# 2018 – 2<sup>nd</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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**July 2018** 

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## List of Acronyms and Abbreviations

% diff percent difference

A/D analog to digital converter
ARS Air Resource Specialist, Inc.

ASTM American Society for Testing and Materials
CASTNET Clean Air Status and Trends Network

DAS data acquisition system

DC direct current

deg degree

DVM digital voltmeter

EEMS Environmental, Engineering & Measurement Services, Inc.

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

FSAD Field Site Audit Database

GPS geographical positioning system

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

mv milivolt

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

NPS National Park Service

QAPP Quality Assurance Project Plan SOP standard operating procedure

TEI Thermo Environmental Instruments
USNO United States Naval Observatory

V volts

WRR World Radiation Reference

## 1.0 CASTNET Quarterly Report

## 1.1 Introduction

The Clean Air Status and Trends Network (CASTNET) is a national air monitoring program developed under mandate of the 1990 Clean Air Act Amendments. Each site in the network measures acidic gases and particles 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 June 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 (BLM) and several independent partners. AMEC-FW is responsible for operating the EPA and ECCC sponsored sites, and Air Resource Specialist, Inc. (ARS) is responsible for operating the NPS and BLM sponsored sites.

## 1.2 Project Objectives

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

Performance audits verify that all evaluated variables are consistent with the accuracy goals as defined in the CASTNET Quality Assurance Project Plan (QAPP). The parameter specific accuracy goals are presented in Table 1. Six EPA sponsored sites that are operated by AMEC-FW continue to operator meteorological sensors. Those sites are BEL116, BVL30, CHE185, IRL141, PAL190, and PND165. Five sites in WY sponsored by EPA and operated by the BLM/ARS also operate meteorological sensors and are BAS601, NEC602, BUF603, FOR605, and SHE604. Meteorological sensors at site FOR605 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, ROM206, and BEL116. None of those variables were audited during this reporting period.

 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	Orientation Accuracy	Parallel to alignment rod/crossarm, or sighted to distant point	≤±5° from degrees true
Wind Direction	Linearity	Eight cardinal points on test fixture	≤±5° mean absolute error
		Starting torque tested with torque gauge	< 10 g-cm Climatronics; < 20 g-cm R.M. Young

Sensor	Parameter	Audit Challenge	Acceptance Criteria
Wind Speed	Accuracy	Shaft rotational speed generated and measured with certified synchronous motor	$\leq \pm 0.5$ mps below 5.0 mps input; $\leq \pm 5.0\%$ of input at or above 5.0 mps
Wind Speed	Starting Threshold	Starting torque tested with torque gauge	< 0.5 g-cm
Mass Flow Controller	Flow Rate	Comparison with Primary Standard	$\leq \pm 5.0\%$ 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	≤±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 Second Quarter 2018

This report consists of the systems and performance and other audit results from the CASTNET sites visited during the second quarter (April through June) 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
CAN407	FSA+Flow+Ozone	NPS	4/3/2018	Canyonlands NP
JOT403	FSA+Flow+Ozone	NPS	4/5/2018	Joshua Tree NM
IRL141	FSA+Flow+Ozone	EPA	4/10/2018	Indian River Lagoon
SUM156	FSA+Flow+Ozone	EPA	4/12/2018	Sumatra
PET427	FSA+Flow+Ozone	NPS	4/16/2018	Petrified Forest NP
GRC474	FSA+Flow+Ozone	NPS	4/17/2018	Grand Canyon NP
CHA467	FSA+Flow+Ozone	NPS	4/19/2018	Chiricahua NM
GAS153	FSA+Flow+Ozone	EPA	5/10/2018	Georgia Station
SND152	FSA+Flow+Ozone	EPA	5/11/2018	Sand Mountain
ESP127	FSA+Flow+Ozone	EPA	5/12/2018	Edgar Evins St. Park
SPD111	FSA+Flow+Ozone	EPA	5/13/2018	Speedwell
DIN431	FSA+Flow+Ozone	NPS	5/17/2018	Dinosaur NM
FOR605	Meteorology+FSA+Flow	EPA+BLM	6/6/2018	Fortification Creek

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
ZIO433	Ozone	NPS	4/6/2018	Zion National Park
BBE401	Ozone	NPS	4/23/2018	Big Bend NP
ALC188	Ozone	EPA	4/26/2018	Alabama-Coushatta
BAS601	Ozone	EPA+BLM	6/4/2018	Basin
NEC602	Ozone	EPA+BLM	6/6/2018	Newcastle
CVL151	Ozone	EPA	6/15/2018	Coffeeville
CAD150	Ozone	EPA	6/16/2018	Caddo Valley
CHE185	Ozone	EPA	6/17/2018	Cherokee Nation
CDZ171	Ozone	EPA	6/23/2018	Cadiz

## 1.4 Audit Results

The observations and results of the systems and performance audits are included in Appendix A, *CASTNET Audit Report Forms* by site, arranged by audit date. Photographs of site conditions are included within each systems report where necessary. Copies of the spot reports that were sent immediately following the audit of each site are included as Appendix B, *CASTNET Site Spot Report Forms*. The Ozone PE results and observations are included in Appendix C, *CASTNET Ozone Performance Evaluation Forms*.

## 2.0 NADP Quarterly Report

## 2.1 Introduction

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

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

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

As of March 2018 the PO and NED have moved to the Wisconsin State Lab of Hygiene (WSLH) located at the University of Wisconsin in Madison WI. The CAL is scheduled to move to WSLH during the summer of 2018.

## 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 Second Quarter 2018

This report covers the results from the NADP sites surveyed during the first quarter (April through June) of 2018. The station names and dates of the audits are presented in Table 4.

Table 4. Sites Surveyed – Second Quarter 2018

Side ID	Network	Visit Date	Station Name		
AL99	AMoN	5/11/2018	Sand Mountain Research & Extension Center		
AR03	AMoN	6/16/2018	Caddo Valley		
AZ03	NTN	4/17/2018	Grand Canyon National Park-Hopi Point		
AZ98	AMoN	4/19/2018	Chiricahua Nm		
BC16	MDN	6/27/2018	Saturna Island		
CA67	AMoN	4/5/2018	Joshua Tree National Park-Black Rock		
CO09	NTN	5/31/2018	Kawaneechee Meadow		
CO22	NTN	5/1/2018	Pawnee		
CO90	NTN	5/22/2018	Niwot Ridge-Southeast		
CO94	NTN	5/22/2018	Sugarloaf		
FL19	AMoN	4/10/2018	Indian River Lagoon		
FL23	AMoN	4/12/2018	Sumatra		
GA41	AMoN	5/10/2018	Georgia Station		
IA23	NTN	5/9/2018	Mcnay Research Center		
KS32	MDN/NTN	5/7/2018	Lake Scott State Park		
KY98	AMoN	6/23/2018	Cadiz		
MO03	NTN	6/18/2018	Ashland Wildlife Area		
MO05	NTN	6/19/2018	University Forest		
MO46	MDN	6/19/2018	Mingo National Wildlife Refuge		
MS30	AMoN	6/15/2018	Coffeevile		

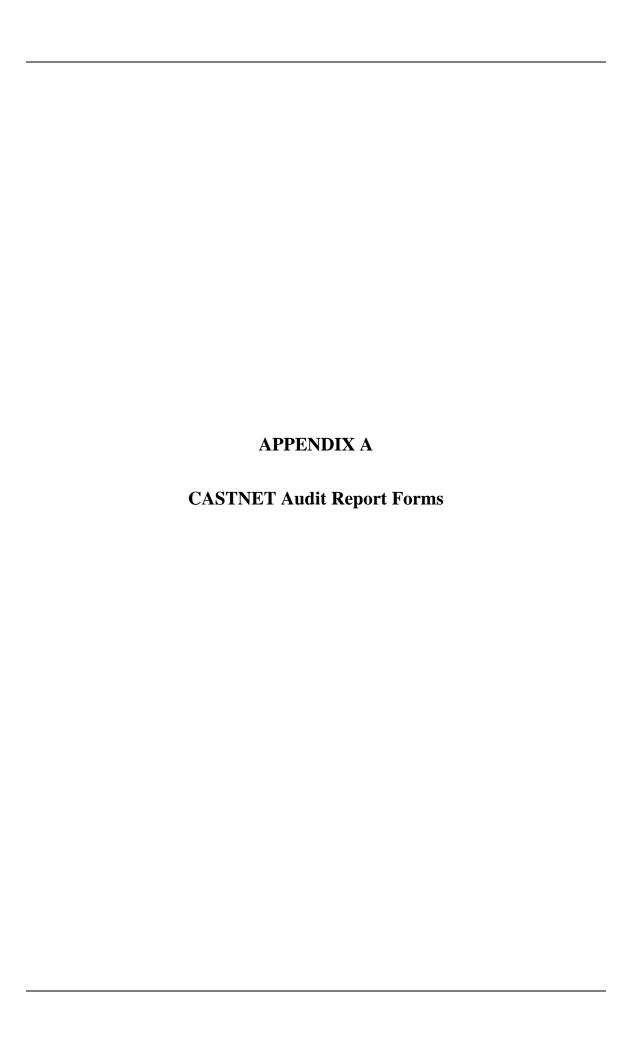
Side ID	<u>Network</u>	<u>Visit Date</u>	Station Name
MT00	NTN	6/5/2018	Little Bighorn Battlefield National Monument
NE15	MDN/NTN	5/10/2018	Mead
NE99	NTN	5/11/2018	North Platte Agricultural Experiment Station
NV03	NTN	6/20/2018	Smith Valley
OK99	AMoN	6/17/2018	Cherokee Nation
TN04	AMoN	5/13/2018	Speedwell
TN07	AMoN	5/12/2018	Edgar Evins St. Park
TX22	NTN	4/24/2018	Guadalupe Mnt. Np
TX41	AMoN	4/26/2018	Alabama-Coushatta
UT01	NTN/AMoN	5/15/2018	Canyonlands National Park-Island in the Sky
UT09	NTN	4/3/2018	Canyonlands National Park-Island In The Sky
UT95	NTN	5/16/2018	East McKee
UT99	NTN	4/4/2018	Bryce Canyon National Park-Repeater Hill
WA03	MDN	6/29/2018	Makah National Fish Hatchery
WA14	NTN	6/29/2018	Olympic National Park-Hoh Ranger Station
WA18	MDN	6/26/2018	Seattle/NOAA
WA19	NTN	6/28/2018	North Cascades National Park-Marblemount Ranger Station
WA21	NTN	6/25/2018	La Grande
WA99	NTN/AMoN	6/25/2018	Mount Rainier National Park-Tahoma Washington
WY93	AMoN	6/4/2018	Basin – Big Horn

## 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					
CAN	CAN407-Martin Valvur-04/03/2018										
1	4/3/2018	Computer	Hewlett Packard	none	EliteBook	CNV1360668					
2	4/3/2018	DAS	Environmental Sys Corp	90665	8816	2689					
3	4/3/2018	Elevation	Elevation	None	1	None					
4	4/3/2018	Filter pack flow pump	Thomas	none	107CA18	079600005251					
5	4/3/2018	flow rate	Mykrolis	03388	FC280SAV-4S	AW9403022					
6	4/3/2018	Infrastructure	Infrastructure	none	none	none					
7	4/3/2018	Met tower	Universal Tower	01357	unknown	none					
8	4/3/2018	MFC power supply	Tylan	03678	RO-32	none					
9	4/3/2018	Modem	Sierra wireless	none	GX450	LA54620441001003					
10	4/3/2018	Ozone	ThermoElectron Inc	none	49i A3NAA	1030745086					
11	4/3/2018	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	1030745084					
12	4/3/2018	Sample Tower	Aluma Tower	illegible	В	none					
13	4/3/2018	Shelter Temperature	ARS	none	none	none					
14	4/3/2018	Siting Criteria	Siting Criteria	None	1	None					
15	4/3/2018	Temperature2meter	Climatronics	none	100093	5708					
16	4/3/2018	Zero air pump	Twin Tower Engineering	90721	TT70/E4	526297					

#### **DAS Data Form DAS Time Max Error:** 1 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg **Environmental Sys** 2689 CAN407 Martin Valvur 04/03/2018 DAS Primary Das Date: 4 /3 /2018 **Audit Date** 4 /3 /2018 HY Parameter DAS Mfg 10:38:00 10:37:00 Das Time: **Audit Time** Tfer Desc. Source generator (D 12010039329 **Serial Number** Das Day: 93 **Audit Day** 93 Tfer ID 01322 **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 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 -0.0003 0.0002 V V 12 0.1000 0.0997 0.0997 0.000012 0.3000 0.2995 0.2996 V V 0.0001 12 0.5000 0.4999 V V -0.0001 0.5000 12 0.7000 V V 0.0000 0.6997 0.6997 V V 12 0.9000 0.9000 0.9001 0.0001 12 1.0000 0.9991 0.9992 V V 0.0001

# Flow Data Form

Mfg	9	Serial Num	nber Ta	Site	Tec	chnician	Site Visit I	Date Paran	neter	Owner ID
Mykrolis		AW940302	22	CAN407	Ma	artin Valvur	04/03/2018	flow ra	te	03388
Mfg	Tyla	n				Mfg	BIOS		arameter FI	
SN/Owner ID	none	Э	03678			Serial Number	148613	Т	fer Desc. B	OS 220-H
Parameter	MFC	power sup	pply			Tfer ID	01421			
						Slope	0.	98450 Int	ercept	0.10300
						Cert Date	3/	1/2018 <b>Co</b>	rrCoff	1.00000
DAS 1:			DAS 2:		L	Cal Factor Z	Zero	-0.00	06	
A Avg % Diff:	A M		A Avg %	Dif A Ma	x % Di	Cal Factor F	ull Scale	5.33	38	
2.73%		3.08%				Rotometer R	leading:	3	.4	
Desc.	Т	est type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSigna	ll PctDifference
primary	-	p off	0.000	0.000	0.01	0.0000	0.02	l/m	l/m	
primary	-	check	0.000	0.000	0.02	0.0000	0.03	1/m	l/m	
primary	test		2.990	2.930	2.81	0.0000	3.01	l/m	1/m	2.73%
primary	test		3.000	2.940	2.81	0.0000	3.01	l/m	1/m 1/m	2.38%
primary	test	_	2.980	2.920	_	0.0000	3.01	l/m		3.08%
Sensor Compo	onen	t Leak Les	t		Conditio	n		Status	pass	
Sensor Compe	onen	t Tubing C	ondition		Conditio	Condition Good		Status	pass	
Sensor Compo	onen	t Filter Pos	sition		Conditio	n Good		Status	pass	
Sensor Compo				n	Conditio	Clean and dry	Clean and dry		pass	
Sensor Compo	onen	Moisture	Present			n No moisture p	resent		pass	
Sensor Compo	onen	filter Dist	tance		Conditio	n 5.5 cm		Status	pass	
Sensor Compo	onen	Filter Dep	oth		Conditio	0.5 cm		Status	pass	
Sensor Component Filter Azimuth		muth		Conditio	Condition 225 deg		Status	pass		
Sensor Compo	onen	System M	1emo		Conditio	n		Status	pass	

# **Ozone Data Form**

Name	Mfg Se	erial Number Ta	Site	Technic	cian	Site Visit Date	Parame	eter	Owner ID
Intercept   -0.26156   Intercept   0.0000   CorrCoff   0.99998   CorrCoff   0.0000	ThermoElectron Inc 1	030745086	CAN407	Martin '	Valvur	04/03/2018	Ozone		none
A Avg % Diff: A Max % Di	Intercept -0.2	26156 Intercept	0.00000	Seri	ial Number	49CPS-70008-			
UseDescription	DAS 1:	<b>DAS 2:</b>		Slop	pe	1.008	01 Inter	rcept	-0.05199
UseDescription			6Dif A Max %		t Date	9/11/20	17 Cori	·Coff	1.00000
primary									
primary   2   16.64   16.55   15.99   ppb   -3.38%   primary   3   38.43   38.17   37.61   ppb   -1.47%   primary   4   66.896   68.46   68.16   ppb   -0.44%   primary   5   109.42   108.60   108.20   ppb   -0.37%	•						te Unit	PctDiffe	rence
primary		-				1.1			-3.38%
Primary   S   109.42   108.60   108.20   ppb   -0.37%									
Sensor Component   Sample Train   Condition   Good   Status   pass						1.1			
Sensor Component 22.5 degree rule Condition Clean Status pass Sensor Component Inlet Filter Condition Condition Clean Status pass Sensor Component Battery Backup Condition N/A Status pass Sensor Component Offset Condition -0.2 Status pass Sensor Component Span Condition 1.008 Status pass Sensor Component Zero Voltage Condition -0.015 Status pass Sensor Component Fullscale Voltage Condition 1.000 Status pass Sensor Component Cell A Freq. Condition 1.000 Status pass Sensor Component Cell A Noise Condition 0.9 ppb Status pass Sensor Component Cell A Flow Condition 0.67 lpm Status pass Sensor Component Cell A Freq. Condition 605.3 mmHg Status pass Sensor Component Cell A Tmp. Condition 31.8 C Status pass Sensor Component Cell B Freq. Condition 10.1.2 kHz Status pass Sensor Component Cell B Freq. Condition 10.2 kHz Status pass Sensor Component Cell B Freq. Condition 10.4 ppb Status pass Sensor Component Cell B Freq. Condition 10.5 ppb Status pass Sensor Component Cell B Freq. Condition 10.5 ppb Status pass Sensor Component Cell B Freq. Condition 6.64.7 mmHg Status pass Sensor Component Cell B Fressure Condition 6.64.7 mmHg Status pass Sensor Component Cell B Fressure Condition 6.64.7 mmHg Status pass Sensor Component Cell B Fressure Condition 6.64.7 mmHg Status pass Sensor Component Cell B Tmp. Condition Not tested Status pass						5.20 ppo	Status	nass	-0.57%
Sensor Component         Inlet Filter Condition         Condition         Clean         Status         pass           Sensor Component         Battery Backup         Condition         N/A         Status         pass           Sensor Component         Offset         Condition         -0.2         Status         pass           Sensor Component         Span         Condition         1.008         Status         pass           Sensor Component         Zero Voltage         Condition         0.015         Status         pass           Sensor Component         Fullscale Voltage         Condition         1.000         Status         pass           Sensor Component         Cell A Freq.         Condition         93.9 kHz         Status         pass           Sensor Component         Cell A Noise         Condition         0.9 ppb         Status         pass           Sensor Component         Cell A Flow         Condition         0.67 lpm         Status         pass           Sensor Component         Cell B Freq.         Condition         101.2 kHz         Status         pass           Sensor Component         Cell B Flow         Condition         0.67 lpm         Status         pass           Sensor Component         Cell B	_			_					
Sensor Component         Battery Backup         Condition         N/A         Status         pass           Sensor Component         Offset         Condition         1.008         Status         pass           Sensor Component         Span         Condition         1.008         Status         pass           Sensor Component         Zero Voltage         Condition         1.000         Status         pass           Sensor Component         Fullscale Voltage         Condition         1.000         Status         pass           Sensor Component         Cell A Freq.         Condition         93.9 kHz         Status         pass           Sensor Component         Cell A Freq.         Condition         0.9 ppb         Status         pass           Sensor Component         Cell A Flow         Condition         0.67 lpm         Status         pass           Sensor Component         Cell B Treq.         Condition         0.8 ppb         Status         pass           Sensor Component         Cell B Flow         Condition         0.67 lpm         Status         pass           Sensor Component         Cell B Pressure         Condition         604.7 mmHg         Status         pass           Sensor Component         Cell B Tmp	_						Status	pass	
Sensor Component Span Condition Condition Sensor Component Span Condition Condition Sensor Component Sensor Component Sensor	Sensor Component	Inlet Filter Condition	on	Condition C	lean		Status	pass	
Sensor Component       Span       Condition       1.008       Status       pass         Sensor Component       Zero Voltage       Condition       -0.015       Status       pass         Sensor Component       Fullscale Voltage       Condition       1.000       Status       pass         Sensor Component       Cell A Freq.       Condition       93.9 kHz       Status       pass         Sensor Component       Cell A Noise       Condition       0.9 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       607 lpm       Status       pass         Sensor Component       Cell A Tmp.       Condition       605.3 mmHg       Status       pass         Sensor Component       Cell B Freq.       Condition       0.1.2 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Fressure       Condition       604.7 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass	<b>Sensor Component</b>	Battery Backup		Condition N	/A		Status	pass	
Sensor Component       Zero Voltage       Condition       -0.015       Status       pass         Sensor Component       Fullscale Voltage       Condition       1.000       Status       pass         Sensor Component       Cell A Freq.       Condition       93.9 kHz       Status       pass         Sensor Component       Cell A Noise       Condition       0.9 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       31.8 C       Status       pass         Sensor Component       Cell B Freq.       Condition       101.2 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.8 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	Sensor Component	Offset		Condition -C	).2		Status	pass	
Sensor Component       Fullscale Voltage       Condition       1.000       Status       pass         Sensor Component       Cell A Freq.       Condition       93.9 kHz       Status       pass         Sensor Component       Cell A Noise       Condition       0.9 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       31.8 C       Status       pass         Sensor Component       Cell B Freq.       Condition       101.2 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.8 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       Mot tested       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	Sensor Component	Span		Condition 1.	.008		Status	pass	
Sensor Component       Cell A Freq.       Condition       93.9 kHz       Status       pass         Sensor Component       Cell A Noise       Condition       0.9 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       605.3 mmHg       Status       pass         Sensor Component       Cell A Pressure       Condition       31.8 C       Status       pass         Sensor Component       Cell B Freq.       Condition       101.2 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.8 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       604.7 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass	Sensor Component	Zero Voltage		Condition -0	0.015		Status	pass	
Sensor ComponentCell A NoiseCondition0.9 ppbStatuspassSensor ComponentCell A FlowCondition0.67 lpmStatuspassSensor ComponentCell A PressureCondition605.3 mmHgStatuspassSensor ComponentCell A Tmp.Condition31.8 CStatuspassSensor ComponentCell B Freq.Condition101.2 kHzStatuspassSensor ComponentCell B NoiseCondition0.8 ppbStatuspassSensor ComponentCell B FlowCondition0.67 lpmStatuspassSensor ComponentCell B PressureCondition604.7 mmHgStatuspassSensor ComponentCell B Tmp.ConditionStatuspassSensor ComponentLine LossConditionNot testedStatuspass	Sensor Component	Fullscale Voltage		Condition 1.	.000		Status	pass	
Sensor Component       Cell A Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       605.3 mmHg       Status       pass         Sensor Component       Cell A Tmp.       Condition       31.8 C       Status       pass         Sensor Component       Cell B Freq.       Condition       101.2 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.8 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       604.7 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass	Sensor Component	Cell A Freq.		Condition 93	3.9 kHz		Status	pass	
Sensor ComponentCell A PressureCondition605.3 mmHgStatuspassSensor ComponentCell A Tmp.Condition31.8 CStatuspassSensor ComponentCell B Freq.Condition101.2 kHzStatuspassSensor ComponentCell B NoiseCondition0.8 ppbStatuspassSensor ComponentCell B FlowCondition0.67 lpmStatuspassSensor ComponentCell B PressureCondition604.7 mmHgStatuspassSensor ComponentCell B Tmp.ConditionStatuspassSensor ComponentLine LossConditionNot testedStatuspass	Sensor Component	Cell A Noise		Condition 0.	.9 ppb		Status	pass	
Sensor ComponentCell A Tmp.Condition31.8 CStatuspassSensor ComponentCell B Freq.Condition101.2 kHzStatuspassSensor ComponentCell B NoiseCondition0.8 ppbStatuspassSensor ComponentCell B FlowCondition0.67 lpmStatuspassSensor ComponentCell B PressureCondition604.7 mmHgStatuspassSensor ComponentCell B Tmp.ConditionStatuspassSensor ComponentLine LossConditionNot testedStatuspass	Sensor Component	Cell A Flow		Condition 0.	.67 lpm		Status	pass	
Sensor Component       Cell B Freq.       Condition       101.2 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.8 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       604.7 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	Sensor Component	Cell A Pressure		Condition 60	05.3 mmHg		Status	pass	
Sensor Component       Cell B Noise       Condition       0.8 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       604.7 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	Sensor Component	Cell A Tmp.		Condition 3	1.8 C		Status	pass	
Sensor Component       Cell B Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       604.7 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	<b>Sensor Component</b>	Cell B Freq.		Condition 10	01.2 kHz		Status	pass	
Sensor Component       Cell B Pressure       Condition       604.7 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	Sensor Component	Cell B Noise		Condition 0.	.8 ppb		Status	pass	
Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	Sensor Component	Cell B Flow		Condition 0.	.67 lpm		Status	pass	
Sensor Component Line Loss Condition Not tested Status pass	<b>Sensor Component</b>	Cell B Pressure		Condition 60	04.7 mmHg		Status	pass	
	Sensor Component	Cell B Tmp.		Condition			Status	pass	
Sensor Component System Memo Condition Status pass	Sensor Component	Line Loss		<b>Condition</b> N	ot tested		Status	pass	
	Sensor Component	System Memo		Condition			Status	pass	

#### 2 Meter Temperature Data Form Calc. Difference Serial Number Ta **Technician** Site Visit Date Parameter Mfg Site **Owner ID** CAN407 Martin Valvur 04/03/2018 Climatronics 5708 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 0.21 0.47 Test type UseDescription InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit Difference 0.0000 primary Temp Low Rang 0.02 0.04 0.13 C 0.09 Temp Mid Rang 24.47 24.49 0.0000 24.41 C -0.08 primary primary Temp High Rang 47.97 48.00 0.0000 47.53 C -0.47Sensor 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

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** ARS CAN407 Martin Valvur 04/03/2018 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** 0.72 1.10 01229 **Tfer ID** 0.99986 -0.01977 Slope Intercept 1/24/2018 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference		
primary	Temp Mid Range	23.77	23.79	0.000	24.9	C	1.06		
primary	Temp Mid Range	23.76	23.78	0.000	24.9	С	1.1		
primary	Temp Mid Range	21.61	21.63	0.000	21.6	С	0.01		
Sensor Component System Memo Condition Status pass									
	<u> </u>								

# Infrastructure Data For

Site	e ID	CAN407	Technician	Martin Valvur	Site Visit Date	04/03/2018	
	Shelter Ma	ake	Shelter Model	She	lter Size		
	NPS		R46453	640	cuft		
	ACCUSATION DESCRIPTION	and Average Average		RESERVE DE VOICE DE LA COMPANSION DE LA CO	No. 537-001-240-01-0-0-70-0-70		

Sensor Component	Sample Tower Type	Condition	Туре В	Status	pass
<b>Sensor Component</b>	Conduit	Condition	Good	Status	pass
<b>Sensor Component</b>	Met Tower	Condition	Good	Status	pass
<b>Sensor Component</b>	Moisture Trap	Condition	Not 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
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
<b>Sensor Component</b>	Sample Train	Condition	Good	Status	pass

# **Field Systems Comments**

1 Parameter: SitingCriteriaCom

The small parking lot at the visitors center is approximately 100m to the northeast.

2 Parameter: ShelterCleanNotes

The shelter is in good condition, well organized and well maintained.

#### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 04/03/2018 CAN407 Technician | Martin Valvur Site ID Musselman Arch **USGS Map** NPS/EPA Site Sponsor (agency) Map Scale NPS **Operating Group Map Date** 49-037-0101 AQS# Climatronics **Meteorological Type** Ozone, IMPROVE **Air Pollutant Analyzer QAPP** Latitude dry, wet **Deposition Measurement QAPP** Longitude Land Use woodland - mixed, desert range **QAPP Elevation Meters Terrain** complex **QAPP Declination** Marginally Conforms to MLM **OAPP Declination Date** (435) 259-4141 38.458323 **Site Telephone Audit Latitude** Visitors Center **Audit Longitude** -109.82126 Site Address 1 route 313 Site Address 2 **Audit Elevation** 1794 San Juan 11.6 County **Audit Declination** Moab, UT City, State **Present** Fire Extinguisher 84532 Inspected April 2015 Zip Code Mountain **First Aid Kit** in vehicle 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 NPS Model R46453 **Shelter Size** 640 cuft **✓** Notes The shelter is in good condition, well organized and well maintained. Shelter Clean **✓** Notes Site OK

From I-70, take exit 180 south on route 191. Approximately 9 miles north of Moab, turn right (west) on route 313 at

the sign for Canyonlands National Park. Follow 313 west for 25 miles passing the state park and continuing straight

to Canyonlands. The site is at the end of the dirt road behind the visitors center, in the maintenance area.

**Driving Directions** 

# Field Systems Data Form

F-02058-1500-S2-rev002

Site ID CAN407 Technician Martin Valvur Site Visit Date 04/03/2018

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

Siting Distances OK ✓

**Siting Criteria Comment** 

The small parking lot at the visitors center is approximately 100m to the northeast.

Fie	eld Systems Data Form	F-02058-1500-S3-rev					
Site	CAN407 Technician Martin Valvur		Site Visit Date 04/03/2018				
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>✓</b>	N/A				
3	Are the tower and sensors plumb?	<b>✓</b>	N/A				
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?	<b>✓</b>					
5	Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)	<b>✓</b>					
6	Is the solar radiation sensor plumb?	<b>✓</b>	N/A				
7	Is it sited to avoid shading, or any artificial or reflected light?	<b>✓</b>	N/A				
8	Is the rain gauge plumb?	✓	N/A				
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	<b>✓</b>	N/A				
10	Is the surface wetness sensor sited with the grid surface facing north?	✓	N/A				
11	Is it inclined approximately 30 degrees?	<b>✓</b>	N/A				

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

Fie	ld Systems Data Form		F-02058-1500-S4-rev002					
Site	Technician Martin Valvur		Site Visit Date 04/03/2018					
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?	✓	Temperature only					
3	Are the shields for the temperature and RH sensors clean?	✓						
4	Are the aspirated motors working?	<b>✓</b>						
5	Is the solar radiation sensor's lens clean and free of scratches?	<b>✓</b>	N/A					
6	Is the surface wetness sensor grid clean and undamaged?	<b>✓</b>	N/A					
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	<b>✓</b>						
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	<b>✓</b>						
	de any additional explanation (photograph or sketch if neces al or man-made, that may affect the monitoring parameters:		regarding conditions listed above, or any other features,					
	<u> </u>							

## Field Systems Data Form F-02058-1500-S5-rev002 CAN407 Technician | Martin Valvur Site Visit Date 04/03/2018 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 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? 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	CAN407	Technician	Martin Valvur		Site Visi	it Date 04/03/201	8	
	DAC					. J t t t			
	DAS, SE	ensor translators, and	peripheral equi	<u>pment operation</u>	<u>is ar</u>	<u>ia maintena</u>	<u>nce</u>		
1		DAS instruments appointained?	ear to be in good	l condition and	<b>✓</b>				
2		the components of the , backup, etc)	e DAS operation	al? (printers,	<b>✓</b>				
3		analyzer and sensor sing protection circuitry		through	<b>✓</b>	Met sensors	only		
4		signal connections pr intained?	rotected from the	e weather and	<b>✓</b>				
5	Are the	signal leads connected	d to the correct	DAS channel?	<b>✓</b>				
6	Are the ground	DAS, sensor translated?	ors, and shelter	properly	<b>✓</b>				
7	Does th	e instrument shelter h	nave a stable pov	ver source?	<b>✓</b>				
8	Is the in	nstrument shelter tem	perature control	lled?	<b>✓</b>				
9	Is the m	net tower stable and g	rounded?			Stable		Grounded	
	is the in	ict tower stable and gr	ounaca.			<b>✓</b>		<b>✓</b>	
10	Is the sa	ample tower stable an	d grounded?			_ ✓		<u> </u>	
11	Tower o	comments?						V	
		additional explanational an-made, that may a				y) regarding	g conditions listed	l above, or a	ny other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 CAN407 Site Visit Date 04/03/2018 Site ID Technician | Martin Valvur **Documentation** Does the site have the required instrument and equipment manuals? N/A Yes No Yes No N/A **V ✓** Wind speed sensor **Data logger V** Wind direction sensor **V Data logger** ✓ **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 V** Filter flow pump **Temperature translator** П **V V Humidity sensor translator Surge protector ✓** П П **V UPS Solar radiation translator** $\checkmark$ **~** Tipping bucket rain gauge Lightning protection device ~ **V Shelter heater** Ozone analyzer **V ✓** Filter pack flow controller Shelter air conditioner Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V ✓** Dataview **SSRF V ✓ 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? ✓ Flow & observation sections Are the Site Status Report Forms being completed and current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab?

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

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

current?

Control charts not used

#### **Field Systems Data Form** F-02058-1500-S8-rev002 CAN407 Site Visit Date 04/03/2018 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 **✓** 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 V Automatic Zero/Span Tests** Daily **V V** Monthly Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests Manual Precision Level Test V V** Alarm values only weekly **Analyzer Diagnostics Tests ~** Monthly **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 ~** As needed **Zero Air Desiccant Check ✓** Unknown Do multi-point calibration gases go through the complete sample train including all filters?

3 Are the automatic and manual z/s/p checks monitored and reported? If yes, how?

Dataview

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

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

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

complete sample train including all filters?

**✓** 

Fi	eld Sy	stems Data Forn	1					F-02058-1500-S9-rev002				
Sit	e ID	CAN407	echnic	cian	Martin Valvur		Site Visit Date	04/03/2018				
	Site ope	ration procedures										
1	Is the fi	lter pack being changed ev	ery Tu	iesda	y as scheduled	<b>V</b>	Filter changed mor	nings				
2	Are the correctl	Site Status Report Forms y?	being o	comp	oleted and filed	<b>✓</b>						
3	Are dat	a downloads and backups	peing p	perfo	ormed as		No longer required					
4	Are gen	eral observations being ma	de an	d rec	orded? How?	<b>✓</b>	Dataview and SSR	F				
5	Are site fashion	supplies on-hand and repl	enishe	d in	a timely	<b>✓</b>						
6	Are san	ple flow rates recorded? I	low?			<b>✓</b>	SSRF					
7	Are san	nples sent to the lab on a re	gular	sche	dule in a timely	<b>✓</b>						
8		ers protected from contamoping? How?	nation	dur	ing handling	<b>✓</b>	Clean gloves on and off					
9		site conditions reported reons manager or staff?	gularl	y to 1	the field							
QC	Check P	erformed		Freq	quency			Compliant				
I	Multi-poi	nt MFC Calibrations	<b>✓</b>	Sem	iannually			✓				
]	Flow Syst	em Leak Checks	<b>✓</b>	Wee	kly			✓				
]	Filter Pac	k Inspection										
]	Flow Rate	Setting Checks		Wee				✓				
1	Visual Ch	eck of Flow Rate Rotomet		Wee				<b>▽</b>				
]	In-line Filter Inspection/Replacement ✓ As needed				eeded		✓					
	Sample L	ine Check for Dirt/Water										
		dditional explanation (pho n-made, that may affect tl					r) regarding condit	ions listed above, or any other features,				

# **Field Systems Data Form**

# F-02058-1500-S10-rev002

Site ID

CAN407

**Technician** Martin Valvur

Site Visit Date 04/03/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	EliteBook	CNV1360668	none
DAS	Environmental Sys Corp	8816	2689	90665
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	079600005251	none
flow rate	Mykrolis	FC280SAV-4S	AW9403022	03388
Infrastructure	Infrastructure	none	none	none
Met tower	Universal Tower	unknown	none	01357
MFC power supply	Tylan	RO-32	none	03678
Modem	Sierra wireless	GX450	LA54620441001003	none
Ozone	ThermoElectron Inc	49i A3NAA	1030745086	none
Ozone Standard	ThermoElectron Inc	49i A1NAA	1030745084	none
Sample Tower	Aluma Tower	В	none	illegible
Shelter Temperature	ARS	none	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature2meter	Climatronics	100093	5708	none
Zero air pump	Twin Tower Engineering	TT70/E4	526297	90721

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
JOT	7403-Martin	Valvur-04/05/2018				
1	4/5/2018	DAS	Environmental Sys Corp	90599	8816	2271
2	4/5/2018	Elevation	Elevation	None	1	None
3	4/5/2018	Filter pack flow pump	Thomas	none	107CAB18B	070000013426
4	4/5/2018	flow rate	Tylan	03378	FC280AV	AW9403016
5	4/5/2018	Infrastructure	Infrastructure	none	none	none
6	4/5/2018	MFC power supply	Tylan	03683	RO-32	FP9403017
7	4/5/2018	Modem	Sixnet	none	BT6801	680X5215960043
8	4/5/2018	Ozone	ThermoElectron Inc	none	49i A3NAA	CM08460006
9	4/5/2018	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	1130950194
10	4/5/2018	Sample Tower	Aluma Tower	923310	В	none
11	4/5/2018	Shelter Temperature	ARS	none	none	none
12	4/5/2018	Siting Criteria	Siting Criteria	None	1	None
13	4/5/2018	Temperature2meter	RM Young	none	41342	14960
14	4/5/2018	Zero air pump	Werther International	none	PC70/4	606491

#### **DAS Data Form** 0.95 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg **Environmental Sys** 2271 JOT403 Martin Valvur 04/05/2018 DAS Primary Das Date: 4 /5 /2018 **Audit Date** 4 /5 /2018 HY **Parameter** DAS Mfg 7:56:03 7:57:00 Das Time: **Audit Time** Tfer Desc. Source generator (D 12010039329 **Serial Number** Das Day: 95 **Audit Day** 95 Tfer ID 01322 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0001 0.0002 0.0001 0.0002 6/15/2014 1.00000 **Cert Date** CorrCoff Fluke **Parameter** DAS Mfg **Serial Number** 95740243 Tfer Desc. DVM 01312 Tfer ID 1.00000 0.00000 **Slope Intercept** 2/14/2018 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 3 0.0000 -0.0002 0.0000 0.0002 V V 3 0.1000 0.0997 0.0999 0.00023 0.3000 0.2993 0.2993 V V 0.0000 3 0.5000 0.4999 0.4999 V V 0.00003 0.7000 V V -0.0002 0.7000 0.6998 V V 3 0.9000 0.8999 0.9000 0.0001 3 0.9996 0.9996 V V 1.0000 0.0000

# Flow Data Form

Mfg S		Serial Number Ta Si		Site T		chnician	Site Visit l	Date Paran	neter	Owner ID
Гуlan	A	W940301	16	JOT403	Ma	Martin Valvur 04/05/2018		8 flow ra	ite	03378
Mfg	Tylan					Mfg	BIOS	I	Parameter Flo	w Rate
SN/Owner ID	FP94	03017	03683			Serial Number	148613	7	fer Desc. Blo	OS 220-H
Parameter	MEC	power sup	anly			Tfer ID	01421			
rarameter	IVII C	power sup	эріу							
						Slope	0	.98450 Int	ercept	0.1030
						Cert Date	3/	1/2018 <b>Co</b>	rrCoff	1.0000
DAS 1:			DAS 2:		L	Cal Factor Z	ero	0.0	24	
A Avg % Diff:	A Max	x % Di	A Avg %	Dif A Max	x % Di	Cal Factor F	ull Scale	5.	58	
1.58%		1.69%				Rotometer R	eading:	3	3.2	
Desc.	Te	st type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	PctDifferenc
primary	pump	off	0.000	0.000	-0.09	0.0000	-0.02	l/m	1/m	
primary	leak c	heck	0.000	0.000	-0.07	0.0000	-0.01	l/m	1/m	
primary	test p		3.020	2.960	2.94	0.0000	3.01	l/m	1/m	1.69%
primary	test p		3.030	2.970	2.94	0.0000	3.01	1/m	1/m	1.359
primary	test p	t 3	3.020	2.960	2.94	0.0000	3.01	1/m	1/m	1.69%
Sensor Comp	onent	Leak Tes	t		Conditio	n		Statu	pass	
Sensor Comp	onent	Tubing C	ondition		Conditio	n Good		Statu	pass	
Sensor Comp	onent	Filter Pos	osition		Conditio	<b>n</b> Good		Statu	pass	
Sensor Compo	onent	Rotomete	er Condition	າ	Conditio	n Clean and dry		Statu	pass	
Sensor Compo	onent	Moisture	Present		Conditio	n No moisture p	resent	Statu	pass	
Sensor Compo	onent	Filter Dist	tance		Conditio	<b>n</b> 3.5 cm		Statu	pass	
Sensor Compo	onent	Filter Dep	oth		Conditio	n 0.5 cm		Statu	pass	
Sensor Compo	onent	Filter Aziı	muth		Conditio	n Not tested		Statu	pass	
Sensor Component System Memo		Conditio	n		Statu	pass				

# **Ozone Data Form**

Mfg Serial Number Ta		Site	Tec		chnician		Site Visit Date		eter	Owner ID
ThermoElectron Inc	CM08460006	JOT403	Ma	artin Valv	ur	04/05/2	018	Ozone		none
Slope:   1.0     1.0	0.00000 0.00000 0.00000	Mfg Serial N Tfer ID Slope Cert Da		Thermole 49CPS-7		Tfo	rcept	-0.05199		
UseDescription	1.8% ConcGroup	Tfer Raw	Tfer	Corr	Si	to	Sita	e Unit	PctDiffe	aranca
primary	1	0.09	0.1		0.4		ppb	UIII	FCIDIII	rence
primary	2	14.17	14.		14.		ppb			1.77%
primary primary	3 4	36.62 67.26	36. 66.		36. 67.		ppb			0.80%
primary	5	108.66	107		108		ppb ppb			0.89%
Sensor Component	Sample Train		Condition	on Good				Status	pass	
<b>Sensor Component</b>	22.5 degree rule		Conditio	on				Status	pass	
Sensor Component	Inlet Filter Conditio	n	<b>Condition</b> Clean			Status pa			pass	
Sensor Component	Battery Backup		Condition N/A				Status pass			
Sensor Component	Offset		Condition -0.3				Status	pass		
Sensor Component	Span		Condition 1.026					Status	pass	
<b>Sensor Component</b>	Zero Voltage		Condition 0.04				Status	pass		
<b>Sensor Component</b>	Fullscale Voltage		Condition 1.000			Status P			pass	
<b>Sensor Component</b>	Cell A Freq.		Condition 84.2 kHz			Status p			pass	
<b>Sensor Component</b>	Cell A Noise		Condition 0.4 ppb			Status			pass	
Sensor Component	Cell A Flow		Conditio	on 0.72 l	om	Status			pass	
Sensor Component	Cell A Pressure		Conditio	on 654.5	mmHg		Status pass			
<b>Sensor Component</b>	Cell A Tmp.		Conditio	on 35.3 (	)			Status	pass	
Sensor Component	Cell B Freq.		Conditio	78.2 k	Hz			Status	pass	
Sensor Component	Cell B Noise		Conditio	0.4 pp	b			Status	pass	
<b>Sensor Component</b>	Cell B Flow		Conditio	0.70 l	om			Status	pass	
Sensor Component	Cell B Pressure		Condition	on 653.6	mmHg			Status	pass	
Sensor Component	Cell B Tmp.		Condition	on				Status	pass	
<b>Sensor Component</b>	Line Loss		Condition	Not te	sted			Status	pass	
Sensor Component	System Memo		Conditio	on				Status	pass	

#### 2 Meter Temperature Data Form Calc. Difference Serial Number Ta **Technician** Site Visit Date Parameter Mfg Site **Owner ID** JOT403 Martin Valvur RM Young 14960 04/05/2018 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 0.13 0.16 Test type UseDescription InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit Difference 0.0000 primary Temp Low Rang 0.13 0.15 -0.01 C -0.16 Temp Mid Rang 25.73 25.75 0.0000 25.60 C -0.15 primary -0.09 primary Temp High Rang 45.47 45.50 0.0000 45.41 C 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

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** JOT403 Martin Valvur ARS 04/05/2018 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** 0.58 0.69 01229 **Tfer ID** -0.01977 **Slope** 0.99986 Intercept 1/24/2018 1.00000 **Cert Date** CorrCoff OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. 0.000primary Temp Mid Range 24.55 24.57 25.2 C 0.61

23.85

23.86

Condition

Temp Mid Range

Temp Mid Range

Sensor Component | System Memo

primary primary 23.83

23.84

0.000

0.000

C

C

Status pass

0.69

0.43

24.5

24.3

### **Infrastructure Data For**

Site ID JOT403 Technician Martin Valvur Site Visit Date 04/05/2018

Shelter Make	Shelter Model	Shelter Size	
ShelterOne	E8129-28036	768 cuft	

Sensor Component	Sample Tower Type	Condition	Type B	Status	pass
Sensor Component	Conduit	Condition	Good	Status	pass
Sensor Component	Met Tower	Condition	Good	Status	pass
<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	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
Sensor Component	Tubing Type	Condition	3/8 teflon	Status	pass
Sensor Component	Sample Train	Condition	Good	Status	pass

# **Field Systems Comments**

1 Parameter: ShelterCleanNotes

The shelter is only a few years old and is in good condition, clean and well organized but not grounded.

### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 04/05/2018 JOT403 Technician | Martin Valvur Site ID Yucca Valley South **USGS Map** NPS/EPA Site Sponsor (agency) Map Scale NPS **Operating Group Map Date** 06-071-9002 AQS# RM Young **Meteorological Type** Ozone, IMPROVE **Air Pollutant Analyzer QAPP** Latitude 34.0714 dry, wet **QAPP** Longitude -116.3906 **Deposition Measurement** 1244 **Land Use** desert **QAPP Elevation Meters** complex **Terrain QAPP Declination** No Conforms to MLM **OAPP Declination Date** (760) 228-1927 34.069569 **Site Telephone Audit Latitude** -116.388933 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 1243 San Bernardino 12 County **Audit Declination** Yacca Valley, CA City, State **Present** Fire Extinguisher 92284 Inspected March 2014 Zip Code **✓** Pacific **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 **Model** E8129-28036 ShelterOne **Shelter Size** 768 cuft **✓** Notes The shelter is only a few years old and is in good condition, clean and well organized but not Shelter Clean arounded.

At the intersection of route 62 and route 247 in Yucca Valley, take Joshua Lane south (route 247). Follow the signs

for Joshua Tree National Monument. The site is up the dirt road through the locked gate (cable) toward the water

**✓** Notes

tower. (gate lock = 1123 shelter lock = 5570)

Site OK

**Driving Directions** 

# Field Systems Data Form

F-02058-1500-S2-rev002

Site ID	JOT403	Technician	Martin Valvur	Site Visit Date	04/05/2018

Potential Interferent	Minimum Distance From Measurement Apparatus	Distance	Pass = Checked
Large Point Source of SO2 or NOx	20 to 40 km		
Major industrial complex	10 to 20 km		✓
City > 50,000 population	40 km		✓
City 10,000 to 50,000 population	10 km		✓
City 1,000 to 10,000 population	5 km		✓
Major highway, airport or rail yard	2 km		✓
Secondary road, heavily traveled	500 m		✓
Secondary road, lightly traveled	200 m		✓
Feedlot operations	500 m		✓
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

Fi	eld Systems Data Form		F-02058-1500-S3-rev002
Site	JOT403 Technician Martin Valvur		Site Visit Date 04/05/2018
1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	<b>✓</b>	N/A
2	Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind)	<b>✓</b>	N/A
3	Are the tower and sensors plumb?	<b>✓</b>	N/A
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?	<b>✓</b>	
5	Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)	<b>✓</b>	
6	Is the solar radiation sensor plumb?	<b>✓</b>	N/A
7	Is it sited to avoid shading, or any artificial or reflected light?	<b>✓</b>	N/A
8	Is the rain gauge plumb?	<b>✓</b>	N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	<b>✓</b>	N/A
10	Is the surface wetness sensor sited with the grid surface facing north?	<b>✓</b>	N/A
11	Is it inclined approximately 30 degrees?	<b>✓</b>	N/A

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

Fi	eld Systems Data Form		F-02058-1500-S4-rev002
Site	JOT403 Technician Martin Valvur		Site Visit Date 04/05/2018
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	<b>✓</b>	N/A
2	Are all the meteorological sensors operational online, and reporting data?	<b>✓</b>	N/A
3	Are the shields for the temperature and RH sensors clean?	<b>✓</b>	
4	Are the aspirated motors working?	<b>✓</b>	
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>	
	ride any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	ary	) regarding conditions listed above, or any other features,

Fi	eld Systems Data Form	F-02058-1500-S5-rev002	
Site	JOT403 Technician Martin Valvur		Site Visit Date 04/05/2018
	Siting Criteria: Are the pollutant analyzers and deposition e	<u>quipı</u>	nent sited in accordance with 40 CFR 58, Appendix E
1	Do the sample inlets have at least a 270 degree arc of unrestricted airflow?	<b>✓</b>	
2	Are the sample inlets 3 - 15 meters above the ground?	<b>✓</b>	
3	Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees?	<b>V</b>	
	Pollutant analyzers and deposition equipment operations and	d ma	intenance
1	Do the analyzers and equipment appear to be in good condition and well maintained?	✓	
2	Are the analyzers and monitors operational, on-line, and reporting data?	<b>✓</b>	
3	Describe ozone sample tube.		1/4 teflon by 12 meters
4	Describe dry dep sample tube.		3/8 teflon by 12 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	<b>✓</b>	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	<b>✓</b>	
7	Is the zero air supply desiccant unsaturated?	<b>✓</b>	
8	Are there moisture traps in the sample lines?		
9	Is there a rotometer in the dry deposition filter line, and is it clean?	<b>✓</b>	Clean and dry
	ide any additional explanation (photograph or sketch if neces ral or man-made, that may affect the monitoring parameters:		regarding conditions listed above, or any other features,

# Field Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	JOT403	Technician	Martin Valvur		Site Vis	it Date 04/05/201	8	
	DAS, se	nsor translators, and	peripheral equi	pment operation	าร ลา	nd maintena	nce		
1	Do the I well mai	OAS instruments appeintained?	ear to be in good	l condition and	•				
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	d to the correct	DAS channel?	<b>✓</b>				
6	Are the grounde	DAS, sensor translated?	ors, and shelter	properly		Shelter not (	grounded		
7	Does the	e 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 🗸		<b>Grounded</b>	
10	Is the sa	mple tower stable and	d grounded?						
11	Tower c	omments?					tower is bolted to t	he shelter	
		additional explanationan-made, that may a				y) regarding	g conditions listed	l above, or a	any other features,
				- S Parameter					

#### **Field Systems Data Form** F-02058-1500-S7-rev002 JOT403 Site Visit Date 04/05/2018 Site ID **Technician** Martin Valvur **Documentation** Does the site have the required instrument and equipment manuals? N/A Yes No Yes No N/A **V V** Wind speed sensor **Data logger V** Wind direction sensor **V Data logger** ✓ **V** П Temperature sensor Strip chart recorder **✓ V** Relative humidity sensor Computer ✓ П Solar radiation sensor **V** Modem П **V V Printer** Surface wetness sensor ✓ **V** 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 ~ $\checkmark$ **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 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 JOT403 Technician | Martin Valvur Site Visit Date 04/05/2018 Site ID Site operation procedures ARS provides refresher training during maintenance visits 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? **Compliant QC Check Performed Frequency V ✓** N/A **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A Translator Zero/Span Tests (climatronics) **✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values ✓ V** 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 ✓** Semiannually

Automatic Zero/Span Tests	<b>⊻</b> Daily	
Manual Zero/Span Tests	✓ Every 2 weeks	✓
<b>Automatic Precision Level Tests</b>	✓ Daily	✓
<b>Manual Precision Level Test</b>		
<b>Analyzer Diagnostics Tests</b>	Alarm values only	✓
In-line Filter Replacement (at inlet)	✓ Every 2 weeks	✓
In-line Filter Replacement (at analyze	□ N/A	✓
Sample Line Check for Dirt/Water		
Zero Air Desiccant Check	✓ Weekly	✓
1 Do multi-point calibration gases go through	gh the complete	
sample train including all filters?	through the	
2 Do automatic and manual z/s/p gasses go complete sample train including all filter	s?	
3 Are the automatic and manual z/s/p chec	ks monitored and Dataview	

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

Fi	Field Systems Data Form				F-02058-1500-S9-rev002			
Sit	e ID JOT403 Tec	hnician	Martin Valvur		Site Visit Date	04/05/2018		
	Site operation procedures							
1	Is the filter pack being changed every	y Tuesda	y as scheduled?	<b>V</b>	Filter changed morir	nings (50%)		
2	Are the Site Status Report Forms becorrectly?	ing com	oleted and filed	<b>✓</b>				
3	Are data downloads and backups be scheduled?	ing perfo	ormed as		No longer required			
4	Are general observations being made	and red	corded? How?	<b>✓</b>	SSRF			
5	Are site supplies on-hand and replen fashion?	ished in	a timely	<b>✓</b>				
6	Are sample flow rates recorded? How	w?		<b>✓</b>	SSRF			
7	Are samples sent to the lab on a regulation?	lar sche	dule in a timely	<b>✓</b>				
8	Are filters protected from contamina and shipping? How?	tion dui	ing handling	✓	Clean gloves on and	d off		
9	Are the site conditions reported regularizations manager or staff?	larly to	the field					
QC	Check Performed	Free	quency			Compliant		
]	Multi-point MFC Calibrations	<b>✓</b> Sem	iannually			<b>✓</b>		
]	Flow System Leak Checks	Wee	kly			<b>✓</b>		
]	Filter Pack Inspection							
]	Flow Rate Setting Checks	<b>✓</b> Wee	kly			<b>✓</b>		
,	Visual Check of Flow Rate Rotometer	<b>✓</b> Wee	kly			<b>✓</b>		
]	In-line Filter Inspection/Replacement	<b>✓</b> Eve	y 2 weeks			<b>✓</b>		
\$	Sample Line Check for Dirt/Water							
	vide any additional explanation (photo iral or man-made, that may affect the			sary	) regarding condition	ons listed above, or a	ny other features,	

# Field Systems Data Form

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

Site ID

JOT403

Technician Martin Valvur

Site Visit Date 04/05/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Environmental Sys Corp	8816	2271	90599
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18B	070000013426	none
flow rate	Tylan	FC280AV	AW9403016	03378
Infrastructure	Infrastructure	none	none	none
MFC power supply	Tylan	RO-32	FP9403017	03683
Modem	Sixnet	BT6801	680X5215960043	none
Ozone	ThermoElectron Inc	49i A3NAA	CM08460006	none
Ozone Standard	ThermoElectron Inc	49i A1NAA	1130950194	none
Sample Tower	Aluma Tower	В	none	923310
Shelter Temperature	ARS	none	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature2meter	RM Young	41342	14960	none
Zero air pump	Werther International	PC70/4	606491	none

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
IRL	141-Sandy (	Grenville-04/10/2018				
1	4/10/2018	Computer	Dell	007024	Inspiron 15	8W2MC12
2	4/10/2018	DAS	Campbell	000340	CR3000	2119
3	4/10/2018	Elevation	Elevation	None	1	None
4	4/10/2018	Filter pack flow pump	Thomas	02759	107CAB18	1192001899
5	4/10/2018	Flow Rate	Apex	000593	AXMC105LPMDPCV	illegible
6	4/10/2018	Infrastructure	Infrastructure	none	none	none
7	4/10/2018	Modem	Raven	06384	H4222-C	0802310499
8	4/10/2018	Ozone	ThermoElectron Inc	000609	49i A1NAA	1009241782
9	4/10/2018	Ozone Standard	ThermoElectron Inc	000446	49i A3NAA	CM08200022
10	4/10/2018	Sample Tower	Aluma Tower	000020	В	AT-61152-A-H8-F
11	4/10/2018	Shelter Temperature	Campbell	none	107-L	none
12	4/10/2018	Siting Criteria	Siting Criteria	None	1	None
13	4/10/2018	Temperature	RM Young	illegible	41342VC	14804
14	4/10/2018	Zero air pump	Werther International	06909	C 70/4	000829161

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2119 IRL141 Sandy Grenville 04/10/2018 DAS Primary Das Date: 4 /10/2018 **Audit Date** 4 /10/2018 Datel Parameter DAS Mfg 9:40:34 9:40:34 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** 100 Das Day: 100 **Audit Day** Tfer ID 01320 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0002 0.0000 0.0002 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 0.2997 V V 0.0000 7 0.5000 0.4996 V V 0.00000.4996 7 0.7000 V V 0.0000 0.6995 0.6995 7 V V 0.9000 0.8993 0.8993 0.00007 1.0000 0.9993 0.9991 V V -0.0002

## Flow Data Form

Ifg pex	Serial illegib		Site IRL141	Tec	ndy Grenville	Site Visit I		ate	Owner ID 000593
фех	lilegib	vic .	IIICLI 41						
				]	Mfg	BIOS	P	arameter Flo	w Rate
					Serial Number		Т	fer Desc. BIC	OS 220-H
				,	Tfer ID	01414			
					Slope		00055 Inte	ercept	-0.01570
				(	Cert Date	2/2	1/2018 Cor	rCoff	1.0000
DAS 1:		DAS 2:			Cal Factor Z	ero	-0.0	)1	
A Avg % Diff:	A Max %		Dif A Max	% <b>Di</b>	Cal Factor F		0.9		
1.10%		32%			Rotometer R	eading:	1	.5	
Desc.	Test ty	pe Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.000	-0.01	1/m	l/m	
primary	test pt 1	1.498	1.510	1.54	0.000	1.50	1/m	l/m	-0.66%
primary	test pt 2	1.502	1.520	1.54	0.000	1.50	1/m	l/m	-1.32%
primary	test pt 3	1.501	1.520	1.54	0.000	1.50	1/m	l/m	-1.32%
Sensor Compo	onent Lea	k Test		Condition	1		Status	pass	
Sensor Compo	onent Tub	ing Condition		<b>Condition</b> Good		Status		s pass	
Sensor Compo	onent Filte	er Position		Condition	Fair		Status	pass	
Sensor Compo	onent Rote	ometer Conditio	n	Condition	Clean and dry		Status	pass	
Sensor Compo	onent Mois	sture Present		Condition	See comments	3	Status	pass	
Sensor Compo	onent Filte	er Distance		Condition	4.8 cm		Status	pass	
Sensor Compo	onent Filte	er Depth		Condition	0.0 cm		Status	pass	
Sensor Compo	onent Filte	er Azimuth		Condition	90 deg		Status	pass	
Sensor Component System Memo				Condition	1		Status	pass	

## **Ozone Data Form**

Mfg	erial Number Ta	Site	Teo	chnician		Site Visit Date		Parame	ter	Owner ID
ThermoElectron Inc 1	009241782	IRL141	Sa	andy Gren	/ille	04/10/2	018	Ozone		000609
Slope:         0.9           Intercept         0.2           CorrCoff         0.9	0.00000 Serial Number			Thermol 0517112	Electron 2167		rameter ozor er Desc. Ozo	ne primary stan		
DAS 1:	DAS 2:		. = 4	Slope			1.0050	4 Inter	cept	0.32915
A Avg % Diff: A Ma	x % Di A Avg %	6Dif A Max %	6 Di	Cert Dat	e	(	9/12/201	7 Corr	Coff	1.00000
UseDescription	ConcGroup	Tfer Raw	Tfer (		Si			Unit	PctDiffe	rence
primary primary	2	0.10 15.10	-0.2 14.0		0.5	.80	ppb ppb			0.75%
primary	3	35.10	34.:			.20	ppb			-1.13%
primary primary	5	67.90 109.90	67.2 109.		67 108		ppb ppb			0.10%
Sensor Component			Conditio		100		рро	Status	pass	-0.0070
Sensor Component			Conditio					Status		
Sensor Component	Inlet Filter Condition	n	Conditio	Clean				Status	pass	
Sensor Component	Battery Backup		Conditio	n N/A				Status	pass	
Sensor Component	Offset		Conditio	0.20				Status	pass	
Sensor Component	Span		Conditio	n 1.016				Status	pass	
Sensor Component	Zero Voltage		Condition N/A					Status	pass	
Sensor Component	Fullscale Voltage		Condition N/A				Status P			
Sensor Component	Cell A Freq.		Condition 96.2 kHz			Status			pass	
Sensor Component	Cell A Noise		Conditio	0.6 ppt	)	Status			pass	
Sensor Component	Cell A Flow		Conditio	0.73 lp	m			Status	pass	
Sensor Component	Cell A Pressure		Conditio	731.8 r	nmHg			Status	pass	
Sensor Component	Cell A Tmp.		Conditio	32.2 C				Status	pass	
Sensor Component	Cell B Freq.		Conditio	98.7 kH	łz			Status	pass	
Sensor Component	Cell B Noise		Conditio	0.9 ppb	)			Status	pass	
Sensor Component	Cell B Flow		Conditio	0.73 lp	m			Status	pass	
Sensor Component	Cell B Pressure		Conditio	732.1 r	nmHg			Status	pass	
Sensor Component	Cell B Tmp.		Conditio	on				Status	pass	
Sensor Component	Line Loss		Conditio	Not tes	ted			Status	s pass	
<b>Sensor Component</b>	System Memo		Conditio	on				Status	pass	

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young 14804 IRL141 04/10/2018 Temperature illegible Parameter Temperature Mfg Extech 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 0.26 0.63 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.14 0.05 0.000 0.1 $\mathbf{C}$ 0.03 C Temp Mid Range 25.15 24.86 0.000 24.7 -0.13 primary 48.20 47.6 C -0.63 primary Temp High Range 48.68 0.000 Condition Clean Sensor Component | Shield Status pass Sensor Component Blower Condition Functioning **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 IRL141 04/10/2018 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** 0.40 0.83 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	23.08	22.81	0.000	23.0	C	0.17	
primary	Temp Mid Range	25.02	24.73	0.000	25.6	С	0.83	
primary	Temp Mid Range	24.68	24.39	0.000	24.6	С	0.19	
Sensor Con	ponent System Memo		Condition	Status pass				

### **Infrastructure Data For**

Site	e ID	IRL141	Technician	Sandy Grenville	Site Visit Date	04/10/2018	l
	Shelter Ma	ıke	Shelter Model	She	lter Size		
Ī	Ekto		8810	640	cuft		

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

# **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem		
Flow Rate	IRL141	Sandy Grenville	04/10/2018	Moisture Present	Apex	4169				
The filter sample tubing has drops of moisture in low sections outside the shelter.										

## **Field Systems Comments**

1 Parameter: SiteOpsProcComm

The site operator is doing an excellent job of handling and changing the filter pack.

2 Parameter: SiteOpsProcedures

Manual z/s/p performed following ozone inlet filter changes. Leak checks no longer performed.

3 Parameter: SitingCriteriaCom

Sebastian has an estimated population of 18,000. The park operates a boat ramp with vehicle parking near the site. The site is surrounded on three sides by boat traffic using the ramp.

4 Parameter: ShelterCleanNotes

The shelter is still clean and well organized.. The shelter floor and the bottom of the walls are severely rotting and now has extensive mold growth. It has deteriorated since the previous audit.

5 Parameter: MetOpMaintCom

The meteorological signals were not functioning upon arrival. The site operator removed the relative humidity signal which returned other signals to normal. Signal cables are showing signs of wear with some missing insulation and bear wires.

### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 04/10/2018 IRL141 Technician Sandy Grenville Site ID Sebastian **USGS Map** EPA/SJRWMD Site Sponsor (agency) Map Scale IRC Health Dept **Operating Group Map Date** 12-061-9991 AQS# R.M. Young **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude dry **Deposition Measurement QAPP** Longitude **Land Use** coastal **QAPP Elevation Meters** flat **Terrain QAPP Declination** Yes Conforms to MLM **OAPP Declination Date** (772) 538-2365 27.849215 **Site Telephone Audit Latitude** Sebastian Inlet State Park -80.455595 Site Address 1 **Audit Longitude** 9700 South A1A Site Address 2 **Audit Elevation** Indian River -5.8 County **Audit Declination** Melbourne Beach, FL City, State **Present** Fire Extinguisher 32951 inspected Feb 2016 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 **V Backup Operator Security Fence V Secure Shelter** Backup Op. Phone #

**Driving Directions** 

Shelter Clean

Site OK

Backup Op. E-mail

Shelter Working Room ✓ Make

Ekto

**✓** Notes

**✓** Notes

From I-95 take exit 180, east on 192 to AIA. Turn right (south) and proceed approximately 18 miles over the Sebastian Inlet bridge. Once over the bridge, turn right at the entrance to the park and check in at the guard station. The site is at the west end of the road past the boat launch ramp.

Stable Entry Step

The shelter is still clean and well organized.. The shelter floor and the bottom of the walls are

severely rotting and now has extensive mold growth. It has deteriorated since the previous audit.

**Shelter Size** 

640 cuft

Model 8810

## **Field Systems Data Form**

F-02058-1500-S2-rev002

Site ID	IRL141	<b>Technician</b>	Sandy Grenville	Site Visit Date	04/10/2018

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	5 to 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	100 m	
Small parking lot	100 m	10 - 20 m	
Tree line	50 m		✓
Obstacles to wind	10 times obstacle height		✓

Siting Distances OK  $\Box$ 

**Siting Criteria Comment** 

Sebastian has an estimated population of 18,000. The park operates a boat ramp with vehicle parking near the site. The site is surrounded on three sides by boat traffic using the ramp.

Fie	eld Sy	stems Data Fo	rm				F-02058	B-15	00-S3-1	rev002
Site	ID	IRL141	Technician	Sandy Grenville		Site Visit Date	04/10/2018			
1		d speed and direction s duenced by obstruction		as to avoid	<b>✓</b>	N/A				
2	(i.e. wind horizont	d sensors mounted so a d sensors should be mo ally extended boom >2 to the prevailing wind	ounted atop the Ex the max diar	tower or on a	<b>✓</b>	N/A				
3		tower and sensors plur			<b>✓</b>	N/A				
4		temperature shields po diated heat sources suc			<b>✓</b>					
5	condition surface a	perature and RH sensons? (i.e. ground below and not steeply sloped. water should be avoid	sensors should Ridges, hollow	be natural	✓					
6	Is the so	lar radiation sensor pl	umb?		<b>✓</b>	N/A				
7	Is it sited light?	l to avoid shading, or a	any artificial o	r reflected	<b>✓</b>	N/A				
8	Is the ra	in gauge plumb?			<b>✓</b>	N/A				
9	Is it sited towers, o	l to avoid sheltering efetc?	fects from buil	dings, trees,	<b>✓</b>	N/A				
10	Is the su facing n	rface wetness sensor si	ted with the gr	rid surface	<b>✓</b>	N/A				

✓ N/A

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

11 Is it inclined approximately 30 degrees?

Site ID   RL141   Technician   Sandy Grenville   Site Visit Date   04/10/2018    1	
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  Signs of wear	
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  Signs of wear	
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  Signs of wear	
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  ✓ Signs of wear	
scratches?  Is the surface wetness sensor grid clean and undamaged?  Are the sensor signal and power cables intact, in good  Signs of wear	
Are the sensor signal and power cables intact, in good  Signs of wear	
The the sensor signal and power cases mixed, in good	
condition, and well maintained?	
Are the sensor signal and power cable connections protected from the elements and well maintained?	
ovide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or tural or man-made, that may affect the monitoring parameters:  e meteorological signals were not functioning upon arrival. The site operator removed the relative humidity signal values to normal. Signal cables are showing signs of wear with some missing insulation and bear wires.	

### Field Systems Data Form F-02058-1500-S5-rev002 IRL141 Technician Sandy Grenville Site Visit Date 04/10/2018 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 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? **~** 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:

# Field Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	IRL141	Technician	Sandy Grenville		Site Vis	it Date 04/10/201	8	
	DAS, se	nsor translators, and	peripheral equi	pment operation	ıs ar	nd maintena	<u>nce</u>		
1	Do the I	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 g protection circuitry	_	through	<b>✓</b>	Met sensors	only		
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	e 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?						
11	Tower c	omments?				<b>V</b>		✓	
		additional explanationan-made, that may a				y) regardin	g conditions listed	d above, or a	nny other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 IRL141 Technician Sandy Grenville Site Visit Date 04/10/2018 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** 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** $\checkmark$ **V Humidity sensor translator Surge protector** 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 ✓ SSRF ✓ V ✓ V Site Ops Manual** Feb 2014 **V HASP ✓** Feb 2014 **Field Ops Manual Calibration Reports ✓ 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 current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? **~** 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 IRL141 Technician Sandy Grenville Site Visit Date 04/10/2018 Site ID Site operation procedures on-site 7/9/2001 by MACTEC 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** N/A **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **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** N/A In-line Filter Replacement (at analyze **V V** Weekly Sample Line Check for Dirt/Water **~** Weekly **Zero Air Desiccant Check** Unknown Do multi-point calibration gases go through the complete sample train including all filters? **✓** Do automatic and manual z/s/p gasses go through the

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

✓

SSRF, control charts, call-in, logbook

Manual z/s/p performed following ozone inlet filter changes. Leak checks no longer performed.

complete sample train including all filters?

reported? If yes, how?

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

### Field Systems Data Form F-02058-1500-S9-rev002 IRL141 Technician Sandy Grenville Site Visit Date 04/10/2018 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? **✓** Clean gloves on and off Are filters protected from contamination during handling and shipping? How? **~** Are the site conditions reported regularly to the field operations manager or staff? **QC Check Performed Compliant Frequency V** ✓ Semiannually **Multi-point MFC Calibrations** Weekly **V** Flow System Leak Checks **Filter Pack Inspection V ✓** Weekly **Flow Rate Setting Checks V ✓** Weekly **Visual Check of Flow Rate Rotometer** ✓ Semiannually **V In-line Filter Inspection/Replacement ✓** Weekly Sample Line Check for Dirt/Water Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,

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

The site operator is doing an excellent job of handling and changing the filter pack.

# Field Systems Data Form

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

Site ID

IRL141

Technician Sandy Grenville

Site Visit Date 04/10/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	8W2MC12	007024
DAS	Campbell	CR3000	2119	000340
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	1192001899	02759
Flow Rate	Apex	AXMC105LPMDPC	illegible	000593
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4222-C	0802310499	06384
Ozone	ThermoElectron Inc	49i A1NAA	1009241782	000609
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200022	000446
Sample Tower	Aluma Tower	В	AT-61152-A-H8-F	000020
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	14804	illegible
Zero air pump	Werther International	C 70/4	000829161	06909

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number				
SUN	SUM156-Sandy Grenville-04/12/2018									
1	4/12/2018	Computer	Dell	07029	Inspiron 15	Unknown				
2	4/12/2018	DAS	Campbell	000335	CR3000	2114				
3	4/12/2018	Elevation	Elevation	None	1	None				
4	4/12/2018	Filter pack flow pump	Thomas	00235	107CA18	00688001783				
5	4/12/2018	Flow Rate	Apex	000685	AXMC105LPMDPCV	illegible				
6	4/12/2018	Infrastructure	Infrastructure	none	none	none				
7	4/12/2018	Ozone	ThermoElectron Inc	000724	49i A1NAA	1105347328				
8	4/12/2018	Ozone Standard	ThermoElectron Inc	000511	49i A3NAA	0922236888				
9	4/12/2018	Sample Tower	Aluma Tower	03542	Α	none				
10	4/12/2018	Shelter Temperature	Campbell	none	107-L	none				
11	4/12/2018	Siting Criteria	Siting Criteria	None	1	None				
12	4/12/2018	Temperature	RM Young	05043	41342VO	9639				
13	4/12/2018	Zero air pump	Werther International	06897	C 70/4	000821893				

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2114 SUM156 Sandy Grenville 04/12/2018 DAS Primary Das Date: 4 /12/2018 **Audit Date** 4 /12/2018 Datel Parameter DAS Mfg 10:27:20 10:27:20 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** 102 Das Day: 102 **Audit Day** Tfer ID 01320 **Low Channel: High Channel: Avg Diff: Avg Diff: Max Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0001 0.0001 0.0001 0.0001 2/13/2012 1.00000 **Cert Date** CorrCoff Fluke **Parameter** DAS Mfg **Serial Number** 95740135 Tfer Desc. DVM 01311 Tfer ID 1.00000 0.00000 **Slope Intercept** 2/13/2018 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 0.0000 -0.0001 0.0000 0.0001 V V 7 0.1000 0.0998 0.0999 0.0001 7 0.3000 0.2996 0.2997 V V 0.0001 7 0.5000 0.4995 0.4995 V V 0.00007 0.7000 V V 0.0000 0.6994 0.6994 7 V V 0.9000 0.8993 0.8992 -0.0001 7 1.0000 0.9991 0.9990 V V -0.0001

## Flow Data Form

pex	ill	legible	ļ	SUM156	Sar	ndy Grenville	04/12/2018 Flow Ra		ate	000685	
						Mfg			arameter Flo	ow Rate	
						Serial Number		т	fer Desc. Bl	OS 220-H	
								1	iei Desc. Di	00 220 11	
					'	Tfer ID	01414				
						Slope	1.	00055 Inte	ercept	-0.0157	
						Cert Date	2/2	1/2018 Cor	rCoff	1.0000	
					L	——————————————————————————————————————		.,,2010	TCOII		
DAS 1:			<b>DAS 2:</b>			Cal Factor Z	ero		0		
A Avg % Diff:	A Max		A Avg %I	Dif A Max	% Di	Cal Factor F	ull Scale		1		
2.17%		2.60%				Rotometer R	eading:	1.3	35		
Desc.	Tes	st type	-	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	II PctDifference	
	pump		0.000	0.000	0.00	0.000	-0.01				
	leak c		0.000	0.000	0.01	0.000	0.00	l/m	1/m	1.050	
	test pt		1.518 1.522	1.530 1.540	1.51	0.000	1.50	1/m 1/m	1/m 1/m	-1.96% -2.60%	
	test pt		1.522	1.530	1.50	0.000	1.50	1/m	1/m	-2.009	
Sensor Component Leak Test		Condition				Status pass					
_					_						
Sensor Compo	onent	I ubing C	ondition		Condition	ondition Good			Status pass		
Sensor Compo	nent	Filter Pos	sition	Cond		n Good		Status	Status pass		
Sensor Compo	nent	Rotomete	er Condition	l	Condition	Clean and dry	Clean and dry		Status pass		
				Status							
Sensor Component Moisture Present											
Sensor Compo	onent	Filter Dist	tance		Condition	4.0 cm	Status	Status pass			
Sensor Component Filter Depth		Condition	2.0 cm		Status	tus pass					
Sensor Component Filter Azimuth		Condition	270 deg		Status	Status pass					
Sensor Component System Memo		Condition	n	Status	Status pass						
					<u> </u>						

## **Ozone Data Form**

Mfg Se	erial Number Ta	Site	Te	chnician		Site Visi	t Date Para	meter	Owner ID
ThermoElectron Inc 1105347328		SUM156 S		andy Grenville		04/12/20	Ozor	е	000724
Slope: 1.00155 Slope: Intercept -1.06424 Intercept CorrCoff 0.99998 CorrCoff		0.00000 0.00000 0.00000						Parameto	ozone C. Ozone primary stan
DAS 1: A Avg % Diff: A Ma	6Dif A Max 9	Slope Cert Date				tercept orrCoff	0.32915		
2.5%	4.9%			CCI t Da			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		1100000
UseDescription	ConcGroup	Tfer Raw	Tfer			te	Site Unit	Po	ctDifference
primary primary	2	0.04 15.30	-0. 14.				ppb ppb		-4.90%
primary	3	35.00	34.				ppb		-2.29%
primary	4	68.70	68.				ppb		-1.85%
primary	5	110.00	109		108	3.30	ppb		-0.75%
Sensor Component	Sample Train		Condition	Good			Stat	pass	
<b>Sensor Component</b>	sor Component 22.5 degree rule		Condition				Stat	pass	
<b>Sensor Component</b>	mponent Inlet Filter Condition		Condition		Clean		Stat	pass	
Sensor Component	Battery Backup		Condition N/A			Stat	pass		
Sensor Component	Offset		Condition 0.7			Stat	pass		
Sensor Component	Span	Condition		on 1.015		Stat	pass		
Sensor Component	Zero Voltage	Cond		ion N/A		Stat	pass		
<b>Sensor Component</b>	Fullscale Voltage	Condition		on N/A		Stat	pass		
<b>Sensor Component</b>	Cell A Freq.	Condition		on 110.6 kHz		Stat	pass		
<b>Sensor Component</b>	Cell A Noise		Condition		0.3 ppb		Status pas		
<b>Sensor Component</b>	Cell A Flow	Condition		<b>0.73</b> lpm		Status		pass	
<b>Sensor Component</b>	Cell A Pressure		Condition 714.2 mmHg		Status		pass	pass	
<b>Sensor Component</b>	Cell A Tmp.		Condition 37.1 C				Status pass		
<b>Sensor Component</b>	Cell B Freq.		Conditio	97.6 kHz			Stat	Status pass	
<b>Sensor Component</b>	Cell B Noise		Conditio	tion 0.4 ppb			Stat	pass	
<b>Sensor Component</b>	Cell B Flow		Conditio	on 0.66 lpm		Stat	pass		
<b>Sensor Component</b>	Cell B Pressure		Condition	on 713.5 mmHg		Stat	pass		
<b>Sensor Component</b>	Cell B Tmp.		Condition	on			Stat	pass	
<b>Sensor Component</b>	Line Loss		Condition	on Not tested			Stat	pass	
<b>Sensor Component</b>	System Memo		Condition	on			Stat	pass	

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young 9639 SUM156 04/12/2018 Temperature 05043 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 0.22 0.29 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.15 0.06 0.000 0.4 $\mathbf{C}$ 0.29 C Temp Mid Range 24.90 24.61 0.000 24.4 -0.23 primary 0.000 49.0 C -0.15 primary Temp High Range 49.63 49.15 Status Fail Sensor Component | Shield **Condition** Dirty Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** SUM156 Sandy Grenville Shelter Temperature Campbell 04/12/2018 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** 0.91 1.39 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	26.80	26.50	0.000	26.0	C	-0.55		
primary	Temp Mid Range	28.50	28.18	0.000	27.4	С	-0.79		
primary	Temp Mid Range	23.24	22.97	0.000	24.4	C	1.39		
Sensor Con	nponent System Memo		Condition		Status pass				

### **Infrastructure Data For**

Si	te ID	SUM156	Technician	Sandy Grenville	Site Visit Date	04/12/2018	
	Shelter M	ake	Shelter Model	She	lter Size		
	Ekto		8810	640	cuft		
	NAME OF THE OWNER OF THE OWNER.				NE SERVE CETABLE COMPANION		

<b>Sensor Component</b>	Sample Tower Type	Condition	Type A	Status	pass
<b>Sensor Component</b>	Conduit	Condition	Good	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	Fair	Status	pass
<b>Sensor Component</b>	Shelter Condition	Condition	Fair	Status	pass
<b>Sensor Component</b>	Shelter Door	Condition	Good	Status	pass
<b>Sensor Component</b>	Shelter Roof	Condition	Good	Status	pass
Sensor Component	Shelter Floor	Condition	Fair	Status	pass
Sensor Component	Signal Cable	Condition	Fair	Status	pass
Sensor Component	Tubing Type	Condition	3/8 teflon	Status	pass
Sensor Component	Sample Train	Condition	Good	Status	pass

# **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	d Problem
Flow Rate	SUM156	Sandy Grenville	04/12/2018	Moisture Present	Apex	4171		
The filter sample tubing	has drops of moi	sture in low section	s outside the sh	elter.				

# **Field Systems Comments**

#### 1 Parameter: DasComments

The meteorological tower has been removed. The temperature sensor is mounted in a naturally aspirated shield on the sample tower which is not grounded.

### 2 Parameter: SitingCriteriaCom

The site is surrounded by pine trees on land managed by the forest service. A few trees are now 17 meters tall and within 17 meters of the sample tower. Most trees are 30 meters from the sample tower.

### 3 Parameter: ShelterCleanNotes

The shelter is clean and well organized.. The site operator does an excellent job of organizing and maintaining the site.

### 4 Parameter: PollAnalyzerCom

There is water in the flow tubing outside the shelter. Trees to the north are less than 20 meters from the sample inlets.

### 5 Parameter: MetOpMaintCom

The temperature sensor shield is dirty and the signal cable is showing signs of wear.

#### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 04/12/2018 SUM156 Technician Sandy Grenville Site ID Sumatra **USGS Map** EPA/USFS Site Sponsor (agency) Map Scale USFS/private **Operating Group Map Date** 12-077-9991 AQS# R.M. Young **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude dry, wet **Deposition Measurement QAPP** Longitude Land Use wetlands, woodland - evergreen **QAPP Elevation Meters** flat **Terrain QAPP Declination** Yes Conforms to MLM **OAPP Declination Date** (850) 670-8376 30.110226 **Site Telephone Audit Latitude** Rt 65 **Audit Longitude** -84.99038 Site Address 1 Apalachicola National Forest Site Address 2 **Audit Elevation** 16 Liberty County **Audit Declination** Bristol, FL City, State **Present** Fire Extinguisher 32321 New in 2015 Zip Code Eastern **First Aid Kit** Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # none **Climbing Belt** Primary Op. E-mail **Backup Operator** none **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

**Driving Directions** 

Shelter Clean

Site OK

**✓** Notes

**✓** Notes

maintaining the site.

From Tallahassee take Hwy 20 west about 25 miles to Hosford. Turn left (south) on Hwy 65 at the intersection in Hosford. Continue about 22 miles on Hwy 65 past Wilma. Turn right on a dirt road and bear left continuing south parallel to Hwy 65. The site will be visible on the right.

The shelter is clean and well organized.. The site operator does an excellent job of organizing and

## Field Systems Data Form

F-02058-1500-S2-rev002

Site ID SUM156 Technician Sandy Grenville Site Visit Date 04/12/2018

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		$\checkmark$
Limited agricultural operations	200 m		✓
Large parking lot	200 m		✓
Small parking lot	100 m		✓
Tree line	50 m	17 m	
Obstacles to wind	10 times obstacle height		<b>~</b>

Siting Distances OK **✓** 

**Siting Criteria Comment** 

The site is surrounded by pine trees on land managed by the forest service. A few trees are now 17 meters tall and within 17 meters of the sample tower. Most trees are 30 meters from the sample tower.

Fie	eld Systems Data Form		F-02058-1500-S3-rev002
Site	SUM156 Technician Sandy Grenville		Site Visit Date 04/12/2018
1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	<b>✓</b>	N/A
2	Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind)	<b>✓</b>	N/A
3	Are the tower and sensors plumb?	<b>✓</b>	N/A
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?	<b>✓</b>	
5	Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)	✓	
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/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	<b>✓</b>	N/A
10	Is the surface wetness sensor sited with the grid surface facing north?	<b>✓</b>	N/A

✓ N/A

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

11 Is it inclined approximately 30 degrees?

Fie	Field Systems Data Form				F-02058-1500-S4-rev				
Site	e ID	SUM156	Technician	Sandy Grenville		Site Visit Date 04/12/2018			
1		the meterological sensition, and well maintain		intact, in good	<b>✓</b>				
2		ll the meteorological so ting data?	ensors operational	l online, and	<b>✓</b>				
3	Are th	ne shields for the temp	erature and RH s	ensors clean?		Dirty			
4	Are th	ne aspirated motors wo	orking?		<b>✓</b>	N/A			
5	Is the scrate	solar radiation sensor hes?	's lens clean and f	ree of	<b>✓</b>	N/A			
6	Is the	surface wetness senso	r grid clean and u	ndamaged?	<b>✓</b>	N/A			
7		ne sensor signal and po tion, and well maintair		, in good		Signs of wear			
8		ne sensor signal and po the elements and well i		tions protected	✓				
		y additional explanational explanation			ary)	y) regarding conditions listed above, or any other features,			
The t	empera	ature sensor shield is dir	ty and the signal ca	able is showing si	gns	s of wear.			

### Field Systems Data Form F-02058-1500-S5-rev002 SUM156 Technician Sandy Grenville Site Visit Date 04/12/2018 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? Trees 17 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? **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 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? **~** 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,

There is water in the flow tubing outside the shelter. Trees to the north are less than 20 meters from the sample inlets.

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

# **Field Systems Data Form**

F-02058-1500-S6-rev002

Site	e ID	SUM156	Technician	Sandy Grenville		Site Visit Date	04/12/201	8	
	DAS, se	nsor translators, and j	peripheral equip	oment operation	ns ai	nd maintenance			
1	Do the I	OAS instruments appeintained?		-					
2		the components of the backup, etc)	DAS operationa	al? (printers,	<b>✓</b>				
3		nalyzer and sensor sig g protection circuitry		hrough	✓	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 chan  Are the DAS, sensor translators, and shelter properly								
6	grounded?								
7	Does the instrument shelter have a stable power source?				✓				
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	mple tower stable and	l grounded?						
11	Tower o	omments?							

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. The temperature sensor is mounted in a naturally aspirated shield on the sample tower which is not grounded.

#### **Field Systems Data Form** F-02058-1500-S7-rev002 SUM156 Technician Sandy Grenville Site Visit Date 04/12/2018 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 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** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V** $\checkmark$ **~ Humidity sensor translator Surge protector** П **V ~ UPS Solar radiation translator ~ V** Tipping bucket rain gauge Lightning protection device ~ $\checkmark$ **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 ✓ SSRF ✓ V ✓ Site Ops Manual** Oct 2010 **HASP ✓** Oct 2010 **Field Ops Manual Calibration Reports V** 2/2/2016 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:

#### **Field Systems Data Form** F-02058-1500-S8-rev002 SUM156 Technician Sandy Grenville Site Visit Date 04/12/2018 Site ID Site operation procedures Trained on-site in 1989 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 Compliant Frequency** $\checkmark$ **V** N/A **Multipoint Calibrations V V** N/A **Visual Inspections** ~ N/A Translator Zero/Span Tests (climatronics) **✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values ✓ ✓** 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** ✓ Somiannually

Politi Calibrations	Semiannual	пу	-
<b>Automatic Zero/Span Tests</b>	<b>✓</b> Daily		$\checkmark$
Manual Zero/Span Tests	✓ As needed		$\checkmark$
<b>Automatic Precision Level Tests</b>	<b>✓</b> Daily		$\checkmark$
<b>Manual Precision Level Test</b>	✓ As needed		$\checkmark$
<b>Analyzer Diagnostics Tests</b>	✓ Weekly		$\checkmark$
<b>In-line Filter Replacement (at inlet)</b>	✓ Every 2 wee	eks	$\checkmark$
In-line Filter Replacement (at analyze	□ N/A		$\checkmark$
Sample Line Check for Dirt/Water	✓ Weekly		$\checkmark$
Zero Air Desiccant Check	Weekly		$\checkmark$
1 Do multi-point calibration gases go thr sample train including all filters?	rough the complete	Unknown	
2 Do automatic and manual z/s/p gasses complete sample train including all filt	0		
3 Are the automatic and manual z/s/p ch reported? If yes, how?	ecks monitored and	SSRF, logbook, call-in	

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

#### Field Systems Data Form F-02058-1500-S9-rev002 SUM156 Technician Sandy Grenville Site Visit Date 04/12/2018 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? **✓** 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:

# Field Systems Data Form

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

Site ID

SUM156

Technician Sandy Grenville

Site Visit Date 04/12/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07029
DAS	Campbell	CR3000	2114	000335
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	00688001783	00235
Flow Rate	Apex	AXMC105LPMDPC	illegible	000685
Infrastructure	Infrastructure	none	none	none
Ozone	ThermoElectron Inc	49i A1NAA	1105347328	000724
Ozone Standard	ThermoElectron Inc	49i A3NAA	0922236888	000511
Sample Tower	Aluma Tower	A	none	03542
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VO	9639	05043
Zero air pump	Werther International	C 70/4	000821893	06897

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
PET	7427-Martin	Valvur-04/16/2018				
1	4/16/2018	Computer	Hewlett Packard	none	6560 b	5CB22906TB
2	4/16/2018	DAS	Environmental Sys Corp	90641	8816	2526
3	4/16/2018	Elevation	Elevation	None	1	None
4	4/16/2018	Filter pack flow pump	Thomas	none	107CAB18B	071100039615
5	4/16/2018	Flow Rate	Alicat	none	MC-10SLPM-D-PCV	150339
6	4/16/2018	Infrastructure	Infrastructure	none	none	none
7	4/16/2018	Ozone	ThermoElectron Inc	none	49i A3NAA	CM08460048
8	4/16/2018	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	1211052489
9	4/16/2018	Sample Tower	Aluma Tower	none	В	none
10	4/16/2018	Shelter Temperature	ARS	none	none	none
11	4/16/2018	Siting Criteria	Siting Criteria	None	1	None
12	4/16/2018	Temperature2meter	RM Young	none	41342	029201
13	4/16/2018	Zero air pump	Werther International	none	PC 70/4	531382

#### **DAS Data Form** 0.33 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg **Environmental Sys** 2526 PET427 Martin Valvur 04/16/2018 DAS Primary Das Date: 4 /16/2018 **Audit Date** 4 /16/2018 HY Parameter DAS Mfg 8:44:25 8:44:45 Das Time: **Audit Time** Tfer Desc. Source generator (D 12010039329 **Serial Number** 106 Das Day: 106 **Audit Day** Tfer ID 01322 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0003 0.0001 0.0003 0.0001 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 14 0.0000 -0.0004 -0.0003 0.0001 V V 14 0.1000 0.0996 0.0999 0.0003 14 0.3000 0.2995 0.2993 V V -0.0002 14 0.5000 0.4996 V V 0.00000.4996 0.7000 V V 0.0000 14 0.6992 0.6992 V V 14 0.9000 0.8998 0.8997 -0.0001 14 0.9996 V V 0.0001 1.0000 0.9997

## Flow Data Form

Afg	Se	rial Num	iber Ta S	ite	Tec	hnician	Site Visit I	Date Parar	neter	Owner ID	
Alicat	1:	50339		PET427	Ma	rtin Valvur	04/16/2018	Flow F	Rate	none	
					]	Mfg	BIOS	I	Parameter Flo	w Rate	
						Serial Number	148613 <b>T</b>		Γfer Desc. BIC	)S 220-H	
					,	Γfer ID	01421				
						Slope	0.	98450 Int	ercept	0.1030	
					•	Cert Date	3/	1/2018 <b>Co</b>	rrCoff	1.0000	
DAS 1:			DAS 2:			Cal Factor Z	ero	-0.0	15		
Avg % Diff:	A Max	x % Di	A Avg %I	Dif A Max	% Di	Cal Factor F	ull Scale	5.0	28		
0.39% 0.57% Rotometer Reading:					3.	45					
Desc.	Tes	st type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	utSignal Output S E In		OutputSignall	PctDifference	
primary	pump		0.000	0.000	0.01	0.0000	0.00	l/m	1/m		
primary	leak c		0.000	0.000	0.01	0.0000	-0.01	l/m	1/m		
primary	test pt		3.042	2.990	3.00	0.0000	3.01	l/m	1/m	0.57%	
primary	test pt		3.044	2.990	3.00	0.0000	3.01	1/m	l/m	0.549	
primary	test pt	3	3.063	3.010	3.00	0.0000	3.01	1/m	1/m	-0.07%	
Sensor Compo	onent	Leak Test	t		Condition	1		Statu	pass		
Sensor Compo	onent	Tubing Co	ondition		Condition	Good		Statu	s pass		
Sensor Compo	onent	Filter Pos	ition		Condition	Good		Statu	pass		
Sensor Compo	onent	Rotomete	r Condition		Condition	Clean and dry		Statu	pass		
Sensor Compo	onent	Moisture I	Present		Condition	No moisture pr	resent	Statu	Status pass		
Sensor Compo	onent	Filter Dist	ance		Condition	4.5 cm		Statu	Status pass		
Sensor Compo	onent	Filter Dep	oth		Condition	0.2 cm		Statu	s pass		
Sensor Compo	onent	Filter Azir	nuth		Condition	90 deg		Statu	Status pass		
Sensor Component System Memo		Condition	1		Statu	Status pass					

## **Ozone Data Form**

Note	Mfg Se	erial Number Ta	Site	Te	chnician		Site Visit	Date Param	eter Owner ID
DAS 1:	ThermoElectron Inc	CM08460048	PET427	Ma	artin Valv	ur	04/16/201	18 Ozone	none
A Avg % Diff: A Max % Di	Intercept -0.1	4499 Intercept	0.00000	)	Serial N		49CPS-70		
UseDescription					Slope		1	1.00801 Inte	rcept -0.05199
UseDescription   ConeGroup   Tifer Raw   Tifer Corr   Site   Site Unit   PetDifference   primary   1   0.26   0.30   0.43   ppb   1.196%   primary   2   13.81   13.75   13.48   ppb   1.196%   primary   3   36.12   35.88   35.25   ppb   1.176%   primary   4   69.50   68.99   68.08   ppb   1.32%   primary   5   116.96   116.08   115.30   ppb   -1.32%   primary   5   116.96   116.08   115.30   ppb   -0.67%   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   Sensor Component   Condition   Condition   O.11   Status   pass   Sensor Component   Span   Condition   0.997   Status   pass   Sensor Component   Span   Condition   0.0002   Status   pass   Sensor Component   Evolvitage   Condition   0.0002   Status   pass   Sensor Component   Cell A Freq.   Condition   10.76   kHz   Status   pass   Sensor Component   Cell A Pies   Condition   0.67   pm   Status   pass   Sensor Component   Cell A Piessure   Condition   0.67   pm   Status   pass   Sensor Component   Cell A Pressure   Condition   0.89   Status   pass   Sensor Component   Cell A Trop.   Condition   0.80   Status   pass   Sensor Component   Cell A Trop.   Condition   0.80   Status   pass   Sensor Component   Cell B Freq.   Condition   0.80   Status   pass   Sensor Component   Cell B Freq.   Condition   0.80   Status   pass   Sensor Component   Cell B Freq.   Condition   0.80   Status   pass   Sensor Component   Cell B Fressure   Condition   Condition   Status   pass   Sensor Component   Cell B Fressure   Condition   Condition   Status   pass   Sensor Component   Cell B Fressure   Condition   Condition   Status   pass   Sensor Component   Cell B Fressure   Condition   Condition   Status   pass   Sensor Component   Cell B Fressure   Condition   Condition   Status   pass   Sensor Component   Cell B Fressure   Condition   Condition   Status   pass   Condition   Status   pas			Dif A Max 9	% Di	Cert Da	ite	9/	11/2017 Cor	rCoff 1.00000
primary   1   0.26   0.30   0.43   ppb			TC D.	TrC	C - · · ·	G.	4.	C'A TILLA	D. (D. CC.
primary   2   13.81   13.75   13.48   ppb   -1.96%	•	ConcGroup							PctDifference
primary		2					1	•	-1.96%
primary 5 116.96 116.08 115.30 ppb -0.67%  Sensor Component Sample Train Condition Good Status pass  Sensor Component 22.5 degree rule Condition Status pass  Sensor Component Inlet Filter Condition Condition Clean Status pass  Sensor Component Battery Backup Condition N/A Status pass  Sensor Component Offset Condition 0.1 Status pass  Sensor Component Span Condition 0.997 Status pass  Sensor Component Zero Voltage Condition 0.0002 Status pass  Sensor Component Fullscale Voltage Condition 1.0000 Status pass  Sensor Component Cell A Freq. Condition 107.6 kHz Status pass  Sensor Component Cell A Flow Condition 0.67 lpm Status pass  Sensor Component Cell A Tmp. Condition 33.8 C Status pass  Sensor Component Cell B Freq. Condition 109.3 kHz Status pass  Sensor Component Cell B Noise Condition 109.3 kHz Status pass  Sensor Component Cell B Freq. Condition 109.3 kHz Status pass  Sensor Component Cell B Freq. Condition 109.3 kHz Status pass  Sensor Component Cell B Freq. Condition 109.3 kHz Status pass  Sensor Component Cell B Freq. Condition 109.5 mmHg Status pass  Sensor Component Cell B Freq. Condition 109.5 mmHg Status pass  Sensor Component Cell B Freq. Condition 109.5 mmHg Status pass  Sensor Component Cell B Freq. Condition 109.5 mmHg Status pass  Sensor Component Cell B Freq. Condition 109.5 mmHg Status pass  Sensor Component Cell B Freq. Condition 109.5 mmHg Status pass  Sensor Component Cell B Freq. Condition 109.5 mmHg Status pass  Sensor Component Cell B Tmp. Condition Not tested Status pass	primary	3	36.12	35.	.88	35	.25 p	pb	-1.76%
Sensor Component Sample Train Condition Good Status pass Sensor Component 22.5 degree rule Condition Status pass Sensor Component Inlet Filter Condition Condition Clean Status pass Sensor Component Battery Backup Condition N/A Status pass Sensor Component Offset Condition 0.1 Status pass Sensor Component Span Condition 0.997 Status pass Sensor Component Zero Voltage Condition 0.0002 Status pass Sensor Component Fullscale Voltage Condition 1.0000 Status pass Sensor Component Cell A Freq. Condition 1.0000 Status pass Sensor Component Cell A Noise Condition 0.6 ppb Status pass Sensor Component Cell A Flow Condition 0.67 lpm Status pass Sensor Component Cell A Freq. Condition 0.67 lpm Status pass Sensor Component Cell A Trp. Condition 33.8 C Status pass Sensor Component Cell B Freq. Condition 109.3 kHz Status pass Sensor Component Cell B Freq. Condition 109.3 kHz Status pass Sensor Component Cell B Freq. Condition 109.5 ppb Status pass Sensor Component Cell B Freq. Condition 109.5 ppb Status pass Sensor Component Cell B Freq. Condition 109.5 ppb Status pass Sensor Component Cell B Freq. Condition 109.5 ppb Status pass Sensor Component Cell B Freq. Condition 109.5 ppb Status pass Sensor Component Cell B Freq. Condition 109.5 ppb Status pass Sensor Component Cell B Freq. Condition 109.5 ppb Status pass Sensor Component Cell B Fressure Condition 109.5 ppb Status pass Sensor Component Cell B Frep. Condition 109.5 ppd Status pass Sensor Component Cell B Frep. Condition 109.5 ppd Status pass							1	pb	
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 0.1 Status pass Sensor Component Span Condition 0.997 Status pass Sensor Component Zero Voltage Condition 0.0002 Status pass Sensor Component Fullscale Voltage Condition 1.0000 Status pass Sensor Component Cell A Freq. Condition 10.76 kHz Status pass Sensor Component Cell A Noise Condition 0.6 ppb Status pass Sensor Component Cell A Flow Condition 0.67 lpm Status pass Sensor Component Cell A Freq. Condition 0.69.8 mmHg Status pass Sensor Component Cell A Tmp. Condition 10.93 kHz Status pass Sensor Component Cell B Freq. Condition 10.93 kHz Status pass Sensor Component Cell B Freq. Condition 10.8 ppb Status pass Sensor Component Cell B Freq. Condition 10.8 ppb Status pass Sensor Component Cell B Freq. Condition 10.8 ppb Status pass Sensor Component Cell B Freq. Condition 10.8 ppb Status pass Sensor Component Cell B Freq. Condition 10.8 ppb Status pass Sensor Component Cell B Freq. Condition 10.8 ppb Status pass Sensor Component Cell B Freq. Condition 10.8 ppb Status pass Sensor Component Cell B Freq. Condition 10.8 ppb Status pass Sensor Component Cell B Freq. Condition 10.8 ppb Status pass Sensor Component Cell B Freq. Condition 10.8 pps Status pass Sensor Component Cell B Freq. Condition 10.8 pps Status pass Sensor Component Cell B Freq. Condition 10.8 pps Status pass Sensor Component Cell B Freq. Condition 10.8 pps Status pass	primary	5	116.96	116	5.08	115	5.30 p	pb	-0.67%
Sensor Component       Inlet Filter Condition       Condition       Clean       Status       pass         Sensor Component       Battery Backup       Condition       N/A       Status       pass         Sensor Component       Offset       Condition       0.1       Status       pass         Sensor Component       Span       Condition       0.997       Status       pass         Sensor Component       Zero Voltage       Condition       0.0002       Status       pass         Sensor Component       Fullscale Voltage       Condition       1.0000       Status       pass         Sensor Component       Cell A Freq.       Condition       1.0000       Status       pass         Sensor Component       Cell A Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell A Tmp.       Condition       0.93 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Flow       Condition       0.69.5 mmHg       Status       pass	<b>Sensor Component</b>	Sample Train		Conditio	Good			Status	pass
Sensor Component       Battery Backup       Condition       N/A       Status       pass         Sensor Component       Offset       Condition       0.1       Status       pass         Sensor Component       Span       Condition       0.997       Status       pass         Sensor Component       Zero Voltage       Condition       0.0002       Status       pass         Sensor Component       Fullscale Voltage       Condition       1.0000       Status       pass         Sensor Component       Cell A Freq.       Condition       107.6 kHz       Status       pass         Sensor Component       Cell A Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       609.8 mmHg       Status       pass         Sensor Component       Cell B Freq.       Condition       0.8 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       609.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass </td <td>Sensor Component</td> <td>22.5 degree rule</td> <td></td> <td>Conditio</td> <td>on</td> <td></td> <td></td> <td>Status</td> <td>pass</td>	Sensor Component	22.5 degree rule		Conditio	on			Status	pass
Sensor Component Offset Condition 0.1 Status pass  Sensor Component Span Condition 0.997 Status pass  Sensor Component Zero Voltage Condition 0.0002 Status pass  Sensor Component Fullscale Voltage Condition 1.0000 Status pass  Sensor Component Cell A Freq. Condition 107.6 kHz Status pass  Sensor Component Cell A Noise Condition 0.6 ppb Status pass  Sensor Component Cell A Flow Condition 0.67 lpm Status pass  Sensor Component Cell A Pressure Condition 609.8 mmHg Status pass  Sensor Component Cell B Freq. Condition 109.3 kHz Status pass  Sensor Component Cell B Freq. Condition 109.3 kHz Status pass  Sensor Component Cell B Noise Condition 0.67 lpm Status pass  Sensor Component Cell B Freq. Condition 109.3 kHz Status pass  Sensor Component Cell B Pressure Condition 0.67 lpm Status pass  Sensor Component Cell B Freq. Condition 0.67 lpm Status pass  Sensor Component Cell B Pressure Condition 0.67 lpm Status pass  Sensor Component Cell B Pressure Condition 609.5 mmHg Status pass  Sensor Component Cell B Tmp. Condition Not tested Status pass	Sensor Component	Inlet Filter Conditio	n	Conditio	on Clean			Status	pass
Sensor Component       Span       Condition       0.997       Status       pass         Sensor Component       Zero Voltage       Condition       0.0002       Status       pass         Sensor Component       Fullscale Voltage       Condition       1.0000       Status       pass         Sensor Component       Cell A Freq.       Condition       107.6 kHz       Status       pass         Sensor Component       Cell A Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell A Trp.       Condition       609.8 mmHg       Status       pass         Sensor Component       Cell B Freq.       Condition       109.3 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.8 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       609.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass	<b>Sensor Component</b>	Battery Backup		Conditio	N/A			Status	pass
Sensor Component       Zero Voltage       Condition       0.0002       Status       pass         Sensor Component       Fullscale Voltage       Condition       1.0000       Status       pass         Sensor Component       Cell A Freq.       Condition       107.6 kHz       Status       pass         Sensor Component       Cell A Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell A Tmp.       Condition       33.8 C       Status       pass         Sensor Component       Cell B Freq.       Condition       109.3 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.8 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass	Sensor Component	Offset		Conditio	on 0.1			Status	pass
Sensor Component       Fullscale Voltage       Condition       1.0000       Status       pass         Sensor Component       Cell A Freq.       Condition       107.6 kHz       Status       pass         Sensor Component       Cell A Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       609.8 mmHg       Status       pass         Sensor Component       Cell B Freq.       Condition       109.3 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.8 ppb       Status       pass         Sensor Component       Cell B Fressure       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	Sensor Component	Span		Conditio	on 0.997			Status	pass
Sensor Component       Cell A Freq.       Condition       107.6 kHz       Status       pass         Sensor Component       Cell A Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       609.8 mmHg       Status       pass         Sensor Component       Cell A Tmp.       Condition       33.8 C       Status       pass         Sensor Component       Cell B Freq.       Condition       109.3 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.8 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       One of the condition       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass	Sensor Component	Zero Voltage		Conditio	0.000	2		Status	pass
Sensor Component       Cell A Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       33.8 C       Status       pass         Sensor Component       Cell B Freq.       Condition       109.3 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.8 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       609.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass	Sensor Component	Fullscale Voltage		Conditio	n 1.000	0		Status	pass
Sensor ComponentCell A FlowCondition0.67 lpmStatuspassSensor ComponentCell A PressureCondition609.8 mmHgStatuspassSensor ComponentCell A Tmp.Condition33.8 CStatuspassSensor ComponentCell B Freq.Condition109.3 kHzStatuspassSensor ComponentCell B NoiseCondition0.8 ppbStatuspassSensor ComponentCell B FlowCondition0.67 lpmStatuspassSensor ComponentCell B PressureCondition609.5 mmHgStatuspassSensor ComponentCell B Tmp.ConditionStatuspassSensor ComponentLine LossConditionNot testedStatuspass	Sensor Component	Cell A Freq.		Conditio	on 107.6	kHz		Status	pass
Sensor Component       Cell A Pressure       Condition       609.8 mmHg       Status       pass         Sensor Component       Cell A Tmp.       Condition       33.8 C       Status       pass         Sensor Component       Cell B Freq.       Condition       109.3 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.8 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       Gondition       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass	Sensor Component	Cell A Noise		Conditio	0.6 pp	b		Status	pass
Sensor Component       Cell A Tmp.       Condition       33.8 C       Status       pass         Sensor Component       Cell B Freq.       Condition       109.3 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.8 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       609.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass	Sensor Component	Cell A Flow		Conditio	on 0.67 l	om		Status	pass
Sensor Component       Cell B Freq.       Condition       109.3 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.8 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       609.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	Sensor Component	Cell A Pressure		Conditio	on 609.8	mmHg		Status	pass
Sensor Component       Cell B Noise       Condition       0.8 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       609.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	Sensor Component	Cell A Tmp.		Conditio	33.8 C			Status	pass
Sensor Component       Cell B Flow       Condition       0.67 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       609.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	Sensor Component	Cell B Freq.		Conditio	on 109.3	kHz		Status	pass
Sensor Component       Cell B Pressure       Condition       609.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	Sensor Component	Cell B Noise		Conditio	0.8 pp	b		Status	pass
Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	<b>Sensor Component</b>	Cell B Flow		Conditio	on 0.67 l	om		Status	pass
Sensor Component Line Loss Condition Not tested Status pass	Sensor Component	Cell B Pressure		Conditio	on 609.5	mmHg		Status	pass
	Sensor Component	Cell B Tmp.		Conditio	on			Status	pass
Sensor Component System Memo Condition Status pass	Sensor Component	Line Loss		Conditio	Not te	sted		Status	pass
	Sensor Component	System Memo		Conditio	on			Status	pass

#### 2 Meter Temperature Data Form Calc. Difference Serial Number Ta **Technician** Site Visit Date Parameter Mfg Site **Owner ID** PET427 Martin Valvur RM Young 029201 04/16/2018 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 0.66 0.76 Test type UseDescription InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit Difference 0.0000 0.58 C primary Temp Low Rang 0.03 0.05 0.53 Temp Mid Rang 24.72 24.74 0.0000 25.42 C 0.68 primary primary Temp High Rang 47.16 47.19 0.0000 47.95 C 0.76 Sensor Component | Properly Sited **Condition** Properly sited **Status** pass Condition Clean Sensor Component | Shield **Status** pass Condition Functioning Status pass Sensor Component Blower Sensor Component Blower Status Switch Status pass **Condition** N/A Sensor Component | System Memo Condition Status pass

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Martin Valvur ARS PET427 04/16/2018 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** 0.35 0.79 01229 **Tfer ID** -0.01977 **Slope** 0.99986 Intercept 1/24/2018 1.00000 **Cert Date** CorrCoff OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. 0.000-0.79 primary Temp Mid Range 25.48 25.50 24.7 C 25.59 25.61 0.000 C 0.04 Temp Mid Range 25.7 primary

0.000

27.3

C

Status pass

0.22

27.11

Condition

27.09

primary

Temp Mid Range

Sensor Component | System Memo

### **Infrastructure Data For**

Site ID	PET427	Technician	Martin Valvur	Site Visit Date	04/16/2018	

Shelter Make	Shelter Model	Shelter Size	
Ekto	8814	896 cuft	

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

# **Field Systems Comments**

1 Parameter: SiteOpsProcComm

completing the site observation section of the SSRF was discussed with the operator. Clean gloves are now used to remove and install the dry deposition filter pack.

2 Parameter: DasComments

The heating and air conditioning systems run simultaneously. The towers are not grounded.

3 Parameter: DocumentationCo

The most recent calibration and maintenance report is not available onsite.

4 Parameter: ShelterCleanNotes

The shelter is dusty, but in good condition, well organized and maintained.

#### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 04/16/2018 PET427 Technician Martin Valvur Site ID Padilla Tank **USGS Map** NPS/EPA Site Sponsor (agency) Map Scale NPS **Operating Group Map Date** 04-017-0119 AQS# R.M. Young **Meteorological Type Air Pollutant Analyzer** Ozone, neph **QAPP** Latitude **Deposition Measurement** dry, wet **QAPP** Longitude desert Land Use **QAPP Elevation Meters** flat Terrain **QAPP Declination** Yes Conforms to MLM **OAPP Declination Date** (928) 524-6668 34.822508 **Site Telephone Audit Latitude** -109.892485 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 1712 Navajo 10.5 County **Audit Declination** Petrified Forest, AZ City, State **Present** Fire Extinguisher 85942 Inspected March 2018 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 8814 Ekto **Shelter Size** 896 cuft **✓** Notes The shelter is dusty, but in good condition, well organized and maintained. Shelter Clean **✓** Notes Site OK From I-40 take exit 311 to the Petrified Forest. The site operator's office is located in the visitors center. The site is **Driving Directions** another 25 miles further south on the park road near the Rainbow Forest at the south end of the park, 1.5 miles west

of the main road on a closed side road. The gate at the side road is usually open. The park ranger horse stable is

located past the site on the side road.

# Field Systems Data Form

F-02058-1500-S2-rev002

Site ID PET427 Technician Martin Valvur Site Visit Date 04/16/2018

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

Fie	eld Systems Data Form		F-02058-1500-S3-rev002
Site	PET427 Technician Martin Valvur		Site Visit Date 04/16/2018
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	✓	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?	<b>✓</b>	N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	<b>✓</b>	N/A
10	Is the surface wetness sensor sited with the grid surface facing north?	✓	N/A
11	Is it inclined approximately 30 degrees?	<b>✓</b>	N/A

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

Fi	Field Systems Data Form								F-02058-1500-S4-rev002
Sit	te I	ID	PET427		Technicia	Martin Valvu	r	Site Visit Date	e 04/16/2018
1			he meterolog			be intact, in go	od 🔽	Temperature only	,
2			the meteoro	logical sens	sors operatio	onal online, and	✓	Temperature only	,
3	A	Are the	shields for t	the tempera	ature and R	H sensors clean	?	Temperature only	,
4	A	Are the	e aspirated m	notors worl	king?		<b>✓</b>		
5		Is the se	olar radiatio	on sensor's	lens clean ar	ıd free of	<b>✓</b>	N/A	
6	I	Is the s	urface wetne	ess sensor g	grid clean an	d undamaged?	✓	N/A	
7			e sensor signa on, and well			act, in good	<b>✓</b>		
8			e sensor signa ne elements a			nections protec	ted 🔽		
						or sketch if ne		regarding condit	tions listed above, or any other features,
						<b>81</b>			

F10	eld Sy	stems Data Fo	orm		F-02058-1500-S5-rev002
Site	e ID	PET427	Technician Martin	Valvur	Site Visit Date 04/16/2018
	Siting C	criteria: Are the pollut	ant analyzers and dep	osition equipn	nent sited in accordance with 40 CFR 58, Appendix E
1		sample inlets have at lo	east a 270 degree arc o	ıf 🗸	
2	Are the	sample inlets 3 - 15 m	eters above the ground	d? ✓	
3		sample inlets > 1 meter meters from trees?	er from any major obst	truction,	
	<b>Pollutar</b>	nt analyzers and depos	ition equipment opera	itions and mai	ntenance
1		nnalyzers and equipme on and well maintained	ent appear to be in goo 1?	od 🗸	
2	Are the reporting		rs operational, on-line,	, and	
3	Describe	e ozone sample tube.			1/4 teflon by 12 meters
4	Describe	e dry dep sample tube			3/8 teflon by 8 meters
5		ine filters used in the o	ozone sample line? (if y	yes	At inlet only
6	Are sam		kinks, moisture, and	✓	
7	Is the ze	ero air supply desiccan	t unsaturated?	V	
8	Are the	re moisture traps in th	e sample lines?		
9	Is there clean?	a rotometer in the dry	deposition filter line,	and is it	Clean and dry
			(photograph or sketch		regarding conditions listed above, or any other features,

# Field Systems Data Form

# F-02058-1500-S6-rev002

Site	e ID	PET427	Technician	Martin Valvur		Site Vis	it Date 04/16/20	118	
	DAS, ser	nsor translators, and p	peripheral equi	pment operation	ns ai	nd maintena	<u>nnce</u>		
1		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 g protection circuitry		through	<b>✓</b>	Met sensors	s only		
4		signal connections pro ntained?	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 j	properly	<b>✓</b>				
7	Does the	instrument shelter h	ave a stable pov	ver source?	<b>✓</b>				
8	Is the in	strument shelter temp	oerature control	lled?	<b>✓</b>				
9	Is the m	et tower stable and gr	ounded?			<b>Stable</b>		Grounded	
10	Is the sa	mple tower stable and	l grounded?			<b>✓</b>			
11	Tower c	omments?							
nat	ural or m	additional explanation an-made, that may after a dark conditioning systems.	ffect the monito	ring parameter	s:			ed above, or a	any other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 PET427 Site Visit Date 04/16/2018 Site ID Technician | Martin Valvur **Documentation** Does the site have the required instrument and equipment manuals? Yes No N/A Yes No N/A **✓ V** Wind speed sensor **Data logger V V** Wind direction sensor **Data logger** ✓ **V** П Temperature sensor Strip chart recorder **V V** Relative humidity sensor Computer **V** П Solar radiation sensor **V** Modem ✓ П **V Printer** Surface wetness sensor ✓ **V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V ~ Humidity sensor translator Surge protector** П П **V V UPS Solar radiation translator ~ V** Tipping bucket rain gauge Lightning protection device ~ **✓ Shelter heater** Ozone analyzer **V** $\checkmark$ Filter pack flow controller Shelter air conditioner $\checkmark$ Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V** Dataview **SSRF ✓ V ✓ V Site Ops Manual** Oct 2015 **HASP Field Ops Manual ✓ Calibration Reports** Not current 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? **V** 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:

The most recent calibration and maintenance report is not available onsite.

current?

#### **Field Systems Data Form** F-02058-1500-S8-rev002 PET427 Site Visit Date 04/16/2018 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** N/A **Visual Inspections V** N/A Translator Zero/Span Tests (climatronics) **✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **QC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** Every 4 weeks Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests Manual Precision Level Test V V** Alarm values only **Analyzer Diagnostics Tests ~** Every 4 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Sample Line Check for Dirt/Water Weekly **~ V** Semiannually **Zero Air Desiccant Check ✓** Do multi-point calibration gases go through the complete sample train including all filters? **✓**

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

**✓** 

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?

#### Field Systems Data Form F-02058-1500-S9-rev002 PET427 Technician | Martin Valvur Site Visit Date 04/16/2018 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 No observations correctly? No longer required Are data downloads and backups being performed as scheduled? Are general observations being made and recorded? How? **V** Are site supplies on-hand and replenished in a timely fashion? SSRF Are sample flow rates recorded? How? Are samples sent to the lab on a regular schedule in a timely second day 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 V ✓** Unknown **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:

completing the site observation section of the SSRF was discussed with the operator. Clean gloves are now used to remove and install the dry deposition filter pack.

# Field Systems Data Form

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

Site ID PET427 Technician Martin Valvur Site Visit Date 04/16/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	6560 b	5CB22906TB	none
DAS	Environmental Sys Corp	8816	2526	90641
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18B	071100039615	none
Flow Rate	Alicat	MC-10SLPM-D-PC	150339	none
Infrastructure	Infrastructure	none	none	none
Ozone	ThermoElectron Inc	49i A3NAA	CM08460048	none
Ozone Standard	ThermoElectron Inc	49i A1NAA	1211052489	none
Sample Tower	Aluma Tower	В	none	none
Shelter Temperature	ARS	none	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature2meter	RM Young	41342	029201	none
Zero air pump	Werther International	PC 70/4	531382	none

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
GRO	C474-Martii	n Valvur-04/17/2018				
1	4/17/2018	Computer	Hewlett Packard	none	6560 b	5CB22906T9
2	4/17/2018	DAS	Environmental Sys Corp	90602	8816	2270
3	4/17/2018	Elevation	Elevation	None	1	None
4	4/17/2018	Filter pack flow pump	Thomas	none	107CAB110	109500000031
5	4/17/2018	flow rate	Tylan	none	FC280SAV	AW9805027
6	4/17/2018	Infrastructure	Infrastructure	none	none	none
7	4/17/2018	MFC power supply	Tylan	none	RO-32	illegible
8	4/17/2018	Modem	Sierra wireless	none	GX450	LA54620247001003
9	4/17/2018	Ozone	ThermoElectron Inc	none	49i A3NAA	1023943902
10	4/17/2018	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	1130450191
11	4/17/2018	Printer	Hewlett Packard	none	842C	unknown
12	4/17/2018	Sample Tower	Aluma Tower	03570	В	none
13	4/17/2018	Shelter Temperature	ARS	none	none	none
14	4/17/2018	Siting Criteria	Siting Criteria	None	1	None
15	4/17/2018	Temperature2meter	RM Young	none	41342VC	17626
16	4/17/2018	Zero air pump	Werther International	none	PC70/4	531380

#### **DAS Data Form** 1.37 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg **Environmental Sys** 2270 GRC474 Martin Valvur 04/17/2018 DAS Primary Das Date: 4 /17/2018 **Audit Date** 4 /17/2018 HY Parameter DAS Mfg 10:44:23 10:45:45 Das Time: **Audit Time** Tfer Desc. Source generator (D 12010039329 **Serial Number** 107 Das Day: 107 **Audit Day** Tfer ID 01322 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0006 0.0003 0.0006 0.0003 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 13 0.0000 -0.0003 -0.0003 0.0000 V V 13 0.1000 0.0997 0.0997 0.000013 0.3000 0.2994 0.2993 V V -0.0001 13 0.5000 0.4975 V V 0.0003 0.4972 0.7000 V V 0.0005 13 0.6994 0.6999 V V 13 0.9000 0.8992 0.8997 0.0005 13 1.0000 0.9990 0.9996 V V 0.0006

## Flow Data Form

Mfg	Se	erial Nun	nber Ta	Site	Tec	hnician	Site Visit	Date Parar	neter	Owner ID	
Tylan		AW9805027		GRC474	Ма	rtin Valvur	04/17/201	8 flow ra	ate	none	
Mfg	Tylan					Mfg	BIOS	I	Parameter Flow Rate		
SN/Owner ID	illegible none					Serial Number	148613	7	Tfer Desc. BIOS 220-H		
						Tfer ID	01421				
Parameter	IVIFC	power sup	opiy								
						Slope	0	.98450 Int	ercept	0.1030	
						Cert Date	3/	/1/2018 <b>Co</b>	rrCoff	1.0000	
DAS 1: DAS 2:					L	Cal Factor Z	0.1	0.124			
A Avg % Diff: A Max % Di A Avg			A Avg %l	%Dif A Max % Di		Cal Factor F	ull Scale	5.5	5.567		
1.44%		1.55%				Rotometer R	eading:	3	3.5		
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	-0.18	0.0000	-0.03	l/m	1/m		
primary	leak c	heck	0.000	0.000	-0.18	0.0000	-0.02	1/m	1/m		
primary	test pt	: 1	3.027	2.970	2.67	0.0000	3.02	l/m	1/m	1.55%	
primary	test pt		3.037	2.980	2.67	0.0000	3.02	l/m	1/m	1.21%	
primary	test pt	: 3	3.030	2.970	2.67	0.0000	3.02	l/m	1/m	1.55%	
Sensor Component Leak Test			Conditio	n		Statu	Status pass				
<b>Sensor Component</b>		Tubing Condition		Conditio	<b>n</b> Good	Good		s pass			
<b>Sensor Component</b>		Filter Position			Conditio	Good		Statu	spass		
<b>Sensor Component</b>		Rotometer Condition			Conditio	Clean and dry		Statu	spass		
<b>Sensor Component</b>		Moisture Present			Conditio	No moisture p	resent	Statu	spass		
<b>Sensor Component</b>		Filter Distance			Conditio	4.5 cm		Statu	spass		
<b>Sensor Component</b>		t Filter Depth			Conditio	0.5 cm		Statu	Status pass		
<b>Sensor Component</b>		t Filter Azimuth			Conditio	225 deg	Statu	tatus pass			
<b>Sensor Component</b>		System Memo			Conditio	n	Statu	Status pass			

## **Ozone Data Form**

CorrCoff 0.99995 CorrCoff 0.00000  DAS 1: DAS 2: Slope 1.00801 Intercept  A Avg % Diff: A Max % Di 2.1% 3.3% A Avg % Diff A Max % Di 2.1% 9/11/2017 CorrCoff	none  er ozone  Ozone primary stan	
Intercept         -0.42301         Intercept         0.00000         Serial Number         49CPS-70008-364         Tfer Description           CorrCoff         0.99995         CorrCoff         0.00000         Tfer ID         01110           DAS 1:         DAS 2:         Slope         1.00801         Intercept           A Avg % Diff: A Max % Di         A Avg % Diff         A Max % Di         Cert Date         9/11/2017         CorrCoff		
A Avg % Diff: A Max % Di 2.1% 3.3% Cert Date  9/11/2017 CorrCoff		
2.1% 3.3% Cert Date 9/11/2017 CorrCoff	-0.05199	
UseDescription ConcGroup Tfer Raw Tfer Corr Site Site Unit Po	1.00000	
	ctDifference	
primary         1         0.12         0.17         0.11         ppb           primary         2         14.98         14.91         14.42         ppb	-3.29%	
primary 3 36.98 36.73 35.94 ppb	-2.15%	
primary 4 67.85 67.36 65.85 ppb	-2.24%	
primary 5 115.43 114.56 113.90 ppb	-0.58%	
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 Battery Backup Condition N/A Status pass	pass	
Sensor Component Offset Condition -0.1 Status pass		
Sensor Component Span Condition 1.013 Status pass		
Sensor Component Zero Voltage Condition 0.0002 Status pass		
Sensor Component Fullscale Voltage Condition 1.0003 Status pass		
Sensor Component Cell A Freq. Condition 83.6 kHz pass		
Sensor Component Cell A Noise Condition 0.4 ppb Status pass		
Sensor Component Cell A Flow Condition 0.69 lpm Status pass		
Sensor Component Cell A Pressure Condition 591.8 mmHg Status pass		
Sensor Component Cell A Tmp. Condition 29.5 C Status pass		
Sensor Component Cell B Freq. Condition 75.5 kHz pass		
Sensor Component Cell B Noise Condition 0.6 ppb Status pass		
Sensor Component Cell B Flow Condition 0.69 lpm Status pass		
Sensor Component Cell B Pressure Condition 591.5 mmHg Status pass		
Sensor Component Cell B Tmp. Condition Status pass		
Sensor Component Line Loss Condition Not tested Status pass		
Sensor Component System Memo Condition Status pass		

#### 2 Meter Temperature Data Form Calc. Difference Serial Number Ta Site **Technician** Site Visit Date Parameter Mfg **Owner ID** GRC474 Martin Valvur RM Young 17626 04/17/2018 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 0.09 0.13 Test type UseDescription InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit Difference Temp Low Rang 0.0000 primary 0.04 0.06 0.19 C 0.13 Temp Mid Rang 25.19 25.21 0.0000 25.32 C 0.11 primary primary Temp High Rang 47.57 47.60 0.0000 47.62 C 0.02 Sensor Component | Properly Sited **Condition** Properly sited **Status** pass Condition Clean Sensor Component | Shield **Status** pass Condition Functioning Status pass Sensor Component Blower Sensor Component Blower Status Switch Status pass **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Martin Valvur ARS GRC474 04/17/2018 Shelter Temperature none none **DAS 1: DAS 2:** Fluke Mfg Parameter Shelter Temperatur Abs Avg Err Abs Max Er **Abs Avg Err** Abs Max Er Tfer Desc. RTD 3275143 **Serial Number** 0.76 0.95 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 0.000primary Temp Mid Range 18.60 18.62 19.1 C 0.44 0.000 C 0.89 Temp Mid Range 18.07 18.09 19.0 primary

20.38

Condition

0.000

21.3

C

Status pass

0.95

primary

Temp Mid Range

Sensor Component | System Memo

20.36

#### **Infrastructure Data For** GRC474 Technician | Martin Valvur Site Visit Date 04/17/2018 Site ID **Shelter Make Shelter Model Shelter Size** 8810 Ekto 640 cuft Sensor Component | Sample Tower Type **Condition** Type B Status pass **Condition** Good Sensor Component | Conduit Status pass Sensor Component Met Tower **Condition** Good Status pass **Condition** Not installed **Sensor Component** Moisture Trap **Status** pass

**Condition** Good

**Condition** Functioning

**Condition** Installed

**Condition** Good

**Condition** Good

**Condition** Good

**Condition** Good

**Condition** Fair

**Condition** Good

**Condition** Good

Condition 3/8 teflon

**Status** pass

**Status** pass

Status pass

**Status** pass

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 Comments**

1 Parameter: SiteOpsProcedures

Ozone inlet filters are changed more often if fires are burning in the area.

2 Parameter: ShelterCleanNotes

The shelter is in fair condition, clean, neat, and well organized. Some floor tiles are missing and broken.

3 Parameter: MetOpMaintCom

The signal cables are beginning to deteriorate and some signal cables are exposed to the elements and not protected.

#### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 04/17/2018 GRC474 Technician | Martin Valvur Site ID **Grand Canyon USGS Map** NPS/EPA Site Sponsor (agency) Map Scale NPS **Operating Group Map Date** 04-005-8001 AQS# R.M. Young **Meteorological Type** Ozone, UV-B **Air Pollutant Analyzer 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** (928) 638-2031 36.058642 **Site Telephone Audit Latitude** 2D Albright Ave -112.183575 Site Address 1 **Audit Longitude** PO Box 129 Site Address 2 **Audit Elevation** 2070 Coconino 11.5 County **Audit Declination** Grand Canyon, AZ City, State **Present** 86023 Fire Extinguisher No inspection date Zip Code Arizona **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

**Driving Directions** 

Shelter Clean

Site OK

**✓** Notes

**✓** Notes

broken.

From Flagstaff, AZ take route 180 north to the Grand Canyon National Park. The site operator's office is in the Mckee building on Albright Ave. Obtain a pass to travel the West Rim Road. The gate code is #1965. The site is a few miles along the rim road on the left just past the Abyss.

The shelter is in fair condition, clean, neat, and well organized. Some floor tiles are missing and

## Field Systems Data Form

F-02058-1500-S2-rev002

Site ID GRC474 Technician Martin Valvur Site Visit Date 04/17/2018

Potential Interferent	Minimum Distance From Measurement Apparatus	Distance	Pass = Checked
Large Point Source of SO2 or NOx	20 to 40 km		
Major industrial complex	10 to 20 km		✓
City > 50,000 population	40 km		✓
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

Fie	eld Sy	stems Data Fo	orm		F-02058-1500-S3-rev002					-rev002
Site	e ID	GRC474	Technician	Martin Valvur		Site Visit Date	04/17/2018			
1		d speed and direction duenced by obstruction		as to avoid	<b>✓</b>	N/A				
2	(i.e. wind horizont	d sensors mounted so d sensors should be m ally extended boom > to the prevailing wind	ounted atop the 2x the max diam	e tower or on a	<b>✓</b>	N/A				
3		tower and sensors plu			<b>✓</b>	N/A				
4		temperature shields p diated heat sources su			<b>✓</b>					
5	condition surface a	perature and RH sens ns? (i.e. ground below and not steeply sloped water should be avoi	sensors should . Ridges, hollov	be natural	<b>✓</b>	Above shelter				
6	Is the so	lar radiation sensor p	lumb?		<b>✓</b>	N/A				
7	Is it sited light?	l to avoid shading, or	any artificial o	r reflected	<b>✓</b>	N/A				
8	Is the ra	in gauge plumb?			<b>✓</b>	N/A				
9	Is it sited towers, e	l to avoid sheltering e	ffects from bui	ldings, trees,	<b>✓</b>	N/A				
10	Is the surfacing no	rface wetness sensor s	sited with the g	rid surface	<b>✓</b>	N/A				
11	Is it incl	ined approximately 3	0 degrees?		<b>✓</b>	N/A				

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

11 Is it inclined approximately 30 degrees?

Fie	eld Syst	tems Data	Form		F-02058-1500-S4-rev002				
Site	e ID G	RC474	Technician Martin Valvur		Site Visit Date 04/17/2018				
1		meterological ser and well maintai	asors appear to be intact, in good ned?	<b>✓</b>	N/A				
2	Are all the reporting of		ensors operational online, and	<b>✓</b>	N/A				
3	Are the shi	ields for the tem	perature and RH sensors clean?	<b>✓</b>					
4	Are the asp	pirated motors w	orking?	<b>✓</b>					
5	Is the solar scratches?		r's lens clean and free of	<b>✓</b>	N/A				
6	Is the surfa	ace wetness sense	or grid clean and undamaged?	<b>✓</b>	N/A				
7		nsor signal and p and well maintai	ower cables intact, in good ned?		Signs of wear				
8		nsor signal and p lements and well	ower cable connections protected maintained?		Some cables exposed				
			on (photograph or sketch if necess	sary)	regarding conditions listed above, or any other features,				
The s	signal cables	are beginning to	deteriorate and some signal cables a	are e	xposed to the elements and not protected.				

Fi	eld Systems Data Form		F-02058-1500-S5-rev002				
Site	GRC474 Technician Martin Valvur		Site Visit Date 04/17/2018				
	Siting Criteria: Are the pollutant analyzers and deposition ed	uipr	nent sited in accordance with 40 CFR 58, Appendix E				
1	Do the sample inlets have at least a 270 degree arc of unrestricted airflow?	<b>✓</b>					
2	Are the sample inlets 3 - 15 meters above the ground?	<b>✓</b>					
3	Are the sample inlets $>$ 1 meter from any major obstruction, and 20 meters from trees?	<b>✓</b>					
	Pollutant analyzers and deposition equipment operations and	mai	intenance				
1	Do the analyzers and equipment appear to be in good condition and well maintained?	<b>✓</b>					
2	Are the analyzers and monitors operational, on-line, and reporting data?	<b>✓</b>					
3	Describe ozone sample tube.		1/4 teflon by 12 meters				
4	Describe dry dep sample tube.		3/8 teflon by 12 meters				
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	<b>✓</b>	At inlet only				
6	Are sample lines clean, free of kinks, moisture, and obstructions?	<b>✓</b>					
7	Is the zero air supply desiccant unsaturated?	✓					
8	Are there moisture traps in the sample lines?						
9	Is there a rotometer in the dry deposition filter line, and is it clean?	<b>✓</b>	Clean and dry				
	ride any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	ary)	regarding conditions listed above, or any other features,				

# Field Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	GRC474	Technician	Martin Valvur		Site Visi	it Date 04/17/201	8	
	DAS, sei	nsor translators, and	peripheral equi	oment operation	ıs ar	ıd maintena	nce		
1	well mai	OAS instruments appentained?	ear to be in good	condition and	•				
2		he components of the backup, etc)	DAS operation	al? (printers,	<b>✓</b>				
3		nalyzer and sensor sig g protection circuitry	_	through	<b>✓</b>	Met sensors	only		
4		signal connections pro ntained?	otected from the	e weather and	<b>✓</b>				
5	Are the	signal leads connected	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 have a stable power source?								
8	Is the in	strument shelter temp	perature control	lled?	<b>✓</b>				
9	Is the me	et tower stable and gr	ounded?			Stable		Grounded	
10	T 41					✓		<b>✓</b>	
10	Is the sa	mple tower stable and	d grounded?			<b>✓</b>			
11	Tower c	omments?					er not grounded bu	ut bolted to th	e shelter
		additional explanatio an-made, that may al				y) regardin	g conditions listed	d above, or a	any other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 GRC474 Site Visit Date 04/17/2018 Site ID **Technician** Martin Valvur **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** П Temperature sensor Strip chart recorder **V V** Relative humidity sensor Computer **V** Solar radiation sensor **V** Modem П **V** ~ **Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V** $\checkmark$ **V Humidity sensor translator Surge protector** 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** Oct 2015 **HASP Field Ops Manual Calibration Reports ✓** Not current Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Flow & observation sections Are the Site Status Report Forms being completed and current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab?

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

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

current?

Control charts not used

#### **Field Systems Data Form** F-02058-1500-S8-rev002 GRC474 Site Visit Date 04/17/2018 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** 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** Every 3 or 4 weeks Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests V Manual Precision Level Test V V** Alarm values only **Analyzer Diagnostics Tests V** Every 3 or 4 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Weekly Sample Line Check for Dirt/Water **~ V** Weekly **Zero Air Desiccant Check** ✓ Unknown Do multi-point calibration gases go through the complete sample train including all filters? **✓** Do automatic and manual z/s/p gasses go through the complete sample train including all filters? **✓** Dataview Are the automatic and manual z/s/p checks monitored and reported? If yes, how?

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

Ozone inlet filters are changed more often if fires are burning in the area.

FI	eld Systems Data Form		F-02058-1500-89-rev002					
Site	GRC474 Tec	hnician Martin Valvur		Site Visit Date	04/17/2018			
	Site operation procedures							
1	Is the filter pack being changed ever	y Tuesday as scheduled?	Filter changed morinings 95% of the time					
2	Are the Site Status Report Forms be correctly?	ing completed and filed	<b>✓</b>					
3	Are data downloads and backups be scheduled?	ing performed as		No longer required				
4	Are general observations being made	e and recorded? How?	<b>✓</b>	SSRF				
5	Are site supplies on-hand and replen fashion?	ished in a timely	<b>✓</b>					
6	Are sample flow rates recorded? How	w?	<b>✓</b>	SSRF				
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	✓	Clean gloves on an	d off			
9	Are the site conditions reported regularized operations manager or staff?	larly to the field						
QC	Check Performed	Frequency			Compliant			
N	Aulti-point MFC Calibrations	<b>✓</b> Semiannually			✓			
F	Flow System Leak Checks	Weekly			✓			
F	ilter Pack Inspection							
F	Flow Rate Setting Checks	✓ Weekly			✓			
7	isual Check of Flow Rate Rotometer			✓				
Ι	n-line Filter Inspection/Replacement			✓				
S	ample Line Check for Dirt/Water	Weekly			$\checkmark$			
	ride any additional explanation (photo ral or man-made, that may affect the			y) regarding conditi	ons listed above, or ar	ny other features,		

## Field Systems Data Form

## F-02058-1500-S10-rev002

Site ID

GRC474

**Technician** Martin Valvur

Site Visit Date 04/17/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	6560 b	5CB22906T9	none
DAS	Environmental Sys Corp	8816	2270	90602
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB110	109500000031	none
flow rate	Tylan	FC280SAV	AW9805027	none
Infrastructure	Infrastructure	none	none	none
MFC power supply	Tylan	RO-32	illegible	none
Modem	Sierra wireless	GX450	LA54620247001003	none
Ozone	ThermoElectron Inc	49i A3NAA	1023943902	none
Ozone Standard	ThermoElectron Inc	49i A1NAA	1130450191	none
Printer	Hewlett Packard	842C	unknown	none
Sample Tower	Aluma Tower	В	none	03570
Shelter Temperature	ARS	none	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature2meter	RM Young	41342VC	17626	none
Zero air pump	Werther International	PC70/4	531380	none

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
СН	A467-Martii	n Valvur-04/19/2018				
1	4/19/2018	Computer	Hewlett Packard	none	65606	5CB22906V1
2	4/19/2018	DAS	Environmental Sys Corp	90611	8816	2613
3	4/19/2018	Elevation	Elevation	None	1	None
4	4/19/2018	Filter pack flow pump	Thomas	none	107CAB18	051600053774
5	4/19/2018	flow rate	Tylan	none	FC280SAV	AW9706014
6	4/19/2018	Infrastructure	Infrastructure	none	none	none
7	4/19/2018	MFC power supply	Tylan	none	RO-32	FP99706005
8	4/19/2018	Modem	US Robotics	09615	56k	unknown
9	4/19/2018	Ozone	ThermoElectron Inc	none	49i A3NAA	CM08460007
10	4/19/2018	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	CM08460051
11	4/19/2018	Sample Tower	Aluma Tower	03566	Α	none
12	4/19/2018	Shelter Temperature	ARS	none	none	none
13	4/19/2018	Siting Criteria	Siting Criteria	None	1	None
14	4/19/2018	Temperature2meter	RM Young	none	41342	018535
15	4/19/2018	Zero air pump	Werther International	none	PC70/4	000665785

#### **DAS Data Form** 0.25 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg **Environmental Sys** 2613 CHA467 Martin Valvur 04/19/2018 DAS Primary Das Date: 4 /19/2018 **Audit Date** 4 /19/2018 HY Parameter DAS Mfg 9:53:00 9:52:45 Das Time: **Audit Time** Tfer Desc. Source generator (D 12010039329 **Serial Number** 109 Das Day: 109 **Audit Day** 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 13 0.0000 -0.0008 -0.0005 0.0003 V V 13 0.1000 0.0999 0.1000 0.0001 13 0.3000 0.2997 0.2997 V V 0.0000 13 0.5000 0.4991 V V 0.0004 0.4987 0.7000 V V 0.0004 13 0.6996 0.7000 V V 13 0.9000 0.8993 0.8996 0.0003 13 V V 1.0000 0.9997 1.0000 0.0003

## Flow Data Form

- ylan	A'	W970601	4	CHA467	Ма	rtin Valvur	04/19/2018	8 flow ra	te	none	
	Tulon			1		Mfg		<b>p</b>	arameter Flo	w Rate	
Mfg	Tylan					<u> </u>	BIOS				
SN/Owner ID	Owner ID FP99706005 none			Serial Number	148613	T	fer Desc. BIC	OS 220-H			
Parameter	nrameter MFC power supply		,	Tfer ID	01421						
				Slope	0.	98450 Inte	ercept	0.10300			
					(	Cert Date	3/	1/2018 Co	rCoff	1.00000	
DAS 1:			<b>DAS 2:</b>		L	Cal Factor Z	ero	0.43	33		
A Avg % Diff:	A Max	x % Di	A Avg %I	oif A Max	% <b>Di</b>	Cal Factor F	ull Scale	5.81	18		
0.49%		0.87%				Rotometer R	eading:	3	.3		
Desc.	Tes	st type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	PctDifference	
primary	pump	off	0.000	0.000	-0.40	0.0000	0.04	l/m	1/m		
primary	leak c	heck	0.000	0.000	-0.40	0.0000	0.04	l/m	l/m		
primary	test pt	1	3.058	3.000	2.40	0.0000	3.03	l/m	1/m	0.87%	
primary	test pt	2	3.073	3.020	2.40	0.0000	3.02	l/m	l/m	0.10%	
primary	test pt	3	3.071	3.010	2.40	0.0000	3.03 l/m		l/m	0.50%	
Sensor Comp	onent	Leak Tes	t		Condition	n		Status	pass		
Sensor Comp	onent	Tubing C	ondition		Condition	Good	Good		pass		
Sensor Comp	onent	Filter Pos	sition		Condition	Condition Good		Status		pass	
Sensor Comp	onent	Rotomete	er Condition		Condition	Clean and dry		Status		pass	
Sensor Comp	onent	Moisture	Present		Condition	No moisture p	Status	pass			
Sensor Comp	onent	Filter Dist	tance		Condition	6.3 cm		Status	pass		
Sensor Comp	onent	Filter Dep	oth		Condition	0.3 cm		Status	pass		
Sensor Comp	onent	Filter Azir	muth		Condition	90 deg		Status	pass		
Sensor Component System Memo			Condition	n		Status	pass				

## **Ozone Data Form**

Mfg Serial Number Ta		Site	Technician		Site Visit Date Param		eter Ow	ner ID
ThermoElectron Inc	CM08460007	CHA467	Martin Val	vur	04/19/2018	Ozone	non	e
Intercept -0. CorrCoff 0.	98088 Slope: 96843 Intercept 99997 CorrCoff	0.00000 0.00000 0.00000	Serial 1	Number )	ThermoElecture 49CPS-700		rameter ozone er Desc. Ozone p	rimary stan
DAS 1: A Avg % Diff: A Ma	DAS 2: ax % Di A Avg %	6Dif A Max %	Slope Slope		1.	00801 Inter	cept	-0.05199
4.9%	7.7%		Cert D	ate	9/1	1/2017 <b>Corr</b>	Coff	1.00000
UseDescription primary primary primary	ConcGroup  1  2  3	Tfer Raw 0.19 14.69 36.31	Tfer Corr 0.24 14.62 36.07	-0. 13	te 43 pp 49 pp .06 pp	b		e 73% 57%
primary	4	67.67	67.18	+	.54 pp			93%
primary	5	116.95	116.07		5.20 pp			47%
Sensor Componen	Sample Train		Condition Good	<u> </u>		Status	pass	
Sensor Componen	22.5 degree rule		Condition			Status	pass	
Sensor Componen	Inlet Filter Condition	n	<b>Condition</b> Not t	ested		Status	pass	
Sensor Componen	Battery Backup		<b>Condition</b> N/A			Status	pass	
Sensor Componen	Offset		Condition 0.4			Status	pass	
Sensor Componen	Span		Condition 1.02	ion 1.021			pass	
Sensor Componen	Zero Voltage		Condition -0.00	dition -0.0002		Status	pass	
Sensor Componen	Fullscale Voltage		Condition 0.999	ition 0.9997		Status	pass	
Sensor Componen	Cell A Freq.		Condition 94.5	t <b>ion</b> 94.5 kHz		Status	pass	
Sensor Componen	Cell A Noise		Condition 0.6 p	<b>on</b> 0.6 ppb		Status	pass	
Sensor Componen	Cell A Flow		Condition 0.73	on 0.73 lpm		Status	pass	
Sensor Componen	Cell A Pressure		Condition 627.5	627.5 mmHg		Status	pass	
Sensor Componen	Cell A Tmp.		Condition 33.0	С		Status	pass	
Sensor Componen	Cell B Freq.		Condition 95.6	kHz		Status	pass	
Sensor Componen	Cell B Noise		Condition 0.9 p	pb		Status	pass	
Sensor Componen	Cell B Flow		Condition 0.69	lpm		Status	pass	
Sensor Componen	Cell B Pressure		Condition 627.2	2 mmHg		Status	pass	
Sensor Componen	Cell B Tmp.		Condition			Status	pass	
Sensor Componen	Line Loss		Condition Not tested		Status P			
Sensor Componen	System Memo		Condition			Status	pass	

#### 2 Meter Temperature Data Form Calc. Difference Serial Number Ta **Technician** Site Visit Date Parameter Mfg Site **Owner ID** CHA467 Martin Valvur RM Young 018535 04/19/2018 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 0.39 0.44 Test type UseDescription InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit Difference 0.0000 0.39 C primary Temp Low Rang 0.07 0.09 0.3 Temp Mid Rang 24.59 24.61 0.0000 25.05 C 0.44 primary primary Temp High Rang 46.46 46.49 0.0000 46.92 C 0.43 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

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** ARS Martin Valvur 04/19/2018 Shelter Temperature CHA467 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** 0.50 0.99 01229 **Tfer ID** 0.99986 -0.01977 Slope Intercept 1/24/2018 CorrCoff 1.00000 **Cert Date**

primary Te				OutputTmpSignal	OutputSignalEng	OSE Unit	Difference	
rJ	emp Mid Range	22.80	22.82	0.000	23.8	C	0.99	
primary Te	emp Mid Range	24.46	24.48	0.000	24.8	С	0.3	
primary Te	emp Mid Range	24.89	24.91	0.000	25.1	C	0.2	
Sensor Compo	onent System Memo		Condition	Status pass				

# Site ID CHA467 Technician Martin Valvur Site Visit Date 04/19/2018 Shelter Make Shelter Model Shelter Size Ekto 8810 640 cuft Sensor Component Sample Tower Type Condition Type B Status pass

Sensor Component	Sample Tower Type	Condition	Туре В	Status	pass
<b>Sensor Component</b>	Conduit	Condition	Good	Status	pass
Sensor Component	Met Tower	Condition	Good	Status	pass
Sensor Component	Moisture Trap	Condition	Not installed	Status	pass
Sensor Component	Power Cables	Condition	Fair	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	Fair	Status	pass
Sensor Component	Tubing Type	Condition	3/8 teflon	Status	pass
Sensor Component	Sample Train	Condition	Good	Status	pass

## **Field Systems Comments**

1 Parameter: SiteOpsProcedures

The site operator routinely reviews the previous week's data.

2 Parameter: SitingCriteriaCom

A large point source is located 40 km northwest of the site, just southwest of Wilcox.

3 Parameter: ShelterCleanNotes

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

4 Parameter: MetSensorComme

The temperature sensor is mounted on the south side of the meteorological tower.

5 Parameter: MetOpMaintCom

The signal cable insulation is beginning to deteriorate particularly at the base of the meteorological tower.

#### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 04/19/2018 CHA467 Technician | Martin Valvur Site ID **Bowie Mountain South USGS Map** NPS/EPA Site Sponsor (agency) Map Scale NPS **Operating Group Map Date** 04-003-8001 AQS# R.M. Young **Meteorological Type** Ozone, neph, IMPROVE **Air Pollutant Analyzer QAPP** Latitude dry, wet **Deposition Measurement QAPP** Longitude **Land Use** desert range, woodland - mixed **QAPP Elevation Meters** complex **Terrain QAPP Declination** No Conforms to MLM **OAPP Declination Date** (520) 824-4182 32.009405 **Site Telephone Audit Latitude** 13063 East Bontia Canyon Road -109.389058 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 1569 9.6 Cochise County **Audit Declination** Wilcox, AZ City, State **Present** Fire Extinguisher 85632 Inspected Dec 2017 Zip Code Mountain First Aid Kit Time Zone **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **V Climbing Belt** Primary Op. E-mail **Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Step Backup Op. E-mail Shelter Working Room ✓ Make Model 8810 Ekto **Shelter Size** 640 cuft **✓** Notes The shelter is in good condition, clean, well organized, and well maintained. Shelter Clean **✓** Notes Site OK

From I-10 take exit 344 (Wilcox AZ). Continue south on route 186 from Wilcox to Chiricahua National Monument,

approximately 30 miles and turn left at route 181 (follow sign for Chiricahua National Monument). Continue another few miles to park entrance. The site is just before the fee both on the north side of the road about 150 meters.

**Driving Directions** 

## **Field Systems Data Form**

F-02058-1500-S2-rev002

Site ID CHA467 Technician Martin Valvur Site Visit Date 04/19/2018

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		<b>✓</b>
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		$ lap{\checkmark}$
Feedlot operations	500 m		lacksquare
Intensive agricultural ops (including aerial spraying)	500 m		✓
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** 

A large point source is located 40 km northwest of the site, just southwest of Wilcox.

Fi	eld Systems Data Form		F-02058-1500-S3-rev002					
Site	CHA467 Technician Martin Valvur		Site Visit Date 04/19/2018					
1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	<b>✓</b>	N/A					
2	Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind)	<b>✓</b>	N/A					
3	Are the tower and sensors plumb?	<b>✓</b>	N/A					
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?		South					
5	Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)	<b>✓</b>						
6	Is the solar radiation sensor plumb?	<b>✓</b>	N/A					
7	Is it sited to avoid shading, or any artificial or reflected light?	<b>✓</b>	N/A					
8	Is the rain gauge plumb?	✓	N/A					
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	<b>✓</b>	N/A					
10	Is the surface wetness sensor sited with the grid surface facing north?	<b>✓</b>	N/A					
11	Is it inclined approximately 30 degrees?	<b>✓</b>	N/A					
	ovide any additional explanation (photograph or sketch if neco ural or man-made, that may affect the monitoring parameter		y) regarding conditions listed above, or any other features,					

The temperature sensor is mounted on the south side of the meteorological tower.

Fie	eld S	ystems Data	Form		F-02058-1500-S4-rev002
Site	· ID	CHA467	Technician Martin Valvur		Site Visit Date 04/19/2018
1		the meterological ser	nsors appear to be intact, in good ined?	<b>✓</b>	N/A
2		the meteorological sing data?	sensors operational online, and	✓	Temperature only
3	Are the	e shields for the tem	perature and RH sensors clean?	<b>✓</b>	Moderately clean
4	Are the	e aspirated motors w	orking?	<b>✓</b>	N/A
5	Is the s		r's lens clean and free of	<b>✓</b>	N/A
6	Is the s	surface wetness sense	or grid clean and undamaged?	<b>✓</b>	N/A
7		e sensor signal and p on, and well maintai	ower cables intact, in good ined?		Signs of wear
8		e sensor signal and p he elements and well	ower cable connections protected maintained?	✓	
			on (photograph or sketch if necessaffect the monitoring parameters:	sary	regarding conditions listed above, or any other features,
The s	signal ca	ble insulation is begin	ning to deteriorate particularly at the	base	e of the meteorological tower.

#### Field Systems Data Form F-02058-1500-S5-rev002 CHA467 Technician | Martin Valvur Site Visit Date 04/19/2018 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 12 meters At inlet only Are in-line filters used in the ozone sample line? (if ves indicate location) **~** Are sample lines clean, free of kinks, moisture, and obstructions? **V** Is the zero air supply desiccant unsaturated? Are there moisture traps in the sample lines? 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	CHA467	Technician	Martin Valvur		Site Visi	it Date 04/19/201	8	
	DAS, so	ensor translators, a	nd peripheral equi	<u>pment operation</u>	<u>is ar</u>	<u>ıd maintena</u>	<u>nce</u>		
1		DAS instruments a nintained?	ppear to be in good	l condition and	<b>✓</b>				
2		the components of a, backup, etc)	the DAS operation	al? (printers,	<b>✓</b>				
3		analyzer and senson		through	<b>✓</b>	Met sensors	only		
4		e signal connections aintained?	protected from the	e weather and	<b>✓</b>				
5	Are the	e signal leads conne	cted to the correct	DAS channel?	<b>✓</b>				
6	Are the	e DAS, sensor transled?	lators, and shelter	properly	<b>✓</b>				
7	Does th	e instrument shelte	r have a stable pov	ver source?	<b>✓</b>				
8	Is the in	nstrument shelter to	emperature control	lled?	<b>✓</b>				
9	Is the n	net tower stable and	l grounded?			Stable 🗸		Grounded	
10	Is the s	ample tower stable	and grounded?			<b>✓</b>			
11	Tower	comments?				towers bolte	d to shelter		
		y additional explana man-made, that ma				y) regardin	g conditions liste	d above, or a	any other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 CHA467 Site Visit Date 04/19/2018 Site ID **Technician** Martin Valvur **Documentation** Does the site have the required instrument and equipment manuals? N/A Yes No Yes No N/A **V ✓** Wind speed sensor **Data logger 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** $\checkmark$ Filter pack flow controller Shelter air conditioner $\checkmark$ Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V ✓** Dataview **SSRF V ✓ V V Site Ops Manual HASP Field Ops Manual Calibration Reports ✓** Not current 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 CHA467 Site Visit Date 04/19/2018 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** N/A **Translator Zero/Span Tests (climatronics) ✓ V** Weekly **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? **OC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** Every 2 weeks Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests Manual Precision Level Test V V** Monthly **Analyzer Diagnostics Tests ~** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze 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? **✓** Dataview Are the automatic and manual z/s/p checks monitored and reported? If yes, how?

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

The site operator routinely reviews the previous week's data.

Field Systems Data Form						F-02058-1500-S9-rev00				
Sit	te ID	CHA467 <b>T</b>	echnic	ian Martin Valvur		Site Visit Date	04/19/2018			
	Site ope	ration procedures								
1	Is the fi	lter pack being changed ev	ery Tu	esday as scheduled	<b>?</b> ✓	Filter changed mor	inings			
2	Are the correctl	Site Status Report Forms y?	being c	ompleted and filed	<b>✓</b>					
3	Are dat	a downloads and backups ded?	oeing p	erformed as		No longer required				
4	Are gen	eral observations being ma	de and	l recorded? How?	<b>✓</b>	Dataview and SSR	F			
5	Are site fashion	supplies on-hand and repl	enished	d in a timely	<b>✓</b>					
6	Are san	nple flow rates recorded? H	low?		<b>✓</b>	SSRF				
7	Are san	nples sent to the lab on a re	gular s	chedule in a timely	✓					
8		ers protected from contami oping? How?	nation	during handling	✓	Clean gloves on a	nd off			
9		site conditions reported re ons manager or staff?	gularly	to the field						
QC	Check P	erformed	]	Frequency			Compliant			
I	Multi-poi	nt MFC Calibrations	✓ :	Semiannually			✓			
]	Flow Syst	em Leak Checks	<b>✓</b> \	Weekly			<b>✓</b>			
]	Filter Pac	k Inspection								
]	Flow Rate	e Setting Checks		Weekly			<b>✓</b>			
1	Visual Ch	eck of Flow Rate Rotometo		Weekly			<b>✓</b>			
]	In-line Fil	ter Inspection/Replacemen	t 🛂	Semiannually			<b>✓</b>			
9	Sample L	ine Check for Dirt/Water	Ш							
		ndditional explanation (pho an-made, that may affect th				y) regarding condit	tions listed above, or any other features,			

## Field Systems Data Form

## F-02058-1500-S10-rev002

CHA467 Site ID

**Technician** Martin Valvur

Site Visit Date 04/19/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	65606	5CB22906V1	none
DAS	Environmental Sys Corp	8816	2613	90611
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	051600053774	none
flow rate	Tylan	FC280SAV	AW9706014	none
Infrastructure	Infrastructure	none	none	none
MFC power supply	Tylan	RO-32	FP99706005	none
Modem	US Robotics	56k	unknown	09615
Ozone	ThermoElectron Inc	49i A3NAA	CM08460007	none
Ozone Standard	ThermoElectron Inc	49i A1NAA	CM08460051	none
Sample Tower	Aluma Tower	A	none	03566
Shelter Temperature	ARS	none	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature2meter	RM Young	41342	018535	none
Zero air pump	Werther International	PC70/4	000665785	none

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number				
GAS153-Sandy Grenville-05/10/2018										
1	5/10/2018	Computer	Dell	07019	Inspiron 15	GK2MC12				
2	5/10/2018	DAS	Campbell	000635	CR3000	4934				
3	5/10/2018	Elevation	Elevation	None	1	None				
4	5/10/2018	Filter pack flow pump	Thomas	04858	107CAB18	608102A				
5	5/10/2018	Flow Rate	Apex	000643	AXMC105LPMDPCV	illegible				
6	5/10/2018	Infrastructure	Infrastructure	none	none	none				
7	5/10/2018	Modem	Raven	06805	H4222-C	0934411884				
8	5/10/2018	Ozone	ThermoElectron Inc	000705	49i A1NAA	1030244807				
9	5/10/2018	Ozone Standard	ThermoElectron Inc	000371	49i A3NAA	0726124692				
10	5/10/2018	Sample Tower	Aluma Tower	000138	В	none				
11	5/10/2018	Shelter Temperature	Campbell	none	107-L	none				
12	5/10/2018	Siting Criteria	Siting Criteria	None	1	None				
13	5/10/2018	Temperature	RM Young	04319	41342	4038				
14	5/10/2018	UPS	APC	missing	BP6505	NB0009260535				
15	5/10/2018	Zero air pump	Werther International	06865	C 70/4	000814277				

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 4934 **GAS153** Sandy Grenville 05/10/2018 DAS Primary Das Date: 5 /10/2018 **Audit Date** 5 /10/2018 Datel Parameter DAS Mfg 14:27:42 14:27:42 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** Das Day: 130 **Audit Day** 130 Tfer ID 01320 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0003 0.0001 0.0003 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 0.0003 0.0003 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 0.0000 0.6995 0.6995 7 V V 0.9000 0.8994 0.8994 0.00007 1.0000 0.9992 0.9992 V V 0.0000

## Flow Data Form

Ifg		Serial Number TaSiteTechnicianSite Visit DillegibleGAS153Sandy Grenville05/10/2018		Date Param	ate	Owner ID 000643					
pex	IIIE	egible		GAS 153	Sai	ndy Grenville	05/10/2016	riow K	ale	000043	
					-	Mfg	BIOS	P	arameter Flo	er Flow Rate	
	Serial Number Tf					fer Desc. BIC	OS 220-H				
	<b>Tfer ID</b> 01414										
					1	Slope	1.	00055 Inte	ercept	-0.0157	
						Cert Date	2/2	1/2018 Cor	rCoff	1.0000	
DAS 1:		1	DAS 2:			Cal Factor Z	ero	-0.0	)2		
A Avg % Diff:	A Max		A Avg %I	Dif A Max	% Di	Cal Factor F			1		
3.02%		3.23%				Rotometer R	eading:	1	.5		
Desc.	Test	t type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	PctDifference	
primary	pump o	off	0.000	0.000	-0.01	0.000	-0.03	l/m	l/m		
primary	leak ch	neck	0.000	0.000	0.00	0.000	-0.02 l/m		l/m		
primary	test pt	1	1.533	1.550	1.50	0.000	1.50	1/m	l/m	-3.23%	
primary	test pt		1.531	1.550	1.49	0.000	1.50	1/m	l/m	-3.23%	
primary	test pt	3	1.530	1.540	1.49	0.000	1.50	1/m	l/m	-2.60%	
Sensor Compo	onent	_eak Test			Condition	n		Status	pass		
Sensor Compo	onent 7	Γubing Co	ndition		Condition	Good		Status	Status pass		
Sensor Compo	onent F	Filter Posi	tion		Condition	Good		Status	pass		
Sensor Compo	onent F	Rotomete	r Condition		Condition	Clean and dry		Status	pass		
Sensor Compo	onent N	Moisture F	Present		Condition	No moisture p	resent	Status	pass		
Sensor Compo	onent F	ilter Dista	ance		Condition	1.6 cm		Status	pass		
Sensor Compo	onent F	ilter Dept	th		Condition	1.7 cm		Status	pass		
Sensor Compo	onent F	ilter Azim	nuth		Condition	190 deg	Status	pass			
Sensor Component System Memo			Condition	n	Status	pass					

# **Ozone Data Form**

Mfg Se	erial Number Ta	Site	Те	chnician		Site Vis	it Date	Parame	ter Owner ID	
ThermoElectron Inc 1	030244807	GAS153	Sa	andy Gre	nville	05/10/2	.018	Ozone	000705	
Intercept -1.3	Slope: 32697 Intercept 09996 CorrCoff	0.00000	0	Mfg Serial N Tfer ID		Thermole 0517112 01113			rameter ozone er Desc. Ozone primary si	tan
DAS 1: A Avg % Diff: A Ma	DAS 2: x % Di	6Dif A Max 9	0/. <b>D</b> :	Slope			1.0050	4 Inter	<b>ccept</b> 0.3291	15
11.2%	17.0%	ODII A WIAX	/0 D1	Cert Da	ite	(	9/12/201	7 Corr	<b>Coff</b> 1.0000	)0
UseDescription	ConcGroup	Tfer Raw		Corr	Si	te 25		e Unit	PctDifference	
primary primary	2	14.90		.32 .49		.03	ppb ppb		-16.98%	
primary	3	35.00		.49		.40	ppb		-11.86%	
primary	4	68.00	67.	.33	61	.81	ppb		-8.20%	
primary	5	109.70	108	3.82	100	0.30	ppb		-7.83%	
<b>Sensor Component</b>	Sample Train		Condition	on Good				Status	pass	
Sensor Component	22.5 degree rule		Conditio	on				Status	pass	
Sensor Component	Inlet Filter Condition	n	Condition	on Clean				Status	pass	
<b>Sensor Component</b>	Battery Backup		Condition	on Not fu	ınctioning			Status	Fail	
<b>Sensor Component</b>	Offset		Condition	on 0.70				Status	pass	
Sensor Component	Span		Condition	on 1.038				Status	pass	
Sensor Component	Zero Voltage		Conditio	on N/A				Status	pass	
Sensor Component	Fullscale Voltage		Condition	on N/A				Status	pass	
Sensor Component	Cell A Freq.		Condition	on 109.7	kHz			Status	pass	
<b>Sensor Component</b>	Cell A Noise		Condition	on 0.7 pr	b			Status	pass	
<b>Sensor Component</b>	Cell A Flow		Condition	on 0.19 I	pm			Status	Fail	
<b>Sensor Component</b>	Cell A Pressure		Condition	on 734.9	mmHg			Status	pass	
<b>Sensor Component</b>	Cell A Tmp.		Condition	on 37.3 (				Status	pass	
<b>Sensor Component</b>	Cell B Freq.		Condition	on 97.6 k	Hz			Status	pass	
<b>Sensor Component</b>	Cell B Noise		Condition	on 0.7 pp	b			Status	pass	
<b>Sensor Component</b>	Cell B Flow		Condition	on 0.21 l	pm			Status	Fail	
<b>Sensor Component</b>	Cell B Pressure		Condition	on 734.6	mmHg			Status	pass	
Sensor Component	Cell B Tmp.		Condition	on				Status	pass	
Sensor Component	Line Loss		Condition	on about	2%			Status	pass	
Sensor Component	System Memo		Condition	on See o	omments	i .		Status	pass	

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young 4038 GAS153 05/10/2018 Temperature 04319 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 0.03 0.04 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.19 0.10 0.000 0.1 C -0.04 C Temp Mid Range 25.36 25.07 0.000 25.1 0.02 primary 47.8 C -0.04 primary Temp High Range 48.30 47.83 0.000 Condition Moderately clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Sandy Grenville Shelter Temperature Campbell GAS153 05/10/2018 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** 0.55 1.08 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	25.11	24.82	0.000	25.4	C	0.53
primary	Temp Mid Range	28.18	27.87	0.000	27.8	C	-0.03
primary	Temp Mid Range	23.92	23.64	0.000	24.7	С	1.08
Sensor Con	nponent System Memo		Condition		Status	pass	

### **Infrastructure Data For**

Site ID	GAS153	Technician	Sandy Grenville	Site Visit Date	05/10/2018	

Shelter Make	Shelter Model	Shelter Size	
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
Sensor Component	Met Tower	Condition	N/A	Status	pass
Sensor Component	Moisture Trap	Condition	Installed	Status	pass
Sensor Component	Power Cables	Condition	Good	Status	pass
Sensor Component	Shelter Temp Control	Condition	Functioning	Status	pass
Sensor Component	Rotometer	Condition	Installed	Status	pass
Sensor Component	Sample Tower	Condition	Good	Status	pass
Sensor Component	Shelter Condition	Condition	Good	Status	pass
Sensor Component	Shelter Door	Condition	Good	Status	pass
Sensor Component	Shelter Roof	Condition	Good	Status	pass
Sensor Component	Shelter Floor	Condition	Good	Status	pass
<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

# **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Ozone This analyzer diagnostic	GAS153 check is outside	Sandy Grenville the manufacturer's		Cell B Flow value.	ThermoElectron	3480		
Ozone This analyzer diagnostic	GAS153 check is outside	Sandy Grenville the manufacturer's		Cell A Flow	ThermoElectron	3480		

# **Field Systems Comments**

1 Parameter: SiteOpsProcedures

It was reported that the ozone inlet filter is replaced every two weeks, and a manual zero test is performed every week.

#### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 05/10/2018 **GAS153** Technician Sandy Grenville Site ID Hollonville **USGS Map EPA** Site Sponsor (agency) Map Scale UGA **Operating Group Map Date** 13-231-9991 AQS# R.M. Young **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude dry, wet **Deposition Measurement QAPP** Longitude Land Use agriculture, woodland - mixed **QAPP Elevation Meters Terrain** gently rolling **QAPP Declination** Yes Conforms to MLM **OAPP Declination Date** (770) 229-8542 33.181173 **Site Telephone Audit Latitude** Bledsoe Farm, GA Experiment Station -84.410054 Site Address 1 **Audit Longitude** 1913 Jackson road Site Address 2 **Audit Elevation** 265 Pike County **Audit Declination** Williamson, GA City, State **Present** Fire Extinguisher ✓ 30292 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 Secure Shelter** Not locked Backup Op. Phone # Stable Entry Step Backup Op. E-mail Shelter Working Room ✓ Make Model 8810 Ekto **Shelter Size** 640 cuft **✓** Notes Shelter Clean **✓** Notes Site OK From I-75 take exit 205 (Rt 16) west to Griffin. Continue west through Griffin to 19/41 south. Turn south on 19/41 **Driving Directions** and take the next exit (Rt 362) west toward Williamson. Continue 7.2 miles on 362 through Williamson. Bear right on the dirt road marked Blanton Mill Road, approximately 0.9 miles to the gated Bledsoe Farm on the right. The site

is past the farm office and sheds on the north side of the farm.

# Field Systems Data Form

F-02058-1500-S2-rev002

Site ID GAS153 Technician Sandy Grenville Site Visit Date 05/10/2018

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

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

Fie	eld Sy	stems Data Fo	orm			F-02058-	1500-S3-rev002
Site	e ID	GAS153	Technician S	Sandy Grenville		Site Visit Date 05/10/2018	
1		d speed and direction s luenced by obstruction		as to avoid	<b>✓</b>	N/A	
2	(i.e. wind horizont	l sensors mounted so a l sensors should be mo ally extended boom >2 to the prevailing wind	ounted atop the 2x the max diam	tower or on a	<b>✓</b>	N/A	
3	Are the	tower and sensors plui	mb?		✓	N/A	
4		temperature shields po diated heat sources su			<b>✓</b>		
5	condition surface a	perature and RH sensons? (i.e. ground below and not steeply sloped. water should be avoid	sensors should l Ridges, hollows	oe natural	<b>✓</b>		
6	Is the so	ar radiation sensor pl	umb?		<b>✓</b>	N/A	
7	Is it sited light?	l to avoid shading, or	any artificial or	reflected	<b>✓</b>	N/A	
8	Is the ra	in gauge plumb?			<b>✓</b>	N/A	
9	Is it sited towers, e	I to avoid sheltering ef etc?	fects from build	ings, trees,	<b>✓</b>	N/A	
10	Is the su	rface wetness sensor si	ited with the gri	d surface	<b>✓</b>	N/A	

✓ N/A

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

facing north?

11 Is it inclined approximately 30 degrees?

Fie	eld Systems Data Form		F-02058-1500-S4-rev002				
Site	ID GAS153 Technician Sandy Grenville		Site Visit Date 05/10/2018				
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	<b>✓</b>					
2	Are all the meteorological sensors operational online, and reporting data?	<b>✓</b>					
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?	✓	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?	✓	N/A				
	de any additional explanation (photograph or sketch if necessal 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 GAS153 Technician Sandy Grenville Site Visit Date 05/10/2018 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) **✓** 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	GAS153	Technician	Sandy Grenville		Site Visi	it Date 05/10/201	8	
	DAS, se	nsor translators, and	peripheral equi	pment operation	ıs ar	nd maintena	nce		
1	Do the I	OAS instruments appe		_					
2	Are all t	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 prontained?	otected from the	e weather and	<b>✓</b>				
5	Are the	signal leads connected	d to the correct	DAS channel?	✓				
6	Are the grounde	DAS, sensor translated?	ors, and shelter	properly	<b>✓</b>				
7	Does the	e instrument shelter h	ave a stable pov	ver source?	<b>✓</b>				
8	Is the in	strument shelter temp	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?			<u> </u>		<u> </u>	
11	Tower c	omments?				Met tower re	emoved		
		additional explanationan-made, that may a				y) regarding	g conditions listed	d above, or a	nny other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 GAS153 Technician Sandy Grenville Site Visit Date 05/10/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No N/A Yes Yes No N/A **V** 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 ~ Humidity sensor translator Surge protector** 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 ✓ SSRF ✓ V Site Ops Manual ✓ V HASP** Oct 2011 **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 GAS153 Technician Sandy Grenville Site Visit Date 05/10/2018 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** N/A **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **OC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** Weekly Manual Zero/Span Tests **V** Daily **Automatic Precision Level Tests Manual Precision Level Test 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 **~** 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? ✓ Call-in only Are the automatic and manual z/s/p checks monitored and reported? If yes, how? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

It was reported that the ozone inlet filter is replaced every two weeks, and a manual zero test is performed every week.

### Field Systems Data Form F-02058-1500-S9-rev002 GAS153 Technician Sandy Grenville Site Visit Date 05/10/2018 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, call-in 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 **V 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

GAS153

Technician Sandy Grenville

Site Visit Date 05/10/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	GK2MC12	07019
DAS	Campbell	CR3000	4934	000635
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	608102A	04858
Flow Rate	Apex	AXMC105LPMDPC	illegible	000643
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4222-C	0934411884	06805
Ozone	ThermoElectron Inc	49i A1NAA	1030244807	000705
Ozone Standard	ThermoElectron Inc	49i A3NAA	0726124692	000371
Sample Tower	Aluma Tower	В	none	000138
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	4038	04319
UPS	APC	BP6505	NB0009260535	missing
Zero air pump	Werther International	C 70/4	000814277	06865

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
SNI	0152-Sandy	Grenville-05/11/2018				
1	5/11/2018	Computer	Dell	07047	Inspiron 15	BY3MC12
2	5/11/2018	DAS	Campbell	000357	CR3000	2135
3	5/11/2018	Elevation	Elevation	None	1	None
4	5/11/2018	Filter pack flow pump	Thomas	04855	107CAB18	060300020200
5	5/11/2018	Flow Rate	Apex	000856	AXMC105LPMDPCV	illegible
6	5/11/2018	Infrastructure	Infrastructure	none	none	none
7	5/11/2018	Modem	Raven	06458	V4221-V	0808337422
8	5/11/2018	Ozone	ThermoElectron Inc	000725	49i A1NAA	1105347328
9	5/11/2018	Ozone Standard	ThermoElectron Inc	000704	49i A3NAA	1030244816
10	5/11/2018	Sample Tower	Aluma Tower	000148	В	none
11	5/11/2018	Shelter Temperature	Campbell	none	107-L	none
12	5/11/2018	Siting Criteria	Siting Criteria	None	1	None
13	5/11/2018	Temperature	RM Young	06405	41342	14038
14	5/11/2018	Zero air pump	Werther International	06900	PC70/4	000821894

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2135 SND152 Sandy Grenville 05/11/2018 DAS Primary Das Date: 5 /11/2018 **Audit Date** 5 /11/2018 Datel Parameter DAS Mfg 11:16:46 11:16:46 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** 131 131 Das Day: **Audit Day** 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 0.2998 0.2998 V V 0.0000 7 0.5000 0.4996 0.4996 V V 0.00007 0.7000 V V 0.0000 0.6995 0.6995 7 V V 0.9000 0.8994 0.8994 0.00007 1.0000 0.9992 0.9993 V V 0.0001

# Flow Data Form

Mfg	Se	rial Num	ber Ta S	ite	Tec	hnician Site Visit D		Date Paran	neter	Owner ID	
Apex	ill	egible		SND152	Sai	ndy Grenville	05/11/2018	Flow F	Rate	000856	
						Mfg	BIOS	I	Parameter Flo	ow Rate	
						Serial Number		1	fer Desc. Blo	OS 220-H	
	<b>Tfer ID</b> 01414										
						Slope	1	00055 Int	ercept	-0.01570	
						_			-		
						Cert Date	2/2	1/2018 <b>Co</b>	rrCoff	1.00000	
DAS 1:			DAS 2:			Cal Factor Z	ero	-0.	05		
A Avg % Diff:	A Max	« % Di	A Avg %I	Dif A Max	% <b>Di</b>	Cal Factor F	ull Scale	0.9	95		
1.32%		1.32%				Rotometer R	eading:	1	.5		
Desc.	Tes	st type		Input Corr_	MfcDisp.	OutputSignal	1	InputUnit	OutputSignal	l PctDifference	
primary	pump		0.000	0.000	0.04	0.000	-0.01	l/m	1/m		
primary	leak c		0.000	0.000	0.01	0.000	-0.04	l/m	1/m		
primary	test pt		1.506	1.520	1.55	0.000	1.50	l/m	l/m	-1.32%	
primary	test pt		1.506	1.520	1.55	0.000	1.50	l/m	l/m	-1.32%	
primary	test pt		1.505	1.520	1.55	0.000	1.50	l/m	l/m	-1.32%	
Sensor Compo	onent	Leak Test	<u> </u>		Condition			Status pass			
Sensor Compo	onent	Tubing Co	ondition		Condition	on Good		Statu	Status pass		
Sensor Compo	onent	Filter Posi	ition		Condition	n Good		Statu	Status pass		
Sensor Compo	onent	Rotomete	r Condition		Condition	Clean and dry	Clean and dry		Status pass		
Sensor Compo	onent	Moisture F	Present		Condition	No moisture p	resent	Statu	pass		
Sensor Compo	onent	Filter Dista	ance		Condition	4.0 cm		Statu	pass		
Sensor Compo	onent	Filter Dep	th		Condition	0.7 cm		Statu	pass		
Sensor Compo	onent	Filter Azin	nuth		Condition	200 deg		Statu	pass		
Sensor Component		t System Memo			Condition	Condition		Status		3	

# **Ozone Data Form**

Mfg S	erial Number Ta	Site	Technician	l	Site Visi	t Date Parame	ter Owner ID
ThermoElectron Inc 1	105347328	SND152	Sandy Gre	nville	05/11/20	Ozone	000725
Intercept -0.5	99526 Slope: 53683 Intercept 99999 CorrCoff	0.00000 0.00000 0.00000	Serial I	Number	ThermoE 0517112		rameter ozone er Desc. Ozone primary stan
DAS 1:	<b>DAS 2:</b>		Slope			1.00504 Inter	<b>ccept</b> 0.32915
A Avg % Diff: A Ma	x % Di A Avg % 4.8%	6Dif A Max %	6 Di Cert D	ate	9	/12/2017 Corr	<b>Coff</b> 1.00000
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Si	te	Site Unit	PctDifference
primary	1	0.05	-0.27			ppb	Terbinerence
primary	2	15.10	14.69			ppb	-4.83%
primary	3	34.90	34.39	_		ppb	-1.80%
primary primary	5	67.70 110.00	67.03 109.12			ppb ppb	-1.63% -0.84%
Sensor Component			Condition Good			Status	
Sensor Component	22.5 degree rule		Condition			Status	pass
Sensor Component	Inlet Filter Condition	n	Condition Clear	1		Status	pass
Sensor Component	Battery Backup		Condition N/A			Status	pass
Sensor Component	Offset		Condition 0.6			Status	pass
Sensor Component	Span		Condition 1.013	3		Status	pass
Sensor Component	Zero Voltage		Condition N/A			Status	pass
Sensor Component	Fullscale Voltage		Condition N/A			Status	pass
<b>Sensor Component</b>	Cell A Freq.		Condition 104.3	8 kHz		Status	pass
<b>Sensor Component</b>	Cell A Noise		Condition 0.8 p	pb		Status	pass
<b>Sensor Component</b>	Cell A Flow		Condition 0.61	lpm		Status	pass
Sensor Component	Cell A Pressure		Condition 694.4			Status	pass
Sensor Component	Cell A Tmp.		Condition 34.9	С		Status	pass
Sensor Component	Cell B Freq.		Condition 92.2			Status	
Sensor Component	-		Condition 0.6 p			Status	
Sensor Component	-		Condition 0.69			Status	
Sensor Component	Cell B Pressure		Condition 694.4	l mmHg		Status	pass
Sensor Component	Cell B Tmp.		Condition			Status	
Sensor Component			Condition Not to	ested		Status	
Sensor Component	System Memo		Condition			Status	pass

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young 14038 SND152 05/11/2018 Temperature 06405 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 0.06 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.16 0.07 0.000 0.0 C -0.04 C Temp Mid Range 25.60 25.31 0.000 25.3 -0.06 primary 48.91 0.000 C -0.01 primary Temp High Range 48.43 48.4 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 SND152 05/11/2018 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** 0.62 0.77 01227 **Tfer ID** 1.00798 0.09168 Slope Intercept 2/13/2018 CorrCoff 1.00000 **Cert Date**

		InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary T	Гетр Mid Range	25.30	25.01	0.000	25.7	C	0.73
primary T	Гетр Mid Range	24.18	23.90	0.000	24.3	С	0.36
primary T	Гетр Mid Range	29.69	29.36	0.000	28.6	С	-0.77
Sensor Comp	onent System Memo		Condition		Status	pass	

### **Infrastructure Data For**

Si	te ID SND152	Technician	Sandy Grenville	Site Visit Date 05/11/2018	
	Shelter Make	Shelter Model	She	lter Size	
	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
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
<b>Sensor Component</b>	Rotometer	Condition	Installed	Status	pass
Sensor Component	Sample Tower	Condition	Good	Status	pass
Sensor Component	Shelter Condition	Condition	Fair	Status	pass
Sensor Component	Shelter Door	Condition	Fair	Status	pass
<b>Sensor Component</b>	Shelter Roof	Condition	Fair	Status	pass
<b>Sensor Component</b>	Shelter Floor	Condition	Fair	Status	pass
<b>Sensor Component</b>	Signal Cable	Condition	Fair	Status	pass
Sensor Component	Tubing Type	Condition	3/8 teflon	Status	pass
Sensor Component	Sample Train	Condition	Good	Status	pass

# **Field Systems Comments**

### 1 Parameter: DasComments

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

### 2 Parameter: SiteOpsProcedures

Ozone sample line leak checks are no longer performed. A manual zero/span test is performed every two weeks following the inlet filter change.

### 3 Parameter: SitingCriteriaCom

The site is located on an active research farm with cattle and poultry. Cattle are fed within 100 meters of the site. A new building has been constructed 32 meters south of the sample tower. A Climate Reference Network site is located on the farm on the south side of Hwy 68 which is a better location for the CASTNET site.

### 4 Parameter: ShelterCleanNotes

The shelter is kept clean, neat, and very well organized. The shelter floor has deteriorated since the previous audit with areas of extreme rot just inside the door and along the north wall.

### 5 Parameter: MetSensorComme

The temperature sensor is mounted to the sample tower and is oriented to the west. The shield has faded to gray in color and is no longer white which may affect the reflectivity.

### 6 Parameter: MetOpMaintCom

The temperature sensor signal cable is now in poor condition with several sections of tape and many kinks.

#### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 05/11/2018 SND152 Technician Sandy Grenville Site ID Crossville **USGS Map EPA** Site Sponsor (agency) Map Scale Auburn Univ./private **Operating Group Map Date** 01-049-9991 AQS# R.M. Young **Meteorological Type** Ozone, PM10 Air Pollutant Analyzer **QAPP** Latitude dry, wet, **Deposition Measurement QAPP** Longitude Agriculture, Dairy Land Use **QAPP Elevation Meters** plateau, gently rolling **Terrain QAPP Declination** Marginally Conforms to MLM **OAPP Declination Date** (256) 528-7175 34.289001 **Site Telephone Audit Latitude** Sand Mountain Research & Extension -85.970065 Site Address 1 **Audit Longitude** 13112 Hwy 68 Site Address 2 **Audit Elevation** 349 DeKalb County **Audit Declination** Crossville, AL City, State **Present** Fire Extinguisher 35962 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 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

**Driving Directions**From I-59 take exit 205, Highway 68, west toward Crossville. The site is on the right at the Sand Mountain Research and Extension Station just at the east edge of Crossville. The combination to the gate lock is 22-32-10.

The shelter is kept clean, neat, and very well organized. The shelter floor has deteriorated since the

previous audit with areas of extreme rot just inside the door and along the north wall.

**✓** Notes

**✓** Notes

Shelter Clean

Site OK

## **Field Systems Data Form**

F-02058-1500-S2-rev002

Site ID SND152 Technician Sandy Grenville Site Visit Date 05/11/2018

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	100 m	
Intensive agricultural ops (including aerial spraying)	500 m		✓
Limited agricultural operations	200 m		✓
Large parking lot	200 m		✓
Small parking lot	100 m	20 m	
Tree line	50 m		✓
Obstacles to wind	10 times obstacle height		<b>V</b>

### Siting Distances OK

### **Siting Criteria Comment**

The site is located on an active research farm with cattle and poultry. Cattle are fed within 100 meters of the site. A new building has been constructed 32 meters south of the sample tower. A Climate Reference Network site is located on the farm on the south side of Hwy 68 which is a better location for the CASTNET site.

te Visit Date 05/11/2018
d pointing west

The temperature sensor is mounted to the sample tower and is oriented to the west. The shield has faded to gray in color and is no longer white which may affect the reflectivity.

Fie	eld S	ystems Data	Form		F-02058-1500-S4-rev002			
Site	e ID	SND152	Technician	Sandy Grenville		Site Visit Date 05/11/2018		
1		the meterological so		e intact, in good	<b>✓</b>	N/A		
2		the meteorologicaling data?	l sensors operation	nal online, and	✓	N/A		
3	Are the	e shields for the ten	nperature and RH	sensors clean?		Shields dirty		
4	Are the	e aspirated motors	working?		<b>✓</b>	N/A		
5	Is the s	solar radiation sens	or's lens clean and	l free of	<b>✓</b>	N/A		
6	Is the s	surface wetness sen	sor grid clean and	undamaged?	<b>✓</b>	N/A		
7		e sensor signal and ion, and well maint		ct, in good	<b>✓</b>	Signs of wear		
8		e sensor signal and he elements and we		ections protected	✓	N/A		
		additional explana nan-made, that may			ary)	) regarding conditions listed above, or any other features,		
The t	temperat	ture sensor signal ca	ble is now in poor o	ondition with severa	al se	ections of tape and many kinks.		

### Field Systems Data Form F-02058-1500-S5-rev002 SND152 Technician Sandy Grenville Site Visit Date 05/11/2018 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 12 meters Describe dry dep sample tube. 3/8 teflon by 12 meters At inlet only Are in-line filters used in the ozone sample line? (if ves indicate location) **~** Are sample lines clean, free of kinks, moisture, and obstructions? **V** Is the zero air supply desiccant unsaturated? Flow line only Are there moisture traps in the sample lines? Is there a rotometer in the dry deposition filter line, and is it Clean and dry clean?

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

## Field Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	SND152	Technician	Sandy Grenville		Site Visit Date	05/11/2018	3	
	DAS, se	ensor translators, and p	peripheral equi	pment operation	ıs aı	nd maintenance			
1		DAS instruments appe intained?	ar to be in good	l condition and	<b>✓</b>				
2		the components of the backup, etc)	DAS operation	al? (printers,	<b>✓</b>				
3	lightning protection circuitry?					Met sensors only			
4		signal connections pro intained?	otected from the	e weather and	<b>✓</b>				
5	Are the	signal leads connected	to the correct	DAS channel?	<b>✓</b>				
6	Are the ground	DAS, sensor translatored?	rs, and shelter	properly	<b>✓</b>				
7	Does th	e instrument shelter h	ave a stable pov	ver source?	<b>✓</b>				
8	Is the ir	strument shelter temp	perature contro	lled?	<b>✓</b>				
9	Is the m	net tower stable and gr	ounded?			Stable		Grounded	
10	Is the sa	ample tower stable and	l grounded?					<u>✓</u>	
11	Tower	comments?				Met tower removed			

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

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

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

#### **Field Systems Data Form** F-02058-1500-S7-rev002 SND152 Technician Sandy Grenville Site Visit Date 05/11/2018 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 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 Humidity sensor translator Surge protector** 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 **V** Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF ✓ V ✓ V Site Ops Manual** Feb 2014 **V HASP ✓** Feb 2014 **Field Ops Manual Calibration Reports 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

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 SND152 Technician Sandy Grenville Site Visit Date 05/11/2018 Site ID Site operation procedures Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **V** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed** Frequency **Compliant ✓ V** N/A **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **OC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** Every 2 weeks Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests V Manual Precision Level Test V** Not performed **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 ✓** 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? ✓ Call-in only 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:

reported? If yes, how?

Ozone sample line leak checks are no longer performed. A manual zero/span test is performed every two weeks following the inlet filter change.

### Field Systems Data Form F-02058-1500-S9-rev002 SND152 Technician Sandy Grenville Site Visit Date 05/11/2018 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 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 V** ✓ Semiannually **In-line Filter Inspection/Replacement** ✓ Every 2 weeks 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

SND152

Technician Sandy Grenville

Site Visit Date 05/11/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	BY3MC12	07047
DAS	Campbell	CR3000	2135	000357
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	060300020200	04855
Flow Rate	Apex	AXMC105LPMDPC	illegible	000856
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0808337422	06458
Ozone	ThermoElectron Inc	49i A1NAA	1105347328	000725
Ozone Standard	ThermoElectron Inc	49i A3NAA	1030244816	000704
Sample Tower	Aluma Tower	В	none	000148
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	14038	06405
Zero air pump	Werther International	PC70/4	000821894	06900

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
ESF	P127-Sandy	Grenville-05/12/2018				
1	5/12/2018	Computer	Dell	07060	Inspiron 15	894MC12
2	5/12/2018	DAS	Campbell	illegible	CR3000	3817
3	5/12/2018	Elevation	Elevation	None	1	None
4	5/12/2018	Filter pack flow pump	Thomas	02975	107CAB18	0493002476
5	5/12/2018	Flow Rate	Apex	000642	AXMC105LPMDPCV	54755
6	5/12/2018	Infrastructure	Infrastructure	none	none	none
7	5/12/2018	Modem	Raven	06606	H4223-C	0844355622
8	5/12/2018	Ozone	ThermoElectron Inc	000695	49i A1NAA	1030244801
9	5/12/2018	Ozone Standard	ThermoElectron Inc	000327	49i A3NAA	0622717852
10	5/12/2018	Sample Tower	Aluma Tower	03550	Α	none
11	5/12/2018	Shelter Temperature	Campbell	none	107-L	none
12	5/12/2018	Siting Criteria	Siting Criteria	None	1	None
13	5/12/2018	Temperature	RM Young	06406	41342VC	14039
14	5/12/2018	Zero air pump	Werther International	06909	C 70/4	000829161

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 3817 ESP127 Sandy Grenville 05/12/2018 DAS Primary Das Date: 5 /12/2018 **Audit Date** 5 /12/2018 Datel Parameter DAS Mfg 14:08:00 14:08:00 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** Das Day: 132 **Audit Day** 132 Tfer ID 01320 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0002 0.0001 0.0002 0.0001 2/13/2012 1.00000 **Cert Date** CorrCoff Fluke **Parameter** DAS Mfg **Serial Number** 95740135 Tfer Desc. DVM 01311 Tfer ID 1.00000 0.00000 **Slope Intercept** 2/13/2018 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 0.0000 0.0000 0.0000 0.0000 V V 7 0.1000 0.0999 0.0999 0.00007 0.3000 0.2997 0.2997 V V 0.0000 7 0.5000 0.4996 V V 0.00000.4996 7 0.7000 V V 0.0000 0.6995 0.6995 7 V V 0.9000 0.8994 0.8992 -0.0002 7 1.0000 0.9993 0.9991 V V -0.0002

## Flow Data Form

Mfg	Serial	Number Ta	Site	Tec	hnician	Site Visit I	Date Param	neter	Owner ID
pex	54755		ESP127	Sar	ndy Grenville	05/12/2018	Flow R	ate	000642
					Mfg	BIOS	P	arameter Flo	w Rate
				,	Serial Number		Т	fer Desc. BIG	OS 220-H
				,	<b>Tfer ID</b> 01414				
					TICI ID				
				3	Slope		00055 Inte	ercept	-0.0157
					Cert Date	2/2	1/2018 Co	rCoff	1.0000
DAS 1:		DAS 2:		L	Cal Factor Z	ero	0.0	)2	
A Avg % Diff:	A Max %		6Dif A Max	x % Di	Cal Factor F			1	
2.38%	2.6				Rotometer R	eading:	1	.4	
Desc.	Test typ	e Input l/r	n Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	PctDifferenc
primary	pump off	0.000	0.000	0.00	0.000	0.02	l/m	1/m	
primary	leak check	0.000	0.000	0.01	0.000	0.01	1/m	l/m	
primary	test pt 1	1.528	1.540	1.51	0.000	1.50	l/m	l/m	-2.609
primary	test pt 2	1.528	1.540	1.51	0.000	1.51	1/m	l/m	-1.959
primary	test pt 3	1.530	1.540	1.51	0.000	1.50	1/m	l/m	-2.609
Sensor Comp	onent Leak	Test		Condition	1		Status	pass	
Sensor Comp	onent Tubi	ng Condition		Condition	Good		Status	pass	
Sensor Comp	onent Filter	Position		Condition	Poor		Status	Fail	
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	5.2 cm		Status	pass	
Sensor Comp	onent Filter	Depth		Condition	-0.5 cm		Status	Fail	
Sensor Comp	onent Filter	Azimuth		Condition	Condition 270 deg			pass	
Sensor Comp	onent Syste	em Memo		Condition	Condition See comments		Status	pass	

## **Ozone Data Form**

Mfg	Serial Number Ta	Site	Technician		Site Visi	t Date Parame	eter Owner ID
ThermoElectron Inc	1030244801	ESP127	Sandy Gre	nville	05/12/20	Ozone	000695
Intercept -0. CorrCoff 0.	98976 Slope: 44844 Intercept 99999 CorrCoff	0.00000 0.00000 0.00000	Serial N	Number	ThermoE 0517112 01113		rameter ozone er Desc. Ozone primary stan
DAS 1: A Avg % Diff: A Ma	DAS 2: ax % Di A Avg %	6Dif A Max %	Slope Slope			1.00504 Inter	<b>ccept</b> 0.32915
2.4%	3.5%		Cert Da	ate	9	/12/2017 Corr	Coff 1.00000
UseDescription primary primary primary	ConcGroup  1  2  3	Tfer Raw 0.01 15.00 34.80	Tfer Corr -0.31 14.59 34.29	-0. 14	.08	Site Unit ppb ppb ppb	PctDifference -3.50% -2.60%
primary	4	67.60	66.93			ppb	-2.00%
primary	5	109.80	108.92		7.50	ppb	-1.30%
Sensor Component			Condition Good			Status	
Sensor Component	22.5 degree rule		Condition			Status	pass
Sensor Component	Inlet Filter Condition	on	Condition Clear	1		Status	pass
Sensor Component	Battery Backup		Condition N/A			Status	pass
Sensor Component	Offset		Condition 0.40			Status	pass
Sensor Component	Span		Condition 1.008	l		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 104.1	kHz		Status	pass
Sensor Component	Cell A Noise		Condition 0.7 pp	ob		Status	pass
Sensor Component	Cell A Flow		Condition 0.70	pm		Status	pass
Sensor Component	Cell A Pressure		Condition 697.7	mmHg		Status	pass
Sensor Component	Cell A Tmp.		Condition 31.8	C		Status	pass
Sensor Component	Cell B Freq.		Condition 98.8	кНz		Status	pass
Sensor Component	Cell B Noise		Condition 0.8 pp	ob		Status	pass
Sensor Component	Cell B Flow		Condition 0.70	pm		Status	pass
Sensor Component	Cell B Pressure		Condition 697.4	mmHg		Status	pass
Sensor Component	Cell B Tmp.		Condition			Status	pass
Sensor Component	Line Loss		Condition Not to	dition Not tested			pass
Sensor Component	System Memo		Condition			Status	pass

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young 14039 ESP127 05/12/2018 Temperature 06406 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 0.34 0.63 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.19 0.10 0.000 0.4 $\mathbf{C}$ 0.3 25.49 C Temp Mid Range 25.79 0.000 25.4 -0.09 primary 48.24 48.9 C primary Temp High Range 48.72 0.000 0.63 Condition Moderately clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Sandy Grenville Shelter Temperature Campbell ESP127 05/12/2018 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** 0.24 0.37 01227 **Tfer ID** 1.00798 0.09168 Slope Intercept 2/13/2018 CorrCoff 1.00000 **Cert Date**

	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary T	Гетр Mid Range	23.93	23.65	0.000	23.7	C	0.08
primary T	Гетр Mid Range	29.24	28.92	0.000	29.2	С	0.28
primary T	Гетр Mid Range	22.30	22.03	0.000	22.4	С	0.37
Sensor Component System Memo Condition Status pass							

#### **Infrastructure Data For**

Site ID ESP127	Technician Sandy Grenville	Site Visit Date 05/12/2018	
----------------	----------------------------	----------------------------	--

Shelter Make	Shelter Model	Shelter Size	
Ekto	8810	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	Fair	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

## **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	d Problem
Flow Rate	ESP127	Sandy Grenville	05/12/2018	Filter Position	Apex	3540		
The filter attachment plat	te is mounted too	low in the enclosur	re resulting in t	he filter being expo	sed to wind-drive	n rain and in the	standard o	eometric

# **Field Systems Comments**

1 Parameter: DasComments

The Shelter is dirty and cluttered with no trash can and dead beetles on the counter top. The heater and air conditioner are operating simultaneously.

2 Parameter: ShelterCleanNotes

The shelter has been improved since the previous audit, however there is still some rot in the walls.

#### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 05/12/2018 ESP127 Technician Sandy Grenville Site ID Silver Point **USGS Map EPA** Site Sponsor (agency) Map Scale private, TN DEC **Operating Group Map Date** 47-041-9991 AQS# Climatronics **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude dry **Deposition Measurement QAPP** Longitude Land Use woodland - mixed **QAPP Elevation Meters Terrain** rolling - complex **QAPP Declination** No Conforms to MLM **OAPP Declination Date** (615) 597-6556 36.03893 **Site Telephone Audit Latitude** Craft Center Rd. **Audit Longitude** -85.73305 Site Address 1 Hurricane Bridge Site Address 2 **Audit Elevation** 302 DeKalb -3.5 County **Audit Declination** Smithville, TN City, State **Present** Fire Extinguisher 37166 New in 2015 Zip Code Central **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 The shelter has been improved since the previous audit, however there is still some rot in the walls. Shelter Clean

From interstate 40 take exit 273, south on 56. Immediately after crossing the Hurricane Bridge over the Caney Fork

River, turn left at the sign for Tennessee Tech and the Appalachian Center for Crafts. Continue about 1 mile to the

locked (518) yellow gate on the right. The site is up the hill through the gate.

**✓** Notes

Site OK

**Driving Directions** 

F-02058-1500-S2-rev002

C!4° ID	ESP127	Taskaisian	Sandy Grenville	Site Visit Date	05/12/2019
Site ID	LOF IZI	1 echnician	Salidy Gleriville	Site visit Date	03/12/2016

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		$\checkmark$
City 10,000 to 50,000 population	10 km		$ lap{\checkmark}$
City 1,000 to 10,000 population	5 km		$ lap{\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	30 m	
Obstacles to wind	10 times obstacle height		✓

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

Fie	eld Sy	ystems Data Fo	orm				F-020	58-15	500-S3-rev	002
Site	e ID	ESP127	Technician Sa	ndy Grenville		Site Visit Date	05/12/2018		]	
1		nd speed and direction nfluenced by obstruction		to avoid	<b>✓</b> [	N/A				
2	(i.e. wii horizor	nd sensors mounted so nd sensors should be m ntally extended boom > nto the prevailing wind	ounted atop the to 2x the max diamet	wer or on a		N/A				
3	Are the	e tower and sensors plu	ımb?		<b>✓</b>	N/A				
4		e temperature shields p adiated heat sources su			<b>✓</b>					
5	condition surface	nperature and RH sensons? (i.e. ground belowed and not steeply sloped g water should be avoi	v sensors should be I. Ridges, hollows,	natural	<b>✓</b>					
6	Is the s	olar radiation sensor p	olumb?		<b>✓</b>	N/A				
7	Is it site light?	ed to avoid shading, or	any artificial or re	eflected	<b>✓</b> I	N/A				
8	Is the r	ain gauge plumb?			<b>✓</b> I	N/A				
9	Is it site towers,	ed to avoid sheltering e etc?	effects from buildir	ngs, trees,	<b>✓</b>	N/A				
10	Is the s	urface wetness sensor	sited with the grid	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?

Fic	eld Systems Data Form		F-02058-1500-S4-rev002
Site	ESP127 Technician Sandy Grenville		Site Visit Date 05/12/2018
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?	✓	
	ide any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	ary)	regarding conditions listed above, or any other features,

### Field Systems Data Form F-02058-1500-S5-rev002 ESP127 Technician Sandy Grenville Site Visit Date 05/12/2018 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? **~** 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:

F-02058-1500-S6-rev002

Site	e ID	ESP127	Technician	Sandy Grenville		Site Visit Date	05/12/2018	3	
	DAG			4 4.		1			
	DAS, se	nsor translators, and	<u>peripneral equi</u>	<u>pment operation</u>	ns ai	<u>id maintenance</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	Are the signal connections protected from the weather and well maintained?				<b>✓</b>				
5	Are the	signal leads connected	to the correct	DAS channel?	<b>✓</b>				
6	Are the DAS, sensor translators, and shelter properly grounded?				<b>✓</b>				
7	Does the	e 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	l grounded?			<b>✓</b>		<b>✓</b>	
11	Tower c	omments?							

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

The Shelter is dirty and cluttered with no trash can and dead beetles on the counter top. The heater and air conditioner are operating

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

simultaneously.

#### **Field Systems Data Form** F-02058-1500-S7-rev002 ESP127 Technician Sandy Grenville Site Visit Date 05/12/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? N/A Yes No No N/A Yes **V** 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** $\checkmark$ **V Humidity sensor translator Surge protector** 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 SSRF ✓ V ✓ Site Ops Manual** Oct 2010 **HASP V** Nov 2010 **Field Ops Manual Calibration Reports V ✓** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Minimal information Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current?

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

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

#### **Field Systems Data Form** F-02058-1500-S8-rev002 ESP127 Technician Sandy Grenville Site Visit Date 05/12/2018 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** N/A **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **QC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** As needed Manual Zero/Span Tests **V ~** Daily **Automatic Precision Level Tests V Manual Precision Level Test** As needed **V V** Weekly **Analyzer Diagnostics Tests ~** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Weekly Sample Line Check for Dirt/Water **~ V** Weekly **Zero Air Desiccant Check ✓** Do multi-point calibration gases go through the complete sample train including all filters?

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

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

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

complete sample train including all filters?

reported? If yes, how?

**✓** 

**✓** 

Logbook, call-in

Fi	eld Sy	stems Data Form					F-02058-1	1500-S9-rev002
Sit	e ID	ESP127 Te	chnici	ian Sandy Grenvill	е	Site Visit Date	05/12/2018	
	Site ope	ration procedures						
1	Is the filter pack being changed every Tuesday as scheduled?			!? ✓				
2	Are the Site Status Report Forms being completed and filed correctly?			<b>✓</b>				
3	Are data	a downloads and backups beed?	ing p	erformed as		No longer required		
4	Are gen	eral observations being mad	e and	l recorded? How?	<b>✓</b>	SSRF, call-in		
5	5 Are site supplies on-hand and replenished in a timely fashion?			<b>✓</b>				
6	Are sam	ple flow rates recorded? Ho	w?		<b>✓</b>	SSRF, logbook, call-in		
7	Are sam	ples sent to the lab on a reg	ılar s	chedule in a timely	<b>v</b>			
8		rs protected from contaminoping? How?	ation	during handling	<b>✓</b>	Clean gloves on an	d off	
9		site conditions reported reg ons manager or staff?	ılarly	to the field	<b>✓</b>			
QC	Check Po	erformed	I	Frequency			Compliant	
Multi-point MFC Calibrations Semiannually		Semiannually			$\checkmark$			
Flow System Leak Checks Weekly				$\checkmark$				
Filter Pack Inspection								
]	Flow Rate Setting Checks Weekly					$\checkmark$		
7	Visual Check of Flow Rate Rotometer  Weekly					✓		
]	In-line Filter Inspection/Replacement Semiannually					$\checkmark$		
	Sample Li	ne Check for Dirt/Water	V	Weekly			$\checkmark$	
		dditional explanation (phot n-made, that may affect the				y) regarding condit	ions listed above, or	any other features,

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

Site ID

ESP127

Technician Sandy Grenville

Site Visit Date 05/12/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	894MC12	07060
DAS	Campbell	CR3000	3817	illegible
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	0493002476	02975
Flow Rate	Apex	AXMC105LPMDPC	54755	000642
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4223-C	0844355622	06606
Ozone	ThermoElectron Inc	49i A1NAA	1030244801	000695
Ozone Standard	ThermoElectron Inc	49i A3NAA	0622717852	000327
Sample Tower	Aluma Tower	A	none	03550
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	14039	06406
Zero air pump	Werther International	C 70/4	000829161	06909

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
SPL	0111-Sandy	Grenville-05/13/2018				
1	5/13/2018	Computer	Dell	07057	Inspiron 15	4H4MC12
2	5/13/2018	DAS	Campbell	000342	CR3000	2121
3	5/13/2018	Elevation	Elevation	None	1	None
4	5/13/2018	Filter pack flow pump	Thomas	04861	107CAB18	00019997
5	5/13/2018	Flow Rate	Apex	000459	AXMC105LPMDPCV	40577
6	5/13/2018	Infrastructure	Infrastructure	none	none	none
7	5/13/2018	Modem	Raven	06463	V4221-V	0808337428
8	5/13/2018	Ozone	ThermoElectron Inc	000742	49i A1NAA	1105347313
9	5/13/2018	Ozone Standard	ThermoElectron Inc	000450	49i A3NAA	CM08200026
10	5/13/2018	Sample Tower	Aluma Tower	03548	Α	none
11	5/13/2018	Shelter Temperature	Campbell	none	107-L	none
12	5/13/2018	Siting Criteria	Siting Criteria	None	1	None
13	5/13/2018	Temperature	RM Young	04314	41342	4011
14	5/13/2018	UPS	APC	06096	RS800	080331133278
15	5/13/2018	Zero air pump	Werther International	06928	C 70/4	000822222

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2121 SPD111 Sandy Grenville 05/13/2018 DAS Primary Das Date: 5 /13/2018 **Audit Date** 5 /13/2018 Datel Parameter DAS Mfg 12:41:20 12:41:20 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** Das Day: 133 **Audit Day** 133 Tfer ID 01320 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0002 0.0001 0.0002 0.0001 2/13/2012 1.00000 **Cert Date** CorrCoff Fluke **Parameter** DAS Mfg **Serial Number** 95740135 Tfer Desc. DVM 01311 Tfer ID 1.00000 0.00000 **Slope Intercept** 2/13/2018 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 0.0000 0.0000 0.0000 0.0000 V V 7 0.1000 0.0999 0.0999 0.00007 0.3000 0.2997 0.2997 V V 0.0000 7 0.5000 0.4996 V V 0.00000.4996 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

/Ifg		nber Ta S			hnician		Date Param		Owner ID
рех	40577		SPD111	Sar	ndy Grenville	05/13/2018	Flow R	ate	000459
				1	Mfg	BIOS	P	arameter Flo	w Rate
				5	Serial Number		Т	fer Desc. BIG	OS 220-H
				r	Γfer ID	01414			
					Slope	1.	00055 Inte	ercept	-0.0157
					Cert Date	2/2	1/2018 <b>Co</b> 1	rCoff	1.0000
DAS 1:		DAS 2:		L	Cal Factor Z	ero	-0.0	)2	
A Avg % Diff:	A Max % Di	A Avg %I	oif A Max	% Di	Cal Factor F	ull Scale	0.9	97	
1.32%	1.32%				Rotometer R	eading:	1	.7	
Desc.	Test type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	I PctDifferenc
primary	pump off	0.000	0.000	0.01	0.000	-0.02	1/m	l/m	
primary	leak check	0.000	0.000	0.01	0.000	-0.01	1/m	l/m	
primary	test pt 1	1.504	1.520	1.53	0.000	1.50	1/m	l/m	-1.329
primary	test pt 2	1.507	1.520	1.53	0.000	1.50	1/m	l/m	-1.329
primary	test pt 3	1.509	1.520	1.53	0.000	1.50	1/m	l/m	-1.329
Sensor Comp	onent Leak Te	st		Condition	1		Status	pass	
Sensor Comp	onent Tubing C	Condition		Condition	Good		Status	pass	
Sensor Comp	onent Filter Po	sition		Condition	Good		Status	pass	
Sensor Comp	onent Rotomet	er Condition		Condition	Clean and dry		Status	pass	
Sensor Comp	onent Moisture	Present		Condition	No moisture pr	resent	Status	pass	
Sensor Component Filter Distance		Condition	4.0 cm	Status	pass				
Sensor Comp	onent Filter De	pth		Condition	2.3 cm		Status	pass	
Sensor Component Filter Azimuth		Condition	Not tested		Status	pass			
Sensor Comp	onent System	Memo		Condition	1		Status	pass	

## **Ozone Data Form**

Mfg S	erial Number Ta	Site	Technician	L	Site Visi	t Date Parame	ter Owner ID
ThermoElectron Inc 1	105347313	SPD111	Sandy Gre	nville	05/13/20	Ozone	000742
Intercept 0.1 CorrCoff 0.9	99197 Slope: 4502 Intercept 19996 CorrCoff	0.00000 0.00000 0.00000	Serial N	Number	0517112	167 <b>Tf</b>	rameter ozone er Desc. Ozone primary stan
DAS 1: A Avg % Diff: A Ma	DAS 2: x % Di	aDif A Max %	% Di			1.00504 Inter	
1.0%	1.3%		Cert Da	ate	9	/12/2017 Corr	<b>Coff</b> 1.00000
UseDescription primary primary primary	ConcGroup  1 2 3	Tfer Raw 0.01 14.90 34.69	Tfer Corr -0.31 14.49 34.18	-0. 14 34	.66	Site Unit ppb ppb ppb	PctDifference  1.17% 1.02%
primary primary	5	68.10 110.00	67.43			ppb	-1.26% -0.57%
Sensor Component	-		Condition Good			ppb Status	
Sensor Component			Condition			Status	
Sensor Component			Condition Clear	1		Status	
Sensor Component		Condition N/A			Status		
Sensor Component		Condition 0.3			Status	pass	
Sensor Component	Span	Condition 1.005			Status		pass
Sensor Component	Zero Voltage		Condition N/A	dition N/A		Status	pass
Sensor Component	Fullscale Voltage	Condition N/A			Status	pass	
Sensor Component	Cell A Freq.	Condition 95.9 kHz			Status	pass	
Sensor Component	Cell A Noise		Condition 0.7 ppb		Status		pass
Sensor Component	Cell A Flow		Condition 0.67	pm	Status		pass
Sensor Component	Cell A Pressure		Condition 702.0	ion 702.0 mmHg		Status	pass
Sensor Component	Cell A Tmp.		Condition 35.0	tion 35.0 C		Status	pass
Sensor Component	Cell B Freq.		Condition 101.4	ition 101.4 kHz		Status	pass
Sensor Component Cell B Noise			Condition 0.8 p	ition 0.8 ppb		Status	pass
Sensor Component Cell B Flow			Condition 0.65	ition 0.65 lpm		Status	pass
Sensor Component Cell B Pressure			Condition Not to	lition Not tested		Status	pass
Sensor Component	Cell B Tmp.		Condition			Status	pass
Sensor Component	Line Loss		Condition Not to	ested		Status	pass
<b>Sensor Component</b>	System Memo		Condition			Status	pass

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young 4011 SPD111 05/13/2018 Temperature 04314 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 0.10 0.12 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.17 0.08 0.000 0.2 $\mathbf{C}$ 0.12 C -0.09 Temp Mid Range 25.29 25.00 0.000 24.9 primary 47.53 47.5 C -0.08 primary Temp High Range 48.00 0.000 Condition Moderately clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Sandy Grenville Shelter Temperature Campbell SPD111 05/13/2018 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** 0.67 0.89 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	22.37	22.10	0.000	22.7	C	0.63
primary	Temp Mid Range	25.46	25.17	0.000	26.1	С	0.89
primary	Temp Mid Range	27.61	27.30	0.000	26.8	C	-0.5
Sensor Component System Memo			Condition		Status	pass	

#### **Infrastructure Data For**

Site ID SPD111 Technician Sandy Grenville Site Visit Date 05/13/201	8
---	---

Shelter Make	Shelter Model	Shelter Size	
Ekto	8810	640 cuft	

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

## **Field Systems Comments**

1 Parameter: DasComments

The sample tower is an older Type A tower and some small cracks are present in the tower legs. The tower clamps are very rusty.

2 Parameter: SitingCriteriaCom

The site is in a pasture with as many as 75 cattle. The cattle are fed within 100 meters of the site. When the site is visited the cattle approach to within 10 meters of the site.

3 Parameter: ShelterCleanNotes

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

4 Parameter: MetOpMaintCom

The temperature signal cables is showing signs of wear.

#### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 05/13/2018 SPD111 Technician Sandy Grenville Site ID Ausmus **USGS Map EPA** Site Sponsor (agency) Map Scale private **Operating Group Map Date** 47-025-9991 AQS# R.M. Young **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude dry, wet **Deposition Measurement QAPP** Longitude Land Use Agriculture, dairy, woodland - mixed **QAPP Elevation Meters** rolling / complex **Terrain QAPP Declination** Conforms to MLM Marginally **OAPP Declination Date** 4238698159 36.46983 **Site Telephone Audit Latitude** 718 Russell Hill Road -83.826511 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 361 Claiborne -5.1 County **Audit Declination** , TN City, State **Present** Fire Extinguisher 37870 New in 2015 Zip Code Eastern First Aid Kit Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **V Climbing Belt** Primary Op. E-mail **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 shelter is in good condition. The shelter is clean, neat, well organized and well maintained. Shelter Clean **✓** Notes Site OK From I-75 take exit 134, 25W to 63 and LaFollette. Continue through LaFollette on 63 into Claiborne county. Just **Driving Directions** past mile marker 6 and the B&B gas and tire station in Claiborne county, turn right on an unmarked road. This road will end at a Tee after about 150 yds. Turn left at the Tee and then an immediate right at the next intersection onto

Russell Hill Rd. The site will be on the right in the pasture behind the silo.

F-02058-1500-S2-rev002

Site ID SPD111 Technician Sandy Grenville Site Visit Date 05/13/2018

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	100 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 Distances OK  $\Box$ 

**Siting Criteria Comment** 

The site is in a pasture with as many as 75 cattle. The cattle are fed within 100 meters of the site. When the site is visited the cattle approach to within 10 meters of the site.

Fie	eld Systems Data Form	F-02058-1500-S3-rev002
Site	SPD111 Technician Sandy Grenville	Site Visit Date 05/13/2018
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)	<b>✓</b> N/A
3	Are the tower and sensors plumb?	✓ N/A
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?	
5	Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)	
6	Is the solar radiation sensor plumb?	✓ N/A
7	Is it sited to avoid shading, or any artificial or reflected light?	✓ N/A
8	Is the rain gauge plumb?	✓ N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	✓ N/A
10	Is the surface wetness sensor sited with the grid surface facing north?	✓ N/A

✓ 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 SPD111 Technician Sandy Grenville		Site Visit Date 05/13/2018
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	<b>✓</b>	
2	Are all the meteorological sensors operational online, and reporting data?	✓	
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>	Signs of wear
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	✓	
	de any additional explanation (photograph or sketch if necessed or man-made, that may affect the monitoring parameters:	sary	regarding conditions listed above, or any other features,
	emperature signal cables is showing signs of wear.		

### Field Systems Data Form F-02058-1500-S5-rev002 SPD111 Technician Sandy Grenville Site Visit Date 05/13/2018 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? 75 % saturated 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	SPD111	Technician	Sandy Grenville		Site Vis	it Date 05/13/201	8	
	DAS, se	nsor translators, and	peripheral equit	oment operation	ıs ar	nd maintena	nnce		
1		DAS instruments appe		<del>-</del>	<b>✓</b>				
1		intained?	car to be in good	condition and					
2		the components of the backup, etc)	DAS operationa	al? (printers,	<b>✓</b>				
3		nnalyzer and sensor sig g protection circuitry		hrough	<b>✓</b>	Met sensors	sonly		
4		signal connections prointained?	otected from the	weather and	<b>✓</b>				
5	Are the	signal leads connected	d to the correct I	OAS channel?	<b>✓</b>				
6	Are the grounde	DAS, sensor translated?	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	perature control	led?	✓				
9	Is the m	et tower stable and gi	counded?			<b>Stable</b>		Grounded	
10	Is the sa	ample tower stable and	d grounded?			<b>~</b>			
11	Tower o	comments?				Met tower re	emoved		
	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	The sample tower is an older Type A tower and some small cracks are present in the tower legs. The tower clamps are very rusty.								

#### **Field Systems Data Form** F-02058-1500-S7-rev002 SPD111 Technician Sandy Grenville Site Visit Date 05/13/2018 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 V Humidity sensor translator Surge protector ✓** П П **V UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device** ~ **✓ Shelter heater** Ozone analyzer **V V** Filter pack flow controller Shelter air conditioner **~** Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V ✓ SSRF ✓ V ✓ Site Ops Manual** Nov 2011 **V HASP V** Feb 2014 **✓ Field Ops Manual** July 1990 **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:

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

Site	e <b>ID</b>	SPD111	Technicia	n S	Sandy Grenville		Site Visit Date 05/13/	2018	
Site operation procedures									
1 Has the site operator attended a formal C course? If yes, when and who instructed?					ASTNET training ✓ Trained by ESE employee		EOH during site	installation	
2 Has the backup operator attended a formal Catraining course? If yes, when and who instruct									
3					esday	<b>✓</b>			
4						<b>✓</b>			
5		ite operator(s) knowled uired site activities? (in				<b>✓</b>			
	Are reg	gular operational QA/Q	C checks pe	rfor	med on meteor	rolo	gical instruments?		
QC	Check !	Performed			Frequency			Compliant	
Mu	ıltipoint	Calibrations		<b>✓</b>	Semiannuall	y		<b>✓</b>	
	sual Insp			<b>✓</b>	N/A			$\checkmark$	
	_	Zero/Span Tests (clima	atronics)		N/A			$\checkmark$	
		in Gauge Test		<b>✓</b>	N/A			$\checkmark$	
Co	nfirm R	easonableness of Curre	nt Values	✓	Weekly			$\checkmark$	
Test Surface Wetness Response			<b>✓</b>	N/A			$\checkmark$		
	Are reg	gular operational QA/Q	OC checks pe	rfor	med on the ozo	ne	analyzer?		
QC	Check 1	Performed			Frequency			Compliant	
Mu	ılti-point	t Calibrations		<b>✓</b>	Semiannuall	У		<b>✓</b>	
Au	tomatic	Zero/Span Tests		<b>✓</b>	Daily			<b>✓</b>	
		ro/Span Tests		<b>✓</b>	As needed			$\checkmark$	
		Precision Level Tests		<b>✓</b>	Daily			$\checkmark$	
Ma	nual Pro	ecision Level Test		<b>✓</b>	As needed			$\checkmark$	
An	alyzer D	iagnostics Tests		<b>✓</b>	Weekly			$\checkmark$	
	•	er Replacement (at inle	t)	<b>✓</b>	Every 2 wee	ks		<b>✓</b>	
		er Replacement (at ana			N/A			<b>✓</b>	
Sar	mple Lin	e Check for Dirt/Wate	r	<b>✓</b>	Weekly			$\checkmark$	
Zei	ro Air D	esiccant Check		<b>✓</b>	Weekly			<b>✓</b>	
1		ti-point calibration gas		h th	e complete		Unknown		
2	sample train including all filters?  Do automatic and manual z/s/p gasses go through the								
	complete sample train including all filters?								
3		e automatic and manua ed? If yes, how?	l z/s/p check	s mo	nitored and	<b>✓</b>	Call-in only		
	-	_					y) regarding conditions lis	sted above, or a	ny other features,
nati	urai or n	nan-made, that may aff	ect the moni	ıorır	ng parameters				
1									

#### Field Systems Data Form F-02058-1500-S9-rev002 SPD111 Technician Sandy Grenville Site Visit Date 05/13/2018 Site ID **Site operation procedures** Is the filter pack being changed every Tuesday as scheduled? ✓ Filter changed afternoons 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? **✓** 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

SPD111

Technician Sandy Grenville

Site Visit Date 05/13/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	4H4MC12	07057
DAS	Campbell	CR3000	2121	000342
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	00019997	04861
Flow Rate	Apex	AXMC105LPMDPC	40577	000459
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0808337428	06463
Ozone	ThermoElectron Inc	49i A1NAA	1105347313	000742
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200026	000450
Sample Tower	Aluma Tower	A	none	03548
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	4011	04314
UPS	APC	RS800	080331133278	06096
Zero air pump	Werther International	C 70/4	000822222	06928

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number			
DIN	DIN431-Martin Valvur-05/17/2018								
1	5/17/2018	Computer	Hewlett Packard	none	ProBook	5CB22906V2			
2	5/17/2018	DAS	Environmental Sys Corp	90652	8816	2565			
3	5/17/2018	elevation	Elevation	none	none	none			
4	5/17/2018	Filter pack flow pump	Thomas	none	107CA18	0191007241			
5	5/17/2018	flow rate	Mykrolis	none	FC280SAV-4S	AW902153			
6	5/17/2018	Infrastructure	Infrastructure	none	none	none			
7	5/17/2018	MFC power supply	Tylan	none	RO-32	FP9706002			
8	5/17/2018	Modem	US Robotics	none	V.92	1MCWZ4iN2382			
9	5/17/2018	Ozone	ThermoElectron Inc	none	49i A3NAA	1211052490			
10	5/17/2018	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	CM08460050			
11	5/17/2018	Shelter Temperature	ARS	none	unknown	none			
12	5/17/2018	siting criteria	Siting Criteria	none	none	None			
13	5/17/2018	Temperature2meter	RM Young	none	41342	4273			
14	5/17/2018	Zero air pump	Werther International	none	PC70/4	531395			

#### **DAS Data Form** 1.57 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg **Environmental Sys** 2565 DIN431 Martin Valvur 05/17/2018 DAS Primary Das Date: 5 /17/2018 **Audit Date** 5 /17/2018 HY Parameter DAS Mfg 8:54:26 Das Time: 8:56:00 **Audit Time** Tfer Desc. Source generator (D 12010039329 **Serial Number** Das Day: 137 **Audit Day** 137 Tfer ID 01322 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0003 0.0002 0.0003 0.0002 6/15/2014 1.00000 **Cert Date** CorrCoff Fluke **Parameter** DAS Mfg **Serial Number** 95740243 Tfer Desc. DVM 01312 Tfer ID 1.00000 0.00000 **Slope Intercept** 2/14/2018 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output **DAS** Output InputUnit OutputUnit Difference 10 0.0000 -0.0003 -0.0002 0.0001 V V 10 0.1000 0.0995 0.0997 0.000210 0.3000 0.2994 0.2996 V V 0.0002 10 0.5000 0.4992 0.4993 V V 0.0001 10 0.7000 V V 0.0002 0.6995 0.6997 V V 10 0.9000 0.8995 0.8998 0.0003 10 1.0000 0.9999 0.9999 V V 0.0000

## Flow Data Form

Mfg	Serial Nun	nber Ta	Site	Tec	hnician	Site Visit I	Oate Param	neter	Owner ID
Mykrolis	AW902153	3	DIN431	Mai	rtin Valvur	05/17/2018	flow ra	te	none
Mfg	Tylan				Mfg	P	Parameter Flow Rate		
SN/Owner ID	FP9706002	none			Serial Number	148613	Т	fer Desc. Bl	OS 220-H
Parameter	MFC power sup	oply		,	Гfer ID	01421			
					Slope	0.	98450 Inte	ercept	0.10300
					Cert Date	3/	1/2018 Co	rrCoff	1.00000
DAS 1:		DAS 2:		L	Cal Factor Z	ero	0.04	14	
A Avg % Diff:	A Max % Di	A Avg %l	Dif A Max	% Di	Cal Factor F	ull Scale	10.9	91	
0.47%	0.63%				Rotometer R	eading:	3	.5	
Desc.	Test type	-	Input Corr_	MfcDisp.	OutputSignal	-	InputUnit	OutputSignal	I PctDifference
primary	pump off	0.000	0.000	-0.04	0.0000	0.03	1/m	1/m	
primary	leak check	0.000	0.000	-0.04	0.0000	0.03	1/m	l/m	0.4=
primary	test pt 1	3.040	2.980	1.35	0.0000	2.99	1/m	1/m	0.47%
primary primary	test pt 2 test pt 3	3.072 3.071	3.020	1.35 1.35	0.0000	3.00	1/m 1/m	1/m 1/m	-0.63%
	onent Leak Tes		3.010	Condition		3.00	Status		-0.30%
				_					
Sensor Compo	onent Tubing C	ondition		Condition	Good		Status	pass	
Sensor Compo	onent Filter Pos	sition		Condition	Good		Status	pass	
Sensor Compo	nent Rotomete	er Condition	1	Condition	Clean and dry		Status	pass	
Sensor Compo	onent Moisture	Present		Condition	No moisture pr	resent	Status	pass	
Sensor Compo	onent Filter Dis	tance		Condition	5.5 cm		Status	pass	
Sensor Compo	onent Filter Dep	oth		Condition	1.0 cm		Status	pass	
Sensor Compo	onent Filter Azi	muth		Condition	360 deg		Status	pass	
Sensor Compo	onent System N	/lemo		Condition	1		Status	pass	

## **Ozone Data Form**

Mfg Se	erial Number Ta	Site	Te	chnician		Site Visi	it Date	Parame	eter Owner ID	,
ThermoElectron Inc 1	211052490	DIN431	М	artin Valv	ur	05/17/20	018	Ozone	none	
Slope:         0.9           Intercept         0.6           CorrCoff         0.9	0.00000	Tfer ID	Serial Number		ThermoElectron In 49CPS-70008-364		rameter ozone er Desc. Ozone primary s			
DAS 1: A Avg % Diff: A Max	DAS 2: x % Di A Avg %	6Dif A Max (	% Di	Slope			1.00801		-	
1.4%	3.0%			Cert Da	ite	9	9/11/2017	7 Corr	*Coff 1.0000	00
UseDescription primary	ConcGroup	Tfer Raw 0.15	0.2		Si 0.		Site ppb	Unit	PctDifference	
primary primary	3	14.31 38.00	14.	.24 .74	14 37		ppb ppb		3.02%	
primary	4	67.48	66.		67		ppb		0.51%	
primary	5	110.34	109				ppb		-1.29%	
<b>Sensor Component</b>	Sample Train		Condition	on Good				Status	pass	
<b>Sensor Component</b>	22.5 degree rule		Condition	on				Status	pass	
Sensor Component	Inlet Filter Conditio	n	Condition	on Clean				Status	pass	
<b>Sensor Component</b>	Battery Backup		Condition	on N/A				Status	pass	
Sensor Component	Offset		Condition	on -0.4				Status	pass	
Sensor Component	Span		Condition	on 1.004				Status	pass	
<b>Sensor Component</b>	Zero Voltage		Condition 0.0001				Status	pass		
Sensor Component	Fullscale Voltage		Condition 1.0000				Status	pass		
<b>Sensor Component</b>	Cell A Freq.		Condition 80.2 kHz				Status	pass		
Sensor Component	Cell A Noise		Conditio	0.3 pp	b	Status			pass	
<b>Sensor Component</b>	Cell A Flow		Condition	on 0.67 I	pm			Status	pass	
Sensor Component	Cell A Pressure		Condition	on 620.0	mmHg			Status	pass	
Sensor Component	Cell A Tmp.		Condition	on 35.5 (				Status	pass	
Sensor Component	Cell B Freq.		Condition	on 76.8 k	Hz			Status	pass	
Sensor Component	Cell B Noise		Condition	on 0.4 pp	b			Status	pass	
<b>Sensor Component</b>	Cell B Flow		Condition	on 0.65 I	pm			Status	pass	
Sensor Component	Cell B Pressure		Condition	on 619.1	mmHg			Status	pass	
Sensor Component	Cell B Tmp.	Conditio	ion				Status	pass		
Sensor Component	Line Loss		Condition	Not tested				Status	pass	
Sensor Component	System Memo		Conditio	on				Status	pass	

#### 2 Meter Temperature Data Form Calc. Difference Serial Number Ta **Technician** Site Visit Date Parameter Mfg Site **Owner ID** DIN431 Martin Valvur RM Young 4273 05/17/2018 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 0.05 0.06 Test type UseDescription InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit Difference Temp Low Rang 0.0000 primary 0.03 0.05 $0.00\,{\rm C}$ -0.05 Temp Mid Rang 24.13 24.15 0.0000 24.21 C 0.06 primary primary Temp High Rang 48.37 48.40 0.0000 48.43 C 0.03 Sensor Component | Properly Sited **Condition** Properly sited **Status** pass Condition Clean Sensor Component | Shield **Status** pass Condition Functioning Status pass Sensor Component Blower Sensor Component Blower Status Switch Status pass **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Martin Valvur ARS DIN431 05/17/2018 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** 0.31 0.57 01229 **Tfer ID** -0.01977 **Slope** 0.99986 Intercept 1/24/2018 1.00000 **Cert Date** CorrCoff OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. 0.000primary Temp Mid Range 25.34 25.36 25.5 C 0.12 0.000 C 0.23 Temp Mid Range 26.44 26.46 26.7 primary

0.000

C

Status pass

26.0

0.57

25.45

Condition

25.43

primary

Temp Mid Range

Sensor Component | System Memo

## Infrastructure Data For

Site ID DIN431 Technician Martin Valvur Site Visit Date 05/17/2018

Shelter Make Shelter Model Shelter Size

American Portable Buildings A0810 640 cuft

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

## **Field Systems Comments**

1 Parameter: SiteOpsProcComm

Filter handling procedures have improved since the previous audit. Gloves are being used to handle the filter.

2 Parameter: DasComments

All sensors, filter pack, and ozone sample inlet are on a single, crank-down tower.

3 Parameter: SiteOpsProcedures

The site operator is not responsible for manual zero/span/precision checks, or multipoint calibrations, of the ozone analyzer.

4 Parameter: SitingCriteriaCom

A small parking lot for park service employees is located approximately 40 meters north of the site.

5 Parameter: ShelterCleanNotes

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

6 Parameter: MetSensorComme

The ambient temperature sensor is mounted approximately 8 meters from the ground and above the shelter roof.

#### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 05/17/2018 DIN431 Technician Martin Valvur Site ID Dinosaur Quarry **USGS Map NPS** Site Sponsor (agency) Map Scale NPS **Operating Group Map Date** 49-047-1002 AQS# R.M. Young **Meteorological Type** 40.4373 **Air Pollutant Analyzer** Ozone **QAPP** Latitude -109.3046 **Deposition Measurement** dry **QAPP** Longitude Desert 1463 **Land Use QAPP Elevation Meters** 10.7 complex **Terrain QAPP Declination** Marginally Conforms to MLM **OAPP Declination Date** 40.4373 **Site Telephone Audit Latitude** -109.3046 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 1463 Uintah 10.7 County **Audit Declination** Jensen, UT City, State **Present** Fire Extinguisher 84035 Not present Zip Code Mountain **First Aid Kit** Time Zone **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # Primary Op. E-mail **Climbing Belt Backup Operator Security Fence V** Backup Op. Phone # **Secure Shelter** Stable Entry Step Backup Op. E-mail Shelter Working Room ✓ Make Model A0810 American Portable B **Shelter Size** 640 cuft **✓** Notes The shelter is in good condition, clean, and well organized. **Shelter Clean ✓** Notes

Go east on route 40 from Vernal, UT. Turn north on route 149 and follow signs for Dinosaur National Monument.

Site OK

**Driving Directions** 

## Field Systems Data Form

F-02058-1500-S2-rev002

Site ID DIN431 Technician Martin Valvur Site Visit Date 05/17/2018

Potential Interferent	Minimum Distance From Measurement Apparatus	Distance	Pass = Checked
Large Point Source of SO2 or NOx	20 to 40 km		
Major industrial complex	10 to 20 km		✓
City > 50,000 population	40 km		✓
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	40 m	✓
Tree line	50 m		✓
Obstacles to wind	10 times obstacle height		<b>✓</b>

Siting Distances OK

**Siting Criteria Comment** 

A small parking lot for park service employees is located approximately 40 meters north of the site.

Fi	eld Sy	stems Data Fo	orm				F-02058-1	500-S3-rev002
Sit	e ID	DIN431	Technician	Martin Valvur		Site Visit Date	05/17/2018	
1		nd speed and direction ifluenced by obstruction		as to avoid	<b>✓</b>	N/A		
2	(i.e. win	nd sensors mounted so dd sensors should be m tally extended boom > nto the prevailing wind	ounted atop the 2x the max dia	e tower or on a	<b>✓</b>	N/A		
3		tower and sensors plu			<b>✓</b>	N/A		
4		temperature shields p adiated heat sources su				Mounted on south o	f tower, over shelter	
5	condition surface	nperature and RH sensons? (i.e. ground below and not steeply sloped g water should be avoi	sensors should Ridges, hollov	l be natural				
6	Is the so	olar radiation sensor p	lumb?		<b>✓</b>	N/A		
7	Is it site light?	ed to avoid shading, or	any artificial o	r reflected	<b>✓</b>	N/A		
8	Is the ra	ain gauge plumb?			<b>✓</b>	N/A		
9	Is it site towers,	ed to avoid sheltering e etc?	ffects from bui	ldings, trees,	<b>✓</b>	N/A		
10	Is the su facing n	urface wetness sensor sorth?	sited with the g	rid surface	<b>✓</b>	N/A		
11	Is it inc	clined approximately 3	0 degrees?		<b>✓</b>	N/A		
		additional explanatio				y) regarding condit	ions listed above, or	any other features,

The ambient temperature sensor is mounted approximately 8 meters from the ground and above the shelter roof.

Fic	eld Systems Data Form		F-02058-1500-S4-rev002
Site	DIN431 Technician Martin Valvur		Site Visit Date 05/17/2018
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	<b>✓</b>	
2	Are all the meteorological sensors operational online, and reporting data?	✓	
3	Are the shields for the temperature and RH sensors clean?	<b>✓</b>	
4	Are the aspirated motors working?	<b>✓</b>	
5	Is the solar radiation sensor's lens clean and free of scratches?	<b>✓</b>	N/A
6	Is the surface wetness sensor grid clean and undamaged?	<b>✓</b>	N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	<b>✓</b>	
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	✓	
	ride any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	sary)	regarding conditions listed above, or any other features,

Fi	eld Sy	stems Data Fo	orm			F-02058-1500-S5-rev002
Site	e ID	DIN431	Technician Marti	in Valvur		Site Visit Date 05/17/2018
	Siting C	Criteria: Are the pollut	ant analyzers and de	eposition equ	ipn	nent sited in accordance with 40 CFR 58, Appendix E
1		sample inlets have at le	east a 270 degree arc	of	<b>✓</b>	
2	Are the	sample inlets 3 - 15 me	eters above the groun	nd?	<b>~</b>	
3		sample inlets > 1 metemeters from trees?	er from any major ok	ostruction,	<b>✓</b>	
	<u>Pollutar</u>	nt analyzers and depos	ition equipment ope	rations and 1	mai	<u>ntenance</u>
1		analyzers and equipme on and well maintained		ood	<b>✓</b>	
2		analyzers and monitoning data?	rs operational, on-lin	ne, and	<b>✓</b>	
3	Describ	e ozone sample tube.				1/4 teflon by 12 meters
4	Describ	e dry dep sample tube				3/8 teflon by 12 meters
5		ine filters used in the o	ozone sample line? (i	f yes	<b>✓</b>	At inlet only
6	Are san	uple lines clean, free of tions?	kinks, moisture, an	<b>d</b>	✓	
7	Is the ze	ero air supply desiccan	t unsaturated?	[	<b>✓</b>	
8	Are the	re moisture traps in th	e sample lines?	[		No
9	Is there clean?	a rotometer in the dry	deposition filter line	e, and is it	✓	Clean and dry
		additional explanation an-made, that may affe			ry)	regarding conditions listed above, or any other features,

# Field Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	DIN431	Technician	Martin Valvur		Site Visi	it Date 05/17/201	8	
	DAS, se	nsor translators, and	peripheral equi	pment operation	ıs aı	nd maintena	nce		
1	Do the l	OAS instruments appe							
	well ma	intained?							
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 prointained?	otected from the	e weather and	<b>✓</b>				
5	Are the	signal leads connected	d to the correct	DAS channel?	<b>✓</b>				
6	Are the grounde	DAS, sensor translated?	ors, and shelter	properly	<b>✓</b>				
7	Does the	e instrument shelter h	ave a stable pov	ver source?	<b>✓</b>				
8	Is the in	strument shelter temp	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?						
11	Tower o	omments?				One tower o	nly	<b>V</b>	
		additional explanationan-made, that may a				y) regarding	g conditions listed	d above, or a	nny other features,
All :	sensors, f	ilter pack, and ozone sa	ample inlet are or	n a single, crank-	dowr	n tower.			

#### **Field Systems Data Form** F-02058-1500-S7-rev002 **DIN431** Technician | Martin Valvur Site Visit Date 05/17/2018 Site ID **Documentation** Does the site have the required instrument and equipment manuals? N/A Yes No Yes No N/A **V ✓** Wind speed sensor **Data logger V V** Wind direction sensor **Data logger V V** П Temperature sensor Strip chart recorder **V V** Relative humidity sensor Computer **V** 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 ~ **✓ 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** Not present **SSRF ✓ V Site Ops Manual** Not present **HASP** Not present **Field Ops Manual** Not present **Calibration Reports ✓** 1/20/2014 Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Flow & observation sections Are the Site Status Report Forms being completed and current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab?

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

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

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

current?

Control charts not used

#### **Field Systems Data Form** F-02058-1500-S8-rev002 **DIN431** Site Visit Date 05/17/2018 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** N/A **Multipoint Calibrations V V** N/A **Visual Inspections ✓ V** N/A Translator Zero/Span Tests (climatronics) **✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **Compliant OC Check Performed** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily Not performed Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests Manual Precision Level Test** Not performed Not performed **Analyzer Diagnostics Tests ~ ✓** Monthly **In-line Filter Replacement (at inlet) V V** N/A In-line Filter Replacement (at analyze Sample Line Check for Dirt/Water Not performed **V V** Semiannually **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? **✓** Dataview Are the automatic and manual z/s/p checks monitored and reported? If yes, how? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

The site operator is not responsible for manual zero/span/precision checks, or multipoint calibrations, of the ozone analyzer.

### Field Systems Data Form F-02058-1500-S9-rev002 DIN431 Technician | Martin Valvur Site Visit Date 05/17/2018 Site ID Site operation procedures Is the filter pack being changed every Tuesday as scheduled? ✓ Filter changed various times Are the Site Status Report Forms being completed and filed correctly? No longer required Are data downloads and backups being performed as scheduled? **✓** SSRF Are general observations being made and recorded? How? **~** Are site supplies on-hand and replenished in a timely fashion? SSRF Are sample flow rates recorded? How? Are samples sent to the lab on a regular schedule in a timely fashion? **✓** Clean gloves on and off Are filters protected from contamination during handling and shipping? How? Are the site conditions reported regularly to the field operations manager or staff? **QC Check Performed Compliant Frequency V** ✓ Semiannually **Multi-point MFC Calibrations** Not performed Flow System Leak Checks **Filter Pack Inspection V ✓** Weekly **Flow Rate Setting Checks V** Weekly **Visual Check of Flow Rate Rotometer V** ✓ Semiannually **In-line Filter Inspection/Replacement** ■ Not performed Sample Line Check for Dirt/Water Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,

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:

Filter handling procedures have improved since the previous audit. Gloves are being used to handle the filter.

# Field Systems Data Form

## F-02058-1500-S10-rev002

Site ID DIN431 Technician Martin Valvur Site Visit Date 05/17/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	ProBook	5CB22906V2	none
DAS	Environmental Sys Corp	8816	2565	90652
elevation	Elevation	none	none	none
Filter pack flow pump	Thomas	107CA18	0191007241	none
flow rate	Mykrolis	FC280SAV-4S	AW902153	none
Infrastructure	Infrastructure	none	none	none
MFC power supply	Tylan	RO-32	FP9706002	none
Modem	US Robotics	V.92	1MCWZ4iN2382	none
Ozone	ThermoElectron Inc	49i A3NAA	1211052490	none
Ozone Standard	ThermoElectron Inc	49i A1NAA	CM08460050	none
Shelter Temperature	ARS	unknown	none	none
siting criteria	Siting Criteria	none	None	none
Temperature2meter	RM Young	41342	4273	none
Zero air pump	Werther International	PC70/4	531395	none

# Site Inventory by Site Visit

Site V	isit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
FOR	605-Martir	ı Valvur-06/06/2018				
1	6/6/2018	DAS	Campbell	49922	CR1000	illegible
2	6/6/2018	elevation	Elevation	none	none	none
3	6/6/2018	Flow Rate	Omega	none	FMA6518ST-RS232	394013-3
4	6/6/2018	Infrastructure	Infrastructure	none	none	none
5	6/6/2018	Precipitation	Handar	none	444A	2998
6	6/6/2018	Relative Humidity	Vaisala	none	HMP45AC	Z3210004
7	6/6/2018	siting criteria	Siting Criteria	none	none	None
8	6/6/2018	Solar Radiation	Licor	none	LI-200	PY47986
9	6/6/2018	Temperature	Unknown	none	Unknown	none
10	6/6/2018	Wind Direction	Met One	illegible	024	J5213
11	6/6/2018	Wind Speed	Met One	none	014	K2278

## Flow Data Form

<b>Afg</b>	Sei	rial Num	ber Ta S	ite	Tecl	hnician	Site Visit I	Date Paran	neter	Owner ID	
Omega	39	94013-3	ı	OR605	Mai	tin Valvur	06/06/2018	Flow F	Rate	none	
					1	Mfg	BIOS		Parameter Flow Rate		
						Serial Number	148613	7	Tfer Desc. BIOS 220-H		
					r	Γfer ID	01421				
								20.450 -		0.4000	
						Slope	0.	98450 Int	ercept	0.1030	
					•	Cert Date	3/	I/2018 <b>Co</b>	rrCoff	1.0000	
DAS 1:			DAS 2:			Cal Factor Z	ero	0.	18		
A Avg % Diff:	A Max		A Avg %I	Dif A Max	% Di	Cal Factor F	_	1.0			
0.39%		0.49%				Rotometer R	eading:		0		
Desc.	Tes	t type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignall	PctDifference	
primary	pump		0.000	0.000	0.00	0.000	0.06	l/m	l/m		
primary	leak cl		0.000	0.000	0.00	0.000	0.16	1/m	l/m		
primary	test pt		3.122	3.070	0.00	0.000	3.06	l/m	l/m	-0.49%	
primary	test pt		3.119	3.060	0.00	0.000	3.05	l/m	l/m	-0.20%	
primary	test pt	3	3.121	3.070	0.00	0.000	3.06	1/m	l/m	-0.49%	
Sensor Compo	onent	Leak Test	t		Condition	1		Statu	pass		
Sensor Compo	onent	Tubing Co	ondition		Condition	Good		Statu	pass		
Sensor Compo	onent	Filter Pos	ition		Condition	Good		Statu	pass		
Sensor Compo	onent	Rotomete	r Condition		Condition	N/A		Statu	pass		
Sensor Compo	onent	Moisture I	Present		Condition	No moisture pr	resent	Statu	pass		
Sensor Compe	onent	Filter Dist	ance		Condition	4.5 cm		Statu	pass		
Sensor Compo	onent F	Filter Dep	th		Condition	3.0 cm		Statu	pass		
Sensor Compo	onent	Filter Azin	nuth		Condition	180 deg		Statu	pass	_	
Sensor Component System Memo		Condition	n		Statu	pass					

Wind Speed	Data Form							
Mfg	Serial Number Ta	Site	T	echnician	Site Visit Date	Param	eter	Owner ID
Met One	K2278	FOR605	N	Martin Valvur	06/06/2018	Wind S	peed	none
				Mfg	RM Young	Pa	arameter wind	I speed
				Serial Number	CA4353	Tf	fer Desc. wind	speed motor (h
				Tfer ID	01457			
Decree of Control CN	N/A			Slope	1.0000	0 Inte	rcept	0.00000
Prop or Cups SN Prop or Cups Toro			0.3	Cert Date	4/19/201		rCoff	1.00000
Prop Correction Fa	•			Cert Date	4/19/201	Cor	rcon	1.00000
DAS		<b>DAS 2:</b>						
	Range High Ran	nge Low Ra	inge	High Range				
Abs Avg Err								
Abs Max Er							1	
Sensor Compone				Good		Status	pass	
Sensor Compone	Prop or Cups Cond	dition	Conditi	ion Good		Status	pass	
Sensor Compone	nt Sensor Heater		Conditi	ion N/A		Status	pass	
Sensor Compone	nt Torque		Conditi	ion		Status	pass	
Sensor Compone	nt Sensor Plumb		Conditi	ion Plumb		Status	pass	
Sensor Compone	nt System Memo		Conditi	ion		Status	pass	

#### **Wind Direction Data Form** Serial Number Ta **Technician** Site Visit Date Parameter Owner ID Mfg FOR605 Martin Valvur Wind Direction Met One J5213 06/06/2018 illegible Mfg Ushikata Parameter wind direction 190037 Tfer Desc. transit **Serial Number** 01265 Tfer ID 0.00000 **Slope** 1.00000 **Intercept** Vane SN: N/A C. A. Align. deg. true: 5 5 355 VaneTorque to 3/5/2018 1.00000 **Cert Date** CorrCoff **DAS 1: DAS 2: Orientation Linearity: Orientation Linearity:** 3.0 Abs Avg Err 5 Abs Max Er UseDescription TferID Input Raw Linearity Output V Output Deg. Difference Change Error 0 01265 5 0.000 5 0 primary 5 5 85 0.000 90 primary 01265 175 0.000 177 2 2 primary 01265 5 5 01265 267 0.000 272 primary Sensor Component | Condition **Condition** Good Status pass **Condition** Good **Sensor Component** Mast **Status** pass Sensor Component | Sensor Heater **Condition** N/A Status pass Sensor Component Sensor Plumb **Condition** Plumb Status pass Sensor Component | Torque Condition **Status** pass Sensor Component | Vane Condition **Condition** Good **Status** pass Sensor Component | System Memo Condition Status pass

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg FOR605 Martin Valvur 06/06/2018 Temperature Unknown none none Fluke Mfg 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 0.06 0.08 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.03 0.05 0.000 0.0 C -0.04 C Temp Mid Range 23.45 23.47 0.000 23.6 0.08 primary 47.84 0.000 47.8 C -0.05 primary Temp High Range 47.81 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

#### **Humidity Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Z3210004 FOR605 Martin Valvur Relative Humidity Vaisala 06/06/2018 none Mfg Rotronic **Parameter** Relative Humidity Tfer Desc. GTL 75296 **Serial Number** 01220 **Tfer ID Slope** 0.95430 **Intercept** 1.78964 2/8/2018 0.99980 **Cert Date** CorrCoff **DAS 1: DAS 2:** Low Range **High Range** Low Range **High Range** 0.4 3.9 **Abs Avg Err** 0.5 3.9 **Abs Max Er** UseDesc. Test type Device Input RH GTL Raw RH Corr. **DAS Volts** DAS %RH Difference RH Low Range GTL 33.2 0.000 primary 32.8 32.8 32.3 -0.5 51.8 0.000 -0.2 primary RH Low Range GTL 52.9 52.9 52.7 primary RH High Range GTL 93.6 86.6 93.6 0.000 89.7 -3.9 Status Fail Sensor Component | RH Filter **Condition** Dirty Sensor Component | Shield **Condition** Clean **Status** pass Sensor Component Blower **Condition** N/A Status pass Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component | System Memo Status pass Condition

#### **Solar Radiation Data Form** Serial Number Ta **Technician** Site Visit Date Parameter **Owner ID** Mfg PY47986 FOR605 Martin Valvur Solar Radiation Licor 06/06/2018 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 6.2% 7.4% 0.0% 0.0% Tfer Corr UseDescription Measure Date MeasureTime DAS w/m2 PctDifference Tfer Raw primary 6/6/2018 9:00 608 608 575 -5.4% -4.2% 10:00 774 774 742 primary 6/6/2018 primary 6/6/2018 11:00 872 872 823 -5.6% primary 6/6/2018 12:00 910 910 841 -7.6% -7.4% 975 975 903 primary 6/6/2018 13:00 Sensor Component | Sensor Clean **Condition** Clean Status pass Sensor Component | Sensor Level **Condition** Level **Status** pass Sensor Component Properly Sited **Condition** Properly sited Status pass Sensor Component System Memo Status pass **Condition**

# **Precipitation Data Form**

Mfg	S	erial N	lumber Ta	Site		Tec	chnician		Site Visit Date		Parameter		Owner ID		
Handar	2	2998		FOR605		Ма	ırtin Valvur	ur 06/06/2018		06/2018	Precipitation		n	none	
							Mfg		PMF	)	Pa	araı	meter Pre	cipitation	
DAS 1:			<b>DAS 2:</b>				Serial Nun	ıber	Non	Э	Tf	fer l	Desc. 250	ml graduate	)
A Avg % Diff: A Max % Di				%Dif A Max % Di			Tfer ID		0124	19					
							Slope			1.0000	00 Inte	rce	pt	0.000	000
							Cert Date			4/26/201	Cor	rCo	off	1.000	000
UseDesc.	Test t	ype	TferVolume	Iteration	TimePerT	ip	Eq.Ht	DAS	eng	Eq.HtUnit	OSE U	nit	TferUnits	PctDifferer	nce
primary test 1		231.5		5 sec		7.25 7.		10 mm		mm	ml		-2.1	%	
Sensor Com	ponent	Properly Sited			Cond	dition 45 degree rule					Status	ра	SS		
Sensor Com	ponent	Gauge Drain Screen			Cond	Condition Installed					Status	ра	SS		
Sensor Com	ponent	Funnel Clean			Cond	Condition Clean				Status p		pass			
Sensor Com	ponent	Condition			Cond	Condition Good			Status		Status	pass			
Sensor Com	ponent	Gauge Screen			Cond	ondition Installed				Status pas		oass			
Sensor Component		Gauge Clean			Cond	litio	tion Clean			Status		pass			
Sensor Com	ponent	Level			Cond	litio	ion Level			Sta		spass			
Sensor Com	ponent	Sensor Heater			Cond	litio	tion N/A			Sta		s pass			
Sensor Com	ponent	System Memo			Cond	litio	n				Status	ра	SS		

### **Infrastructure Data For** FOR605 Technician | Martin Valvur Site Visit Date 06/06/2018 Site ID **Shelter Make Shelter Model Shelter Size** Sensor Component | Sample Tower Type **Condition** Other Status pass **Condition** Good Sensor Component | Conduit Status pass **Sensor Component** Met Tower **Condition** Good Status pass **Sensor Component** Moisture Trap **Condition** Not installed **Status** pass Sensor Component | Power Cables **Condition** Fair **Status** pass Sensor Component | Shelter Temp Control **Condition** N/A **Status** pass **Condition** Not installed Status pass Sensor Component Rotometer Sensor Component | Sample Tower **Condition** Good Status pass Sensor Component | Shelter Condition **Condition** Good Status pass Sensor Component | Shelter Door **Condition** Good Status pass Sensor Component | Shelter Roof **Condition** Good Status pass Sensor Component | Shelter Floor **Condition** N/A Status pass Sensor Component | Signal Cable **Condition** Good Status pass Condition 3/8 teflon Status pass **Sensor Component** Tubing Type Sensor Component | Sample Train **Condition** Good Status pass

## **Field Systems Comments**

### 1 Parameter: SiteOpsProcComm

The dry deposition sample height is approximately 6 meters and not 10 meters. The observation section of the SSRF is not used. The site operator mentioned that he occasionally does not receive site support in a timely manner.

### 2 Parameter: DocumentationCo

There is no documentation available at the site since there is no place to store documents. The site does not have a computer or shelter other than the small enclosure. The site operator completes a site checklist which remains in his vehicle. Information from the checklist is later filed at his office. Per instruction from ARS the COC portion of the SSRF is not being used.

## 3 Parameter: SitingCriteriaCom

The site is located in a wellfield with oil and gas operations nearby.

## 4 Parameter: ShelterCleanNotes

This is a small footprint site with instruments mounted in enclosure on tripod tower.

### 5 Parameter: PollAnalyzerCom

The enclosure protecting the dry deposition filter pack is much smaller in diameter than the normal filter pack enclosure. The geometry of the enclosure may effect particulate collection making data not directly comparable to other CASTNET sites.

### 6 Parameter: MetOpMaintCom

The temperature sensor is now separate from the humidity sensor. The relative humidity measurement is 1.2 meters above the ground.

### F-02058-1500-S1-rev002 Field Systems Data Form FOR605 Technician Martin Valvur Site Visit Date 06/06/2018 Site ID **USGS Map EPA** Site Sponsor (agency) **Map Scale** BLM **Operating Group Map Date** AQS# Met One **Meteorological Type Air Pollutant Analyzer QAPP** Latitude **Deposition Measurement** dry **QAPP** Longitude Range **Land Use QAPP Elevation Meters** Rolling Terrain **QAPP Declination** Marginally Conforms to MLM **OAPP Declination Date** 44.339232 **Site Telephone Audit Latitude** -105.92023 Site Address 1 **Audit Longitude** 1402 Site Address 2 **Audit Elevation** Campbell 9.3 County **Audit Declination** Gillette, WY City, State **Present** Fire Extinguisher 82716 Zip Code Mountain **First Aid Kit** Time Zone **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # Primary Op. E-mail **Climbing Belt Backup Operator Security Fence ~** Backup Op. Phone # **Secure Shelter** Stable Entry Step Backup Op. E-mail Shelter Working Room Model **Shelter Size** Notes This is a small footprint site with instruments mounted in enclosure on tripod tower. **Shelter Clean** Site OK Notes

**Driving Directions** 

## **Field Systems Data Form**

F-02058-1500-S2-rev002

Site ID FOR605 Technician Martin Valvur Site Visit Date 06/06/2018

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 Distances OK ✓

**Siting Criteria Comment** 

The site is located in a wellfield with oil and gas operations nearby.

## **Field Systems Data Form** F-02058-1500-S3-rev002 Site Visit Date 06/06/2018 Technician | Martin Valvur Site ID FOR605 **~** Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? **~** Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) **~** Are the tower and sensors plumb? **~** Are the temperature shields pointed north or positioned to 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) **~** Is the solar radiation sensor plumb? **~** Is it sited to avoid shading, or any artificial or reflected light? **V** Is the rain gauge plumb? 45 degree rule violation 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:

Fie	eld Systems Data Form	F-02058-1500-S4-rev002					
Site	Technician Martin Valvur	Site Visit Date 06/06/2018					
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	d V					
2	Are all the meteorological sensors operational online, and reporting data?						
3	Are the shields for the temperature and RH sensors clean?						
4	Are the aspirated motors working?	✓ N/A					
5	Is the solar radiation sensor's lens clean and free of scratches?						
6	Is the surface wetness sensor grid clean and undamaged?	✓ N/A					
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	Signs of wear					
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	d 🗸					
	de any additional explanation (photograph or sketch if necestal or man-made, that may affect the monitoring parameters	essary) regarding conditions listed above, or any other features, s:					
The t	emperature sensor is now separate from the humidity sensor. Th	he relative humidity measurement is 1.2 meters above the ground.					

## Field Systems Data Form F-02058-1500-S5-rev002 FOR605 Technician | Martin Valvur Site Visit Date 06/06/2018 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. N/A Describe dry dep sample tube. 3/8 teflon by 8 meters **✓** N/A Are in-line filters used in the ozone sample line? (if ves indicate location) **~** Are sample lines clean, free of kinks, moisture, and obstructions? ✓ N/A Is the zero air supply desiccant unsaturated? Are there moisture traps in the sample lines? Is there a rotometer in the dry deposition filter line, and is it clean?

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

The enclosure protecting the dry deposition filter pack is much smaller in diameter than the normal filter pack enclosure. The geometry of the enclosure may effect particulate collection making data not directly comparable to other CASTNET sites.

# Field Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	FOR605	Technician	Martin Valvur		Site Vis	it Date 06/06/201	8	
DAS consent translators and national equipment energias and resistances									
DAS, sensor translators, and peripheral equipment operations and maintenance									
1	Do the l well ma	OAS instruments appeintained?	ear to be in good	l condition and					
2		the components of the backup, etc)	DAS operation	al? (printers,					
3		nalyzer and sensor sig g protection circuitry		through					
4		signal connections pro intained?	e weather and	<b>✓</b>					
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	e instrument shelter h	ave a stable pov	ver source?	<b>✓</b>	Solar power			
8	Is the in	strument shelter temp	perature contro	lled?	<b>✓</b>	N/A			
9	Is the m	et tower stable and gr	ounded?			Stable		Grounded	
10	Is the sa	imple tower stable and	d grounded?			V		<b>✓</b>	
11	Tower o	comments?							
	Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:								
				01					

#### FOR605 Site Visit Date 06/06/2018 Site ID Technician Martin Valvur **Documentation** Does the site have the required instrument and equipment manuals? Yes No N/A N/A Yes No Wind speed sensor **Data logger** П Wind direction sensor **Data logger** П Temperature sensor Strip chart recorder П Relative humidity sensor Computer П П Solar radiation sensor Modem П П П **Printer** Surface wetness sensor П Wind sensor translator Zero air pump **Temperature translator** Filter flow pump **Humidity sensor translator Surge protector** П П **UPS Solar radiation translator** Tipping bucket rain gauge **Lightning protection device Shelter heater** Ozone analyzer Filter pack flow controller Shelter air conditioner Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log SSRF V Site Ops Manual HASP Field Ops Manual Calibration Reports** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? N/A **V** Are the Site Status Report Forms being completed and current? Are the chain-of-custody forms properly used to document sample transfer to and from lab? **~** N/A Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

There is no documentation available at the site since there is no place to store documents. The site does not have a computer or shelter other than the small enclosure. The site operator completes a site checklist which remains in his vehicle. Information from the checklist is

later filed at his office. Per instruction from ARS the COC portion of the SSRF is not being used.

F-02058-1500-S7-rev002

**Field Systems Data Form** 

#### **Field Systems Data Form** F-02058-1500-S8-rev002 FOR605 Site Visit Date 06/06/2018 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** 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** N/A **V** N/A **Automatic Zero/Span Tests V** N/A Manual Zero/Span Tests **V** N/A **Automatic Precision Level Tests V** N/A **Manual Precision Level Test V** N/A **Analyzer Diagnostics Tests ~** N/A **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V** N/A Sample Line Check for Dirt/Water **~** N/A **Zero Air Desiccant Check ✓** N/A Do multi-point calibration gases go through the complete sample train including all filters?

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

✓ N/A

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

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

complete sample train including all filters?

reported? If yes, how?

### Field Systems Data Form F-02058-1500-S9-rev002 FOR605 Technician | Martin Valvur Site Visit Date 06/06/2018 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 Flow section only correctly? No longer required Are data downloads and backups being performed as scheduled? Are general observations being made and recorded? How? **~** Are site supplies on-hand and replenished in a timely fashion? SSRF Are sample flow rates recorded? How? Are samples sent to the lab on a regular schedule in a timely fashion? **✓** One set of gloves only Are filters protected from contamination during handling and shipping? How? Are the site conditions reported regularly to the field operations manager or staff? **Compliant** QC Check Performed **Frequency V** ✓ Semiannually **Multi-point MFC Calibrations V** Weekly Flow System Leak Checks **Filter Pack Inspection V ✓** Weekly **Flow Rate Setting Checks** □ N/A **V Visual Check of Flow Rate Rotometer** ✓ As needed **V In-line Filter Inspection/Replacement** Sample Line Check for Dirt/Water Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,

The dry deposition sample height is approximately 6 meters and not 10 meters. The observation section of the SSRF is not used. The site

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

operator mentioned that he occasionally does not receive site support in a timely manner.

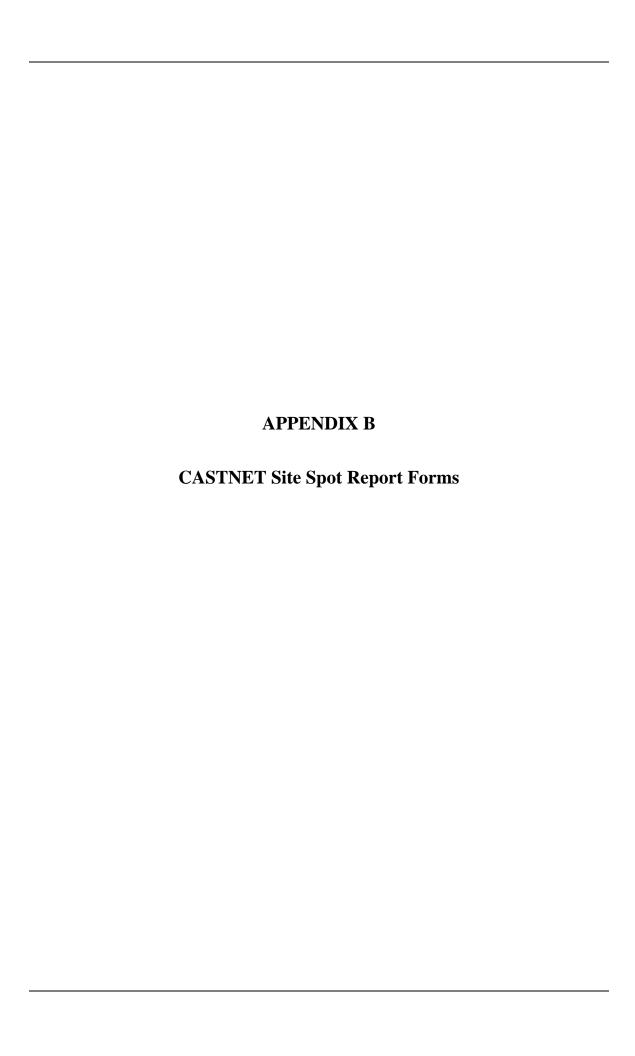
## Field Systems Data Form

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

Site ID FOR605 Technician Martin Valvur Site Visit Date 06/06/2018

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR1000	illegible	49922
elevation	Elevation	none	none	none
Flow Rate	Omega	FMA6518ST-RS232	394013-3	none
Infrastructure	Infrastructure	none	none	none
Precipitation	Handar	444A	2998	none
Relative Humidity	Vaisala	HMP45AC	Z3210004	none
siting criteria	Siting Criteria	none	None	none
Solar Radiation	Licor	LI-200	PY47986	none
Temperature	Unknown	Unknown	none	none
Wind Direction	Met One	024	J5213	illegible
Wind Speed	Met One	014	K2278	none



**Data Compiled:** 7/21/2018 10:58:05 AM

SiteVisitDate Site Technician

04/26/2018 ALC188 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.00068	unitless	P
2	Ozone Intercept	P	0	5	4	-0.87301	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99996	unitless	P
4	Ozone % difference avg	P	7	10	4	2.7	%	P
5	Ozone % difference max	P	7	10	4	4.7	%	P

**Data Compiled:** 7/22/2018 9:45:27 AM

 SiteVisitDate
 Site
 Technician

 06/04/2018
 BAS601
 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	1.00258	unitless	P
2	Ozone Intercept	P	0	5	4	0.02374	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
4	Ozone % difference avg	P	7	10	4	0.6	%	P
5	Ozone % difference max	P	7	10	4	1.2	%	P

### **Field Performance Comments**

1 Parameter: Ozone SensorComponent: Cell A Tmp. CommentCode 99

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

**Data Compiled:** 7/21/2018 10:51:18 AM

SiteVisitDate Site Technician

04/23/2018 BBE401 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.99145	unitless	P
2	Ozone Intercept	P	0	5	4	-0.70388	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99993	unitless	P
4	Ozone % difference avg	P	7	10	4	4.2	%	P
5	Ozone % difference max	P	7	10	4	9.9	%	P

Data Compiled: 7/2

7/22/2018 10:55:45 PM

SiteVisitDate Site Technician

06/16/2018 CAD150 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.97654	unitless	P
2	Ozone Intercept	P	0	5	4	-1.28958	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99996	unitless	P
4	Ozone % difference avg	P	7	10	4	6.1	%	P
5	Ozone % difference max	P	7	10	4	9.6	%	P

Data Compiled:

7/19/2018 5:37:37 PM

SiteVisitDate Site Technician

04/03/2018 CAN407 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.21	c	P
2	Temperature2meter max error	P	5	0.5	3	0.47	c	P
3	Ozone Slope	P	0	1.1	4	0.99814	unitless	P
4	Ozone Intercept	P	0	5	4	-0.26156	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99998	unitless	P
6	Ozone % difference avg	P	7	10	4	1.4	%	P
7	Ozone % difference max	P	7	10	4	3.4	%	P
8	Flow Rate average % difference	P	10	5	10	2.73	%	P
9	Flow Rate max % difference	P	10	5	10	3.08	%	P
10	DAS Voltage average error	P	12	0.003	63	0.0001	V	P
11	Shelter Temperature average error	P	5	2	18	0.72	c	P
12	Shelter Temperature max error	P	5	2	18	1.1	c	P

SiteVisitDate	Site	Technician

04/03/2018

CAN407

Martin Valvur

## **Field Systems Comments**

1 Parameter: SitingCriteriaCom

The small parking lot at the visitors center is approximately 100m to the northeast.

2 Parameter: ShelterCleanNotes

The shelter is in good condition, well organized and well maintained.

**Data Compiled:** 7/22/2018 11:10:56 PM

SiteVisitDate Site Technician

06/23/2018 CDZ171 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.99861	unitless	P
2	Ozone Intercept	P	0	5	4	-1.01538	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
4	Ozone % difference avg	P	7	10	4	3.2	%	P
5	Ozone % difference max	P	7	10	4	6.5	%	P

**Data Compiled:** 7/21/2018 10:35:04 AM

SiteVisitDate Site Technician

04/19/2018 CHA467 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.39	c	P
2	Temperature2meter max error	P	5	0.5	3	0.44	c	P
3	Ozone Slope	P	0	1.1	4	0.98088	unitless	P
4	Ozone Intercept	P	0	5	4	-0.96843	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99997	unitless	P
6	Ozone % difference avg	P	7	10	4	4.9	%	P
7	Ozone % difference max	P	7	10	4	7.7	%	P
8	Flow Rate average % difference	P	10	5	10	0.49	%	P
9	Flow Rate max % difference	P	10	5	10	0.87	%	P
10	DAS Voltage average error	P	13	0.003	70	0.0003	V	P
11	Shelter Temperature average error	P	5	2	18	0.50	c	P
12	Shelter Temperature max error	P	5	2	18	0.99	c	P

04/19/2018

CHA467

Martin Valvur

### **Field Systems Comments**

1 Parameter: SiteOpsProcedures

The site operator routinely reviews the previous week's data.

2 Parameter: SitingCriteriaCom

A large point source is located 40 km northwest of the site, just southwest of Wilcox.

3 Parameter: ShelterCleanNotes

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

4 Parameter: MetSensorComme

The temperature sensor is mounted on the south side of the meteorological tower.

5 Parameter: MetOpMaintCom

The signal cable insulation is beginning to deteriorate particularly at the base of the meteorological tower.

**Data Compiled:** 7/22/2018 11:05:40 PM

SiteVisitDate Site Technician

06/17/2018 CHE185 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.94545	unitless	P
2	Ozone Intercept	P	0	5	4	0.67160	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99994	unitless	P
4	Ozone % difference avg	P	7	10	4	4.0	%	P
5	Ozone % difference max	P	7	10	4	5.6	%	P

**Data Compiled:** 7/22/2018

7/22/2018 10:50:25 PM

SiteVisitDate Site Technician

06/15/2018 CVL151 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.01283	unitless	P
2	Ozone Intercept	P	0	5	4	-1.14547	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99984	unitless	P
4	Ozone % difference avg	P	7	10	4	4.1	%	P
5	Ozone % difference max	P	7	10	4	10.2	%	Fail

**Data Compiled:** 7/22/2018 9:36:24 AM

SiteVisitDate Site Technician

05/17/2018 DIN431 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.05	c	P
2	Temperature2meter max error	P	5	0.5	3	0.06	c	P
3	Ozone Slope	P	0	1.1	4	0.98450	unitless	P
4	Ozone Intercept	P	0	5	4	0.64081	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99995	unitless	P
6	Ozone % difference avg	P	7	10	4	1.4	%	P
7	Ozone % difference max	P	7	10	4	3.0	%	P
8	Flow Rate average % difference	P	10	5	10	0.47	%	P
9	Flow Rate max % difference	P	10	5	10	0.63	%	P
10	DAS Voltage average error	P	10	0.003	70	0.0002	V	P
11	Shelter Temperature average error	P	5	2	9	0.31	c	P
12	Shelter Temperature max error	P	5	2	9	0.57	c	P

05/17/2018

DIN431

Martin Valvur

### **Field Systems Comments**

1 Parameter: SiteOpsProcComm

Filter handling procedures have improved since the previous audit. Gloves are being used to handle the filter.

2 Parameter: DasComments

All sensors, filter pack, and ozone sample inlet are on a single, crank-down tower.

3 Parameter: SiteOpsProcedures

The site operator is not responsible for manual zero/span/precision checks, or multipoint calibrations, of the ozone analyzer.

4 Parameter: SitingCriteriaCom

A small parking lot for park service employees is located approximately 40 meters north of the site.

5 Parameter: ShelterCleanNotes

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

6 Parameter: MetSensorComme

The ambient temperature sensor is mounted approximately 8 meters from the ground and above the shelter roof.

Data Compiled:

7/21/2018 12:56:11 PM

SiteVisitDate Site Technician

05/12/2018 ESP127 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	3	0.34	c	P
2	Temperature max error	P	4	0.5	3	0.63	c	Fail
3	Ozone Slope	P	0	1.1	4	0.98976	unitless	P
4	Ozone Intercept	P	0	5	4	-0.44844	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
6	Ozone % difference avg	P	7	10	4	2.3	%	P
7	Ozone % difference max	P	7	10	4	3.5	%	P
8	Flow Rate average % difference	P	10	5	6	2.38	%	P
9	Flow Rate max % difference	P	10	5	6	2.6	%	P
10	DAS Voltage average error	P	7	0.003	63	0.0001	V	P
11	Shelter Temperature average error	P	5	2	15	0.24	c	P
12	Shelter Temperature max error	P	5	2	15	0.37	c	P

SiteVisitDate	Site	Technician
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05/12/2018

ESP127

Sandy Grenville

### **Field Performance Comments**

1 Parameter: Flow Rate SensorComponent: Filter Position CommentCode 71

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

## **Field Systems Comments**

1 Parameter: DasComments

The Shelter is dirty and cluttered with no trash can and dead beetles on the counter top. The heater and air conditioner are operating simultaneously.

2 Parameter: ShelterCleanNotes

The shelter has been improved since the previous audit, however there is still some rot in the walls.

Data Compiled:

7/22/2018 10:29:49 PM

SiteVisitDate Site Technician

06/06/2018 FOR605 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Wind Direction Input Deg True average error (de	P	2	5	8	3.0	degrees	P
2	Wind Direction Input Deg True max error (deg)	P	2	5	8	5	degrees	P
3	Temperature average error	P	4	0.5	3	0.06	c	P
4	Temperature max error	P	4	0.5	3	0.08	c	P
5	Relative Humidity average above 85%	P	6	10	1	3.9	%	P
6	Relative Humidity max above 85%	P	6	10	1	3.9	%	P
7	Relative Humidity average below 85%	P	6	10	2	0.3	%	P
8	Relative Humidity max below 85%	P	6	10	2	0.5	%	P
9	Solar Radiation % diff of avg	P	9	10	15	6.17	%	P
10	Solar Radiation % diff of max STD value	P	9	10	15	7.4	%	P
11	Precipitation average % difference	P	1	10	1	2.1	%	P
12	Precipitation max % difference	P	1	10	1	2.1	%	P
13	Flow Rate average % difference	P	10	5	2	0.39	%	P
14	Flow Rate max % difference	P	10	5	2	0.49	%	P

SiteVisitDate	Site	Technician

06/06/2018

FOR605

Martin Valvur

### **Field Systems Comments**

1 Parameter: SiteOpsProcComm

The dry deposition sample height is approximately 6 meters and not 10 meters. The observation section of the SSRF is not used. The site operator mentioned that he occasionally does not receive site support in a timely manner.

2 Parameter: DocumentationCo

There is no documentation available at the site since there is no place to store documents. The site does not have a computer or shelter other than the small enclosure. The site operator completes a site checklist which remains in his vehicle. Information from the checklist is later filed at his office. Per instruction from ARS the COC portion of the SSRF is not being used.

3 Parameter: SitingCriteriaCom

The site is located in a wellfield with oil and gas operations nearby.

4 Parameter: ShelterCleanNotes

This is a small footprint site with instruments mounted in enclosure on tripod tower.

5 Parameter: PollAnalyzerCom

The enclosure protecting the dry deposition filter pack is much smaller in diameter than the normal filter pack enclosure. The geometry of the enclosure may effect particulate collection making data not directly comparable to other CASTNET sites.

6 Parameter: MetOpMaintCom

The temperature sensor is now separate from the humidity sensor. The relative humidity measurement is 1.2 meters above the ground.

**Data Compiled:** 7/21/2018 11:41:30 AM

SiteVisitDate Site Technician

05/10/2018 GAS153 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	18	0.03	c	P
2	Temperature max error	P	4	0.5	18	0.04	c	P
3	Ozone Slope	P	0	1.1	4	0.93379	unitless	P
4	Ozone Intercept	P	0	5	4	-1.32697	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99996	unitless	P
6	Ozone % difference avg	P	7	10	4	11.2	%	Fail
7	Ozone % difference max	P	7	10	4	17.0	%	Fail
8	Flow Rate average % difference	P	10	5	3	3.02	%	P
9	Flow Rate max % difference	P	10	5	3	3.23	%	P
10	DAS Voltage average error	P	7	0.003	49	0.0001	V	P
11	Shelter Temperature average error	P	5	2	15	0.55	c	P
12	Shelter Temperature max error	P	5	2	15	1.08	c	P

SiteVisitDate Site Technician

05/10/2018

GAS153

Sandy Grenville

### **Field Performance Comments**

1 Parameter: Ozone SensorComponent: Cell B Flow CommentCode 99

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

2 Parameter: Ozone SensorComponent: Cell A Flow CommentCode 99

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

### **Field Systems Comments**

1 Parameter: SiteOpsProcedures

It was reported that the ozone inlet filter is replaced every two weeks, and a manual zero test is performed every week.

**Data Compiled:** 7/21/2018 9:55:29 AM

SiteVisitDate Site Technician

04/17/2018 GRC474 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.09	c	P
2	Temperature2meter max error	P	5	0.5	3	0.13	c	P
3	Ozone Slope	P	0	1.1	4	0.99403	unitless	P
4	Ozone Intercept	P	0	5	4	-0.42301	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99995	unitless	P
6	Ozone % difference avg	P	7	10	4	2.1	%	P
7	Ozone % difference max	P	7	10	4	3.3	%	P
8	Flow Rate average % difference	P	10	5	9	1.44	%	P
9	Flow Rate max % difference	P	10	5	9	1.55	%	P
10	DAS Voltage average error	P	13	0.003	70	0.0003	V	P
11	Shelter Temperature average error	P	5	2	18	0.76	c	P
12	Shelter Temperature max error	P	5	2	18	0.95	c	P

04/17/2018

GRC474

Martin Valvur

## **Field Systems Comments**

1 Parameter: SiteOpsProcedures

Ozone inlet filters are changed more often if fires are burning in the area.

2 Parameter: ShelterCleanNotes

The shelter is in fair condition, clean, neat, and well organized. Some floor tiles are missing and broken.

3 Parameter: MetOpMaintCom

The signal cables are beginning to deteriorate and some signal cables are exposed to the elements and not protected.

Data Compiled:

7/19/2018 8:33:44 PM

SiteVisitDate Site Technician

04/10/2018 IRL141 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	9	0.26	c	P
2	Temperature max error	P	4	0.5	9	0.63	c	Fail
3	Ozone Slope	P	0	1.1	4	0.99181	unitless	P
4	Ozone Intercept	P	0	5	4	0.26706	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99998	unitless	P
6	Ozone % difference avg	P	7	10	4	0.7	%	P
7	Ozone % difference max	P	7	10	4	1.1	%	P
8	Flow Rate average % difference	P	10	5	3	1.1	%	P
9	Flow Rate max % difference	P	10	5	3	1.32	%	P
10	DAS Voltage average error	P	7	0.003	63	0.0000	V	P
11	Shelter Temperature average error	P	5	2	15	0.40	c	P
12	Shelter Temperature max error	P	5	2	15	0.83	c	P

04/10/2018

IRL141

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.

### **Field Systems Comments**

1 Parameter: SiteOpsProcComm

The site operator is doing an excellent job of handling and changing the filter pack.

2 Parameter: SiteOpsProcedures

Manual z/s/p performed following ozone inlet filter changes. Leak checks no longer performed.

3 Parameter: SitingCriteriaCom

Sebastian has an estimated population of 18,000. The park operates a boat ramp with vehicle parking near the site. The site is surrounded on three sides by boat traffic using the ramp.

4 Parameter: ShelterCleanNotes

The shelter is still clean and well organized.. The shelter floor and the bottom of the walls are severely rotting and now has extensive mold growth. It has deteriorated since the previous audit.

5 Parameter: MetOpMaintCom

The meteorological signals were not functioning upon arrival. The site operator removed the relative humidity signal which returned other signals to normal. Signal cables are showing signs of wear with some missing insulation and bear wires.

Data Compiled: 7/19/2

7/19/2018 7:36:57 PM

SiteVisitDate Site Technician

04/05/2018 JOT403 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.13	c	P
2	Temperature2meter max error	P	5	0.5	3	0.16	c	P
3	Ozone Slope	P	0	1.1	4	1.00731	unitless	P
4	Ozone Intercept	P	0	5	4	0.20872	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
6	Ozone % difference avg	P	7	10	4	1.2	%	P
7	Ozone % difference max	P	7	10	4	1.8	%	P
8	Flow Rate average % difference	P	10	5	10	1.58	%	P
9	Flow Rate max % difference	P	10	5	10	1.69	%	P
10	DAS Voltage average error	P	3	0.003	56	0.0001	V	P
11	Shelter Temperature average error	P	5	2	18	0.58	c	P
12	Shelter Temperature max error	P	5	2	18	0.69	c	P

SiteVisitDate	Site	Technician				
04/05/2010	IOT402	3.6 (* 37.1				

04/05/2018

JOT403

Martin Valvur

## **Field Systems Comments**

1 Parameter: ShelterCleanNotes

The shelter is only a few years old and is in good condition, clean and well organized but not grounded.

**Data Compiled:** 7/22/2018 10:43:35 PM

SiteVisitDate Site Technician

06/07/2018 NEC602 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.01187	unitless	P
2	Ozone Intercept	P	0	5	4	-1.41665	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99994	unitless	P
4	Ozone % difference avg	P	7	10	4	4.1	%	P
5	Ozone % difference max	P	7	10	4	11.5	%	Fail

Data Compiled:

7/21/2018 9:08:33 AM

SiteVisitDate Site Technician

04/16/2018 PET427 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.66	c	Fail
2	Temperature2meter max error	P	5	0.5	3	0.76	c	Fail
3	Ozone Slope	P	0	1.1	4	0.99262	unitless	P
4	Ozone Intercept	P	0	5	4	-0.14499	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
6	Ozone % difference avg	P	7	10	4	1.4	%	P
7	Ozone % difference max	P	7	10	4	2.0	%	P
8	Flow Rate average % difference	P	10	5	2	0.39	%	P
9	Flow Rate max % difference	P	10	5	2	0.57	%	P
10	DAS Voltage average error	P	14	0.003	63	0.0001	V	P
11	Shelter Temperature average error	P	5	2	18	0.35	c	P
12	Shelter Temperature max error	P	5	2	18	0.79	c	P

SiteVisitDate	Site	Technician
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04/16/2018

PET427

Martin Valvur

### **Field Systems Comments**

1 Parameter: SiteOpsProcComm

completing the site observation section of the SSRF was discussed with the operator. Clean gloves are now used to remove and install the dry deposition filter pack.

2 Parameter: DasComments

The heating and air conditioning systems run simultaneously. The towers are not grounded.

3 Parameter: DocumentationCo

The most recent calibration and maintenance report is not available onsite.

4 Parameter: ShelterCleanNotes

The shelter is dusty, but in good condition, well organized and maintained.

Data Compiled: 7/21

7/21/2018 12:14:05 PM

SiteVisitDate Site Technician

05/11/2018 SND152 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	9	0.04	c	P
2	Temperature max error	P	4	0.5	9	0.06	c	P
3	Ozone Slope	P	0	1.1	4	0.99526	unitless	P
4	Ozone Intercept	P	0	5	4	-0.53683	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
6	Ozone % difference avg	P	7	10	4	2.3	%	P
7	Ozone % difference max	P	7	10	4	4.8	%	P
8	Flow Rate average % difference	P	10	5	2	1.32	%	P
9	Flow Rate max % difference	P	10	5	2	1.32	%	P
10	DAS Voltage average error	P	7	0.003	63	0.0000	V	P
11	Shelter Temperature average error	P	5	2	15	0.62	c	P
12	Shelter Temperature max error	P	5	2	15	0.77	c	P

05/11/2018

SND152

Sandy Grenville

### **Field Systems Comments**

#### 1 Parameter: DasComments

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

#### 2 Parameter: SiteOpsProcedures

Ozone sample line leak checks are no longer performed. A manual zero/span test is performed every two weeks following the inlet filter change.

#### 3 Parameter: SitingCriteriaCom

The site is located on an active research farm with cattle and poultry. Cattle are fed within 100 meters of the site. A new building has been constructed 32 meters south of the sample tower. A Climate Reference Network site is located on the farm on the south side of Hwy 68 which is a better location for the CASTNET site.

#### 4 Parameter: ShelterCleanNotes

The shelter is kept clean, neat, and very well organized. The shelter floor has deteriorated since the previous audit with areas of extreme rot just inside the door and along the north wall.

#### 5 Parameter: MetSensorComme

The temperature sensor is mounted to the sample tower and is oriented to the west. The shield has faded to gray in color and is no longer white which may affect the reflectivity.

#### 6 Parameter: MetOpMaintCom

The temperature sensor signal cable is now in poor condition with several sections of tape and many kinks.

Data Compiled:

7/22/2018 8:48:36 AM

SiteVisitDate Site Technician

05/13/2018 SPD111 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	15	0.10	c	P
2	Temperature max error	P	4	0.5	15	0.12	c	P
3	Ozone Slope	P	0	1.1	4	0.99197	unitless	P
4	Ozone Intercept	P	0	5	4	0.14502	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99996	unitless	P
6	Ozone % difference avg	P	7	10	4	1.0	%	P
7	Ozone % difference max	P	7	10	4	1.3	%	P
8	Flow Rate average % difference	P	10	5	9	1.32	%	P
9	Flow Rate max % difference	P	10	5	9	1.32	%	P
10	DAS Voltage average error	P	7	0.003	63	0.0001	V	P
11	Shelter Temperature average error	P	5	2	15	0.67	c	P
12	Shelter Temperature max error	P	5	2	15	0.89	c	P

05/13/2018

SPD111

Sandy Grenville

### **Field Systems Comments**

1 Parameter: DasComments

The sample tower is an older Type A tower and some small cracks are present in the tower legs. The tower clamps are very rusty.

2 Parameter: SitingCriteriaCom

The site is in a pasture with as many as 75 cattle. The cattle are fed within 100 meters of the site. When the site is visited the cattle approach to within 10 meters of the site.

3 Parameter: ShelterCleanNotes

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

4 Parameter: MetOpMaintCom

The temperature signal cables is showing signs of wear.

**Data Compiled:** 7/19/2018 10:38:38 PM

SiteVisitDate Site Technician

04/12/2018 SUM156 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	12	0.22	c	P
2	Temperature max error	P	4	0.5	12	0.29	c	P
3	Ozone Slope	P	0	1.1	4	1.00155	unitless	P
4	Ozone Intercept	P	0	5	4	-1.06424	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99998	unitless	P
6	Ozone % difference avg	P	7	10	4	2.4	%	P
7	Ozone % difference max	P	7	10	4	4.9	%	P
8	Flow Rate average % difference	P	10	5	3	2.17	%	P
9	Flow Rate max % difference	P	10	5	3	2.6	%	P
10	DAS Voltage average error	P	7	0.003	63	0.0001	V	P
11	Shelter Temperature average error	P	5	2	15	0.91	c	P
12	Shelter Temperature max error	P	5	2	15	1.39	c	P

04/12/2018

SUM156

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.

### **Field Systems Comments**

1 Parameter: DasComments

The meteorological tower has been removed. The temperature sensor is mounted in a naturally aspirated shield on the sample tower which is not grounded.

2 Parameter: SitingCriteriaCom

The site is surrounded by pine trees on land managed by the forest service. A few trees are now 17 meters tall and within 17 meters of the sample tower. Most trees are 30 meters from the sample tower.

3 Parameter: ShelterCleanNotes

The shelter is clean and well organized.. The site operator does an excellent job of organizing and maintaining the site.

4 Parameter: PollAnalyzerCom

There is water in the flow tubing outside the shelter. Trees to the north are less than 20 meters from the sample inlets.

5 Parameter: MetOpMaintCom

The temperature sensor shield is dirty and the signal cable is showing signs of wear.

### **EEMS Spot Report**

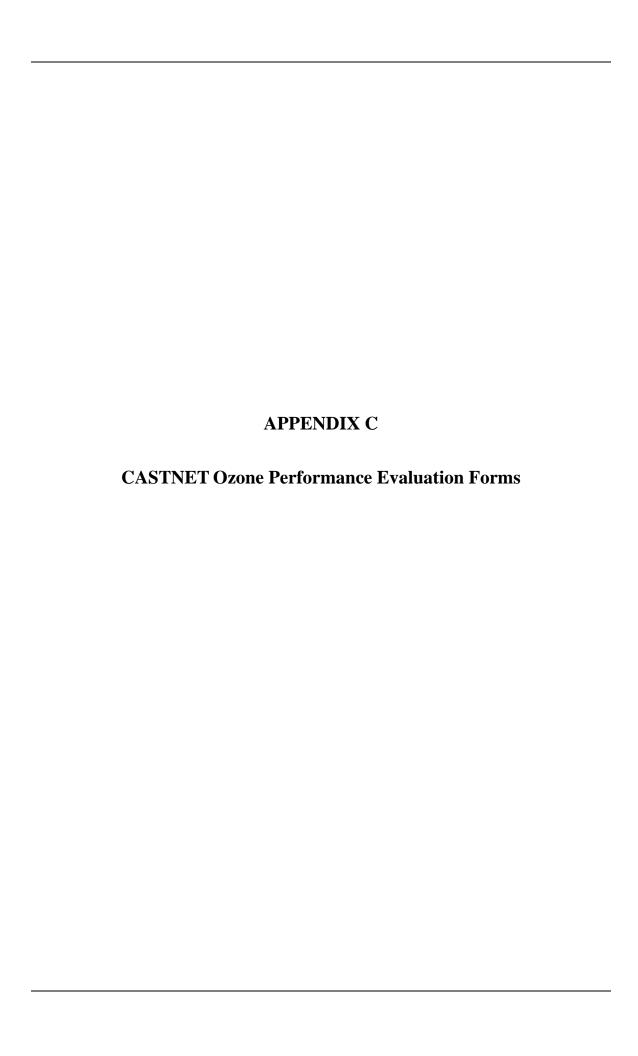
**Data Compiled:** 7/19/2018 7:34:13 PM

SiteVisitDate Site Technician

04/06/2018 ZIO433 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	1.00431	unitless	P
2	Ozone Intercept	P	0	5	4	0.28805	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99998	unitless	P
4	Ozone % difference avg	P	7	10	4	1.8	%	P
5	Ozone % difference max	P	7	10	4	3.6	%	P



Site Vi	sit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
ZIO43	3-Martin	Valvur-04/06/2018				
1	4/6/2018	DAS	Environmental Sys Corp	missing	8816	unknown1
2	4/6/2018	Ozone	ThermoElectron Inc	90568	49C	49C-59348-322
3	4/6/2018	Ozone Standard	ThermoElectron Inc	90728	49C	49C-70528-366

Mfg Se	Site	Te	chnician		Site Visi	it Date	Parame	eter Owner II	D		
ThermoElectron Inc 4	9C-59348-322	ZIO433	Ma	artin Valv	ur	04/06/2	018	Ozone	90568		
Intercept 0.2 CorrCoff 0.9	Slope: Intercept CorrCoff	0.00000 Mfg 0.00000 Seria 0.00000 Tfer			lumber				rameter ozone er Desc. Ozone primary		
DAS 1: A Avg % Diff: A Max	DAS 2: x % Di A Avg %	6Dif A Max 9	% Di	Slope			1.0080		•		
1.8%	3.6%			Cert Da	ite	S	9/11/201	7 Corr	<b>Coff</b> 1.000	000	
UseDescription primary	ConcGroup 1	Tfer Raw 0.14	Tfer 0.1	19		10	ppb	Unit	PctDifference		
primary primary	3	15.13 36.79	15. 36.				ppb ppb		3.59%		
primary	4	65.90	65.	.42	66		ppb		1.04%		
primary	5	108.34	107		108	3.10	ppb		0.53%		
Sensor Component	Sample Train		Condition	Good				Status	pass		
<b>Sensor Component</b>	22.5 degree rule		Condition	on				Status	pass		
Sensor Component	Inlet Filter Conditio	n	Condition Clean					Status	pass		
Sensor Component	Battery Backup		Conditio	N/A				Status	pass		
Sensor Component	Offset		Conditio	on -0.1				Status	pass		
Sensor Component	Span		Conditio	n 1.008				Status	pass		
Sensor Component	Zero Voltage		Condition 0.0018				Status	pass			
Sensor Component	Fullscale Voltage		Condition 1.0028				Status	pass			
Sensor Component	Cell A Freq.		Conditio	on 103.0	kHz			Status	pass		
Sensor Component	Cell A Noise		Conditio	0.8 pp	b			Status	pass		
Sensor Component	Cell A Flow		Conditio	on 0.74 l	pm			Status	pass		
Sensor Component	Cell A Pressure		Conditio	on 643.0	mmHg			Status	pass		
<b>Sensor Component</b>	Cell A Tmp.		Condition	36.0 C	)			Status	pass		
<b>Sensor Component</b>	Cell B Freq.		Condition	on 114.6	kHz			Status	pass		
Sensor Component	Cell B Noise		Conditio	0.6 pp	bb			Status	pass		
<b>Sensor Component</b>	Sensor Component Cell B Flow		Conditio	on 0.74 l	pm			Status	pass		
Sensor Component	Sensor Component Cell B Pressure		Condition	on 642.9	mmHg			Status	pass		
Sensor Component	Sensor Component Cell B Tmp.			tion				Status	Status pass		
Sensor Component	Sensor Component Line Loss			Not tested				Status	pass		
Sensor Component	System Memo		Conditio	on				Status	pass		

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
BBE	401-Sandy	Grenville-04/23/2018				
1	4/23/2018	DAS	Environmental Sys Corp	90767	8816	4592
2	4/23/2018	Ozone	ThermoElectron Inc	90517	49C	49C-58468-318
3	4/23/2018	Ozone Standard	ThermoElectron Inc	90831	49C	0520012325
4	4/23/2018	Zero air pump	Twin Tower Engineering	none	TT70/4E	526293

Mfg Se	Site	Te	Technician S		Site Visi	Site Visit Date Par		ter Owner l	ID	
ThermoElectron Inc 4	9C-58468-318	BBE401	Sa	andy Grei	nville	04/23/20	018	Ozone	90517	
Intercept -0.7	99145 Slope: 70388 Intercept 19993 CorrCoff	0.00000 0.00000 0.00000							rameter ozone er Desc. Ozone primar	y stan
DAS 1: A Avg % Diff: A Mar 4.2%	DAS 2: x % Di	6Dif A Max 9	% Di Cert Date			1.00504 <b>Intercept</b> 9/12/2017 <b>CorrCoff</b>				2915 0000
UseDescription	ConcGroup	Tfer Raw	Tfer	Corr	Si	ite	Site	Unit	PctDifference	
primary	1	0.11	-0.				ppb		0.070/	
primary primary	3	15.20 34.90	14. 34.				ppb ppb		-9.87% -3.90%	
primary	4	67.80	67.				ppb		-1.68%	
primary	5	111.80	110	).91	109		ppb		-1.40%	
<b>Sensor Component</b>	Sample Train		Conditio	on Good				Status	pass	
Sensor Component	22.5 degree rule		Conditio	on		Status pa			pass	
Sensor Component	Inlet Filter Conditio	n	Condition Clean			Status pa			pass	
Sensor Component	Battery Backup		Conditio	on N/A				Status	pass	
Sensor Component	Offset		Conditio	on 0.1				Status	pass	
Sensor Component	Span		Conditio	on 1.004				Status	pass	
<b>Sensor Component</b>	Zero Voltage		Condition Not tested				Status	pass		
<b>Sensor Component</b>	Fullscale Voltage		Condition Not tested				Status	pass		
<b>Sensor Component</b>	Cell A Freq.		Conditio	on 96.8 k	Hz			Status	pass	
Sensor Component	Cell A Noise		Conditio	on 1.3 pp	b			Status	pass	
Sensor Component	Cell A Flow		Conditio	on 0.73 l	om			Status	pass	
<b>Sensor Component</b>	Cell A Pressure		Conditio	on 654.8	mmHg			Status	pass	
<b>Sensor Component</b>	Cell A Tmp.		Conditio	on 33.2 (				Status	pass	
Sensor Component	Cell B Freq.		Conditio	81.3 k	Hz			Status	pass	
Sensor Component	Cell B Noise		Conditio	0.8 pp	b			Status	pass	
Sensor Component	Sensor Component Cell B Flow		Conditio	on 0.76 l	om			Status	pass	
<b>Sensor Component</b>	Sensor Component Cell B Pressure		Conditio	on 655.0	mmHg			Status	pass	
Sensor Component	Sensor Component Cell B Tmp.		Conditio	on				Status pass		
Sensor Component	Line Loss		Conditio	tion Not tested				Status	us pass	
Sensor Component	System Memo		Conditio	on				Status	pass	

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
ALC188-Sandy Grenville-04/26/2018						
1	4/26/2018	DAS	Campbell	000422	CR3000	2523
2	4/26/2018	Ozone	ThermoElectron Inc	000745	49i A1NAA	1105347310
3	4/26/2018	Ozone Standard	ThermoElectron Inc	000694	49i A3NAA	1030244815
4	4/26/2018	Zero air pump	Werther International	06916	C 70/4	000829158

Mfg S	erial Number Ta	Site	Technicia	Technician S		oate Parame	eter Owner ID
ThermoElectron Inc	1105347310	ALC188	Sandy Gr	enville	04/26/2018	Ozone	000745
Intercept -0.8	Slope: 37301 Intercept 99996 CorrCoff	0.00000 0.00000 0.00000	Serial				rameter ozone er Desc. Ozone primary stan
DAS 1:	DAS 2:	/Die A Mari 0	Slope		1.	00504 Inter	<b>ccept</b> 0.32915
A Avg % Diff: A Ma	4.7% A Avg %	6Dif A Max %	Cert E	ate	9/12	2/2017 Corr	*Coff 1.00000
UseDescription primary	ConcGroup	Tfer Raw	Tfer Corr		te pp	Site Unit	PctDifference
primary	2	14.90	14.49		.81 pp		-4.69%
primary	3	34.80	34.29		.04 pp		-3.65%
primary primary	5	68.30 110.10	67.63 109.22		.35 pp 3.80 pp		-1.89% -0.38%
Sensor Component			Condition Goo		лоо рр	Status	
Sensor Component			Condition			Status	
Sensor Component	Inlet Filter Condition	on	Condition Clean			Status	pass
Sensor Component	Battery Backup		Condition N/A			Status	pass
Sensor Component	Offset		Condition -0.70	)		Status	pass
Sensor Component	Span		Condition 1.03	4		Status	pass
Sensor Component	Zero Voltage		Condition N/A			Status	pass
Sensor Component	Fullscale Voltage		Condition N/A	ition N/A		Status	pass
Sensor Component	Cell A Freq.		Condition 104.	ion 104.1 kHz		Status	pass
Sensor Component	Cell A Noise		Condition 0.8 p	0.8 ppb		Status	pass
Sensor Component	Cell A Flow		Condition 0.59	lpm		Status	pass
Sensor Component	Cell A Pressure		Condition 711.	1 mmHg		Status	pass
Sensor Component	Cell A Tmp.		Condition 32.2	С		Status	pass
Sensor Component	Cell B Freq.		Condition 93.1	kHz		Status	pass
Sensor Component	Cell B Noise		Condition 0.9 p	opb		Status	pass
<b>Sensor Component</b>	Cell B Flow		Condition 0.69	lpm		Status	pass
<b>Sensor Component</b>	Cell B Pressure		Condition 711.	4 mmHg		Status	pass
<b>Sensor Component</b>	Cell B Tmp.		Condition			Status	pass
Sensor Component	Line Loss		<b>Condition</b> Not	tested		Status	pass
Sensor Component	System Memo		Condition			Status	pass

Site V	isit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
BAS601-Martin Valvur-06/04/2018						
1	6/4/2018	DAS	Campbell	none	CR1000	unknown1
2	6/4/2018	Ozone	ThermoElectron Inc	L0534684	49i A1NAA	1214552973
3	6/4/2018	Ozone Standard	ThermoElectron Inc	none	49i E3CAA	1214552971
4	6/4/2018	Zero air pump	Thomas	none	107CAB18	100800033636

Intercept 0.02374 Intercept CorrCoff 0.99999 CorrCoff	1 M 0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID	06/04/2018  ThermoElectron 49CPS-70008-3		L0534684
Intercept 0.02374 Intercept CorrCoff 0.99999 CorrCoff	0.00000 0.00000	Serial Number	49CPS-70008-3		
	May % Di		01110		er Desc. Ozone primary stan
DAS 1: DAS 2:	May % Di	Slope	1.0080	1 Inter	<b>cept</b> -0.05199
A Avg % Diff: A Max % Di	NIAX /0 DI	Cert Date	9/11/201	7 Corr	<b>Coff</b> 1.00000
	Dow Tfor	Corr Si	to Sit	e Unit	PctDifference
UseDescription ConcGroup Tfer I primary 1 0.2		27 0.4		e Onit	PCIDITIETETICE
primary 2 15	28 15	.21 15.	1.1		-1.25%
primary 3 35.9		.69 35.			0.70%
primary 4 68.		.92 68.	1.1		0.12%
primary 5 114.		3.92 114	.30 ppb		0.33%
Sensor Component Sample Train	Condition	on Good		Status	pass
Sensor Component 22.5 degree rule	Condition	on		Status	pass
Sensor Component Inlet Filter Condition	Condition	on Not tested		Status	pass
Sensor Component Battery Backup	Condition	on N/A		Status	pass
Sensor Component Offset	Condition	on 0.1		Status	pass
Sensor Component Span	Condition	on 1.029		Status	pass
Sensor Component Zero Voltage	Condition	ion N/A		Status	pass
Sensor Component Fullscale Voltage	Condition	on N/A		Status	pass
Sensor Component Cell A Freq.	Condition	on 97.5 kHz		Status	pass
Sensor Component Cell A Noise	Condition	on 0.8 ppb		Status	pass
Sensor Component Cell A Flow	Condition	on 0.66 lpm		Status	pass
Sensor Component Cell A Pressure	Condition	on 647.1 mmHg		Status	pass
Sensor Component Cell A Tmp.	Condition	on 46.9 C		Status	Fail
Sensor Component Cell B Freq.	Condition	on 68.8 kHz		Status	pass
Sensor Component Cell B Noise	Condition	on 0.8 ppb		Status	pass
Sensor Component Cell B Flow	Condition	on 0.69 lpm		Status	pass
Sensor Component Cell B Pressure	Condition	on 646.5 mmHg		Status	pass
Sensor Component Cell B Tmp.	Condition	on		Status	pass
Sensor Component Line Loss	Condition	on Not tested		Status	pass
Sensor Component System Memo	Condition	on		Status	pass

### **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Ozone	BAS601	Martin Valvur	06/04/2018	Cell A Tmp.	ThermoElectron	3802		

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

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
NEC	602-Marti	n Valvur-06/07/2018				
1	6/7/2018	DAS	Campbell	none	CR1000	41007
2	6/7/2018	Filter pack flow pump	Thomas	none	107CAB18A	079600005244
3	6/7/2018	Ozone	ThermoElectron Inc	none	49i A1NAA	1214552974
4	6/7/2018	Ozone Standard	ThermoElectron Inc	L0534683	49i E3CAA	1214552972

Mfg Se	Site	Technician S		Site Visit Date Parame			eter Owner ID			
ThermoElectron Inc 1	214552974	NEC602	Ma	artin Valv	ur	06/07/2	018	Ozone		none
Slope:   1.0       1.0	0.00000 0.00000 0.00000	000 Serial Number 4 Tfer ID							e primary stan -0.05199	
A Avg % Diff: A Ma		Dif A Max 9	% Di	Slope Cert Da	te	9	9/11/201		-	1.00000
4.1%	11.5%			Cert Da						
UseDescription primary	ConcGroup 1	Tfer Raw 0.19	Tfer (		Si -0	te 45	Site	Unit	PctDiffer	ence
primary	2	15.69	15.			.82	ppb		-	11.47%
primary	3 4	35.10 67.82	34.5 67.5			.52	ppb			-3.87% -0.94%
primary primary	5	111.45	110		110		ppb ppb			0.08%
Sensor Component	Sample Train		Conditio	Good				Status	pass	
<b>Sensor Component</b>	22.5 degree rule		Conditio	n				Status		
Sensor Component	Inlet Filter Conditio	n	Condition Clean				Status	pass		
<b>Sensor Component</b>	Battery Backup		Conditio	n N/A				Status	pass	
Sensor Component	Offset		Conditio	on 0.4				Status	pass	
Sensor Component	Span		Conditio	n 1.062				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.		Conditio	87.1 k	Hz			Status	pass	
Sensor Component	Cell A Noise		Conditio	1.1 pp	b			Status	pass	
Sensor Component	Cell A Flow		Conditio	on 0.61 l	om			Status	pass	
Sensor Component	Cell A Pressure		Conditio	627.4	mmHg			Status	pass	
Sensor Component	Cell A Tmp.		Conditio	36.4 C	)			Status	pass	
Sensor Component	Cell B Freq.		Conditio	67.4 k	Hz			Status	pass	
Sensor Component	Cell B Noise		Conditio	0.8 pp	b			Status	pass	
<b>Sensor Component</b>	Sensor Component Cell B Flow			on 0.62 l	om			Status	pass	
Sensor Component	Cell B Pressure		Conditio	626.8	mmHg			Status	pass	
<b>Sensor Component</b>	Sensor Component Cell B Tmp.			dition				Status	pass	
Sensor Component	Sensor Component Line Loss			Not tested				Status	pass	
Sensor Component	System Memo		Conditio	on				Status	pass	

Site	Site Visit Date Parameter		Mfg	Owner ID	Model Number	Serial Number
CVL	151-Sandy	Grenville-06/15/2018				
1	6/15/2018	DAS	Campbell	000410	CR3000	2508
2	6/15/2018	Ozone	ThermoElectron Inc	000698	49i A1NAA	1030244797
3	6/15/2018	Ozone Standard	ThermoElectron Inc	000464	49i A3NAA	0622717858
4	6/15/2018	Zero air pump	Werther International	06867	C 70/4	000814279

A Avg % Diff: A Max % Di A Avg %Dif A Max % Di	
Intercept	
A Avg % Diff: A Max % Di         A Avg %Diff: A Max % Di         Cert Date         6/12/2018         CorrCoff         1.           UseDescription primary         ConcGroup 1 Tfer Raw primary         Tfer Corr 1 Site 2 Site Unit 2 PctDifference         Site 2 Site Unit 3 Site 2 Site Unit 3 Site 3 Site Unit 4 Site 3 Site Unit 5 Site 3 Site Unit 5 Site 3 Site Unit 4 Site 3 Site Unit 5 Site 3 Site Unit 5 Site 3 Site Unit 5 Site 3 Site 4 Site 3 Site Unit 5 Site 3 Site Unit 5 Site 3 Site Unit 5 Site 3 Site 4 Site	ıry stan
primary         1         0.11         0.02         -0.03         ppb           primary         2         14.00         13.84         12.43         ppb         -10.19%           primary         3         34.40         34.15         32.63         ppb         -4.45%           primary         4         68.00         67.59         66.92         ppb         -0.99%           primary         5         110.00         109.39         110.20         ppb         0.74%           Sensor Component         Sample Train         Condition         Good         Status         pass           Sensor Component         Inlet Filter Condition         Condition         Clean         Status         pass           Sensor Component         Battery Backup         Condition         N/A         Status         pass	08880
primary         2         14.00         13.84         12.43         ppb         -10.19%           primary         3         34.40         34.15         32.63         ppb         -4.45%           primary         4         68.00         67.59         66.92         ppb         -0.99%           primary         5         110.00         109.39         110.20         ppb         0.74%           Sensor Component         Sample Train         Condition         Good         Status         pass           Sensor Component         Inlet Filter Condition         Condition         Clean         Status         pass           Sensor Component         Battery Backup         Condition         N/A         Status         pass	
primary         3         34.40         34.15         32.63         ppb         -4.45%           primary         4         68.00         67.59         66.92         ppb         -0.99%           primary         5         110.00         109.39         110.20         ppb         0.74%           Sensor Component         Sample Train         Condition         Good         Status         pass           Sensor Component         Inlet Filter Condition         Condition         Clean         Status         pass           Sensor Component         Battery Backup         Condition         N/A         Status         pass	_
primary 4 68.00 67.59 66.92 ppb -0.99% primary 5 110.00 109.39 110.20 ppb 0.74%  Sensor Component Sample Train Condition Good Status pass  Sensor Component Dilet Filter Condition Clean Status pass  Sensor Component Battery Backup Condition N/A Status pass	_
primary 5 110.00 109.39 110.20 ppb 0.74%  Sensor Component Sample Train Condition Good Status pass  Sensor Component 22.5 degree rule Condition Status pass  Sensor Component Inlet Filter Condition Condition Clean Status pass  Sensor Component Battery Backup Condition N/A Status pass	_
Sensor Component       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       Inlet Filter Condition       Condition       Clean       Status       pass         Sensor Component       Battery Backup       Condition       N/A       Status       pass	
Sensor Component Battery Backup Condition N/A Status pass	
Sensor Component Offset Condition 0.000 Status pass	
Status pass	
Sensor Component Span Condition 1.112 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 90.2 kHz Pass	
Sensor Component Cell A Noise Condition 0.6 ppb Status pass	
Sensor Component Cell A Flow Condition 0.62 lpm Status pass	
Sensor Component Cell A Pressure Condition 715.9 mmHg Status pass	
Sensor Component Cell A Tmp. Condition 35.8 C Status pass	
Sensor Component Cell B Freq. Condition 116.2 kHz Pass	
Sensor Component Cell B Noise Condition 1.0 ppb Status pass	
Sensor Component Cell B Flow Condition 0.58 lpm Status pass	
Sensor Component Cell B Pressure Condition 715.6 mmHg Status pass	
Sensor Component Cell B Tmp. Condition Status pass	
Sensor Component Line Loss Condition Not tested Status pass	
Sensor Component System Memo Condition Status pass	

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
CAD150-Sandy Grenville-06/16/2018						
1	6/16/2018	DAS	Campbell	000421	CR3000	2530
2	6/16/2018	Ozone	ThermoElectron Inc	000624	49i A1NAA	1009241792
3	6/16/2018	Ozone Standard	ThermoElectron Inc	000439	49i A3NAA	CM08200015
4	6/16/2018	Zero air pump	Werther International	06914	C 70/4	000829156

Mfg	Serial Number Ta	Site	Technician		Site Visit I	Date Parame	ter Owner ID
ThermoElectron Inc	1009241792	CAD150	Sandy Gre	nville	06/16/201	8 Ozone	000624
Intercept -1.	Intercept -1.28958 Intercept		0.00000 Mfg 0.00000 Serial Number Tfer ID				rameter ozone er Desc. Ozone primary stan
DAS 1:	DAS 2:		Slope		1.	.00470 <b>Inter</b>	cept 0.08880
A Avg % Diff: A Ma	9.6% A Avg %	6Dif A Max %	Cert Da	ite	6/1	2/2018 Corr	Coff 1.00000
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Si		Site Unit	PctDifference
primary primary	2	1.50	1.40	0.2	11		-9.64%
primary	3	35.00	34.74	32.	11		-6.68%
primary	4	67.50	67.09	63.	1.1		-5.05%
primary	5	109.80	109.19	105	.70 pr		-3.20%
Sensor Componen	Sample Train		Condition Good			Status	pass
Sensor Componen	22.5 degree rule		Condition			Status	pass
Sensor Componen	Inlet Filter Condition	on	Condition Clear	ı		Status	pass
Sensor Componen	Battery Backup		<b>Condition</b> N/A			Status	pass
Sensor Componen	Offset		Condition 0.20			Status	pass
Sensor Componen	Span		Condition 1.037			Status	pass
Sensor Componen	Zero Voltage		Condition N/A			Status	pass
Sensor Componen	Fullscale Voltage		Condition N/A			Status	pass
Sensor Componen	Cell A Freq.		Condition 104.7	kHz		Status	pass
Sensor Componen	Cell A Noise		Condition 0.6 pp	ob		Status	pass
Sensor Componen	Cell A Flow		Condition 0.71	pm		Status	pass
Sensor Componen	Cell A Pressure		Condition 722.4	mmHg		Status	pass
Sensor Componen	Cell A Tmp.		Condition 33.7	0		Status	pass
Sensor Componen	Cell B Freq.		Condition 89.1	кНz		Status	pass
Sensor Componen	Cell B Noise		Condition 0.9 pp	ondition 0.9 ppb		Status	pass
Sensor Componen	Cell B Flow		Condition 0.74	dition 0.74 lpm		Status	pass
Sensor Componen	Cell B Pressure		Condition 723.0	lition 723.0 mmHg			pass
Sensor Componen	Cell B Tmp.		Condition	lition			pass
Sensor Componen	Line Loss		Condition Not to	ested		Status	pass
Sensor Componen	System Memo		Condition			Status	pass

Site	Site Visit Date Parameter		Mfg	Owner ID		Serial Number
СНЕ	E185-Sandy	Grenville-06/17/2018				
1	6/17/2018	DAS	Environmental Sys Corp	120283	8832	A0382
2	6/17/2018	Ozone	Ecotech	87161	EC9810B	10-0064
3	6/17/2018	Ozone Standard	Ecotech	70864	GasCal1000	01-0429
4	6/17/2018	Zero air pump	Ecotech	none	8301LC	01-0658

	Mfg Se	erial Number Ta	Site	Te	chnician		Site Visit	Date Param	eter Owner ID
DAS 1:	Ecotech 1	0-0064	CHE185	Sa	andy Grer	rville	06/17/20	18 Ozone	87161
A Avg % Diff: A Max % Di	Intercept 0.6	ntercept 0.67160 Intercept 0.00000		)	Serial Number		0517112167 <b>Tfe</b>		
Primary   1   0.50   0.40   1.30   ppb	A Avg % Diff: A Ma	x % Di A Avg %	6Dif A Max 9	% Di	_	te			
Primary   2   16.00   15.83   16.00   ppb   11.07%     Primary   3   34.90   34.64   32.70   ppb   5.5.60%     Primary   4   68.00   67.59   64.40   ppb   -4.72%     Primary   5   109.60   108.99   104.00   ppb   -4.72%     Primary   5   109.60   108.99   104.00   ppb   -4.58%     Sensor Component Sample Train   Condition   Good   Status   pass     Sensor Component Inlet Filter Condition   Condition   Condition   Status   pass     Sensor Component Unlet Filter Condition   Condition   Condition   Condition   Status   pass     Sensor Component Diffect   Condition   N/A   Status   pass     Sensor Component Span   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 Noise   Condition   N/A   Status   pass     Sensor Component Cell A Freq.   Condition   N/A   Status   pass     Sensor Component Cell A Freq.   Condition   N/A   Status   pass     Sensor Component Cell B Noise   Condition   N/A   Status   pass     Sensor Component Cell B Freq.   Condition   N/A   Status   pass     Sensor Component Cell B Pressure   Condition   N/A   Status   pass     Sensor Component Cell B Freq.   Condition   N/A   Status   pass     Sensor Component Cell B Pressure   Condition   N/A   Status   pass     Sensor Component Cell B Pressure   Condition   N/A   Status   pass     Sensor Component Cell B Pressure   Condition   N/A   Status   pass     Sensor Component Cell B Pressure   Condition   N/A   Status   pass     Sensor Component Cell B Pressure   Condition   N/A   Status   pass     Sensor Component Cell B Pressure   Condition   N/A   Status   pass     Sensor Component   Cell B Pressure   Condition   N/A   Status   pass     Sensor Component   Cell B Pressure   Condition   N/A   Status   pass	UseDescription	ConcGroup	Tfer Raw	Tfer	Corr	Si	te	Site Unit	PctDifference
primary		_					-	•	
primary 4 68.00 67.59 64.40 ppb 4.4.72% primary 5 109.60 108.99 104.00 ppb 4.4.72% primary 5 109.60 108.99 104.00 ppb 4.4.58%  Sensor Component Sample Train Condition Good Status pass  Sensor Component 22.5 degree rule Condition Status pass  Sensor Component Inlet Filter Condition Condition Clean Status pass  Sensor Component Offset Condition N/A Status pass  Sensor Component Span Condition 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 N/A Status pass  Sensor Component Cell A Flow Condition N/A Status pass  Sensor Component Cell A Flow Condition N/A Status pass  Sensor Component Cell A Freq. Condition N/A Status pass  Sensor Component Cell A Flow Condition N/A Status pass  Sensor Component Cell A Flow Condition N/A Status pass  Sensor Component Cell A Freq. Condition N/A Status pass  Sensor Component Cell B Freq. Condition N/A Status pass  Sensor Component Cell B Freq. Condition N/A Status pass  Sensor Component Cell B Freq. Condition N/A Status pass  Sensor Component Cell B Freq. Condition N/A Status pass  Sensor Component Cell B Freq. Condition N/A Status pass  Sensor Component Cell B Freq. Condition N/A Status pass  Sensor Component Cell B Pressure Condition N/A Status pass  Sensor Component Cell B Freq. Condition N/A Status pass  Sensor Component Cell B Freq. Condition N/A Status pass  Sensor Component Cell B Freq. Condition N/A Status pass  Sensor Component Cell B Freq. Condition N/A Status pass  Sensor Component Cell B Freq. Condition N/A Status pass	-			-				_	
Primary 5 109.60 108.99 104.00 ppb -4.58%  Sensor Component Sample Train							-		
Sensor Component   Sample Train   Condition   Good   Status   pass								_	
Sensor Component         Inlet Filter Condition         Condition         Clean         Status         pass           Sensor Component         Battery Backup         Condition         Functioning         Status         pass           Sensor Component         Offset         Condition         N/A         Status         pass           Sensor Component         Span         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 Noise         Condition         N/A         Status         pass           Sensor Component         Cell A Flow         Condition         0.49 lpm         Status         pass           Sensor Component         Cell A Pressure         Condition         707.9 mmHg         Status         pass           Sensor Component         Cell B Freq.         Condition         N/A         Status         pass           Sensor Component         Cell B Noise         Condition         N/A         Status         pass           Sensor Component         Cell B Freq. <td>-</td> <td>Sample Train</td> <td></td> <td>Condition</td> <td>on Good</td> <td></td> <td></td> <td></td> <td>pass</td>	-	Sample Train		Condition	on Good				pass
Sensor Component         Battery Backup         Condition         Functioning         Status         pass           Sensor Component         Offset         Condition         N/A         Status         pass           Sensor Component         Span         Condition         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         N/A         Status         pass           Sensor Component         Cell A Freq.         Condition         N/A         Status         pass           Sensor Component         Cell A Freq.         Condition         N/A         Status         pass           Sensor Component         Cell B Freq.         Condition         N/A         Status         pass           Sensor Component         Cell B Flow         Condition         N/A         Status         pass           Sensor Component         Cell B Pressure         Condition         N/A         Status         pass           Sensor Component         Cell B Tmp.         Condition<	Sensor Component	22.5 degree rule		Condition	on			Status	pass
Sensor Component Offset Condition N/A Status pass  Sensor Component Span Condition 1.017 Status pass  Sensor Component Zero Voltage Condition N/A Status pass  Sensor Component Fullscale Voltage Condition N/A Status pass  Sensor Component Cell A Freq. Condition N/A Status pass  Sensor Component Cell A Noise Condition N/A Status pass  Sensor Component Cell A Flow Condition N/A Status pass  Sensor Component Cell A Pressure Condition 707.9 mmHg Status pass  Sensor Component Cell A Tmp. Condition 37.4 C Status pass  Sensor Component Cell B Freq. Condition N/A Status pass  Sensor Component Cell B Freq. Condition N/A Status pass  Sensor Component Cell B Noise Condition N/A Status pass  Sensor Component Cell B Pressure Condition N/A Status pass  Sensor Component Cell B Pressure Condition N/A Status pass  Sensor Component Cell B Pressure Condition N/A Status pass  Sensor Component Cell B Pressure Condition N/A Status pass  Sensor Component Cell B Pressure Condition N/A Status pass  Sensor Component Cell B Tmp. Condition N/A Status pass  Sensor Component Cell B Tmp. Condition N/A Status pass  Sensor Component Line Loss Condition About 3% Status pass	Sensor Component	Inlet Filter Conditio	n	Condition	on Clean			Status	pass
Sensor Component Span Condition 1.017 Status pass Sensor Component Zero Voltage Condition N/A Status pass Sensor Component Fullscale Voltage Condition N/A Status pass Sensor Component Cell A Freq. Condition N/A Status pass Sensor Component Cell A Noise Condition N/A Status pass Sensor Component Cell A Flow Condition N/A Status pass Sensor Component Cell A Flow Condition N/A Status pass Sensor Component Cell A Pressure Condition 707.9 mmHg Status pass Sensor Component Cell A Tmp. Condition 37.4 C Status pass Sensor Component Cell B Freq. Condition N/A Status pass Sensor Component Cell B Freq. Condition N/A Status pass Sensor Component Cell B Pressure Condition N/A Status pass Sensor Component Cell B Flow Condition N/A Status pass Sensor Component Cell B Flow Condition N/A Status pass Sensor Component Cell B Freq. Condition N/A Status pass Sensor Component Cell B Freq. Condition N/A Status pass Sensor Component Cell B Freq. Condition N/A Status pass Sensor Component Cell B Freq. Condition N/A Status pass Sensor Component Cell B Tmp. Condition N/A Status pass Sensor Component Line Loss Condition Status pass	Sensor Component	Battery Backup		Condition	Condition Functioning			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 Noise       Condition       0.49 lpm       Status       pass         Sensor Component       Cell A Flow       Condition       707.9 mmHg       Status       pass         Sensor Component       Cell A Tmp.       Condition       37.4 C       Status       pass         Sensor Component       Cell B Freq.       Condition       N/A       Status       pass         Sensor Component       Cell B Noise       Condition       N/A       Status       pass         Sensor Component       Cell B Flow       Condition       N/A       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Status       pass	Sensor Component	Offset		Condition	on 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 Noise       Condition       0.49 lpm       Status       pass         Sensor Component       Cell A Flow       Condition       707.9 mmHg       Status       pass         Sensor Component       Cell A Tmp.       Condition       37.4 C       Status       pass         Sensor Component       Cell B Freq.       Condition       N/A       Status       pass         Sensor Component       Cell B Noise       Condition       N/A       Status       pass         Sensor Component       Cell B Flow       Condition       N/A       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Status       pass	Sensor Component	Span		Condition	Condition 1.017			Status	pass
Sensor Component       Cell A Freq.       Condition       N/A       Status       pass         Sensor Component       Cell A Noise       Condition       0.49 lpm       Status       pass         Sensor Component       Cell A Flow       Condition       707.9 mmHg       Status       pass         Sensor Component       Cell A Tmp.       Condition       37.4 C       Status       pass         Sensor Component       Cell B Freq.       Condition       N/A       Status       pass         Sensor Component       Cell B Noise       Condition       N/A       Status       pass         Sensor Component       Cell B Flow       Condition       N/A       Status       pass         Sensor Component       Cell B Pressure       Condition       N/A       Status       pass         Sensor Component       Line Loss       Condition       about 3%       Status       pass	Sensor Component	Zero Voltage		Condition	Condition N/A			Status	pass
Sensor Component       Cell A Noise       Condition       N/A       Status       pass         Sensor Component       Cell A Flow       Condition       0.49 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       707.9 mmHg       Status       pass         Sensor Component       Cell A Tmp.       Condition       37.4 C       Status       pass         Sensor Component       Cell B Freq.       Condition       N/A       Status       pass         Sensor Component       Cell B Noise       Condition       N/A       Status       pass         Sensor Component       Cell B Flow       Condition       N/A       Status       pass         Sensor Component       Cell B Pressure       Condition       N/A       Status       pass         Sensor Component       Line Loss       Condition       about 3%       Status       pass	Sensor Component	Fullscale Voltage		Condition	Condition N/A			Status	pass
Sensor Component       Cell A Flow       Condition       0.49 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       707.9 mmHg       Status       pass         Sensor Component       Cell A Tmp.       Condition       N/A       Status       pass         Sensor Component       Cell B Freq.       Condition       N/A       Status       pass         Sensor Component       Cell B Flow       Condition       N/A       Status       pass         Sensor Component       Cell B Pressure       Condition       N/A       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       about 3%       Status       pass	Sensor Component	Cell A Freq.		Condition	Condition N/A			Status	pass
Sensor Component       Cell A Pressure       Condition       707.9 mmHg       Status       pass         Sensor Component       Cell A Tmp.       Condition       37.4 C       Status       pass         Sensor Component       Cell B Freq.       Condition       N/A       Status       pass         Sensor Component       Cell B Noise       Condition       N/A       Status       pass         Sensor Component       Cell B Flow       Condition       N/A       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       about 3%       Status       pass	Sensor Component	Cell A Noise		Condition N/A				Status	pass
Sensor Component       Cell A Tmp.       Condition       37.4 C       Status       pass         Sensor Component       Cell B Freq.       Condition       N/A       Status       pass         Sensor Component       Cell B Noise       Condition       N/A       Status       pass         Sensor Component       Cell B Flow       Condition       N/A       Status       pass         Sensor Component       Cell B Pressure       Condition       N/A       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       about 3%       Status       pass	Sensor Component	Cell A Flow		Condition 0.49 lpm				Status	pass
Sensor Component       Cell B Freq.       Condition       N/A       Status       pass         Sensor Component       Cell B Noise       Condition       N/A       Status       pass         Sensor Component       Cell B Flow       Condition       N/A       Status       pass         Sensor Component       Cell B Pressure       Condition       N/A       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       about 3%       Status       pass	Sensor Component	Cell A Pressure		Condition	on 707.9	mmHg		Status	pass
Sensor Component       Cell B Noise       Condition       N/A       Status       pass         Sensor Component       Cell B Flow       Condition       N/A       Status       pass         Sensor Component       Cell B Pressure       Condition       N/A       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       about 3%       Status       pass	Sensor Component	Cell A Tmp.		Condition	on 37.4 C	)		Status	pass
Sensor Component       Cell B Flow       Condition       N/A       Status       pass         Sensor Component       Cell B Pressure       Condition       N/A       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       about 3%       Status       pass	Sensor Component	Cell B Freq.		Conditio	on N/A			Status	pass
Sensor Component       Cell B Pressure       Condition       N/A       Status pass         Sensor Component       Cell B Tmp.       Condition       Status pass         Sensor Component       Line Loss       Condition about 3%       Status pass	Sensor Component	Cell B Noise		Condition	on N/A			Status	pass
Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       about 3%       Status       pass	Sensor Component	Cell B Flow		Condition	on N/A			Status	pass
Sensor Component Line Loss Condition about 3% Status pass	Sensor Component	Cell B Pressure		Condition	on N/A			Status	pass
	Sensor Component Cell B Tmp.			Condition				Status	pass
Sensor Component System Memo Condition Status pass	Sensor Component Line Loss		Conditio	about 3%			Status	pass	
	<b>Sensor Component</b>	System Memo		Conditio	on			Status	pass

Site	Site Visit Date Parameter		Mfg	Owner ID	Model Number	Serial Number
CDZ	I171-Sandy	Grenville-06/23/2018				
1	6/23/2018	DAS	Campbell	000352	CR3000	2130
2	6/23/2018	Ozone	ThermoElectron Inc	000727	49i A1NAA	1105347320
3	6/23/2018	Ozone Standard	ThermoElectron Inc	000544	49i A3NAA	0929938242
4	6/23/2018	Zero air pump	Werther International	06879	C 70/4	000814275

Mfg	Serial Number Ta	Site	Technician		Site Visit	Date Parame	eter Owner ID
ThermoElectron Inc	1105347320	CDZ171	Sandy Gre	nville	06/23/201	Ozone	000727
Intercept -1.	99861 Slope: 01538 Intercept 99999 CorrCoff	0.00000 0.00000 0.00000	Serial N	lumber	05171121 01113	67 <b>Tf</b>	rameter ozone er Desc. Ozone primary stan
A Avg % Diff: A Ma		%Dif A Max %				.00470 Inter	
3.3%	6.5%		Cert Da	ite	6/1	12/2018 Corr	Coff 1.00000
UseDescription primary primary primary	ConcGroup  1  2  3	7 Tfer Raw 0.80 15.00 34.80	Tfer Corr 0.70 14.84 34.54	13. 33.	20 p 88 p 20 p	Site Unit pb pb pb	PctDifference  -6.47%  -3.88%
primary primary	5	67.70 108.70	67.29 108.10	66. 107	1	pb pb	-1.62% -1.02%
Sensor Component	Sample Train		Condition Good	1	j <u>a</u> .	Status	pass
Sensor Component	22.5 degree rule		Condition			Status	pass
Sensor Component	Inlet Filter Condition	on	Condition Clear	l		Status	pass
Sensor Component	Battery Backup		<b>Condition</b> N/A			Status	pass
Sensor Component	Offset		Condition 0.000	1		Status	pass
Sensor Component	Span		Condition 1.018			Status	pass
Sensor Component	Zero Voltage		Condition N/A			Status	pass
Sensor Component	Fullscale Voltage		<b>Condition</b> N/A			Status	pass
Sensor Component	Cell A Freq.		Condition 88.7	кНz		Status	pass
Sensor Component	Cell A Noise		Condition 0.7 pp	ob		Status	pass
Sensor Component	Cell A Flow		Condition 0.74	pm		Status	pass
Sensor Component	Cell A Pressure		Condition 697.7	mmHg		Status	pass
Sensor Component	Cell A Tmp.		Condition 35.3	0		Status	pass
Sensor Component	Cell B Freq.		Condition 91.8	кНz		Status	pass
Sensor Component	Cell B Noise		Condition 0.9 pp	Condition 0.9 ppb		Status	pass
Sensor Component	Cell B Flow		Condition 0.79	dition 0.79 lpm		Status	pass
Sensor Component	Cell B Pressure		<b>Condition</b> Not to	ition Not tested		Status	pass
Sensor Component	Cell B Tmp.		Condition	lition			pass
Sensor Component	Line Loss		Condition Not to	Not tested		Status	pass
Sensor Component	System Memo		Condition			Status	pass