	N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	<b>✓</b> N	N/A
10	Is the surface wetness sensor sited with the grid surface facing porth?	<b>V</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	ld Systems Data Form		F-02058-1500-S4-rev002				
Site	ID NPT006 Technician Martin Valvur		Site Visit Date 07/03/2018				
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?	<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 NPT006 Technician | Martin Valvur Site Visit Date 07/03/2018 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? **~** 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 10 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? **✓** Is there a rotometer in the dry deposition filter line, and is it clean?

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

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

## Field Systems Data Form F-02058-1500-S6-rev002 Site ID NPT006 Technician Martin Valvur Site Visit Date 07/03/2018 DAS, sensor translators, and peripheral equipment operations and maintenance Do the DAS instruments appear to be in good condition and well maintained? **✓** Are all the components of the DAS operational? (printers, modem, backup, etc) Do the analyzer and sensor signal leads pass through lightning protection circuitry? **✓** Are the signal connections protected from the weather and well maintained? **V** Are the signal leads connected to the correct DAS channel? Are the DAS, sensor translators, and shelter properly **~** grounded? **✓** 7 Does the instrument shelter have a stable power source? **✓** Is the instrument shelter temperature controlled? Grounded **Stable** Is the met tower stable and grounded? **V** Is the sample tower stable and grounded?

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 Tower comments?

#### **Field Systems Data Form** F-02058-1500-S7-rev002 NPT006 Technician | Martin Valvur Site Visit Date 07/03/2018 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 ✓** Wind direction sensor **V Data logger** ✓ **V** Temperature sensor Strip chart recorder **✓ V** Relative humidity sensor Computer ✓ П П 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 П **V V UPS Solar radiation translator ~ 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 V Site Ops Manual V HASP V V Field Ops Manual 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

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

current?

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

#### **Field Systems Data Form** F-02058-1500-S8-rev002 NPT006 Site Visit Date 07/03/2018 Site ID Technician | Martin Valvur 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** Weekly **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 V** Semiannually **V V Automatic Zero/Span Tests** Daily **V** N/A Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests V** N/A **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** 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, logbook

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 Systems Data Form					F-02058-150	0-S9-rev002	
Site	e ID NPT006 Tec	hnician	Martin Valvur		Site Visit Date	07/03/2018		
	Site operation procedures							
1	Is the filter pack being changed every	y Tuesda	y as scheduled?	<b>✓</b>				
2	Are the Site Status Report Forms bei	ing comp	leted and filed	<b>✓</b>				
3	Are data downloads and backups bei scheduled?	ing perfo	rmed as		No longer required			
4	Are general observations being made and recorded? How				SSRF			
5	5 Are site supplies on-hand and replenished in a timely fashion?							
6	6 Are sample flow rates recorded? How?				SSRF, logbook			
7	Are samples sent to the lab on a regulation?	lar sched	ule in a timely	<b>✓</b>				
8	Are filters protected from contamina and shipping? How?	ition duri	ng handling	<b>✓</b>	Clean gloves on ar	nd off		
9	Are the site conditions reported reguloperations manager or staff?	larly to t	he field	<b>✓</b>				
QC	Check Performed	Freq	uency			Compliant		
N	Multi-point MFC Calibrations	Semi	annually			<b>✓</b>		
	Flow System Leak Checks	Week	dy			<b>✓</b>		
F	Filter Pack Inspection	<b>✓</b>				✓		
F	Flow Rate Setting Checks Weekly					✓		
7	Visual Check of Flow Rate Rotometer   ✓ Weekly					✓		
I	n-line Filter Inspection/Replacement	Semi	annually			✓		
S	Sample Line Check for Dirt/Water	Week	dy			✓		
	ride any additional explanation (photo ral or man-made, that may affect the			sary	) regarding condit	ions listed above, or any	other features,	

# Field Systems Data Form

# F-02058-1500-S10-rev002

NPT006 **Site ID** 

**Technician** Martin Valvur

Site Visit Date 07/03/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	1Y3MC12	07065
DAS	Campbell	CR3000	2131	000353
DAS	Campbell	CR850	28381	none
Filter pack flow pump	Permotec	BL30EB	432201630446	none
Flow Rate	Apex	AXMC105LPMDPC	illegible	00854
Modem	Sierra wireless	GX440	Unknown	06990
Ozone	ThermoElectron Inc	49i A1NAA	1009241779	000612
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200024	000448
Sample Tower	Aluma Tower	AT516D1	AT214153Z12	000839
Shelter Temperature	Campbell	107-L	none	none
Temperature	RM Young	41342VC	6695	04681
Zero air pump	Werther International	PC 70/4	000815300	000626

# Site Inventory by Site Visit

Site \	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
СНС	432-Marti	n Valvur-08/06/2018				
1	8/6/2018	Computer	Hewlett Packard	none	ProBook	5CG5340VRK
2	8/6/2018	DAS	Environmental Sys Corp	none	8832	A4871K
3	8/6/2018	elevation	Elevation	none	none	none
4	8/6/2018	Infrastructure	Infrastructure	none	none	none
5	8/6/2018	Modem	CradlePoint	none	unknown	unknown
6	8/6/2018	Ozone	ThermoElectron Inc	none	49i A3NAA	CM08460049
7	8/6/2018	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	1152780006
8	8/6/2018	Precipitation	Texas Electronics	none	TR-525i-HT	64172-315
9	8/6/2018	Relative Humidity	Vaisala	none	HMP45AC	21730143
10	8/6/2018	Sample Tower	Aluma Tower	none	FOT-10	Unknown
11	8/6/2018	Shelter Temperature	ARS	none	unknown	none
12	8/6/2018	siting criteria	Siting Criteria	none	none	None
13	8/6/2018	Solar Radiation	Licor	none	Pyranometer	PY16747
14	8/6/2018	Temperature2meter	Vaisala	none	HMP45AC	21730143
15	8/6/2018	Wind Direction	RM Young	none	AQ05305	54831wdr
16	8/6/2018	Wind Speed	RM Young	none	AQ05305	54831wsp
17	8/6/2018	Zero air pump	Werther International	none	P 70/4	000756726

#### **DAS Data Form DAS Time Max Error:** 0.6 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg **Environmental Sys** A4871K CHC432 Martin Valvur 08/06/2018 DAS Primary Das Date: 8 /6 /2018 **Audit Date** 8 /6 /2018 HY Parameter DAS Mfg 9:14:30 9:15:06 Das Time: **Audit Time** Tfer Desc. Source generator (D 12010039329 **Serial Number** Das Day: 218 **Audit Day** 218 Tfer ID 01322 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0008 0.0004 0.0008 0.0004 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 -0.0011 -0.0012-0.0001 V V 9 0.1000 0.0999 0.1000 0.0001 9 0.3000 0.3995 0.3996 V V 0.0001 9 0.5000 0.4992 V V 0.0008 0.5000 9 0.7000 V V 0.0000 0.6998 0.6998 V V 9 0.9000 0.8998 0.9005 0.00079 V V 1.0000 0.9997 1.0004 0.0007

# **Ozone Data Form**

None	Mfg		Serial Number	er Ta Site	e	Techi	nician	Site Visit Date	Parame	eter	Owner I	D
Intercept	ThermoElec	ctron Inc	CM08460049	CH	HC432	Marti	in Valvur	08/06/2018	Ozone		none	
A Avg % Diff: A Max % Di	Intercept	-	0.06102 Inte	rcept	0.00000	Se	erial Number	49CPS-70008-3				/ stan
UseDescription   ConcGroup   Tfer Raw   Tfer Corr   Site   Site Unit   RelPerDif   AbsDif			Max % Di A		A Max % Di		_					
primary	0.0	0%	0.0%									
Primary   2   16.35   16.27   16.24   ppb		1	ConcGroup			r			RelPer	Dif		
primary 3 37.69 37.44 37.78 ppb 0.9 primary 4 67.00 66.51 66.91 ppb 0.6 primary 5 107.02 106.22 107.20 ppb 0.92  Sensor Component Sample Train Condition Good Status pass Sensor Component Inlet Filter Condition Condition Clean Status pass Sensor Component Inlet Filter Condition Condition Clean Status pass Sensor Component Inlet Filter Condition Condition Clean Status pass Sensor Component Diffect Condition N/A Status pass Sensor Component Gffset Condition 0.40 Status pass Sensor Component Span Condition 0.995 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 N/A Status pass Sensor Component Cell A Freq. Condition 0.7 ppb Status pass Sensor Component Cell A Freq. Condition 0.64 lpm Status pass Sensor Component Cell A Freq. Condition 0.64 lpm Status pass Sensor Component Cell A Trip. Condition 34.9 C Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass	_		1					* *				
primary 4 67.00 66.51 66.91 ppb 0.6 primary 5 107.02 106.22 107.20 ppb 0.92  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 Unlet Filter Condition Condition Clean Status pass Sensor Component Offset Condition 0.40 Status pass Sensor Component Span Condition 0.40 Status pass Sensor Component Span Condition 0.40 Status pass Sensor Component Zero Voltage Condition NA Status pass Sensor Component Fullscale Voltage Condition NA Status pass Sensor Component Cell A Freq. Condition 0.7 ppb Status pass Sensor Component Cell A Flow Condition 0.7 ppb Status pass Sensor Component Cell A Flow Condition 0.64 lpm Status pass Sensor Component Cell A Tmp. Condition 34.9 C Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition 0.64 lpm Status pass	_							* *		0.0	-0.03	
Primary   5   107.02   106.22   107.20   ppb   0.92		•										
Sensor Component       22.5 degree rule       Condition       Status       pass         Sensor Component       Inlet Filter Condition       Condition       Clean       Status       pass         Sensor Component       Battery Backup       Condition       N/A       Status       pass         Sensor Component       Offset       Condition       0.40       Status       pass         Sensor Component       Span       Condition       0.40       Status       pass         Sensor Component       Zero Voltage       Condition       N/A       Status       pass         Sensor Component       Zero Voltage       Condition       N/A       Status       pass         Sensor Component       Cell A Freq.       Condition       0.7 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.64 lpm       Status       pass         Sensor Component       Cell A Freq.       Condition       595.1 mmHg       Status       pass         Sensor Component       Cell B Freq.       Condition       84.4 kHz       Status       pass         Sensor Component       Cell B Flow       Condition       0.64 lpm       Status       pass         Sensor Component	-	-										
Sensor Component       Inlet Filter Condition       Condition       Clean       Status       pass         Sensor Component       Battery Backup       Condition       N/A       Status       pass         Sensor Component       Offset       Condition       0.40       Status       pass         Sensor Component       Span       Condition       0.995       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       64.6 kHz       Status       pass         Sensor Component       Cell A Noise       Condition       0.7 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.64 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       34.9 C       Status       pass         Sensor Component       Cell B Freq.       Condition       84.4 kHz       Status       pass         Sensor Component       Cell B Flow       Condition       0.64 lpm       Status       pass <th< td=""><td>Sensor C</td><td>ompone</td><td>nt Sample Tra</td><td>in</td><td>Cond</td><td>lition</td><td>Good</td><td></td><td>Status</td><td>pass</td><td></td><td></td></th<>	Sensor C	ompone	nt Sample Tra	in	Cond	lition	Good		Status	pass		
Sensor Component         Battery Backup         Condition         N/A         Status         pass           Sensor Component         Offset         Condition         0.40         Status         pass           Sensor Component         Span         Condition         0.995         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         64.6 kHz         Status         pass           Sensor Component         Cell A Noise         Condition         0.64 lpm         Status         pass           Sensor Component         Cell A Pressure         Condition         595.1 mmHg         Status         pass           Sensor Component         Cell B Freq.         Condition         84.4 kHz         Status         pass           Sensor Component         Cell B Riow         Condition         0.6 ppb         Status         pass           Sensor Component         Cell B Flow         Condition         594.5 mmHg         Status         pass           Sensor Component         Cell B Tmp.<	Sensor C	ompone	nt 22.5 degree	rule	Cond	lition			Status	pass		
Sensor Component         Offset         Condition         0.40         Status         pass           Sensor Component         Span         Condition         0.995         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         64.6 kHz         Status         pass           Sensor Component         Cell A Noise         Condition         0.7 ppb         Status         pass           Sensor Component         Cell A Flow         Condition         0.64 lpm         Status         pass           Sensor Component         Cell A Pressure         Condition         34.9 C         Status         pass           Sensor Component         Cell B Freq.         Condition         84.4 kHz         Status         pass           Sensor Component         Cell B Flow         Condition         0.64 lpm         Status         pass           Sensor Component         Cell B Pressure         Condition         Sensor Status         Status         pass           Sensor Component         Cell B	Sensor C	ompone	nt Inlet Filter C	Condition	Cond	lition	Clean		Status	pass		
Sensor Component Span Condition 0.995 Sensor Component Zero Voltage Condition N/A Status pass Sensor Component Fullscale Voltage Condition N/A Status pass Sensor Component Cell A Freq. Condition 64.6 kHz Status pass Sensor Component Cell A Noise Condition 0.7 ppb Status pass Sensor Component Cell A Flow Condition 0.64 lpm Status pass Sensor Component Cell A Pressure Condition 595.1 mmHg Status pass Sensor Component Cell A Tmp. Condition 34.9 C Status pass Sensor Component Cell B Freq. Condition 84.4 kHz Status pass Sensor Component Cell B Noise Condition 0.6 ppb Status pass Sensor Component Cell B Flow Condition 0.64 lpm Status pass Sensor Component Cell B Flow Condition 0.64 lpm Status pass Sensor Component Cell B Flow Condition 0.64 lpm Status pass Sensor Component Cell B Flow Condition 0.64 lpm Status pass Sensor Component Cell B Freq. Condition Description Status pass Sensor Component Cell B Tmp. Condition Status pass Sensor Component Cell B Tmp. Condition Status pass	Sensor C	ompone	nt Battery Bac	kup	Cond	lition	N/A		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       64.6 kHz       Status       pass         Sensor Component       Cell A Noise       Condition       0.7 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.64 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       595.1 mmHg       Status       pass         Sensor Component       Cell B Freq.       Condition       84.4 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       594.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass	Sensor C	ompone	nt Offset		Cond	lition	0.40		Status	pass		
Sensor Component       Fullscale Voltage       Condition       N/A       Status       pass         Sensor Component       Cell A Freq.       Condition       64.6 kHz       Status       pass         Sensor Component       Cell A Noise       Condition       0.7 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.64 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       34.9 C       Status       pass         Sensor Component       Cell B Freq.       Condition       84.4 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell B Fressure       Condition       594.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass	Sensor C	ompone	nt Span		Cond	lition	0.995		Status	pass		
Sensor Component       Cell A Freq.       Condition       64.6 kHz       Status       pass         Sensor Component       Cell A Noise       Condition       0.7 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       595.1 mmHg       Status       pass         Sensor Component       Cell A Tmp.       Condition       34.9 C       Status       pass         Sensor Component       Cell B Freq.       Condition       84.4 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       O.64 lpm       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	Sensor C	ompone	nt Zero Voltag	е	Cond	lition	N/A		Status	pass		
Sensor Component       Cell A Noise       Condition       0.7 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.64 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       595.1 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       84.4 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.64 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       594.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass	Sensor C	ompone	nt Fullscale Vo	oltage	Cond	lition	N/A		Status	pass		
Sensor Component       Cell A Flow       Condition       0.64 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       595.1 mmHg       Status       pass         Sensor Component       Cell A Tmp.       Condition       34.9 C       Status       pass         Sensor Component       Cell B Freq.       Condition       84.4 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.64 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       594.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass	Sensor C	ompone	cell A Freq		Cond	lition	64.6 kHz		Status	pass		
Sensor ComponentCell A PressureCondition595.1 mmHgStatuspassSensor ComponentCell A Tmp.Condition34.9 CStatuspassSensor ComponentCell B Freq.Condition84.4 kHzStatuspassSensor ComponentCell B NoiseCondition0.6 ppbStatuspassSensor ComponentCell B FlowCondition0.64 lpmStatuspassSensor ComponentCell B PressureCondition594.5 mmHgStatuspassSensor ComponentCell B Tmp.ConditionStatuspassSensor ComponentLine LossConditionNot testedStatuspass	Sensor C	ompone	nt Cell A Noise	Э	Cond	lition	0.7 ppb		Status	pass		
Sensor ComponentCell A Tmp.Condition34.9 CStatuspassSensor ComponentCell B Freq.Condition84.4 kHzStatuspassSensor ComponentCell B NoiseCondition0.6 ppbStatuspassSensor ComponentCell B FlowCondition0.64 lpmStatuspassSensor ComponentCell B PressureCondition594.5 mmHgStatuspassSensor ComponentCell B Tmp.ConditionStatuspassSensor ComponentLine LossConditionNot testedStatuspass	Sensor C	ompone	nt Cell A Flow		Cond	lition	0.64 lpm		Status	pass		
Sensor ComponentCell B Freq.Condition84.4 kHzStatuspassSensor ComponentCell B NoiseCondition0.6 ppbStatuspassSensor ComponentCell B FlowCondition0.64 lpmStatuspassSensor ComponentCell B PressureCondition594.5 mmHgStatuspassSensor ComponentCell B Tmp.ConditionStatuspassSensor ComponentLine LossConditionNot testedStatuspass	Sensor C	ompone	Cell A Pres	sure	Cond	lition	595.1 mmHg		Status	pass		
Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.64 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       594.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	Sensor C	ompone	Cell A Tmp.		Cond	lition	34.9 C		Status	pass		
Sensor Component       Cell B Flow       Condition       0.64 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       594.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	Sensor C	ompone	nt Cell B Freq						Status	pass		
Sensor Component       Cell B Pressure       Condition       594.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	Sensor C	ompone	nt Cell B Noise	Э	Cond	lition	0.6 ppb		Status	pass		
Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	Sensor C	ompone	nt Cell B Flow		Cond	lition	0.64 lpm		Status	pass		
Sensor Component Line Loss Condition Not tested Status pass	Sensor C	ompone	Cell B Pres	sure	Cond	lition	594.5 mmHg		Status	pass		
	Sensor C	ompone	Cell B Tmp.						Status	pass		
Sensor Component System Memo Condition Status pass		•			Cond	lition	Not tested		Status	pass		
	Sensor C	ompone	System Me	mo	Cond	lition			Status	pass		

#### **Wind Speed Data Form** Mfg Serial Number Ta **Technician** Site Visit Date Parameter Owner ID CHC432 Martin Valvur Wind Speed RM Young 54831wsp 08/06/2018 none RM Young Parameter wind speed Mfg CA4353 Tfer Desc. wind speed motor (h **Serial Number** 01457 Tfer ID 1.00000 0.00000 **Slope Intercept** 76717 Prop or Cups SN 0.3 **to** 0.3 **Prop or Cups Torque Cert Date** 4/19/2018 CorrCoff 1.00000 **Prop Correction Fact** 0.0512 **DAS 1: DAS 2:** Low Range Low Range **High Range High Range** 0.05 0.09% Abs Avg Err 0.20 0.16% Abs Max Er Out V UseDescription: Input Device Input RPM Input m/s DAS m/s Diff/ % Diff Diff WsM 0 0.20 0.0 0.0 -0.20 primary 200 1.02 0.0 1.0 0.00 primary 400 2.05 0.0 2.1 0.00 primary 800 4.10 0.0 4.1 0.00 primary 0.0 6.2 primary 1200 6.14 0.16% 12.29 0.0 12.3 0.08% primary 2400 primary 4000 20.48 0.0 20.5 0.05% 48.13 48.2 0.06% 9400 0.0 primary Sensor Component | Condition **Condition** Good **Status** pass Sensor Component Prop or Cups Condition Condition Good **Status** pass Sensor Component | Sensor Heater **Condition** N/A Status pass Sensor Component Torque Status pass Condition **Condition** Plumb Sensor Component | Sensor Plumb Status pass Sensor Component | System Memo Condition Status pass

# **Wind Direction Data Form**

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	54831wdr	CHC432	Martin Valvur	08/06/2018	Wind Direction	none
			Mfg	RM Young	Parameter	wind direction
			Serial Number		Tfer Desc.	wind direction wheel
			Tfer ID	01266		
Vane SN: N/A		A. Align. deg. true:	Slope	1.0000	0 Intercept	0.00000
VaneTorque	5 <b>to</b> 5	180	Cert Date	1/1/200	06 CorrCoff	1.00000
			Mfg	RM Young	Parameter	wind direction
			Serial Number	None	Tfer Desc.	wind direction wheel
			Tfer ID	01252		
			Mfg	Ushikata	Parameter	wind direction
			Serial Number	190037	Tfer Desc.	transit
			Tfer ID	01265		
			Slope	1.0000	0 Intercept	0.00000
			Cert Date	3/5/201	8 CorrCoff	1.00000
DAS	S 1:	<b>DAS 2:</b>				

	DAS I.		DAS 2.	
	Orientation	Linearity:	Orientation	Linearity:
Abs Avg Err	2.0	1.0		
Abs Max Er	4	3		

UseDescription	TferID	Input Raw	Linearity	Output V	Output Deg.	Difference	Change	Error
primary	01266	0	✓	0.0000	0	0	46	1
primary	01266	45	<b>✓</b>	0.0000	42	3	42	-3
primary	01266	90	<b>✓</b>	0.0000	86	4	44	-1
primary	01266	135	<b>✓</b>	0.0000	131	4	45	0
primary	01266	180	<b>✓</b>	0.0000	178	2	47	2
primary	01266	225	<b>✓</b>	0.0000	223	2	45	0
primary	01266	270	✓	0.0000	269	1	46	1
primary	01266	315	✓	0.0000	314	1	45	0
primary	01265	90		0.0000	86	4		4
primary	01265	180		0.0000	177	3		3
primary	01265	270		0.0000	269	1		1
primary	01265	360		0.0000	0	0		0
Sensor Compon	ent Condition		Condi	Good		Statu	s pass	
Sensor Compon	ent Mast		Condi	Good		Statu	s pass	
Sensor Compon	ent Sensor Heate	er	Condi	Condition N/A			s pass	
Sensor Compon	ent Sensor Pluml	)	Condi	Condition Plumb			s pass	

Torque	Condition		Status	pass
Vane Condition	Condition Go	bood	Status	pass
System Memo	Condition		Status	pass
	Vane Condition	Vane Condition Condition	Vane Condition Good	Vane Condition Good Status

## 2 Meter Temperature Data Form Calc. Difference Serial Number Ta **Technician** Site Visit Date Parameter Mfg Site **Owner ID** CHC432 Martin Valvur Vaisala 21730143 08/06/2018 Temperature2meter none Parameter Temperature Mfg Fluke 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 3.86 5.73 Test type UseDescription InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit Difference 0.0000 primary Temp Low Rang 0.44 0.46 2.50 C 2.04 Temp Mid Rang 31.30 31.32 0.0000 27.50 C -3.82 primary primary Temp High Rang 45.30 45.33 0.0000 39.60 C -5.73 Sensor Component | Properly Sited **Condition** Properly sited **Status** pass Sensor Component | Shield Condition Clean **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

### **Humidity Data Form** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Vaisala 21730143 CHC432 Martin Valvur 08/06/2018 Relative Humidity none Mfg Rotronic **Parameter** Relative Humidity Tfer Desc. GTL 75296 **Serial Number** 01220 **Tfer ID Slope** 0.95430 **Intercept** 1.78964 **Cert Date** 2/8/2018 0.99980 CorrCoff **DAS 1: DAS 2:** Low Range **High Range** Low Range **High Range** 3.1 **Abs Avg Err** 4.5 **Abs Max Er** UseDesc. Test type Device Input RH GTL Raw RH Corr. DAS Volts DAS %RH Difference RH Low Range **GTL** 32.8 32.7 0.0000 primary 32.8 31.2 -1.6 -4.5 RH Low Range **GTL** 52.9 50.3 52.9 0.0000 48.4 primary Status pass Sensor Component | RH Filter **Condition** Clean Condition Clean Sensor Component | Shield **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 PY16747 CHC432 Martin Valvur Solar Radiation Licor 08/06/2018 none Mfg **Eppley** Parameter solar radiation Tfer Desc. SR transfer sensor 23824 **Serial Number** 01247 **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 0.9% 1.5% 0.0% 0.0% UseDescription Measure Date MeasureTime PctDifference Tfer Raw Tfer Corr DAS w/m2 primary 8/6/2018 8:00 535 535 587 9.6% 799 9:00 799 773 -3.2% primary 8/6/2018 primary 8/6/2018 10:00 929 929 904 -2.7% -2.5% primary 8/6/2018 11:00 1020 1020 995 -1.5% 1029 1029 1014 primary 8/6/2018 12:00 Sensor Component | Sensor Clean **Condition** Clean Status pass Sensor Component | Sensor Level **Condition** Level **Status** pass Condition Properly sited Sensor Component | Properly Sited **Status** pass Sensor Component System Memo Status pass Condition

# **Precipitation Data Form**

Mfg	S	erial l	Number Ta	Site		Tech	echnician Site Visit Date		Paramo	eter	0	wner ID		
Texas Electror	nics 6	64172-	315	CHC432		Mar	tin Valvur		08/0	06/2018	Precipita	ation	no	one
						N	Mfg		PMF	)	Pa	ramete	r Precipi	tation
DAS 1:			<b>DAS 2:</b>			S	Serial Nun	ıber	Non	е	Tf	er Desc	250ml	graduate
A Avg % Diff	,		<u>_</u>	Dif A	Max % Di	,   1	Tfer ID		0124	19				
5.5%		7.3	3%				Slope			1.0000	0 Inter	rcept		0.00000
							Cert Date				3 Cori			1.00000
UseDesc.	Test	type	TferVolume	Iteration	TimePerT	ip	Eq.Ht	DAS	Seng	Eq.HtUnit	OSE Ur	nit Tfer	Units Pc	tDifference
primary	test 1		231.5	1	10 sec		5.50		90	mm	mm		nl	7.3%
primary	test 2		231.5	2	10 sec		5.50	5.	30	mm	mm	n	nl	-3.6%
Sensor Com	ponent	Prope	erly Sited		Cond	lition	on Properly sited			Status pass				
Sensor Com	ponent	Gaug	e Drain Scree	en	Cond	lition	Installed				Status	pass		
Sensor Com	ponent	Funn	el Clean		Cond	lition	Clean				Status	pass		
Sensor Com	ponent	Cond	ition		Cond	lition	Good				Status	pass		
Sensor Com	ponent	Gaug	e Screen		Cond	lition	Installed				Status	pass		
Sensor Com	ponent	Gaug	e Clean		Cond	lition	Clean				Status	pass		
Sensor Com	ponent	Level			Cond	lition	Level				Status	pass		
Sensor Com	ponent	Sens	or Heater		Cond	lition	Not tested				Status	Status pass		
Sensor Com	ponent	Syste	m Memo		Cond	lition	on				Status pass			

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Martin Valvur ARS CHC432 08/06/2018 Shelter Temperature none 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** 3.34 3.51 01229 **Tfer ID** -0.01977 **Slope** 0.99986 Intercept 1/24/2018 1.00000 **Cert Date** CorrCoff InputTmpCorr. OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw 23.29 23.31 0.000primary Temp Mid Range 26.7 C 3.42

23.60

23.33

Condition

Temp Mid Range

Temp Mid Range

Sensor Component | System Memo

primary

primary

23.58

23.31

0.000

0.000

C

C

Status pass

3.51

3.1

27.1

26.4

## **Infrastructure Data For** CHC432 Technician Martin Valvur Site Visit Date 08/06/2018 Site ID **Shelter Make Shelter Model Shelter Size** 8812 Ekto 768 cuft 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** 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** N/A

**Condition** Good

**Condition** Good

**Condition** Good

**Condition** Good

**Condition** Good

**Condition** Good

**Condition** N/A

**Condition** N/A

Sensor Component Rotometer

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

Status pass

# **Field Systems Comments**

1 Parameter: SiteOpsProcComm

Dry deposition samples are not collected at this CASTNET site.

Field Systems Da	ata Form	F-02058-1500-S1-rev0				
Site ID CHC432	Technician Martin Valvur	Site Visit Date 08/0	6/2018			
Site Sponsor (agency)	NPS	USGS Map				
<b>Operating Group</b>	NPS	Map Scale				
AQS#	35-045-0020	Map Date				
Meteorological Type	R.M. Young					
Air Pollutant Analyzer	Ozone	QAPP Latitude				
<b>Deposition Measurement</b>		<b>QAPP</b> Longitude				
Land Use		<b>QAPP Elevation Meters</b>				
Terrain		<b>QAPP Declination</b>				
Conforms to MLM		<b>QAPP Declination Date</b>				
Site Telephone		Audit Latitude	36.034484			
Site Address 1		Audit Longitude	-107.904275			
Site Address 2		Audit Elevation	1964			
County	San Juan	<b>Audit Declination</b>	9.13			
City, State	Nageezi, NM	Present				
Zip Code	87037	Fire Extinguisher	Not present			
Time Zone	Mountain	First Aid Kit	Not present			
<b>Primary Operator</b>		Safety Glasses				
Primary Op. Phone #		Safety Hard Hat	Not present			
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 Room $\overline{\checkmark}$	Make Ekto M	odel 8812	Shelter Size 768 cuft			
Shelter Clean	Notes					
Site OK	Notes					
park e	highway 550 take county road 7950 (dirt entrance look for a gate on the north side dirt road to the top of the mesa.					

F-02058-1500-S2-rev002

Site ID	CHC432	Technician	Martin Valvur	Site Visit Date	08/06/2018

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

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

Fic	eld Sy	stems Data Fo	rm			F-02058-1	.500-S3-rev002
Site	e ID	CHC432	Technician Martin Valvur		Site Visit Date	08/06/2018	
1		d speed and direction fluenced by obstruction	sensors sited so as to avoid ns?	<b>✓</b>			
2	(i.e. wind horizont	d sensors should be me	as to minimize tower effects? Sounted atop the tower or on a Ex the max diameter of the	✓			
3	Are the	tower and sensors plu	mb?	✓			
4			ointed north or positioned to ch as buildings, walls, etc?	<b>✓</b>			
5	condition surface	ns? (i.e. ground below	ors sited to avoid unnatural sensors should be natural Ridges, hollows, and areas of led)	✓			
6	Is the so	lar radiation sensor p	umb?	<b>✓</b>			
7	Is it sited light?	d to avoid shading, or	any artificial or reflected	<b>✓</b>			
8	Is the ra	in gauge plumb?		<b>✓</b>			
9	Is it sited towers, o		fects from buildings, trees,	✓			
10	Is the su facing n		ted with the grid surface	✓	N/A		
11	Is it inc	lined approximately 3	degrees?	✓	N/A		

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

eld Systems Data Form	F-02058-1500-S4-rev002
Technician Martin Valvur	Site Visit Date 08/06/2018
Do all the meterological sensors appear to be intact, in good condition, and well maintained?	
Are all the meteorological sensors operational online, and reporting data?	
Are the shields for the temperature and RH sensors clean?	
Are the aspirated motors working?	
Is the solar radiation sensor's lens clean and free of scratches?	
Is the surface wetness sensor grid clean and undamaged?	✓ N/A
Are the sensor signal and power cables intact, in good condition, and well maintained?	
Are the sensor signal and power cable connections protected from the elements and well maintained?	
	sary) regarding conditions listed above, or any other features,
<b>2</b>	Do all the meterological sensors appear to be intact, in good condition, and well maintained?  Are all the meteorological sensors operational online, and reporting data?  Are the shields for the temperature and RH sensors clean?  Are the aspirated motors working?  Is the solar radiation sensor's lens clean and free of scratches?  Is the surface wetness sensor grid clean and undamaged?  Are the sensor signal and power cables intact, in good condition, and well maintained?  Are the sensor signal and power cable connections protected from the elements and well maintained?

## Field Systems Data Form F-02058-1500-S5-rev002 CHC432 Technician | Martin Valvur Site Visit Date 08/06/2018 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. N/A 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? Not present Are there moisture traps in the sample lines? **✓** N/A 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	e ID	CHC432	Technician	Martin Valvur		Site Vis	sit Date 08/06/20	18	
	DAS e	ensor translators, and	norinhoral oqui	nment operation	ne one	d maintans	nce		
				_		u mamtena	ance		
1	Do the well ma	DAS instruments appeaintained?	ear to be in good	l condition and	<b>✓</b>				
2		the components of the a, backup, etc)	DAS operation	al? (printers,	<b>✓</b>				
3		analyzer and sensor sign protection circuitry		through	<b>✓</b>				
4		e signal connections pro nintained?	otected from the	e weather and	<b>✓</b>				
5	Are the	e signal leads connected	d to the correct	DAS channel?	<b>✓</b>				
6	Are the	e DAS, sensor translateded?	ors, and shelter	properly	<b>✓</b>				
7	Does th	ne instrument shelter h	ave a stable pov	ver source?	<b>✓</b>				
8	Is the i	nstrument shelter temp	perature control	lled?	<b>✓</b>				
9	Is the n	net tower stable and gr	ounded?			Stable		Grounded	
10	Is the s	ample tower stable and	d grounded?						
11	Tower	comments?							
		y additional explanatio man-made, that may a				) regardin	g conditions liste	d above, or a	any other features,
		,		0.1					

#### **Field Systems Data Form** F-02058-1500-S7-rev002 CHC432 Technician | Martin Valvur Site Visit Date 08/06/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No Yes N/A No N/A Yes Wind speed sensor **Data logger** П **V** $\checkmark$ П Wind direction sensor **Data logger V** $\checkmark$ П Temperature sensor Strip chart recorder **✓ V** П Relative humidity sensor Computer **V** П ✓ Solar radiation sensor Modem П 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** $\checkmark$ **V** Tipping bucket rain gauge П 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** Dataview **SSRF V ✓** N/A **✓ V Site Ops Manual** Electronic copy **V HASP ✓** Electronic copy **✓ Field Ops Manual V** Electronic copy **Calibration Reports ✓** Electronic copy Ozone z/s/p Control Charts **V V** Electronic copy Preventive maintenance schedul **V V** Electronic copy Is the station log properly completed during every site visit? ✓ N/A **V** Are the Site Status Report Forms being completed and current? Are the chain-of-custody forms properly used to document **✓** N/A 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?

Electronic copy

## F-02058-1500-S8-rev002

Site	e ID	CHC432	Technicia	n [	Martin Valvur		Site Visit Date	08/06/2018		
1	Has the	eration procedures e site operator attended If yes, when and who i		AS'	FNET training	<b>✓</b>	N/A			
2							N/A			
3		te visited regularly on tl				<b>✓</b>				
4	Are the	standard CASTNET op d by the site operator?	erational p	roc	edures being	<b>✓</b>	N/A			
5	Is the si the requ	te operator(s) knowledg nired site activities? (inc	eable of, ar	ıd a ıme	ble to perform entation)	✓				
	Are regular operational QA/QC checks performed on meteorological instruments?									
QC	Check I	Performed			Frequency			Compliant		
Mu	ltipoint (	Calibrations		<b>✓</b>	Semiannual	у		✓		
Vis	ual Inspe	ections		<b>✓</b>	Weekly			✓		
Tra	anslator Z	Zero/Span Tests (climat	ronics)	<b>✓</b>	N/A			✓		
Ma	nual Rai	n Gauge Test		<b>✓</b>	Monthly			✓		
Coı	nfirm Re	asonableness of Curren	t Values	<b>✓</b>	Weekly			✓		
Tes	t Surface	e Wetness Response		<b>✓</b>	N/A			✓		
	Are reg	ular operational QA/QC	C checks pe	rfor	med on the oz	<u>one</u>	analyzer?			
QC	Check I	erformed			Frequency			Compliant		
Mu	lti-point	Calibrations		<b>✓</b>	Semiannual	у		✓		
Aut	tomatic <b>Z</b>	Zero/Span Tests		<b>V</b>	Daily		✓			
Ma	nual Zer	o/Span Tests		✓	Every 2 wee	ks		✓		
Aut	tomatic I	Precision Level Tests		<b>✓</b>	Daily			✓		
Ma	nual Pre	cision Level Test			Not perform	ed		<b>✓</b>		
Ana	alyzer Di	agnostics Tests		<b>✓</b>	Alarm value	s on	ly	<b>✓</b>		
In-l	line Filte	r Replacement (at inlet)		<b>✓</b>	Every 2 wee	ks		<u> </u>		
In-l	line Filte	r Replacement (at analy	ze	<b>✓</b>	N/A			<u> </u>		
San	nple Line	e Check for Dirt/Water		<b>✓</b>	Every 2 wee	ks		<u> </u>		
Zer	o Air De	siccant Check		<b>✓</b>	Weekly			✓		
1		i-point calibration gase train including all filter:		h th	ne complete	<b>✓</b>	Unknown			
2	Do auto	matic and manual z/s/p	gasses go t		ugh the	<b>✓</b>				
3	complete sample train including all filters?  Are the automatic and manual z/s/p checks monitored and reported? If yes, how?  Electronic copy									
	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 Systems Data Form			F-02058-1500-S9-rev002					
Sit	e ID CHC432 Tec	hnician	Martin Valvur		Site Visit Date	08/06/2018			
	Site operation procedures								
1	Is the filter pack being changed every	y Tuesda	y as scheduled?	<b>✓</b>	N/A				
2	Are the Site Status Report Forms bei	ng comp	leted and filed	<b>✓</b>	N/A				
3	Are data downloads and backups beischeduled?	ng perfo	rmed as	<b>✓</b>	N/A				
4	Are general observations being made	and rec	orded? How?	✓	N/A				
5	Are site supplies on-hand and replen fashion?	a timely	<b>✓</b>						
6	Are sample flow rates recorded? How	v?		<b>✓</b>	N/A				
7	Are samples sent to the lab on a regularishion?	lar scheo	dule in a timely	<b>✓</b>	N/A				
8	Are filters protected from contamina and shipping? How?	tion dur	ing handling	<b>✓</b>	N/A				
9	Are the site conditions reported regularizations manager or staff?	larly to t	he field						
QC	Check Performed	Freq	uency			Compliant			
I	Multi-point MFC Calibrations	✓ N/A				<b>✓</b>			
J	Flow System Leak Checks	✓ N/A				✓			
J	Filter Pack Inspection   N/A					✓			
Flow Rate Setting Checks						✓			
Visual Check of Flow Rate Rotometer ✓ N/A						$\checkmark$			
J	n-line Filter Inspection/Replacement	✓ N/A				$\checkmark$			
5	Sample Line Check for Dirt/Water	✓ N/A				$\checkmark$			
	vide any additional explanation (photo ural or man-made, that may affect the			sary	) regarding conditi	ons listed above, or a	ny other features,		

Dry deposition samples are not collected at this CASTNET site.

## F-02058-1500-S10-rev002

Site ID

CHC432

Technician Martin Valvur

Site Visit Date 08/06/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	ProBook	5CG5340VRK	none
DAS	Environmental Sys Cor	p 8832	A4871K	none
elevation	Elevation	none	none	none
Infrastructure	Infrastructure	none	none	none
Modem	CradlePoint	unknown	unknown	none
Ozone	ThermoElectron Inc	49i A3NAA	CM08460049	none
Ozone Standard	ThermoElectron Inc	49i A1NAA	1152780006	none
Precipitation	Texas Electronics	TR-525i-HT	64172-315	none
Relative Humidity	Vaisala	HMP45AC	21730143	none
Sample Tower	Aluma Tower	FOT-10	Unknown	none
Shelter Temperature	ARS	unknown	none	none
siting criteria	Siting Criteria	none	None	none
Solar Radiation	Licor	Pyranometer	PY16747	none
Temperature2meter	Vaisala	HMP45AC	21730143	none
Wind Direction	RM Young	AQ05305	54831wdr	none
Wind Speed	RM Young	AQ05305	54831wsp	none
Zero air pump	Werther International	P 70/4	000756726	none

# Site Inventory by Site Visit

Site V	isit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
MEV	405-Marti	n Valvur-08/07/2018				
1	8/7/2018	Computer	Hewlett Packard	none	EliteBook	CNV347CS41
2	8/7/2018	DAS	Environmental Sys Corp	90613	8816	2616
3	8/7/2018	Elevation	Elevation	None	1	None
4	8/7/2018	Filter pack flow pump	Thomas	01718	107CA18	00000599
5	8/7/2018	flow rate	Tylan	none	FC280AV-4S	AW9403013
6	8/7/2018	Infrastructure	Infrastructure	none	none	none
7	8/7/2018	MFC power supply	Tylan	none	RO-32	FP9710002
8	8/7/2018	Modem	Sierra wireless	none	GX450	LA54620331001003
9	8/7/2018	Ozone	ThermoElectron Inc	none	49C	0425208058
10	8/7/2018	Ozone Standard	ThermoElectron Inc	90717	49C	49C-66823-354
11	8/7/2018	Sample Tower	Aluma Tower	illegible	В	none
12	8/7/2018	Shelter Temperature	ARS	none	none	none
13	8/7/2018	Siting Criteria	Siting Criteria	None	1	None
14	8/7/2018	Temperature2meter	RM Young	none	41342	15106
15	8/7/2018	Zero air pump	Werther International	none	PC40/4	526289

#### **DAS Data Form** 0.22 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg **Environmental Sys** 2616 MEV405 Martin Valvur 08/07/2018 DAS Primary Das Date: 8 /7 /2018 **Audit Date** 8 /7 /2018 HY Parameter DAS Mfg 12:17:15 12:17:28 Das Time: **Audit Time** Tfer Desc. Source generator (D 12010039329 **Serial Number** Das Day: 219 **Audit Day** 219 Tfer ID 01322 **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 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 12 0.0000 -0.0005 -0.0006 -0.0001 V V 12 0.1000 0.0994 0.0992 -0.000212 0.3000 0.2996 0.2993 V V -0.0003 12 0.5000 0.4993 V V -0.0003 0.4996 12 0.7000 V V -0.0002 0.6999 0.6997 V V 12 0.9000 0.8999 0.8996 -0.0003 12 1.0000 0.9993 V V -0.0004 0.9997

## Flow Data Form

Mfg	Seria	al Number	Ta S	Site	Te	chnician	Site Visit D	ate Paran	neter	Owner ID
Tylan	AWS	9403013		MEV405	M	artin Valvur	08/07/2018	flow ra	te	none
Mfg	Tylan					Mfg	BIOS		arameter Flo	
SN/Owner ID	FP97100	002 no	one			Serial Number	148613	T	fer Desc. Blo	OS 220-H
Parameter	MFC pov	wer supply				Tfer ID	01421			
						Slope	0.9	98450 <b>Int</b>	ercept	0.10300
						Cert Date	3/1	/2018 <b>Co</b>	rrCoff	1.00000
DAS 1:		DAS	S 2:			Cal Factor Z	ero		0	
A Avg % Diff:	A Max %	6 Di AA	vg %I	Dif A Ma	x % Di	Cal Factor F	ull Scale		0	
3.74%	3	.80%				Rotometer R	eading:		0	
Desc.	Test t	ype Inp	ut l/m	Input Corr_	MfcDisp	OutputSignal	Output S E	InputUnit	OutputSignal	I PctDifference
primary	pump of	f 0.	.000	0.000	-0.10	0.0000	0.04	1/m	1/m	
primary	leak chec	ck 0.	.000	0.000	-0.08	0.0000	0.08	1/m	1/m	
primary	test pt 1	2.	.977	2.920	2.69	0.0000	3.03	1/m	1/m	3.80%
primary	test pt 2	2.	.979	2.920	2.68	0.0000	3.03	1/m	1/m	3.66%
primary	test pt 3	2.	.981	2.920	2.68	0.0000	3.03	1/m	1/m	3.77%
Sensor Compo	onent Lea	ak Test			Condition	on		Status	pass	
Sensor Compo	onent Tu	bing Condit	ion		Condition	Good		Status	pass	
Sensor Compo	onent Filt	ter Position			Condition	Good		Status	pass	
Sensor Compo	onent Ro	tometer Co	ndition	l	Condition	Clean and dry		Status	pass	
Sensor Compo	onent Mc	oisture Pres	ent		Condition	No moisture pr	esent	Status	pass	
Sensor Compo			)			5.0 cm		Status	pass	
Sensor Compo						1.0 cm			pass	
Sensor Compo						Not tested			pass	
Sensor Compo	onent Sy	stem Memo	)		Condition	on		Status	pass	

## **Ozone Data Form**

Mfg		Serial Number	er Ta	Site	Tec	hnician	Site Visit Date	Paramo	eter	Owner II	)
ThermoElec	ctron Inc	0425208058		MEV405	Ма	rtin Valvur	08/07/2018	Ozone		none	
Slope: Intercept CorrCoff	-:		e: rcept rCoff	0.00000 0.00000 0.00000		Mfg Serial Number Tfer ID	ThermoElectron 49CPS-70008-3			ozone Ozone primary	stan
	Diff: A N		AS 2: Avg %l	Dif A Max % ]	Di	Slope Cert Date	1.0080		rcept ·Coff	-0.051 1.000	
UseDescr	intion	ConcGroup	Tfer	Raw Tfer	Corr	Site	Site Unit	RelPer	Dif	AbsDif	
prima		1	0.			0.48	ppb	Kell el	DII	0.26	
prima	•	2	14.	.66 14.	59	8.83	ppb			-5.76	
prima	•	3	38.			34.41	ppb		-11.3		
prima		4		.60 65.		61.78	ppb		-5.28		
prima	-	5	115			110.80	ppb		-3.07		1
Sensor C	ompone	nt Sample Tra	ın	C	onditio	n Good		Status	pass		
Sensor C	ompone	nt 22.5 degree	rule	Co	onditio	n		Status	pass		
Sensor C	ompone	nt Inlet Filter C	ondition	C	onditio	n Moderately cle	an	Status	pass		
Sensor C	ompone	nt Battery Bac	kup	Co	onditio	n N/A		Status	pass		
Sensor C	ompone	nt Offset		C	onditio	n 0.30		Status	pass		
Sensor C	ompone	nt Span		C	onditio	n 1.052		Status	pass		
Sensor C	ompone	nt Zero Voltag	е	C	onditio	n 0.0001		Status	pass		
Sensor C	ompone	nt Fullscale Vo	ltage	C	onditio	n 1.0001		Status	pass		
Sensor C	ompone	nt Cell A Freq.		C	onditio	n 71.3 kHz		Status	pass		
Sensor C	ompone	nt Cell A Noise	)	C	onditio	<b>n</b> 0.9 ppb		Status	pass		
Sensor C	ompone	nt Cell A Flow		Co	onditio	n 0.64 lpm		Status	pass		
Sensor C	ompone	nt Cell A Press	sure	C	onditio	n 516.0 mmHg		Status	pass		
Sensor C	ompone	nt Cell A Tmp.		C	onditio	<b>n</b> 34.4 C		Status	pass		
Sensor C	ompone	nt Cell B Freq.		C	onditio	n 101.5 kHz		Status	pass		
Sensor C	ompone	nt Cell B Noise	)	C	onditio	1.2 ppb		Status	pass		
Sensor C	ompone	nt Cell B Flow		Co	onditio	<b>n</b> 0.54 lpm		Status	pass		
Sensor C	ompone	nt Cell B Press	sure	C	onditio	n 515.5 mmHg		Status	pass		
Sensor C	ompone	nt Cell B Tmp.		Co	onditio	n		Status	pass		
Sensor C	ompone	nt Line Loss		Co	onditio	n		Status	pass		
Sensor C	ompone	nt System Mer	no	Co	onditio	n		Status	pass		

## 2 Meter Temperature Data Form Calc. Difference Serial Number Ta **Technician** Site Visit Date Parameter Mfg Site **Owner ID** Martin Valvur RM Young 15106 MEV405 08/07/2018 Temperature2meter none Parameter Temperature Mfg Fluke 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 0.28 0.38 Test type UseDescription InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit Difference Temp Low Rang 0.0000 primary 0.73 0.75 0.62 C -0.13 Temp Mid Rang 22.05 22.07 0.0000 22.45 C 0.38 primary primary Temp High Rang 47.28 47.31 0.0000 47.65 C 0.34 Sensor Component | Properly Sited **Condition** Properly sited **Status** pass Sensor Component | Shield **Condition** Dirty Status Fail Condition Functioning Sensor Component Blower Status pass 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 MEV405 08/07/2018 Shelter Temperature none 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** 0.77 1.80 01229 **Tfer ID** -0.01977 **Slope** 0.99986 Intercept 1/24/2018 1.00000 **Cert Date** CorrCoff InputTmpCorr. OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw 24.79 0.000primary Temp Mid Range 24.77 23.0 C -1.8

23.46

23.37

Condition

Temp Mid Range

Temp Mid Range

Sensor Component | System Memo

primary primary 23.44

23.35

0.000

0.000

C

C

Status pass

23.0

23.3

-0.45

-0.06

# Site ID MEV405 Technician Martin Valvur Site Visit Date 08/07/2018 Shelter Make Shelter Model Shelter Size Ekto 888 512 cuft Sensor Component Sample Tower Type Condition Type B Status pass Sensor Component Conduit Conduit Good Status pass

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

## Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 08/07/2018 MEV405 Technician | Martin Valvur Site ID Moccasin Mesa **USGS Map** NPS/EPA Site Sponsor (agency) Map Scale NPS **Operating Group Map Date** 08-083-0101 AQS# Climatronics **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude dry, wet, IMPROVE **Deposition Measurement QAPP** Longitude Land Use woodland - evergreen **QAPP Elevation Meters** complex **Terrain QAPP Declination** No Conforms to MLM **OAPP Declination Date** 37.198398 **Site Telephone Audit Latitude** Natural Resources -108.490462 Site Address 1 **Audit Longitude** Mesa Verde National Park Site Address 2 **Audit Elevation** 2170 Montezuma 10.3 County **Audit Declination** Cortez, CO City, State **Present** Fire Extinguisher 81330 No inspection date Zip Code Mountain **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 888 Ekto **Shelter Size** 512 cuft **✓** Notes The shelter is in good condition, clean, and organized. Shelter Clean **✓** Notes Site OK From the main entrance on highway 160, go through the park gate and drive about 35 minutes to mile marker 19.

Just after mile marker 19 turn right on the paved service road. The air quality office is the stone building about 200

yards down the road. Continue on the same road to the site.

**Driving Directions** 

F-02058-1500-S2-rev002

Site ID MEV405 Technician Martin Valvur Site Visit Date 08/07/2018

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	30 m	
Small parking lot	100 m		✓
Tree line	50 m		✓
Obstacles to wind	10 times obstacle height		✓

Siting Distances	OK	
------------------	----	--

**Siting Criteria Comment** 

A large parking lot for park service employees is located approximately 30 meters north of the site.

Fie	eld Systems Data Form		F-02058-1500-S3-rev002
Site	MEV405 Technician Martin Valvur		Site Visit Date 08/07/2018
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	<b>✓</b>	N/A
	tower into the prevailing wind)		
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?	✓	N/A
8	Is the rain gauge plumb?	✓	N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	✓	N/A
10	Is the surface wetness sensor sited with the grid surface facing north?	✓	N/A
11	Is it inclined approximately 30 degrees?	<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	ID MEV405 Technician Martin Valvur		Site Visit Date 08/07/2018
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?		Shields dirty
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?	✓	
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 MEV405 Technician | Martin Valvur Site Visit Date 08/07/2018 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 **~** 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. 1/4 teflon by 10 meters Describe dry dep sample tube. 3/8 teflon by 10 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? Clean and dry Is there a rotometer in the dry deposition filter line, and is it

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?

There were fires in the area during the audit. There was a larger than normal pressure drop across the ozone sample inlet filter. Some tests were performed that indicated that nearly all ozone loss was due to the sample inlet filter and holder assembly.

F-02058-1500-S6-rev002

Site	ID	MEV405	Technician	Martin Valvur		Site Visi	it Date 08/07/201	8	
	DAC as		d			. J			
	DAS, se	<u>nsor translators, a</u>	nd peripheral equi	<u>pment operation</u>	is ai	<u>ia maintena</u>	<u>nce</u>		
1		OAS instruments a intained?	ppear to be in good	l condition and	<b>✓</b>				
2		the components of backup, etc)	the DAS operation	al? (printers,	<b>✓</b>				
3		nnalyzer and senso g protection circui	r signal leads pass tary?	through	<b>✓</b>	Met sensors	only		
4		signal connections intained?	protected from the	e weather and	<b>✓</b>				
5	Are the	signal leads conne	cted to the correct	DAS channel?	<b>✓</b>				
6	Are the grounde		lators, and shelter	properly	<b>✓</b>				
7	Does the	e instrument shelte	er have a stable pov	ver source?	<b>✓</b>				
8	Is the in	strument shelter t	emperature contro	lled?	<b>✓</b>				
9	Is the m	et tower stable and	d grounded?			Stable		Grounded	
						<b>✓</b>		<b>✓</b>	
10	Is the sa	mple tower stable	and grounded?			<b>✓</b>		<b>✓</b>	
11	Tower c	comments?						<u>V</u>	
			ation (photograph or affect the monito			y) regarding	g conditions listed	d above, or a	iny other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 MEV405 Site Visit Date 08/07/2018 Site ID **Technician** Martin Valvur **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 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 ~ $\checkmark$ 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 Site Ops Manual HASP 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? ✓ Dataview Flow & observation sections Are the Site Status Report Forms being completed and current? Are the chain-of-custody forms properly used to document **✓**

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:

Control charts not used

sample transfer to and from lab?

current?

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

## **Field Systems Data Form** F-02058-1500-S8-rev002 MEV405 Site Visit Date 08/07/2018 Site ID Technician | Martin Valvur 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** Semiannually **Multipoint Calibrations V V** Weekly **Visual Inspections ✓ V** Weekly Translator Zero/Span Tests (climatronics) **✓ V** Monthly **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 V** Semiannually **V Automatic Zero/Span Tests** Daily **V V** Monthly Manual Zero/Span Tests **V** Daily **Automatic Precision Level Tests Manual Precision Level Test V V** Weekly **Analyzer Diagnostics Tests ~** Monthly **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze Sample Line Check for Dirt/Water **~ ~ Zero Air Desiccant Check** Semiannually ✓ 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:

**✓** 

Dataview

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	Field Systems Data Form							F-02058-1	500-S9-rev002
Sit	e ID	MEV405	Technic	ian	Martin Valvur		Site Visit Date	08/07/2018	
	Site ope	ration procedures							
1	Is the fi	lter pack being changed	l every Tu	esd	ay as scheduled?	<b>V</b>	Filter changed morin	nings	
2	Are the correctl	Site Status Report Fori	ms being	com	pleted and filed	<b>✓</b>			
3	Are dat	a downloads and backu	ps being	erf	ormed as		No longer required		
4	Are gen	eral observations being	made an	d re	corded? How?	✓	SSRF		
5	Are site	supplies on-hand and r	eplenishe	d in	a timely	<b>✓</b>			
6	Are san	ple flow rates recorded	l? How?			<b>✓</b>	SSRF		
7	Are san	nples sent to the lab on a	a regular	sche	dule in a timely	<b>✓</b>			
8		ers protected from conta oping? How?	aminatior	du	ring handling	✓	Uses bag as glove		
9		site conditions reported ons manager or staff?	l regularl	y to	the field				
QC	Check P	erformed		Fre	quency			Compliant	
I	Multi-poi	nt MFC Calibrations	✓	Sen	niannually			$\checkmark$	
J	Flow Syst	em Leak Checks	✓	Wee	ekly			$\checkmark$	
]	Filter Pac	k Inspection							
J	Flow Rate	Setting Checks		Wee				$\checkmark$	
1	Visual Ch	eck of Flow Rate Roton		Wee				<b>✓</b>	
J	In-line Fil	ter Inspection/Replacer	nent 🔽	As r	needed			$\checkmark$	
9	Sample Li	ine Check for Dirt/Wat	er 🗆						
		ndditional explanation ( nn-made, that may affec					regarding condition	ons listed above, or a	any other features,

## F-02058-1500-S10-rev002

Site ID

MEV405

Technician Martin Valvur

Site Visit Date 08/07/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	EliteBook	CNV347CS41	none
DAS	Environmental Sys Corp	8816	2616	90613
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	00000599	01718
flow rate	Tylan	FC280AV-4S	AW9403013	none
Infrastructure	Infrastructure	none	none	none
MFC power supply	Tylan	RO-32	FP9710002	none
Modem	Sierra wireless	GX450	LA54620331001003	none
Ozone	ThermoElectron Inc	49C	0425208058	none
Ozone Standard	ThermoElectron Inc	49C	49C-66823-354	90717
Sample Tower	Aluma Tower	В	none	illegible
Shelter Temperature	ARS	none	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature2meter	RM Young	41342	15106	none
Zero air pump	Werther International	PC40/4	526289	none

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
ARE	E128-Sandy	Grenville-08/18/2018				
1	8/18/2018	Computer	Dell	07045	Inspiron 15	Unknown
2	8/18/2018	DAS	Campbell	000400	CR3000	2524
3	8/18/2018	Elevation	Elevation	None	1	None
4	8/18/2018	Filter pack flow pump	Thomas	02661	107CA110	000012187C
5	8/18/2018	Flow Rate	Apex	000462	AXMC105LPMDPCV	42228
6	8/18/2018	Infrastructure	Infrastructure	none	none	none
7	8/18/2018	Modem	Raven	06809	V4221-V	093644408
8	8/18/2018	Ozone	ThermoElectron Inc	000621	49i A1NAA	1009241798
9	8/18/2018	Ozone Standard	ThermoElectron Inc	000199	49i A3NAA	0607315737
10	8/18/2018	Sample Tower	Aluma Tower	666361	В	none
11	8/18/2018	Shelter Temperature	Campbell	none	107-L	none
12	8/18/2018	Siting Criteria	Siting Criteria	None	1	None
13	8/18/2018	Temperature	RM Young	06542	41342VC	14803
14	8/18/2018	Zero air pump	Werther International	06866	PC70/4	000815262

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2524 ARE128 Sandy Grenville 08/18/2018 DAS Primary Das Date: 8 /18/2018 **Audit Date** 8 /18/2018 Datel Parameter DAS Mfg 10:09:34 10:09:34 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** Das Day: 230 **Audit Day** 230 Tfer ID 01320 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0001 0.0001 0.0001 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 0.0001 0.0001 V V 7 0.1000 0.0999 0.0999 0.00007 0.3000 0.2997 0.2997 V V 0.0000 7 0.5000 0.4996 0.4996 V V 0.00007 0.7000 V V -0.0001 0.6996 0.6995 7 V V 0.9000 0.8994 0.8993 -0.0001 7 1.0000 0.9992 0.9991 V V -0.0001

## Flow Data Form

Ifg	Se	erial Numl	ber Ta S	site	Tec	hnician	Site Visit I	Date Paran	ieter	Owner ID	
pex	4:	2228		ARE128	Sa	ndy Grenville	08/18/2018	Flow F	Rate	000462	
						Mfg	BIOS	P	arameter Flo	w Rate	
						Serial Number		Т	fer Desc. BIG	OS 220-H	
						Tfer ID	01414				
						Slope	1	00055 Int	ercept	-0.01570	
						_			_		
						Cert Date	2/21	1/2018 <b>Co</b>	rrCoff	1.0000	
DAS 1:		1	DAS 2:			Cal Factor Z	ero	0.0	05		
A Avg % Diff:	A Max	x % Di _A	A Avg %I	Dif A Max	% <b>Di</b>	Cal Factor F	ull Scale	1.0	02		
3.85%		3.85%				Rotometer R	eading:	1	.5		
Desc.				Input Corr_	MfcDisp.	OutputSignal	-	InputUnit		PctDifference	
primary	pump		0.000	0.000	-0.07	0.000	-0.01	1/m	1/m		
primary	leak c		0.000	0.000	0.00	0.000	0.02	l/m	1/m		
primary	test pt		1.550	1.560	1.49	0.000	1.50	1/m	1/m	-3.85%	
primary	test pt		1.546	1.560	1.49	0.000	1.50	1/m	l/m	-3.85%	
primary	test pt		1.542	1.560	1.49	0.000	1.50	1/m	l/m	-3.85%	
Sensor Compo	onent	Leak Test			Condition	n		Status	Status pass		
Sensor Compo	onent	Tubing Co	ndition		Condition	Good		Status	pass		
Sensor Compo	onent	Filter Posit	tion		Condition	<b>n</b> Good		Status	pass		
Sensor Compo	onent	Rotometer	r Condition		Condition	Clean and dry		Status	Status pass		
Sensor Compo	onent	Moisture F	Present		Condition	No moisture p	resent	Status	pass		
Sensor Compo	onent	Filter Dista	ance		Condition	2.5 cm		Status	pass		
Sensor Compo	onent	Filter Dept	th		Condition	2.0 cm		Status	Status pass		
Sensor Compo	onent	Filter Azim	nuth		Condition	290 deg		Status	Status pass		
Sensor Component System Memo		Condition	n		Status	Status pass					

## **Ozone Data Form**

Mfg	Serial Numbe	er Ta Site	Te	chnician	Site Visit Date	Parame	eter	Owner I	D
ThermoElectron Inc	1009241798	ARE128	3 S	andy Grenville	08/18/2018	Ozone		000621	
Intercept -(		rcept	0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID	ThermoElectron 0517112167 01113		rameter	ozone Ozone primary	y stan
DAS 1: A Avg % Diff: A M	Iax % Di A	AS 2: Avg %Dif A	Max % Di	Slope Cert Date	1.0050		•		2915
0.0%	0.0%								
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPer	Dif	AbsDif	
primary primary	2	0.70 14.90	0.36 14.49	0.11	ppb ppb			-0.25	
primary	3	34.90	34.39	33.63	ppb		-2.23	-0.32	
primary	4	67.90	67.23	67.03	ppb		-0.3		
primary	5	109.70	108.82	108.50	ppb		-0.29		
Sensor Componer	Sample Tra	in	Conditi	Good		Status	pass		
Sensor Componer	22.5 degree	rule	Conditi	on		Status	pass		
Sensor Componer	Inlet Filter C	ondition	Conditi	on Clean		Status	pass		
Sensor Componer	Battery Bac	kup	Conditi	on N/A		Status	pass		
Sensor Componer	Offset		Conditi	on 0.10		Status	pass		
Sensor Componer	Span		Conditi	on 1.011		Status	pass		
Sensor Componer	Zero Voltag	е	Conditi	on N/A		Status	pass		
Sensor Componer	Fullscale Vo	ltage	Conditi	on N/A		Status	pass		
Sensor Componer	Cell A Freq.		Conditi	on 95.8 kHz		Status	us pass		
Sensor Componer	Cell A Noise	)	Conditi	<b>on</b> 0.4 ppb		Status	pass		
Sensor Componer	Cell A Flow		Conditi	<b>on</b> 0.76 lpm		Status	pass		
Sensor Componer	Cell A Press	sure	Conditi	707.2 mmHg		Status	pass		
Sensor Componer	Cell A Tmp.		Conditi	on 36.9 C		Status	pass		
Sensor Componer	Cell B Freq.		Conditi	78.0 kHz		Status	pass		
Sensor Componer	Cell B Noise	)	Conditi	0.4 ppb		Status	pass		
Sensor Componer	Cell B Flow		Conditi	0.74 lpm		Status	pass		
Sensor Componer	Cell B Press	sure	Conditi	707.9 mmHg		Status	pass		
Sensor Componer	Cell B Tmp.		Conditi	on		Status	pass		
Sensor Componer	Line Loss		Conditi	Not tested		Status	tus pass		
Sensor Componer	System Mer	no	Conditi	on		Status	pass		

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young 14803 ARE128 08/18/2018 Temperature 06542 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 0.36 0.62 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.46 0.37 0.000 0.4 $\mathbf{C}$ 0.06 C -0.41 Temp Mid Range 24.91 24.62 0.000 24.2 primary 0.000 C -0.62 primary Temp High Range 49.43 48.95 48.3 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** Sandy Grenville Campbell ARE128 08/18/2018 Shelter Temperature 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** 0.34 0.36 01227 **Tfer ID** 1.00798 0.09168 **Slope** Intercept 2/13/2018 1.00000 **Cert Date** CorrCoff OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Mid Range 26.61 26.31 0.00026.6 C 0.33

0.000

0.000

C

C

Status pass

26.1

25.2

0.33

0.36

25.79

24.81

Condition

26.09

25.10

Temp Mid Range

Temp Mid Range

Sensor Component | System Memo

primary

primary

## **Infrastructure Data For**

Site ID	ARE128	Technician	Sandy Grenville	Site Visit Date	08/18/2018	
Shelter	Make	Shelter Model	She	lter Size		
Ekto		8810 (s/n 2116-	7) 640	cuft		

Sensor Component	Sample Tower Type	Condition	Type B	Status	pass
Sensor Component	Conduit	Condition	N/A	Status	pass
Sensor Component	Met Tower	Condition	N/A	Status	pass
Sensor Component	Moisture Trap	Condition	Installed	Status	pass
<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
Sensor Component	Signal Cable	Condition	Good	Status	pass
<b>Sensor Component</b>	Tubing Type	Condition	3/8 teflon	Status	pass
<b>Sensor Component</b>	Sample Train	Condition	Good	Status	pass

#### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 08/18/2018 ARE128 Technician Sandy Grenville Site ID Arendtsville **USGS Map EPA** Site Sponsor (agency) Map Scale PSU/private **Operating Group Map Date** 42-001-9991 AQS# Climatronics **Meteorological Type** Air Pollutant Analyzer Ozone, IMROVE **QAPP** Latitude 39.9231 dry, wet, Hg, PM **QAPP** Longitude -77.3078 **Deposition Measurement** 269 Land Use agriculture **QAPP Elevation Meters** complex - rolling 10.9 Terrain **QAPP Declination** Marginally 2/22/2006 Conforms to MLM **OAPP Declination Date** (717) 677-9866 39.923241 **Site Telephone Audit Latitude** PSU Fruit Research Orchard -77.307863 Site Address 1 **Audit Longitude** Winding Road Site Address 2 **Audit Elevation** 266 Adams -11 County **Audit Declination** Arendtsville, PA City, State **Present** Fire Extinguisher 17307 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 2116-7) Ekto **Shelter Size** 640 cuft **✓** Notes Shelter Clean **✓** Notes Site OK From Gettysburg take route 34 north to Biglerville. At the intersection of 34 and 234 turn left (west) to Arendtsville. **Driving Directions** Continue into the town of Arendtsville. At the stop sign next to the gas station, turn left and immediately turn right,

onto Chambersburg Street. Continue approximately 0.4 miles and turn right onto Winding Road. There is a sign for

Boyer Nursery & Orchard. The site will be visible at the top of the hill in the orchard on the right.

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Site ID ARE128 Technician Sandy Grenville Site Visit Date 08/18/2018

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

Siting Distances OK ✓

**Siting Criteria Comment** 

The site is located in an active orchard where spraying occurs. Fruit trees are rotated with corn and other crops.

## **Field Systems Data Form** F-02058-1500-S3-rev002 Site Visit Date 08/18/2018 Site ID ARE128 Technician Sandy Grenville ✓ 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 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

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

facing north?

11 Is it inclined approximately 30 degrees?

## **Field Systems Data Form** F-02058-1500-S4-rev002 Site ID ARE128 Technician Sandy Grenville Site Visit Date 08/18/2018 Temperature only Do all the meterological sensors appear to be intact, in good condition, and well maintained? **~** Temperature only Are all the meteorological sensors operational online, and reporting data? **~** Are the shields for the temperature and RH sensors clean? 3 **✓** N/A Are the aspirated motors working? **✓** N/A Is the solar radiation sensor's lens clean and free of scratches? **✓** N/A Is the surface wetness sensor grid clean and undamaged? **~** Are the sensor signal and power cables intact, in good condition, and well maintained? **✓** Are the sensor signal and power cable connections protected from the elements and well maintained? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters: The 10-meter temperature sensor has been moved to a naturally aspirated shield on the sample tower. The temperature sensor was replaced the week before the audit and has not been calibrated onsite.

## Field Systems Data Form F-02058-1500-S5-rev002 ARE128 Technician Sandy Grenville Site Visit Date 08/18/2018 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) **✓** 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?

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?

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DAS, sensor translators, and peripheral equipment operations and maintenance  1 Do the DAS instruments appear to be in good condition and well maintained?  2 Are all the components of the DAS operational? (printers, modem, backup, etc)  3 Do the analyzer and sensor signal leads pass through lightning protection circuitry?  4 Are the signal connections protected from the weather and well maintained?  5 Are the signal leads connected to the correct DAS channel?  6 Are the DAS, sensor translators, and shelter properly grounded?	
1 Do the DAS instruments appear to be in good condition and well maintained? 2 Are all the components of the DAS operational? (printers, modem, backup, etc) 3 Do the analyzer and sensor signal leads pass through lightning protection circuitry? 4 Are the signal connections protected from the weather and well maintained? 5 Are the signal leads connected to the correct DAS channel? 6 Are the DAS, sensor translators, and shelter properly	
well maintained?  2 Are all the components of the DAS operational? (printers, modem, backup, etc)  3 Do the analyzer and sensor signal leads pass through lightning protection circuitry?  4 Are the signal connections protected from the weather and well maintained?  5 Are the signal leads connected to the correct DAS channel?  6 Are the DAS, sensor translators, and shelter properly	
modem, backup, etc)  3 Do the analyzer and sensor signal leads pass through lightning protection circuitry?  4 Are the signal connections protected from the weather and well maintained?  5 Are the signal leads connected to the correct DAS channel?  6 Are the DAS, sensor translators, and shelter properly	
lightning protection circuitry?  4 Are the signal connections protected from the weather and well maintained?  5 Are the signal leads connected to the correct DAS channel?  6 Are the DAS, sensor translators, and shelter properly	
well maintained?  5 Are the signal leads connected to the correct DAS channel?  6 Are the DAS, sensor translators, and shelter properly	
6 Are the DAS, sensor translators, and shelter properly	
grounded:	
7 Does the instrument shelter have a stable power source?	
8 Is the instrument shelter temperature controlled?	
9 Is the met tower stable and grounded?  Stable  Grounded	
10 Is the sample tower stable and grounded?   ✓	
11 Tower comments?  Met tower removed	
Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other feature natural or man-made, that may affect the monitoring parameters:	ıres,
The meteorological tower has been removed.	

#### **Field Systems Data Form** F-02058-1500-S7-rev002 ARE128 Technician Sandy Grenville Site Visit Date 08/18/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No N/A Yes No N/A Yes **✓** Wind speed sensor **Data logger** П **V** Wind direction sensor **V Data logger V V** 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 ~ Humidity sensor translator Surge protector** П **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 **~** 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** Oct 2010 **V HASP ✓** 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

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?

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Site	ID	ARE128	Technicia	ı S	Sandy Grenville		Site Visit Date 0	8/18/2018	
1	Has the	eration procedures site operator attended If yes, when and who i		AST	NET training	<b>✓</b>	Refresher training by	Lavery and Howell,	July 2006
2		backup operator atten g course? If yes, when a				<b>✓</b>	Refresher training by	Lavery and Howell,	July 2006
	-	e visited regularly on t				<b>✓</b>			
		standard CASTNET op d by the site operator?	perational p	oce	edures being	<b>✓</b>			
5						<b>✓</b>			
	Are regi	ılar operational QA/QO	C checks per	fori	med on meteor	<u>rolo</u>	gical instruments?		
QC	Check P	erformed			Frequency			Compliant	
Mul	tipoint (	Calibrations		<b>✓</b>	Semiannuall	у		<b>✓</b>	
Visu	ıal Inspe	ctions		<b>✓</b>	Weekly			<u> </u>	
Tra	nslator <b>Z</b>	Zero/Span Tests (climat	ronics)		N/A			✓	
Mar	nual Rai	n Gauge Test			N/A			✓	
Con	firm Re	asonableness of Curren	t Values	✓	Weekly			✓	
Test	t Surface	Wetness Response			N/A			✓	
	Are regi	ılar operational QA/QC	C checks per	<u>fori</u>	med on the ozo	<u>one</u>	analyzer?		
QC	Check P	erformed			Frequency			Compliant	
Mul	ti-point	Calibrations		<b>✓</b>	Semiannuall	y		<b>✓</b>	
Aut	omatic Z	ero/Span Tests		<b>✓</b>	Daily			<b>✓</b>	
Mar	nual Zer	o/Span Tests							
		recision Level Tests		<b>✓</b>	Daily			<b>✓</b>	
Mar	nual Pre	cision Level Test							
Ana	lvzer Di	agnostics Tests		<b>✓</b>	Weekly			<b>✓</b>	
	•	Replacement (at inlet)	)	<b>✓</b>	Every 2 wee	ks		✓	
		Replacement (at analy		<b>✓</b>	N/A			<b>✓</b>	
		Check for Dirt/Water		<b>✓</b>	Weekly			<b>✓</b>	
	_	siccant Check		<b>✓</b>	Weekly			✓	
2	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								
Prov	ide any a	l? If yes, how? additional explanation ( an-made, that may affe					y) regarding conditio	ns listed above, or	any other features,

## Field Systems Data Form F-02058-1500-S9-rev002 ARE128 Technician Sandy Grenville Site Visit Date 08/18/2018 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, logbook Are general observations being made and recorded? How? **V** 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? Gloves not consistently used 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** ✓ 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 handles the filter caps with bare hands but handles the filter pack using the Ziploc filter bag.

## F-02058-1500-S10-rev002

Site ID

ARE128

Technician Sandy Grenville

Site Visit Date 08/18/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07045
DAS	Campbell	CR3000	2524	000400
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA110	000012187C	02661
Flow Rate	Apex	AXMC105LPMDPC	42228	000462
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	093644408	06809
Ozone	ThermoElectron Inc	49i A1NAA	1009241798	000621
Ozone Standard	ThermoElectron Inc	49i A3NAA	0607315737	000199
Sample Tower	Aluma Tower	В	none	666361
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	14803	06542
Zero air pump	Werther International	PC70/4	000815262	06866

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
MK	G113-Sandy	Grenville-08/20/2018				
1	8/20/2018	Computer	Dell	07030	Inspiron 15	Unknown
2	8/20/2018	DAS	Campbell	000404	CR3000	2521
3	8/20/2018	Elevation	Elevation	None	1	None
4	8/20/2018	Filter pack flow pump	Thomas	03639	107CAB18	049400004427
5	8/20/2018	Flow Rate	Apex	000637	AXMC105LPMDPCV	illegible
6	8/20/2018	Infrastructure	Infrastructure	none	none	none
7	8/20/2018	Modem	Raven	06593	V4221-V	0844350394
8	8/20/2018	Ozone	ThermoElectron Inc	000703	49i A1NAA	1030244805
9	8/20/2018	Ozone Standard	ThermoElectron Inc	000374	49i A3NAA	0726124694
10	8/20/2018	Sample Tower	Aluma Tower	666362	В	AT-5107-E-4-11
11	8/20/2018	Shelter Temperature	Campbell	none	107-L	none
12	8/20/2018	Siting Criteria	Siting Criteria	None	1	None
13	8/20/2018	Temperature	RM Young	04312	41342	4009
14	8/20/2018	Zero air pump	Werther International	06937	C 70/4	000821896

#### **DAS Data Form** 0 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2521 MKG113 Sandy Grenville 08/20/2018 DAS Primary Das Date: 8 /20/2018 **Audit Date** 8 /20/2018 Datel Parameter DAS Mfg 16:39:50 16:39:50 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** Das Day: 232 **Audit Day** 232 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 0.0001 0.0001 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 -0.0001 0.6995 0.6994 7 V V 0.9000 0.8994 0.8992 -0.00027 0.9993 0.9991 V V -0.0002 1.0000

# Flow Data Form Mfg Serial Number Ta Site Technician Site Visit Date Parameter Owner ID Apex | illegible | MKG113 | Sandy Grenville | 08/20/2018 | Flow Rate | 000637

ļ -	- 3				
		Mfg	BIOS	Parameter	Flow Rate
		Serial Number		Tfer Desc.	BIOS 220-H
		Tfer ID	01414		
		Slope	1.00055	Intercept	-0.01570
		Cert Date	2/21/2018	CorrCoff	1.00000
2404	DAGA			0	

A Avg % Diff: A Max % Di  O.88% 1.32% Cal Factor Full Scale  Rotometer Reading: 1.	<b>DAS 1:</b>	<b>DAS 2:</b>		Cal Factor Zero	0
0.88% 1.32% Rotometer Reading: 1.	A Avg % Diff: A Max % Di	A Avg %Dif	A Max % Di	Cal Factor Full Scale	1
	0.88% 1.32%			<b>Rotometer Reading:</b>	1.55

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignall	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	0.00	0.000	-0.01	1/m	l/m	
primary	test pt 1	1.497	1.510	1.50	0.000	1.50	1/m	l/m	-0.66%
primary	test pt 2	1.499	1.510	1.50	0.000	1.50	1/m	l/m	-0.66%
primary	test pt 3	1.501	1.520	1.50	0.000	1.50	1/m	l/m	-1.32%
Sensor Component Leak Test			Condition			Status	pass		
Sensor Comp	onent Tubing C	ondition		Condition	Good		Status	pass	
Sensor Component Filter Position		Condition	Good		Status	pass			
Sensor Component Rotometer Condition		Condition	Clean and dry		Status	pass			
Sensor Component Moisture Present			Condition	See comments	3	Status	pass		
Sensor Component Filter Distance		Condition	3.5 cm		Status	pass			
Sensor Component Filter Depth			Condition	3.0 cm		Status	pass		
Sensor Component Filter Azimuth			Condition	ondition 90 deg			pass		
			Condition			Status	pass		

## **Ozone Data Form**

Mfg	Serial Number	er Ta Site	7	Гесhnician	Site Visit Date	Parameter	or Owner ID
ThermoElectron Inc	1030244805	MKG11	3	Sandy Grenville	08/20/2018	Ozone	000703
Intercept		rcept	0.00000	Mfg Serial Number Tfer ID	ThermoElectron 0517112167 01113		Desc. Ozone primary stan
DAS 1: A Avg % Diff: A M	Iax % Di A	AS 2: Avg %Dif A	Max % Di	Slope Cert Date	1.0050		
0.0%	0.0%			Cert Date	0/12/201	Corre	WII 1.00000
UseDescription	ConcGroup	Tfer Raw	Tfer Corr		Site Unit	RelPerDi	
primary	2	0.00	-0.32 14.59	0.15 14.47	ppb		0.47
primary primary	3	34.90	34.39	33.86	ppb ppb	-1	1.55
primary	4	68.10	67.43	66.58	ppb		1.27
primary	5	108.90	108.02	107.10	ppb	-0	0.86
Sensor Componer	Sample Tra	in	Condi	tion Good		Status pa	ass
Sensor Componer	22.5 degree	rule	Condi	tion		Status pa	ass
Sensor Componer	Inlet Filter C	ondition	Condi	tion Clean		Status pa	ass
Sensor Componer	Battery Bac	kup	Condi	tion N/A		Status pa	ass
Sensor Componer	Offset		Condi	0.10		Status pa	ass
Sensor Componer	Span		Condi	1.015		Status pa	ass
Sensor Componer	Zero Voltage	е	Condi	ition N/A		Status pa	ass
Sensor Componer	Fullscale Vo	oltage	Condi	ition N/A		Status pa	ass
Sensor Componer	Cell A Freq.		Condi	tion 98.5 kHz		Status pa	ass
Sensor Componer	Cell A Noise	<del>,</del>	Condi	tion 0.8 ppb		Status pa	ass
Sensor Componer	Cell A Flow		Condi	tion 0.55 lpm		Status pa	ass
Sensor Componer	Cell A Press	sure	Condi	692.4 mmHg		Status pa	ass
Sensor Componer	Cell A Tmp.		Condi	37.4 C		Status pa	ass
Sensor Componer	Cell B Freq.		Condi	88.7 kHz		Status pa	ass
Sensor Componer	Cell B Noise	;	Condi	0.9 ppb		Status pa	ass
Sensor Componer	Cell B Flow		Condi	0.62 lpm		Status pa	ass
Sensor Componer	Cell B Press	sure	Condi	693.0 mmHg		Status pa	ass
Sensor Componer	Cell B Tmp.		Condi	tion		Status pa	ass
Sensor Componer	Line Loss		Condi	Not tested		Status pa	ass
Sensor Componer	System Mer	no	Condi	tion		Status pa	ass

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young 4009 MKG113 08/20/2018 Temperature 04312 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 0.14 0.22 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.36 0.27 0.000 0.2 C -0.07 C -0.13 Temp Mid Range 24.92 24.63 0.000 24.5 primary 48.52 0.000 C -0.22 primary Temp High Range 49.00 48.3 Condition Clean Sensor Component | Shield **Status** pass Sensor Component Blower Status pass **Condition** N/A 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 Shelter Temperature Campbell MKG113 08/20/2018 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** 0.48 0.70 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	28.97	28.65	0.000	28.2	C	-0.5
primary	Temp Mid Range	24.91	24.62	0.000	25.3	С	0.7
primary	Temp Mid Range	28.39	28.07	0.000	28.3	С	0.24
Sensor Con	ponent System Memo	)	Condition		Status	pass	

## **Infrastructure Data For**

Sandy Grenville	Site Visit Date 08/20/2018
lel Shelt	ter Size
16-4) 640 c	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
<b>Sensor Component</b>	Shelter Door	Condition	Fair	Status	pass
<b>Sensor Component</b>	Shelter Roof	Condition	Fair	Status	pass
Sensor Component	Shelter Floor	Condition	Poor	Status	Fail
Sensor Component	Signal Cable	Condition	Good	Status	pass
Sensor Component	Tubing Type	Condition	3/8 teflon	Status	pass
Sensor Component	Sample Train	Condition	Good	Status	pass

#### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 08/20/2018 MKG113 Technician Sandy Grenville Site ID Hadley **USGS Map EPA** Site Sponsor (agency) Map Scale PA/private **Operating Group Map Date** 42-085-9991 AQS# Climatronics **Meteorological Type** Ozone, IMPROVE Air Pollutant Analyzer **QAPP** Latitude 41.4250 dry -80.1447 **Deposition Measurement QAPP** Longitude 384 Land Use woodland - mixed, agriculture **QAPP Elevation Meters** 9.25 **Terrain** gently rolling **QAPP Declination** 2/22/2006 Conforms to MLM Marginally **OAPP Declination Date** (724) 253-3685 41.426847 **Site Telephone Audit Latitude** M. K. Goddard St. Park -80.145247 Site Address 1 **Audit Longitude** 684 Lake Wilhelm Rd. Site Address 2 **Audit Elevation** 377 Mercer -9.3 County **Audit Declination** Sandy Lake, PA City, State **Present** Fire Extinguisher New in 2014 16145 Zip Code Eastern Time Zone **First Aid Kit ✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **V 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 2116-4) Ekto **Shelter Size** 640 cuft **✓** Notes The shelter is clean and organized. Leak and rot below the air conditioner and on the floor under the Shelter Clean counter. Mold increasing on walls and floor.

From I-79 take exit 130 (route 358). Go west and bear right onto Sheakleyville Road. Continue less than a mile to

the site will be visible on the right at the state park headquarters facility.

the stop sign, and turn right onto Lake Wilhelm Road. Continue approximately 1.5 miles, just after crossing the lake

**✓** Notes

Site OK

**Driving Directions** 

F-02058-1500-S2-rev002

Site ID	MKG113	<b>Technician</b>	Sandy Grenville	Site Visit Date	08/20/2018

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	1.5 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	10 - 30 m	
Obstacles to wind	10 times obstacle height		<b>✓</b>

Siting Distances OK
Siting Criteria Comment

## **Field Systems Data Form** F-02058-1500-S3-rev002 Site Visit Date 08/20/2018 Site ID MKG113 Technician Sandy Grenville ✓ 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 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

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

facing north?

11 Is it inclined approximately 30 degrees?

Fie	eld Systems Data Form		F-02058-1500-S4-rev002
Site	ID MKG113 Technician Sandy Grenville	!	Site Visit Date 08/20/2018
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?	<b>✓</b>	
	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,
7 8 Prov	Is the surface wetness sensor grid clean and undamaged?  Are the sensor signal and power cables intact, in good condition, and well maintained?  Are the sensor signal and power cable connections protected from the elements and well maintained?  de any additional explanation (photograph or sketch if neces	✓ ✓	

## Field Systems Data Form F-02058-1500-S5-rev002 MKG113 Technician Sandy Grenville Site Visit Date 08/20/2018 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? One tree as tall as inlet within 12 meters 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	MKG113	Technician	Sandy Grenville		Site Vis	it Date 08/20/2	018	
	DAS go	ngan translators, and r	noninhonal agui	nment energies	20 O.	nd maintana	maa		
	DAS, SE	nsor translators, and p	<u>peripheral equi</u>	pment operation	is ai	<u>ia mamiena</u>	<u>ince</u>		
1		OAS instruments appeintained?	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 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 translato	rs, and shelter	properly	<b>✓</b>				
7	Does the	e instrument shelter ha	ave a stable pov	ver source?	<b>✓</b>				
8	Is the in	strument shelter temp	oerature contro	lled?	<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>		<b>✓</b>	
11	Tower c	omments?				Met tower re	emoved		
		additional explanation				y) regardin	g conditions lis	ted above, or a	any other features,

The Met tower has been removed and the temperature sensor is now mounted on the sample tower in a naturally aspirated shield.

#### **Field Systems Data Form** F-02058-1500-S7-rev002 MKG113 Technician Sandy Grenville Site Visit Date 08/20/2018 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** 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 ~ Humidity sensor translator Surge protector** П П **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 ✓ Site Ops Manual** Feb 2014 **V HASP V** Feb 2014 **✓ V Field Ops Manual** Feb 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 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,

current?

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

## F-02058-1500-S8-rev002

Site operation procedures   1 Has the site operator attended a formal CASTNET training	Site	e ID	MKG113	Technicia	n [	Sandy Grenville		Site Visit Date 08/20/2	018	
Is the site visited regularly on the required Tuesday schedule?  4 Are the standard CASTNET operational procedures being followed by the site operator?  5 Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation)  Are regular operational QA/OC checks performed on meteorological instruments?  OC Check Performed Frequency Compliant  Multipoint Calibrations V Semiannually  Visual Inspections V Weekly  Translator Zero/Span Tests (climatronics) N/A  Manual Rain Gauge Test V N/A  Are regular operational OA/OC checks performed on the ozone analyzer?  OC Check Performed Frequency Compliant  Multi-point Calibrations V Semiannually  Are regular operational OA/OC checks performed on the ozone analyzer?  OC Check Performed Frequency Compliant  Multi-point Calibrations V Semiannually  Automatic Zero/Span Tests V Daily  Manual Precision Level Test V As needed  Multi-point Calibration Level Test V As needed  Multi-point Calibration Sess W Weekly  In-line Filter Replacement (at analyze Weekly  In-line Filter Replacement (at analyze Weekly  NA N	1	Has the	e site operator attende		AST	FNET training	<b>✓</b>	July 2006, refresher training	by Howell and Lavery	
schedule?  4 Are the standard CASTNET operational procedures being of followed by the site operator?  5 Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation)  Are regular operational OA/OC checks performed on meteorological instruments?  QC Check Performed Frequency Compliant  Multipoint Calibrations	2									
flollowed by the site operator?  5 Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation)  Are regular operational OA/OC cheeks performed on meteorological instruments?  QC Cheek Performed Frequency Compliant  Multipoint Calibrations Weekly Weekly Weekly  Translator Zero/Span Tests (climatronics) N/A  Manual Rain Gauge Test Weekly Weekl	3			the required	Tu	esday	<b>✓</b>			
Are regular operational QA/QC checks performed on meteorological instruments?  QC Check Performed Frequency Compliant Multipoint Calibrations	4				roc	edures being	<b>✓</b>			
QC Check Performed Frequency Compliant  Multipoint Calibrations ✓ Semiannually ✓  Visual Inspections ✓ Weekly ✓  Translator Zero/Span Tests (climatronics)	5	Is the si the requ	te operator(s) knowled uired site activities? (in	lgeable of, an	d a	ble to perform entation)	<b>✓</b>			
Multipoint Calibrations  Visual Inspections  V		Are reg	ular operational QA/Q	C checks per	for	med on meteo	<u>rolo</u>	gical instruments?		
Visual Inspections  Visual	QC	Check I	Performed			Frequency			Compliant	
Translator Zero/Span Tests (climatronics)	Mu	ltipoint (	Calibrations		<b>✓</b>	Semiannuall	у		✓	
Manual Rain Gauge Test  Confirm Reasonableness of Current Values  Weekly  Weekly  Are regular operational OA/OC checks performed on the ozone analyzer?  QC Check Performed  Multi-point Calibrations  Automatic Zero/Span Tests  Manual Precision Level Test  Manual Precision Level Test  Manual Precision Level Test  Meekly  In-line Filter Replacement (at inlet)  In-line Filter Replacement (at analyze  Min-line Filter Replacement (at analyze  Min-line Check for Dirt/Water  Weekly  Weekly  Unknown  SSRF, logbook, call-in  reported? If yes, how?  Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	Vis	ual Insp	ections		<b>✓</b>	Weekly				
Confirm Reasonableness of Current Values  Confirm Reasonableness of Current Values  Velocity  Via  Are regular operational OA/OC checks performed on the ozone analyzer?  QC Check Performed  Frequency  Compliant  Multi-point Calibrations  Velocity  Manual Zero/Span Tests  Velocity  Manual Zero/Span Tests  Velocity  Manual Precision Level Test  Meekly  In-line Filter Replacement (at inlet)  In-line Filter Replacement (at analyze  Manual Line Check for Dirt/Water  Weekly  Velocity  Velocity  Weekly  Velocity	Tra	nslator Z	Zero/Span Tests (clima	tronics)		N/A				
Test Surface Wetness Response  Are regular operational OA/OC checks performed on the ozone analyzer?  QC Check Performed  Frequency  Compliant  Multi-point Calibrations  V Semiannually  Automatic Zero/Span Tests  V Daily  Manual Zero/Span Tests  V Daily  V As needed  Automatic Precision Level Tests  V Daily  Weekly  In-line Filter Replacement (at inlet)  In-line Filter Replacement (at analyze  Zero Air Desiccant Check  V Weekly  Do automatic and manual z/s/p gasses go through the complete sample train including all filters?  Do 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,	Ma	nual Rai	n Gauge Test			N/A				
Are regular operational OA/OC checks performed on the ozone analyzer?  QC Check Performed Frequency Compliant  Multi-point Calibrations	Cor	nfirm Re	asonableness of Curre	nt Values		Weekly				
QC Check Performed Frequency Compliant  Multi-point Calibrations	Tes	t Surfac	e Wetness Response		✓	N/A			✓	
Multi-point Calibrations  Automatic Zero/Span Tests  Manual Zero/Span Tests  Manual Zero/Span Tests  V As needed  Automatic Precision Level Tests  Weekly  In-line Filter Replacement (at inlet)  In-line Filter Replacement (at analyze  Sample Line Check for Dirt/Water  Zero Air Desiccant Check  Do aily  Weekly  Weekly  Weekly  Weekly  Weekly  Weekly  In-line Filter Replacement (at malyze  Sample Line Check for Dirt/Water  Weekly  Weekly  Weekly  Weekly  Weekly  Sample Line Check for Dirt/Water  Weekly  Weekly  Weekly  Sample Line Check for Dirt/Water  Weekly  Weekly  Sample Line Check for Dirt/Water  Weekly  Sample Line Check for Dirt/Water  Weekly  Weekly  Sample Line Check for Dirt/Water  Weekly  Weekly  Sample Line Check for Dirt/Water  Weekly  Weekly  Weekly  Sample Line Check for Dirt/Water  Sample Line Check for Dirt/Water  Weekly  Sample Line Check for Dirt/Water  Weekly  Sample Line Check for Dirt/Water  Weekly  Sample Line Check for Dirt/Water  Sample		Are reg	ular operational QA/Q	C checks per	for	med on the ozo	one	analyzer?		
Automatic Zero/Span Tests  Manual Zero/Span Tests  Manual Zero/Span Tests  Weekly  In-line Filter Replacement (at inlet)  Sample Line Check for Dirt/Water  Zero Air Desiccant Check  Do automatic and manual z/s/p gasses go through the complete sample train including all filters?  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,	QC	Check I	Performed			Frequency			Compliant	
Manual Zero/Span Tests    As needed   V	Mu	lti-point	Calibrations		<b>✓</b>	Semiannuall	у		✓	
Automatic Precision Level Tests  Manual Precision Level Test  As needed  Manual Precision Level Test  As needed  Meekly  In-line Filter Replacement (at inlet)  In-line Filter Replacement (at analyze  Sample Line Check for Dirt/Water  Zero Air Desiccant Check  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?  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,	Aut	tomatic 2	Zero/Span Tests		<b>✓</b>	Daily			✓	
Manual Precision Level Test  Analyzer Diagnostics Tests  Weekly  In-line Filter Replacement (at inlet)  Every 2 weeks  In-line Filter Replacement (at analyze  Sample Line Check for Dirt/Water  Zero Air Desiccant Check  Weekly  Unknown  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?  Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	Ma	nual Zer	o/Span Tests		✓	As needed			✓	
Analyzer Diagnostics Tests  In-line Filter Replacement (at inlet)  In-line Filter Replacement (at analyze  In-line Filter Replacement (at inlet)  In-line Filter Replac	Aut	tomatic I	Precision Level Tests		<b>✓</b>	Daily			✓	
In-line Filter Replacement (at inlet)  In-line Filter Replacement (at analyze  In-line Filter Replacement (at inlet)  In-line Filter Replacement (at analyze  Weekly  In-line Filter Replacement (at analyze (	Ma	nual Pre	cision Level Test			As needed				
In-line Filter Replacement (at analyze Sample Line Check for Dirt/Water Zero Air Desiccant Check     Weekly   Weekly	Ana	alyzer Di	agnostics Tests			Weekly				
Sample Line Check for Dirt/Water  Zero Air Desiccant Check  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?  Are the automatic and manual z/s/p checks monitored and reported? If yes, how?  SSRF, logbook, call-in  Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	In-l	line Filte	r Replacement (at inle	t)		Every 2 wee	ks			
Zero Air Desiccant Check    Weekly	In-l	line Filte	r Replacement (at anal	lyze						
1 Do multi-point calibration gases go through the complete sample train including all filters? 2 Do automatic and manual z/s/p gasses go through the complete sample train including all filters? 3 Are the automatic and manual z/s/p checks monitored and reported? If yes, how?  SSRF, logbook, call-in  Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	San	nple Lin	e Check for Dirt/Water	r		Weekly				
sample train including all filters?  Do automatic and manual z/s/p gasses go through the complete sample train including all filters?  Are the automatic and manual z/s/p checks monitored and reported? If yes, how?  SSRF, logbook, call-in  Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	Zer	o Air De	esiccant Check		<b>✓</b>	Weekly			✓	
2 Do automatic and manual z/s/p gasses go through the complete sample train including all filters? 3 Are the automatic and manual z/s/p checks monitored and reported? If yes, how?  SSRF, logbook, call-in  Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	1				h th	ne complete		Unknown		
3 Are the automatic and manual z/s/p checks monitored and reported? If yes, how?  SSRF, logbook, call-in Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	2	Do auto	matic and manual z/s/	p gasses go tl	rou	ugh the	<b>✓</b>			
	3	Are the	automatic and manua		mo	onitored and	<b>✓</b>	SSRF, logbook, call-in		
natural or man-made, that may affect the monitoring parameters:								y) regarding conditions lis	ed above, or any other feature	es,
	natu	iral or m	an-made, that may aff	ect the monit	ori	ng parameters	•			

### Field Systems Data Form F-02058-1500-S9-rev002 MKG113 Technician Sandy Grenville Site Visit Date 08/20/2018 Site ID Site operation procedures Is the filter pack being changed every Tuesday as scheduled? ✓ Filter changed various times of day 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? **✓** 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? **QC Check Performed Compliant Frequency V** ✓ Semiannually **Multi-point MFC Calibrations** Weekly **V** Flow System Leak Checks Weekly **V Filter Pack Inspection** Weekly **V Flow Rate Setting Checks** Weekly **V 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

MKG113

Technician Sandy Grenville

Site Visit Date 08/20/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07030
DAS	Campbell	CR3000	2521	000404
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	049400004427	03639
Flow Rate	Apex	AXMC105LPMDPC	illegible	000637
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0844350394	06593
Ozone	ThermoElectron Inc	49i A1NAA	1030244805	000703
Ozone Standard	ThermoElectron Inc	49i A3NAA	0726124694	000374
Sample Tower	Aluma Tower	В	AT-5107-E-4-11	666362
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	4009	04312
Zero air pump	Werther International	C 70/4	000821896	06937

# Site Inventory by Site Visit

Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
F112-Sandy	Grenville-08/21/2018				
8/21/2018	Computer	Dell	07054	Inspiron 15	Unknown
8/21/2018	DAS	Campbell	000414	CR3000	2537
8/21/2018	Elevation	Elevation	None	1	None
8/21/2018	Filter pack flow pump	Thomas	000965	107CA18	00000878
8/21/2018	Flow Rate	Apex	000671	AXMC105LPMDPCV	illegible
8/21/2018	Infrastructure	Infrastructure	none	none	none
8/21/2018	Modem	Raven	06455	V4221-V	0808337420
8/21/2018	Ozone	ThermoElectron Inc	000728	49i A1NAA	1105347306
8/21/2018	Ozone Standard	ThermoElectron Inc	000432	49i A3NAA	CM08200008
8/21/2018	Sample Tower	Aluma Tower	03443	Α	none
8/21/2018	Shelter Temperature	Campbell	none	107-L	none
8/21/2018	Siting Criteria	Siting Criteria	None	1	None
8/21/2018	Temperature	RM Young	06388	41342	13992
8/21/2018	Zero air pump	Werther International	06932	C 70/4	000829174
	F112-Sandy 8/21/2018 8/21/2018 8/21/2018 8/21/2018 8/21/2018 8/21/2018 8/21/2018 8/21/2018 8/21/2018 8/21/2018 8/21/2018 8/21/2018	8/21/2018 DAS 8/21/2018 Elevation 8/21/2018 Filter pack flow pump 8/21/2018 Flow Rate 8/21/2018 Infrastructure 8/21/2018 Modem 8/21/2018 Ozone 8/21/2018 Ozone Standard 8/21/2018 Sample Tower 8/21/2018 Shelter Temperature 8/21/2018 Siting Criteria 8/21/2018 Temperature	8/21/2018 Computer Dell 8/21/2018 DAS Campbell 8/21/2018 Elevation Elevation 8/21/2018 Filter pack flow pump Thomas 8/21/2018 Flow Rate Apex 8/21/2018 Infrastructure Infrastructure 8/21/2018 Modem Raven 8/21/2018 Ozone ThermoElectron Inc 8/21/2018 Sample Tower Aluma Tower 8/21/2018 Shelter Temperature Campbell 8/21/2018 Siting Criteria Siting Criteria 8/21/2018 Temperature RM Young	### F112-Sandy Grenville-08/21/2018  ### 8/21/2018	### F112-Sandy Grenville-08/21/2018  ### 8/21/2018 Computer Dell 07054 Inspiron 15  ### 8/21/2018 DAS Campbell 000414 CR3000  ### 8/21/2018 Elevation Elevation None 1  ### 8/21/2018 Filter pack flow pump Thomas 000965 107CA18  ### 8/21/2018 Flow Rate Apex 000671 AXMC105LPMDPCV  ### 8/21/2018 Infrastructure Infrastructure none none  ### 8/21/2018 Modem Raven 06455 V4221-V  ### 8/21/2018 Ozone ThermoElectron Inc 000728 49i A1NAA  ### 8/21/2018 Sample Tower Aluma Tower 03443 A  ### 8/21/2018 Shelter Temperature Campbell none 107-L  ### 8/21/2018 Siting Criteria Siting Criteria None 1  ### 8/21/2018 Temperature RM Young 06388 41342

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2537 KEF112 Sandy Grenville 08/21/2018 DAS Primary Das Date: 8 /21/2018 **Audit Date** 8 /21/2018 Datel Parameter DAS Mfg 11:49:01 11:49:01 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** Das Day: 233 **Audit Day** 233 Tfer ID 01320 **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 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 0.2998 V V 0.0001 7 0.5000 0.4996 V V 0.00000.4996 7 0.7000 V V 0.0001 0.6995 0.6996 7 V V 0.9000 0.8994 0.8994 0.00007 1.0000 0.9992 0.9993 V V 0.0001

## Flow Data Form

	legible	KEF112	N	Mfg Serial Number	08/21/2018 BIOS	Pa	arameter Flo	000671 w Rate
OAS 1:				G	BIOS		arameter Flo	w Rate
DAS 1:			S	Serial Number				
DAS 1:						T	fer Desc. BIC	OS 220-H
OAS 1:			J	Γfer ID	01414			
DAS 1:			6	None.	1	00055 <b>Inte</b>		-0.01570
OAS 1:			8	Slope			ercept	
OAS 1:				Cert Date	2/21	1/2018 Cor	rCoff	1.0000
	<b>DAS 2:</b>			Cal Factor Z	ero		0	
A Avg % Diff: A Ma		Dif A Max	: % <b>Di</b>	Cal Factor F		0.9	8	
2.39%	2.61%			Rotometer R	eading:	1.	6	
Desc. Te	st type Input 1/m	n Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignall	PctDifference
primary pump	off 0.000	0.000	0.01	0.000	0.01	l/m	1/m	
primary leak o	check 0.000	0.000	0.01	0.000	0.01	l/m	1/m	
primary test p		1.530	1.53	0.000	1.49	l/m	1/m	-2.61%
primary test p		1.530	1.53	0.000	1.50	l/m	1/m	-1.96%
primary test p	t 3 1.521	1.540	1.53	0.000	1.50	l/m	1/m	-2.60%
<b>Sensor Component</b>	Leak Test		Condition	1		Status	pass	
Sensor Component Tubing Condition			Condition	Good		Status	pass	
<b>Sensor Component</b>	Filter Position		Condition	Good		Status	pass	
<b>Sensor Component</b>	Rotometer Condition	n	Condition	Clean and dry		Status	pass	
Sensor Component Moisture Present			Condition	dition No moisture present		Status	pass	
Sensor Component Filter Distance			Condition	3.5 cm		Status	pass	
Sensor Component Filter Depth		Condition	2.0 cm		Status	pass		
Sensor Component Filter Azimuth		Condition	300 deg		Status	pass		
Sensor Component System Memo		Condition				pass		

## **Ozone Data Form**

Mfg	Serial Numbe	er Ta Site	7	Гесhnician	Site Visit Date	Paramete	r Owner ID	
ThermoElectron Inc	1105347306	KEF112	!	Sandy Grenville	08/21/2018	Ozone	000728	
Intercept -0		rcept	0.00000	Mfg Serial Number Tfer ID	ThermoElectron 0517112167 01113		meter ozone  Desc. Ozone primary stan	
DAS 1: A Avg % Diff: A M	ax % Di A	AS 2: Avg %Dif A	Max % Di	Slope Cert Date	1.0050			
0.0%	0.0%			Cert Date	5, 12, 23	Corre		
•	ConcGroup	Tfer Raw	Tfer Corr		Site Unit	RelPerDi		
primary primary	2	0.90 15.00	0.56 14.59	0.20	ppb ppb		-0.36 -0.84	
primary	3	35.00	34.49	33.30	ppb	-3	3.51	
primary	4	67.90	67.23	65.47	ppb	-2	2.65	
primary	5	109.50	108.62	107.10	ppb	-1	.41	
Sensor Componen	t Sample Trai	in	Condi	tion Good		Status pa	ass	
Sensor Componen	22.5 degree	rule	Condi	tion		Status pa	ass	
Sensor Componen	Inlet Filter C	ondition	Condi	tion Clean		Status pa	ass	
Sensor Componen	Battery Back	kup	Condi	tion N/A		Status pa	ass	
Sensor Componen	Offset		Condi	<b>tion</b> 0.000		Status pa	ass	
Sensor Componen	Span		Condi	lition 1.011		Status pa	ass	
Sensor Componen	Zero Voltage		Condi	ition N/A		Status pa	ass	
Sensor Componen	fullscale Vo	ltage	Condi	tion N/A		Status pa	ass	
Sensor Componen	Cell A Freq.		Condi	tion 91.8 kHz		Status pa	ass	
Sensor Componen	Cell A Noise	<b>)</b>	Condi	tion 0.9 ppb		Status pa	ass	
Sensor Componen	Cell A Flow		Condi	tion 0.69 lpm		Status pa	ass	
Sensor Componen	t Cell A Press	sure	Condi	tion 661.1 mmHg		Status pa	ass	
Sensor Componen	Cell A Tmp.	Cell A Tmp.		ition 36.6 C		Status pa	ass	
Sensor Componen	Cell B Freq.	Cell B Freq.		tion 87.7 kHz		Status pa	ass	
Sensor Componen	Cell B Noise		Condi	tion 0.8 ppb		Status pa	pass	
Sensor Componen	Cell B Flow		Condi	tion 0.68 lpm		Status pa	ass	
Sensor Componen	Cell B Pressure		Condi	tion 660.8 mmHg		Status pa	ass	
Sensor Componen	nt Cell B Tmp.		Condi	ition		Status pa	ass	
Sensor Componen	Line Loss		Condi	tion Not tested		Status pa	ass	
Sensor Componen	Sensor Component System Memo			tion		Status pass		

### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young KEF112 Temperature 06388 13992 08/21/2018 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 0.08 0.17 Test type OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. InputTmpRaw InputTmpCorr. primary Temp Low Range 0.21 0.12 0.000 0.1 $\mathbf{C}$ 0.02 C Temp Mid Range 25.66 25.37 0.000 25.3 -0.06 primary 0.000 48.9 C -0.17 primary Temp High Range 49.55 49.07 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** Sandy Grenville Shelter Temperature Campbell KEF112 08/21/2018 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** 0.32 0.54 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	25.88	25.58	0.000	25.8	C	0.23
primary	Temp Mid Range	28.80	28.48	0.000	27.9	С	-0.54
primary	Temp Mid Range	23.78	23.50	0.000	23.7	C	0.2
Sensor Com	ponent System Memo		Condition		Status	pass	

## **Infrastructure Data For**

Site ID KEF112 Technician Sandy Grenville Site Visit Date 08/21/2018

Shelter Make	Shelter Model	Shelter Size	
Ekto	8810 (s/n 2149-14)	640 cuft	

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

## Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 08/21/2018 KEF112 Technician Sandy Grenville Site ID James City **USGS Map EPA** Site Sponsor (agency) Map Scale PAFS/private **Operating Group Map Date** 42-047-9991 AQS# R.M. Young **Meteorological Type** Air Pollutant Analyzer Ozone **QAPP** Latitude 41.5981 dry, wet **QAPP** Longitude -78.7683 **Deposition Measurement** 622 Land Use woodland - mixed **QAPP Elevation Meters** 10.5 Terrain rolling **QAPP Declination** Yes 2/24/2006 Conforms to MLM **OAPP Declination Date** (814) 837-8069 41.598119 **Site Telephone Audit Latitude** Kane Experimental Forest Hdqts -78.767866 Site Address 1 **Audit Longitude** Seven Mile Road Site Address 2 **Audit Elevation** 618 Elk -10.3 County **Audit Declination** Kane, PA City, State **Present** Fire Extinguisher 16735 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 2149-14) Ekto **Shelter Size** 640 cuft **✓** Notes The shelter is clean and very well organized. The floor has been replaced but the bottom of walls Shelter Clean are beginning to deteriorate. **✓** Notes Site OK From Kane go south on route 66 for approximately 1 mile. Just past the 2nd cemetery turn left. Continue to the stop **Driving Directions** sign just over the railroad tracks. Turn right and continue approximately 3.2 miles through the town of Lamont.

About 0.5 mile past Lamont, turn left on a gravel road which is marked with a brown Forest Service sign for the NE Forest Experimental Station. Continue approximately 2 miles and bear left at the fork. The site is behind the green

Forest Service buildings on the left.

F-02058-1500-S2-rev002

Site ID KEF112 Technician Sandy Grenville Site Visit Date 08/21/2018

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

Siting Distances OK

**Siting Criteria Comment** 

The site is in a clearing within the Kane Experimental Forest, the tree line is within 10 meters of the site.

## **Field Systems Data Form** F-02058-1500-S3-rev002 Site Visit Date 08/21/2018 Site ID KEF112 Technician Sandy Grenville ✓ 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 avoid radiated heat sources such as buildings, walls, etc? Temperature sensor mounted over shelter roof 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 11 Is it inclined approximately 30 degrees?

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

The sample tower is attached to the shelter and the temperature sensor is positioned directly over the metal roof of the shelter.

Fie	eld Systems Data Form		F-02058-1500-S4-rev002					
Site	ID KEF112 Technician Sandy Grenville	)	Site Visit Date 08/21/2018					
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>	Moderately 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?	<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 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 KEF112 Technician Sandy Grenville Site Visit Date 08/21/2018 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. 1/4 teflon by 15 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? 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:

Trees to the east are within 10 meters of the ozone inlet and at the same height as the inlet.

F-02058-1500-S6-rev002

Site	e ID	KEF112	Technician S	Sandy Grenville		Site Visi	it <b>Date</b> 08/21/201	8	
	DAS, se	nsor translators, and p	peripheral equip	ment operation	<u>15 a1</u>	nd maintena	<u>nce</u>		
1		OAS instruments appeintained?	ear to be in good	condition and	<b>✓</b>				
2		he components of the backup, etc)	DAS operational	l? (printers,	<b>✓</b>				
3		nalyzer and sensor sig g protection circuitry		nrough	✓	Met sensors	only		
4		signal connections prointained?	otected from the	weather and	<b>✓</b>				
5	Are the	signal leads connected	l to the correct D	AS channel?	<b>✓</b>				
6	Are the grounde	DAS, sensor translatoed?	ors, and shelter p	roperly	<b>✓</b>				
7	Does the	e instrument shelter h	ave a stable pow	er source?	<b>✓</b>				
8	Is the in	strument shelter temp	perature controll	ed?	<b>✓</b>				
9	Is the m	et tower stable and gr	ounded?			Stable		Grounded	
10	Is the sa	mple tower stable and	d grounded?						
11	Tower c	omments?				Met Tower re	emoved, SampleT	ower not gro	unded
		additional explanatio nan-made, that may at				y) regardinį	g conditions listed	d above, or a	ny other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 KEF112 Technician Sandy Grenville Site Visit Date 08/21/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No N/A Yes No N/A Yes **✓** Wind speed sensor **Data logger** П **V** Wind direction sensor **V Data logger** ✓ **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 П **V V UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device** ~ $\checkmark$ **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** Feb 2014 **V HASP V** Feb 2014 **✓ V Field Ops Manual** Oct 2011 **Calibration Reports V V** Ozone z/s/p Control Charts **V** 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 KEF112 Technician Sandy Grenville Site Visit Date 08/21/2018 Site ID Site operation procedures Has the site operator attended a formal CASTNET training Current operator trained by previous operator, who was trained by 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** As needed Manual Zero/Span Tests **V 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** 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?

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

The inlet filter is replaced and a zero/span/precision check is performed 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?

Fl	eia Systems L	vata Form				F-02058-1500-89-rev002					
Sit	e ID KEF112	Tec	chnician	Sandy Grenville		Site Visit Date	08/21/2018				
	Site operation proce	<u>edures</u>									
1	Is the filter pack be	ing changed ever	y Tuesda	y as scheduled?	<b>V</b>	Filter changed morr	ings				
2	Are the Site Status I correctly?	Report Forms be	ing comp	oleted and filed	<b>✓</b>						
3	Are data downloads scheduled?	and backups be	ing perfo	ormed as		No longer required					
4	Are general observations being made and recorded? How?					SSRF, logbook					
5	Are site supplies on-hand and replenished in a timely fashion?										
6	Are sample flow rates recorded? How?					SSRF, call-in					
7	Are samples sent to the lab on a regular schedule in a timely fashion?										
8	Are filters protected and shipping? How		ation dur	ing handling	<b>✓</b>	Clean gloves on and	d off				
9	Are the site condition operations manager		ılarly to	the field	✓						
QC	Check Performed		Free	quency			Compliant				
I	Multi-point MFC Cal	ibrations	<b>✓</b> Sem	iannually			<b>✓</b>				
]	Flow System Leak Ch	ecks	✓ Wee	kly			✓				
J	Filter Pack Inspection	l									
J	Flow Rate Setting Cho	ecks	Weekly				✓				
•	Visual Check of Flow					✓					
J	In-line Filter Inspectio	on/Replacement	✓ As n	eeded			✓				
5	Sample Line Check fo	r Dirt/Water	✓ Wee	kly			$\checkmark$				
	vide any additional ex ıral or man-made, tha					) regarding conditi	ons listed above, or a	ny other features,			

## F-02058-1500-S10-rev002

Site ID

KEF112

Technician Sandy Grenville

Site Visit Date 08/21/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07054
DAS	Campbell	CR3000	2537	000414
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	00000878	000965
Flow Rate	Apex	AXMC105LPMDPC	illegible	000671
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0808337420	06455
Ozone	ThermoElectron Inc	49i A1NAA	1105347306	000728
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200008	000432
Sample Tower	Aluma Tower	A	none	03443
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	13992	06388
Zero air pump	Werther International	C 70/4	000829174	06932

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
PSU	1106-Sandy	Grenville-08/22/2018				
1	8/22/2018	Computer	Dell	07046	Inspiron 15	Unknown
2	8/22/2018	DAS	Campbell	000407	CR3000	2512
3	8/22/2018	Elevation	Elevation	None	1	None
4	8/22/2018	Filter pack flow pump	Thomas	06023	107CAB18	060400022676
5	8/22/2018	Flow Rate	Apex	000823	AXMC105LPMDPCV	50749
6	8/22/2018	Infrastructure	Infrastructure	none	none	none
7	8/22/2018	Modem	Raven	06483	V4221-V	0808310813
8	8/22/2018	Ozone	ThermoElectron Inc	000678	49i A1NAA	1030244791
9	8/22/2018	Ozone Standard	ThermoElectron Inc	000434	49i A3NAA	CM08200010
10	8/22/2018	Sample Tower	Aluma Tower	02747	Α	none
11	8/22/2018	Shelter Temperature	Campbell	none	107-L	none
12	8/22/2018	Siting Criteria	Siting Criteria	None	1	None
13	8/22/2018	Temperature	RM Young	05046	41342VC	9642
14	8/22/2018	Zero air pump	Werther International	06921	C 70/4	000836216

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2512 PSU106 Sandy Grenville 08/22/2018 DAS Primary Das Date: 8 /20/2018 **Audit Date** 8 /20/2018 Datel Parameter DAS Mfg 9:04:30 9:04:30 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** Das Day: 232 **Audit Day** 232 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 0.0998 0.0999 0.0001 7 0.3000 0.2997 0.2997 V V 0.0000 7 0.5000 0.4996 V V 0.00010.4995 7 0.7000 V V -0.0001 0.6995 0.6994 7 V V 0.9000 0.8993 0.8992 -0.0001 7 0.9994 0.9992 V V -0.0002 1.0000

# Flow Data Form

<b>Afg</b>	Ser	ial Number	Ta S	ite	Tec	hnician Site Visit Date		Paran	neter	Owner ID
рех	507	749	I	PSU106	Sa	ndy Grenville	08/22/2018	Flow F	Rate	000823
						Mfg	BIOS	P	arameter Flo	w Rate
						Serial Number		T	fer Desc. Blo	OS 220-H
						Tfer ID	01414			
						Clama	1	00055 <b>Int</b>		-0.0157
									ercept	
						Cert Date	2/2	1/2018 <b>Co</b>	rrCoff	1.0000
DAS 1:		DAS	S 2:		_	Cal Factor Z	ero	-0.0	02	
A Avg % Diff:	A Max	% Di A A	vg %I	Dif A Max	x % Di	Cal Factor F	ull Scale		1	
2.80%	;	3.85%				Rotometer R	eading:	1	.5	
Desc.	Test	type Inpi	ut l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	l PctDifference
primary	pump o		000	0.000	0.01	0.000	-0.02	1/m	l/m	
primary	leak che		000	0.000	0.00	0.000	-0.02	1/m	1/m	
primary	test pt 1		543	1.560	1.49	0.000	1.50	1/m	1/m	-3.85%
primary	test pt 2		520	1.530	1.49	0.000	1.50	l/m	1/m	-1.96%
primary	test pt 3		527	1.540	1.49	0.000	1.50	1/m	1/m	-2.60%
Sensor Compo	onent L	eak Test			Condition	See comments	5	Status	pass	
Sensor Compe	onent T	ubing Conditi	ion		Condition	Good		Status	pass	
Sensor Compo	onent F	ilter Position			Condition	Good		Status	pass	
Sensor Compo	onent R	Rotometer Co	ndition		Conditio	Clean and dry		Status	pass	
Sensor Compo	onent N	Noisture Prese	ent		Condition	No moisture p	resent	Status	pass	
Sensor Compo	onent F	ilter Distance	<b>!</b>		Conditio	4.0 cm		Status	pass	
Sensor Compo	onent F	ilter Depth			Condition	0.5 cm		Status	pass	
Sensor Compo	onent F	ilter Azimuth			Condition	250 deg		Status	pass	
		System Memo	l		Condition	n		Status	pass	

# **Ozone Data Form**

		r Ta Site	16	chnician	Site Visit Date	Parame	eter	Owner I	D
ThermoElectron Inc 10	030244791	PSU10	Sa Sa	andy Grenville	08/22/2018	Ozone		000678	
Intercept -1.22		rcept	0.00000 0.00000 0.00000	Mfg Serial Number	ThermoElectron		ramete er Desc	r ozone Ozone primary	/ stan
Correon 5.50	COLI	Con	5.00000	Tfer ID	01113				
DAS 1:		AS 2:		Slope	1.0050	)4 Inter	cept	0.32	:915
A Avg % Diff: A Max	0.0% A	Avg %Dif A	Max % Di	Cert Date	9/12/201	17 Corr	Coff	1.00	000
UseDescription Co	oncGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPer	Dif	AbsDif	
primary	1	1.00	0.66	-0.09	ppb			-0.75	
primary	2	15.00	14.59	13.46	ppb		7.46	-1.13	
primary	3	35.00 67.90	34.49 67.23	32.01 63.44	ppb		-7.46 -5.8		
primary primary	5	110.00	109.12	106.50	ppb ppb		-2.43		
			<u> </u>		ppo	C4 - 4			
Sensor Component	Sample Hai	11	Condition	Good		Status	pass		
Sensor Component	22.5 degree	rule	Condition			Status	pass		
Sensor Component	Inlet Filter C	ondition	Condition	Clean		Status	pass		
<b>Sensor Component</b>	Battery Back	кир	Condition	on N/A		Status	pass		
Sensor Component	Offset		Condition	on 0.40		Status	pass		
Sensor Component	Span		Condition	<b>1.006</b>		Status	pass		
Sensor Component	Zero Voltage	Э	Condition	on N/A		Status	pass		
Sensor Component	Fullscale Vo	ltage	Condition	on N/A		Status	pass		
Sensor Component	Cell A Freq.		Condition	92.2 kHz		Status	pass		
Sensor Component	Cell A Noise	<b>)</b>	Condition	0.9 ppb		Status	pass		
Sensor Component	Cell A Flow		Condition	0.68 lpm		Status	pass		
Sensor Component	Cell A Press	sure	Condition	723.2 mmHg		Status	pass		
Sensor Component	Cell A Tmp.		Condition	on 34.0 C		Status	pass		
Sensor Component	Cell B Freq.		Condition	93.6 kHz		Status	pass		
Sensor Component	Cell B Noise	)	Condition	0.6 ppb		Status	pass		
Sensor Component	Cell B Flow		Condition	0.67 lpm		Status	pass		
Sensor Component	Cell B Press	sure	Condition	722.9 mmHg		Status	pass		
Sensor Component	Cell B Tmp.		Condition	on		Status	pass		
Sensor Component	Line Loss		Condition	Not tested		Status	pass		
Sensor Component	System Mer	no	Condition	on		Status	pass		

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young 9642 PSU106 08/22/2018 Temperature 05046 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 0.09 0.14 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.12 0.03 0.000 0.2 C 0.14 C Temp Mid Range 24.87 24.58 0.000 24.5 -0.05 primary 0.000 48.0 C -0.07 primary Temp High Range 48.59 48.11 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** Sandy Grenville Campbell PSU106 08/22/2018 Shelter Temperature 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** 0.32 0.44 01227 **Tfer ID** 1.00798 0.09168 **Slope** Intercept 2/13/2018 1.00000 **Cert Date** CorrCoff OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. 23.91 0.000primary Temp Mid Range 23.63 24.1 C 0.44 23.37 0.000 C 0.37 Temp Mid Range 23.65 23.7 primary

24.14

Condition

0.000

C

Status pass

0.16

24.3

24.42

primary

Temp Mid Range

Sensor Component | System Memo

## **Infrastructure Data For**

2018

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

### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 08/22/2018 PSU106 Technician Sandy Grenville Site ID Pine Grove Mills **USGS Map EPA** Site Sponsor (agency) Map Scale PSU **Operating Group Map Date** 42-027-9991 AQS# Climatronics **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude 40.7209 dry **QAPP** Longitude -77.9316 **Deposition Measurement** 376 Land Use agriculture **QAPP Elevation Meters** rolling - complex 10.9 **Terrain QAPP Declination** Marginally 9/16/2005 Conforms to MLM **OAPP Declination Date** (814) 237-5778 40.720902 Site Telephone **Audit Latitude** PSU Agriculture Research Farm -77.931759 Site Address 1 **Audit Longitude** Site Address 2 Tadpole Road **Audit Elevation** 364 Centre -10.7 County **Audit Declination** Rockspring, PA City, State **Present** Fire Extinguisher 16865 new in 2015 Zip Code Eastern Time Zone **First Aid Kit ✓ 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** PSU Model N/A **Shelter Size** 3840 cuft **✓** Notes The shelter is owned by the university and is clean and orderly. The site is part of the Surfrad Shelter Clean network. **✓** Notes Site OK

From 322 on the east side of State College, take SR 3024 south. After the traffic light at the intersection of route 26,

SR 3024 will change to Whitehall Road. Continue on Whitehall road for approximately 3 miles to Fairbrook. Turn left on Tadpole Road in Fairbrook at the church. Continue approximately 0.5 miles, the site will be in the field on the right.

**Driving Directions** 

F-02058-1500-S2-rev002

Site ID PSU106 Technician Sandy Grenville Site Visit Date 08/22/2018

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	State College	
City 1,000 to 10,000 population	5 km		✓
Major highway, airport or rail yard	2 km		✓
Secondary road, heavily traveled	500 m		✓
Secondary road, lightly traveled	200 m		✓
Feedlot operations	500 m		✓
Intensive agricultural ops (including aerial spraying)	500 m		✓
Limited agricultural operations	200 m	10 m	
Large parking lot	200 m		✓
Small parking lot	100 m		✓
Tree line	50 m		✓
Obstacles to wind	10 times obstacle height		✓

Siting Distances OK

**Siting Criteria Comment** 

The site is within 10 km of State College which has a population of approximately 50,000. The site is located in a university agricultural research field.

Fie	eld Sys	stems Data Fo	rm				F-0205	8-1500	)-S3-rev002
Site	e ID	PSU106	Technician	Sandy Grenville		Site Visit Date	08/22/2018		
1		l speed and direction s luenced by obstruction		as to avoid	<b>V</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)	unted atop the x the max dian	tower or on a	✓	N/A			
3	Are the	ower and sensors plun	ab?		<b>V</b>	N/A			
4		emperature shields po diated heat sources suc			<b>✓</b>				
5	condition surface a	perature and RH sensons? (i.e. ground below sund not steeply sloped. water should be avoid	sensors should Ridges, hollow	be natural	<b>V</b>				
6	Is the sol	ar radiation sensor plu	umb?		<b>V</b>	N/A			
7	Is it sited light?	l to avoid shading, or a	nny artificial or	reflected	<b>V</b>	N/A			
8	Is the ra	in gauge plumb?			<b>✓</b>	N/A			
9	Is it sited towers, e	to avoid sheltering effect?	fects from build	lings, trees,	<b>V</b>	N/A			
10	Is the su	rface wetness sensor si	ted with the gri	id surface	<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:

✓ N/A

facing north?

11 Is it inclined approximately 30 degrees?

eld Systems Data Form	F-02058-1500-S4-rev00					
PSU106 Technician Sandy Grenville	<b>)</b>	Site Visit Date 08/22/2018				
Do all the meterological sensors appear to be intact, in good condition, and well maintained?	<b>✓</b>	Temperature only				
Are all the meteorological sensors operational online, and reporting data?	<b>✓</b>	Temperature only				
Are the shields for the temperature and RH sensors clean?	<b>✓</b>					
Are the aspirated motors working?	<b>✓</b>	N/A				
Is the solar radiation sensor's lens clean and free of scratches?	<b>✓</b>	N/A				
Is the surface wetness sensor grid clean and undamaged?	✓	N/A				
Are the sensor signal and power cables intact, in good condition, and well maintained?	<b>✓</b>					
Are the sensor signal and power cable connections protected from the elements and well maintained?	<b>V</b>					
		) regarding conditions listed above, or any other features,				
0-meter temperature sensor is now mounted in a naturally aspira	ed sl	nield on the sample tower.				
2	Do all the meterological sensors appear to be intact, in good condition, and well maintained?  Are all the meteorological sensors operational online, and reporting data?  Are the shields for the temperature and RH sensors clean?  Are the aspirated motors working?  Is the solar radiation sensor's lens clean and free of scratches?  Is the surface wetness sensor grid clean and undamaged?  Are the sensor signal and power cables intact, in good condition, and well maintained?  Are the sensor signal and power cable connections protected from the elements and well maintained?	Do all the meterological sensors appear to be intact, in good condition, and well maintained?  Are all the meteorological sensors operational online, and reporting data?  Are the shields for the temperature and RH sensors clean?  Are the aspirated motors working?  Is the solar radiation sensor's lens clean and free of scratches?  Is the surface wetness sensor grid clean and undamaged?  Are the sensor signal and power cables intact, in good condition, and well maintained?  Are the sensor signal and power cable connections protected				

## Field Systems Data Form F-02058-1500-S5-rev002 PSU106 Technician Sandy Grenville Site Visit Date 08/22/2018 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. 1/4 teflon by 20 meters Describe dry dep sample tube. 3/8 teflon by 20 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? Is the zero air supply desiccant unsaturated? Flow line only 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:

The zero air desiccant is saturated.

F-02058-1500-S6-rev002

Site	e <b>ID</b>	PSU106	Technician	Sandy Grenville		Site Vis	it Date 08/22/201	8	
	DAS co	nsor translators, and	norinhoral oqui	nment operation	16 O1	nd maintana	nca		
	DAS, SC	isor translators, and	peripheral equi	pinent operation	15 ai	<u>iu mamiena</u>	ince		
1	Do the I well mai	OAS instruments appentained?	ear 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	_	through	<b>✓</b>	Met sensors	only		
4		signal connections pro ntained?	otected from the	e weather and	✓				
5	Are the	signal leads connected	d to the correct	DAS channel?	<b>✓</b>				
6	Are the grounde	DAS, sensor translated?	ors, and shelter	properly	<b>✓</b>				
7	Does the	instrument shelter h	ave a stable pov	ver source?	<b>✓</b>				
8	Is the in	strument shelter temp	perature contro	lled?	<b>✓</b>				
9	Is the m	et tower stable and gr	ounded?			Stable		Grounded	
10	Is the sa	mple tower stable and	d grounded?			<b>✓</b>		<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	e meteorol	ogical tower has been i	removed.						

#### **Field Systems Data Form** F-02058-1500-S7-rev002 PSU106 Technician Sandy Grenville Site Visit Date 08/22/2018 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 V V Humidity sensor translator Surge protector** П П **V V UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device** $\checkmark$ **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 ✓ V Site Ops Manual** Feb 2014 **V HASP V** Feb 2014 **V Field Ops Manual V Calibration Reports 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 PSU106 Technician Sandy Grenville Site Visit Date 08/22/2018 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 No backup operator 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 V** Weekly **Visual Inspections** ~ Translator Zero/Span Tests (climatronics) N/A **✓ V** N/A **Manual Rain Gauge Test V V** Weekly **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** ✓ Semiannually ~

	*		Commannaa	ury .		
Auto	omatic Zero/Span Tests	<b>✓</b>	Daily			$\checkmark$
Mar	ual Zero/Span Tests		As needed			$\checkmark$
Auto	omatic Precision Level Tests	<b>✓</b>	Daily			$\checkmark$
Mar	ual Precision Level Test		As needed			$\checkmark$
Ana	lyzer Diagnostics Tests	✓	Weekly			$\checkmark$
In-li	ne Filter Replacement (at inlet)	✓	Every 2 we	eks		$\checkmark$
In-li	ne Filter Replacement (at analyze	<b>✓</b>	N/A			$\checkmark$
Sam	ple Line Check for Dirt/Water	✓	Weekly			$\checkmark$
Zero	Air Desiccant Check	<b>✓</b>	Weekly			$\checkmark$
	Do multi-point calibration gases go throus sample train including all filters?	igh the	complete		Unknown	
	2	thuou	ah tha	<b>✓</b>		
	Do automatic and manual z/s/p gasses go		gn tne			
	complete sample train including all filter					
3	Are the automatic and manual z/s/p chec	ks moi	nitored and	<b>✓</b>	logbook, call-in	
	reported? If yes, how?					

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

## Field Systems Data Form F-02058-1500-S9-rev002 PSU106 Technician Sandy Grenville Site Visit Date 08/22/2018 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? **✓** 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? gloves are not used 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 uses the filter bag as a glove when handling the filter pack.

## F-02058-1500-S10-rev002

Site ID

PSU106

Technician Sandy Grenville

Site Visit Date 08/22/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07046
DAS	Campbell	CR3000	2512	000407
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	060400022676	06023
Flow Rate	Apex	AXMC105LPMDPC	50749	000823
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0808310813	06483
Ozone	ThermoElectron Inc	49i A1NAA	1030244791	000678
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200010	000434
Sample Tower	Aluma Tower	A	none	02747
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	9642	05046
Zero air pump	Werther International	C 70/4	000836216	06921

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
ANA	A115-Sandy	Grenville-09/10/2018				
1	9/10/2018	Computer	Dell	07017	Inspiron 15	9K2MC12
2	9/10/2018	DAS	Campbell	000339	CR3000	2118
3	9/10/2018	Elevation	Elevation	None	1	None
4	9/10/2018	Filter pack flow pump	Thomas	06025	107CAB18	060400022682
5	9/10/2018	Flow Rate	Apex	000809	AXMC105LPMDPCV	illegible
6	9/10/2018	Infrastructure	Infrastructure	none	none	none
7	9/10/2018	Modem	Raven	06588	V4221-V	0844352818
8	9/10/2018	Ozone	ThermoElectron Inc	000699	49i A1NAA	1030244804
9	9/10/2018	Ozone Standard	ThermoElectron Inc	000686	49i A3NAA	1030244818
10	9/10/2018	Sample Tower	Aluma Tower	000180	В	none
11	9/10/2018	Shelter Temperature	Campbell	none	107-L	none
12	9/10/2018	Siting Criteria	Siting Criteria	None	1	None
13	9/10/2018	Temperature	RM Young	06535	41342	14796
14	9/10/2018	Zero air pump	Werther International	06933	C 70/4	000836202

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2118 ANA115 Sandy Grenville 09/10/2018 DAS Primary Das Date: 9 /10/2018 **Audit Date** 9 /10/2018 Datel Parameter DAS Mfg 13:11:30 Das Time: 13:11:30 **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** Das Day: 253 **Audit Day** 253 Tfer ID 01320 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0005 0.0002 0.0005 0.0002 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 0.0001 0.0001 V V 7 0.1000 0.0999 0.1000 0.0001 7 0.3000 0.2997 0.2998 V V 0.0001 7 0.5000 0.4997 V V 0.00020.4995 7 0.7000 V V 0.0005 0.6995 0.7000 7 V V 0.9000 0.8994 0.8995 0.0001 7 0.9993 0.9995 V V 1.0000 0.0002

# Flow Data Form

Mfg	Serial	Number Ta	Site	Tec	hnician	Site Visit I	Date Paran	neter	Owner ID
Арех	illegibl	е	ANA115	Sar	ndy Grenville	09/10/2018	Flow R	ate	000809
					Mfg	BIOS	P	arameter Flo	ow Rate
					Serial Number		Т	fer Desc. Blo	OS 220-H
					Tfer ID	01414			
							22255		0.0457
					Slope	1.	00055 Inte	ercept	-0.0157
					Cert Date	2/2	1/2018 <b>Co</b>	rCoff	1.0000
DAS 1:		DAS 2:		L	Cal Factor Z	ero	-0.0	)1	
A Avg % Diff:	A Max % l	Di A Avg %	Dif A Max	« % Di	Cal Factor F	ull Scale		1	
1.53%	1.9	6%			Rotometer R	eading:	1	.5	
Desc.	Test typ	e Input l/n	n Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	I PctDifference
primary	pump off	0.000	0.000	0.00	0.000	0.00	l/m	1/m	
primary	leak check	0.000	0.000	0.01	0.000	-0.01	l/m	1/m	
primary	test pt 1	1.512	1.530	1.50	0.000	1.50	l/m	1/m	-1.96%
primary	test pt 2	1.508	1.520	1.50	0.000	1.50	l/m	l/m	-1.32%
primary	test pt 3	1.510	1.520	1.50	0.000	1.50	l/m	1/m	-1.329
Sensor Comp	onent Leak	Test		Condition	n		Status	pass	
Sensor Comp	onent Tubii	ng Condition		Condition	Good		Status	pass	
Sensor Comp	onent Filter	Position		Condition	Good		Status	pass	
Sensor Comp	onent Roto	meter Condition	on	Condition	Clean and dry		Status	pass	
Sensor Comp	onent Mois	ture Present		Condition	No moisture p	resent	Status	pass	
Sensor Comp	onent Filter	Distance		Condition	4.5 cm		Status	pass	
Sensor Comp	onent Filter	Depth		Condition	2.0 cm		Status	pass	
Sensor Comp	onent Filter	Azimuth		Condition	130 deg		Status	pass	
	. 01	em Memo		Condition	n		Status	pass	

# **Ozone Data Form**

Mfg	Serial Numbe	er Ta Site	Т	echnician	Site Visit Date	Parameter	r Owner ID
ThermoElectron Inc	1030244804	ANA115	5	Sandy Grenville	09/10/2018	Ozone	000699
Intercept		rcept	0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180030022 01114		meter ozone  Desc. Ozone primary stan
DAS 1:	D	AS 2:		Slope	1.0029	00 Interce	pt 0.10980
A Avg % Diff: A N		Avg %Dif A	Max % Di	Cert Date	9/7/201	18 CorrCo	off 1.00000
0.0%	0.0%						'
UseDescription	ConcGroup	Tfer Raw 0.12	Tfer Corr 0.01	Site -0.08	Site Unit	RelPerDif	f AbsDif -0.09
primary primary	2	15.26	15.10	15.46	ppb ppb		0.36
primary	3	35.18	34.96	35.73	ppb	2	18
primary	4	67.71	67.40	68.68	ppb	1	.88
primary	5	109.90	109.47	111.40	ppb	1	.75
Sensor Compone	nt Sample Trai	n	Condit	ion Good		<b>Status</b> pa	ass
Sensor Compone	nt 22.5 degree	rule	Condit	ion		Status pa	ass
Sensor Compone	nt Inlet Filter C	ondition	Condit	ion Clean		Status pa	ass
Sensor Compone	nt Battery Back	kup	Condit	ion N/A		Status pa	ass
Sensor Compone	nt Offset		Condit	ion 0.000		Status pa	ass
Sensor Compone	nt Span		Condit	ion 1.043		Status pa	ass
Sensor Compone	nt Zero Voltage	е	Condit	ion N/A		<b>Status</b> pa	ass
Sensor Compone	nt Fullscale Vo	ltage	Condit	ion N/A		<b>Status</b> pa	ass
Sensor Compone	cell A Freq.		Condit	ion 89.7 kHz		<b>Status</b> pa	ass
Sensor Compone	nt Cell A Noise	;	Condit	ion 0.9 ppb		<b>Status</b> pa	ass
Sensor Compone	nt Cell A Flow		Condit	ion 0.72 lpm		<b>Status</b> pa	ass
Sensor Compone	nt Cell A Press	sure	Condit	ion 697.8 mmHg		<b>Status</b> pa	iss
Sensor Compone	nt Cell A Tmp.		Condit	ion 32.7 C		Status pa	ass
Sensor Compone	nt Cell B Freq.		Condit	ion 87.1 kHz		Status pa	ass
Sensor Compone	nt Cell B Noise	)	Condit	ion 1.0 ppb		Status pa	nss
Sensor Compone	nt Cell B Flow		Condit	ion 0.67 lpm		Status pa	ass
Sensor Compone	nt Cell B Press	sure	Condit	ion 697.5 mmHg		Status pa	ass
Sensor Compone	cell B Tmp.		Condit	ion		Status pa	ass
Sensor Compone	nt Line Loss		Condit	ion Not tested		Status pa	ass
Sensor Compone	nt System Mer	no	Condit	ion		<b>Status</b> pa	ass

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young 14796 ANA115 09/10/2018 Temperature 06535 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 0.13 0.20 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.180.09 0.000 0.0 $\mathbf{C}$ -0.07 C Temp Mid Range 25.08 24.79 0.000 24.7 -0.13 primary 47.70 0.000 47.5 C -0.2 primary Temp High Range 48.17 Condition Clean Sensor Component | Shield **Status** pass Sensor Component Blower Status pass **Condition** N/A 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 Shelter Temperature Campbell ANA115 09/10/2018 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** 0.43 0.53 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	21.98	21.71	0.000	22.1	C	0.36
primary	Temp Mid Range	24.35	24.07	0.000	23.5	С	-0.53
primary	Temp Mid Range	25.01	24.72	0.000	24.3	C	-0.4
Sensor Con	ponent System Memo	)	Condition		Status	pass	

### **Infrastructure Data For**

Si	te ID	ANA115	Technician	Sandy Grenville	Site Visit Date	09/10/2018	
	Shelter Ma	ake	Shelter Model	She	elter Size		
	Ekto	- 100 mg	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
<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	Fair	Status	pass
<b>Sensor Component</b>	Shelter Door	Condition	Fair	Status	pass
<b>Sensor Component</b>	Shelter Roof	Condition	Good	Status	pass
<b>Sensor Component</b>	Shelter Floor	Condition	Fair	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

### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 09/10/2018 ANA115 Technician Sandy Grenville Site ID Pinckney **USGS Map EPA** Site Sponsor (agency) Map Scale University of MI **Operating Group Map Date** 26-161-9991 AQS# Climatronics **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude dry, wet, Hg **Deposition Measurement QAPP** Longitude Land Use woodland - mixed **QAPP Elevation Meters** flat Terrain **QAPP Declination** Marginally Conforms to MLM **OAPP Declination Date** (734) 426-0060 42.416636 **Site Telephone Audit Latitude** 8420 Strawberry Lake Rd. **Audit Longitude** -83.90218 Site Address 1 Site Address 2 **Audit Elevation** 266 Washtenaw -6.6 County **Audit Declination** Dexter, MI City, State **Present** Fire Extinguisher 48130 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 **V Security Fence Backup Operator 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 Shelter Clean The shelter is in fair condition, however somewhat cluttered.

**Driving Directions** 

Site OK

**✓** Notes

From Ann Arbor take I-94 west to exit 169 to Dexter, turning right (north) to Dexter. Continue a few miles to the stop sign and turn left. Continue approximately one block to the small park in the center of town and turn right (north). Continue through Dexter, across the railroad tracks and river. Turn left (west) just across the river on Huron River Drive. Continue about 8 miles on Huron River Drive which becomes a dirt road after the intersection of North Territorial Rd. The site is on the left, just past the first sharp turn in the road (to the right) where it becomes Strawberry Lake Road.

## Field Systems Data Form

F-02058-1500-S2-rev002

Site ID ANA115 Sandy Grenville Site Visit Date 09/10/2018

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		lacksquare
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		ightharpoons
Secondary road, heavily traveled	500 m		lacksquare
Secondary road, lightly traveled	200 m		$ lap{\checkmark}$
Feedlot operations	500 m		✓
Intensive agricultural ops (including aerial spraying)	500 m		$ lap{\checkmark}$
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** 

Site is confined within a fenced area that is somewhat small. There is available space adjacent to the fenced area that could be utilized to improve the instrument siting.

### **Field Systems Data Form** F-02058-1500-S3-rev002 Site Visit Date 09/10/2018 ANA115 Site ID Technician Sandy Grenville ✓ 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 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 Sy	ystems Dat	a Fo	orm				F-02058-1500-S4-rev002
Site	e ID	ANA115		Technic	i <mark>an</mark> Sa	ndy Grenville		Site Visit Date 09/10/2018
1		the meterological on, and well main			o be int	act, in good	<b>✓</b>	Temperature only
2 Are all the meteorological sensors operational online, and reporting data?							✓	Temperature only
3	Are the	e shields for the to	emper	ature and F	RH sens	sors clean?	<b>✓</b>	
4	Are the	e aspirated motor	s wor	king?			<b>✓</b>	N/A
5	Is the s	olar radiation sen	nsor's	lens clean a	and free	e of	<b>✓</b>	N/A
6	Is the s	urface wetness se	ensor g	grid clean a	nd und	amaged?	✓	N/A
7		e sensor signal an on, and well main			tact, in	good	✓	
8		e sensor signal an ne elements and v			nnectio	ns protected	<b>✓</b>	
		additional explar an-made, that m					sary)	) regarding conditions listed above, or any other features,

### Field Systems Data Form F-02058-1500-S5-rev002 ANA115 Technician Sandy Grenville Site Visit Date 09/10/2018 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

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	ANA115	Technician	Sandy Grenville		Site Visi	it Date 09/10/201	18	
	DAS so	nsor translators, ar	nd narinharal aqui	nment energies	ac or	ad maintana	noo		
	DAS, Se	<u>iisor translators, ar</u>	<u>ia peripheral equi</u>	pment operation		iu mamiena	<u>iice</u>		
1		OAS instruments apintained?	ppear to be in good	l condition and	<b>✓</b>				
2		the components of t backup, etc)	the DAS operation	al? (printers,	✓				
3		nalyzer and sensor g protection circuit		through	<b>✓</b>	Met sensors	only		
4		signal connections intained?	protected from the	e weather and	<b>✓</b>				
5	Are the signal leads connected to the correct DAS channel?								
6	Are the grounde	DAS, sensor transled?	ators, and shelter	properly	<b>✓</b>				
7	Does the	e instrument shelte	r have a stable pov	ver source?	<b>✓</b>				
8	Is the in	strument shelter te	emperature contro	lled?	✓				
9	Is the m	et tower stable and	grounded?			Stable		Grounded	
10	Is the sa	ample tower stable a	and grounded?						
11	Tower c	comments?				Sample towe	er not grounded		
Dun	wide on	additional armlana	tion (photograph	on alzotak if massa	ago:	v) nogovdi	r aonditions lists	d above and	ny othon footunes
		additional explana nan-made, that may				y) regarding	g conditions liste	u above, or a	my other leatures,
The	met towe	er has been removed	d. The DAS controls	the shelter heat	ing a	nd cooling.			

#### **Field Systems Data Form** F-02058-1500-S7-rev002 ANA115 Technician Sandy Grenville Site Visit Date 09/10/2018 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** 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 ~ Humidity sensor translator Surge protector** П П **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 **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 ✓ SSRF ✓ V Site Ops Manual ✓ V HASP** Oct 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? ✓ 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?

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 ANA115 Technician Sandy Grenville Site Visit Date 09/10/2018 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** 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? **OC 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 ~ V** Every 2 weeks **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?

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

The ozone inlet filter is changed and a Z/S/P is performed every two weeks.

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

reported? If yes, how?

### Field Systems Data Form F-02058-1500-S9-rev002 ANA115 Technician Sandy Grenville Site Visit Date 09/10/2018 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, logbook Are general observations being made and recorded? How? **✓** 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? **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:

## Field Systems Data Form

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

Site ID

ANA115

Technician Sandy Grenville

Site Visit Date 09/10/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	9K2MC12	07017
DAS	Campbell	CR3000	2118	000339
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	060400022682	06025
Flow Rate	Apex	AXMC105LPMDPC	illegible	000809
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0844352818	06588
Ozone	ThermoElectron Inc	49i A1NAA	1030244804	000699
Ozone Standard	ThermoElectron Inc	49i A3NAA	1030244818	000686
Sample Tower	Aluma Tower	В	none	000180
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	14796	06535
Zero air pump	Werther International	C 70/4	000836202	06933

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
НО	X148-Sandy	Grenville-09/11/2018				
1	9/11/2018	Computer	Dell	07062	Inspiron 15	Unknown
2	9/11/2018	DAS	Campbell	000426	CR3000	2533
3	9/11/2018	Elevation	Elevation	None	1	None
4	9/11/2018	Filter pack flow pump	Thomas	06026	107CAB18	060400022659
5	9/11/2018	Flow Rate	Apex	000526	AXMC105LPMDPCV	48099
6	9/11/2018	Infrastructure	Infrastructure	none	none	none
7	9/11/2018	Modem	Raven	06480	H4222-C	0808311145
8	9/11/2018	Ozone	ThermoElectron Inc	000614	49i A1NAA	1009241794
9	9/11/2018	Ozone Standard	ThermoElectron Inc	000438	49i A3NAA	CM08200014
10	9/11/2018	Sample Tower	Aluma Tower	000131	В	none
11	9/11/2018	Shelter Temperature	Campbell	none	107-L	none
12	9/11/2018	Siting Criteria	Siting Criteria	None	1	None
13	9/11/2018	Temperature	RM Young	04357	41342	4187
14	9/11/2018	Zero air pump	Werther International	06938	C 70/4	000829164

#### **DAS Data Form DAS Time Max Error:** 0.03 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2533 HOX148 Sandy Grenville 09/11/2018 DAS Primary Das Date: 9 /13/2018 **Audit Date** 9 /13/2018 Datel Parameter DAS Mfg 14:03:42 14:03:40 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** Das Day: 256 **Audit Day** 256 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 -0.0001 0.0001 0.0002 V V 7 0.1000 0.0998 0.0999 0.0001 7 0.3000 0.2997 0.2998 V V 0.0001 7 0.5000 0.4996 V V 0.0001 0.4995 7 0.7000 V V 0.0001 0.6995 0.6996 7 V V 0.9000 0.8993 0.8994 0.0001 7 1.0000 0.9992 0.9993 V V 0.0001

## Flow Data Form

Ifg	Ser	rial Numb	er Ta S	ite	Tec	hnician	Site Visit I	Oate Paran	ieter	Owner ID	
pex	48	099	ŀ	HOX148	Sa	ndy Grenville	09/11/2018	Flow R	late	000526	
						Mfg	BIOS	P	arameter Flo	w Rate	
						Serial Number		T	fer Desc. BIC	OS 220-H	
						Tfer ID	01414				
						GI.	1	00055 Int	, –	0.0157	
						Slope			ercept	-0.0157	
						Cert Date	2/21	1/2018 Co	rrCoff	1.0000	
DAS 1:		D	OAS 2:			Cal Factor Z	ero	-0.0	01		
A Avg % Diff:	A Max	% Di A	Avg %E	Dif A Max	% Di	Cal Factor F	ull Scale	0.0	98		
2.27%		2.74%				Rotometer R	eading:	1	.3		
Desc.	Test	t type   1	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	PctDifference	
primary	pump o		0.000	0.000	0.10	0.000	0.09	1/m	1/m		
primary	leak ch		0.000	0.000	0.03	0.000	0.03	l/m	l/m		
primary	test pt		1.451	1.470	1.52	0.000	1.50	1/m	1/m	2.04%	
primary	test pt		1.451	1.470	1.52	0.000	1.50	1/m	1/m	2.04%	
primary	test pt ?	3	1.448	1.460	1.52	0.000	1.50	1/m	l/m	2.74%	
Sensor Compo	onent	eak Test			Condition	n		Status	pass		
Sensor Compo	onent T	Tubing Cor	ndition		Condition	Good		Status	pass		
Sensor Compe	onent F	ilter Positi	ion		Condition	Good		Status	Status pass		
Sensor Compo	onent F	Rotometer	Condition		Condition	Clean and dry		Status	Status pass		
Sensor Compe	onent N	Moisture Pi	resent		Condition	No moisture pr	resent	Status	pass		
Sensor Compo	onent F	ilter Dista	nce		Condition	4.5 cm		Status	pass		
Sensor Compo	onent F	ilter Depth	า		Condition	3.0 cm		Status	pass		
Sensor Compo	onent F	ilter Azimı	uth		Condition	200 deg		Status	pass		
Sensor Component System Memo			Condition	n		Status	Status pass				

## **Ozone Data Form**

Mfg S	erial Numbe	r Ta Site	,	Гесhnician	Site Visit Date	Parame	eter	Owner ID
ThermoElectron Inc	1009241794	НОХ	148	Sandy Grenville	09/11/2018	Ozone		000614
Intercept -0.8		e: ccept ·Coff	0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180030022 01114			Ozone primary stan
DAS 1: A Avg % Diff: A Ma		AS 2: Avg %Dif	A Max % Di	Slope	9/7/20		_	0.10980
0.0%	0.0%			Cert Date	9/1/20	18 Corr	Con	1.00000
UseDescription C	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPer	Dif	AbsDif
primary	1	0.22	0.10	-0.24	ppb			-0.34
primary	2	15.56	15.40	14.76	ppb		1.2	-0.64
primary primary	3 4	34.72 66.93	34.51 66.62	34.10 66.77	ppb ppb		-1.2 0.22	
primary	5	109.64	109.21	110.90	ppb		1.54	
				tion Good		Status		
Sensor Component Sample Train  Sensor Component 22.5 degree rule				tion		Status		
Sensor Component	Inlet Filter C	ondition	Condi	tion Clean		Status	pass	
Sensor Component				tion N/A	Status	pass		
Sensor Component	Offset		Condi	0.50		Status	pass	
Sensor Component	Span		Condi	1.049		Status	pass	
Sensor Component	Zero Voltage	)	Condi	tion N/A	Status	pass		
Sensor Component	Fullscale Vo	ltage	Condi	lition N/A		Status	pass	
Sensor Component	Cell A Freq.		Condi	tion 100.5 kHz	Status pass		pass	
Sensor Component	Cell A Noise		Condi	0.7 ppb	0.7 ppb		pass	
Sensor Component	Cell A Flow		Condi	tion 0.70 lpm		Status	pass	
Sensor Component	Cell A Press	ure	Condi	706.1 mmHg		Status	pass	
Sensor Component	Cell A Tmp.		Condi	32.2 C		Status	pass	
Sensor Component	Cell B Freq.		Condi	96.2 kHz		Status	pass	
Sensor Component	Cell B Noise		Condi	0.6 ppb		Status	pass	
Sensor Component	Cell B Flow		Condi	0.69 lpm		Status	pass	
Sensor Component	Cell B Press	ure	Condi	706.7 mmHg		Status	pass	
Sensor Component	Cell B Tmp.		Condi	tion		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 Sandy Grenville RM Young 4187 HOX148 09/11/2018 Temperature 04357 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 0.09 0.12 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.20 0.11 0.000 0.1 C -0.04 25.0 C Temp Mid Range 25.40 25.11 0.000 -0.1 primary 49.22 0.000 49.1 C -0.12 primary Temp High Range 49.70 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** Sandy Grenville Shelter Temperature Campbell HOX148 09/11/2018 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** 0.46 0.58 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	28.40	28.08	0.000	27.6	C	-0.47
primary	Temp Mid Range	25.24	24.95	0.000	24.6	С	-0.34
primary	Temp Mid Range	21.42	21.16	0.000	21.7	C	0.58
Sensor Con	nponent System Memo		Condition	Status pass			

### **Infrastructure Data For**

Si	te ID HOX148	Technician Sandy Grenvi	e Site Visit Date 09/11/2018
	Shelter Make	Shelter Model	Shelter Size
8	Ekto	8810	640 cuft

<b>Sensor Component</b>	Sample Tower Type	Condition	Type B	Status	pass
<b>Sensor Component</b>	Conduit	Condition	N/A	Status	pass
<b>Sensor Component</b>	Met Tower	Condition	N/A	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
Sensor Component	Shelter Condition	Condition	Fair	Status	pass
<b>Sensor Component</b>	Shelter Door	Condition	Fair	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	Fair	Status	pass
<b>Sensor Component</b>	Tubing Type	Condition	3/8 teflon	Status	pass
Sensor Component	Sample Train	Condition	Good	Status	pass

### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 09/11/2018 HOX148 Technician Sandy Grenville Site ID Hoxeyville **USGS Map EPA** Site Sponsor (agency) Map Scale private **Operating Group Map Date** 26-165-9991 AQS# R.M. Young **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude dry **Deposition Measurement QAPP** Longitude Land Use woodlands - mixed **QAPP Elevation Meters** gently rolling **Terrain QAPP Declination** Yes Conforms to MLM **OAPP Declination Date** (231) 862-3750 44.18089 **Site Telephone Audit Latitude** 10637 South 9 Rd. -85.73898 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 297 Wexford County **Audit Declination** Cadillac, MI City, State **Present** Fire Extinguisher 49601 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 Ekto **Shelter Size** 640 cuft **✓** Notes The lower section of the shelter walls are beginning to rot and show mold. Shelter Clean **✓** Notes Site OK From Cadillac proceed west on route 55 for approximately 12.5 miles. Turn left (south) on Hoxeyville Road (S13) **Driving Directions** and continue approximately 2 miles to the first stop sign. Turn right (west) on an unmarked road and continue

approximately 2 miles to 9 road. Turn left (south) on 9 road which is not paved and continue approximately 1 mile,

the site is on the left.

## Field Systems Data Form

F-02058-1500-S2-rev002

Site ID HOX148 Technician Sandy Grenville Site Visit Date 09/11/2018

Potential Interferent	Minimum Distance From Measurement Apparatus	Distance	Pass = Checked
Large Point Source of SO2 or NOx	20 to 40 km	~ 30 km	
Major industrial complex	10 to 20 km		✓
City > 50,000 population	40 km		✓
City 10,000 to 50,000 population	10 km		✓
City 1,000 to 10,000 population	5 km		✓
Major highway, airport or rail yard	2 km		✓
Secondary road, heavily traveled	500 m		✓
Secondary road, lightly traveled	200 m		✓
Feedlot operations	500 m		✓
Intensive agricultural ops (including aerial spraying)	500 m		✓
Limited agricultural operations	200 m	10 m	
Large parking lot	200 m		✓
Small parking lot	100 m		✓
Tree line	50 m		✓
Obstacles to wind	10 times obstacle height		✓

Siting Distances OK ✓

**Siting Criteria Comment** 

There is a co-generating and smelting facility in Cadillac approximately 30 km to the northeast. The site is located in a hay field which is cut 2 or 3 times per year.

### **Field Systems Data Form** F-02058-1500-S3-rev002 Site Visit Date 09/11/2018 Site ID HOX148 Technician Sandy Grenville ✓ 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 West 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 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

Met tower removed and temperature installed in naturally aspirated shield on the west leg of the sample tower.

11 Is it inclined approximately 30 degrees?

### **Field Systems Data Form** F-02058-1500-S4-rev002 HOX148 Technician Sandy Grenville Site Visit Date 09/11/2018 Site ID Temperature only Do all the meterological sensors appear to be intact, in good condition, and well maintained? **~** Temperature only Are all the meteorological sensors operational online, and reporting data? **~** Are the shields for the temperature and RH sensors clean? 3 **✓** N/A Are the aspirated motors working? **✓** N/A Is the solar radiation sensor's lens clean and free of scratches? **✓** N/A Is the surface wetness sensor grid clean and undamaged? ✓ Signs of wear Are the sensor signal and power cables intact, in good condition, and well maintained? **✓** Are the sensor signal and power cable connections protected from the elements and well maintained? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters: Upon arrival the temperature sensor was found outside of the shield and exposed to direct sunlight. It was secured following the audit. Temperature data should be considered suspect from the previous site visit until after the audit. The signal cables are showing signs of wear with the outer insulation missing in a few places.

### Field Systems Data Form F-02058-1500-S5-rev002 HOX148 Technician Sandy Grenville Site Visit Date 09/11/2018 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 Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	HOX148	Technician	Sandy Grenville		Site Vis	it Date 09/11/201	8	
	DAS, sei	nsor translators, and	peripheral equi	pment operation	ns aı	nd maintena	nnce		
1		OAS instruments appe		_					
1	well mai	ntained?	ar to be in good	Condition and					
2		he components of the backup, etc)	DAS operation	al? (printers,	<b>✓</b>				
3		nalyzer and sensor sig		through	<b>✓</b>				
4		signal connections prontained?	otected from the	e weather and	<b>✓</b>				
5	Are the	signal leads connected	l to the correct	DAS channel?	<b>✓</b>				
6	Are the grounde	DAS, sensor translated?	ors, and shelter	properly	<b>✓</b>				
7	Does the	instrument shelter h	ave a stable pov	ver source?	<b>✓</b>				
8	Is the in	strument shelter temp	perature control	lled?	<b>✓</b>				
9	Is the m	et tower stable and gr	ounded?			Stable		Grounded	
		Ü							
10	Is the sa	mple tower stable and	d grounded?			<b>V</b>		<b>✓</b>	
11	Tower c	omments?				Met tower re	emoved		
		additional explanation an-made, that may a				ry) regardin	g conditions listed	d above, or a	any other features,
		•							

#### **Field Systems Data Form** F-02058-1500-S7-rev002 HOX148 Technician Sandy Grenville Site Visit Date 09/11/2018 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** 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 **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 **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 ✓ SSRF ✓ V ✓ Site Ops Manual** Oct 2014 **HASP ✓** Oct 2014 **✓ Field Ops Manual** June 1987 **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 HOX148 Technician Sandy Grenville Site Visit Date 09/11/2018 Site ID Site operation procedures 10/20/2000 by ESE employee EOH 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? **OC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** Manual Zero/Span Tests **V ✓** Daily **Automatic Precision Level Tests V V Manual Precision Level Test ✓ V** Weekly **Analyzer Diagnostics Tests V** Every 2 weeks **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?

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

The ozone analyzer sample inlet filter is replaced and a Z/S/P check is performed 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?

F10	eld Systems Data Form				F-02058-15	000-89-rev002
Site	HOX148 Tec	hnician Sandy Grenville		Site Visit Date	09/11/2018	
	Site operation procedures					
1	Is the filter pack being changed every	y Tuesday as scheduled?	<b>~</b>	Filter changed morr	nings	
2	Are the Site Status Report Forms bei	ing completed and filed	<b>✓</b>			
3	Are data downloads and backups be scheduled?	ng performed as		No longer required		
4	Are general observations being made	e and recorded? How?	<b>✓</b>	SSRF, logbook		
5	Are site supplies on-hand and replen fashion?	ished in a timely	<b>✓</b>			
6	Are sample flow rates recorded? How	v?	<b>✓</b>	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	d off	
9	Are the site conditions reported reguloperations manager or staff?	larly to the field	✓			
QC	Check Performed	Frequency			Compliant	
N	<b>Multi-point MFC Calibrations</b>	<b>✓</b> Semiannually			✓	
F	low System Leak Checks	Weekly			✓	
F	ilter Pack Inspection					
F	low Rate Setting Checks			✓		
7	<b>Visual Check of Flow Rate Rotometer</b>			✓		
I	n-line Filter Inspection/Replacement			$\checkmark$		
S	ample Line Check for Dirt/Water	Weekly			$\checkmark$	
	ide 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

HOX148

Technician Sandy Grenville

Site Visit Date 09/11/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07062
DAS	Campbell	CR3000	2533	000426
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	060400022659	06026
Flow Rate	Apex	AXMC105LPMDPC	48099	000526
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4222-C	0808311145	06480
Ozone	ThermoElectron Inc	49i A1NAA	1009241794	000614
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200014	000438
Sample Tower	Aluma Tower	В	none	000131
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	4187	04357
Zero air pump	Werther International	C 70/4	000829164	06938

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
UVI	.124-Sandy	Grenville-09/12/2018				
1	9/12/2018	Computer	Dell	07012	Inspiron 15	Unknown
2	9/12/2018	DAS	Campbell	000347	CR3000	2126
3	9/12/2018	Elevation	Elevation	None	1	None
4	9/12/2018	Filter pack flow pump	Thomas	02973	107CAB18	0493002467
5	9/12/2018	Flow Rate	Apex	000600	AXMC105LPMDPCV	illegible
6	9/12/2018	Infrastructure	Infrastructure	none	none	none
7	9/12/2018	Modem	Raven	06466	V4221-V	0808339409
8	9/12/2018	Ozone	ThermoElectron Inc	000680	49i A1NAA	1030244792
9	9/12/2018	Ozone Standard	ThermoElectron Inc	000362	49i A3NAA	0726124686
10	9/12/2018	Sample Tower	Aluma Tower	03557	Α	none
11	9/12/2018	Shelter Temperature	Campbell	none	107-L	none
12	9/12/2018	Siting Criteria	Siting Criteria	None	1	None
13	9/12/2018	Temperature	RM Young	06504	41342	14624
14	9/12/2018	Zero air pump	Werther International	06936	C 70/4	000829169

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2126 UVL124 Sandy Grenville 09/12/2018 DAS Primary Das Date: 9 /12/2018 **Audit Date** 9 /12/2018 Datel Parameter DAS Mfg 11:08:09 Das Time: 11:08:09 **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** Das Day: 255 **Audit Day** 225 Tfer ID 01320 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0001 0.0001 0.0001 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 0.0998 0.0999 0.0001 7 0.3000 0.2997 0.2997 V V 0.0000 7 0.5000 0.4996 V V 0.0001 0.4995 7 0.7000 V V 0.0000 0.6995 0.6995 7 V V 0.9000 0.8994 0.8993 -0.0001 7 1.0000 0.9993 0.9992 V V -0.0001

## Flow Data Form

/Ifg			Site		hnician		Date Paran		Owner ID
pex	illegible		UVL124	Sar	ndy Grenville	09/12/2018	Flow F	Rate	000600
				1	Mfg	BIOS	P	Parameter Flo	w Rate
				5	Serial Number		Т	fer Desc. BIG	OS 220-H
				ŗ	<b>Ifer ID</b>	01414			
					Slope	1	00055 Int	ercept	-0.0157
					_			-	
					Cert Date	2/2	1/2018 <b>Co</b>	rrCoff	1.0000
DAS 1:		<b>DAS 2:</b>			Cal Factor Z	ero	-0.0	02	
Avg % Diff:	A Max % Di	A Avg %l	Dif A Max	% Di	Cal Factor F	ull Scale	0.0	99	
25.74%	26.11%	6			Rotometer R	eading:		2	
Desc.	Test type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.03	1/m	1/m	
primary	leak check	0.000	0.000	0.00	0.000	-0.01	1/m	1/m	
primary	test pt 1	2.013	2.030	1.51	0.000	1.50	l/m	l/m	-26.119
primary	test pt 2	2.000	2.010	1.51	0.000	1.50	l/m	l/m	-25.37%
primary	test pt 3	2.009	2.020	1.50	0.000	1.50	l/m	1/m	-25.749
Sensor Compo	onent Leak T	est		Condition	1		Status	pass	
Sensor Compo	onent Tubing	Condition		Condition	Good		Status	pass	
Sensor Compo	onent Filter F	osition		Condition	Good		Status	pass	
Sensor Compo	onent Rotom	eter Condition	l	Condition	Clean and dry		Status	pass	
Sensor Compo				Condition	No moisture pr	resent	Status	pass	
Sensor Compo				Condition	4.0 cm		Status	pass	
Sensor Compo				Condition			Status	pass	
_	onent Filter A			Condition 10 deg			pass		
Sensor Compo		Memo		Condition			Status		

## **Ozone Data Form**

Mfg	S	erial Numbe	r Ta S	Site	Tec	chnician	Site Visit Date	Parame	eter	Owner l	ID
ThermoElectro	n Inc	1030244792	l	UVL124	Sa	indy Grenville	09/12/2018	Ozone		000680	
Slope:	-0.1		rcept	0.00000	)	Mfg Serial Number	ThermoElectron		ramete	r ozone Ozone primar	y stan
CorrCoff	0.9	99998 Cori	·Coff	0.00000	0	Tfer ID	01114				
DAS 1:		<b>D</b> A	AS 2:			Slope	1.0029	0 Inter	rcept	0.10	0980
A Avg % Diff			Avg %E	Dif A Max	% Di	Cert Date	9/7/201	8 Corr	·Coff	1.00	0000
0.0%		0.0%				Cert Bute		Corr	COII		
UseDescripti	ion C	ConcGroup	Tfer l		er Corr	Site	Site Unit	RelPer	Dif	AbsDif	
primary		1	0.1		0.00	0.21	ppb			0.21	
primary primary		3	15.3 34.0		15.02 34.40	14.57 33.67	ppb ppb		-2.14	-0.45	
primary		4	67.3		67.07	65.94	ppb		-1.7		
primary		5	111.		10.68	109.40	ppb		-1.16		
Sensor Com	ponent	Sample Trai	n		Conditio	Good		Status	pass		
Sensor Com	ponent	22.5 degree	rule		Conditio	on		Status	pass		
Sensor Com	ponent	Inlet Filter C	ondition		Conditio	Clean		Status	pass		
Sensor Com	ponent	Battery Back	кир		Conditio	n N/A		Status	pass		
Sensor Com	ponent	Offset			Conditio	on 0.20		Status	pass		
Sensor Com	ponent	Span			Conditio	1.009		Status	pass		
Sensor Com	ponent	Zero Voltage	)		Conditio	n N/A		Status	pass		
Sensor Com	ponent	Fullscale Vo	Itage		Conditio	N/A		Status	pass		
Sensor Com	ponent	Cell A Freq.			Conditio	100.5 kHz		Status	pass		
Sensor Com	ponent	Cell A Noise	)		Conditio	on 0.6 ppb		Status	pass		
Sensor Com	ponent	Cell A Flow			Conditio	0.69 lpm		Status	pass		
Sensor Com	ponent	Cell A Press	ure		Conditio	724.5 mmHg		Status	pass		
Sensor Com	ponent	Cell A Tmp.			Conditio	Not tested		Status	pass		
Sensor Com	ponent	Cell B Freq.			Conditio	94.5 kHz		Status	pass		
Sensor Com	ponent	Cell B Noise			Conditio	0.7 ppb		Status	pass		
Sensor Com	ponent	Cell B Flow			Conditio	0.65 lpm		Status	pass		
Sensor Com	ponent	Cell B Press	ure		Conditio	725.0 mmHg		Status	pass		
Sensor Com	ponent	Cell B Tmp.			Conditio	on		Status	pass		
Sensor Com	ponent	Line Loss			Conditio	Not tested		Status	pass		
Sensor Com	ponent	System Men	no		Conditio	on		Status	pass		

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young 14624 UVL124 09/12/2018 Temperature 06504 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 0.04 0.10 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.19 0.10 0.000 0.1 C -0.02 C Temp Mid Range 25.23 24.94 0.000 24.8 -0.1 primary 0.000 48.2 C -0.01 primary Temp High Range 48.64 48.16 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** UVL124 Sandy Grenville Shelter Temperature Campbell 09/12/2018 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** 0.22 0.42 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	24.60	24.31	0.000	24.7	C	0.42		
primary	Temp Mid Range	23.54	23.26	0.000	23.4	С	0.16		
primary	Temp Mid Range	26.76	26.46	0.000	26.4	С	-0.08		
Sensor Component System Memo Condition Status pass									
Sensor Con	pass								

## Infrastructure Data For

Sit	e ID	UVL124	Technician	Sandy Grenville	Site Visit Date	09/12/2018	
	Shelter Ma	ake	Shelter Model	She	Iter Size		
	Ekto	400,000,000,000,000,000,000,000,000,000	8810	640	cuft	2-10-10-10-10-10-10-10-10-10-10-10-10-10-	
	The state of the s	JESANTAN ING BURSAN		STATE OF THE PARTY			

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

### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 09/12/2018 UVL124 Technician Sandy Grenville Site ID Ellington **USGS Map EPA** Site Sponsor (agency) Map Scale private **Operating Group Map Date** 26-157-9991 AQS# R.M. Young **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude dry, wet **QAPP** Longitude **Deposition Measurement** Land Use agriculture **QAPP Elevation Meters** flat **Terrain QAPP Declination** Yes Conforms to MLM **OAPP Declination Date** (989) 673-5901 43.613572 **Site Telephone Audit Latitude** 1821 E. Dickerson Rd. -83.359869 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 202 Tuscola County **Audit Declination** Unionville, MI City, State **Present** Fire Extinguisher 48767 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 clean and in good condition. Shelter Clean **✓** Notes Site OK From Saginaw MI, take route 81 east through Caro. About 2.9 miles past the junction of SR24 and 81, turn left **Driving Directions** (north) on Colwood. There is a large church at that intersection. Continue on Colwood for about 6 miles to the

intersection of Dickerson road. Turn left (west) at the stop sign. The site is on the right (north) side on the road

behind the first farmhouse, where Fred Matt, the landowner resides.

F-02058-1500-S2-rev002

Site ID UVL124 Technician Sandy Grenville Site Visit Date 09/12/2018

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	30 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>~</b>

Siting Distances OK

**Siting Criteria Comment** 

The site is located in an active agriculture field usually planted with beans or corn.

Fie	eld Sy	stems Data Fo	orm				F-02058-1	500-S3-rev002
Site	e ID	UVL124	Technician	Sandy Grenville		Site Visit Date 09/	12/2018	
1		d speed and direction fluenced by obstruction		as to avoid	<b>✓</b>	N/A		
2	(i.e. wind horizont	d sensors mounted so d sensors should be me ally extended boom > to the prevailing wind	ounted atop the 2x the max diam	tower or on a	<b>✓</b>	N/A		
3	Are the	tower and sensors plu	mb?		<b>✓</b>	N/A		
4		temperature shields po diated heat sources su	-		<b>✓</b>			
5	condition surface	perature and RH sens ns? (i.e. ground below and not steeply sloped gwater should be avoic	sensors should l . Ridges, hollows	be natural	<b>V</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 or	reflected	<b>✓</b>	N/A		
8	Is the ra	in gauge plumb?			<b>✓</b>	N/A		
9	Is it sited towers, o	d to avoid sheltering e	ffects from build	lings, trees,	<b>~</b>	N/A		
10	Is the su	rface wetness sensor s	ited with the gri	d surface	✓	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?

Fie	Field Systems Data Form													F-020	58-15	500-	<b>S4-r</b> 6	ev002
Site	ID		UVL1	24			Tech	nician	Sandy	y Grenville	)		Site Visit Date 09/	12/2018				
1			e mete					r to be	intact	t, in good	✓	T	emperature only					
2			he met g data		ogical	sense	ors ope	rationa	ıl onlir	ne, and	✓	T	emperature only					
3	Are	e the	shields	for t	he ten	npera	ture an	d RH	sensor	s clean?	<b>✓</b>							
4	Are	e the	aspira	ted m	otors	work	ing?				✓	N.	//A					
5		he so atche		liatio	n sens	or's l	ens clea	ın and	free of	Ē	<b>✓</b>	N	/A					
6	Is the	he su	rface v	vetne	ss sens	sor gi	id clea	n and ı	ındam	aged?	✓	N	/A					
7			sensor n, and				r cable ?	s intact	t, in go	ood	<b>✓</b>							
8							r cable intaine		ctions	protected	<b>✓</b>							
										ch if neces		7) <b>r</b> o	egarding conditions	listed abo	ve, or a	ny oth	er featu	ires,
Met to	ower	r remo	oved ar	nd tem	nperati	ure mo	ounted i	n natur	ally as	pirated sh	ield or	on s	sample tower.					
6 7 8 Provinatur	Are con Are from	atche the su e the s dition e the s m the any ac	s? rface v sensor n, and sensor e eleme ddition n-mad	signa well 1 signa ents an	ss sens al and mainta al and nd we plana at may	powe ained powe ll mai	rid clear cable? r cable intained	n and use intact connected?	undam t, in go ctions r sketc ing pa	naged? ood protected ch if neces rameters	✓ I ✓ ssary)	N. N. ro	/A egarding conditions	listed abo	ve, or a	ny oth	er featu	ures,

### Field Systems Data Form F-02058-1500-S5-rev002 UVL124 Technician Sandy Grenville Site Visit Date 09/12/2018 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:

F-02058-1500-S6-rev002

Site	e ID	UVL124		Technician	Sandy Grenville		Site Visi	it Date 09/12/20	18	
	DAS co	maan tuanalata	na and n	orinhoral aqui	pment operation	ng or	nd maintana	nao		
	DAS, SE	<u>ensor transiato</u>	<u>18, anu p</u>	<u>eripheral equi</u>	pment operation	<u> 18 ai</u>	<u>iu mamiena.</u>	<u>nce</u>		
1		DAS instrumen intained?	nts appea	ar to be in good	l condition and	<b>✓</b>				
2		the component , backup, etc)	ts of the	DAS operation	al? (printers,	✓				
3		analyzer and so		nal leads pass	through	<b>✓</b>	Met sensors	only		
4		signal connect intained?	tions pro	tected from the	e weather and	<b>✓</b>				
5	Are the	signal leads co	onnected	to the correct	DAS channel?	<b>✓</b>				
6	Are the ground		ranslato	rs, and shelter	properly	<b>✓</b>				
7	Does th	e instrument s	helter ha	ve a stable pov	ver source?	<b>✓</b>				
8	Is the in	nstrument shel	ter temp	erature contro	lled?	<b>✓</b>				
9	Is the m	net tower stable	e and gro	ounded?			Stable		Grounded	
			Ü							
10	Is the sa	ample tower st	able and	grounded?			<b>✓</b>			
11	Tower	comments?					Tower not gr	rounded		
					or sketch if nece ring parameter		y) regarding	g conditions liste	ed above, or a	any other features,

#### **Field Systems Data Form** UVL124 Technician Sandy Grenville Site Visit Date 09/12/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? Yes No N/A Yes N/A No **V V** Wind speed sensor **Data logger V V** Wind direction sensor **Data logger V** П **V** Temperature sensor Strip chart recorder **V V** Relative humidity sensor Computer **V** П **V** Modem Solar radiation sensor П П **V V** Surface wetness sensor **Printer** $\checkmark$ **V** Wind sensor translator Zero air pump **V Temperature translator V** Filter flow pump **V V Humidity sensor translator Surge protector** П **V UPS V Solar radiation translator** П П **V V** Tipping bucket rain gauge Lightning protection device **V V** Ozone analyzer Shelter heater **V V** Shelter air conditioner Filter pack flow controller 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 V Site Ops Manual** Oct 2014 **V HASP V** Oct 2014 **Field Ops Manual Calibration Reports V** 4/3/2018 **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 **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,

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natural or man-made, that may affect the monitoring parameters: The ozone diagnostic and observation sections of the SSRF were completed during the filter removal visit and not the installation visit as

indicated on the form. This was noted during the previous audit visit.

### **Field Systems Data Form** F-02058-1500-S8-rev002 UVL124 Technician Sandy Grenville Site Visit Date 09/12/2018 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** 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? **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** Every 2 weeks **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? **✓** Logbook, call-in Are the automatic and manual z/s/p checks monitored 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:

Ozone sample train leak-check performed every two weeks.

reported? If yes, how?

### Field Systems Data Form F-02058-1500-S9-rev002 UVL124 Technician Sandy Grenville Site Visit Date 09/12/2018 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 With noted exceptions correctly? No longer required Are data downloads and backups being performed as scheduled? SSRF, logbook Are general observations being made and recorded? How? **✓** 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? **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 SSRF indicates that the ozone inlet filter is changed weekly rather than every two weeks as is performed.

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Site ID

UVL124

Technician Sandy Grenville

Site Visit Date 09/12/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07012
DAS	Campbell	CR3000	2126	000347
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	0493002467	02973
Flow Rate	Apex	AXMC105LPMDPC	illegible	000600
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0808339409	06466
Ozone	ThermoElectron Inc	49i A1NAA	1030244792	000680
Ozone Standard	ThermoElectron Inc	49i A3NAA	0726124686	000362
Sample Tower	Aluma Tower	A	none	03557
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	14624	06504
Zero air pump	Werther International	C 70/4	000829169	06936

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
CT	H110-Eric H	lebert-09/25/2018				
1	9/25/2018	Computer	Dell	07044	Inspiron 15	Unknown
2	9/25/2018	DAS	Campbell	000415	CR3000	2510
3	9/25/2018	Elevation	Elevation	None	1	None
4	9/25/2018	Filter pack flow pump	Thomas	02664	107CA18	1092135217
5	9/25/2018	Flow Rate	Apex	000557	AXMC105LPMDPCV	unknown
6	9/25/2018	Infrastructure	Infrastructure	none	none	none
7	9/25/2018	Modem	Raven	06599	V4221-V	0844349892
8	9/25/2018	Ozone	ThermoElectron Inc	000735	49i A1NAA	1105347308
9	9/25/2018	Ozone Standard	ThermoElectron Inc	000447	49i A3NAA	CM08200023
10	9/25/2018	Sample Tower	Aluma Tower	666363	В	AT-5107-E-4-10
11	9/25/2018	Shelter Temperature	Campbell	none	107-L	none
12	9/25/2018	Shield (10 meter)	RM Young	none	unknown	none
13	9/25/2018	Siting Criteria	Siting Criteria	None	1	None
14	9/25/2018	Temperature	RM Young	06301	41342	12540
15	9/25/2018	Zero air pump	Werther International	06864	PC70/4	000815261

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2510 CTH110 Eric Hebert 09/25/2018 DAS Primary Das Date: 9 /26/2018 **Audit Date** 9 /26/2018 Datel Parameter DAS Mfg 14:46:00 Das Time: 14:46:00 **Audit Time** Tfer Desc. Source generator (D 4000392 **Serial Number** Das Day: 269 **Audit Day** 269 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 0.0999 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 -0.0002 0.7000 0.6998 7 V V 0.9000 0.9000 0.8998 -0.00027 0.9998 V V -0.0002 1.0000 1.0000

## Flow Data Form

Mfg hpex		nknown	iber Ta	CTH110		chnician c Hebert	09/25/2018	Date Parar Flow F		Owner ID 000557
						Mfg	BIOS	] ]	Parameter Flo	w Rate
						Serial Number	122974	7	Tfer Desc. BIC	OS 220-H
							01416		Ter Beset	-
						Tfer ID	01416			
						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	
A Avg % Diff:	A Max	x % Di	A Avg %	Dif A Max	% Di	Cal Factor F	ull Scale	(	).9	
2.17%		2.60%				Rotometer R	eading:	1.	55	
Desc.	Te	st type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignall	PctDifference
primary	pump		0.000	0.000	-0.02	0.000	-0.01	l/m	l/m	
primary	leak c		0.000	0.000	0.05	0.000	0.04	1/m	1/m	
primary	test pt		1.538	1.530	1.66	0.000	1.50	1/m	1/m	-1.96%
primary	test pt		1.538	1.530	1.66	0.000	1.50	1/m	1/m	-1.96%
primary	test pt		1.541	1.540	1.66	0.000	1.50	1/m	1/m	-2.60%
Sensor Comp	onent	Leak Tes	t		Conditio	n		Statu	pass	
Sensor Comp	onent	Tubing C	ondition		Conditio	n Good		Statu	s pass	
Sensor Compo	onent	Filter Pos	sition		Conditio	n Good		Statu	spass	
Sensor Comp	onent	Rotomete	er Condition	1	Conditio	n Clean and dry		Statu	s pass	
Sensor Comp	onent	Moisture	Present		Conditio	n No moisture p	resent	Statu	pass	
Sensor Compo	onent	Filter Dist	tance		Conditio	<b>n</b> 3.0 cm		Statu	pass	
Sensor Comp	onent	Filter Dep	oth		Conditio	n 5.5 cm		Statu	pass	
Sensor Comp	onent	Filter Azir	muth		Conditio	n 180 deg		Statu	pass	
	onont	System M	/lemo		Conditio	n		Statu	pass	

## **Ozone Data Form**

Mfg		Serial Number	er Ta	Site	Te	chnician	Site Visit Date	Paramo	eter	Owner II	D
ThermoElec	ctron Inc	1105347308		CTH110	Er	ic Hebert	09/25/2018	Ozone		000735	
Slope: Intercept CorrCoff	(		e: [ rcept [ rCoff [	0.0000 0.0000 0.0000	00	Mfg Serial Number	ThermoElectron 1180930075			ozone Ozone primary	∕ stan
		Max % Di A	AS 2: Avg %	Dif A Max	% Di	Tfer ID Slope Cert Date	01115 1.0032 9/14/201		rcept rCoff	0.07	
	0%	0.0%						l e			
UseDescr		ConcGroup			fer Corr	Site	Site Unit	RelPer	Dif	AbsDif	
prima prima	-	2		3.18	0.02	0.21	ppb ppb			0.19	
prima	-	3		.52	34.33	34.59	ppb		0.75	0.71	
prima	-	4	70	).74	70.44	69.12	ppb		-1.89		
prima	-	5		2.55	112.11	109.90	ppb		-1.99		
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	ondition	າ	Condition	Clean		Status	pass		
Sensor C	ompone	nt Battery Bac	kup		Condition	on N/A		Status	pass		
Sensor C	ompone	nt Offset			Condition	Not tested		Status	pass		
Sensor C	ompone	nt Span			Condition	Not tested		Status	pass		
Sensor C	ompone	nt Zero Voltag	е		Condition	on N/A		Status	pass		
Sensor C	ompone	nt Fullscale Vo	ltage		Condition	on N/A		Status	pass		
Sensor C	ompone	nt Cell A Freq.			Condition	101.7 kHz		Status	pass		
Sensor C	ompone	nt Cell A Noise	)		Condition	1.8 ppb		Status	pass		
Sensor C	ompone	nt Cell A Flow			Condition	0.58 lpm		Status	pass		
Sensor C	ompone	nt Cell A Press	sure		Condition	688.4 mmHg		Status	pass		
Sensor C	ompone	nt Cell A Tmp.			Condition	29.0 C		Status	pass		
Sensor C	ompone	nt Cell B Freq.			Condition	102.2 kHz		Status	pass		
Sensor C	ompone	nt Cell B Noise	)		_	1.7 ppb		Status	pass		
	_	nt Cell B Flow			_	0.72 lpm		Status	pass		
Sensor C	ompone	nt Cell B Press	sure		Condition	689.0 mmHg		Status			
Sensor C	ompone	nt Cell B Tmp.			Condition			Status			
		nt Line Loss			Condition	Not tested		Status	pass		
Sensor C	ompone	nt System Mer	no		Condition	on		Status	pass		

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg RM Young 12540 CTH110 Eric Hebert Temperature 06301 09/25/2018 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 0.08 0.13 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range -0.04 0.05 0.000 0.1 C 0.08 C Temp Mid Range 21.71 21.64 0.000 21.7 0.02 primary 49.47 49.3 C primary Temp High Range 49.75 0.000 -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** CTH110 Shelter Temperature Campbell Eric Hebert 09/25/2018 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** 1.13 1.42 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	23.86	23.77	0.000	24.8	C	1.05
primary	Temp Mid Range	23.30	23.22	0.000	24.6	С	1.42
primary	Temp Mid Range	23.61	23.52	0.000	24.5	C	0.93
Sensor Component System Memo Condition Status pass							

### **Infrastructure Data For**

Site ID	CTH110	Technician Eric	Hebert	<b>Site Visit Date</b>	09/25/2018	
SEX SMESS				SUSPENSION STATES		
CIL. IA.	N # 1 1 2	CL .14 Mr. J.1	CL II	CO.		

Shelter Make	Shelter Model	Shelter Size
Ekto	8810 (s/n 2116-6)	640 cuft

<b>Sensor Component</b>	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	Fair	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 Data Form F-02058-1500-S1-rev002 Technician Eric Hebert Site Visit Date 09/25/2018 CTH110 Site ID Mecklenburg **USGS Map EPA** Site Sponsor (agency) Map Scale IES **Operating Group Map Date** 36-109-9991 AQS# R.M. Young **Meteorological Type** Air Pollutant Analyzer Ozone, ammonia **QAPP** Latitude 42.4010 -76.6535 dry, wet **QAPP** Longitude **Deposition Measurement** 515 **Land Use** woodland - mixed **QAPP Elevation Meters** 12.3 Terrain rolling **QAPP Declination** No 12/28/2004 Conforms to MLM **OAPP Declination Date** (607) 564-7622 42.400875 **Site Telephone Audit Latitude** CR 136 (Connecticut Hill Road) -76.653516 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 511 -12.0 Tompkins County **Audit Declination** Newfield, NY City, State **Present** Fire Extinguisher 14867 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 2116-6) Ekto **Shelter Size** 640 cuft The condition of the shelter walls are beginning to deteriorate. Shelter Clean **✓** Notes Site OK From Ithaca take route 13 south to hwy 327. Bear right onto hwy 327 and go past both the lower and upper **Driving Directions**

entrances for Robert Treman St Park. Turn left at the second left past the upper entrance to the park onto Trumbell Corners Road. Continue on Trumbell Corners Rd for approximately one mile to the stop sign. Turn right at the stop onto Connecticut Hill Road and continue for approximately 1/4 mile where it veers to the right. The site is up the hill

on the left just after the turn in the road.

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Site ID CTH110 Technician Eric Hebert Site Visit Date 09/25/2018

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	30 m	
Obstacles to wind	10 times obstacle height		✓

### Siting Distances OK

**Siting Criteria Comment** 

There is a point source north of Ithaca within 40 km of the site. The tree line is less than 50 m from the site. The siting is acceptable even with the noted exceptions. Trees and overgrowth have recently been removed from the site which has improved siting criteria.

### **Field Systems Data Form** F-02058-1500-S3-rev002 Site Visit Date 09/25/2018 Technician Eric Hebert Site ID CTH110 ✓ 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 East 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 facing north? ✓ N/A 11 Is it inclined approximately 30 degrees?

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

The temperature sensor is mounted on the east leg of the sample tower.

Fie	eld Systems Data Form	F-02058-1500-S4-rev002	
Site	ID CTH110 Technician Eric Hebert		Site Visit Date 09/25/2018
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?	✓	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 CTH110 Technician | Eric Hebert Site Visit Date 09/25/2018 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:

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Site	e ID	CTH110	Technician	Eric Hebert		Site Visit Date	09/25/2018				
	DAS, sensor translators, and peripheral equipment operations and maintenance										
1		OAS instruments appe intained?	ar to be in good	d condition and	<b>✓</b>						
2		the 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 intained?	tected 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 translato	rs, and shelter	properly	<b>✓</b>						
7	Does the	e instrument shelter ha	ave a stable pov	wer source?	<b>✓</b>						
8	Is the in	strument shelter temp	erature contro	lled?	<b>✓</b>						
9	Is the m	et tower stable and gr	ounded?			Stable	Gro	unded			
10	Is the sa	ample tower stable and	grounded?				[	<b>✓</b>			
11	Tower c	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 meteorological tower has been removed and the temperature sensor has been moved to the east leg of the sample tower at 10 meters above the ground. The shield has been changed from aspirated to naturally aspirated.

#### **Field Systems Data Form** F-02058-1500-S7-rev002 CTH110 Technician | Eric Hebert Site Visit Date 09/25/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No N/A Yes No N/A Yes **V** Wind speed sensor **Data logger V** Wind direction sensor **V Data logger V 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 ~ Humidity sensor translator Surge protector ✓** П П **~ UPS Solar radiation translator ~ V** Tipping bucket rain gauge Lightning protection device ~ $\checkmark$ **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 V SSRF ✓ V ✓ Site Ops Manual** Oct 2001 **V HASP V** Oct 2015 **✓ V Field Ops Manual** Oct 2015 **Calibration Reports V 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 CTH110 Technician Eric Hebert Site Visit Date 09/25/2018 Site ID Site operation procedures Trained at ESE 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 **~** 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? **OC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** Manual Zero/Span Tests **V ✓** Daily **Automatic Precision Level Tests V V Manual Precision Level Test ✓ V** Weekly **Analyzer Diagnostics Tests V** Every 2 weeks **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?

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

The ozone inlet filter is replaced and a Z/S/P is performed 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?

Field Systems Data Form						F-02058-1500-S9-rev00				
Site	e ID	CTH110 Tec	hnicia	n Eric Hebert		Site Visit Date	09/25/2018	]		
	_	ration procedures				<b>-</b>				
1	Is the fil	ter pack being changed ever	y Tues	sday as scheduled	<b>Y</b>	Filter changed after	noons			
2	Are the correctl	Site Status Report Forms be y?	ing coi	mpleted and filed	<b>✓</b>					
3	Are data	a downloads and backups be ed?	ng pe	rformed as		No longer required				
4	Are gen	eral observations being made	and 1	recorded? How?	<b>✓</b>	SSRF				
5	Are site	supplies on-hand and replen	ished i	in a timely	<b>✓</b>					
6	Are sam	ple flow rates recorded? Ho	w?		<b>✓</b>	SSRF, call-in				
7	Are sam	ples sent to the lab on a regu	lar scl	hedule in a timely	<b>✓</b>					
8		ers protected from contamina oping? How?	tion d	uring handling	<b>✓</b>	Clean gloves on and	d off			
9		site conditions reported regu ons manager or staff?	larly t	to the field	<b>✓</b>					
QC	Check Po	erformed	Fı	requency			Compliant			
N	Multi-poi	nt MFC Calibrations	✓ Se	emiannually			✓			
I	Flow Syste	em Leak Checks	<b>✓</b> W	eekly			$\checkmark$			
I	Filter Pac	k Inspection								
I	Flow Rate	<b>Setting Checks</b>	<b>✓</b> W	eekly			$\checkmark$			
7	Visual Ch	eck of Flow Rate Rotometer	<b>✓</b> W	eekly			$\checkmark$			
I	n-line Fil	ter Inspection/Replacement	<b>✓</b> Se	emiannually			$\checkmark$			
5	Sample Li	ne Check for Dirt/Water	<b>✓</b> W	eekly			$\checkmark$			
		dditional explanation (photo n-made, that may affect the				y) regarding conditi	ons listed above, or a	ny other features,		

## F-02058-1500-S10-rev002

Site ID

CTH110

Technician Eric Hebert

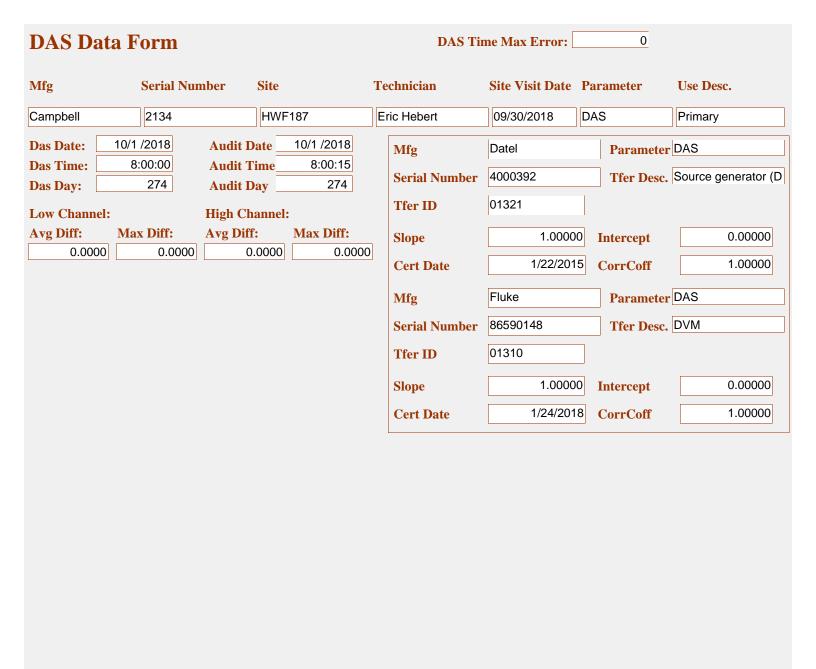
Site Visit Date 09/25/2018

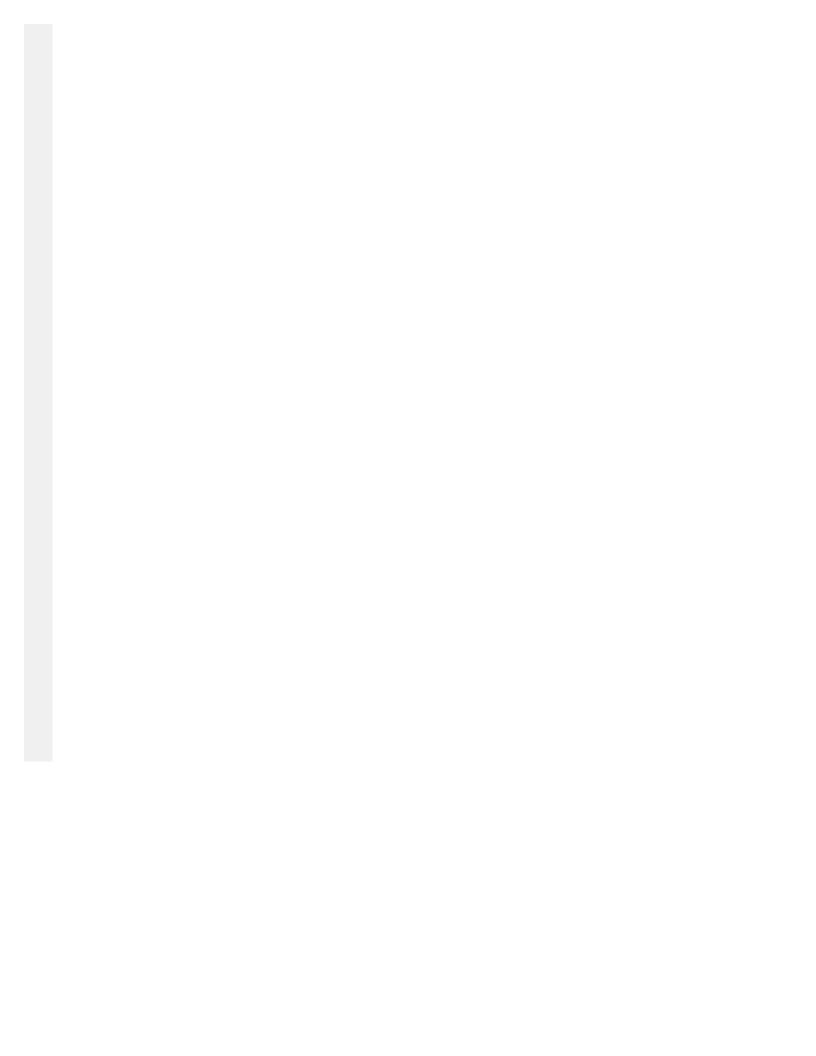
**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07044
DAS	Campbell	CR3000	2510	000415
Elevation	Elevation	<u> </u> 1	None	None
Filter pack flow pump	Thomas	107CA18	1092135217	02664
Flow Rate	Apex	AXMC105LPMDPC	unknown	000557
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0844349892	06599
Ozone	ThermoElectron Inc	49i A1NAA	1105347308	000735
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200023	000447
Sample Tower	Aluma Tower	В	AT-5107-E-4-10	666363
Shelter Temperature	Campbell	107-L	none	none
Shield (10 meter)	RM Young	unknown	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	12540	06301
Zero air pump	Werther International	PC70/4	000815261	06864

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
HW	F187-Eric I	Hebert-09/30/2018				
1	9/30/2018	Computer	Dell	07034	Inspiron 15	Unknown
2	9/30/2018	DAS	Campbell	000356	CR3000	2134
3	9/30/2018	Elevation	Elevation	None	1	None
4	9/30/2018	Filter pack flow pump	Thomas	02358	illegible	illegible
5	9/30/2018	Flow Rate	Apex	000592	AXMC105LPMDPCV	illegible
6	9/30/2018	Infrastructure	Infrastructure	none	none	none
7	9/30/2018	Modem	Raven	06807	H4223-C	0934393748
8	9/30/2018	Ozone	ThermoElectron Inc	000700	49i A1NAA	1030244793
9	9/30/2018	Ozone Standard	ThermoElectron Inc	000445	49i A3NAA	CM08200021
10	9/30/2018	Sample Tower	Aluma Tower	illegible	В	AT-5107-E-4-12
11	9/30/2018	Shelter Temperature	Campbell	none	107-L	unknown
12	9/30/2018	Siting Criteria	Siting Criteria	None	1	None
13	9/30/2018	Temperature	RM Young	06503	41342	14623
14	9/30/2018	Zero air pump	Werther International	06931	C 70/4	000836212
15	9/30/2018	Zero air pump	Teledyne	000772	701H	608





## Flow Data Form

Ifg	Serial Nun	nber Ta S	ite	Tec	hnician	Site Visit D	ate Paran	neter	Owner ID
pex	illegible		HWF187	Eric	Hebert	09/30/2018	Flow F	Rate	000592
				]	Mfg	BIOS	P	arameter Fl	ow Rate
					Serial Number	122974	T	fer Desc. Bl	OS 220-H
				,	Tfer ID	01416			
					01	4	00178 <b>Int</b>	, [	0.00161
					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 %I	Dif A Max	% <b>Di</b>	Cal Factor F	ull Scale	0.9	96	
3.23%	3.23%				Rotometer R	eading:	1	.6	
Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSigna	II PctDifference
primary	pump off	0.000	0.000	0.00	0.000	0.00	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	1.557	1.550	1.56	0.000	1.50	1/m	l/m	-3.23%
primary	test pt 2	1.559	1.550	1.55	0.000	1.50	1/m	l/m	-3.23%
primary	test pt 3	1.558	1.550	1.56	0.000	1.50	1/m	l/m	-3.23%
Sensor Compo	nent Leak Tes	st		Condition	1		Status	pass	
Sensor Compo	nent Tubing C	ondition		Condition	Good		Status	pass	
Sensor Compo	onent Filter Pos	sition		Condition	Good		Status	pass	
Sensor Compo	nent Rotomete	er Condition		Condition	Clean and dry		Status	pass	
Sensor Compo	onent Moisture	Present		Condition	See comments	3	Status	pass	
Sensor Compo	onent Filter Dis	tance		Condition	6.5 cm		Status	pass	
Sensor Compo	onent Filter Dep	oth		Condition	3.0 cm		Status	pass	
Sensor Compo	onent Filter Azi	muth		Condition	270 deg		Status	pass	
Songon Compa	onent System N	Memo		Condition	1		Status	pass	

## **Ozone Data Form**

Mfg	Serial Numbe	er Ta Site	Te	chnician	Site Visit Date	Parame	eter	Owner ID	
ThermoElectron Inc	1030244793	HWF18	7 Er	ic Hebert	09/30/2018	Ozone		000700	
Intercept 0.		rcept	0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180930075 01115			ozone  Ozone primary st	tan
DAS 1: A Avg % Diff: A Ma		AS 2: Avg %Dif A	Max % Di	Slope Cert Date	1.0032 9/14/20		•	0.0716	_
•	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPer	Dif	AbsDif	
primary primary	2	-0.45 13.10	-0.51 12.98	-0.13 12.88	ppb ppb			-0.1	
primary	3	34.61	34.42	33.53	ppb		-2.62	0.1	
primary	4	67.21	66.92	64.83	ppb		-3.17		
primary	5	110.12	109.69	105.80	ppb		-3.61		
Sensor Component	Sample Tra	in	Condition	Good		Status	pass		
Sensor Component	22.5 degree	rule	Condition	on		Status	pass		
Sensor Component	Inlet Filter C	ondition	Condition	Clean		Status	pass		
Sensor Component	Battery Bac	kup	Condition	N/A		Status	pass		
Sensor Component	Offset		Condition	on 0.10		Status	pass		
Sensor Component	Span		Condition	on 0.983		Status	pass		
Sensor Component	Zero Voltag	е	Condition	on N/A		Status	pass		
Sensor Component	Fullscale Vo	ltage	Condition	on N/A		Status	pass		
Sensor Component	Cell A Freq.		Condition	94.3 kHz		Status	pass		
Sensor Component	Cell A Noise	)	Condition	Not tested		Status	pass		
Sensor Component	Cell A Flow		Condition	0.62 lpm		Status	pass		
Sensor Component	Cell A Press	sure	Condition	710.0 mmHg		Status	pass		
Sensor Component	Cell A Tmp.		Condition	38.7 C		Status	pass		
Sensor Component	Cell B Freq.		Condition	93.1 kHz		Status	pass		
Sensor Component	Cell B Noise	)	Condition	Not tested		Status	pass		
Sensor Component	Cell B Flow		Condition	0.66 lpm		Status	pass		
Sensor Component	Cell B Press	sure	Condition	711.0 mmHg		Status	pass		
Sensor Component	Cell B Tmp.		Condition	on		Status	pass		
Sensor Component	Line Loss		Condition	Not tested		Status	pass		
Sensor Component	System Mer	no	Condition	on		Status	pass		

### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg RM Young 14623 HWF187 Eric Hebert 09/30/2018 Temperature 06503 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 0.09 0.18 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. -0.08 primary Temp Low Range 0.01 0.000 0.1 $\mathbf{C}$ 0.06 C Temp Mid Range 23.56 23.47 0.000 23.5 0.04 primary C primary Temp High Range 45.84 45.59 0.000 45.8 0.18 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** 09/30/2018 Shelter Temperature Campbell HWF187 Eric Hebert unknown 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** 0.32 0.42 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	28.17	28.05	0.000	27.8	C	-0.24	
primary	Temp Mid Range	28.44	28.32	0.000	28.0	C	-0.3	
primary	Temp Mid Range	28.71	28.59	0.000	28.2	C	-0.42	
Sensor Component System Memo Condition Status pass								

### **Infrastructure Data For** HWF187 Technician Eric Hebert Site Visit Date 09/30/2018 Site ID **Shelter Make Shelter Model Shelter Size ESF** none 1630 cuft Sensor Component | Sample Tower Type Status pass **Condition** Type B 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

**Condition** Good

**Condition** Functioning

**Condition** Installed

**Condition** Poor

**Condition** Fair

**Condition** Fair

**Condition** Good

**Condition** Fair

**Condition** Good

**Condition** Good

Condition 3/8 teflon

**Status** pass

**Status** pass

**Status** pass

Status Fail

Status pass

Sensor Component | Power Cables

Sensor Component Rotometer

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

Sensor Component | Shelter Temp Control

### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 09/30/2018 Technician Eric Hebert HWF187 Site ID Newcomb **USGS Map EPA** Site Sponsor (agency) Map Scale SUNY/ESF **Operating Group Map Date** 36-031-9991 AQS# R.M. Young **Meteorological Type Air Pollutant Analyzer** Ozone, Hg **QAPP** Latitude 43.9732 dry, wet, Hg **QAPP** Longitude -74.2232 **Deposition Measurement** woodland - mixed 502 **Land Use QAPP Elevation Meters** complex 14.5 **Terrain QAPP Declination** 6/17/2004 No Conforms to MLM **OAPP Declination Date** (518) 582-4800 43.973044 **Site Telephone Audit Latitude** Adirondack Ecological Center -74.223317 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 497 -14 Essex County **Audit Declination** Newcomb, NY City, State **Present** Fire Extinguisher ✓ 12852 Inspected in Oct 2018 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 Secure Shelter** Backup Op. Phone # Stable Entry Step Backup Op. E-mail Shelter Working Room ✓ Make Model none ESF **Shelter Size** 1630 cuft **✓** Notes The shelter is in fair condition. **Shelter Clean ✓** Notes Site OK

From I-87 take exit 29 west to Newcomb. Continue through Newcomb (about 6 miles). Just west of town, turn right

(north) at the Adirondack Ecological Center. Continue past the building on the dirt road to the site.

**Driving Directions** 

F-02058-1500-S2-rev002

Site ID HWF187 Eric Hebert Site Visit Date 09/30/2018

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

Siting Distances OK 🔽

**Siting Criteria Comment** 

Trees are beginning to approach the limit for ozone inlet criteria. The conditions were discussed with the site operator.

Fie	eld Systems Data Form	F-02058-1500-S3-rev002
Site	Technician Eric Hebert	Site Visit Date 09/30/2018
1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	✓ N/A
2	Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind)	N/A
3	Are the tower and sensors plumb?	✓ N/A
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?	
5	Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)	
6	Is the solar radiation sensor plumb?	✓ N/A
7	Is it sited to avoid shading, or any artificial or reflected light?	N/A
8	Is the rain gauge plumb?	N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	N/A
10	Is the surface wetness sensor sited with the grid surface facing porth?	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 Data Form	F-02058-1500-S4-rev002				
Site	ID HWF187 Technician Eric Hebert		Site Visit Date 09/30/2018			
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?	<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 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 HWF187 Technician | Eric Hebert Site Visit Date 09/30/2018 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) **✓** 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:

## Field Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	HWF187	Technician	Eric Hebert		Site Vis	it Date 09/30/2	2018	
	DAS, se	nsor translators, and j	peripheral equip	oment operation	ns ar	nd maintena	<u>ince</u>		
1		OAS instruments appeintained?	ar to be in good	condition and	<b>✓</b>				
2	2 Are all the components of the DAS operational? (printers, modem, backup, etc)								
3	3 Do the analyzer and sensor signal leads pass through lightning protection circuitry?   ✓				<b>✓</b>	Met sensors	only		
4	4 Are the signal connections protected from the weather and well maintained?		<b>✓</b>						
5	Are the	signal leads connected	l to the correct I	DAS channel?	<b>✓</b>				
6	Are the grounde	DAS, sensor translatoed?	ors, and shelter p	oroperly	<b>✓</b>				
7	Does the	e instrument shelter h	ave a stable pow	ver source?	<b>✓</b>				
8	Is the in	strument shelter temp	oerature control	led?	<b>✓</b>				
9	Is the m	et tower stable and gr	ounded?			Stable		Grounded	
10	Is the sa	ample tower stable and	l grounded?					<b>✓</b>	
11	Tower o	comments?				Met Tower r	removed		
		additional explanatio nan-made, that may at				y) regardin	g conditions lis	sted above, or a	any other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 HWF187 Technician | Eric Hebert Site Visit Date 09/30/2018 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 ✓ SSRF ✓ V ✓ Site Ops Manual** Oct 2001 **V HASP ✓** Nov 2009 **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? ✓ 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 HWF187 Technician Eric Hebert Site Visit Date 09/30/2018 Site ID Site operation procedures Trained during site installation by ESE 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** 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** Every 2 weeks **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?

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

The ozone inlet filter is replaced and the sample train is leak tested every other week.

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				F-02058-1500-S9-rev002				
Site	e ID	HWF187 Te	chnic	eian Eric Hebert		Site Visit Date	09/30/2018			
	Site operation procedures									
1	Is the fi	lter pack being changed ever	y Tu	iesday as scheduled?	<b>~</b>	Filter changed morinings				
2 Are the Site Status Report Forms being completed and filed correctly?				<b>✓</b>						
3	Are dat	a downloads and backups beed?	ing j	performed as		No longer required				
4	Are gen	eral observations being mad	e an	d recorded? How?	<b>✓</b>	SSRF				
5	Are site	supplies on-hand and replet?	ishe	ed in a timely	<b>✓</b>					
6	Are san	nple flow rates recorded? Ho	w?		<b>✓</b>	SSRF, call-in				
7	Are san	nples sent to the lab on a reg	ılar	schedule in a timely	<b>✓</b>					
8		ers protected from contamin pping? How?	ation	during handling	<b>✓</b>	Clean gloves on and off				
9		site conditions reported regions manager or staff?	ılarl	y to the field	<b>✓</b>					
QC	Check P	erformed		Frequency			Compliant			
N	Multi-poi	nt MFC Calibrations	<b>✓</b>	Semiannually			✓			
I	Flow Syst	em Leak Checks	<b>✓</b>	Weekly			✓			
I	Filter Pac	k Inspection								
I	Flow Rate	e Setting Checks	<b>✓</b>	Weekly			✓			
7	Visual Ch	Check of Flow Rate Rotometer   ✓ Weekly					✓			
I	n-line Fil	ter Inspection/Replacement	<b>✓</b>	Semiannually			✓			
S	Sample L	ine Check for Dirt/Water	<b>✓</b>	Weekly			✓			
	Provide any additional explanation (photograph or sketch if necess natural or man-made, that may affect the monitoring parameters:					y) regarding conditi	ions listed above, or	any other features,		

## Field Systems Data Form

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

Site ID

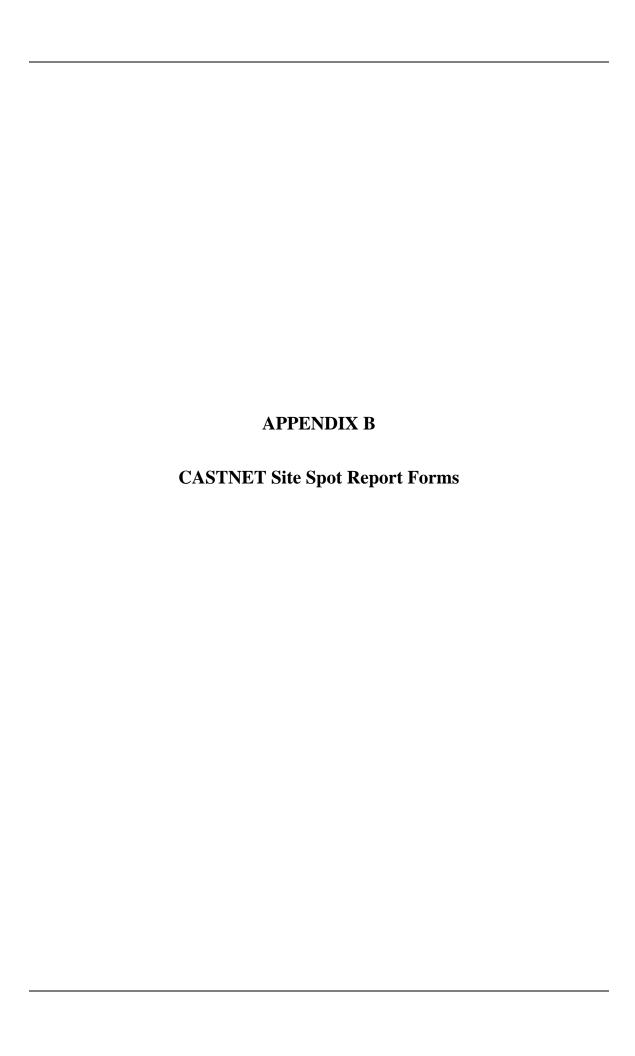
HWF187

Technician Eric Hebert

Site Visit Date 09/30/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07034
DAS	Campbell	CR3000	2134	000356
Elevation	Elevation	<u> </u> 1	None	None
Filter pack flow pump	Thomas	illegible	illegible	02358
Flow Rate	Apex	AXMC105LPMDPC	illegible	000592
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4223-C	0934393748	06807
Ozone	ThermoElectron Inc	49i A1NAA	1030244793	000700
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200021	000445
Sample Tower	Aluma Tower	В	AT-5107-E-4-12	illegible
Shelter Temperature	Campbell	107-L	unknown	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	14623	06503
Zero air pump	Teledyne	701H	608	000772
Zero air pump	Werther International	C 70/4	000836212	06931



**Data Compiled:** 12/4/2018 8:41:55 PM

SiteVisitDate Site Technician

09/10/2018 ANA115 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	9	0.13	c	P
2	Temperature max error	P	4	0.5	9	0.20	c	P
3	Ozone Slope	P	0	1.1	4	1.01785	unitless	P
4	Ozone Intercept	P	0	5	4	0.03993	ppb	P
5	Ozone correlation	P	0	0.995	4	1.00000	unitless	P
6	Ozone % difference avg	P	7	10	4	2.1	%	P
7	Ozone Absolute Difference g1	P	7	3	1	-0.09	ppb	P
8	Ozone Absolute Difference g2	P	7	1.5	1	0.36	ppb	P
9	Ozone % difference max	P	7	10	4	2.4	%	P
10	Flow Rate average % difference	P	10	5	4	1.53	%	P
11	Flow Rate max % difference	P	10	5	4	1.96	%	P
12	DAS Voltage average error	P	7	0.003	49	0.0002	V	P
13	Shelter Temperature average error	P	5	2	15	0.43	c	P
14	Shelter Temperature max error	P	5	2	15	0.53	c	P

SiteVisitDate	Site	Technician

09/10/2018

ANA115

Sandy Grenville

### **Field Systems Comments**

1 Parameter: DasComments

The met tower has been removed. The DAS controls the shelter heating and cooling.

2 Parameter: SiteOpsProcedures

The ozone inlet filter is changed and a Z/S/P is performed every two weeks.

3 Parameter: SitingCriteriaCom

Site is confined within a fenced area that is somewhat small. There is available space adjacent to the fenced area that could be utilized to improve the instrument siting.

4 Parameter: ShelterCleanNotes

The shelter is in fair condition, however somewhat cluttered.

**Data Compiled:** 12/3/2018 4:59:29 PM

SiteVisitDate Site Technician

08/18/2018 ARE128 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	15	0.36	c	P
2	Temperature max error	P	4	0.5	15	0.62	c	Fail
3	Ozone Slope	P	0	1.1	4	1.00136	unitless	P
4	Ozone Intercept	P	0	5	4	-0.47127	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
6	Ozone % difference avg	P	7	10	4	1.6	%	P
7	Ozone Absolute Difference g1	P	7	3	1	-0.25	ppb	P
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.52	ppb	P
9	Ozone % difference max	P	7	10	4	3.6	%	P
10	Flow Rate average % difference	P	10	5	8	3.85	%	P
11	Flow Rate max % difference	P	10	5	8	3.85	%	P
12	DAS Voltage average error	P	7	0.003	70	0.0001	V	P
13	Shelter Temperature average error	P	5	2	15	0.34	c	P
14	Shelter Temperature max error	P	5	2	15	0.36	c	P

SiteVisitDate	Site	Technician

08/18/2018

ARE128

Sandy Grenville

### **Field Systems Comments**

1 Parameter: SiteOpsProcComm

The site operator handles the filter caps with bare hands but handles the filter pack using the Ziploc filter bag.

2 Parameter: DasComments

The meteorological tower has been removed.

3 Parameter: SitingCriteriaCom

The site is located in an active orchard where spraying occurs. Fruit trees are rotated with corn and other crops.

4 Parameter: MetOpMaintCom

The 10-meter temperature sensor has been moved to a naturally aspirated shield on the sample tower. The temperature sensor was replaced the week before the audit and has not been calibrated onsite.

**Data Compiled:** 12/3/2018 9:02:58 AM

SiteVisitDate Site Technician

08/01/2018 CDR119 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.98984	unitless	P
2	Ozone Intercept	P	0	5	4	-0.45756	ppb	P
3	Ozone correlation	P	0	0.995	4	1.00000	unitless	P
4	Ozone % difference avg	P	7	10	4	2.6	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-0.29	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.69	ppb	P
7	Ozone % difference max	P	7	10	4	4.6	%	P

**Data Compiled:** 12/3/2018 1:55:49 PM

SiteVisitDate Site Technician

08/06/2018 CHC432 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	3.86	c	Fail
2	Temperature2meter max error	P	5	0.5	3	5.73	c	Fail
3	Wind Speed average error below 5m/s in m/s	P	3	0.5	4	0.05	m/s	P
4	Wind Speed max error below 5m/s in m/s	P	3	0.5	4	0.20	m/s	P
5	Wind Speed average % difference above 5 m/s	P	3	5	4	0.1	%	P
6	Wind Speed max % difference above 5 m/s	P	3	5	4	0.2	%	P
7	Wind Speed Torque average error	P	3	0.5	1	0.30	g-cm	P
8	Wind Speed Torque max error	P	3	0.5	1	0.3	g-cm	P
9	Wind Direction Input Deg True average error (de	P	2	5	4	2.0	degrees	P
10	Wind Direction Input Deg True max error (deg)	P	2	5	4	4	degrees	P
11	Wind Direction Linearity average error (deg)	P	2	5	8	1.0	degrees	P
12	Wind Direction Linearity max error (deg)	P	2	5	8	3	degrees	P
13	Wind Direction Torque average error	P	2	30	1	5	g-cm	P
14	Wind Direction Torque max error	P	2	30	1	5	g-cm	P
15	Relative Humidity average below 85%	P	6	10	2	3.1	%	P
16	Relative Humidity max below 85%	P	6	10	2	4.5	%	P
17	Solar Radiation % diff of avg	P	9	10	5	0.91	%	P
18	Solar Radiation % diff of max STD value	P	9	10	5	1.5	%	P
19	Precipitation average % difference	P	1	10	2	5.5	%	P
20	Precipitation max % difference	P	1	10	2	7.3	%	P
21	Ozone Slope	P	0	1.1	4	1.00902	unitless	P
22	Ozone Intercept	P	0	5	4	-0.06102	ppb	P
23	Ozone correlation	P	0	0.995	4	1.00000	unitless	P
24	Ozone % difference avg	P	7	10	4	0.7	%	P
25	Ozone Absolute Difference g1	P	7	3	1	0.05	ppb	P
26	Ozone Absolute Difference g2	P	7	1.5	1	-0.03	ppb	P
27	Ozone % difference max	P	7	10	4	0.9	%	P
28	DAS Voltage average error	P	9	0.003	14	0.0004	V	P
29	Shelter Temperature average error	P	5	2	6	3.34	c	Fail
30	Shelter Temperature max error	P	5	2	6	3.51	c	Fail

SiteVisitDate	Site	Technician
08/06/2018	CHC432	Martin Valvur

# **Field Systems Comments**

1 Parameter: SiteOpsProcComm

Dry deposition samples are not collected at this CASTNET site.

**Data Compiled:** 12/3/2018 9:18:37 AM

SiteVisitDate Site Technician

08/02/2018 CKT136 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.98748	unitless	P
2	Ozone Intercept	P	0	5	4	-0.32891	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
4	Ozone % difference avg	P	7	10	4	2.3	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-0.28	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.49	ppb	P
7	Ozone % difference max	P	7	10	4	3.3	%	P

**Data Compiled:** 12/4/2018 8:17:50 PM

SiteVisitDate Site Technician

08/30/2018 CNT169 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.03442	unitless	P
2	Ozone Intercept	P	0	5	4	-0.47485	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99997	unitless	P
4	Ozone % difference avg	P	7	10	4	1.8	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-0.08	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.08	ppb	P
7	Ozone % difference max	P	7	10	4	3.1	%	P

**Data Compiled:** 12/4/2018 10:16:25 PM

SiteVisitDate Site Technician

09/25/2018 CTH110 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.08	c	P
2	Temperature max error	P	4	0.5	6	0.13	c	P
3	Ozone Slope	P	0	1.1	4	0.97547	unitless	P
4	Ozone Intercept	P	0	5	4	0.59409	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99997	unitless	P
6	Ozone % difference avg	P	7	10	4	1.9	%	P
7	Ozone Absolute Difference g1	P	7	3	1	0.19	ppb	P
8	Ozone Absolute Difference g2	P	7	1.5	1	0.41	ppb	P
9	Ozone % difference max	P	7	10	4	3.1	%	P
10	Flow Rate average % difference	P	10	5	4	2.17	%	P
11	Flow Rate max % difference	P	10	5	4	2.6	%	P
12	DAS Voltage average error	P	7	0.003	56	0.0001	V	P
13	Shelter Temperature average error	P	5	2	15	1.13	c	P
14	Shelter Temperature max error	P	5	2	15	1.42	c	P

SiteVisitDate	Site	Technician

09/25/2018

CTH110

Eric Hebert

### **Field Systems Comments**

1 Parameter: DasComments

The meteorological tower has been removed and the temperature sensor has been moved to the east leg of the sample tower at 10 meters above the ground. The shield has been changed from aspirated to naturally aspirated.

2 Parameter: SiteOpsProcedures

The ozone inlet filter is replaced and a Z/S/P is performed every two weeks.

3 Parameter: SitingCriteriaCom

There is a point source north of Ithaca within 40 km of the site. The tree line is less than 50 m from the site. The siting is acceptable even with the noted exceptions. Trees and overgrowth have recently been removed from the site which has improved siting criteria.

4 Parameter: ShelterCleanNotes

The condition of the shelter walls are beginning to deteriorate.

5 Parameter: MetSensorComme

The temperature sensor is mounted on the east leg of the sample tower.

**Data Compiled:** 12/3/2018 8:31:29 AM

SiteVisitDate Site Technician

07/06/2018 GLR468 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.01182	unitless	P
2	Ozone Intercept	P	0	5	4	0.37141	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99997	unitless	P
4	Ozone % difference avg	P	7	10	4	1.8	%	P
5	Ozone Absolute Difference g1	P	7	3	1	0.64	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	0.18	ppb	P
7	Ozone % difference max	P	7	10	4	3.0	%	P

**Data Compiled:** 12/4/2018 9:38:31 PM

SiteVisitDate Site Technician

09/11/2018 HOX148 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.09	c	P
2	Temperature max error	P	4	0.5	6	0.12	c	P
3	Ozone Slope	P	0	1.1	4	1.01978	unitless	P
4	Ozone Intercept	P	0	5	4	-0.80351	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99996	unitless	P
6	Ozone % difference avg	P	7	10	4	1.8	%	P
7	Ozone Absolute Difference g1	P	7	3	1	-0.34	ppb	P
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.64	ppb	P
9	Ozone % difference max	P	7	10	4	4.2	%	P
10	Flow Rate average % difference	P	10	5	8	2.27	%	P
11	Flow Rate max % difference	P	10	5	8	2.74	%	P
12	DAS Voltage average error	P	7	0.003	63	0.0001	V	P
13	Shelter Temperature average error	P	5	2	15	0.46	c	P
14	Shelter Temperature max error	P	5	2	15	0.58	c	P

SiteVisitDate S	Site	Technician
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09/11/2018

HOX148

Sandy Grenville

### **Field Systems Comments**

1 Parameter: SiteOpsProcedures

The ozone analyzer sample inlet filter is replaced and a Z/S/P check is performed every two weeks.

2 Parameter: SitingCriteriaCom

There is a co-generating and smelting facility in Cadillac approximately 30 km to the northeast. The site is located in a hay field which is cut 2 or 3 times per year.

3 Parameter: ShelterCleanNotes

The lower section of the shelter walls are beginning to rot and show mold.

4 Parameter: MetSensorComme

Met tower removed and temperature installed in naturally aspirated shield on the west leg of the sample tower.

5 Parameter: MetOpMaintCom

Upon arrival the temperature sensor was found outside of the shield and exposed to direct sunlight. It was secured following the audit. Temperature data should be considered suspect from the previous site visit until after the audit. The signal cables are showing signs of wear with the outer insulation missing in a few places.

**Data Compiled:** 12/4/2018 10:43:39 PM

SiteVisitDate Site Technician

09/30/2018 HWF187 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	15	0.09	c	P
2	Temperature max error	P	4	0.5	15	0.18	c	P
3	Ozone Slope	P	0	1.1	4	0.96137	unitless	P
4	Ozone Intercept	P	0	5	4	0.40858	ppb	P
5	Ozone correlation	P	0	0.995	4	1.00000	unitless	P
6	Ozone % difference avg	P	7	10	4	2.5	%	P
7	Ozone Absolute Difference g1	P	7	3	1	0.38	ppb	P
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.1	ppb	P
9	Ozone % difference max	P	7	10	4	3.5	%	P
10	Flow Rate average % difference	P	10	5	4	3.23	%	P
11	Flow Rate max % difference	P	10	5	4	3.23	%	P
12	Shelter Temperature average error	P	5	2	18	0.32	c	P
13	Shelter Temperature max error	P	5	2	18	0.42	c	P

SiteVisitDate Site Te	echnician
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09/30/2018

HWF187

Eric Hebert

### **Field Performance Comments**

1 Parameter: Flow Rate SensorComponent: Moisture Present CommentCode 72

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

## **Field Systems Comments**

1 Parameter: SiteOpsProcedures

The ozone inlet filter is replaced and the sample train is leak tested every other week.

2 Parameter: SitingCriteriaCom

Trees are beginning to approach the limit for ozone inlet criteria. The conditions were discussed with the site operator.

3 Parameter: ShelterCleanNotes

The shelter is in fair condition.

**Data Compiled:** 12/3/2018 6:03:45 PM

SiteVisitDate Site Technician

08/21/2018 KEF112 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	15	0.08	c	P
2	Temperature max error	P	4	0.5	15	0.17	c	P
3	Ozone Slope	P	0	1.1	4	0.98924	unitless	P
4	Ozone Intercept	P	0	5	4	-0.64896	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99998	unitless	P
6	Ozone % difference avg	P	7	10	4	3.3	%	P
7	Ozone Absolute Difference g1	P	7	3	1	-0.36	ppb	P
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.84	ppb	P
9	Ozone % difference max	P	7	10	4	5.8	%	P
10	Flow Rate average % difference	P	10	5	6	2.39	%	P
11	Flow Rate max % difference	P	10	5	6	2.61	%	P
12	DAS Voltage average error	P	7	0.003	63	0.0000	V	P
13	Shelter Temperature average error	P	5	2	15	0.32	c	P
14	Shelter Temperature max error	P	5	2	15	0.54	c	P

08/21/2018

KEF112

Sandy Grenville

### **Field Systems Comments**

1 Parameter: SiteOpsProcedures

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

2 Parameter: SitingCriteriaCom

The site is in a clearing within the Kane Experimental Forest, the tree line is within 10 meters of the site.

3 Parameter: ShelterCleanNotes

The shelter is clean and very well organized. The floor has been replaced but the bottom of walls are beginning to deteriorate.

4 Parameter: PollAnalyzerCom

Trees to the east are within 10 meters of the ozone inlet and at the same height as the inlet.

5 Parameter: MetSensorComme

The sample tower is attached to the shelter and the temperature sensor is positioned directly over the metal roof of the shelter.

Data Compiled: 12/3

12/3/2018 12:46:01 PM

SiteVisitDate Site Technician

08/03/2018 MCK131 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.99623	unitless	P
2	Ozone Intercept	P	0	5	4	-0.77359	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	-0.79	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.94	ppb	P
7	Ozone % difference max	P	7	10	4	6.3	%	P

**Data Compiled:** 12/3/2018 12:41:03 PM

SiteVisitDate Site Technician

08/03/2018 MCK231 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.98809	unitless	P
2	Ozone Intercept	P	0	5	4	-0.56309	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
4	Ozone % difference avg	P	7	10	4	2.6	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-0.63	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.53	ppb	P
7	Ozone % difference max	P	7	10	4	3.6	%	P

**Data Compiled:** 12/3/2018 3:02:00 PM

SiteVisitDate Site Technician

08/07/2018 MEV405 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.28	c	P
2	Temperature2meter max error	P	5	0.5	3	0.38	c	P
3	Ozone Slope	P	0	1.1	4	0.98879	unitless	P
4	Ozone Intercept	P	0	5	4	-2.76421	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99885	unitless	P
6	Ozone % difference avg	P	7	10	4	14.6	%	Fail
7	Ozone Absolute Difference g1	P	7	3	1	0.26	ppb	P
8	Ozone Absolute Difference g2	P	7	1.5	1	-5.76	ppb	Fail
9	Ozone % difference max	P	7	10	4	39.5	%	Fail
10	Flow Rate average % difference	P	10	5	10	3.74	%	P
11	Flow Rate max % difference	P	10	5	10	3.8	%	P
12	DAS Voltage average error	P	12	0.003	35	0.0003	V	P
13	Shelter Temperature average error	P	5	2	18	0.77	c	P
14	Shelter Temperature max error	P	5	2	18	1.8	c	P

SiteVisitDate	Site	Technician

08/07/2018

MEV405

Martin Valvur

## **Field Systems Comments**

1 Parameter: SitingCriteriaCom

A large parking lot for park service employees is located approximately 30 meters north of the site.

2 Parameter: ShelterCleanNotes

The shelter is in good condition, clean, and organized.

3 Parameter: PollAnalyzerCom

There were fires in the area during the audit. There was a larger than normal pressure drop across the ozone sample inlet filter. Some tests were performed that indicated that nearly all ozone loss was due to the sample inlet filter and holder assembly.

**Data Compiled:** 12/6/2018 1:07:52 PM

SiteVisitDate Site Technician

08/20/2018 MKG113 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.14	c	P
2	Temperature max error	P	4	0.5	6	0.22	c	P
3	Ozone Slope	P	0	1.1	4	0.98818	unitless	P
4	Ozone Intercept	P	0	5	4	0.13975	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99998	unitless	P
6	Ozone % difference avg	P	7	10	4	1.1	%	P
7	Ozone Absolute Difference g1	P	7	3	1	0.47	ppb	P
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.12	ppb	P
9	Ozone % difference max	P	7	10	4	1.5	%	P
10	Flow Rate average % difference	P	10	5	4	0.88	%	P
11	Flow Rate max % difference	P	10	5	4	1.32	%	P
12	DAS Voltage average error	P	7	0.003	63	0.0001	V	P
13	Shelter Temperature average error	P	5	2	15	0.48	c	P
14	Shelter Temperature max error	P	5	2	15	0.70	c	P

08/20/2018

MKG113

Sandy Grenville

### **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.

2 Parameter: Flow Rate SensorComponent: Moisture Present CommentCode 204

There is moisture present in the dry deposition sample train inside the shelter.

### **Field Systems Comments**

1 Parameter: DasComments

The Met tower has been removed and the temperature sensor is now mounted on the sample tower in a naturally aspirated shield.

2 Parameter: ShelterCleanNotes

The shelter is clean and organized. Leak and rot below the air conditioner and on the floor under the counter. Mold increasing on walls and floor.

**Data Compiled:** 7/17/2018 10:37:29 AM

07/03/2018

SiteVisitDate Site Technician

Martin Valvur

### Records with valid pass/fail criteria

NPT006

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.25	c	P
2	Temperature max error	P	4	0.5	6	0.28	c	P
3	Ozone Slope	В	0	1.1	4	1.04884	unitless	P
4	Ozone Slope	P	0	1.1	4	1.04884	unitless	P
5	Ozone Intercept	P	0	5	4	-0.23783	ppb	P
6	Ozone Intercept	P	0	5	4	-0.23783	ppb	P
7	Ozone correlation	В	0	0.995	4	0.99999	unitless	P
8	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
9	Ozone % difference avg	P	7	10	4	4.5	%	P
10	Ozone % difference max	P	7	10	4	5.0	%	P
11	Flow Rate average % difference	P	10	5	2	1.66	%	P
12	Flow Rate max % difference	P	10	5	2	2.04	%	P
13	Shelter Temperature average error	P	5	2	6	0.37	c	P
14	Shelter Temperature max error	P	5	2	6	0.47	c	P

SiteVisitDate Site Technician

07/03/2018

NPT006

Martin Valvur

## **Field Systems Comments**

1 Parameter: SitingCriteriaCom

Site is located in wooded mountainous area.

**Data Compiled:** 12/3/2018 9:07:34 AM

SiteVisitDate Site Technician

08/01/2018 PAR107 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.99060	unitless	P
2	Ozone Intercept	P	0	5	4	-0.75436	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	-0.5	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-1.08	ppb	P
7	Ozone % difference max	P	7	10	4	7.3	%	P

**Data Compiled:** 12/3/2018 8:46:59 AM

SiteVisitDate Site Technician

07/30/2018 PED108 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.99518	unitless	P
2	Ozone Intercept	P	0	5	4	-0.86871	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99998	unitless	P
4	Ozone % difference avg	P	7	10	4	2.8	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-0.87	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.66	ppb	P
7	Ozone % difference max	P	7	10	4	4.3	%	P

**Data Compiled:** 12/3/2018 8:39:19 AM

SiteVisitDate Site Technician

07/23/2018 PND165 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.97782	unitless	P
2	Ozone Intercept	P	0	5	4	-0.04803	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99997	unitless	P
4	Ozone % difference avg	P	7	10	4	2.9	%	P
5	Ozone Absolute Difference g1	P	7	3	1	0.43	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.46	ppb	P
7	Ozone % difference max	P	7	10	4	3.6	%	P

**Data Compiled:** 12/4/2018 9:48:10 PM

SiteVisitDate Site Technician

09/17/2018 PRK134 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.01014	unitless	P
2	Ozone Intercept	P	0	5	4	-0.05475	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99998	unitless	P
4	Ozone % difference avg	P	7	10	4	0.8	%	P
5	Ozone Absolute Difference g1	P	7	3	1	0.09	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	0.14	ppb	P
7	Ozone % difference max	P	7	10	4	1.2	%	P

**Data Compiled:** 12/4/2018 10:59:07 AM

SiteVisitDate Site Technician

08/22/2018 PSU106 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	12	0.09	c	P
2	Temperature max error	P	4	0.5	12	0.14	c	P
3	Ozone Slope	P	0	1.1	4	0.97946	unitless	P
4	Ozone Intercept	P	0	5	4	-1.22536	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99981	unitless	P
6	Ozone % difference avg	P	7	10	4	5.7	%	P
7	Ozone Absolute Difference g1	P	7	3	1	-0.75	ppb	P
8	Ozone Absolute Difference g2	P	7	1.5	1	-1.13	ppb	P
9	Ozone % difference max	P	7	10	4	7.7	%	P
10	Flow Rate average % difference	P	10	5	2	2.8	%	P
11	Flow Rate max % difference	P	10	5	2	3.85	%	P
12	DAS Voltage average error	P	7	0.003	63	0.0001	V	P
13	Shelter Temperature average error	P	5	2	15	0.32	c	P
14	Shelter Temperature max error	P	5	2	15	0.44	c	P

08/22/2018

PSU106

Sandy Grenville

#### **Field Performance Comments**

1 Parameter: Flow Rate SensorComponent: Leak Test CommentCode 206

The flow rate leak test performed at the flow rate standard indicates that the filter pack quick-disconnect fitting is not properly sealing and leaking when a filter is installed.

#### **Field Systems Comments**

1 Parameter: SiteOpsProcComm

The site operator uses the filter bag as a glove when handling the filter pack.

2 Parameter: DasComments

The meteorological tower has been removed.

3 Parameter: SitingCriteriaCom

The site is within 10 km of State College which has a population of approximately 50,000. The site is located in a university agricultural research field.

4 Parameter: ShelterCleanNotes

The shelter is owned by the university and is clean and orderly. The site is part of the Surfrad network.

5 Parameter: PollAnalyzerCom

The zero air desiccant is saturated.

6 Parameter: MetOpMaintCom

The 10-meter temperature sensor is now mounted in a naturally aspirated shield on the sample tower.

**Data Compiled:** 12/4/2018 9:08:31 PM

SiteVisitDate Site Technician

09/12/2018 UVL124 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	15	0.04	c	P
2	Temperature max error	P	4	0.5	15	0.10	c	P
3	Ozone Slope	P	0	1.1	4	0.98778	unitless	P
4	Ozone Intercept	P	0	5	4	-0.12076	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99998	unitless	P
6	Ozone % difference avg	P	7	10	4	2.0	%	P
7	Ozone Absolute Difference g2	P	7	1.5	1	-0.45	ppb	P
8	Ozone % difference max	P	7	10	4	3.0	%	P
9	Flow Rate average % difference	P	10	5	4	25.74	%	Fail
10	Flow Rate max % difference	P	10	5	4	26.11	%	Fail
11	DAS Voltage average error	P	7	0.003	70	0.0001	V	P
12	Shelter Temperature average error	P	5	2	15	0.22	c	P
13	Shelter Temperature max error	P	5	2	15	0.42	c	P

09/12/2018

UVL124

Sandy Grenville

### **Field Systems Comments**

1 Parameter: SiteOpsProcComm

The SSRF indicates that the ozone inlet filter is changed weekly rather than every two weeks as is performed.

2 Parameter: DocumentationCo

The ozone diagnostic and observation sections of the SSRF were completed during the filter removal visit and not the installation visit as indicated on the form. This was noted during the previous audit visit.

3 Parameter: SiteOpsProcedures

Ozone sample train leak-check performed every two weeks.

4 Parameter: SitingCriteriaCom

The site is located in an active agriculture field usually planted with beans or corn.

5 Parameter: ShelterCleanNotes

The shelter is clean and in good condition.

6 Parameter: MetOpMaintCom

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

**Data Compiled:** 12/3/2018 8:55:34 AM

SiteVisitDate Site Technician

07/31/2018 VPI120 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.00707	unitless	P
2	Ozone Intercept	P	0	5	4	-0.63289	ppb	P
3	Ozone correlation	P	0	0.995	4	1.00000	unitless	P
4	Ozone % difference avg	P	7	10	4	1.1	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-0.72	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.41	ppb	P
7	Ozone % difference max	P	7	10	4	2.8	%	P

**Data Compiled:** 12/2/2018 3:13:22 PM

SiteVisitDate Site Technician

07/05/2018 YEL408 Martin Valvur

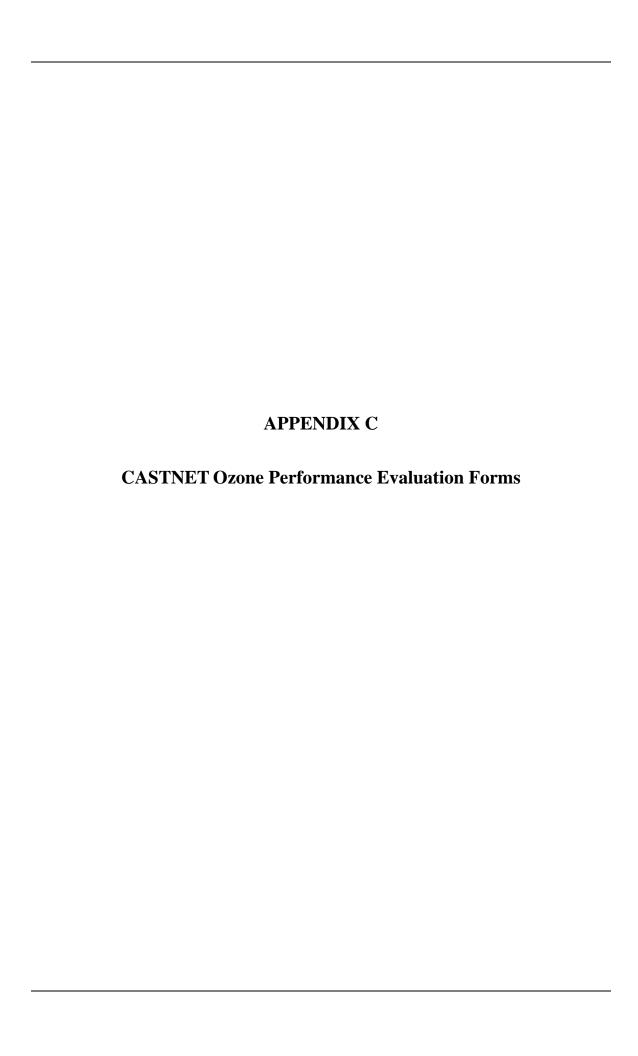
#### Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.09919	unitless	P
2	Ozone Intercept	P	0	5	4	-0.95554	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99997	unitless	P
4	Ozone % difference avg	P	7	10	4	6.7	%	P
5	Ozone Absolute Difference g1	P	7	3	1	-0.64	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	0.41	ppb	P
7	Ozone % difference max	P	7	10	4	9.3	%	P

### **Field Performance Comments**

1 Parameter: Ozone SensorComponent: Cell B Freq. CommentCode 99

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



Site V	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
YEL4	108-Martin	valvur-07/05/2018				
1	7/5/2018	DAS	Environmental Sys Corp	None	8832	A4888K
2	7/5/2018	Ozone	ThermoElectron Inc	none	49i A3NAA	1172090002
3	7/5/2018	Ozone Standard	ThermoElectron Inc	none	49i A1NAB	0926938297
4	7/5/2018	Zero air pump	Werther International	none	PC 70/4	000836215

Mfg	Serial Number	er Ta Site	7	<b>Technician</b>	Site Visit Date	Parameter	Owner ID
ThermoElectron	nc 1172090002	YEL40	8	Martin Valvur	07/05/2018	Ozone	none
Slope: Intercept CorrCoff		rcept	0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID	ThermoElectron 49CPS-70008- 01110		esc. Ozone primary stan
DAS 1: A Avg % Diff: A		AS 2: Avg %Dif A	A Max % Di	Slope	1.008	01 Intercept	-0.05199
0.0%	0.0%	Avg 70DII F	Niax 70 Di	Cert Date	9/11/20	17 CorrCoff	1.00000
UseDescription primary primary	ConcGroup  1 2	Tfer Raw 0.20 15.04	Tfer Corr 0.24 14.97	Site -0.40 15.38	Site Unit ppb ppb	RelPerDif	AbsDif -0.64 0.41
primary	3	34.98	34.75	37.30	ppb	7.08	
primary	5	65.00 109.01	64.53	69.41 118.30	ppb	7.29	
primary Sensor Compo	nent Sample Tra		<u> </u>	tion Good	ppb	Status pass	
_	nent 22.5 degree		Condi			Status pass	
_	nent Inlet Filter C			tion Clean		Status pass	
Sensor Compo	nent Battery Bac	kup		tion N/A		Status pass	
Sensor Compo	nent Offset			tion 0.7		Status pass	
Sensor Compo	nent Span			tion 1.002		Status pass	
Sensor Compo	nent Zero Voltag	е	Condi	tion N/A		Status pass	
Sensor Compo	nent Fullscale Vo	oltage	Condi	tion N/A		Status pass	
Sensor Compo	nent Cell A Freq		Condi	tion 75.5 kHz		Status pass	
Sensor Compo	nent Cell A Noise	Э	Condi	tion 0.9 ppb		Status pass	
Sensor Compo	nent Cell A Flow		Condi	tion 0.63 lpm		Status pass	
Sensor Compo	nent Cell A Pres	sure	Condi	tion 565.8 mmHg		Status pass	
Sensor Compo	nent Cell A Tmp.		Condi	tion 33.1 C		Status pass	
Sensor Compo	nent Cell B Freq		Condi	tion 56.2 kHz		Status Fail	
Sensor Compo	nent Cell B Noise	Э	Condi	tion 0.5 ppb		Status pass	
Sensor Compo	nent Cell B Flow		Condi	tion 0.66 lpm		Status pass	
Sensor Compo	nent Cell B Pres	sure	Condi	tion 565.2 mmHg		Status pass	
Sensor Compo	nent Cell B Tmp.		Condi	tion		Status pass	
Sensor Compo	nent Line Loss		Condi	tion Not tested		Status pass	
Sensor Compo	nent System Me	mo	Condi	tion See comment	s	Status pass	

### **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	d Problem
Ozone	YEL408	Martin Valvur	07/05/2018	Cell B Freq.	ThermoElectron	4436		<b>✓</b>

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

Site V	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
GLR4	468-Martii	ı Valvur-07/06/2018				
1	7/6/2018	DAS	Environmental Sys Corp	90647	8816	2560
2	7/6/2018	Ozone	ThermoElectron Inc	none	49i A3NAA	1023943901
3	7/6/2018	Ozone Standard	ThermoElectron Inc	none	49i A3NAA	0733726104
4	7/6/2018	Zero air pump	Werther International	none	PC70/4	000756725

Mfg	Serial Number	er Ta Site	Tec	chnician	Site Visit Date	Paramete	er Owner ID
ThermoElectron Inc	1023943901	GLR468	Ma	artin Valvur	07/06/2018	Ozone	none
Intercept CorrCoff CODAS 1: A Avg % Diff: A M	).99997 Cor	rcept C rCoff C AS 2:	0.00000 0.00000 0.00000 Max % Di	Mfg Serial Number Tfer ID Slope Cert Date	ThermoElectron 49CPS-70008-3 01110 1.008	364 Tfer	
0.0%	0.0%			Cert Date	3/11/20	Corre	1.00000
UseDescription primary primary primary	ConcGroup 1 2 3	Tfer Raw 0.20 15.04 34.48	Tfer Corr 0.24 14.97 34.25	Site 0.88 15.15 35.29	Site Unit ppb ppb ppb	RelPerD	0.64 0.18 2.99
primary	4	66.99	66.50	67.33	ppb		1.24
primary	5	110.10	109.27	111.10	ppb		1.66
Sensor Componer Sensor Componer			Condition Condition			Status P	
Sensor Componer	Inlet Filter C	ondition	Condition	Clean		<b>Status</b> p	pass
Sensor Componer	Battery Bac	kup	Condition	n N/A		Status P	pass
Sensor Componer	Offset		Condition	on -0.4		Status p	pass
Sensor Componer	Span		Condition	n 1.007		Status p	pass
Sensor Componer	Zero Voltag	9	Condition	on 0.000		<b>Status</b> P	pass
Sensor Componer	Fullscale Vo	ltage	Condition	on 0.9999		Status P	pass
Sensor Componer	Cell A Freq.		Condition	71.3 kHz		<b>Status</b> P	pass
Sensor Componer	cell A Noise	)	Condition	0.5 ppb		Status p	pass
Sensor Componer	Cell A Flow		Condition	0.57 lpm		Status P	pass
Sensor Componer	cell A Press	sure	Condition	672.6 mmHg		Status p	pass
Sensor Componer	Cell A Tmp.		Condition	38.3 C		Status P	pass
Sensor Componer	Cell B Freq.		Condition	62.3 kHz		Status p	pass
Sensor Componer	Cell B Noise	)	Condition	0.6 ppb		Status P	pass
Sensor Componer	Cell B Flow		Condition	0.56 lpm		<b>Status</b> p	pass
Sensor Componer	Cell B Press	sure	Condition	672.3 mmHg		Status P	pass
Sensor Componer	Cell B Tmp.		Condition	on		Status p	pass
Sensor Componer	Line Loss		Condition	Not tested		<b>Status</b> P	pass
Sensor Componer	System Mer	no	Condition	on		<b>Status</b> P	pass

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
PND	0165-Martii	n Valvur-07/23/2018				
1	7/23/2018	DAS	Campbell	000403	CR3000	2516
2	7/23/2018	Ozone	ThermoElectron Inc	000619	49i A1NAA	1009241791
3	7/23/2018	Ozone Standard	ThermoElectron Inc	000435	49i A3NAA	CM08200011
4	7/23/2018	Zero air pump	Werther International	06881	C 70/4	000815264

Mfg		Serial Number	er Ta Site	Т	echnician	Site Visit Date	Paramete	er Owner ID
ThermoElec	ctron Inc	1009241791	PND16	5	Martin Valvur	07/23/2018	Ozone	000619
Slope: Intercept CorrCoff DAS 1: A Avg % I	-(	).99997 Cor	rcept CrCoff C	0.00000 0.00000 0.00000 Max % Di	Mfg Serial Number Tfer ID Slope Cert Date	ThermoElectron 49CPS-70008-3 01110 1.0080 9/11/20	Tfer	
UseDescr		ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerD	if AbsDif
prima	_	1	0.11	0.16	0.59	ppb	Reif elb	0.43
prima		2	13.82	13.76	13.30	ppb		-0.46
prima	ry	3	37.52	37.27	35.94	ppb		3.63
prima	-	4	67.35	66.86	65.14	ppb		2.61
prima	-	5	115.90	115.03	112.70	ppb		2.05
Sensor C	ompone	Sample Tra	in 	Condit	ion Good		Status P	ass
Sensor C	ompone	22.5 degree	rule	Condit	ion		Status P	ass
Sensor C	ompone	Inlet Filter C	Condition	Condit	ion Clean		Status p	ass
Sensor C	ompone	Battery Bac	kup	Condit	ion N/A		Status p	ass
Sensor C	ompone	Offset		Condit	ion -0.6		Status P	ass
Sensor C	ompone	Span		Condit	ion 1.033		Status p	ass
Sensor C	ompone	Zero Voltag	е	Condit	ion N/A		<b>Status</b> P	ass
Sensor C	ompone	Fullscale Vo	oltage	Condit	ion N/A		<b>Status</b> p	ass
Sensor C	ompone	Cell A Freq.		Condit	ion 105.9 kHz		<b>Status</b> p	ass
Sensor C	ompone	Cell A Noise	9	Condit	ion 0.6 ppb		<b>Status</b> p	ass
Sensor C	ompone	Cell A Flow		Condit	ion 0.68 lpm		<b>Status</b> p	ass
Sensor C	ompone	Cell A Press	sure	Condit	ion 567.7 mmHg		Status p	ass
Sensor C	ompone	Cell A Tmp.		Condit	ion 38.3 C		<b>Status</b> p	ass
Sensor C	ompone	Cell B Freq.		Condit	ion 94.2 kHz		<b>Status</b> p	ass
Sensor C	ompone	Cell B Noise	)	Condit	ion 0.3 ppb		Status P	ass
Sensor C	ompone	Cell B Flow		Condit	ion 0.67 lpm		Status P	ass
Sensor C	ompone	Cell B Press	sure	Condit	ion 567.1 mmHg		<b>Status</b> p	ass
Sensor C	ompone	Cell B Tmp.		Condit			<b>Status</b> p	ass
Sensor C	ompone	Line Loss		Condit	ion Not tested		<b>Status</b> P	ass
Sensor C	ompone	System Mer	no	Condit	ion		Status p	ass

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
PED	108-Sandy	Grenville-07/30/2018				
1	7/30/2018	DAS	Campbell	000406	CR3000	2511
2	7/30/2018	Ozone	ThermoElectron Inc	000732	49i A1NAA	1105347319
3	7/30/2018	Ozone Standard	ThermoElectron Inc	000214	49i A3NAA	0622717855
4	7/30/2018	Zero air pump	Werther International	06883	C 70/4	000815257

Mfg	Serial Numbe	r Ta Site	Т	echnician	Site Visit Date	Paramete	er Owner ID
ThermoElectron Inc	1105347319	PED108	5	Sandy Grenville	07/30/2018	Ozone	000732
Intercept -0.		cept	0.00000	Mfg Serial Number Tfer ID	ThermoElectron 0517112167 01113		ameter ozone  Desc. Ozone primary stan
DAS 1: A Avg % Diff: A M: 0.0%		AS 2: Avg %Dif A	Max % Di	Slope Cert Date	1.004		
UseDescription primary primary primary primary primary primary	ConcGroup  1  2  3  4  5	Tfer Raw 0.40 15.60 35.50 67.70 109.70	Tfer Corr 0.30 15.43 35.24 67.29 109.09	Site -0.57 14.77 34.01 65.80 107.90	Site Unit ppb ppb ppb ppb ppb	-2	if AbsDif -0.87 -0.66 3.55 2.24 -1.1
Sensor Componen Sensor Componen	22.5 degree	rule	Condit	ion Good ion Clean		Status Pa	ass
Sensor Componen Sensor Componen		kup		ion N/A ion -0.10		Status pa	
Sensor Componen Sensor Componen		9		ion 0.996 ion N/A		Status p	
Sensor Componen Sensor Componen		ltage		ion N/A ion 84.7 kHz		Status P	
Sensor Componen Sensor Componen				ion 0.8 ppb ion 0.63 lpm		Status P	
Sensor Componen	t Cell A Press	ure	Condit	709.9 mmHg		Status p	ass
Sensor Componen Sensor Componen				ion 35.9 C ion 101.3 kHz		Status Pa	
Sensor Componen Sensor Componen				ion 0.9 ppb ion 0.55 lpm		Status P	
Sensor Componen	t Cell B Press	ure	Condit	ion 709.6 mmHg		Status p	ass
Sensor Componen Sensor Componen	<u>-</u>		Condit	ion Not tested		Status p	
Sensor Componen	System Men	no	Condit	ion		Status p	ass

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
VPII	20-Sandy	Grenville-07/31/2018				
1	7/31/2018	DAS	Campbell	000402	CR3000	2514
2	7/31/2018	Ozone	ThermoElectron Inc	000690	49i A1NAA	1030244800
3	7/31/2018	Ozone Standard	ThermoElectron Inc	000443	49i A3NAA	CM08200019
4	7/31/2018	Zero air pump	Werther International	06886	C 70/4	000815259

Mfg		Serial Number	er Ta - S	Site	Tec	chnician	Site Visit Date	Parame	eter	Owner	ID
ThermoElec	ctron Inc	1030244800		VPI120	Sa	ndy Grenville	07/31/2018	Ozone		000690	
Slope: Intercept CorrCoff	-(		e: rcept rCoff	0.00000 0.00000 0.00000		Mfg Serial Number	ThermoElectron			ozone Ozone prima	ry stan
DAS 1: A Avg % I	Diff: A N		AS 2: Avg %l	Dif A Max %	o Di	Tfer ID Slope	1.0047		rcept		0000
0.0	0%	0.0%				Cert Date	6/12/201	o Cori	Coff	1.0	0000
UseDescr prima	ry	ConcGroup 1	Tfer 0.5	50 (	r Corr 0.40	Site -0.32	Site Unit ppb	RelPer	Dif	AbsDif -0.72	
prima	•	2	15.		4.84	14.43	ppb		0.96	-0.41	
prima prima	-	3 4	35. 67.		5.04 7.39	34.74 67.05	ppb ppb		-0.86 -0.51		
prima	-	5	110		9.39	109.60	ppb		0.19		
Sensor C	ompone	nt Sample Tra	in		Conditio	Good		Status	pass		
Sensor C	ompone	nt 22.5 degree	rule		Conditio	on		Status	pass		
Sensor C	ompone	nt Inlet Filter C	ondition		Conditio	Clean		Status	pass		
Sensor C	ompone	nt Battery Bac	kup		Conditio	N/A		Status	pass		
Sensor C	ompone	nt Offset			Conditio	on 0.60		Status	pass		
Sensor C	ompone	nt Span			Conditio	n 1.026		Status	pass		
Sensor C	ompone	nt Zero Voltag	е	(	Conditio	n N/A		Status	pass		
Sensor C	ompone	nt Fullscale Vo	ltage		Conditio	n N/A		Status	pass		
Sensor C	ompone	cell A Freq.			Conditio	84.5 kHz		Status	pass		
Sensor C	ompone	nt Cell A Noise	)		Conditio	0.7 ppb		Status	pass		
Sensor C	ompone	nt Cell A Flow			Conditio	0.67 lpm		Status	pass		
Sensor C	ompone	nt Cell A Press	sure		Conditio	656.9 mmHg		Status	pass		
Sensor C	ompone	nt Cell A Tmp.			Conditio	32.1 C		Status	pass		
Sensor C	ompone	nt Cell B Freq.			Conditio	71.3 kHz		Status	pass		
Sensor C	ompone	nt Cell B Noise	)		Conditio	0.6 ppb		Status	pass		
Sensor C	ompone	cell B Flow			Conditio	0.66 lpm		Status	pass		
Sensor C	ompone	nt Cell B Press	sure		Conditio	656.3 mmHg		Status	pass		
Sensor C	ompone	nt Cell B Tmp.			Conditio	on		Status	pass		
Sensor C	ompone	nt Line Loss			Conditio	Not tested		Status	pass		
Sensor C	ompone	nt System Mer	no		Conditio	on		Status	pass		

Site V	isit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
PARI	107-Sandy	Grenville-08/01/2018				
1	8/1/2018	DAS	Campbell	000333	CR3000	2112
2	8/1/2018	Ozone	ThermoElectron Inc	000689	49i A1NAA	1030244802
3	8/1/2018	Ozone Standard	ThermoElectron Inc	000436	49i A3NAA	CM08200012
4	8/1/2018	Zero air pump	Werther International	06876	C 70/4	000814286

**Data Compiled:** 12/3/2018 9:07:34 AM

SiteVisitDate Site Technician

08/01/2018 PAR107 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.99060	unitless	P
2	Ozone Intercept	P	0	5	4	-0.75436	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	-0.5	ppb	P
6	Ozone Absolute Difference g2	P	7	1.5	1	-1.08	ppb	P
7	Ozone % difference max	P	7	10	4	7.3	%	P

Site V	isit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
CDR	119-Sandy	Grenville-08/01/2018				
1	8/1/2018	DAS	Campbell	None	CR3000	4935
2	8/1/2018	Ozone	ThermoElectron Inc	000623	49i A1NAA	1009241790
3	8/1/2018	Ozone Standard	ThermoElectron Inc	000365	49i A3NAA	0726124688
4	8/1/2018	Zero air pump	Werther International	06903	C 70/4	000899159

Mfg		Serial Numb	er Ta S	Site	Te	chnician	Site Visit Date	Parame	eter	Owner ID
ThermoElect	ron Inc	1009241790		CDR119	Sa	andy Grenville	08/01/2018	Ozone		000623
Slope: Intercept CorrCoff	-		rCoff	0.00000 0.00000 0.00000		Mfg Serial Number Tfer ID	ThermoElectron 0517112167 01113			er ozone c. Ozone primary sta
DAS 1: A Avg % Di			AS 2: Avg %I	Oif A Max %	o Di	Slope Cert Date	1.0047		rcept Coff	0.08880
UseDescrip primary primary primary	y y	ConcGroup  1 2 3 4	Tfer 1 0.7 15 35. 68.	70 C 30 1: 10 3: 00 6	r Corr 0.60 5.14 4.84 7.59	Site 0.31 14.45 33.90 66.40	Site Unit ppb ppb ppb ppb ppb	RelPer	-2.73 -1.78	AbsDif -0.29 -0.69
primary		5	110		9.39	107.90	ppb		-1.37	
Sensor Co	mpone	nt Sample Tra  22.5 degree  nt Inlet Filter (	e rule	(	Conditio	Good on Clean		Status Status Status	pass	
	_									
	_	nt Battery Bac	кир	<del>-</del>	Conditio			Status		
Sensor Co	mpone	nt Offset			Conditio	on -0.20		Status	pass	
Sensor Co	mpone	nt Span			Conditio	1.009		Status	pass	
Sensor Co	mpone	nt Zero Voltag	е		Conditio	on N/A		Status	pass	
Sensor Co	mpone	nt Fullscale V	oltage		Conditio	n N/A		Status	pass	
Sensor Co	mpone	nt Cell A Freq			Conditio	87.9 kHz		Status	pass	
	_	nt Cell A Nois			Conditio	0.8 ppb		Status	pass	
	•	nt Cell A Flow				0.67 lpm		Status		
	_	nt Cell A Pres				705.9 mmHg		Status		
	•									
	•	nt Cell A Tmp				31.5 C		Status		
	•	nt Cell B Freq				89.0 kHz		Status	pass	
Sensor Co	mpone	cell B Nois	Э		Conditio	0.8 ppb		Status	pass	
Sensor Co	mpone	cell B Flow		(	Conditio	0.68 lpm		Status	pass	
Sensor Co	mpone	nt Cell B Pres	sure		Conditio	Not tested		Status	pass	
Sensor Co	mpone	nt Cell B Tmp			Conditio	on		Status	pass	
Sensor Co	mpone	nt Line Loss			Conditio	Not tested		Status	pass	
	•	nt System Me	mo		Conditio			Status		
	7									

Site V	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
CKT	136-Sandy	Grenville-08/02/2018				
1	8/2/2018	DAS	Campbell	000354	CR3000	2132
2	8/2/2018	Ozone	ThermoElectron Inc	000744	49i A1NAA	1105347324
3	8/2/2018	Ozone Standard	ThermoElectron Inc	000200	49i A3NAA	0607315738
4	8/2/2018	Zero air pump	Werther International	06902	PC70/4	000829157

Mfg	S	Serial Numbe	er Ta Sit	te	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectro	n Inc	1105347324	Cł	KT136	Sandy Grenville	08/02/2018	Ozone	000744
Slope:	-0.		rcept	0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID	ThermoElectron 0517112167 01113		neter ozone  Ozone primary stan
DAS 1: A Avg % Diff			AS 2: Avg %Dif	f A Max % Di	Slope Cert Date	1.0047		
UseDescripti primary primary primary primary	ion (	ConcGroup  1 2 3 4 5	Tfer Ra 0.90 15.10 34.90 68.00 110.00	0.80 0 14.94 0 34.64 0 67.59	Site 0.52 14.45 33.60 66.70 107.60	Site Unit ppb ppb ppb ppb ppb ppb	-3. -1.:	-0.28 -0.49 05 33
	ponent	Sample Tra			ition Good	I T	Status pas	
	_	22.5 degree		Cond	ition		Status pas	
	_	Inlet Filter C			ition Clean		Status pas	
Sensor Com	ponent	Battery Bac	kup	Cond	ition N/A		Status pas	SS
Sensor Com	ponent	Offset		Cond	-0.10		Status pas	SS
Sensor Com	ponent	Span		Cond	ition 1.008		Status pas	SS
Sensor Com	ponent	Zero Voltag	е	Cond	ition N/A		Status pas	SS
Sensor Com	ponent	Fullscale Vo	ltage	Cond	ition N/A		Status pas	SS
Sensor Com	ponent	Cell A Freq.		Cond	ition 94.6 kHz		Status pas	SS
Sensor Com	ponent	Cell A Noise	)	Cond	ition Not tested		Status pas	SS
	•	Cell A Flow			ition 0.66 lpm		Status pas	
	_	Cell A Press	sure		ition 706.9 mmHg		Status pas	
		Cell A Tmp.		<del></del>	ition 36.3 C		Status pas	
					ition 93.3 kHz			
	-	Cell B Freq.					Status pas	
	•	Cell B Noise	)		ition Not tested		Status pas	
	_	t Cell B Flow		<del></del>	o.68 lpm		Status pas	
Sensor Com	ponent	Cell B Press	sure	Cond	Not tested		Status pas	SS
Sensor Com	ponent	Cell B Tmp.		Cond	ition		Status pas	ss
Sensor Com	ponent	Line Loss		Cond	ition Not tested		Status pas	SS
Sensor Com	ponent	System Mei	no	Cond	ition		Status pas	SS

Site V	isit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
МСК	131-Sandy	v Grenville-08/03/2018				
1	8/3/2018	DAS	Campbell	000429	CR3000	2535
2	8/3/2018	Ozone	ThermoElectron Inc	000723	49i A1NAA	1105347327
3	8/3/2018	Ozone Standard	ThermoElectron Inc	000366	49i A3NAA	0726124695
4	8/3/2018	Zero air pump	Werther International	06912	PC70/4	000829177

Mfg		Serial Number	er Ta Site	T	echnician	Site Visit Date	Paramet	er Owner ID	•
ThermoElec	ctron Inc	1105347327	MCK13	1 S	Sandy Grenville	08/03/2018	Ozone	000723	
Slope: Intercept CorrCoff DAS 1: A Avg % I	-(	1.00000 Cor	rcept CrCoff C	0.00000 0.00000 0.00000 Max % Di	Mfg Serial Number Tfer ID Slope Cert Date	ThermoElectron 0517112167 01113 1.0047	Tfe	•	80
			TEC. D	mc c	a.		D 1D D	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
UseDescr prima	_	ConcGroup	Tfer Raw 0.30	Tfer Corr 0.21	Site -0.58	Site Unit	RelPerD	Dif AbsDif -0.79	
prima		2	15.00	14.84	13.90	ppb		-0.79	
prima		3	34.50	34.25	33.55	ppb	-	-2.06	
prima	-	4	67.50	67.09	65.99	ppb		-1.65	
prima	-	5	110.00	109.39	108.20	ppb	-	-1.09	
Sensor C	ompone	Sample Tra	in	Condit	Good		<b>Status</b> P	pass	
Sensor C	ompone	22.5 degree	rule	Condit	ion		Status	pass	
Sensor C	ompone	Inlet Filter C	Condition	Condit	ion Clean		<b>Status</b> P	pass	
Sensor C	ompone	Battery Bac	kup	Condit	ion N/A		<b>Status</b> P	pass	
Sensor C	ompone	Offset		Condit	ion 0.30		Status	pass	
Sensor C	ompone	Span		Condit	ion 1.031	1.031		pass	
Sensor C	ompone	zero Voltag	е	Condit	ion N/A		Status	pass	
Sensor C	ompone	Fullscale Vo	ltage	Condit	ion N/A		Status	pass	
Sensor C	ompone	Cell A Freq.		Condit	ion 89.2 kHz		Status	pass	
Sensor C	ompone	nt Cell A Noise	)	Condit	ion 1.0 ppb	1.0 ppb		pass	
Sensor C	ompone	Cell A Flow		Condit	ion 0.71 lpm		<b>Status</b> P	pass	
Sensor C	ompone	Cell A Press	sure	Condit	ion 724.7 mmHg		<b>Status</b> P	pass	
Sensor C	ompone	Cell A Tmp.		Condit	ion 35.1 C		Status p	pass	
Sensor C	ompone	Cell B Freq.		Condit	ion 92.8 kHz		Status P	pass	
Sensor C	ompone	cell B Noise	)	Condit	ion 0.9 ppb		Status p	pass	
Sensor C	ompone	Cell B Flow		Condit	ion 0.73 lpm		Status P	pass	
Sensor C	ompone	Cell B Press	sure	Condit	ion 725.3 mmHg		<b>Status</b> P	pass	
Sensor C	ompone	Cell B Tmp.		Condit	ion		<b>Status</b> P	pass	
Sensor Component Line Loss			Condit	ion Not tested		<b>Status</b> [	pass		
Sensor C	ompone	System Mer	no	Condit	ion		<b>Status</b> F	pass	

Site V	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number	
MCK231-Sandy Grenville-08/03/2018							
1	8/3/2018	DAS	Campbell	000359	CR3000	2137	
2	8/3/2018	Ozone	ThermoElectron Inc	000682	49i A1NAA	1030244796	
3	8/3/2018	Ozone Standard	ThermoElectron Inc	000433	49i A3NAA	CM08200009	
4	8/3/2018	Zero air pump	Werther International	06924	C 70/4	000836205	

Mfg	\$	Serial Numbe	r Ta Site	Т	Cechnician	Site Visit Date	Parameter	Owner ID
ThermoElec	tron Inc	1030244796	MCK2	31	Sandy Grenville	08/03/2018	Ozone	000682
Slope:		98809 <b>Slop</b> 56309 <b>Inte</b>		0.00000	Mfg	ThermoElectron		eter ozone
Intercept CorrCoff			cept	0.00000	Serial Number	0517112167	Tfer Do	esc. Ozone primary stan
Correon		Con			Tfer ID	01113		
DAS 1:		<b>D</b> A	AS 2:		Slope	1.0047	0 Intercept	0.08880
A Avg % D			Avg %Dif	A Max % Di	Cert Date	6/12/201	8 CorrCoff	1.00000
0.0	)%	0.0%			3373 2 400		0011001	
UseDescri	•	ConcGroup	Tfer Raw	Tfer Corr		Site Unit	RelPerDif	AbsDif
primai	•	1	0.80	0.70	0.07	ppb		-0.63
prima: prima:	-	3	15.00 35.00	14.84 34.74	14.31 33.64	ppb ppb	-3.2	-0.53
prima	-	4	68.00	67.59	66.12	ppb	-3.2	
prima	•	5	109.90	109.29	107.50	ppb	-1.6	
Sensor Co	omponen	Sample Trai	n	Condi	tion Good		Status pass	5
Sensor C	omponen	22.5 degree	rule	Condi	tion		Status pass	S
Sensor C	omponen	Inlet Filter C	ondition	Condi	tion Clean		Status pass	S
Sensor C	omponen	Battery Back	кир	Condi	tion N/A		Status pass	3
Sensor C	omponen	Offset		Condi	<b>tion</b> 0.30		Status pass	3
Sensor C	omponen	Span		Condi	<b>tion</b> 1.017		Status pass	3
Sensor C	omponen	Zero Voltage	Э	Condi	tion N/A		Status pass	S
Sensor C	omponen	Fullscale Vo	ltage	Condi	tion N/A		Status pass	3
Sensor C	omponen	Cell A Freq.		Condi	90.2 kHz		Status pass	3
Sensor C	omponen	Cell A Noise		Condi	0.6 ppb		Status pass	3
Sensor Co	omponen	Cell A Flow		Condi	0.69 lpm		Status pass	5
Sensor C	omponen	Cell A Press	ure		709.4 mmHg		Status pass	3
Sensor C	omponen	Cell A Tmp.		Condi	36.0 C		Status pass	3
Sensor C	omponen	Cell B Freq.		Condi	tion 87.0 kHz		Status pass	3
Sensor C	omponen	Cell B Noise		Condi	0.4 ppb		Status pass	3
Sensor C	omponen	Cell B Flow			tion 0.72 lpm		Status pass	3
Sensor C	omponen	t Cell B Press	ure	Condi	709.7 mmHg		Status pass	8
Sensor C	Sensor Component Cell B Tmp.			Condi			Status pass	
Sensor C	Sensor Component Line Loss			Condi	Not tested		<b>Status</b> pass	3
Sensor C	omponen	System Men	no	Condi	tion		Status pass	S

Site \	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number			
CNT169-Martin Valvur-08/30/2018									
1	8/30/2018	DAS	Campbell	000417	CR3000	2515			
2	8/30/2018	Ozone	ThermoElectron Inc	000620	49i A1NAA	1009241793			
3	8/30/2018	Ozone Standard	ThermoElectron Inc	000687	49i A3NAA	1030244809			
4	8/30/2018	Zero air pump	Werther International	06925	C 70/4	000836220			

Mfg		Serial Number	er Ta Site		Tec	hnician	Site Visit Date	Parame	eter	Owner ID
ThermoElec	tron Inc	1009241793	CNT16	9	Ма	rtin Valvur	08/30/2018	Ozone		000620
Slope: Intercept CorrCoff	-(	0.99997 Cor	rcept rCoff	0.00000 0.00000 0.00000		Mfg Serial Number Tfer ID Slope	ThermoElectron 49CPS-70008-3 01110 1.0080	64 Tfe	er Des	c. Ozone primary stan  -0.05199
A Avg % I			Avg %Dif	A Max % D	i	Cert Date	9/11/201			1.00000
0.0	0%	0.0%				Cert Date		Corr	Con	
UseDescr	1	ConcGroup	Tfer Raw 0.20	Tfer C 0.24		Site 0.16	Site Unit	RelPer	Dif	AbsDif -0.08
prima prima	-	2	14.80	14.7		14.65	ppb ppb			-0.08
prima	-	3	34.93	34.70		34.94	ppb		0.69	
prima	-	4	65.24	64.7		66.62	ppb		2.82	
prima	ry	5	110.52	109.6		113.10	ppb		3.06	
Sensor C	ompone	nt Sample Tra	in	Coi	nditio	<b>n</b> Good		Status	pass	
Sensor C	ompone	nt 22.5 degree	rule	Con	nditio	n		Status	pass	
Sensor C	ompone	nt Inlet Filter C	Condition	Condition		Clean		Status pass		
Sensor C	ompone	nt Battery Bac	kup	Con	nditio	n N/A		Status	pass	
Sensor C	ompone	nt Offset		Con	nditio	n -0.30		Status	pass	
Sensor C	ompone	nt Span		Condition		n 1.011		Status	Status pass	
Sensor C	ompone	nt Zero Voltag	е	Conditio		n/A		Status	pass	
Sensor C	ompone	nt Fullscale Vo	oltage	Condition		n N/A		Status pass		
Sensor C	ompone	nt Cell A Freq.		Conditio		98.6 kHz		Status pass		
Sensor C	ompone	nt Cell A Noise	Э	Condition		0.6 ppb		Status pass		
Sensor C	ompone	nt Cell A Flow		Con	nditio	n 0.60 lpm		Status pass		
Sensor C	ompone	nt Cell A Press	sure	Con	nditio	507.4 mmHg		Status pass		
Sensor C	ompone	nt Cell A Tmp.		Con	nditio	<b>n</b> 34.8 C		Status	pass	
Sensor C	ompone	nt Cell B Freq.		Con	nditio	n 102.3 kHz		Status	pass	
Sensor C	ompone	nt Cell B Noise	e	Con	nditio	0.5 ppb		Status	pass	
Sensor C	ompone	nt Cell B Flow		Con	nditio	0.59 lpm		Status	pass	
Sensor C	ompone	nt Cell B Press	sure	Con	nditio	n 506.7 mmHg		Status	pass	
Sensor C	ompone	nt Cell B Tmp.		Con	nditio	n		Status	pass	
Sensor Component Line Loss			Con	Condition Not tes			Status pass			
Sensor C	ompone	nt System Mei	mo	Con	nditio	n		Status	pass	

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
PRK	134-Sandy	Grenville-09/17/2018				
1	9/17/2018	DAS	Campbell	000411	CR3000	2509
2	9/17/2018	Ozone	ThermoElectron Inc	000693	49i A1NAA	1030244806
3	9/17/2018	Ozone Standard	ThermoElectron Inc	000369	49i A3NAA	0726124690
4	9/17/2018	Zero air pump	Werther International	06905	C 70/4	000821907

Mfg		Serial Number	er Ta Site		Tec	chnician	Site Visit Date	Parame	eter	Owner ID
ThermoElec	ctron Inc	1030244806	PRK <sup>2</sup>	134	Sa	ndy Grenville	09/17/2018	Ozone		000693
Slope: Intercept CorrCoff	Intercept -0.05475 Intercept			0.00000 0.00000 0.00000		Mfg Serial Number	1180030022 Tfer D			ozone  Ozone primary stan
DAS 1:			AS 2:			Tfer ID Slope	1.0029	0 Inter	rcept	0.10980
A Avg % I	Diff: A N	1ax % Di A 0.0%	Avg %Dif	A Max % D		Cert Date	9/7/201	8 Cori	Coff	1.00000
				The co				D 1D	D. C	
UseDescr	1	ConcGroup 1	Tfer Raw 0.20	7 Tfer C		Site 0.17	Site Unit	RelPer	Dif	AbsDif 0.09
prima	•	2	15.14	14.9		15.12	ppb			0.14
prima	•	3	35.62	35.4	0	35.68	ppb		0.79	
prima	-	4	67.71	67.4		67.60	ppb		0.3	
prima		5	109.71	109.2		110.60	ppb		1.2	
Sensor C	ompone	nt Sample Tra	in	Co	nditio	Good		Status	pass	
Sensor C	ompone	nt 22.5 degree	rule	Со	nditio	on		Status	pass	
Sensor C	ompone	nt Inlet Filter C	Condition	Со	nditio	Clean		Status	pass	
Sensor C	ompone	nt Battery Bac	kup	Co	nditio	n N/A		Status	pass	
Sensor C	ompone	nt Offset		Со	nditio	0.000		Status	pass	
Sensor C	ompone	nt Span		Condi		on 1.008		Status	pass	
Sensor C	ompone	nt Zero Voltag	е	Со	nditio	n N/A		Status	pass	
Sensor C	ompone	nt Fullscale Vo	oltage	Condi		on N/A		Status pass		
Sensor C	ompone	nt Cell A Freq		Condi		on 99.2 kHz		Status	pass	
Sensor C	ompone	nt Cell A Noise	Э	Condi		0.8 ppb		Status pass		
Sensor C	ompone	nt Cell A Flow		Cond		<b>on</b> 0.72 lpm		Status pass		
Sensor C	ompone	nt Cell A Pres	sure	Со	nditio	ion 698.4 mmHg		Status	pass	
Sensor C	ompone	nt Cell A Tmp.		Со	nditio	33.9 C		Status	pass	
Sensor C	ompone	nt Cell B Freq	•	Со	nditio	n 101.3 kHz		Status	pass	
Sensor C	ompone	nt Cell B Noise	Э	Со	nditio	1.1 ppb		Status	pass	
Sensor C	ompone	nt Cell B Flow		Со	nditio	0.71 lpm		Status	pass	
Sensor C	ompone	nt Cell B Pres	sure	Со	nditio	697.8 mmHg		Status	pass	
Sensor C	ompone	nt Cell B Tmp.		Со	nditio	on		Status	pass	
Sensor Component Line Loss			Со	nditio	Not tested		Status pass			
Sensor C	ompone	nt System Me	mo	Со	nditio	on		Status	pass	