# 2017 – 3<sup>rd</sup> Quarter Report Support for Conducting Systems & Performance Audits of CASTNET Sites and NADP Monitoring Stations

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## **Prepared for:**

U. S. Environmental Protection Agency

Prepared by:



1128 NW 39<sup>th</sup> Drive Gainesville, FL 32605

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### List of Acronyms and Abbreviations

% diff percent difference

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

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

DAS data acquisition system

DC direct current

deg degree

DVM digital voltmeter

EEMS Environmental, Engineering & Measurement Services, Inc.

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

FSAD Field Site Audit Database

GPS geographical positioning system

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

mv milivolt

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

NPS National Park Service

QAPP Quality Assurance Project Plan SOP standard operating procedure

TEI Thermo Environmental Instruments
USNO United States Naval Observatory

V volts

WRR World Radiation Reference

## 1.0 CASTNET Quarterly Report

### 1.1 Introduction

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

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

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

As of October 2017, the network is comprised of 95 active rural sampling sites across the Untied States and Canada, cooperatively operated by the Environmental Protection Agency (EPA), the National Park Service (NPS), Environment Canada, Bureau of Land Management (BLM) and several independent partners. Wood Group (Wood) is responsible for operating the EPA and Environment Canada sponsored sites, and Air Resource Specialist, Inc. (ARS) is responsible for operating the NPS and BLM sponsored sites.

### 1.2 Project Objectives

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

Performance audits verify that all evaluated variables are consistent with the accuracy goals as defined in the CASTNET Quality Assurance Project Plan (QAPP). The parameter specific accuracy goals are presented in Table 1. Only four EPA sponsored sites that are operated by Wood continue to operate meteorological sensors. Those sites are BEL116, BVL30, CHE185, and PAL190. Six sites in WY sponsored by EPA and operated by the BLM/ARS also operate

meteorological sensors and are PND165, BAS601, NEC602, BUF603, FOR604, and SHE604. The NPS added a new site at Chaco Culture National Historical Park (CHC432) which also monitors meteorological variables. The meteorological sensors at sites PND165, BAS601, SHE604, BUF603, and NEC602 were audited during the station audits performed in third quarter 2017.

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. Those variables were audited at sites ROM206 and PND165 during third quarter 2017. All of the trace gas results for those audits were found to be within acceptance criteria. The preliminary reports of those results were delivered following the audits and are not included in this report.

Table 1. Performance Audit Challenge and Acceptance Criteria

Sensor	Parameter	Audit Challenge	Acceptance Criteria
Precipitation	Response	10 manual tips	1 DAS count per tip
Precipitation	Accuracy	2 introductions of known amounts of water	≤±10.0% of input amount
Relative Humidity	Accuracy	Compared to reference instrument or standard solution	≤±10.0% RH
Solar Radiation	Accuracy	Compared to WRR traceable standard	≤±10.0% of daytime average
Surface Wetness	Response	Distilled water spray mist	Positive response
Surface Wetness	Sensitivity	1% decade resistance	N/A
Temperature	Accuracy	Comparison to 3 NIST measured baths (~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	nd Orientation Parallel to alignment		≤±5° from degrees true
Wind Direction	Linearity	Eight cardinal points on test fixture	≤±5° mean absolute error
Wind Direction	Response Threshold	Starting torque tested with torque gauge	< 10 g-cm Climatronics; < 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	≤± 5.0% of designated rate
Ozone	Slope	Linear regression of multi-	$0.9000 \le m \le 1.1000$
Ozone	Intercept	point test gas concentration as	$-5.0 \text{ ppb} \le b \le 5.0 \text{ ppb}$
Ozone	Correlation Coefficient	measured with a certified transfer standard	0.9950 ≤ r
Ozone	Percent Difference	Comparison with Level 2 standard concentration	≤±10.0% of test gas concentration
DAS	Accuracy	Comparison with certified standard	≤± 0.003 VDC

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

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

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

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

### 1.3 CASTNET Sites Visited Third Quarter 2017

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

**Table 2. Site Audit Visits** 

Side ID	Audit Type	Sponsor	Site Visit Date	Station Name
PND165	With Met	BLM/EPA	7/14/2017	Pinedale
BAS601	With Met	BLM	7/17/2017	Basin
SHE604	Flow & Met	BLM	7/18/2017	Sheridan
VPI120	Without Met	EPA	7/18/2017	Horton Station
BUF603	Flow & Met	BLM	7/19/2017	Buffalo
CDR119	Without Met	EPA	7/20/2017	Cedar Creek St. Park
NEC602	With Met	BLM	7/21/2017	Newcastle
PAR107	Without Met	EPA	7/21/2017	Parsons
CNT169	Without Met	EPA	7/22/2017	Centennial
PED108	Without Met	EPA	7/25/2017	Prince Edward
ROM206	Without Met	EPA	8/2/2017	Rocky Mountain NP
ROM406	Without Met	NPS	8/8/2017	Rocky Mountain NP (NPS)

Side ID	Audit Type	Sponsor	Site Visit Date	Station Name
YEL408	Without Met	NPS	8/16/2017	Yellowstone NP
GLR468	Without Met	NPS	8/17/2017	Glacier NP
LRL117	Without Met	EPA	8/17/2017	Laurel Hill St. Park
THR422	Without Met	NPS	8/29/2017	Theodore Roosevelt NP
VOY413	Without Met	NPS	9/1/2017	Voyageurs NP
SAN189	Flow Only	EPA	9/7/2017	Santee Sioux
NIC001	Flow Only	EPA	9/26/2017	Nick's Lake
WFM105	Flow Only	EPA	9/27/2017	Whiteface Mountain
UND002	Flow Only	EPA	9/28/2017	Underhill

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
ROM206	NOy	EPA	7/13/2017	Rocky Mountain NP
PND165	NOy	BLM/EPA	7/15/2017	Pinedale
KEF112	Ozone	EPA	8/16/2017	Kane Experimental Forest
MKG113	Ozone	EPA	8/17/2017	M. K. Goddard St. Park
ABT147	Ozone	EPA	8/21/2017	Abington
NPT006	Ozone	EPA	8/22/2017	Nez Perce Tribe

Side ID	PE Audit Type	Sponsor	Site Visit Date	Station Name
CRMO	Ozone	NPS	8/23/2017	Craters of the Moon NP
WST109	Ozone	EPA	8/24/2017	Woodstock

### 1.4 Audit Results

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

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

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

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

## 2.0 NADP Quarterly Report

### 2.1 Introduction

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

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

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

### 2.2 Project Objectives

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

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

## 2.3 NADP Sites Visited Third Quarter 2017

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

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

Side ID	<u>Network</u>	Visit Date	Station Name
CO15	NTN	7/26/2017	Sand Spring
NC45	NTN	7/17/2017	Mt. Mitchell
VA00	NTN	7/24/2017	Charlottesville
VA13	NTN	7/18/2017	Horton's Station
VA24	NTN/AMoN	7/25/2017	Prince Edward
VA99	NTN	7/19/2017	Natural Bridge Station
WV04	NTN	7/19/2017	Babcock State Park
CO19	NTN	8/1/2017	Rocky Mountain National Park - Beaver Meadow
CT15	NTN/AMoN	8/21/2017	Abington
MT97	NTN	8/15/2017	Lost Trail Pass
ND08	NTN	8/31/2017	Icelandic State Park
ND11	NTN	8/30/2017	Woodworth
NH02	NTN/AMoN	8/22/2017	Hubbard Brook
NY01	NTN	8/15/2017	Alfred
NY52	NTN	8/15/2017	Bennett Bridge
NY68	MDN/NTN	8/13/2017	Biscuit Brook
NY99	NTN	8/14/2017	West Point
PA18	NTN	8/26/2017	Young Woman's Creek
PA29	AMoN	8/16/2017	Kane Experimental Forest
PA90	NTN	8/19/2017	Hills Creek State Park

U.S. EPA

October, 2017

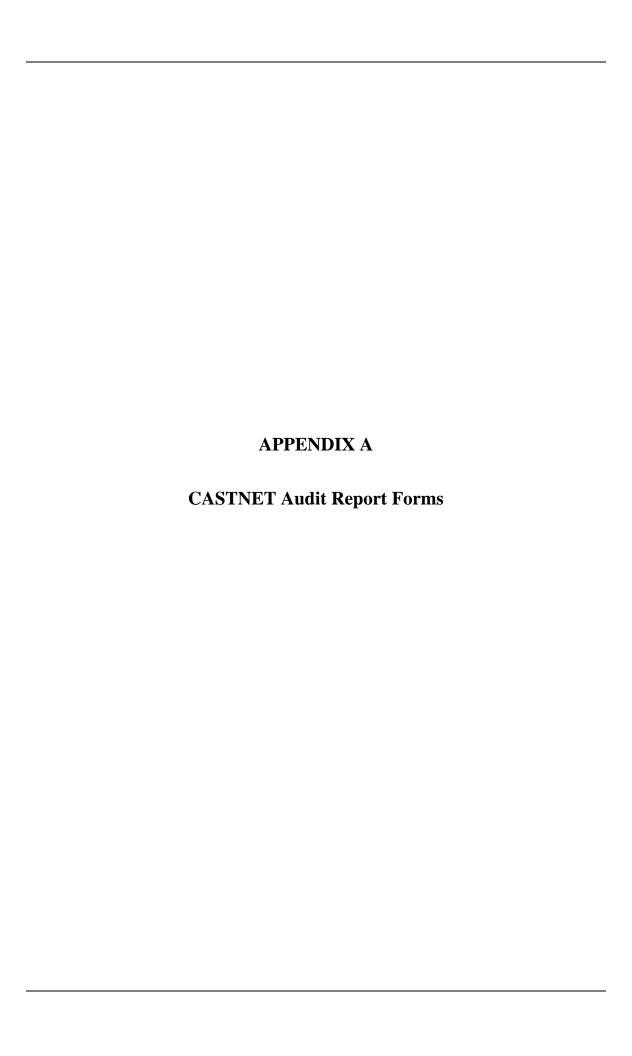
Side ID	<u>Network</u>	Visit Date	Station Name
VT01	NTN	8/22/2017	Bennington
VT99	MDN/NTN/AMoN	8/23/2017	Underhill
WA98	NTN	8/18/2017	Columbia River Gorge
WV18	AMoN	8/27/2017	Parsons
WV99	AIRMoN	8/27/2017	Canaan Valley Institute
MN16	MDN/NTN	9/6/2017	Marcell Experimental Forest
MN18	MDN/NTN/AMoN	9/5/2017	Fernberg
NE98	AMoN	9/7/2017	Santee
PA15	AIRMoN	8/18/2017	Penn State
NY98	NTN/AMoN	9/27/2017	Whiteface

## 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

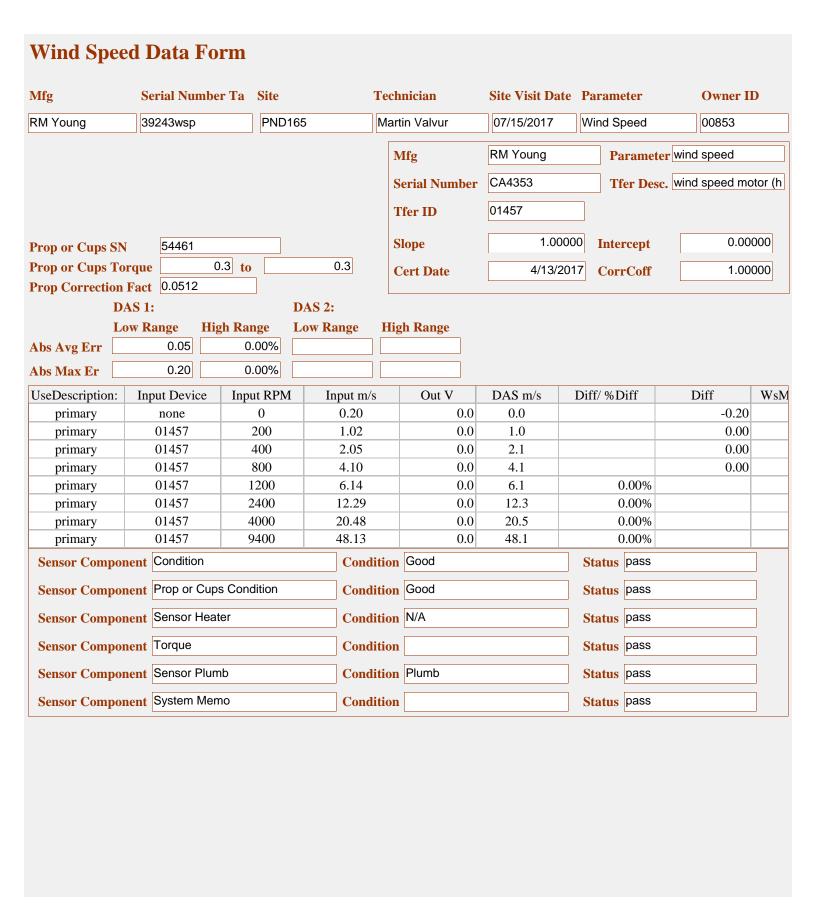
Site '	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
PND	)165-Martii	n Valvur-07/15/2017				
1	7/15/2017	Computer	Dell	07048	Inspiron 15	B72MC12
2	7/15/2017	DAS	Campbell	000403	CR3000	2516
3	7/15/2017	Elevation	Elevation	None	1	None
4	7/15/2017	Filter pack flow pump	Thomas	00534	107CA18	0000162757
5	7/15/2017	Flow Rate	Apex	000549	AXMC105LPMDPCV	illegible
6	7/15/2017	Infrastructure	Infrastructure	none	none	none
7	7/15/2017	Modem	Raven	06608	V4221-V	0844349088
8	7/15/2017	Noy	Teledyne	000795	T200U	101
9	7/15/2017	Ozone	ThermoElectron Inc	000619	49i A1NAA	1009241791
10	7/15/2017	Ozone Standard	ThermoElectron Inc	000329	49i A3NAA	0622717853
11	7/15/2017	Precipitation	Texas Electronics	none	TR-525i-HT	59576-414
12	7/15/2017	Relative Humidity	Vaisala	05026	HMP50	Z4320017
13	7/15/2017	Sample Tower	Aluma Tower	000055	В	AT-81213-J12
14	7/15/2017	Shelter Temperature	Campbell	none	107-L	none
15	7/15/2017	Siting Criteria	Siting Criteria	None	1	None
16	7/15/2017	Solar Radiation	Licor	missing	Pyranometer	PY77051
17	7/15/2017	Surface Wetness	RM Young	illegible	58101	none
18	7/15/2017	Temperature	RM Young	06539	41342	14800
19	7/15/2017	Temperature2meter	RM Young	06305	41342VC	12544
20	7/15/2017	Wind Direction	RM Young	00853	05305	39243wdr
21	7/15/2017	Wind Speed	RM Young	00853	05305	39243wsp
22	7/15/2017	Zero air pump	Werther International	06881	C 70/4	000815264

## Flow Data Form

Ifg	Serial Nun	nber Ta S	lite	Tec	hnician	Site Visit I	Date Paran	neter	Owner ID
pex	illegible		PND165	Ма	rtin Valvur	07/15/2017	Flow F	Rate	000549
					Mfg	BIOS	F	Parameter Flo	ow Rate
				:	Serial Number	148613	ı	fer Desc. Bl	OS 220-H
				,	Tfer ID	01421			
				,	Slope	1.0	00153 Int	ercept	0.00366
					Cert Date			rrCoff	1.00000
					Cert Date	1/20	0/2017	rrColl	1.00000
DAS 1:		<b>DAS 2:</b>			Cal Factor Z	ero	-0.0		
A Avg % Diff:	A Max % Di	A Avg %I	Dif A Max	% <b>Di</b>	Cal Factor F	ull Scale	0.9	94	
1.31%	1.31%				Rotometer R	eading:	3.4	45	
Desc.	Test type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSigna	II PctDifference
primary	pump off	0.000	0.000	0.01	0.000	-0.03	l/m	l/m	
	leak check	0.000	0.000	0.01	0.000	-0.03	1/m	l/m	
<u> </u>	test pt 1	3.057	3.050	3.03	0.000	3.01	l/m	l/m	-1.31%
<u> </u>	test pt 2	3.060	3.050	3.03	0.000	3.01	1/m	l/m	-1.31%
	test pt 3	3.062	3.050	3.04	0.000	3.01	l/m	l/m	-1.31%
Sensor Compo	nent Leak Tes	st		Condition	1		Status	pass	
Sensor Compo	nent Tubing C	Tubing Condition		Condition	Good		Status pass		
Sensor Compo	onent Filter Pos	Filter Position		Condition	Good		Status	pass	
Sensor Compo	nent Rotomete	Rotometer Condition		Condition	Clean and dry		Status	pass	
Sensor Compo	onent Moisture	Moisture Present			No moisture pi	resent	Status	pass	
Sensor Compo	onent Filter Dis	tance		Condition	5.0 cm		Status	pass	
Sensor Compo	onent Filter Dep	Filter Depth			2.0 cm		Status	pass	
Sensor Compo	onent Filter Azi	Filter Azimuth			225 deg		Status	pass	
Sangar Comp	onent System N	/lemo		Condition	1		Status	pass	_

## **Ozone Data Form**

Mfg Se	Serial Number Ta		Site Te		echnician		Site Visit Date   I		eter	Owner II	)
ThermoElectron Inc 1009241791		PND165	Ma	artin Valv	ur	07/15/2	.017	Ozone		000619	
Intercept -0.24	Intercept -0.24393 Intercept			Serial Number		Thermol	Electron 70008-3		rameter Ozer Desc. O	zone zone primary	stan
DAS 1:	DAS 2:	D10 135 0	V 5.	Slope			1.0046	6 Inter	cept	0.012	298
A Avg % Diff: A Max	<b>x % Di A Avg %</b> 6.4%	Dif A Max 9	% Di	Cert Da	te		1/1/201	7 Corr	·Coff	1.000	000
UseDescription	ConcGroup	Tfer Raw	Tfer	Corr	C:	te	Cit	e Unit	PotDi	fference	
primary	1	0.23	0.2		0		ppb	Cint	I CIDI	iterence	
primary	2	15.63	15.	54	14	.55	ppb			-6.37%	
primary	3	34.69	34.			.08	ppb			-4.14%	
primary	4	63.81	63.		61		ppb			-3.48%	
primary	5	110.92	110		107	'.50	ppb			-2.62%	7
Sensor Component	Sample Train		Conditio	Good				Status	pass		
<b>Sensor Component</b>	22.5 degree rule		Conditio	on				Status	pass		
Sensor Component	Inlet Filter Conditio	n	Conditio	n Clean		Status P		pass			
<b>Sensor Component</b>	Battery Backup		Condition N/A		Status pa		pass				
Sensor Component	Offset		Condition -0.60				Status pass				
Sensor Component	Span		Condition 1.033					Status	pass pass		
Sensor Component	Zero Voltage		Condition		on N/A			Status	pass		
<b>Sensor Component</b>	Fullscale Voltage		Condition N/A				Status	s pass			
<b>Sensor Component</b>	Cell A Freq.		Condition 100.7 kHz				Status pass				
<b>Sensor Component</b>	Cell A Noise		Conditio	0.8 pp	b	Status F		pass			
<b>Sensor Component</b>	Cell A Flow		Conditio	0.0 lpi	m	Status		Fail			
Sensor Component	Cell A Pressure		Conditio	on 568.0 mmHg			Status	pass		]	
Sensor Component	Cell A Tmp.		Conditio	35.7 C	;			Status	pass		]
Sensor Component	Cell B Freq.		Conditio	92.5 k	Hz			Status	pass		]
Sensor Component	Sensor Component Cell B Noise		Conditio	0.4 pp	b			Status	pass		
Sensor Component	Cell B Flow		Condition		n			Status	Fail		
Sensor Component Cell B Pressure			Condition 567.4 mmHg		mmHg			Status	pass		
Sensor Component	omponent Cell B Tmp.		Conditio	on				Status	pass		
Sensor Component	Line Loss		Conditio	Not te	sted			Status	pass		
Sensor Component	System Memo		Conditio	on				Status	pass		]_



## **Wind Direction Data Form**

Mfg	Serial N	lumber T	Ta Site		Tech	nician		Site Visit	Date P	aram	eter	Owner ID	
RM Young	39243v	/dr	PND1	65	Mar	tin Valvur		07/15/20	17 V	/ind D	irection	00853	
					N	Afg		RM Young	g	Pa	arameter wind o	direction	
					S	erial Nun	ıber			Tí	fer Desc. wind	direction w	heel
					Т	fer ID		01266					
a <del>-</del>	1/4	~~~~			S	Iono			1.00000	Into	roont	0.000	00
Vane SN: Name Torque	10 <b>to</b>	C	. A. Align	. deg. true:		lope					rcept		
vanerorque_	10 10	10		101		Cert Date		1	/1/2006	Cor	rCoff	1.000	00
					N	<b>Afg</b>		Ushikata		Pa	arameter wind	direction	
					S	erial Nun	ıber	190037		Tí	fer Desc. transi	t	
					Т	fer ID		01265					
					S	Slope			1.00000	Inte	rcept	0.000	00
						Cert Date		2	2/8/2017	Cor	rCoff	1.000	00
	DAS 1:			DAS 2:									
	Orientation	Linea	rity:	Orientatio	n Lin	earity:							
Abs Avg Err	2.		0.7										
Abs Max Er	4	1	2										
UseDescription	on Tferl	D	Input Rav	w Linear	ity O	utput V	Out	out Deg.	Differen	nce	Change	Erro	r
primary	0126		0	<b>✓</b>		0.000		2		2	46.		1.3
primary	0126	56	45	<b>✓</b>		0.000		47		2	44.	6 #######	####
primary	0126	66	90	<b>✓</b>		0.000		93		2	45.	6 #######	####
primary	0126	66	135	<b>✓</b>		0.000		137		2		4 #######	
primary	0126		180	<u> </u>		0.000		180		0		4 #######	
primary	0126		225	<b>✓</b>		0.000		226		1	45		0.5
primary	0126		270	<u></u>		0.000		271		0		7 #######	
primary	0126		315			0.000		316		1	45		0.5
primary	0126		1			0.000		4		3			3
primary	0126		91			0.000		95		4			4
primary	0126	55	181			0.000		180		1			1
primary	0126	55	271			0.000		274		3			3
Sensor Comp	ponent Cond	tion		C	ondition	Good			S	tatus	pass		
Sensor Comp	ponent Mast			C	ondition	Good			S	tatus	pass		
Sensor Comp	ponent Senso	or Heater		C	ondition	N/A			S	tatus	pass		
Sensor Component Sensor Plumb		C	ondition	Plumb			S	tatus	pass				
Sensor Component Torque			C	ondition				S	tatus	pass			
Sensor Component Vane Condition			C	ondition	ition Good Status			pass					
Sensor Comp	ponent Syste	m Memo		C	ondition				S	tatus	pass		

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg RM Young 14800 PND165 Martin Valvur 07/15/2017 Temperature 06539 Mfg Fluke Parameter Temperature Tfer Desc. RTD 3275143 **Serial Number** 01229 **Tfer ID** 0.03191 **Slope** 1.00006 **Intercept DAS 1: DAS 2:** 1/23/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.20 0.30 UseDesc. Test type InputTmpRaw InputTmpCorr. OutputTmpSignal | OutputSignalEng | OSE Unit | Difference primary Temp Low Range 0.07 0.04 0.000 0.34 C 0.3 C Temp Mid Range 24.29 24.26 0.000 24.27 0.01 primary 47.49 47.77 C primary Temp High Range 47.52 0.000 0.28 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

#### 2 Meter Temperature Data Form Calc. Difference Serial Number Ta **Technician** Site Visit Date Parameter Mfg Site **Owner ID** PND165 Martin Valvur 07/15/2017 06305 RM Young 12544 Temperature2meter Parameter Temperature Mfg Fluke Tfer Desc. RTD 3275143 **Serial Number** 01229 Tfer ID **Slope** 1.00006 **Intercept** 0.03191 **DAS 1: DAS 2:** 1/23/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.21 0.48 Test type UseDescription InputTmpRaw InputTmpCorrected OutputTmpSignal OutputSignalEng | OSE Unit Difference primary Temp Low Rang 0.07 0.04 0.000 0.52 C 0.48 Temp Mid Rang 24.29 24.26 0.000 24.18 C -0.08 primary primary Temp High Rang 47.52 47.49 0.000 47.57 C 0.08 Sensor Component | Properly Sited **Condition** Properly sited **Status** pass Sensor Component | Shield Condition Clean **Status** pass Condition Functioning Status pass Sensor Component Blower Sensor Component Blower Status Switch Status pass **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Humidity Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg PND165 Martin Valvur 07/15/2017 Relative Humidity 05026 Vaisala Z4320017 Mfg Rotronic Parameter Relative Humidity Tfer Desc. GTL 75296 **Serial Number** 01220 **Tfer ID** 0.06850 **Slope** 0.99780 **Intercept Cert Date** 1/23/2017 0.99994 CorrCoff **DAS 1: DAS 2:** Low Range **High Range** Low Range **High Range** 3.6 0.7 **Abs Avg Err** 4.6 0.7 **Abs Max Er** UseDesc. Test type Device Input RH GTL Raw RH Corr. **DAS Volts** DAS %RH Difference RH Low Range GTL 0.000 primary 32.8 31.7 32.8 30.2 -2.6 50.3 0.000 -4.6 primary RH Low Range GTL 52.9 52.9 48.3 primary RH High Range GTL 93.6 88.9 93.6 0.000 92.9 -0.7 Condition Clean Status pass Sensor Component | RH Filter 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 PY77051 PND165 Martin Valvur 07/15/2017 Solar Radiation Licor missing Mfg Eppley Parameter solar radiation Tfer Desc. SR transfer sensor 23824 **Serial Number** 01247 **Tfer ID** 1.00000 0.00000 **Slope Intercept DAS 1: DAS 2:** 2/16/2017 1.00000 % Diff of Avg %Diff of Max %Diff of Avg %Diff of Max **Cert Date** CorrCoff 2.6% 3.0% 0.0% 0.0% UseDescription Measure Date MeasureTime Tfer Corr $DAS\ w/m2$ PctDifference Tfer Raw 12:00 primary 7/15/2017 880 880 906 3.0% -1.5% 7/15/2017 13:00 558 558 550 primary primary 7/15/2017 14:00 123 122 96 -21.1% -14.9% primary 7/15/2017 15:00 266 266 226 Status pass Sensor Component | Sensor Clean Condition Clean Sensor Component | Sensor Level Condition Level **Status** pass Condition Properly sited Sensor Component | Properly Sited Status pass Sensor Component | System Memo **Status** pass Condition

# **Precipitation Data Form**

Mfg	S	erial N	lumber Ta	Site		Teo	chnician		Site	Visit Date	Parame	eter		Owner ID
Texas Electron	nics	59576-4	114	PND165		Ma	artin Valvur		07/	15/2017	Precipita	ation		none
							Mfg		PMF	)	Pa	rameter	Prec	cipitation
<b>DAS 1:</b>			<b>DAS 2:</b>				Serial Num	ıber	Non	е	Tf	er Desc.	250r	ml graduate
A Avg % Diff				Dif A N	Max % Di	,	Tfer ID		0124	<b>1</b> 9				
4.6%		5.6	%											
							Slope			1.0000	0 Inter	rcept		0.00000
							<b>Cert Date</b>			4/26/201	3 Corr	Coff		1.00000
II. D	TD 4		TC X/ 1	т	T. D T	,. L	E III	DAG		E ILII :	OGELI	· mc r	r •,  -	D Dicc
UseDesc.	Test test 1	type	TferVolume 250		TimePerT 8 - 10 sec	_	Eq.Ht 0.54	DAS 0				nit   HerU		PctDifference -5.6%
primary primary	test 1		250	2	8 - 10 sec		0.54	0		in	in	m		-3.7%
				L					<i>J</i> <u>L</u>	111				3.770
Sensor Com	ponent	Prope	rly Sited		Cond	litio	Properly s	sited			Status	pass		
Sensor Com	ponent	Gauge	e Drain Scree	n	Cond	litio	Installed				Status	pass		
Sensor Com	ponent	Funne	el Clean		Cond	litio	Clean				Status	pass		
Sensor Com	ponent	Condi	tion		Cond	litio	Good				Status	pass		
Sensor Com	ponent	Gauge	e Screen		Cond	litio	Installed				Status	pass		
Sensor Com	ponent	Gauge	e Clean		Cond	litio	Clean				Status	pass		
Sensor Com	ponent	Level			Cond	litio	Level				Status	pass		
Sensor Com	ponent	Senso	r Heater		Cond	litio	Not tested	d			Status	pass		
Sensor Com	ponent	Syste	m Memo		Cond	litio	on				Status	pass		

## **Surface Wetness Data Form**

Mfg	Serial Number Ta	Site	Technician	<b>Site Visit Date</b>	Parameter	Owner ID
RM Young	none	PND165	Martin Valvur	07/15/2017	Surface Wetness	illegible

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

## ☐ Manual Test Pass

UseDescription	Test Type	Tfer kOhms	OutputSignal	DAS eng	OutputSignalEngUni	TferUnits	OutputSignalUnit
primary	dry	N/A	0.000	1.01	V	N/A	V
primary	wet	N/A	0.000	1.01	V	N/A	V

<b>Sensor Component</b>	Properly Sited	Condition	Properly sited	Status	pass
Sensor Component	Grid Clean	Condition	Clean	Status	pass
<b>Sensor Component</b>	Grid Angle	Condition	About 30 deg	Status	pass
Sensor Component	Grid Orientation	Condition	North	Status	pass
<b>Sensor Component</b>	Grid Condition	Condition	Fair	Status	pass
<b>Sensor Component</b>	Grid Type	Condition	Grid without holes	Status	pass
Sensor Component	System Memo	Condition	See comments	Status	Fail

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Martin Valvur 07/15/2017 Shelter Temperature Campbell PND165 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** 0.60 1.12 01229 **Tfer ID** 1.00006 0.03191 Slope Intercept 1/23/2017 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	25.64	25.61	0.000	26.7	C	1.12
primary	Temp Mid Range	26.90	26.87	0.000	27.1	С	0.2
primary	Temp Mid Range	27.12	27.09	0.000	27.6	С	0.47
Sensor Com	nponent System Memo		Condition		Status	pass	

### **Infrastructure Data For**

Si	te ID	PND165	Technician	Martin Valvur	Site Visit Date	07/15/2017	
	Shelter M	ake	Shelter Model	S	helter Size		
	Ekto	NT - N - N - N - N - N - N - N - N - N -	8810 (s/n 2149-	22) 6	40 cuft		
		THE SECTION AND THE SECTION AND A		d Section of the section of the sect			

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

## **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Ozone This analyzer diagnostic	PND165	Martin Valvur e the manufacturer's	07/15/2017 s recommended	Cell B Flow value.	ThermoElectron	3360		
Ozone This analyzer diagnostic	PND165 c check is outside	Martin Valvur e the manufacturer's	07/15/2017 s recommended	Cell A Flow value.	ThermoElectron	3360		
Surface Wetness This measurement syste	PND165 m is damaged ar	Martin Valvur	07/15/2017	System Memo	RM Young	2855		✓

## **Field Systems Comments**

1 Parameter: SiteOpsProcComm

The site operator was unable to meet the audit team during the site audit. Audit data was obtained by reviewing the on-site documentation and from previous audits.

2 Parameter: SitingCriteriaCom

Construction at the bottom of the hill and entrance to the site access road has been completed.

3 Parameter: ShelterCleanNotes

The shelter is well maintained.

4 Parameter: MetSensorComme

The RH sensor is now mounted in a shield. Both the RH and temperature sensors are mounted above the shelter. The surface wetness sensor is no longer functioning and always indicates a wet response.

#### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 07/15/2017 PND165 Technician | Martin Valvur Site ID Fremont Lake South **USGS Map EPA** Site Sponsor (agency) Map Scale Private / BLM **Operating Group Map Date** 56-035-9991 AQS# R.M. Young **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude 42.9214 -109.7900 dry, wet **QAPP** Longitude **Deposition Measurement** 2388 Land Use range **QAPP Elevation Meters** 12.75 **Terrain** complex **QAPP Declination** Marginally 2/22/2006 Conforms to MLM **OAPP Declination Date** (307) 367-6584 42.929031 **Site Telephone Audit Latitude** Skyline Drive -109.787796 Site Address 1 **Audit Longitude** Fremont Lake Rd. Site Address 2 **Audit Elevation** 2386 Sublette 10.9 County **Audit Declination** Pinedale, WY City, State **Present** Fire Extinguisher 82941 New in 2015 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 (s/n 2149-22) Ekto **Shelter Size** 640 cuft **✓** Notes The shelter is well maintained. Shelter Clean **✓** Notes Site OK

From Rock Springs take route 191 north to Pinedale. At the south edge of town turn right onto Fremont Lake Rd.

Continue approximately 6.5 miles on the main road, past Fremont Lake. The road changes to Skyline Drive. The

site is visible on a ridge on the right. There is a dirt access road to the site in the summer.

**Driving Directions** 

## **Field Systems Data Form**

F-02058-1500-S2-rev002

Site ID PND165 Technician Martin Valvur Site Visit Date 07/15/2017

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

Construction at the bottom of the hill and entrance to the site access road has been completed.

Fi	eld Systems Data Form	F-02058-1500-S3-rev002
Site	PND165 Technician Martin Valvur	Site Visit Date 07/15/2017
1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	
2	Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind)	
3	Are the tower and sensors plumb?	
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?	Over shelter
5	Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)	Over shelter
6	Is the solar radiation sensor plumb?	
7	Is it sited to avoid shading, or any artificial or reflected light?	
8	Is the rain gauge plumb?	
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	
10	Is the surface wetness sensor sited with the grid surface facing north?	
11	Is it inclined approximately 30 degrees?	
	ovide any additional explanation (photograph or sketch if ne cural or man-made, that may affect the monitoring paramete	cessary) regarding conditions listed above, or any other features, ers:

The RH sensor is now mounted in a shield. Both the RH and temperature sensors are mounted above the shelter. The surface wetness sensor is no longer functioning and always indicates a wet response.

ld Systems Data Form	F-02058-1500-S4-rev002
ID PND165 Technician Martin Valvur	Site Visit Date 07/15/2017
Do all the meterological sensors appear to be intact, in good condition, and well maintained?	
Are the shields for the temperature and RH sensors clean?	
Are the aspirated motors working?	
Is the surface wetness sensor grid clean and undamaged?	
Are the sensor signal and power cable connections protected from the elements and well maintained?	d 🗸
de any additional explanation (photograph or sketch if neces al or man-made, that may affect the monitoring parameters:	essary) regarding conditions listed above, or any other features, s:
i	Do all the meterological sensors appear to be intact, in good condition, and well maintained?  Are all the meteorological sensors operational online, and reporting data?  Are the shields for the temperature and RH sensors clean?  Are the aspirated motors working?  Is the solar radiation sensor's lens clean and free of scratches?  Is the surface wetness sensor grid clean and undamaged?  Are the sensor signal and power cables intact, in good condition, and well maintained?  Are the sensor signal and power cable connections protected from the elements and well maintained?

## Field Systems Data Form F-02058-1500-S5-rev002 PND165 Technician | Martin Valvur Site Visit Date 07/15/2017 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:

# Field Systems Data Form

F-02058-1500-S6-rev002

Site	· ID	PND165	Technician	Martin Valvur		Site Vis	sit Date 07/15/20	17	
	DAS, sei	nsor translators, and	nerinheral equi	nment operation	ns ar	d maintena	ance		
				_					
1	1 Do the DAS instruments appear to be in good condition and well maintained?				<b>V</b>				
2	2 Are all the components of the DAS operational? (printers, modem, backup, etc)				<b>✓</b>				
3	Do the analyzer and sensor signal leads pass through lightning protection circuitry?					Met sensors	s 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	instrument shelter h	ave a stable pov	ver source?	<b>✓</b>				
8	Is the in	strument shelter temp	oerature contro	lled?	<b>✓</b>				
9	Is the m	et tower stable and gr	ounded?			<b>Stable</b>		<b>Grounded</b>	
10	Is the sa	mple tower stable and	d 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, natural or man-made, that may affect the monitoring parameters:									

#### **Field Systems Data Form** F-02058-1500-S7-rev002 PND165 Technician | Martin Valvur Site Visit Date 07/15/2017 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** 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** $\checkmark$ **~ Humidity sensor translator Surge protector** П **V ~ UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device** ~ **✓ Shelter heater** Ozone analyzer **V** $\checkmark$ Filter pack flow controller Shelter air conditioner $\checkmark$ Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF ✓ V ✓ V Site Ops Manual** Feb 2014 **V HASP V** Feb 2014 **✓ Field Ops Manual V** Feb 2014 **Calibration Reports V V** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current?

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

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

#### **Field Systems Data Form** F-02058-1500-S8-rev002 PND165 Site Visit Date 07/15/2017 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 V** Semiannually **V V Automatic Zero/Span Tests** Daily **V** N/A Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests V** N/A **Manual Precision Level Test V V** Weekly **Analyzer Diagnostics Tests ~** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Sample Line Check for Dirt/Water Weekly **~ V Zero Air Desiccant Check** Weekly Do multi-point calibration gases go through the complete

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

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

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

<b>/</b>	Unknown
<b>✓</b>	

SSRF, call-in

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

### Field Systems Data Form F-02058-1500-S9-rev002 PND165 Technician | Martin Valvur Site Visit Date 07/15/2017 Site ID Site operation procedures Is the filter pack being changed every Tuesday as scheduled? ✓ Filter changed afternoons approximately 80% Are the Site Status Report Forms being completed and filed **✓** correctly? No longer required Are data downloads and backups being performed as scheduled? **✓** SSRF Are general observations being made and recorded? How? **~** Are site supplies on-hand and replenished in a timely fashion? SSRF, call-in Are sample flow rates recorded? How? Are samples sent to the lab on a regular schedule in a timely fashion? **✓** 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**

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

**✓** Weekly

Sample Line Check for Dirt/Water

The site operator was unable to meet the audit team during the site audit. Audit data was obtained by reviewing the on-site documentation and from previous audits.

## Field Systems Data Form

## F-02058-1500-S10-rev002

**Site ID** 

PND165

**Technician** Martin Valvur

Site Visit Date 07/15/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	B72MC12	07048
DAS	Campbell	CR3000	2516	000403
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	0000162757	00534
Flow Rate	Apex	AXMC105LPMDPC	illegible	000549
nfrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0844349088	06608
Noy	Teledyne	T200U	101	000795
Ozone	ThermoElectron Inc	49i A1NAA	1009241791	000619
Ozone Standard	ThermoElectron Inc	49i A3NAA	0622717853	000329
Precipitation	Texas Electronics	TR-525i-HT	59576-414	none
Relative Humidity	Vaisala	HMP50	Z4320017	05026
Sample Tower	Aluma Tower	В	AT-81213-J12	000055
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Solar Radiation	Licor	Pyranometer	PY77051	missing
Surface Wetness	RM Young	58101	none	illegible
Temperature	RM Young	41342	14800	06539
Temperature2meter	RM Young	41342VC	12544	06305
Wind Direction	RM Young	05305	39243wdr	00853
Wind Speed	RM Young	05305	39243wsp	00853
Zero air pump	Werther International	C 70/4	000815264	06881

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
BAS	5601-Martin	Valvur-07/17/2017				
1	7/17/2017	DAS	Campbell	none	CR1000	unknown1
2	7/17/2017	elevation	Elevation	none	none	none
3	7/17/2017	Filter pack flow pump	Thomas	none	107CAB18	099800009743
4	7/17/2017	Flow Rate	Omega	none	FMA6518ST-RS232	318559-1
5	7/17/2017	Infrastructure	Infrastructure	none	none	none
6	7/17/2017	Met tower	unknown	none	unknown	none
7	7/17/2017	Ozone	ThermoElectron Inc	L0534684	49i A1NAA	1214552973
8	7/17/2017	Ozone Standard	ThermoElectron Inc	none	49i E3CAA	1214552971
9	7/17/2017	Precipitation	Met One	T15382	385	T15382
10	7/17/2017	Relative Humidity	Vaisala	none	HMP45AC	C2410012
11	7/17/2017	Shelter Temperature	unknown	none	unknown	none
12	7/17/2017	siting criteria	Siting Criteria	none	none	None
13	7/17/2017	Solar Radiation	Licor	none	LI-200	PY47987
14	7/17/2017	Temperature2meter	Vaisala	none	HMP45AC	C2410012
15	7/17/2017	Wind Direction	Met One	none	024	M5198
16	7/17/2017	Wind Speed	Met One	W4806	014	W4806
17	7/17/2017	Zero air pump	Thomas	none	107CAB18	100800033636



## Flow Data Form

Afg	Se	rial Num	iber Ta S	ite	Tecl	nnician	Site Visit I	Date Paran	neter	Owner ID
Omega	3	18559-1		BAS601	Mai	tin Valvur	07/17/2017	Flow F	Rate	none
					1	Mfg	BIOS	F	arameter Flo	w Rate
						Serial Number	148613	1	fer Desc. BIC	S 220-H
					r	Γfer ID	01421			
							4	00450 * 4	,	0.0000
						Slope			ercept	0.00366
						Cert Date	1/25	5/2017 <b>Co</b>	rrCoff	1.0000
DAS 1:			DAS 2:			Cal Factor Z	ero	0.29	98	
A Avg % Diff:	A Max	x % Di	A Avg %I	Dif A Max	% Di	Cal Factor F	ull Scale	0.9	93	
3.98%		4.90%				Rotometer R	eading:		0	
Desc.	Tes	st type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignall	PctDifference
primary	pump		0.000	0.000	0.00	0.000	0.30	l/m	l/m	
primary	leak c		0.000	0.000	0.00	0.000	0.30	l/m	l/m	
primary	test pt		3.129	3.120	0.00	0.000	3.27	1/m	l/m	4.90%
primary	test pt		3.172	3.160	0.00	0.000	3.28	l/m	l/m	3.70%
primary	test pt		3.179	3.170	0.00	0.000	3.28	1/m	l/m	3.34%
Sensor Compo	onent	Leak Tes	t		Condition	1		Status	pass	
Sensor Compe	onent [	Tubing Co	ondition		Condition	Good		Status	pass	
Sensor Compo	onent	Filter Pos	ition		Condition	Poor		Status	Fail	
Sensor Compo	onent	Rotomete	r Condition		Condition	N/A		Status	pass	
Sensor Compe	onent	Moisture	Present		Condition	No moisture pr	resent	Status	pass	
Sensor Compo	onent	Filter Dist	ance		Condition	6.0 cm		Status	pass	
Sensor Component Filter Depth		Condition	-3.0 cm		Status	Fail				
Sensor Compo	onent	Filter Azir	nuth		Condition	30 deg		Status	pass	
Sensor Compo	_				Condition			Status	pass	

## **Ozone Data Form**

Name	Mfg Se	erial Number Ta	Site	Те	chnician		Site Visi	t Date	Parame	ter Owne	er ID	
Intercept   0.22520   Intercept   0.00000   CorrCoff   0.00000   CorrCoff   0.00000   Terr ID   O11110   O111110   O1111110   O111110   O1111110   O11111110   O11111110   O1111110   O11111110   O1111110   O1111110   O1111110   O1111110   O1111110   O1111110   O111	ThermoElectron Inc 1	214552973	BAS601	М	artin Valv	ur	07/17/20	017	Ozone	L0534	1684	
A Avg % Diff: A Max % Di	Intercept 0.2	22520 Intercept	0.00000	D	Serial N		49CPS-7				nary stan	
UseDescription			(D10 ) 15 (	V 70.	Slope			1.00466	Inter	cept	.01298	
UseDescription			oDif A Max	% Di	Cert Da	ite		1/1/2017	Corr	Coff 1	.00000	
primary			Tfer Raw	Tfer	Corr	Si	te	Site	Unit	PctDifference		
	*								Omt	TetBilicience		
primary 5 110.21 109.68 109.60 ppb -0.16% primary 5 110.21 109.68 109.60 ppb -0.07%    Sensor Component Sample Train	•	2	15.26	15.	.17	15				1.45	%	
Primary   S   110.21   109.68   109.60   ppb   -0.07%	primary	3	37.23	37.	.04	36	.98	ppb		-0.16	%	
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 Inlet Filter Condition Condition N/A Status pass Sensor Component Glattery Backup Condition N/A Status pass Sensor Component Offset Condition 1.024 Status pass Sensor Component Span Condition 1.024 Status pass Sensor Component Zero Voltage Condition N/A Status pass Sensor Component Fullscale Voltage Condition N/A Status pass Sensor Component Cell A Freq. Condition N/A Status pass Sensor Component Cell A Noise Condition 0.9 ppb Status pass Sensor Component Cell A Flow Condition 0.66 lpm Status pass Sensor Component Cell A Trip. Condition 45.3 C Status pass Sensor Component Cell B Freq. Condition 45.3 C Status pass Sensor Component Cell B Freq. Condition 75.7 kHz Status pass Sensor Component Cell B Freq. Condition 0.69 lpm Status pass Sensor Component Cell B Freq. Condition 0.69 lpm Status pass Sensor Component Cell B Freq. Condition 0.69 lpm Status pass Sensor Component Cell B Freq. Condition 0.69 lpm Status pass Sensor Component Cell B From. Condition 0.69 lpm Status pass Sensor Component Cell B From. Condition Not tested Status pass												
Sensor Component 22.5 degree rule  Condition  Condition  Clean  Status pass  Sensor Component Inlet Filter Condition  Condition  Condition  Clean  Status pass  Sensor Component Battery Backup  Condition  O.4  Status pass  Sensor Component Offset  Condition  O.4  Status pass  Sensor Component Span  Condition  N/A  Status pass  Sensor Component Fullscale Voltage  Condition  N/A  Status pass  Sensor Component Fullscale Voltage  Condition  N/A  Status pass  Sensor Component Cell A Freq.  Condition  O.9 ppb  Status pass  Sensor Component Cell A Noise  Condition  O.9 ppb  Status pass  Sensor Component Cell A Flow  Condition  Condition  O.66 lpm  Status pass  Sensor Component Cell A Pressure  Condition  Sensor Component Cell B Freq.  Condition  Status pass  Sensor Component Cell B Freq.  Condition  Status pass  Sensor Component Cell B Freq.  Condition  O.6 ppb  Status pass  Sensor Component Cell B Noise  Condition  O.6 ppb  Status pass  Sensor Component Cell B Flow  Condition  Status pass  Sensor Component Cell B Freq.  Condition  Status pass  Sensor Component Cell B Fressure  Condition  Status pass  Sensor Component Cell B Fressure  Condition  Status pass  Sensor Component Cell B Fressure  Condition  Status pass	primary	5	110.21	109	0.68	109	0.60	ppb		-0.07	%	
Sensor Component         Inlet Filter Condition         Condition         Clean         Status         pass           Sensor Component         Battery Backup         Condition         N/A         Status         pass           Sensor Component         Offset         Condition         1.024         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 Freq.         Condition         106.1 kHz         Status         pass           Sensor Component         Cell A Flow         Condition         0.9 ppb         Status         pass           Sensor Component         Cell A Flow         Condition         6.66 lpm         Status         pass           Sensor Component         Cell A Freq.         Condition         45.3 C         Status         Fail           Sensor Component         Cell B Freq.         Condition         75.7 kHz         Status         pass           Sensor Component         Cell B Flow <td><b>Sensor Component</b></td> <td>Sample Train</td> <td></td> <td>Condition</td> <td>on Good</td> <td></td> <td></td> <td></td> <td>Status</td> <td>pass</td> <td></td>	<b>Sensor Component</b>	Sample Train		Condition	on Good				Status	pass		
Sensor Component         Battery Backup         Condition         N/A         Status         pass           Sensor Component         Offset         Condition         1.024         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         106.1 kHz         Status         pass           Sensor Component         Cell A Noise         Condition         0.9 ppb         Status         pass           Sensor Component         Cell A Flow         Condition         0.66 lpm         Status         pass           Sensor Component         Cell A Pressure         Condition         646.2 mmHg         Status         pass           Sensor Component         Cell B Freq.         Condition         75.7 kHz         Status         pass           Sensor Component         Cell B Flow         Condition         0.6 ppb         Status         pass           Sensor Component         Cell B Flow         Condition         645.7 mmHg         Status         pass           Sensor Component         Cell B Tm	Sensor Component	22.5 degree rule		Condition	on				Status	pass		
Sensor Component Offset Condition -0.4 Status pass  Sensor Component Span Condition 1.024 Status pass  Sensor Component Zero Voltage Condition N/A Status pass  Sensor Component Fullscale Voltage Condition N/A Status pass  Sensor Component Cell A Freq. Condition 106.1 kHz Status pass  Sensor Component Cell A Noise Condition 0.9 ppb Status pass  Sensor Component Cell A Flow Condition 0.66 lpm Status pass  Sensor Component Cell A Pressure Condition 646.2 mmHg Status pass  Sensor Component Cell A Tmp. Condition 45.3 C Status Fail  Sensor Component Cell B Freq. Condition 75.7 kHz Status pass  Sensor Component Cell B Noise Condition 0.69 lpm Status pass  Sensor Component Cell B Preq. Condition 0.69 lpm Status pass  Sensor Component Cell B Pressure Condition 0.69 lpm Status pass  Sensor Component Cell B Pressure Condition 0.69 lpm Status pass  Sensor Component Cell B Tmp. Condition 0.69 lpm Status pass  Sensor Component Cell B Tmp. Condition Status pass  Sensor Component Cell B Tmp. Condition Not tested Status pass	Sensor Component	Inlet Filter Condition	n	Conditio	on Clean				Status	pass		
Sensor Component       Span       Condition       1.024       Status       pass         Sensor Component       Zero Voltage       Condition       N/A       Status       pass         Sensor Component       Fullscale Voltage       Condition       N/A       Status       pass         Sensor Component       Cell A Freq.       Condition       0.9 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.66 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       646.2 mmHg       Status       pass         Sensor Component       Cell B Freq.       Condition       645.3 C       Status       Fail         Sensor Component       Cell B Freq.       Condition       0.6 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       O.69 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       645.7 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass	<b>Sensor Component</b>	Battery Backup		Condition	on 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       106.1 kHz       Status       pass         Sensor Component       Cell A Noise       Condition       0.9 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.66 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       646.2 mmHg       Status       pass         Sensor Component       Cell B Freq.       Condition       75.7 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.69 lpm       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	<b>Sensor Component</b>	Offset		Conditio	on -0.4				Status	pass		
Sensor Component       Fullscale Voltage       Condition       N/A       Status       pass         Sensor Component       Cell A Freq.       Condition       106.1 kHz       Status       pass         Sensor Component       Cell A Noise       Condition       0.9 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.66 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       646.2 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       45.3 C       Status       Fail         Sensor Component       Cell B Freq.       Condition       75.7 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.69 lpm       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	<b>Sensor Component</b>	Span		Conditio	ondition 1.024				Status	pass		
Sensor Component       Cell A Freq.       Condition       106.1 kHz       Status       pass         Sensor Component       Cell A Noise       Condition       0.9 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.66 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       646.2 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       75.7 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.69 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       645.7 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass	Sensor Component	Zero Voltage		Condition	ndition N/A				Status	pass		
Sensor ComponentCell A NoiseCondition0.9 ppbStatuspassSensor ComponentCell A FlowCondition0.66 lpmStatuspassSensor ComponentCell A PressureCondition646.2 mmHgStatuspassSensor ComponentCell A Tmp.Condition45.3 CStatusFailSensor ComponentCell B Freq.Condition75.7 kHzStatuspassSensor ComponentCell B NoiseCondition0.6 ppbStatuspassSensor ComponentCell B FlowCondition0.69 lpmStatuspassSensor ComponentCell B PressureCondition645.7 mmHgStatuspassSensor ComponentCell B Tmp.ConditionStatuspassSensor ComponentLine LossConditionNot testedStatuspass	<b>Sensor Component</b>	Fullscale Voltage		Condition	ondition N/A				Status	pass		
Sensor Component       Cell A Flow       Condition       0.66 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       646.2 mmHg       Status       pass         Sensor Component       Cell A Tmp.       Condition       45.3 C       Status       Fail         Sensor Component       Cell B Freq.       Condition       75.7 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.69 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       645.7 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass	<b>Sensor Component</b>	Cell A Freq.		Condition	Condition 106.1 kHz				Status	pass		
Sensor Component       Cell A Pressure       Condition       646.2 mmHg       Status       pass         Sensor Component       Cell A Tmp.       Condition       45.3 C       Status       Fail         Sensor Component       Cell B Freq.       Condition       75.7 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.69 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       645.7 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Not tested       Status       pass	<b>Sensor Component</b>	Cell A Noise		Condition	Condition 0.9 ppb				Status	pass		
Sensor ComponentCell A Tmp.Condition45.3 CStatusFailSensor ComponentCell B Freq.Condition75.7 kHzStatuspassSensor ComponentCell B NoiseCondition0.6 ppbStatuspassSensor ComponentCell B FlowCondition0.69 lpmStatuspassSensor ComponentCell B PressureCondition645.7 mmHgStatuspassSensor ComponentCell B Tmp.ConditionStatuspassSensor ComponentLine LossConditionNot testedStatuspass	Sensor Component	Cell A Flow		Condition	on 0.66 l	pm			Status	pass		
Sensor Component       Cell B Freq.       Condition       75.7 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.69 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       645.7 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	on 646.2	mmHg			Status	pass		
Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.69 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       645.7 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	on 45.3 (				Status	Fail		
Sensor Component       Cell B Flow       Condition       0.69 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       645.7 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass         Sensor Component       Line Loss       Condition       Not tested       Status       pass	Sensor Component	Cell B Freq.		Condition	on 75.7 k	Hz			Status	pass		
Sensor Component       Cell B Pressure       Condition       645.7 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	0.6 pp	b			Status	pass		
Sensor Component       Cell B Tmp.       Condition       Status pass         Sensor Component       Line Loss       Condition       Not tested       Status pass	Sensor Component	t Cell B Flow		Condition	on 0.69 I	pm			Status	pass		
Sensor Component Line Loss Condition Not tested Status pass	Sensor Component	Cell B Pressure		Condition	ion 645.7 mmHg				Status	pass		
	Sensor Component	t Cell B Tmp.		Condition	ion				Status	pass		
	Sensor Component	Line Loss		Condition	on Not te	sted			Status	pass		
Sensor Component System Memo Condition Status pass	Sensor Component	System Memo		Condition	on				Status	pass		

#### **Wind Speed Data Form** Mfg Serial Number Ta **Technician** Site Visit Date Parameter Owner ID Wind Speed W4806 Met One W4806 BAS601 Martin Valvur 07/17/2017 Parameter wind speed Mfg RM Young Tfer Desc. wind speed motor (I **Serial Number** 01261 Tfer ID 1.00000 0.00000 **Slope Intercept** N/A Prop or Cups SN 0.4 **to** 0.4 **Prop or Cups Torque** 1/26/2017 **Cert Date** CorrCoff 1.00000 **Prop Correction Fact** N/A RM Young Parameter wind speed Mfg CA4353 Tfer Desc. wind speed motor (h **Serial Number** 01457 Tfer ID 1.00000 0.00000 **Slope Intercept** 4/13/2017 1.00000 **Cert Date** CorrCoff **DAS 1: DAS 2:** Low Range **High Range** Low Range **High Range** 0.18 1.03% Abs Avg Err 0.30 2.61% Abs Max Er UseDescription: Input RPM Out V Diff/ % Diff Diff WsM Input Device Input m/s DAS m/s primary none 0 0.20 0.0 0.0 -0.2001261 40 1.67 0.0 1.7 -0.02 primary primary 01261 80 2.75 0.0 2.5 -0.30 4.26 0.0 4.5 0.19 01261 140 primary 6.1 primary 01261 210 6.07 0.0 -0.33% 400 11.11 0.0 11.2 1.17% primary 01457 22.22 01457 800 0.0 21.6 -2.61% primary primary 01457 1800 48.44 0.0 48.4 0.00% Sensor Component | Condition **Condition** Good **Status** pass Sensor Component Prop or Cups Condition **Condition** Good **Status** pass Sensor Component | Sensor Heater **Condition** N/A **Status** pass Sensor Component | Torque **Status** pass Condition

**Condition** Plumb

**Condition** 

**Status** pass

Status pass

Sensor Component | Sensor Plumb

**Sensor Component** System Memo

#### Wind Direction Data Form **Technician** Site Visit Date Parameter Owner ID Mfg Serial Number Ta BAS601 Martin Valvur Wind Direction Met One M5198 07/17/2017 none Mfg RM Young Parameter wind direction Tfer Desc. wind direction wheel **Serial Number** 01266 Tfer ID Slope 1.00000 **Intercept** 0.00000 Vane SN: N/A C. A. Align. deg. true: 5 to 182 5 VaneTorque 1/1/2006 1.00000 Cert Date CorrCoff Parameter wind direction Ushikata Mfg **Serial Number** 190037 Tfer Desc. transit Tfer ID 01265 1.00000 0.00000 **Slope Intercept Cert Date** 2/8/2017 CorrCoff 1.00000 **DAS 1: DAS 2: Orientation Linearity: Orientation Linearity:** 1.8 Abs Avg Err Abs Max Er 3 UseDescription TferID Input Raw Linearity Output V Output Deg. Difference Change Error 0 primary 01265 2 0.000 2 0 01265 92 0.000 91 1 1 primary 01265 182 0.000 179 3 3 primary 01265 272 0.000 269 3 3 primary Sensor Component | Condition **Condition** Good Status pass **Condition** Good **Status** pass **Sensor Component** Mast Sensor Component | Sensor Heater **Condition** N/A **Status** pass Sensor Component | Sensor Plumb Status pass **Condition** Plumb Sensor Component | Torque **Condition** Good Status pass Sensor Component Vane Condition **Condition** Good **Status** pass

**Condition** See comments

**Sensor Component** System Memo

Status pass

#### 2 Meter Temperature Data Form Calc. Difference Serial Number Ta **Technician** Site Visit Date Parameter Mfg Site **Owner ID** BAS601 Martin Valvur 07/17/2017 Vaisala C2410012 Temperature2meter none Parameter Temperature Mfg Fluke Tfer Desc. RTD 3275143 **Serial Number** 01229 Tfer ID **Slope** 1.00006 **Intercept** 0.03191 **DAS 1: DAS 2:** 1/23/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 2.31 3.17 Test type UseDescription InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit Difference primary Temp Low Rang 4.50 4.47 0.000 7.20 C 2.73 Temp Mid Rang 24.50 24.47 0.000 25.50 C 1.03 primary primary Temp High Rang 42.70 42.67 0.000 39.50 C -3.17Sensor Component | Properly Sited **Condition** Properly sited **Status** pass Condition Clean Sensor Component | Shield **Status** pass Status pass Sensor Component Blower **Condition** N/A Sensor Component Blower Status Switch Status pass **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 BAS601 Martin Valvur 07/17/2017 Relative Humidity Vaisala C2410012 none Mfg Rotronic **Parameter** Relative Humidity Tfer Desc. GTL 75296 **Serial Number** 01220 **Tfer ID** 0.06850 **Slope** 0.99780 **Intercept Cert Date** 1/23/2017 0.99994 CorrCoff **DAS 1: DAS 2:** Low Range **High Range** Low Range **High Range** 1.3 7.4 **Abs Avg Err** 1.4 7.4 **Abs Max Er** UseDesc. Test type Device Input RH GTL Raw RH Corr. **DAS Volts** DAS %RH Difference RH Low Range GTL 0.000 primary 32.8 32.6 32.8 31.4 -1.4 52.4 0.000 -1.1 primary RH Low Range GTL 52.9 52.9 51.8 primary RH High Range GTL 93.6 89.5 93.6 0.000 86.2 -7.4 Condition Clean Status pass Sensor Component | RH Filter 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

# **Precipitation Data Form**

Mfg	S	erial N	Number Ta	Site		Tec	chnician		Site	Visit Date	Paramet	er	Owner ID
Met One	٦	Γ15382	2	BAS601		Ма	artin Valvur		07/	17/2017	Precipitat	ion	T15382
							Mfg		PMF	)	Par	ameter Pre	ecipitation
DAS 1:			<b>DAS 2:</b>				Serial Nun	ıber	Non	е	Tfe	r Desc. 250	Oml graduate
A Avg % Diff				Dif A N	Max % Di	,	Tfer ID		0124	19			
9.7%		14.5	i%								_		
							Slope		L	1.0000	0 Interd	eept	0.00000
							Cert Date			4/26/201	3 Corr	Coff	1.00000
UseDesc.	Test t	vne	TferVolume	Iteration	TimePerT	in [	Eq.Ht	DAS	eng	Ea.HtUnit	OSE Uni	t TferUnits	PctDifference
	test 1	J PC	250	1	8 - 10 sec	-	7.67	6.:		mm	mm	ml	-14.5%
primary	test 2		250	2	13 - 15 se	ec	7.67	7.	11	mm	mm	ml	-7.3%
primary	test 3		250	3	13 - 15 se	ec	7.67	7.	11	mm	mm	ml	-7.3%
Sensor Com	ponent	Prope	erly Sited		Cond	litio	n Properly	sited			Status	ass	
Sensor Com	ponent	Gaug	e Drain Scree	en	Cond	litio	n Installed				Status F	ass	
Sensor Com	ponent	Funne	el Clean		Cond	litio	n Clean				<b>Status</b> F	ass	
Sensor Com	ponent	Cond	ition		Cond	litio	n Good				Status F	ass	
Sensor Com	ponent	Gaug	e Screen		Cond	litio	n Installed				Status p	ass	
Sensor Com	Sensor Component Gauge Clean			Cond	litio	Clean				Status pass			
Sensor Com	Sensor Component Level			Cond	litio	on Level				Status pass			
Sensor Com	ponent	Sense	or Heater		Cond	litio	on N/A				Status pass		
Sensor Com	ponent	Syste	m Memo		Cond	litio	n				<b>Status</b> F	ass	

#### **Solar Radiation Data Form** Serial Number Ta **Technician** Site Visit Date Parameter **Owner ID** Mfg PY47987 BAS601 Martin Valvur 07/17/2017 Solar Radiation Licor none Mfg **Eppley** Parameter solar radiation Tfer Desc. SR transfer sensor 23824 **Serial Number** 01247 **Tfer ID** 1.00000 0.00000 **Slope Intercept DAS 1: DAS 2:** % Diff of Avg %Diff of Max %Diff of Avg %Diff of Max 2/16/2017 1.00000 **Cert Date** CorrCoff 2.5% 4.4% 0.0% 0.0% Tfer Corr UseDescription Measure Date MeasureTime PctDifference Tfer Raw DAS w/m2 primary 7/17/2017 7:00 443 443 453 2.2% 0.5% 7/17/2017 8:00 621 621 624 primary 793 primary 7/17/2017 9:00 793 783 -1.2% -3.5% primary 7/17/2017 10:00 893 893 862 7/17/2017 959 920 -4.0% primary 11:00 958 7/17/2017 12:00 985 985 942 -4.4% primary 7/17/2017 13:00 809 809 783 -3.2% primary Sensor Component | Sensor Clean Condition Clean Status pass Sensor Component | Sensor Level Condition Level **Status** pass Sensor Component | Properly Sited Condition Properly sited Status pass Sensor Component | System Memo Condition Status pass

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Martin Valvur 07/17/2017 Shelter Temperature BAS601 unknown none none **DAS 2: DAS 1:** Mfg Fluke Parameter Shelter Temperatur Abs Avg Err **Abs Max Er** Abs Avg Err **Abs Max Er** Tfer Desc. RTD 3275143 **Serial Number** 2.16 2.72 01229 **Tfer ID** 1.00006 0.03191 Slope Intercept 1/23/2017 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	27.41	27.38	0.000	30.1	C	2.72
primary	Temp Mid Range	28.89	28.86	0.000	30.4	С	1.54
primary	Temp Mid Range	28.52	28.49	0.000	30.7	C	2.21
Sensor Component System Memo Condition Status pass							

### **Infrastructure Data For**

S	ite ID	BAS601	Technician Martin	/alvur Site Visit Date 07/17/2017	
	Shelter M	<b>I</b> ake	Shelter Model	Shelter Size	
	Shelter O	ne	AR 263648	24 cuft	
	Shelter N	<b>Iake</b>	Shelter Model	Shelter Size	

Sensor Component	Sample Tower Type	Condition	Other	Status	pass
Sensor Component	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
Sensor Component	Shelter Temp Control	Condition	Functioning	Status	pass
<b>Sensor Component</b>	Rotometer	Condition	Not 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	N/A	Status	pass
Sensor Component	Signal Cable	Condition	Good	Status	pass
Sensor Component	Tubing Type	Condition	3/8 teflon	Status	pass
Sensor Component	Sample Train	Condition	Good	Status	pass

## **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No	. Haza	rd Problem
Flow Rate	BAS601	Martin Valvur	07/17/2017	Filter Depth	Omega	3806		<b>✓</b>
The filter attachment orientation.	nt plate is mounted	too low in the enclos	sure resulting in	the filter being expe	osed to wind-dr	iven rain and in th	ne standard	geometric
Ozone	BAS601	Martin Valvur	07/17/2017	Cell A Tmp.	ThermoElect	ron 3802		
This analyzer diagn	ostic check is outsi	de the manufacturer'	s recommended	value				

## **Field Systems Comments**

### 1 Parameter: SiteOpsProcComm

There are no clean spare filter caps or Ziploc filter bags on site as was the case during the previous site audit visit. The bag and caps for the received filter are being used to send the removed filter back to the lab. The importance of keeping the shipping material with each filter was discussed with the operator. Some additional information regarding completion of the SSRF was provided to the site operator.

#### 2 Parameter: SiteOpsProcedures

The ozone inlet filter is replaced each month.

### 3 Parameter: DocumentationCo

The filter pack chain-of-custody labels are not being used.

### 4 Parameter: ShelterCleanNotes

The enclosure houses the ozone, DAS, and MFC only.

#### 5 Parameter: MetSensorComme

Some objects violate the 45 degree rule for the tipping bucket rain gage. The Temperature shield is mounted on the south side of the tower tripod at 2 meters.

### 6 Parameter: MetOpMaintCom

The site utilizes a combination sensor for humidity and temperature. It was audited without submersion in a water bath. The temperature sensor is mounted at approximately 2 meters from the ground. The accuracy of the DAS was not tested due to no available channels for the test equipment. The wind direction sensor was not functioning upon arrival for the site audit. The site operator provided a replacement sensor which had been shipped from ARS. EEMS assisted the operator with the installation of the replacement sensor. The wind direction audit results are provided for the replacement sensor.

#### Field Systems Data Form F-02058-1500-S1-rev002 BAS601 Technician Martin Valvur Site Visit Date 07/17/2017 Site ID **USGS Map EPA** Site Sponsor (agency) Map Scale BLM **Operating Group Map Date** 56-003-0002 AQS# **Meteorological Type Air Pollutant Analyzer QAPP** Latitude **Deposition Measurement QAPP** Longitude Land Use **QAPP Elevation Meters Terrain QAPP Declination** Conforms to MLM **OAPP Declination Date** 44.279947 **Site Telephone Audit Latitude** -108.04082 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 1241 Big Horn 10.3 County **Audit Declination** Basin, WY City, State **Present** Fire Extinguisher 82410 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 Model AR 263648 24 cuft Make Shelter One **Shelter Size ✓** Notes The enclosure houses the ozone, DAS, and MFC only. Shelter Clean Site OK Notes **Driving Directions BAS601** Technician Martin Valvur Site Visit Date 07/17/2017 Site ID **USGS Map** EPA Site Sponsor (agency)

**Map Scale** 

BLM

**Operating Group** 

AQS#	56-003-0002	Map Date	
<b>Meteorological Type</b>			
Air Pollutant Analyzer		QAPP Latitude	
<b>Deposition Measurement</b>		<b>QAPP Longitude</b>	
Land Use		<b>QAPP Elevation Meters</b>	
Terrain		<b>QAPP Declination</b>	
Conforms to MLM		<b>QAPP Declination Date</b>	
Site Telephone		Audit Latitude	44.279947
Site Address 1		Audit Longitude	-108.04082
Site Address 2		<b>Audit Elevation</b>	1241
County	Big Horn	<b>Audit Declination</b>	10.3
City, State	Basin, WY	Present	
Zip Code	82410	Fire Extinguisher	
Time Zone	Mountain	First Aid Kit	
<b>Primary Operator</b>		Safety Glasses	
Primary Op. Phone #		Safety Hard Hat	
Primary Op. E-mail		Climbing Belt	
<b>Backup Operator</b>		Security Fence	
Backup Op. Phone #		Secure Shelter	
Backup Op. E-mail		Stable Entry Step	
<b>Shelter Working Room</b> □	Make Mo	odel	Shelter Size
Shelter Clean	Notes		
Site OK	Notes		
<b>Driving Directions</b>			

## **Field Systems Data Form**

F-02058-1500-S2-rev002

Site ID BAS601 Technician Martin Valvur Site Visit Date 07/17/2017

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

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

Site ID BAS601 Technician Martin Valvur Site Visit Date 07/17/2017

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

Siting Distances OK			
Siting Criteria Commen	nt		

Field Systems Data Form					F-02058-1500-S3-rev002					
Site	· ID	BAS601	<b>Technician</b> Martin Va	lvur	Site Visit Date 07/17/2017					
1		nd speed and directi	on sensors sited so as to avo	id ✓						
2	(i.e. wir	nd sensors should be	so as to minimize tower effect mounted atop the tower or n >2x the max diameter of the ind)	on a						
3	Are the	e tower and sensors	plumb?	✓						
4			s pointed north or positione s such as buildings, walls, etc		Pointing south					
5	condition surface	ons? (i.e. ground be	ensors sited to avoid unnatu low sensors should be natura ped. Ridges, hollows, and are voided)	al						
6	Is the s	olar radiation senso	r plumb?	<b>✓</b>						
7	Is it site	ed to avoid shading,	or any artificial or reflected	·						
8	Is the r	ain gauge plumb?		✓						
9	Is it site towers,		g effects from buildings, tre	es,	45 degree rule violation					
10	Is the st		or sited with the grid surface	e	N/A					
11	Is it in	clined approximatel	y 30 degrees?	<b>✓</b>	N/A					
Son	ural or 1	nan-made, that may	affect the monitoring para	meters:	regarding conditions listed above, or any other features, ne Temperature shield is mounted on the south side of the tower					
Site		BAS601	Technician Martin Va	lvur	Site Visit Date 07/17/2017					
1		nd speed and directi nfluenced by obstru	on sensors sited so as to avo	id 🗆						
2	(i.e. wir	nd sensors should be	so as to minimize tower effer e mounted atop the tower or n >2x the max diameter of the ind)	on a						

3	Are the tower and sensors plumb?	
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?	
5	Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)	
6	Is the solar radiation sensor plumb?	
7	Is it sited to avoid shading, or any artificial or reflected light?	
8	Is the rain gauge plumb?	
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	
10	Is the surface wetness sensor sited with the grid surface facing north?	
11	Is it inclined approximately 30 degrees?	
	ovide any additional explanation (photograph or sketch if nece ural or man-made, that may affect the monitoring parameters	) regarding conditions listed above, or any other features,

Fi	eld Sy	stems Data Fo	orm				F-020	58-15	500-S4-rev002
Site	e ID	BAS601	Technician	Martin Valvur		Site Visit Date	07/17/2017		
1				intact, in good	<b>✓</b>				
2			sors operationa	l online, and	<b>✓</b>				
3	Do all the meterological sensors appear to be intact, in good condition, and well maintained?  Are all the meteorological sensors operational online, and reporting data?  Are the shields for the temperature and RH sensors clean?  Are the shields for the temperature and free of scratches?  Is the solar radiation sensor's lens clean and free of scratches?  Is the surface wetness sensor grid clean and undamaged?  Are the sensor signal and power cables intact, in good condition, and well maintained?  Are the sensor signal and power cable connections protected from the elements and well maintained?  Are the sensor signal and power cable connections protected from the elements and well maintained?  Are the sensor signal and power cable connections protected from the account of the tequipment of the sensor signal and power cable connections protected from the elements and well maintained?  Are the sensor signal and power cable connections protected from the elements and well maintained?  Are the sensor signal and power cables intact, in good condition, and well maintained?  Are the sensor signal and power cables intact, in good condition, and well maintained?  Are the sensor signal and power cables intact, in good condition, and well maintained?  Are the sensor signal and power cables intact, in good condition, and well maintained?  Are the sensor signal and power cables intact, in good condition, and well maintained?  Are the sensor signal and power cables intact, in good conditions listed above, or any other features, tural or man-made, that may affect the monitoring parameters:  e site utilizes a combination sensor for humidity and temperature. It was audited without submersion in a water bath. The temperature is repeated proparator provided a replacement sensor with the installation of the replacement sensor. The wind direction sensor was not functioning upon arrival for the site audit. The site operator provided a replacement sensor. The wind direction sensor was not functioning upon arrival for the site audit. T								
4	Site ID BAS601 Technician Martin Valvur Site Visit Date 07/17/2017  1 Do all the meterological sensors appear to be intact, in good condition, and well maintained? 2 Are all the meteorological sensors operational online, and reporting data? 3 Are the shields for the temperature and RH sensors clean? 4 Are the aspirated motors working? 5 Is the solar radiation sensor's lens clean and free of scratches? 6 Is the surface wetness sensor grid clean and undamaged? 7 Are the sensor signal and power cables intact, in good condition, and well maintained? 8 Are the sensor signal and power cable connections protected								
5			lens clean and f	free of	<b>✓</b>				
6	Is the su	rface wetness sensor ş	grid clean and u	ındamaged?	<b>✓</b>	N/A			
7				, in good	<b>✓</b>				
8				ctions protected	<b>✓</b>				
					sary)	regarding conditi	ons listed abo	ove, or aı	ny other features,
sens test e sens	or is mour equipment or which h	nted at approximately 2 The wind direction se and been shipped from the	meters from the nsor was not fun ARS. EEMS ass	ground. The acc ctioning upon arr	uracy ival fo	of the DAS was no or the site audit. Th	ot tested due to e site operato	o no avail r provided	lable channels for the day a replacement
Site	e ID	BAS601	Technician	Martin Valvur		Site Visit Date	07/17/2017		

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

### **Field Systems Data Form** F-02058-1500-S5-rev002 **BAS601** Site Visit Date 07/17/2017 Site ID Technician | Martin Valvur Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E **~** Do the sample inlets have at least a 270 degree arc of unrestricted airflow? **~** Are the sample inlets 3 - 15 meters above the ground? **~** Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and maintenance **~** Do the analyzers and equipment appear to be in good condition and well maintained? **V** Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. 1/4 teflon by 15 meters Describe dry dep sample tube. 3/8 nylon by 15 meters At inlet only Are in-line filters used in the ozone sample line? (if ves indicate location) **~** Are sample lines clean, free of kinks, moisture, and obstructions? **V** Is the zero air supply desiccant unsaturated? Not present Are there moisture traps in the sample lines? Is there a rotometer in the dry deposition filter line, and is it Not present 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: Site Visit Date 07/17/2017 **BAS601** Technician | Martin Valvur 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?

and 20 meters from trees?

Are the sample inlets 3 - 15 meters above the ground?

Are the sample inlets > 1 meter from any major obstruction,

	Pollutant analyzers and deposition equipment operations and	<u>maintenance</u>	
1	Do the analyzers and equipment appear to be in good condition and well maintained?		
2	Are the analyzers and monitors operational, on-line, and reporting data?		
3	Describe ozone sample tube.		
4	Describe dry dep sample tube.		
5	Are in-line filters used in the ozone sample line? (if yes indicate location)		
6	Are sample lines clean, free of kinks, moisture, and obstructions?		
7	Is the zero air supply desiccant unsaturated?		
8	Are there moisture traps in the sample lines?		
9	Is there a rotometer in the dry deposition filter line, and is it clean?		
	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 BAS601 Technician | Martin Valvur Site Visit Date 07/17/2017 Site ID DAS, sensor translators, and peripheral equipment operations and maintenance Do the DAS instruments appear to be in good condition and well maintained? **✓** Are all the components of the DAS operational? (printers, modem, backup, etc) Not present Do the analyzer and sensor signal leads pass through lightning protection circuitry? **✓** Are the signal connections protected from the weather and well maintained? **✓** Are the signal leads connected to the correct DAS channel? Are the DAS, sensor translators, and shelter properly **~** grounded? **✓** Does the instrument shelter have a stable power source? 7 ~ Is the instrument shelter temperature controlled? Grounded **Stable** Is the met tower stable and grounded? **✓ V** Is the sample tower stable and grounded? **V V** 11 Tower comments?

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

Site ID BAS601 Technician Martin Valvur Site Visit Date 07/17/2017

DAS, sensor translators, and peripheral equipment operations and maintenance

1	Do the DAS instruments appear to be in good condition and well maintained?				
2	Are all the components of the DAS operational? (printers, modem, backup, etc)				
3	Do the analyzer and sensor signal leads pass through lightning protection circuitry?				
4	Are the signal connections protected from the weather and well maintained?				
5	Are the signal leads connected to the correct DAS channel?				
6	Are the DAS, sensor translators, and shelter properly grounded?				
7	Does the instrument shelter have a stable power source?				
8	Is the instrument shelter temperature controlled?				
9	Is the met tower stable and grounded?	Stable		Grounded	
10	Is the sample tower stable and grounded?				
11	Tower comments?				
	wide any additional explanation (photograph or sketch if necessary and or man-made, that may affect the monitoring parameters	ry) regarding	g conditions liste	d above, or an	y other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 **BAS601** Site Visit Date 07/17/2017 Site ID Technician | Martin Valvur **Documentation** Does the site have the required instrument and equipment manuals? Yes No N/A No N/A Yes $\overline{\mathbf{V}}$ Wind speed sensor **Data logger V** ✓ П Wind direction sensor **Data logger V V** Temperature sensor Strip chart recorder **V** П **V** Relative humidity sensor Computer **V** П **V** Modem Solar radiation sensor П П **V V** Surface wetness sensor **Printer V V** Wind sensor translator Zero air pump **V Temperature translator V** Filter flow pump **V V** Humidity sensor translator **Surge protector** П **~ UPS V Solar radiation translator V V** Tipping bucket rain gauge **Lightning protection device V V Shelter heater** Ozone analyzer ~ $\checkmark$ Shelter air conditioner Filter pack flow controller **~** Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log** Not present **✓ V SSRF V Site Ops Manual** in BLM office **V HASP** in BLM office **Field Ops Manual V** in BLM office **Calibration Reports** Not present Ozone z/s/p Control Charts Preventive maintenance schedul Not present 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? 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: The filter pack chain-of-custody labels are not being used. Technician | Martin Valvur **BAS601** Site Visit Date 07/17/2017

Site ID

**Documentation** 

#### **Field Systems Data Form** F-02058-1500-S8-rev002 **BAS601** Technician Martin Valvur Site Visit Date 07/17/2017 Site ID Site operation procedures Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **V** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed** Frequency **Compliant ✓ V** Semiannually **Multipoint Calibrations V V** Weekly **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** Monthly **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **OC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V** Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests V Manual Precision Level Test V V** Weekly **Analyzer Diagnostics Tests V** Monthly **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V** Sample Line Check for Dirt/Water **V ~** Weekly **Zero Air Desiccant Check** Unknown Do multi-point calibration gases go through the complete sample train including all filters? **✓** Do automatic and manual z/s/p gasses go through the complete sample train including all filters?

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

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

reported? If yes, how?

The ozone inte	et filter is replaced each	month.				
Site ID	BAS601	Technician	Martin Valvur	Site Visit Date	07/17/2017	

Unknown

### Field Systems Data Form F-02058-1500-S9-rev002 **BAS601** Technician | Martin Valvur Site Visit Date 07/17/2017 Site ID Site operation procedures Is the filter pack being changed every Tuesday as scheduled? Filter changed mornings 90% of the time Are the Site Status Report Forms being completed and filed 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 fashion? ✓ One set of gloves only Are filters protected from contamination during handling and shipping? How? Are the site conditions reported regularly to the field operations manager or staff? QC Check Performed **Frequency Compliant V** ✓ Semiannually **Multi-point MFC Calibrations V** Weekly Flow System Leak Checks **Filter Pack Inspection V ✓** Weekly **Flow Rate Setting Checks** Not present **Visual Check of Flow Rate Rotometer V** ✓ Semiannually **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, natural or man-made, that may affect the monitoring parameters: There are no clean spare filter caps or Ziploc filter bags on site as was the case during the previous site audit visit. The bag and caps for the received filter are being used to send the removed filter back to the lab. The importance of keeping the shipping material with each filter was discussed with the operator. Some additional information regarding completion of the SSRF was provided to the site operator. Site Visit Date 07/17/2017 **BAS601** Technician | Martin Valvur Site ID

Site operation procedures

## **Field Systems Data Form**

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

Site ID BAS601 Technician Martin Valvur Site Vis

Site Visit Date 07/17/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR1000	unknown1	none
elevation	Elevation	none	none	none
Filter pack flow pump	Thomas	107CAB18	099800009743	none
Flow Rate	Omega	FMA6518ST-RS232	318559-1	none
Infrastructure	Infrastructure	none	none	none
Met tower	unknown	unknown	none	none
Ozone	ThermoElectron Inc	49i A1NAA	1214552973	L0534684
Ozone Standard	ThermoElectron Inc	49i E3CAA	1214552971	none
Precipitation	Met One	385	T15382	T15382
Relative Humidity	Vaisala	HMP45AC	C2410012	none
Shelter Temperature	unknown	unknown	none	none
siting criteria	Siting Criteria	none	None	none
Solar Radiation	Licor	LI-200	PY47987	none
Temperature2meter	Vaisala	HMP45AC	C2410012	none
Wind Direction	Met One	024	M5198	none
Wind Speed	Met One	014	W4806	W4806
Zero air pump	Thomas	107CAB18	100800033636	none

Site ID BAS601 Technician Martin Valvur Site Visit Date 07/17/2017

Site Visit Sensors

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number							
VPI	VPI120-Sandy Grenville-07/18/2017												
1	7/18/2017	Computer	Dell	07032	Inspiron 15	Unknown							
2	7/18/2017	DAS	Campbell	000402	CR3000	2514							
3	7/18/2017	Elevation	Elevation	None	1	None							
4	7/18/2017	Filter pack flow pump	Thomas	02751	107CAB18	1192001884							
5	7/18/2017	Flow Rate	Apex	000591	AXMC105LPMDPCV	illegible							
6	7/18/2017	Infrastructure	Infrastructure	none	none	none							
7	7/18/2017	Modem	Raven	06586	V4221-V	0844350237							
8	7/18/2017	Ozone	ThermoElectron Inc	000628	49i A1NAA	1009241786							
9	7/18/2017	Ozone Standard	ThermoElectron Inc	000443	49i A3NAA	CM08200019							
10	7/18/2017	Sample Tower	Aluma Tower	none	В	unknown							
11	7/18/2017	Shelter Temperature	Campbell	none	107-L	none							
12	7/18/2017	Siting Criteria	Siting Criteria	None	1	None							
13	7/18/2017	Temperature	RM Young	04318	41342	4037							
14	7/18/2017	Zero air pump	Werther International	06907	C 70/4	000829179							

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2514 VPI120 Sandy Grenville 07/18/2017 DAS Primary Das Date: 7 /18/2017 **Audit Date** 7 /18/2017 Datel Parameter DAS Mfg 15:11:02 15:11:02 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** Das Day: 199 **Audit Day** 199 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** 1/23/2017 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 0.0000 0.0000 0.0000 0.0000 V V 7 0.1000 0.0999 0.0999 0.00007 0.3000 0.2997 0.2998 V V 0.0001 7 0.5000 0.4996 0.4996 V V 0.00007 0.7000 V V 0.0000 0.6996 0.6996 7 V V 0.9000 0.8994 0.8994 0.00007 1.0000 0.9992 0.9993 V V 0.0001

## Flow Data Form

Mfg	Serial Nun	nber Ta	Site	Teo	chnician	Site Visit I	Oate Param	eter	Owner ID
Apex	illegible		VPI120	Sa	ndy Grenville	07/18/2017	Flow R	ate	000591
					Mfg	BIOS	P	arameter Flo	w Rate
					Serial Number	103471	Т	fer Desc. ne	xus
					Tfer ID	01420			
					Slope	0.9	99825 <b>Int</b> e	ercept	0.00497
					Cert Date	2/7	7/2017 <b>Cor</b>	rCoff	0.99991
					Mfg	BIOS	P	arameter Flo	w Rate
					Serial Number	103424		fer Desc. BIG	
					Tfer ID	01410			
					Slope	0.:	99825 <b>Int</b> e	ercept	0.00497
					Cert Date			rCoff	0.99991
DAS 1:		DAS 2:			Cal Factor Z		-0.0		
A Avg % Diff:		A Avg %	Dif A Max	% Di	Cal Factor F		0.9		
0.67%	0.67%				Rotometer R	eading:	1.4	15	
Desc.	Test type	Input 1/n	n Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	l PctDifference
primary	pump off	0.000	0.000	0.02	0.000	0.01	1/m	1/m	
primary	leak check	0.000	0.000	0.01	0.000	0.00	1/m	1/m	
primary	test pt 1	1.489	1.490	1.51	0.000	1.50	1/m	l/m	0.67%
primary	test pt 2	1.489	1.490	1.51	0.000	1.50	1/m	l/m	0.67%
primary	test pt 3	1.493	1.490	1.51	0.000	1.50	1/m	l/m	0.67%
Sensor Comp	onent Leak Tes	st		Conditio	n		Status	pass	
Sensor Comp	onent Tubing C	Condition		Conditio	n Good	Status		pass	
Sensor Comp	onent Filter Pos	sition		Conditio	n Good	Status		pass	
Sensor Comp	onent Rotomet	er Conditio	n	Conditio	n Clean and dry		Status	pass	
Sensor Comp	onent Moisture	Present		Conditio	No moisture p	resent	Status	pass	
Sensor Comp	onent Filter Dis	tance		Conditio	5.5 cm		Status pass		
Sensor Comp	onent Filter De	pth		Conditio	1.5 cm		Status	pass	
Sensor Comp	onent Filter Azi	muth		Conditio	180 deg		Status	pass	
Sensor Component System Memo		Conditio	n		Status	pass			

## **Ozone Data Form**

Slope:         0.99078         Slope:         0.00000           Intercept         0.53153         Intercept         0.00000           CorrCoff         0.99999         CorrCoff         0.00000	Mfg Serial N Tfer ID	nville	07/18/2017 ThermoElectror	Ozone	000628
Intercept         0.53153         Intercept         0.00000	Serial N		ThermoElectror		
DAS 1: A Avg % Diff: A Max % Di A Avg %Dif A Max % Di	Slope Cert Da		517112175 01111 1.0029 3/21/20	Tfo  Inter	
0.6%	ocit Bu			COIT	
	er Corr	Si		te Unit	PctDifference
1 2	0.43 4.50	0.4	1.1		1.24%
1 3	4.56	34.	1.1		0.46%
1 '	7.37	67.			-0.45%
primary 5 110.04 10	09.30	109	.00 ppb		-0.27%
Sensor Component Sample Train Condit	tion Good			Status	pass
Sensor Component 22.5 degree rule Condit	tion			Status	pass
Sensor Component Inlet Filter Condition Condit	tion Clean			Status	pass
Sensor Component Battery Backup Condit	tion N/A			Status	pass
Sensor Component Offset Condit	<b>tion</b> 0.60			Status	pass
Sensor Component Span Condit	tion 1.007	ion 1.007			pass
Sensor Component Zero Voltage Condit	tion N/A			Status	pass
Sensor Component Fullscale Voltage Condit	tion N/A	N/A		Status	pass
Sensor Component Cell A Freq. Condit	Freq. Condition 79.1 kHz			Status	pass
Sensor Component Cell A Noise Condit	se Condition 0.68 ppb			Status	pass
Sensor Component Cell A Flow Condit	tion 0.68 lpm			Status	pass
Sensor Component Cell A Pressure Condit	tion 664.8	mmHg		Status	pass
Sensor Component Cell A Tmp. Condit	<b>tion</b> 37.4 C	;		Status	pass
Sensor Component Cell B Freq. Condit	<b>tion</b> 85.4 k	Hz		Status	pass
Sensor Component Cell B Noise Condit	<b>tion</b> 0.68 p	pb		Status	pass
Sensor Component Cell B Flow Condit	<b>tion</b> 0.68 lp	om		Status	pass
Sensor Component Cell B Pressure Condit	tion 665.1	mmHg		Status	pass
Sensor Component Cell B Tmp. Condit	tion			Status	pass
Sensor Component Line Loss Condit	tion Not te	Not tested			pass
Sensor Component System Memo Condit	tion			Status	pass

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young 4037 VPI120 07/18/2017 Temperature 04318 Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 **Tfer ID** 0.14754 **Slope** 1.00759 **Intercept DAS 1: DAS 2:** 2/4/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.21 0.43 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.16 0.01 0.000 -0.1 $\mathbf{C}$ -0.08 25.47 C -0.13 Temp Mid Range 25.81 0.000 25.3 primary 0.000 C -0.43 primary Temp High Range 49.47 48.95 48.5 Condition Clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** VPI120 Sandy Grenville 07/18/2017 Shelter Temperature Campbell none none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperatur Abs Avg Err **Abs Max Er** Abs Avg Err **Abs Max Er** Tfer Desc. RTD H232734 **Serial Number** 0.99 1.64 01227 **Tfer ID** 1.00759 0.14754 Slope Intercept 2/4/2017 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	23.53	23.21	0.000	24.9	C	1.64
primary	Temp Mid Range	24.71	24.38	0.000	25.6	С	1.25
primary	Temp Mid Range	27.68	27.32	0.000	27.4	C	0.09
Sensor Con	nponent System Memo	<u> </u>	Condition		Status	pass	

### **Infrastructure Data For**

Site ID VPI120 Technician Sandy Grenville Site Visit Date 07/18/2017

Shelter Make Shelter Model Shelter Size

Ekto 8810 (s/n 2107-3) 640 cuft

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

## **Field Systems Comments**

1 Parameter: SitingCriteriaCom

The site is on a wooded hillside. The temperature sensor and sample inlet are at the tree tops of the downhill trees. The uphill tree line is 30 meters away.

2 Parameter: ShelterCleanNotes

The shelter is clean, neat, and well organized.

#### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 07/18/2017 VPI120 Technician Sandy Grenville Site ID Eggleston **USGS Map EPA** Site Sponsor (agency) Map Scale VA Tech **Operating Group Map Date** 51-071-9991 AQS# Climatronics **Meteorological Type** 37.3300 **Air Pollutant Analyzer** Ozone **QAPP** Latitude dry, wet **QAPP** Longitude -80.5573 **Deposition Measurement** woodland - mixed 920 Land Use **QAPP Elevation Meters** complex 7.9 **Terrain QAPP Declination** 1/31/2007 No Conforms to MLM **OAPP Declination Date** 37.329832 **Site Telephone Audit Latitude** Mountain Lake Rd. -80.55751 Site Address 1 **Audit Longitude** Jefferson National Forest Site Address 2 **Audit Elevation** 920 Giles -7.8 County **Audit Declination** Newport, VA City, State **Present** Fire Extinguisher 24128 New in 2015 Zip Code Eastern **First Aid Kit** Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **V Climbing Belt** Primary Op. E-mail **Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Step Backup Op. E-mail Shelter Working Room ✓ Make Model 8810 (s/n 2107-3) Ekto **Shelter Size** 640 cuft **✓** Notes Shelter Clean The shelter is clean, neat, and well organized. **✓** Notes Site OK

From Blacksburg go west on route 460 approximately 10 miles. Turn right (north) onto route 700, Mountain Lake

Rd., toward Mountain Lake Resort. There is a sign for Virginia Tech and Horton Station. Continue on 700 up the

mountain. Turn right at the sign for Horton Station on the gravel drive into the research center.

**Driving Directions** 

### Field Systems Data Form

F-02058-1500-S2-rev002

Site ID VPI120 Technician Sandy Grenville Site Visit Date 07/18/2017

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

**Siting Criteria Comment** 

The site is on a wooded hillside. The temperature sensor and sample inlet are at the tree tops of the downhill trees. The uphill tree line is 30 meters away.

Fie	eld Sys	stems Data Fo	orm				F-0205	58-15(	00-S3-r	ev002
Site	ID	VPI120	Technician	Sandy Grenville		Site Visit Date	07/18/2017			
1		l speed and direction luenced by obstructio		as to avoid	<b>✓</b>	N/A				
2	(i.e. wind	l sensors mounted so l sensors should be me ally extended boom > to the prevailing wind	ounted atop the 2x the max diar	e tower or on a	✓	N/A				
3		ower and sensors plu			<b>✓</b>	N/A				
4		emperature shields po 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 avoic	sensors should . Ridges, hollow	be natural	✓					
6	Is the sol	ar radiation sensor pl	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 rai	in gauge plumb?			<b>✓</b>	N/A				
9	Is it sited towers, e	l to avoid sheltering e	ffects from buil	dings, trees,	<b>✓</b>	N/A				
10	Is the sur	rface wetness sensor s	ited 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?

Fic	eld Systems Data Form	F-02058-1500-S4-rev002						
Site	VPI120 Technician Sandy Grenville		Site Visit Date 07/18/2017					
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?	Mo	derately clean					
4	Are the aspirated motors working?	<b>✓</b> N/.	4					
5	Is the solar radiation sensor's lens clean and free of scratches?	<b>✓</b> N/	A					
6	Is the surface wetness sensor grid clean and undamaged?	<b>✓</b> N/.	A					
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	<b>✓</b>						
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	<b>✓</b>						
	ide any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	ary) re	garding conditions listed above, or any other features,					

### Field Systems Data Form F-02058-1500-S5-rev002 VPI120 Technician Sandy Grenville Site Visit Date 07/18/2017 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 18 meters Describe dry dep sample tube. 3/8 teflon by 18 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	VPI120	Technician	Sandy Grenville		Site Visi	it Date 07/18/201	7	
	DAS se	ensor translators, and	narinharal aqui	nment energies	1C 01	nd maintana	naa		
	<u>DAS, 80</u>	ensor translators, and	peripheral equi	pinent operation	<u>18 a1</u>	<u>iu mamiena</u>	ince		
1	Do the well ma	DAS instruments appe aintained?	ear to be in good	l condition and	<b>✓</b>				
2		the components of the , backup, etc)	DAS operation	al? (printers,	<b>✓</b>				
3		analyzer and sensor sign protection circuitry	_	through	<b>✓</b>	Met sensors	only		
4		signal connections pro nintained?	otected from the	e weather and	✓				
5	Are the	signal leads connected	d to the correct	DAS channel?	<b>✓</b>				
6	Are the ground	DAS, sensor translateded?	ors, and shelter	properly	<b>✓</b>				
7	Does th	e instrument shelter h	ave a stable pov	ver source?	<b>✓</b>				
8	Is the in	nstrument shelter temp	perature contro	lled?	<b>✓</b>				
9	Is the n	net tower stable and gr	counded?			Stable		Grounded	
10	Is the s	ample tower stable and	d grounded?			<b>✓</b>		V	
11	Tower	comments?				Met tower re	emoved	_	
		y additional explanation nan-made, that may a				y) regarding	g conditions liste	d above, or a	any other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 VPI120 Technician Sandy Grenville Site Visit Date 07/18/2017 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 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 **~** Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V ✓ SSRF ✓ V ✓ Site Ops Manual** Oct 2001 **V HASP ✓** 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:

#### **Field Systems Data Form** F-02058-1500-S8-rev002 VPI120 Technician Sandy Grenville Site Visit Date 07/18/2017 Site ID Site operation procedures Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **V** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency Compliant ✓ V** Semiannually **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **QC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** As needed Manual Zero/Span Tests **V ~** Daily **Automatic Precision Level Tests V Manual Precision Level Test** As needed **V V** Weekly **Analyzer Diagnostics Tests ~** Every 2 weeks **In-line Filter Replacement (at inlet) V V** N/A In-line Filter Replacement (at analyze 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? **✓**

**✓** 

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

logbook, call-in

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

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

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

complete sample train including all filters?

reported? If yes, how?

Fi	eld Sy	stems Data Form			F-02058-1500-S9-rev002					
Site	e <b>ID</b>	VPI120 Ted	chnician Sandy Grenville		Site Visit Date	07/18/2017				
	Site ope	eration procedures								
1	Is the fi	lter pack being changed ever	y Tuesday as scheduled?	<b>V</b>	Filter changed morin	ings				
2	Are the	Site Status Report Forms be	ing completed and filed	<b>✓</b>						
3	Are dat schedul	a downloads and backups beed?	ing performed as		No longer required					
4	Are gen	neral observations being mad	e and recorded? How?	<b>✓</b>	SSRF, logbook					
5	Are site fashion	supplies on-hand and repler?	nished in a timely	<b>✓</b>						
6	Are san	nple flow rates recorded? Ho	w?	<b>✓</b>	SSRF, logbook, call-	in				
7	Are san fashion	nples sent to the lab on a reg ?	ular schedule in a timely	<b>✓</b>						
8		ers protected from contamination pping? How?	ation during handling	<b>✓</b>	Clean gloves on and	l off				
9		site conditions reported regu ons manager or staff?	ılarly to the field	<b>✓</b>						
QC	Check P	erformed	Frequency			Compliant				
N	Aulti-poi	nt MFC Calibrations	✓ Semiannually			<b>✓</b>				
F	Flow Syst	em Leak Checks	✓ Weekly			<b>✓</b>				
I	ilter Pac	k Inspection								
I	Flow Rate	e Setting Checks	✓ Weekly			✓				
7	Visual Ch	eck of Flow Rate Rotometer				<b>✓</b>				
I	n-line Fi	ter Inspection/Replacement	Semiannually			<b>✓</b>				
S	Sample L	ine Check for Dirt/Water	Ц							
		additional explanation (photo an-made, that may affect the			y) regarding condition	ons listed above, or a	any other features,			

### Field Systems Data Form

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

Site ID

VPI120

Technician Sandy Grenville

Site Visit Date 07/18/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07032
DAS	Campbell	CR3000	2514	000402
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	1192001884	02751
Flow Rate	Apex	AXMC105LPMDPC	illegible	000591
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0844350237	06586
Ozone	ThermoElectron Inc	49i A1NAA	1009241786	000628
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200019	000443
Sample Tower	Aluma Tower	В	unknown	none
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	4037	04318
Zero air pump	Werther International	C 70/4	000829179	06907

# Site Inventory by Site Visit

Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
604-Martin	Valvur-07/18/2017				
7/18/2017	DAS	Campbell	49923	CR1000	unknown2
7/18/2017	elevation	Elevation	none	none	none
7/18/2017	Flow Rate	Omega	none	FMA6518ST-RS232	32433-2
7/18/2017	Infrastructure	Infrastructure	none	none	none
7/18/2017	Precipitation	Met One	none	370C	N8139
7/18/2017	Relative Humidity	Vaisala	none	HMP45AC	C2730121
7/18/2017	Sample Tower	Unknown	none	Unknown	None
7/18/2017	siting criteria	Siting Criteria	none	none	None
7/18/2017	Solar Radiation	Licor	none	LI-200	illegible
7/18/2017	Temperature2meter	Vaisala	none	HMP45AC	C2730121
7/18/2017	Wind Direction	Met One	none	024	D3050
7/18/2017	Wind Speed	Met One	none	014	K2273
	7/18/2017 7/18/2017 7/18/2017 7/18/2017 7/18/2017 7/18/2017 7/18/2017 7/18/2017 7/18/2017 7/18/2017	7/18/2017 elevation  7/18/2017 Flow Rate  7/18/2017 Infrastructure  7/18/2017 Precipitation  7/18/2017 Relative Humidity  7/18/2017 Sample Tower  7/18/2017 siting criteria  7/18/2017 Temperature2meter  7/18/2017 Wind Direction	7/18/2017 DAS Campbell 7/18/2017 elevation Elevation 7/18/2017 Flow Rate Omega 7/18/2017 Infrastructure Infrastructure 7/18/2017 Precipitation Met One 7/18/2017 Relative Humidity Vaisala 7/18/2017 Sample Tower Unknown 7/18/2017 siting criteria Siting Criteria 7/18/2017 Temperature2meter Vaisala 7/18/2017 Wind Direction Met One	7604-Martin Valvur-07/18/2017           7/18/2017 DAS         Campbell         49923           7/18/2017 elevation         Elevation         none           7/18/2017 Flow Rate         Omega         none           7/18/2017 Infrastructure         Infrastructure         none           7/18/2017 Precipitation         Met One         none           7/18/2017 Relative Humidity         Vaisala         none           7/18/2017 Sample Tower         Unknown         none           7/18/2017 siting criteria         Siting Criteria         none           7/18/2017 Temperature2meter         Vaisala         none           7/18/2017 Wind Direction         Met One         none	7/18/2017 Valvur-07/18/2017           7/18/2017 DAS         Campbell         49923         CR1000           7/18/2017 elevation         Elevation         none         none           7/18/2017 Flow Rate         Omega         none         FMA6518ST-RS232           7/18/2017 Infrastructure         Infrastructure         none         none           7/18/2017 Precipitation         Met One         none         370C           7/18/2017 Relative Humidity         Vaisala         none         HMP45AC           7/18/2017 Sample Tower         Unknown         none         unknown           7/18/2017 siting criteria         Siting Criteria         none         LI-200           7/18/2017 Temperature2meter         Vaisala         none         HMP45AC           7/18/2017 Wind Direction         Met One         none         024



### Flow Data Form

Ifg	Serial Nun	nder Ta S	ite	Tecl	hnician	Site Visit L	Oate Param	leter	Owner ID	
mega	32433-2		SHE604	Mai	tin Valvur	07/18/2017	7 Flow R	ate	none	
				I	Mfg	BIOS	P	arameter Flo	w Rate	
				5	Serial Number	148613	Т	Tfer Desc. BIOS 220-		
				ŗ	Γfer ID	01421				
					Slope	1.	00153 Inte	ercept	0.00366	
					Cert Date	1/25		rCoff	1.00000	
DAS 1:		DAS 2:			Cal Factor Z	ero	0.19	99		
Avg % Diff:	A Max % Di	A Avg %I	oif A Max	x % Di	Cal Factor E		1.00			
1.36%	2.37%				Rotometer R			0		
Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignall	PctDifference	
primary	pump off	0.000	0.000	0.00	0.000	0.20	1/m	l/m		
primary	leak check	0.000	0.000	0.00	0.000	0.20	1/m	l/m		
primary	test pt 1	3.296	3.290	0.00	0.000	3.21	1/m	l/m	-2.37%	
primary	test pt 2	3.245	3.240	0.00	0.000	3.21	1/m	l/m	-0.99%	
primary	test pt 3	3.236	3.230	0.00	0.000	3.21	1/m	1/m	-0.71%	
Sensor Compo	onent Leak Tes	t		Condition	1		Status	pass		
Sensor Compo	onent Tubing C	ondition		Condition	Good		Status	pass		
Sensor Compo	onent Filter Pos	sition		Condition	Good		Status	pass		
Sensor Compo	onent Rotomete	er Condition		Condition	N/A		Status	pass		
Sensor Compo	onent Moisture	Present		Condition	No moisture pr	resent	Status	pass		
Sensor Compo	onent Filter Dist	tance		Condition	3.0 cm		Status	pass		
Sensor Compo	onent Filter Dep	oth		Condition	2.0 cm		Status	pass		
Sensor Compo	onent Filter Azi	muth		Condition	Not tested		Status	pass		
Sensor Component System Memo			Condition	n		Status	pass			

#### **Wind Speed Data Form** Mfg Serial Number Ta **Technician** Site Visit Date Parameter Owner ID Wind Speed Met One K2273 SHE604 Martin Valvur 07/18/2017 none Parameter wind speed Mfg RM Young Tfer Desc. wind speed motor (I **Serial Number** 01261 Tfer ID 1.00000 0.00000 **Slope Intercept** N/A Prop or Cups SN 0.3 **to** 0.3 **Prop or Cups Torque** 1/26/2017 **Cert Date** CorrCoff 1.00000 **Prop Correction Fact** N/A RM Young Parameter wind speed Mfg CA4353 Tfer Desc. wind speed motor (h **Serial Number** 01457 Tfer ID 1.00000 0.00000 **Slope Intercept** 4/13/2017 1.00000 **Cert Date** CorrCoff **DAS 1: DAS 2:** Low Range **High Range** Low Range **High Range** 0.22 0.83% Abs Avg Err 0.40 1.17% Abs Max Er UseDescription: Input RPM Out V Diff/ % Diff Diff WsM Input Device Input m/s DAS m/s primary none 0.20 0.0 0.6 0.40 0 01261 40 1.67 0.0 1.6 -0.03 primary primary 01261 80 2.75 0.0 2.5 -0.27 4.26 0.0 4.4 0.18 01261 140 primary 6.1 primary 01261 210 6.07 0.0 -0.33% 400 11.11 0.0 11.2 1.17% primary 01457 22.22 01457 800 0.0 22.0 -0.81% primary primary 01457 1800 48.94 0.0 48.5 -1.00% Sensor Component | Condition **Condition** Good Status pass Sensor Component Prop or Cups Condition **Condition** Fair **Status** pass Sensor Component | Sensor Heater **Condition** N/A **Status** pass Sensor Component | Torque **Status** pass Condition

**Condition** Plumb

**Condition** 

**Status** pass

Status pass

Sensor Component | Sensor Plumb

**Sensor Component** System Memo

#### Wind Direction Data Form **Technician** Site Visit Date Parameter Owner ID Mfg Serial Number Ta SHE604 Martin Valvur Wind Direction Met One D3050 07/18/2017 none Mfg RM Young Parameter wind direction Tfer Desc. wind direction wheel **Serial Number** 01266 Tfer ID Slope 1.00000 **Intercept** 0.00000 Vane SN: N/A C. A. Align. deg. true: 7 **to** 181 7 VaneTorque 1/1/2006 1.00000 Cert Date CorrCoff Parameter wind direction Ushikata Mfg **Serial Number** 190037 Tfer Desc. transit Tfer ID 01265 1.00000 0.00000 **Slope Intercept Cert Date** 2/8/2017 CorrCoff 1.00000 **DAS 1: DAS 2: Orientation Linearity: Orientation Linearity:** 2.0 Abs Avg Err Abs Max Er 5 UseDescription TferID Input Raw Linearity Output V Output Deg. Difference Change Error 0 primary 01265 1 0.000 0 01265 91 0.000 88 3 3 primary 01265 181 0.000 181 0 0 primary 01265 271 0.000 266 5 5 primary Sensor Component | Condition **Condition** Good Status pass **Condition** Good **Status** pass **Sensor Component** Mast Sensor Component | Sensor Heater **Condition** N/A **Status** pass Sensor Component | Sensor Plumb Status pass **Condition** Plumb Sensor Component | Torque Status pass **Condition** Sensor Component Vane Condition **Condition** Good **Status** pass **Sensor Component** System Memo **Status** pass **Condition**

#### 2 Meter Temperature Data Form Calc. Difference Serial Number Ta **Technician** Site Visit Date Parameter Mfg Site **Owner ID** SHE604 Martin Valvur 07/18/2017 Vaisala C2730121 Temperature2meter none Parameter Temperature Mfg Fluke Tfer Desc. RTD 3275143 **Serial Number** 01229 Tfer ID **Slope** 1.00006 **Intercept** 0.03191 **DAS 1: DAS 2:** 1/23/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.56 0.83 Test type UseDescription InputTmpRaw InputTmpCorrected OutputTmpSignal OutputSignalEng | OSE Unit Difference primary Temp Low Rang 2.90 2.87 0.000 3.70 C 0.83 Temp Mid Rang 23.50 23.47 0.000 23.60 C 0.13 primary primary Temp High Rang 48.77 48.74 0.000 48.01 C -0.73 Sensor Component | Properly Sited **Condition** Properly sited **Status** pass Condition Clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Sensor Component Blower Status Switch Status pass **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 SHE604 Martin Valvur 07/18/2017 Relative Humidity Vaisala C2730121 none Mfg Rotronic **Parameter** Relative Humidity Tfer Desc. GTL 75296 **Serial Number** 01220 **Tfer ID** 0.06850 **Slope** 0.99780 **Intercept** 1/23/2017 0.99994 **Cert Date** CorrCoff **DAS 1: DAS 2:** Low Range **High Range** Low Range **High Range** 0.6 **Abs Avg Err** 6.0 0.7 6.0 **Abs Max Er** UseDesc. Test type Device Input RH GTL Raw RH Corr. **DAS Volts** DAS %RH Difference RH Low Range GTL 32.0 0.000 primary 32.8 32.8 33.3 0.5 53.6 0.000 -0.7 primary RH Low Range GTL 52.9 52.9 52.2 primary RH High Range GTL 93.6 95.8 93.6 0.000 87.6 -6.0 Status pass Sensor Component | RH Filter **Condition** Clean 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 SHE604 Martin Valvur 07/18/2017 Solar Radiation Licor illegible none Mfg Eppley Parameter solar radiation Tfer Desc. SR transfer sensor 23824 **Serial Number** 01247 **Tfer ID** 1.00000 0.00000 **Slope Intercept DAS 1: DAS 2:** 2/16/2017 1.00000 % Diff of Avg %Diff of Max %Diff of Avg %Diff of Max **Cert Date** CorrCoff 0.8% 1.7% 0.0% 0.0% UseDescription Measure Date MeasureTime Tfer Corr PctDifference Tfer Raw DAS w/m2 primary 7/18/2017 8:00 443 443 437 -1.3% 7/18/2017 9:00 611 610 613 0.5% primary primary 7/18/2017 10:00 757 756 765 1.2% 1.7% primary 7/18/2017 11:00 862 862 877 Status pass Sensor Component | Sensor Clean Condition Clean Sensor Component | Sensor Level Condition Level **Status** pass Condition Properly sited Sensor Component | Properly Sited Status pass Sensor Component | System Memo Status pass Condition

## **Precipitation Data Form**

Mfg	S	erial N	lumber Ta	Site		Tec	chnician		Site	Visit Date	Paramo	eter		Owner ID
Met One	١	N8139		SHE604		Ma	artin Valvur		07/	18/2017	Precipita	ation		none
							Mfg		PMF	)	Pa	rameter	Prec	ipitation
DAS 1:			<b>DAS 2:</b>				Serial Nun	ber	Non	Э	Tf	er Desc.	250n	nl graduate
A Avg % Diff				Dif A N	Max % Di	,	Tfer ID		0124	19				
5.4%		7.2	%				Slope			1.0000	0 Inter	rcept		0.00000
							•			4/26/201		•		
							Cert Date			4/26/201	3 Cori	Coff		1.00000
UseDesc.	Test t	type	TferVolume	Iteration	TimePerT	ip	Eq.Ht	DAS	eng	Eq.HtUnit	OSE Ur	it TferU	nits	PctDifference
primary	test 1		231.5	1	8 - 10 sec	_	7.11	7.3	37	mm	mm	ml		3.7%
primary	test 2		231.5	2	8 - 10 sec	c	7.11	7.0	52	mm	mm	ml		7.2%
Sensor Com	ponent	Prope	rly Sited		Cond	litio	Properly :	sited			Status	pass		
Sensor Com	ponent	Gauge	e Drain Scree	en	Cond	litio	Installed				Status	pass		
Sensor Com	ponent	Funne	el Clean		Cond	litio	tion Clean				Status	pass		
Sensor Com	ponent	Condi	tion		Cond	litio	tion Good				Status pass			
Sensor Com	ponent	Gauge	e Screen		Cond	litio	Installed				Status	pass		
Sensor Com	ponent	Gauge	e Clean		Cond	litio	Clean				Status	pass		
Sensor Component Level Con				Cond	litio	Level				Status pass				
Sensor Com	ponent	Senso	or Heater		Cond	litio	on N/A				Status	pass		
Sensor Com	ponent	Syste	m Memo		Cond	litio	on				Status	pass		

#### **Infrastructure Data For** SHE604 Site Visit Date 07/18/2017 Technician | Martin Valvur 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 **Condition** Good Sensor Component | Power Cables **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** N/A Status pass Sensor Component | Shelter Floor **Condition** N/A Status pass Sensor Component | Signal Cable **Condition** Good Status pass Condition 3/8 teflon Status pass **Sensor Component** Tubing Type Sensor Component | Sample Train **Condition** Good Status pass

### **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazar	d Problem
Wind Speed	SHE604	Martin Valvur	07/18/2017	Prop or Cups Con	Met One	4357		
One set screw is strippe	d.							

### **Field Systems Comments**

1 Parameter: DasComments

The site power source is solar and wind with battery storage. The NEMA enclosure has a cooling fan.

2 Parameter: SiteOpsProcedures

observations of current meteorological measurements are recorded on a hardcopy checklist for ARS and not on the SSRF.

3 Parameter: DocumentationCo

The site operator received a disc with the 2013 QAPP, operating procedures, and HASP which is kept at his office. A hard copy BLM check list developed by ARS is completed and sent to ARS each week.

4 Parameter: SitingCriteriaCom

The site is located in range land. There is an active rail line with coal trains within one kilometer of the site.

5 Parameter: ShelterCleanNotes

NEMA enclosure, solar power

6 Parameter: PollAnalyzerCom

The dry deposition filter pack enclosure is not the standard "pot" size as at the other CASTNET sites. The diameter is much smaller. It is not clear if this will impact particle collection efficiency.

7 Parameter: MetSensorComme

The site is a small footprint solar powered site that has been operating as part of the WARMS network for 10 years. Objects violate the 45 degree rule for the tipping bucket rain gage. Temperature and RH are measured with a combined sensor that cannot be immersed making a temperature audit difficult. The temperature and RH are being measured at 2.5 meters above the ground.

8 Parameter: MetOpMaintCom

The accuracy of the DAS was not tested with a voltage source since there were no available test channels.

#### F-02058-1500-S1-rev002 Field Systems Data Form Site Visit Date 07/18/2017 SHE604 Technician Martin Valvur 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 QAPP** Longitude **Land Use QAPP Elevation Meters** Terrain **QAPP Declination** Conforms to MLM **OAPP Declination Date** 44.933601 **Site Telephone Audit Latitude** -106.847161 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 1141 Sheridan 9.8 **Audit Declination County** Sheridan, WY City, State **Present** Fire Extinguisher 82801 Zip Code Mountain Time Zone First Aid Kit **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # Primary Op. E-mail **Climbing Belt Backup Operator Security Fence ~** Backup Op. Phone # **Secure Shelter** Stable Entry Step Backup Op. E-mail Shelter Working Room Model **Shelter Size ✓** Notes NEMA enclosure, solar power **Shelter Clean** □ Notes Site OK

**Driving Directions** 

### Field Systems Data Form

F-02058-1500-S2-rev002

Site ID SHE604 Technician Martin Valvur Site Visit Date 07/18/2017

Potential Interferent	Minimum Distance From Measurement Apparatus	Distance	Pass = Checked
Large Point Source of SO2 or NOx	20 to 40 km		
Major industrial complex	10 to 20 km		✓
City > 50,000 population	40 km		✓
City 10,000 to 50,000 population	10 km		$\checkmark$
City 1,000 to 10,000 population	5 km		$\checkmark$
Major highway, airport or rail yard	2 km		$\checkmark$
Secondary road, heavily traveled	500 m		✓
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		$\checkmark$
Small parking lot	100 m		✓
Tree line	50 m		✓
Obstacles to wind	10 times obstacle height		✓

Siting Distances OK

**Siting Criteria Comment** 

The site is located in range land. There is an active rail line with coal trains within one kilometer of the site.

Fi	eld Systems Data Form		F-02058-1500-S3-rev002
Site	SHE604 Technician Martin Valvur		Site Visit Date 07/18/2017
1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	<b>✓</b>	
2	Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind)	✓	
3	Are the tower and sensors plumb?	<b>✓</b>	
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>	
7	Is it sited to avoid shading, or any artificial or reflected light?	<b>✓</b>	
8	Is the rain gauge plumb?	✓	
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?		45 degree rule violation
10	Is the surface wetness sensor sited with the grid surface facing north?	<b>✓</b> I	N/A
11	Is it inclined approximately 30 degrees?	<b>✓</b> I	N/A
Pro	vide any additional explanation (photograph or sketch if nec	essary	regarding conditions listed above, or any other features,

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

The site is a small footprint solar powered site that has been operating as part of the WARMS network for 10 years. Objects violate the 45 degree rule for the tipping bucket rain gage. Temperature and RH are measured with a combined sensor that cannot be immersed making a temperature audit difficult. The temperature and RH are being measured at 2.5 meters above the ground.

Fie	eld Systems Data Form	F-02058-1500-S4-rev002	•
Site	ID SHE604 Technician Martin Valvur	Site Visit Date 07/18/2017	
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?		
2	Are all the meteorological sensors operational online, and reporting data?		
3	Are the shields for the temperature and RH sensors clean?		
4	Are the aspirated motors working?	N/A	1
5	Is the solar radiation sensor's lens clean and free of scratches?		-
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?		
8	Are the sensor signal and power cable connections protected from the elements and well maintained?		
	de any additional explanation (photograph or sketch if neces al or man-made, that may affect the monitoring parameters:	ssary) regarding conditions listed above, or any other features,	
The a	ccuracy of the DAS was not tested with a voltage source since the	iere were no available test channels.	
			_

### Field Systems Data Form F-02058-1500-S5-rev002 SHE604 Technician | Martin Valvur Site Visit Date 07/18/2017 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 **✓** N/A Do the analyzers and equipment appear to be in good condition and well maintained? **V** N/A 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 10 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? Not present Are there moisture traps in the sample lines? Is there a rotometer in the dry deposition filter line, and is it Not present clean?

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

The dry deposition filter pack enclosure is not the standard "pot" size as at the other CASTNET sites. The diameter is much smaller. It is not

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

clear if this will impact particle collection efficiency.

# Field Systems Data Form

### F-02058-1500-S6-rev002

Site	e ID	SHE604	Technician	Martin Valvur		Site Vis	it Date 07/18/201	7	
	DAS, se	nsor translators, and p	peripheral equi	oment operation	ns ar	ıd maintena	<u>ince</u>		
1		OAS instruments appentained?	ar to be in good	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?	*	hrough		Not present			
4		signal connections pro ntained?	otected from the	e weather and	<b>✓</b>				
5	Are the	signal leads connected	to the correct l	DAS channel?	<b>✓</b>				
6	Are the grounde	DAS, sensor translato d?	rs, and shelter <b>J</b>	properly	<b>✓</b>				
7	Does the	instrument shelter ha	ave a stable pow	ver source?	<b>✓</b>				
8	Is the in	strument shelter temp	erature control	led?		Marginally			
9	Is the m	et tower stable and gr	ounded?			<b>Stable</b>		Grounded	
10	Is the sa	mple tower stable and	l grounded?			<u> </u>			
11	Tower c	omments?							
nat	ural or n	additional explanation an-made, that may after source is solar and w	fect the monito	ring parameter	s:			d above, or a	any other features,

#### SHE604 Site Visit Date 07/18/2017 Site ID Technician | Martin Valvur **Documentation** Does the site have the required instrument and equipment manuals? Yes No N/A No N/A Yes $\overline{\mathbf{V}}$ Wind speed sensor **Data logger V** ✓ П Wind direction sensor **Data logger** ✓ **V** Temperature sensor Strip chart recorder **V** П **V** Relative humidity sensor Computer **V** П **V** Modem Solar radiation sensor **V V** Surface wetness sensor **Printer** П $\checkmark$ **V** Wind sensor translator Zero air pump **V** П **Temperature translator V** Filter flow pump **V V** Humidity sensor translator **Surge protector** П **V UPS V Solar radiation translator** П **V V** Tipping bucket rain gauge Lightning protection device **V V** Ozone analyzer Shelter heater $\checkmark$ **V** Shelter air conditioner Filter pack flow controller **V** 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 V V Site Ops Manual** 2013 **V HASP V** 2013 **Field Ops Manual V** 2013 **V Calibration Reports** Not present Ozone z/s/p Control Charts Preventive maintenance schedul Not performed Is the station log properly completed during every site visit? Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? **~** N/A Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

The site operator received a disc with the 2013 QAPP, operating procedures, and HASP which is kept at his office. A hard copy BLM check

list developed by ARS is completed and sent to ARS each week.

F-02058-1500-S7-rev002

**Field Systems Data Form** 

#### **Field Systems Data Form** F-02058-1500-S8-rev002 SHE604 Site Visit Date 07/18/2017 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** N/A **Translator Zero/Span Tests (climatronics) ✓ V** Monthly **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values** 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** 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 V** N/A **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V** N/A Sample Line Check for Dirt/Water **~** N/A **Zero Air Desiccant Check ✓** N/A Do multi-point calibration gases go through the complete sample train including all filters? Do automatic and manual z/s/p gasses go through the N/A complete sample train including all filters? **✓** N/A 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:

observations of current meteorological measurements are recorded on a hardcopy checklist for ARS and not on the SSRF.

Fi	eld Sy	stems Data Fo	rm					F-02058-1	500-S9-rev002
Sit	e ID	SHE604	Techni	cian	Martin Valvur		Site Visit Date	07/18/2017	
	Site ope	ration procedures							
1	Is the fil	ter pack being changed	l every T	ıesd	ay as scheduled?	<b>V</b>	Filter changed vario	us times	
2	Are the correctl	Site Status Report Fori y?	ms being	com	pleted and filed	<b>✓</b>			
3	Are data	a downloads and backu	ps being	perf	ormed as		No longer required		
4	Are gen	eral observations being	made an	d re	corded? How?	<b>✓</b>	SSRF		
5	Are site	supplies on-hand and r	eplenish	ed in	a timely	<b>✓</b>			
6	Are sam	ple flow rates recorded	l? How?			<b>✓</b>	SSRF		
7	Are sam	uples sent to the lab on a	a regular	sche	dule in a timely	<b>✓</b>			
8		ers protected from conta oping? How?	aminatio	ı du	ring handling	<b>✓</b>	One set of gloves of	nly	
9		site conditions reported ons manager or staff?	l regular	y to	the field				
QC	Check P	erformed		Fre	quency			Compliant	
I	Multi-poi	nt MFC Calibrations	<b>✓</b>	Sen	niannually			✓	
]	Flow Syste	em Leak Checks	<b>✓</b>	Wee	ekly			<b>✓</b>	
]	Filter Pac	k Inspection							
]	Flow Rate	<b>Setting Checks</b>	<b>✓</b>	Wee				<b>✓</b>	
1	Visual Ch	eck of Flow Rate Roton			present				
J	In-line Fil	ter Inspection/Replacer	nent 🔽	Sen	niannually			✓	
9	Sample Li	ne Check for Dirt/Wate	er						
		dditional explanation ( n-made, that may affec					y) regarding conditi	ons listed above, or a	any other features,

### Field Systems Data Form

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

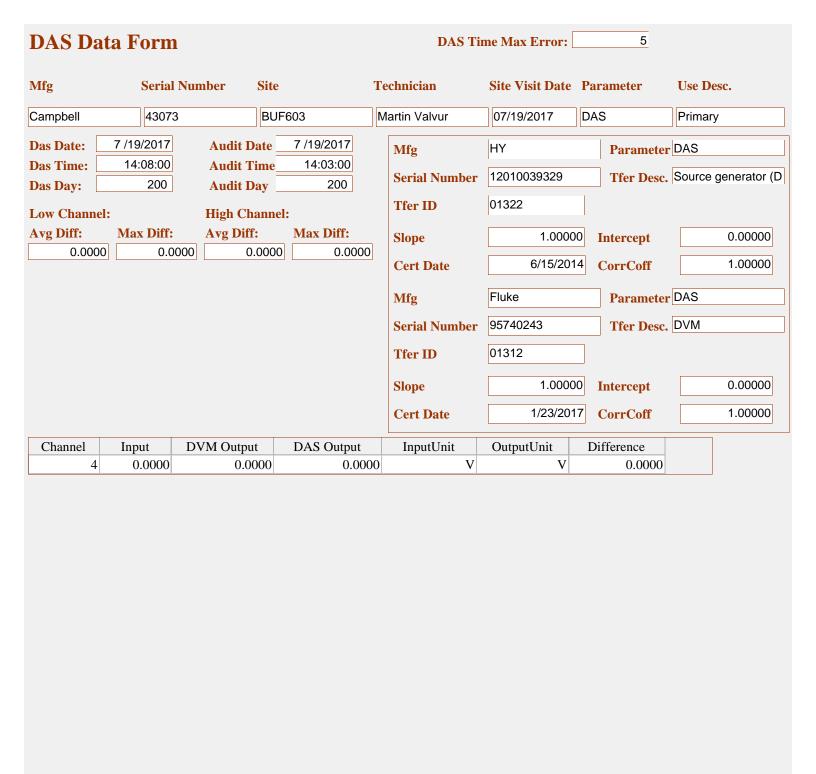
Site ID SHE604 Technician Martin Valvur Site Visit Date 07/18/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR1000	unknown2	49923
elevation	Elevation	none	none	none
Flow Rate	Omega	FMA6518ST-RS232	32433-2	none
Infrastructure	Infrastructure	none	none	none
Precipitation	Met One	370C	N8139	none
Relative Humidity	Vaisala	HMP45AC	C2730121	none
Sample Tower	Unknown	Unknown	None	none
siting criteria	Siting Criteria	none	None	none
Solar Radiation	Licor	LI-200	illegible	none
Temperature2meter	Vaisala	HMP45AC	C2730121	none
Wind Direction	Met One	024	D3050	none
Wind Speed	Met One	014	K2273	none

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
BUI	F603-Martii	n Valvur-07/19/2017				
1	7/19/2017	DAS	Campbell	49917	CR1000	43073
2	7/19/2017	elevation	Elevation	none	none	none
3	7/19/2017	Filter pack flow pump	Thomas	none	107CAB18A	100800033648
4	7/19/2017	Flow Rate	Omega	none	FMA6518ST-RS232	315688-1
5	7/19/2017	Infrastructure	Infrastructure	none	none	none
6	7/19/2017	MFC power supply	Sceptre	none	FMA65PWC	295106-12
7	7/19/2017	Precipitation	Met One	none	385	J7547
8	7/19/2017	Relative Humidity	Vaisala	none	HMP45AC	E3720077
9	7/19/2017	Sample Tower	Unknown	none	Unknown	None
10	7/19/2017	siting criteria	Siting Criteria	none	none	None
11	7/19/2017	Solar Radiation	Licor	none	LI-200	illegible
12	7/19/2017	Temperature2meter	Vaisala	none	HMP45AC	E3720077
13	7/19/2017	Wind Direction	Met One	none	024	J5555
14	7/19/2017	Wind Speed	Met One	none	014	1506



# Flow Data Form

)mega	31	15688-1	315688-1 BUF603			rtin Valvur	07/19/201	7 Flow R	ate	none	
Mfg	Sceptr	re				Mfg	BIOS	P	arameter Flo	w Rate	
						Serial Number	148613	т	fer Desc. BIG	) S 220-H	
SN/Owner ID	29510	6-12	none			Seriai Nuiliber		1	ier Desc. Die	70 220-11	
Parameter	MFC p	ower sup	oply			Tfer ID	01421				
						Slope	1.	.00153 Inte	ercept	0.00366	
						Cert Date	1/2	5/2017 Cor	rCoff	1.00000	
DAS 1:			DAS 2:			Cal Factor Z	ero	0.3	36		
A Avg % Diff:	A Max	w % Di	A Avg %I	oif A Max	w % Di	Cal Factor F		0.9	99		
2.11%		3.38%			Rotometer R			0			
Desc.	Tes	st type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	PctDifference	
primary	pump	off	0.000	0.000	0.00	0.000	0.000 0.36		l/m		
primary	leak cl	heck	0.000	0.000	0.00	0.000	0.36	1/m	l/m		
primary	test pt	1	3.414	3.410	0.00	0.000	3.34	l/m	1/m	-2.08%	
primary	test pt	2	3.473	3.460	0.00	0.000	3.34	l/m	l/m	-3.38%	
primary	test pt 3 3.396		3.396	3.390	0.00	0.000	3.36	l/m	l/m	-0.86%	
Sensor Comp	onent [	Leak Tes	t		Condition	1		Status	Status pass		
Sensor Comp	onent	Tubing C	ondition		Condition			Status	pass		
Sensor Comp	onent	Filter Pos	sition		Condition			Status	pass		
Sensor Comp	onent	Rotomete	er Condition		Condition	N/A		Status	pass		
Sensor Comp	onent	Moisture	Present		Condition	No moisture p	resent	Status	pass		
Sensor Comp	onent	Filter Dist	tance		Condition	3.5 cm		Status	pass		
Sensor Comp	onent	Filter Dep	oth		Condition	7.0 cm		Status	pass		
Sensor Comp	onent	Filter Azir	muth		Condition	180 deg		Status	pass		
Sensor Componer		nt System Memo				ı		Status	pass		

#### **Wind Speed Data Form** Mfg Serial Number Ta **Technician** Site Visit Date Parameter Owner ID BUF603 Wind Speed Met One 1506 Martin Valvur 07/19/2017 none Parameter wind speed Mfg RM Young Tfer Desc. wind speed motor (I **Serial Number** 01261 Tfer ID 1.00000 0.00000 **Slope Intercept** N/A Prop or Cups SN 0.2 **to** 0.2 **Prop or Cups Torque** 1/26/2017 **Cert Date** CorrCoff 1.00000 **Prop Correction Fact** N/A RM Young Parameter wind speed Mfg CA4353 Tfer Desc. wind speed motor (h **Serial Number** 01457 Tfer ID 1.00000 0.00000 **Slope Intercept** 4/13/2017 1.00000 **Cert Date** CorrCoff **DAS 1: DAS 2:** Low Range **High Range** Low Range **High Range** 0.19 0.60% Abs Avg Err 0.30 1.26% Abs Max Er UseDescription: Input RPM Out V Diff/ % Diff Diff WsM Input Device Input m/s DAS m/s primary none 0 0.20 0.0 0.5 0.25 01261 40 1.67 0.0 1.7 -0.02 primary primary 01261 80 2.75 0.0 2.5 -0.30 4.26 0.0 4.5 0.19 01261 140 primary 6.1 primary 01261 210 6.07 0.0 -0.33% 400 11.11 0.0 11.3 primary 01457 1.26% 22.22 01457 800 0.0 22.1 -0.77% primary primary 01457 1800 48.44 0.0 48.5 0.02% Sensor Component | Condition **Condition** Fair **Status** pass Sensor Component Prop or Cups Condition **Condition** Good **Status** pass Sensor Component | Sensor Heater **Condition** N/A **Status** pass Sensor Component | Torque **Status** pass Condition Sensor Component | Sensor Plumb **Condition** Plumb **Status** pass

**Condition** 

**Sensor Component** System Memo

Status pass

#### **Wind Direction Data Form Technician** Site Visit Date Parameter Owner ID Mfg Serial Number Ta BUF603 Martin Valvur Wind Direction Met One J5555 07/19/2017 none Mfg RM Young Parameter wind direction Tfer Desc. wind direction wheel **Serial Number** 01266 Tfer ID Slope 1.00000 **Intercept** 0.00000 Vane SN: N/A C. A. Align. deg. true: 7 **to** 359 7 VaneTorque 1/1/2006 1.00000 Cert Date CorrCoff Parameter wind direction Ushikata Mfg **Serial Number** 190037 Tfer Desc. transit Tfer ID 01265 1.00000 0.00000 **Slope Intercept Cert Date** 2/8/2017 CorrCoff 1.00000 **DAS 1: DAS 2: Orientation Linearity: Orientation Linearity:** 1.5 Abs Avg Err Abs Max Er 3 UseDescription TferID Input Raw Linearity Output V Output Deg. Difference Change Error 3 primary 01265 89 0.000 92 01265 179 0.000 178 1 1 primary 01265 269 0.000 269 0 0 primary 01265 359 0.000 2 2 2 primary Sensor Component | Condition **Condition** Good Status pass **Condition** Good **Status** pass **Sensor Component** Mast Sensor Component | Sensor Heater **Condition** N/A **Status** pass Sensor Component | Sensor Plumb Status pass **Condition** Plumb Sensor Component | Torque Status pass **Condition** Sensor Component Vane Condition **Condition** Good **Status** pass **Sensor Component** System Memo **Status** pass **Condition**

### 2 Meter Temperature Data Form Calc. Difference Serial Number Ta **Technician** Site Visit Date Parameter Mfg Site **Owner ID** BUF603 Martin Valvur 07/19/2017 Vaisala E3720077 Temperature2meter none Parameter Temperature Mfg Fluke Tfer Desc. RTD 3275143 **Serial Number** 01229 Tfer ID **Slope** 1.00006 **Intercept** 0.03191 **DAS 1: DAS 2:** 1/23/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 1.62 4.38 Test type Difference UseDescription InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit primary Temp Low Rang 0.06 0.03 0.000 0.43 C 0.4 Temp Mid Rang 28.40 28.37 0.000 28.30 C -0.07 primary 52.70 C primary Temp High Rang 48.35 48.32 0.000 4.38 Sensor Component | Properly Sited **Condition** Properly sited **Status** pass Condition Clean Sensor Component | Shield **Status** pass Status pass Sensor Component Blower **Condition** N/A Sensor Component Blower Status Switch Status pass **Condition** N/A Sensor Component | System Memo Condition Status pass

### **Humidity Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg BUF603 Martin Valvur 07/19/2017 Relative Humidity Vaisala E3720077 none Mfg Rotronic **Parameter** Relative Humidity Tfer Desc. GTL 75296 **Serial Number** 01220 **Tfer ID** 0.06850 **Slope** 0.99780 **Intercept Cert Date** 1/23/2017 0.99994 CorrCoff **DAS 1: DAS 2:** Low Range **High Range** Low Range **High Range** 2.4 5.9 **Abs Avg Err** 3.0 5.9 **Abs Max Er** UseDesc. Test type Device Input RH GTL Raw RH Corr. **DAS Volts** DAS %RH Difference RH Low Range GTL 31.5 0.000 primary 32.8 32.8 31.1 -1.7 51.3 0.000 -3.0 primary RH Low Range GTL 52.9 52.9 49.9 primary RH High Range GTL 93.6 89.6 93.6 0.000 87.7 -5.9 Condition Clean Status pass Sensor Component | RH Filter 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 BUF603 Martin Valvur 07/19/2017 Solar Radiation Licor illegible none Mfg Eppley Parameter solar radiation Tfer Desc. SR transfer sensor 23824 **Serial Number** 01247 **Tfer ID** 1.00000 0.00000 **Slope Intercept DAS 1: DAS 2:** 2/16/2017 1.00000 % Diff of Avg %Diff of Max %Diff of Avg %Diff of Max **Cert Date** CorrCoff 1.2% 0.8% 0.0% 0.0% UseDescription Measure Date MeasureTime Tfer Corr DAS w/m2 PctDifference Tfer Raw primary 7/19/2017 11:00 942 942 950 0.8% 7/19/2017 primary 12:00 931 931 951 2.1% 0.7% primary 7/19/2017 13:00 878 878 884 Sensor Component | Sensor Clean Condition Clean Status pass Sensor Component | Sensor Level **Condition** Level **Status** pass Condition Properly sited Status pass **Sensor Component** Properly Sited **Sensor Component** System Memo Status pass Condition

# **Precipitation Data Form**

Mfg	S	erial Numbe	er Ta	Site		Te	echnician S		Site	Visit Date	Parame	eter	Owner ID
Met One	J	17547		BUF603		Ma	artin Valvur		07/	19/2017	Precipita	ation	none
							Mfg		PMF	PMP		rameter Pre	ecipitation
DAS 1:		D	AS 2:				Serial Nun	ıber	Non	е	Tf	er Desc. 250	Oml graduate
<b>A Avg % Diff</b> 1.5%		<b>x % Di A</b> 1.5%	Avg %	Dif AN	Iax % Di	1	<b>Tfer ID</b> 01249			19			
						Slope			1.0000	0 Inter	cept	0.00000	
							Cert Date			4/26/201	3 Corr	Coff	1.00000
UseDesc.	Test t	ype TferV	olume	Iteration	TimePerT	'nρ	Eq.Ht	DAS	eng	Eq.HtUnit	OSE Un	it TferUnits	PctDifference
primary	test 1	23	1.5	1	20 sec		3.35	3.3	30	mm	mm	ml	-1.5%
primary	test 2	23	1.5	2	20 sec		3.35	3.3	30	mm	mm	ml	-1.5%
Sensor Com	ponent	Properly Site	ed		Cond	litio	Properly	sited			Status	pass	
Sensor Com	ponent	Gauge Draii	n Scree	en	Cond	litio	ion Installed				Status pass		
Sensor Com	ponent	Funnel Clea	ın		Cond	litio	ion Clean				Status pass		
Sensor Com	ponent	Condition			Cond	litio	ion Good				Status pass		
Sensor Com	ponent	Gauge Scre	en		Cond	litio	Installed				Status	pass	
Sensor Com	ponent	Gauge Clea	ın		Cond	litio	Clean				Status pass		
Sensor Com	ponent	Level			Cond	litio	ion Level				Status pass		
Sensor Com	ponent	Sensor Hea	ter		Cond	litio	on N/A				Status pass		
Sensor Com	ponent	System Mer	mo		Cond	litio	on				Status	pass	

### **Infrastructure Data For** BUF603 Site Visit Date 07/19/2017 Technician | Martin Valvur 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 **Condition** Good Sensor Component | Power Cables **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** N/A Status pass Sensor Component | Shelter Floor **Condition** N/A Status pass Sensor Component | Signal Cable **Condition** Good Status pass Condition 3/8 teflon Status pass **Sensor Component** Tubing Type Sensor Component | Sample Train **Condition** Good Status pass

# **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	d Problem
Wind Speed	BUF603	Martin Valvur	07/19/2017	Condition	Met One	4361		
One set screw is strippe	ed.							

# **Field Systems Comments**

### 1 Parameter: DasComments

The NEMA enclosure has a cooling fan.

### 2 Parameter: DocumentationCo

A disc with the current QAPP has been received and is kept at the site operator's office. The site operator completes and files a hardcopy checklist developed by ARS for BLM each week.

### 3 Parameter: ShelterCleanNotes

NEMA enclosure, 120 VAC power

## 4 Parameter: PollAnalyzerCom

The dry deposition filter pack enclosure is not the standard "pot" size that is used at the other CASTNET sites. The diameter of the enclosure is much smaller and the filter is mounted much deeper inside the opening. The geometry of the filter pack and enclosure is likely to impact particle collection efficiency.

### 5 Parameter: MetSensorComme

The temperature and RH are measured using a combined sensor which cannot be immersed making a temperature audit difficult. The temperature and RH are measured at 2.5 meters above the ground.

### 6 Parameter: MetOpMaintCom

Some of the signal cables are beginning to show signs of wear.

### F-02058-1500-S1-rev002 Field Systems Data Form Site Visit Date 07/19/2017 BUF603 Technician Martin Valvur Site ID **USGS Map EPA** Site Sponsor (agency) **Map Scale** BLM **Operating Group Map Date** AQS# **Meteorological Type** Air Pollutant Analyzer **QAPP** Latitude **Deposition Measurement QAPP** Longitude **Land Use QAPP Elevation Meters** Terrain **QAPP Declination** Conforms to MLM **OAPP Declination Date** 44.144135 **Site Telephone Audit Latitude** -106.108771 Site Address 1 **Audit Longitude** Site Address 2 1320 **Audit Elevation** Johnson 9.3 **Audit Declination County** Buffalo, WY City, State **Present** Fire Extinguisher 82834 Zip Code Mountain Time Zone First Aid Kit **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # Primary Op. E-mail **Climbing Belt Backup Operator Security Fence ~** Backup Op. Phone # **Secure Shelter** Stable Entry Step Backup Op. E-mail Shelter Working Room Model **Shelter Size** Notes NEMA enclosure, 120 VAC power **Shelter Clean** Site OK Notes

**Driving Directions** 

# Field Systems Data Form

F-02058-1500-S2-rev002

Site ID	BUF603	Technician	Martin Valvur	Site Visit Date	07/19/2017

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

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

LI	au Sys	stems Data F				r-0205	8-1500-S3-rev002
Site	ID	BUF603	Technician	Martin Valvur		Site Visit Date 07/19/2017	
1		l speed and directio luenced by obstruct		as to avoid	<b>~</b>		
2	(i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind)						
3	Are the t	ower and sensors p	lumb?	3	<b>/</b>		
4		emperature shields diated heat sources		positionea to	<b>~</b>		
5	condition surface a	perature and RH sen as? (i.e. ground belo and not steeply slope water should be ave	ow sensors should ed. Ridges, hollow	be natural	<b>/</b>		
6	Is the sol	ar radiation sensor	plumb?		<b>~</b>		
7	Is it sited light?	l to avoid shading, o	or any artificial or	reflected	<b>~</b>		
8	Is the rai	in gauge plumb?		5	<b>/</b>		
9	Is it sited towers, e	l to avoid sheltering tc?	g effects from build	dings, trees,	4	5 degree rule violation	
10	Is the sur facing no	rface wetness senson orth?	r sited with the gr	id surface	<b>V</b>	I/A	
11	Is it incli	ined approximately	30 degrees?		<b>V</b>	I/A	

The temperature and RH are measured using a combined sensor which cannot be immersed making a temperature audit difficult. The temperature and RH are measured at 2.5 meters above the ground.

Fie	eld S	ystems Data Fo	rm	F-02058-1500-S4-rev00				
Site	e ID	BUF603	Technician Martin Valvur		Site Visit Date 07/19/2017			
1		the meterological sensor on, and well maintained	s appear to be intact, in good ?	<b>✓</b>				
2		the meteorological sensing data?	ors operational online, and	<b>✓</b>				
3	Are the	e shields for the tempera	ture and RH sensors clean?	<b>✓</b>				
4	Are the	e aspirated motors work	ing?	<b>✓</b>	N/A			
5	Is the s	solar radiation sensor's l nes?	ens clean and free of	<b>✓</b>				
6	Is the s	surface wetness sensor g	rid clean and undamaged?	<b>✓</b>	N/A			
7		e sensor signal and power on, and well maintained		<b>✓</b>	Signs of wear			
8		e sensor signal and power ne elements and well ma	er cable connections protected intained?	<b>✓</b>				
			photograph or sketch if necesset the monitoring parameters:	ary)	regarding conditions listed above, or any other features,			
Some	e of the	signal cables are beginnin	g to show signs of wear.					

## Field Systems Data Form F-02058-1500-S5-rev002 BUF603 Technician | Martin Valvur Site Visit Date 07/19/2017 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 **✓** N/A Do the analyzers and equipment appear to be in good condition and well maintained? **V** N/A 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 10 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? Not present Are there moisture traps in the sample lines? Is there a rotometer in the dry deposition filter line, and is it Not present 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 dry deposition filter pack enclosure is not the standard "pot" size that is used at the other CASTNET sites. The diameter of the enclosure is much smaller and the filter is mounted much deeper inside the opening. The geometry of the filter pack and enclosure is likely to impact particle collection efficiency.

## Field Systems Data Form F-02058-1500-S6-rev002 BUF603 Technician Martin Valvur Site Visit Date 07/19/2017 Site ID DAS, sensor translators, and peripheral equipment operations and maintenance Do the DAS instruments appear to be in good condition and well maintained? **V** Are all the components of the DAS operational? (printers, modem, backup, etc) Not present Do the analyzer and sensor signal leads pass through lightning protection circuitry? **V** Are the signal connections protected from the weather and well maintained? **V** Are the signal leads connected to the correct DAS channel? Are the DAS, sensor translators, and shelter properly **~** grounded? **✓** Does the instrument shelter have a stable power source? 7 Marginally Is the instrument shelter temperature controlled? Grounded **Stable** Is the met tower stable and grounded? **✓**

**V** 

Provide any additional 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 NEMA enclosure has a cooling fan.

Is the sample tower stable and grounded?

11 Tower comments?

#### **Field Systems Data Form** F-02058-1500-S7-rev002 BUF603 Site Visit Date 07/19/2017 Site ID Technician | Martin Valvur **Documentation** Does the site have the required instrument and equipment manuals? Yes No N/A No N/A Yes $\overline{\mathbf{V}}$ Wind speed sensor **Data logger V** ✓ П Wind direction sensor **Data logger** ✓ П **V** Temperature sensor Strip chart recorder **V** П **V** Relative humidity sensor Computer **V** П $\checkmark$ Solar radiation sensor Modem П П **V V** Surface wetness sensor **Printer** П $\checkmark$ **V** Wind sensor translator Zero air pump **V Temperature translator V** Filter flow pump **V V Humidity sensor translator Surge protector** П **~ UPS V Solar radiation translator** П **V V** Tipping bucket rain gauge Lightning protection device **V V Shelter heater** Ozone analyzer $\checkmark$ **V** Shelter air conditioner Filter pack flow controller **~** Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log** Not present **SSRF ✓ V V V Site Ops Manual** 2013 **V HASP V** 2013 **Field Ops Manual V** 2013 **V Calibration Reports** Not present Ozone z/s/p Control Charts N/A **V** Preventive maintenance schedul Not present Is the station log properly completed during every site visit? Not present Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? **~** N/A Are ozone z/s/p control charts properly completed and current?

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

A disc with the current QAPP has been received and is kept at the site operator's office. The site operator completes and files a hardcopy checklist developed by ARS for BLM each week.

### **Field Systems Data Form** F-02058-1500-S8-rev002 BUF603 Site Visit Date 07/19/2017 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 V** Weekly **Confirm Reasonableness of Current Values V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **QC Check Performed Compliant** Frequency **Multi-point Calibrations V** N/A **V** N/A **Automatic Zero/Span Tests V** N/A Manual Zero/Span Tests **V** N/A **Automatic Precision Level Tests V** N/A **Manual Precision Level Test V** N/A **Analyzer Diagnostics Tests ~** N/A **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V** N/A Sample Line Check for Dirt/Water **~** N/A **Zero Air Desiccant Check ✓** N/A Do multi-point calibration gases go through the complete sample train including all filters? Do automatic and manual z/s/p gasses go through the

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

complete sample train including all filters?

reported? If yes, how?

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

N/A

**✓** N/A

Fi	ield Systems Data Form						F-02058-1500-S9-rev002				
Sit	e ID	BUF603	Techni	cian	Martin Valvur		Site Visit Date	07/19/2017			
	Site ope	ration procedures									
1	Is the fil	ter pack being changed	l every T	ıesd	ay as scheduled?	<b>V</b>	Filter changed vario	us times			
2	Are the correctl	Site Status Report For	ms being	com	pleted and filed	<b>✓</b>					
3	Are data downloads and backups being performed as scheduled?						No longer required				
4						<b>✓</b>	SSRF				
5	5 Are site supplies on-hand and replenished in a timely fashion?					<b>✓</b>					
6	Are sam	ple flow rates recorded	l? How?			<b>✓</b>	SSRF				
7	Are sam	aples sent to the lab on	a regular	sche	dule in a timely	<b>✓</b>					
8		ers protected from cont oping? How?	aminatio	ı du	ring handling	<b>✓</b>	One set of gloves only				
9		site conditions reported ons manager or staff?	d regular	y to	the field						
QC	Check P	erformed		Fre	quency			Compliant			
I	Multi-poi	nt MFC Calibrations	<b>✓</b>	Sen	niannually			✓			
J	Flow Syste	em Leak Checks	<b>✓</b>	Wee	ekly			$\checkmark$			
]	Filter Pac	k Inspection									
J	Flow Rate	<b>Setting Checks</b>	<b>✓</b>	Wee	ekly			$\checkmark$			
1	Visual Check of Flow Rate Rotometer  Not present										
]	In-line Filter Inspection/Replacement  Semiannually						✓				
5	Sample Li	ne Check for Dirt/Wat	er 🗆								
		dditional explanation ( n-made, that may affe					r) regarding condition	ons listed above, or a	any other features,		

# Field Systems Data Form

## F-02058-1500-S10-rev002

Site ID BUF603 Technician Martin Valvur Site Visit Date 07/19/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR1000	43073	49917
elevation	Elevation	none	none	none
Filter pack flow pump	Thomas	107CAB18A	100800033648	none
Flow Rate	Omega	FMA6518ST-RS232	315688-1	none
Infrastructure	Infrastructure	none	none	none
MFC power supply	Sceptre	FMA65PWC	295106-12	none
Precipitation	Met One	385	J7547	none
Relative Humidity	Vaisala	HMP45AC	E3720077	none
Sample Tower	Unknown	Unknown	None	none
siting criteria	Siting Criteria	none	None	none
Solar Radiation	Licor	LI-200	illegible	none
Temperature2meter	Vaisala	HMP45AC	E3720077	none
Wind Direction	Met One	024	J5555	none
Wind Speed	Met One	014	1506	none

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
CDI	R119-Sandy	Grenville-07/20/2017				
1	7/20/2017	Computer	Dell	07071	Inspiron 15	Unknown
2	7/20/2017	DAS	Campbell	None	CR3000	4935
3	7/20/2017	Elevation	Elevation	None	1	None
4	7/20/2017	Filter pack flow pump	Thomas	06027	107CAB18	060400022672
5	7/20/2017	Flow Rate	Apex	000660	AXMC105LPMDPCV	54747
6	7/20/2017	Infrastructure	Infrastructure	none	none	none
7	7/20/2017	Modem	Raven	06592	V4221-V	0844350437
8	7/20/2017	Ozone	ThermoElectron Inc	000623	49i A1NAA	1009241790
9	7/20/2017	Ozone Standard	ThermoElectron Inc	000365	49i A3NAA	0726124688
10	7/20/2017	Sample Tower	Aluma Tower	928376	В	AT-51060-56
11	7/20/2017	Shelter Temperature	Campbell	none	107-L	none
12	7/20/2017	Siting Criteria	Siting Criteria	None	1	None
13	7/20/2017	Temperature	RM Young	04448	41342	4546
14	7/20/2017	Zero air pump	Werther International	06903	C 70/4	000899159

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 4935 CDR119 Sandy Grenville 07/20/2017 DAS Primary Das Date: 7 /20/2017 **Audit Date** 7 /20/2017 Datel Parameter DAS Mfg 15:57:00 15:57:00 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** 201 201 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 0.0001 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** 1/23/2017 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output **DAS** Output InputUnit OutputUnit Difference 0.0000 0.0000 0.0001 0.0001 V V 7 0.1000 0.0999 0.1000 0.0001 7 0.3000 0.2997 0.2998 V V 0.0001 7 0.5000 0.4997 V V 0.0001 0.4996 7 0.7000 V V 0.0001 0.6995 0.6996 7 V V 0.9000 0.8994 0.8995 0.0001 7 1.0000 0.9993 0.9994 V V 0.0001

# Flow Data Form

Mfg	Serial Nun	nber Ta	Site	Technician		Site Visit D	ate Paran	neter	Owner ID	
Apex	54747		CDR119	Sa	Sandy Grenville		Flow R	Rate	000660	
					Mfg		BIOS		w Rate	
					Serial Number	103471	T	fer Desc. ne	xus	
					Tfer ID	01420				
					Slope	0.9	99825 Int	ercept	0.00497	
					Cert Date	2/7	7/2017 Co	rrCoff	0.9999	
					Mfg	BIOS	P	arameter Flo	w Rate	
					Serial Number	103424	Т	fer Desc. Blo	OS cell	
					Tfer ID	01410				
					Slope	0.9	99825 Int	ercept	0.0049	
					Cert Date	2/7		rrCoff	0.9999	
DAS 1:		<b>DAS 2:</b>			Cal Factor Z	ero	-0.00			
A Avg % Diff:		A Avg %	Dif A Max	% Di	Cal Factor F	ull Scale	1.00			
1.09%	1.31%				Rotometer R	eading:	1.5	55		
Desc.	Test type	Input 1/n	n Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	l PctDifference	
primary	pump off	0.000	0.000	0.00	0.000	-0.01	1/m	l/m		
primary	leak check	0.000	0.000	0.00	0.000	0.00	1/m	1/m		
primary	test pt 1	1.530	1.530	1.50	0.000	1.51	1/m	1/m	-1.31%	
primary	test pt 2	1.533	1.530	1.50	0.000	1.51	1/m	1/m	-1.31%	
primary	test pt 3	1.527	1.520	1.50	0.000	1.51	l/m	1/m	-0.66%	
•	Deak Tes			Conditio  -	Condition			Status pass		
	nent Tubing C			Conditio	n Good		Status	pass		
Sensor Compo	nent Filter Pos	sition		Conditio	Condition Good		Status pass			
Sensor Compo	Rotomete	er Conditio	on	Conditio	ondition Clean and dry			3		
Sensor Compo	onent Moisture	Present		Conditio	n No moisture pr	resent	Status	pass		
Sensor Component Filter Distance			Conditio	n 5.0 cm		Status	tatus pass			
Sensor Compo	nent Filter Dep	pth		Conditio	2.0 cm		Status	pass		
Sensor Compo	nent Filter Azi	muth		Conditio	n 120 deg		Status	pass		
			Conditio	_	Status	Status pass				

# **Ozone Data Form**

Mfg Se	erial Number Ta	Site	Technician	l	Site Visit	Date Parame	eter Owner ID
ThermoElectron Inc 1	009241790	CDR119	Sandy Gre	nville	07/20/201	Ozone	000623
Intercept O.S CorrCoff O.S  DAS 1: A Avg % Diff: A Ma		0.00000 0.00000 0.00000 6Dif A Max %	Serial I Tfer II Slope				•
1.6%	3.7%						
UseDescription primary primary primary primary	ConcGroup  1 2 3 4	Tfer Raw 0.03 14.90 34.77 67.95	Tfer Corr -0.42 14.40 34.22 67.32	1. 14 34	.93 p	Site Unit pb pb pb pb	3.68% -0.03% -1.47%
primary	5	110.00	109.26	108	3.10 p	pb	-1.06%
Sensor Component			Condition Good			Status	
Sensor Component			Condition See			Status	
Sensor Component			Condition Clean	า		Status	pass
Sensor Component	Battery Backup		<b>Condition</b> N/A			Status	pass
<b>Sensor Component</b>	Offset		Condition 0.3			Status	pass
<b>Sensor Component</b>	Span		Condition 0.993	3		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 87.0 kHz				Status	pass
Sensor Component	Cell A Noise		Condition 0.7 p	tion 0.7 ppb		Status	pass
Sensor Component			Condition 0.69	0.69 lpm		Status	pass
Sensor Component			Condition 713.0			Status	
Sensor Component			Condition 37.5			Status	
Sensor Component			Condition 88.3			Status	
Sensor Component			Condition 0.7 p			Status	
Sensor Component						Status	
_			Condition 0.70 lpm  Condition 713.3 mmHg				
Sensor Component				ышпнд		Status	
Sensor Component			Condition			Status	
Sensor Component			<b>Condition</b> Not t	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 4546 CDR119 07/20/2017 Temperature 04448 Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 **Tfer ID** 0.14754 **Slope** 1.00759 **Intercept DAS 1: DAS 2:** 2/4/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.18 0.27 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.30 0.150.000 0.1 C -0.05 25.29 C Temp Mid Range 25.63 0.000 25.5 0.21 primary 0.000 C -0.27 primary Temp High Range 49.58 49.06 48.8 Condition Clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Sandy Grenville 07/20/2017 Shelter Temperature Campbell CDR119 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** 0.18 0.35 01227 **Tfer ID** 1.00759 0.14754 Slope Intercept 2/4/2017 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	31.27	30.89	0.000	31.0	C	0.14
primary	Temp Mid Range	31.65	31.27	0.000	31.6	С	0.35
primary	Temp Mid Range	33.66	33.26	0.000	33.3	С	0.05
Sensor Component System Memo Condition Status pass							

## Infrastructure Data For

Sit	e ID	CDR119	Technician	Sandy Grenville	Site Visit Date	07/20/2017	
	Shelter M	ake	Shelter Model	She	lter Size		
	Ekto		8810	640	cuft		

Sensor Component	Sample Tower Type	Condition	Type B	Status	pass
Sensor Component	Conduit	Condition	N/A	Status	pass
Sensor Component	Met Tower	Condition	N/A	Status	pass
Sensor Component	Moisture Trap	Condition	Installed	Status	pass
Sensor Component	Power Cables	Condition	Good	Status	pass
Sensor Component	Shelter Temp Control	Condition	Functioning	Status	pass
Sensor Component	Rotometer	Condition	Installed	Status	pass
Sensor Component	Sample Tower	Condition	Good	Status	pass
Sensor Component	Shelter Condition	Condition	Good	Status	pass
Sensor Component	Shelter Door	Condition	Good	Status	pass
Sensor Component	Shelter Roof	Condition	Good	Status	pass
Sensor Component	Shelter Floor	Condition	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
Ozone	CDR119	Sandy Grenville	07/20/2017	22.5 degree rule	ThermoElectron	3532		<b>✓</b>

Trees violate the 22.5 degree clearance rule for the ozone sample inlet.

# **Field Systems Comments**

1 Parameter: SiteOpsProcComm

The filter handling procedures have again improved since the previous site audit visit.

2 Parameter: SitingCriteriaCom

Site is in a wooded valley, within 30 meters of a lightly traveled road. Large diesel trucks use the road. Trees are taller than the sample tower and within 20 meters of the sample tower.

3 Parameter: ShelterCleanNotes

The shelter is in good condition with only a small amount of rot on the walls below the air conditioner.

### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 07/20/2017 CDR119 Site ID Technician Sandy Grenville Glenville **USGS Map** EPA Site Sponsor (agency) Map Scale private, WV parks dept **Operating Group Map Date** 54-021-9991 AQS# Climatronics **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude **Deposition Measurement** dry, wet **QAPP** Longitude woodland - mixed **Land Use QAPP Elevation Meters** complex Terrain **QAPP Declination** No Conforms to MLM **OAPP Declination Date** 38.879503 **Site Telephone Audit Latitude** Cedar Creek St. Park -80.847677 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 240 Gilmer -8 County **Audit Declination** Glenville, WV City, State **Present** Fire Extinguisher ✓ 26351 Inspected Oct 2015 Zip Code Eastern First Aid Kit Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **✓** Primary Op. E-mail **Climbing Belt Backup Operator Security Fence V** Backup Op. Phone # **Secure Shelter** Stable Entry Step Backup Op. E-mail Shelter Working Room ✓ Make Model 8810 640 cuft Ekto **Shelter Size**

The shelter is in good condition with only a small amount of rot on the walls below the air conditioner.

**✓** Notes

**✓** Notes

**Shelter Clean** 

**Driving Directions** 

Site OK

# **Field Systems Data Form**

F-02058-1500-S2-rev002

Site ID	CDR119	<b>Technician</b>	Sandy Grenville	Site Visit Date	07/20/2017

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

Siting Distances OK  $\Box$ 

**Siting Criteria Comment** 

Site is in a wooded valley, within 30 meters of a lightly traveled road. Large diesel trucks use the road. Trees are taller than the sample tower and within 20 meters of the sample tower.

## **Field Systems Data Form** F-02058-1500-S3-rev002 Site Visit Date 07/20/2017 Site ID CDR119 Technician Sandy Grenville ✓ N/A Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? **✓** N/A Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) **✓** N/A Are the tower and sensors plumb? **~** Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? **V** Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) **✓** N/A Is the solar radiation sensor plumb? N/A Is it sited to avoid shading, or any artificial or reflected light? **✓** N/A Is the rain gauge plumb? ✓ N/A Is it sited to avoid sheltering effects from buildings, trees, towers, etc? N/A 10 Is the surface wetness sensor sited with the grid surface

✓ N/A

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

facing north?

11 Is it inclined approximately 30 degrees?

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

Fic	eld Systems Data Form		F-02058-1500-S4-rev002
Site	CDR119 Technician Sandy Grenville	1	Site Visit Date 07/20/2017
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?	✓	
4	Are the aspirated motors working?	✓	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>	N/A
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	<b>V</b>	N/A
	ide any additional explanation (photograph or sketch if necestral or man-made, that may affect the monitoring parameters		regarding conditions listed above, or any other features,

## Field Systems Data Form F-02058-1500-S5-rev002 CDR119 Technician Sandy Grenville Site Visit Date 07/20/2017 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? ✓ 20 meters from trees Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and maintenance **~** Do the analyzers and equipment appear to be in good condition and well maintained? **~** Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. 1/4 teflon by 12 meters Describe dry dep sample tube. 3/8 teflon by 12 meters At inlet only Are in-line filters used in the ozone sample line? (if ves indicate location) **~** Are sample lines clean, free of kinks, moisture, and obstructions? **V** Is the zero air supply desiccant unsaturated? Flow line only Are there moisture traps in the sample lines? Is there a rotometer in the dry deposition filter line, and is it Clean and dry

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

clean?

# Field Systems Data Form

F-02058-1500-S6-rev002

Site	e <b>ID</b>	CDR119	Technician	Sandy Grenville		Site Vis	it Date 07/20/201	7	
	DAS, se	nsor translators, and	peripheral equi	pment operation	ıs aı	nd maintena	nce		
1				_					
1	well mai	OAS instruments appentained?	ear to be in good	condition and					
2		he components of the backup, etc)	DAS operation	al? (printers,	✓				
3		nalyzer and sensor sig g protection circuitry	_	through	<b>✓</b>	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?	<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 control	lled?	<b>✓</b>				
9	Is the m	et tower stable and gr	ounded?			Stable		Grounded	
		· ·							
10	Is the sa	mple tower stable and	d grounded?			<b>✓</b>		<b>✓</b>	
11	Tower c	omments?				Met tower re	emoved	V	
		additional explanationan-made, that may a				y) regarding	g conditions listed	d above, or a	any other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 CDR119 Technician Sandy Grenville Site Visit Date 07/20/2017 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 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 ✓ HASP** no longer on site **✓ Field Ops Manual Calibration Reports ✓** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current?

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

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

### **Field Systems Data Form** F-02058-1500-S8-rev002 CDR119 Technician Sandy Grenville Site Visit Date 07/20/2017 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** Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests V Manual Precision Level Test ✓ V** Weekly **Analyzer Diagnostics Tests ~** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Weekly Sample Line Check for Dirt/Water **~ V** Weekly **Zero Air Desiccant Check** Unknown Do multi-point calibration gases go through the complete sample train including all filters? **✓** Do automatic and manual z/s/p gasses go through the

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

**✓** 

Logbook, call-in

complete sample train including all filters?

reported? If yes, how?

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

### Field Systems Data Form F-02058-1500-S9-rev002 CDR119 Technician Sandy Grenville Site Visit Date 07/20/2017 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? **✓** 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 filter handling procedures have again improved since the previous site audit visit.

# Field Systems Data Form

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

Site ID

CDR119

Technician Sandy Grenville

Site Visit Date 07/20/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07071
DAS	Campbell	CR3000	4935	None
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	060400022672	06027
Flow Rate	Apex	AXMC105LPMDPC	54747	000660
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0844350437	06592
Ozone	ThermoElectron Inc	49i A1NAA	1009241790	000623
Ozone Standard	ThermoElectron Inc	49i A3NAA	0726124688	000365
Sample Tower	Aluma Tower	В	AT-51060-56	928376
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	4546	04448
Zero air pump	Werther International	C 70/4	000899159	06903

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
PAF	R107-Sandy	Grenville-07/21/2017				
1	7/21/2017	Computer	Dell	07072	Inspiron 15	Unknown
2	7/21/2017	DAS	Campbell	000333	CR3000	2112
3	7/21/2017	Elevation	Elevation	None	1	None
4	7/21/2017	Filter pack flow pump	Thomas	00859	107CA18	missing
5	7/21/2017	Flow Rate	Apex	000803	AXMC105LPMDPCV	50752
6	7/21/2017	Infrastructure	Infrastructure	none	none	none
7	7/21/2017	Modem	Raven	06607	H4222-C	0844356054
8	7/21/2017	Ozone	ThermoElectron Inc	000685	49i A1NAA	1030244789
9	7/21/2017	Ozone Standard	ThermoElectron Inc	000436	49i A3NAA	CM08200012
10	7/21/2017	Sample Tower	Aluma Tower	000838	В	unknown
11	7/21/2017	Shelter Temperature	Campbell	none	107-L	none
12	7/21/2017	Siting Criteria	Siting Criteria	None	1	None
13	7/21/2017	Temperature	RM Young	04316	41342VO	4013
14	7/21/2017	Zero air pump	Werther International	06932	C 70/4	000829174

#### **DAS Data Form** 0.02 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2112 PAR107 Sandy Grenville 07/21/2017 DAS Primary Das Date: 7 /21/2017 **Audit Date** 7 /21/2017 Datel Parameter DAS Mfg 12:30:35 12:30:36 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** Das Day: 202 **Audit Day** 202 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** 1/23/2017 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 0.0000 0.0000 0.0000 0.0000 V V 7 0.1000 0.0999 0.0999 0.00007 0.3000 0.2997 0.2998 V V 0.0001 7 0.5000 0.4996 V V 0.00000.4996 7 0.7000 V V 0.0000 0.6995 0.6995 7 V V 0.9000 0.8994 0.8994 0.00007 0.9992 0.9992 V V 1.0000 0.0000

## Flow Data Form

Mfg	Serial Nun	nber Ta	Site	Teo	chnician	Site Visit D	ate Paran	neter	Owner ID
\pex	50752		PAR107	Sa	ndy Grenville	07/21/2017	Flow R	Rate	000803
					Mfg	BIOS	P	arameter Flo	w Rate
					Serial Number	103471	Т	fer Desc. ne	kus
					Tfer ID	01420			
					Slope	0.9	99825 Int	ercept	0.00497
					Cert Date	2/7	7/2017 Co	rrCoff	0.9999
					Mfg	BIOS	P	arameter Flo	w Rate
					Serial Number	103424	Т	fer Desc. BIG	OS cell
					Tfer ID	01410			
					Slope	0.9	99825 <b>Int</b> e	ercept	0.00497
					Cert Date	2/7		rrCoff	0.9999
DAS 1:		<b>DAS 2:</b>			Cal Factor Z		-0.0		
A Avg % Diff:				0.96					
2.82%	3.25%				Rotometer R	eading:	1	.5	
Desc.	Test type	_	n Input Corr_	MfcDisp.	OutputSignal	-	_		PctDifference
primary	pump off	0.000	0.000	0.01	0.000	-0.02	1/m	1/m	
primary	leak check	0.000	0.000	-0.02	0.000	-0.02	1/m	1/m	
primary	test pt 1	1.544	1.540	1.54	0.000	1.50	1/m	1/m	-2.60%
	test pt 2	1.543	1.540	1.54	0.000	1.49	1/m	1/m	-3.25%
primary	test pt 3	1.542	1.540	1.54	0.000	1.50	1/m	1/m	-2.60%
Sensor Compo	nent Leak Tes	st		Conditio	n		Status		
Sensor Compo	nent Tubing C	ondition		Conditio	n Good		Status	pass	
Sensor Compo	nent Filter Pos	sition		Conditio	n Good		Status	pass	
Sensor Compo	nent Rotomete	er Conditio	n	Conditio	Clean and dry		Status	pass	
Sensor Compo	onent Moisture	Present		Conditio	n No moisture pr	resent	Status	pass	
Sensor Compo	nent Filter Dis	tance		Conditio	5.0 cm		Status	pass	
Sensor Compo	nent Filter Dep	oth		Conditio	2.0 cm		Status	pass	
Sensor Component Filter Azimuth				Conditio	270 deg		Status		
Sensor Component System Memo				Conditio		Status	Status pass		

## **Ozone Data Form**

Mfg Se	erial Number Ta	Site	Tec	chnician		Site Visi	it Date	Parame	eter Owner ID	
ThermoElectron Inc 1	030244789	PAR107	Sa	ındy Gren	ville	07/21/2	017	Ozone	000685	
Intercept 0.5 CorrCoff 1.0	9332 Slope: 1699 Intercept 0000 CorrCoff	0.00000 0.00000 0.00000		Mfg Serial N Tfer ID	umber	ThermoE 5171121 01111	75	Tfe	rameter ozone er Desc. Ozone primary sta	
DAS 1: A Avg % Diff: A Ma	DAS 2: x % Di	6Dif A Max %	% Di	Slope			1.00250		-	_
1.3%	4.3%			Cert Da	te	3	3/21/201	7 Corr	*Coff 1.0000	0
UseDescription primary	ConcGroup 1	Tfer Raw 0.07	Tfer (	38	Si 0.0	04	ppb	e Unit	PctDifference	
primary primary	3	15.04 34.94	14. 34.		34.		ppb ppb		4.26%	
primary	4	68.06	67.	43	67.		ppb		0.18%	
primary	5	110.07	109		109	0.10	ppb		-0.21%	
Sensor Component	Sample Train		Conditio	Good				Status	pass	
<b>Sensor Component</b>	22.5 degree rule		Conditio	on				Status	pass	
<b>Sensor Component</b>	Inlet Filter Conditio	n	<b>Condition</b> Clean					Status	pass	
<b>Sensor Component</b>	Battery Backup		Conditio	n N/A				Status	pass	
Sensor Component	Offset		Conditio	on 0.10				Status	pass	
Sensor Component	Span		Condition 1.009					Status	pass	
Sensor Component	Zero Voltage		Condition N/A					Status	pass	
<b>Sensor Component</b>	Fullscale Voltage		Condition N/A					Status	pass	
<b>Sensor Component</b>	Cell A Freq.		Conditio	90.9 k	Hz	Status pa		Status	pass	
Sensor Component	Cell A Noise		Conditio	0.7 pp	b	Status P		Status	pass	
Sensor Component	Cell A Flow		Conditio	0.55 lp	om			Status	pass	
Sensor Component	Cell A Pressure		Conditio	on 693.1	mmHg			Status	pass	
Sensor Component	Cell A Tmp.		Conditio	35.3 C	;			Status	pass	
Sensor Component	Cell B Freq.		Conditio	<b>n</b> 89.0 k	Hz			Status	pass	
Sensor Component	Cell B Noise		Conditio	0.8 pp	b			Status	pass	
Sensor Component	Cell B Flow		Conditio	0.47 lp	om			Status	pass	
Sensor Component	Sensor Component Cell B Pressure		Conditio	692.8	mmHg			Status	pass	
Sensor Component	Cell B Tmp.		Conditio	on				Status	pass	
Sensor Component	Line Loss		Conditio	ndition Not tested				Status	pass	
Sensor Component	System Memo		Conditio					Status	pass	
		·								

### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young 4013 PAR107 07/21/2017 Temperature 04316 Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 Tfer ID 0.14754 **Slope** 1.00759 **Intercept DAS 1: DAS 2:** 2/4/2017 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 0.17 0.02 0.000 0.1 $\mathbf{C}$ 0.08 25.0 C Temp Mid Range 25.28 24.94 0.000 0.01 primary 0.000 48.7 C 0.08 primary Temp High Range 49.14 48.62 Condition Clean Sensor Component | Shield **Status** pass Sensor Component Blower Status pass **Condition** N/A Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Sandy Grenville 07/21/2017 Shelter Temperature Campbell PAR107 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** 0.49 0.60 01227 **Tfer ID** 1.00759 0.14754 Slope Intercept 2/4/2017 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	28.37	28.01	0.000	27.5	C	-0.5
primary	Temp Mid Range	28.00	27.64	0.000	27.3	С	-0.37
primary	Temp Mid Range	24.08	23.75	0.000	24.4	C	0.6
Sensor Con	nponent System Memo	)	Condition	Status pass			

### **Infrastructure Data For**

Si	te ID	PAR107	Technician	Sandy Grenville	Site Visit Date	07/21/2017	
	Shelter Ma	ake	Shelter Model	Sh	elter Size		
	Ekto		8810	640	0 cuft		

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

# **Field Systems Comments**

1 Parameter: SitingCriteriaCom

The city of Parsons, estimated population 1500, is within 5 km of the site.

2 Parameter: ShelterCleanNotes

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

### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 07/21/2017 PAR107 Technician Sandy Grenville Site ID **Parsons USGS Map** EPA/USFS Site Sponsor (agency) Map Scale USFS **Operating Group Map Date** 54-093-9991 AQS# Climatronics **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude **Deposition Measurement** dry, wet **QAPP** Longitude woodland - mixed **Land Use QAPP Elevation Meters** complex **Terrain QAPP Declination** No Conforms to MLM **OAPP Declination Date** 39.090434 **Site Telephone Audit Latitude** USFS Timber & Watershed Lab -79.661742 Site Address 1 **Audit Longitude** Rt. 219, Nursery Bottom Site Address 2 **Audit Elevation** 510 Parsons County **Audit Declination** Parsons, WV City, State **Present** Fire Extinguisher ✓ 26287 Inspected Nov 2015 Zip Code **Time Zone** Eastern **First Aid Kit** ✓ **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

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

Reservoir. The site entrance is on the right next to the visitors center.

Take highway 33W to Elkins WV. Turn onto 19N to Parsons. Continue through town to the Nursery Bottom

**✓** Notes

**✓** Notes

**Shelter Clean** 

**Driving Directions** 

Site OK

## **Field Systems Data Form**

F-02058-1500-S2-rev002

Site ID PAR107 Technician Sandy Grenville Site Visit Date 07/21/2017

Potential Interferent	Minimum Distance From Measurement Apparatus	Distance	Pass = Checked
Large Point Source of SO2 or NOx	20 to 40 km		
Major industrial complex	10 to 20 km		✓
City > 50,000 population	40 km		✓
City 10,000 to 50,000 population	10 km		✓
City 1,000 to 10,000 population	5 km	2.5 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 city of Parsons, estimated population 1500, is within 5 km of the site.

### **Field Systems Data Form** F-02058-1500-S3-rev002 Site Visit Date 07/21/2017 Site ID PAR107 Technician Sandy Grenville ✓ N/A Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? **✓** N/A Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) **✓** N/A Are the tower and sensors plumb? **~** Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? **V** Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) **✓** N/A Is the solar radiation sensor plumb? N/A Is it sited to avoid shading, or any artificial or reflected light? **✓** N/A Is the rain gauge plumb? ✓ N/A Is it sited to avoid sheltering effects from buildings, trees, towers, etc? N/A 10 Is the surface wetness sensor sited with the grid surface

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

✓ N/A

facing north?

11 Is it inclined approximately 30 degrees?

Fic	eld Systems Data Form	F-02058-1500-S4-rev002
Site	ID PAR107 Technician Sandy Grenville	le Site Visit Date 07/21/2017
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	<u>i</u> •
2	Are all the meteorological sensors operational online, and reporting data?	
3	Are the shields for the temperature and RH sensors clean?	
4	Are the aspirated motors working?	✓ N/A
5	Is the solar radiation sensor's lens clean and free of scratches?	✓ N/A
6	Is the surface wetness sensor grid clean and undamaged?	✓ N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	d 🗸
	ide any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	essary) regarding conditions listed above, or any other features, s:

### Field Systems Data Form F-02058-1500-S5-rev002 PAR107 Technician Sandy Grenville Site Visit Date 07/21/2017 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

e ID	PAR107	Technician	Sandy Grenville		Site Vis	it Date 07/21/20	17	
DAS se	nsor translators, and t	nerinheral equi	nment operation	าร ១۲	nd maintena	ince		
			_		<u>la mamiena</u>	<u>ince</u>		
Do the I well ma	OAS instruments appeintained?	ear to be in good	l condition and	<b>✓</b>				
		DAS operation	al? (printers,	✓				
			through	<b>✓</b>	Met sensors	only		
		otected from the	e weather and	<b>✓</b>				
Are the	signal leads connected	d to the correct	DAS channel?	<b>✓</b>				
Are the DAS, sensor translators, and shelter properly grounded?			properly	<b>✓</b>				
Does the	e instrument shelter h	ave a stable pov	ver source?	<b>✓</b>				
Is the in	strument shelter temp	perature contro	lled?	<b>✓</b>				
Is the m	et tower stable and gr	ounded?			Stable		Grounded	
Is the sa	mple tower stable and	d grounded?			<b>✓</b>			
Tower c	omments?					emoved		
					y) regardin	g conditions liste	ed above, or a	any other features,
	DAS, see  Do the I well mai Are all t modem, Do the a lightning Are the well mai Are the grounde Does the Is the in  Is the sa Tower c	DAS, sensor translators, and Do the DAS instruments apperwell maintained? Are all the components of the modem, backup, etc) Do the analyzer and sensor silightning protection circuitry. Are the signal connections prewell maintained? Are the signal leads connected. Are the DAS, sensor translated grounded? Does the instrument shelter has the instrument shelter temporary is the sample tower stable and grown towards.  Tower comments?	DAS, sensor translators, and peripheral equivalent Do the DAS instruments appear to be in good well maintained?  Are all the components of the DAS operation modem, backup, etc)  Do the analyzer and sensor signal leads pass lightning protection circuitry?  Are the signal connections protected from the well maintained?  Are the signal leads connected to the correct. Are the DAS, sensor translators, and shelter grounded?  Does the instrument shelter have a stable poward in the instrument shelter temperature control. Is the met tower stable and grounded?  Is the sample tower stable and grounded?  Tower comments?	DAS, sensor translators, and peripheral equipment operation  Do the DAS instruments appear to be in good condition and well maintained?  Are all the components of the DAS operational? (printers, modem, backup, etc)  Do the analyzer and sensor signal leads pass through lightning protection circuitry?  Are the signal connections protected from the weather and well maintained?  Are the signal leads connected to the correct DAS channel?  Are the DAS, sensor translators, and shelter properly grounded?  Does the instrument shelter have a stable power source?  Is the instrument shelter temperature controlled?  Is the met tower stable and grounded?  Tower comments?	DAS, sensor translators, and peripheral equipment operations and well maintained?  Are all the components of the DAS operational? (printers, modem, backup, etc)  Do the analyzer and sensor signal leads pass through lightning protection circuitry?  Are the signal connections protected from the weather and well maintained?  Are the signal leads connected to the correct DAS channel?  Are the DAS, sensor translators, and shelter properly grounded?  Does the instrument shelter have a stable power source?  Is the instrument shelter temperature controlled?  Is the sample tower stable and grounded?  Tower comments?	DAS, sensor translators, and peripheral equipment operations and maintenary with a possible part of the DAS instruments appear to be in good condition and well maintained?  Are all the components of the DAS operational? (printers, modem, backup, etc)  Do the analyzer and sensor signal leads pass through lightning protection circuitry?  Are the signal connections protected from the weather and well maintained?  Are the signal leads connected to the correct DAS channel?  Are the DAS, sensor translators, and shelter properly grounded?  Does the instrument shelter have a stable power source?  Is the instrument shelter temperature controlled?  Stable  Is the sample tower stable and grounded?  Tower comments?  Met tower reconstruction of the correct property with the components of the correct property with the correct	DAS, sensor translators, and peripheral equipment operations and maintenance  Do the DAS instruments appear to be in good condition and well maintained?  Are all the components of the DAS operational? (printers, modem, backup, etc)  Do the analyzer and sensor signal leads pass through lightning protection circuitry?  Are the signal connections protected from the weather and well maintained?  Are the DAS, sensor translators, and shelter properly grounded?  Does the instrument shelter have a stable power source?  Is the instrument shelter temperature controlled?  Stable  Is the sample tower stable and grounded?  Tower comments?  Met tower removed	DAS, sensor translators, and peripheral equipment operations and maintenance  Do the DAS instruments appear to be in good condition and well maintained?  Are all the components of the DAS operational? (printers, modem, backup, etc)  Do the analyzer and sensor signal leads pass through lightning protection circuitry?  Are the signal connections protected from the weather and well maintained?  Are the signal leads connected to the correct DAS channel?  Are the DAS, sensor translators, and shelter properly grounded?  Does the instrument shelter have a stable power source?  Is the instrument shelter temperature controlled?  Is the met tower stable and grounded?  Tower comments?  Met tower removed  Met tower removed

#### **Field Systems Data Form** F-02058-1500-S7-rev002 PAR107 Technician Sandy Grenville Site Visit Date 07/21/2017 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 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 П Lightning protection device ~ $\checkmark$ **Shelter heater** Ozone analyzer **V ✓** Filter pack flow controller Shelter air conditioner **~** Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF ✓ V ✓ Site Ops Manual** July 1990 **V HASP V** Feb 2014 **Field Ops Manual Calibration Reports V ✓** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Minimal information Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current?

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

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

#### **Field Systems Data Form** F-02058-1500-S8-rev002 PAR107 Technician Sandy Grenville Site Visit Date 07/21/2017 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? **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** Weekly **Analyzer Diagnostics Tests ~** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Weekly Sample Line Check for Dirt/Water **~ V** Weekly **Zero Air Desiccant Check ✓** Do multi-point calibration gases go through the complete sample train including all filters?

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

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

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

complete sample train including all filters?

reported? If yes, how?

**✓** 

✓

Call-in only

Fi	eld S	ystems Data Form		F-02058-1500-S9-rev002						
Sit	e ID	PAR107 Te	chnician Sandy Grenville		Site Visit Date	07/21/2017				
	Site op	eration procedures								
1	Is the f	ilter pack being changed ever	ry Tuesday as scheduled?	<b>~</b>	Filter changed vario	us times				
2	Are the	e Site Status Report Forms bo	eing completed and filed	<b>✓</b>						
3	Are da schedu	ta downloads and backups bolled?	eing performed as		No longer required					
4	Are ge	neral observations being mad	le and recorded? How?	<b>✓</b>	SSRF					
5	Are site supplies on-hand and replenished in a timely fashion?									
6	Are sa	mple flow rates recorded? Ho	ow?	<b>✓</b>	SSRF, call-in					
7	Are sar	mples sent to the lab on a reg	ular schedule in a timely	<b>✓</b>						
8		ters protected from contamin ipping? How?	ation during handling	<b>✓</b>	Clean gloves on and off					
9		e site conditions reported regions manager or staff?	ularly to the field	<b>✓</b>						
QC	Check I	Performed	Frequency			Compliant				
I	Multi-po	int MFC Calibrations	Semiannually			<b>✓</b>				
]	Flow Sys	tem Leak Checks	Weekly			✓				
]	Filter Pa	ck Inspection								
]	Flow Rate Setting Checks Weekly				✓					
7	Visual Check of Flow Rate Rotometer   ✓ Weekly				✓					
]	In-line Filter Inspection/Replacement Semiannually				✓					
	Sample I	Line Check for Dirt/Water								
		additional explanation (photoan-made, that may affect the			y) regarding condition	ons listed above, or	any other features,			

# Field Systems Data Form

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

PAR107 Site ID

Technician Sandy Grenville

Site Visit Date 07/21/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07072
DAS	Campbell	CR3000	2112	000333
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	missing	00859
Flow Rate	Apex	AXMC105LPMDPC	50752	000803
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4222-C	0844356054	06607
Ozone	ThermoElectron Inc	49i A1NAA	1030244789	000685
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200012	000436
Sample Tower	Aluma Tower	В	unknown	000838
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VO	4013	04316
Zero air pump	Werther International	C 70/4	000829174	06932

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
CN'.	T169-Martin	valvur-07/21/2017				
1	7/21/2017	Computer	Dell	07038	Inspiron 15	Unknown
2	7/21/2017	DAS	Campbell	000417	CR3000	2515
3	7/21/2017	Elevation	Elevation	None	1	None
4	7/21/2017	Filter pack flow pump	Thomas	02753	107CAB18	1192001900
5	7/21/2017	Flow Rate	Apex	000559	AXMC105LPMDPCV	illegible
6	7/21/2017	Infrastructure	Infrastructure	none	none	none
7	7/21/2017	Modem	Raven	06600	V4221-V	0844349098
8	7/21/2017	Ozone	ThermoElectron Inc	000620	49i A1NAA	1009241793
9	7/21/2017	Ozone Standard	ThermoElectron Inc	000215	49i A3NAA	0622717856
10	7/21/2017	Sample Tower	Aluma Tower	000179	В	unknown
11	7/21/2017	Shelter Temperature	Campbell	none	107-L	none
12	7/21/2017	Siting Criteria	Siting Criteria	None	1	None
13	7/21/2017	Temperature	RM Young	06501	41342	14606
14	7/21/2017	Zero air pump	Werther International	06925	C 70/4	000836220

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2515 CNT169 Martin Valvur 07/21/2017 DAS Primary Das Date: 7 /22/2017 **Audit Date** 7 /22/2017 HY **Parameter** DAS Mfg 7:39:00 7:39:00 Das Time: **Audit Time** Tfer Desc. Source generator (D 12010039329 **Serial Number** 203 Das Day: 203 **Audit Day** 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** 1/23/2017 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 0.0000 0.0006 0.0005 -0.0001 V V 7 0.1000 0.0995 0.0993 -0.0002 7 0.3000 0.2997 0.2997 V V 0.0000 7 0.5000 0.4992 V V 0.00010.4991 7 0.7000 V V -0.0001 0.6997 0.6996 7 V V 0.9000 0.8993 0.8993 0.00007 0.9994 0.9994 V V 1.0000 0.0000

## Flow Data Form

Ifg	Serial Nun	nber Ta S	Site	Tec	hnician	Site Visit I	Date Paran	neter	Owner ID
pex	illegible		CNT169	Ма	rtin Valvur	07/21/2017	Flow F	Rate	000559
				Mfg	BIOS	F	arameter Flo	ow Rate	
				:	Serial Number	148613	Г	fer Desc. Bl	OS 220-H
				,	Tfer ID	01421			
					Slope	1	00153 Int	ercept	0.00366
					•				
				(	Cert Date	1/25	5/2017 <b>Co</b>	rrCoff	1.00000
OAS 1:		DAS 2:			Cal Factor Z	ero	-0.0	06	
Avg % Diff:	A Max % Di	A Avg %I	Dif A Max	% <b>Di</b>	Cal Factor F	ull Scale	0.9	97	
0.55%	0.99%				Rotometer R	eading:	3	5.7	
Desc.	Test type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E InputUn		OutputSigna	II PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.06	l/m	l/m	
primary	leak check	0.000	0.000	0.05	0.000	0.00	1/m	l/m	
primary	test pt 1	3.030	3.020	2.99	0.000	3.01	l/m	l/m	-0.33%
primary	test pt 2	3.040	3.030	2.97	0.000	3.02	1/m	l/m	-0.33%
primary	test pt 3	3.040	3.030	3.00	0.000	3.00	1/m	1/m	-0.99%
Sensor Compo	onent Leak Tes	st		Condition	1		Status	pass	
Sensor Compo	onent Tubing C	ondition		Condition	Good		Status	pass	
Sensor Compo	onent Filter Pos	sition		Condition	Good		Status	pass	
Sensor Compo	onent Rotomete	er Condition		Condition	Clean and dry		Status	pass	
Sensor Compo	onent Moisture	Present		Condition	No moisture p	resent	Status	pass	
Sensor Compo	Sensor Component Filter Distance Con			Condition	5.5 cm		Status	pass	
Sensor Compo	ensor Component Filter Depth Con			Condition	1.0 cm	Status	pass		
Sensor Compo	onent Filter Azi	muth	Condi		360 deg		Status	pass	_
Sensor Component System Memo C		Condition	1		Status	pass			

## **Ozone Data Form**

Mfg Se	erial Number Ta	Site	Tee	chnician		Site Vis	it Date	Parame	eter	Owner ID
ThermoElectron Inc 1	009241793	CNT169	Ma	artin Valv	ur	07/21/2	2017	Ozone		000620
Intercept 0.6	Slope: Intercept 19992 CorrCoff	0.00000 0.00000 0.00000	)	Mfg Serial N	umber	Thermol 49CPS-	Electron 70008-36		rameter ozo	one primary stan
DAS 1:	DAS 2:	(D10 135 0	V 5.	Slope			1.0046	6 Inter	cept	0.01298
<b>A Avg % Diff: A Ma</b>	8.2% A Avg %	6Dif A Max 9	% Di	Cert Da	te		1/1/201	7 Corr	·Coff	1.00000
UseDescription	ConcGroup	Tfer Raw	Tfer	Corr	C:	te	Site	e Unit	PctDiff	faranca
primary	1	0.30	0.2			59	ppb	Z OIIIt	1 CtDIII	referee
primary	2	14.83	14.	74	15	.87	ppb			7.67%
primary	3	34.96	34.			.63	ppb			8.19%
primary	4	68.26	67.		72		ppb			7.29%
primary	5	112.01	111		117	7.20	ppb			5.14%
Sensor Component	Sample Train		Conditio	Good				Status	pass	
Sensor Component	22.5 degree rule		Conditio	on				Status	pass	
<b>Sensor Component</b>	Inlet Filter Conditio	n	Conditio	n Clean				Status	pass	
<b>Sensor Component</b>	Battery Backup		Conditio	n N/A				Status	pass	
Sensor Component	Offset		Conditio	on -0.30				Status	pass	
<b>Sensor Component</b>	Span		Conditio	n 1.011				Status	pass	
<b>Sensor Component</b>	Zero Voltage		Conditio	n N/A				Status	pass	
Sensor Component	Fullscale Voltage		Conditio	n N/A				Status	pass	
<b>Sensor Component</b>	Cell A Freq.		Conditio	91.0 k	Hz			Status	pass	
Sensor Component	Cell A Noise		Conditio	0.6 pp	b			Status	pass	
Sensor Component	Cell A Flow		Conditio	on 0.61 l	om			Status	pass	
Sensor Component	Cell A Pressure		Conditio	508.6	mmHg			Status	pass	
Sensor Component	Cell A Tmp.		Conditio	34.1 C	;			Status	pass	
Sensor Component	Cell B Freq.		Conditio	91.0 k	Hz			Status	pass	
Sensor Component	Cell B Noise		Conditio	0.6 pp	b			Status	pass	
Sensor Component	Cell B Flow		Conditio	o.61 l	om			Status	pass	
Sensor Component	Cell B Pressure		Conditio	508.3	mmHg			Status	pass	
Sensor Component	Cell B Tmp.		Conditio	on				Status	pass	
Sensor Component	Line Loss		Conditio	Not te	sted			Status	pass	
Sensor Component	System Memo		Conditio	on				Status	pass	

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg RM Young 14606 CNT169 Martin Valvur 07/21/2017 Temperature 06501 Parameter Temperature Mfg Fluke Tfer Desc. RTD 3275143 **Serial Number** 01229 **Tfer ID** 1.00006 0.03191 **Slope Intercept DAS 1: DAS 2:** 1/23/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.11 0.21 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.26 0.23 0.000 0.3 C 0.08 18.99 19.0 C Temp Mid Range 19.02 0.000 0.03 primary 0.000 46.8 C -0.21 primary Temp High Range 47.07 47.04 Condition Clean Sensor Component | Shield **Status** pass Sensor Component Blower Status pass **Condition** N/A Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Martin Valvur 07/21/2017 Shelter Temperature Campbell CNT169 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** 1.74 1.92 01229 **Tfer ID** 1.00006 0.03191 Slope Intercept 1/23/2017 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	25.68	25.65	0.000	24.1	C	-1.51
primary	Temp Mid Range	25.71	25.68	0.000	23.8	С	-1.92
primary	Temp Mid Range	27.61	27.58	0.000	25.8	C	-1.8
Sensor Con	ponent System Memo	)	Condition		Status	pass	

### **Infrastructure Data For**

Si	te ID	CNT169	Technician	Martin Valvur	Site Visit Date	07/21/2017	
	Shelter Ma	ake	Shelter Model	S	Shelter Size		
	Ekto		8810 (s/n 2149-	19)	640 cuft		
				8		A CONTRACTOR OF THE PARTY OF TH	

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

# **Field Systems Comments**

1 Parameter: SiteOpsProcedures

The ozone inlet filter is changed once each month and the ozone sample line is leak tested every two weeks.

2 Parameter: ShelterCleanNotes

The shelter is dirty. Some floor tiles are old and broken

### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 07/21/2017 CNT169 Technician | Martin Valvur Site ID Centennial **USGS Map EPA** Site Sponsor (agency) Map Scale Forest Service **Operating Group Map Date** 56-001-9991 AQS# R.M. Young **Meteorological Type** Air Pollutant Analyzer Ozone **QAPP** Latitude 41.3722 **QAPP** Longitude -106.2422 dry, wet **Deposition Measurement** 3178 **Land Use** woodland - evergreen **QAPP Elevation Meters** 10.9 Terrain complex **QAPP Declination** Marginally 12/28/2004 Conforms to MLM **OAPP Declination Date** (307) 742-7229 41.364531 **Site Telephone Audit Latitude** Brooklyn Lake Guard Station **Audit Longitude** -106.24002 Site Address 1 Medicine Bow National Forest Site Address 2 **Audit Elevation** 3175 Albany 9.5 County **Audit Declination** Centennial, WY City, State **Present** Fire Extinguisher 82055 New in 2015 Zip Code Mountain First Aid Kit Time Zone **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **Climbing Belt** Primary Op. E-mail **Security Fence Backup Operator V Secure Shelter** Backup Op. Phone # Stable Entry Step Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 (s/n 2149-19) Ekto **Shelter Size** 640 cuft Notes The shelter is dirty. Some floor tiles are old and broken Shelter Clean **✓** Notes Site OK From Laramie take route 130 west to Centennial. Continue through town and into the Medicine Bow National Forest. **Driving Directions**

Turn right near the summit onto a dirt road at the sign for Brooklyn Lake Campground. Continue approximately 1.5 miles to Little Brooklyn Lake. There will be a small chapel on the right. Park at the chapel and walk approximately

200 meters up the hill past the chapel to the site.

# Field Systems Data Form

F-02058-1500-S2-rev002

Site ID CNT169 Technician Martin Valvur Site Visit Date 07/21/2017

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

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

Fie	eld Sys	stems Data Fo	orm				F-020	58-15	500-S3	-rev002
Site	e ID	CNT169	Technician	Martin Valvur		Site Visit Date	07/21/2017			
1		d speed and direction fluenced by obstruction		as to avoid	<b>✓</b>	N/A				
2	(i.e. wind horizont	d sensors mounted so d sensors should be 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	Are the	tower and sensors plu	mb?		<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>					
6	Is the so	lar radiation sensor p	lumb?		<b>✓</b>	N/A				
7	Is it sited light?	d to avoid shading, or	any artificial o	r reflected	✓	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 buil	dings, trees,	<b>✓</b>	N/A				
10	Is the sur	rface wetness sensor sorth?	sited 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?

Fie	eld Systems Data Form	F-02058-1500-S4-rev002
Site	ID CNT169 Technician Martin Valvur	Site Visit Date 07/21/2017
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	✓ Temperature only
2	Are all the meteorological sensors operational online, and reporting data?	
3	Are the shields for the temperature and RH sensors clean?	
4	Are the aspirated motors working?	✓ N/A
5	Is the solar radiation sensor's lens clean and free of scratches?	✓ N/A
6	Is the surface wetness sensor grid clean and undamaged?	✓ N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	
	de any additional explanation (photograph or sketch if necessal or man-made, that may affect the monitoring parameters:	ssary) regarding conditions listed above, or any other features,

### Field Systems Data Form F-02058-1500-S5-rev002 CNT169 Technician | Martin Valvur Site Visit Date 07/21/2017 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	CNT169	Technician	Martin Valvur		Site Vis	sit Date 07/21/2	017	
	DAS, ser	nsor translators, and	peripheral equi	oment operation	ıs an	d maintena	ance		
1	Do the I	OAS instruments appe		_					
2		he components of the backup, etc)	DAS operations	al? (printers,	✓				
3		nalyzer and sensor sig g protection circuitry		hrough	✓	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?	✓				
6	Are the grounde	DAS, sensor translated?	ors, and shelter p	properly	<b>✓</b>				
7	Does the	e instrument shelter h	ave a stable pow	ver source?	<b>✓</b>				
8	Is the in	strument shelter temp	oerature control	led?	<b>✓</b>				
9	Is the m	et tower stable and gr	ounded?			Stable		Grounded	
10	Is the sa	mple tower stable and	d grounded?			<u> </u>			
11	Tower c	omments?							
		additional explanatio an-made, that may af				y) regardin	g conditions list	ted above, or a	any other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 CNT169 Technician | Martin Valvur Site Visit Date 07/21/2017 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** П Temperature sensor Strip chart recorder **✓ V** Relative humidity sensor Computer **V** Solar radiation sensor **V** Modem П **V V Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V V Humidity sensor translator Surge protector** П **V V UPS Solar radiation translator ~ V** Tipping bucket rain gauge Lightning protection device ~ $\checkmark$ **Shelter heater** Ozone analyzer ~ **✓** Filter pack flow controller Shelter air conditioner **~** Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF ✓ V ✓ V Site Ops Manual** Feb 2014 **V HASP V** Feb 2014 **✓ Field Ops Manual V** Feb 2014 **Calibration Reports V V** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,

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

### **Field Systems Data Form** F-02058-1500-S8-rev002 CNT169 Site Visit Date 07/21/2017 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 **V V** As needed Manual Zero/Span Tests **V ~** Daily **Automatic Precision Level Tests V Manual Precision Level Test** As needed **V V** Weekly **Analyzer Diagnostics Tests V** 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** 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? ✓ SSRF, call-in Are the automatic and manual z/s/p checks monitored and

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

The ozone inlet filter is changed once each month and the ozone sample line is leak tested every two weeks.

reported? If yes, how?

Fi	eld Sy	stems Data Form				F-02058-15	500-S9-rev002
Sit	e ID	CNT169 Ted	hnician Martin Valvur		Site Visit Date	07/21/2017	
	Site ope	ration procedures					
1	Is the fil	ter pack being changed ever	y Tuesday as scheduled	<b>?</b> ✓	filter changed afterno	ons, 80% of the time	
2	Are the correctly	Site Status Report Forms be y?	ing completed and filed	<b>✓</b>			
3	Are data	a downloads and backups be ed?	ing performed as		No longer required		
4	Are gen	eral observations being mad	e and recorded? How?	<b>✓</b>	SSRF, logbook		
5	Are site fashion?	supplies on-hand and replen	nished in a timely	<b>✓</b>			
6	Are sam	ple flow rates recorded? Ho	w?	<b>✓</b>	SSRF, call-in		
7	Are sam	ples sent to the lab on a regu	ılar schedule in a timely	✓			
8		ers protected from contamination	ation during handling	<b>✓</b>	Clean gloves on and	off	
9		site conditions reported regu ons manager or staff?	llarly to the field	<b>✓</b>			
QC	Check Po	erformed	Frequency		(	Compliant	
ľ	Multi-poir	nt MFC Calibrations	<b>✓</b> Semiannually		Ŀ	✓	
I	Flow Syste	em Leak Checks	✓ Weekly		Į.	✓	
I	Filter Pacl	k Inspection					
I	Flow Rate	<b>Setting Checks</b>	✓ Weekly			✓	
•	Visual Ch	eck of Flow Rate Rotometer	✓ Weekly			✓	
I	In-line Fil	ter Inspection/Replacement	✓ Semiannually			<b>✓</b>	
5	Sample Li	ne Check for Dirt/Water	✓ Weekly		Į.	<b>✓</b>	
		dditional explanation (photo n-made, that may affect the			y) regarding condition	ns listed above, or a	ny other features,

# Field Systems Data Form

## F-02058-1500-S10-rev002

CNT169 Site ID

**Technician** Martin Valvur

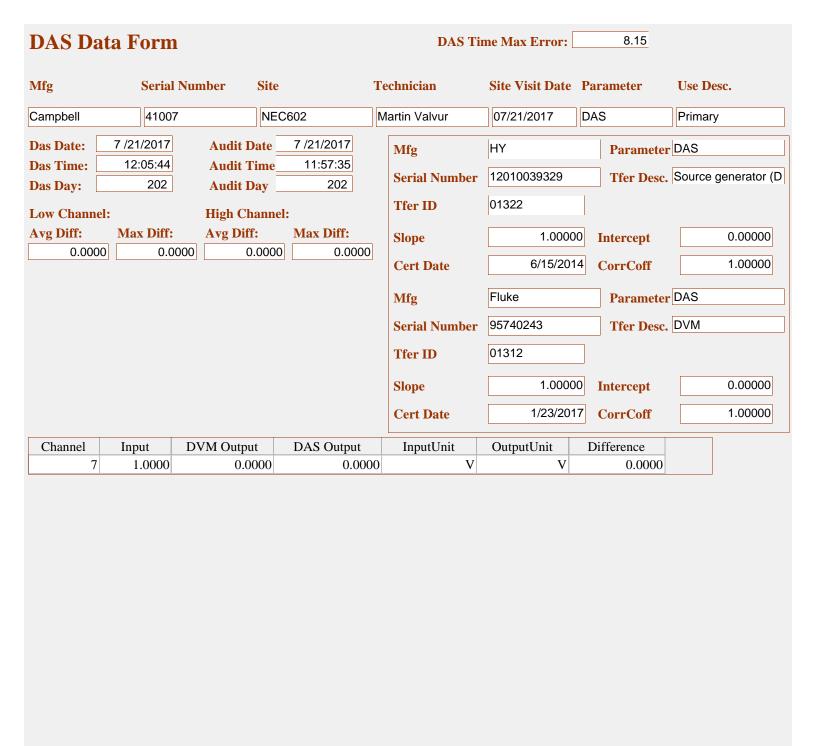
Site Visit Date 07/21/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07038
DAS	Campbell	CR3000	2515	000417
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	1192001900	02753
Flow Rate	Apex	AXMC105LPMDPC	illegible	000559
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0844349098	06600
Ozone	ThermoElectron Inc	49i A1NAA	1009241793	000620
Ozone Standard	ThermoElectron Inc	49i A3NAA	0622717856	000215
Sample Tower	Aluma Tower	В	unknown	000179
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	14606	06501
Zero air pump	Werther International	C 70/4	000836220	06925

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
NEC	C602-Martii	n Valvur-07/21/2017				
1	7/21/2017	DAS	Campbell	none	CR1000	41007
2	7/21/2017	elevation	Elevation	none	none	none
3	7/21/2017	Filter pack flow pump	Thomas	none	107CAB18	061200041880
4	7/21/2017	Flow Rate	Omega	none	FMA6518ST-RS232	324333-1
5	7/21/2017	Infrastructure	Infrastructure	none	none	none
6	7/21/2017	MFC power supply	Sceptre	none	FMA65PWC	295106-8
7	7/21/2017	Ozone	ThermoElectron Inc	none	49i A1NAA	1214552974
8	7/21/2017	Ozone Standard	ThermoElectron Inc	L0534683	49i E3CAA	1214552972
9	7/21/2017	Precipitation	Met One	none	375	T15381
10	7/21/2017	Relative Humidity	Vaisala	none	HMP45AC	C2730143
11	7/21/2017	Sample Tower	Unknown	none	Unknown	None
12	7/21/2017	Shelter Temperature	ARS	none	Thermocouple	none
13	7/21/2017	siting criteria	Siting Criteria	none	none	None
14	7/21/2017	Solar Radiation	Licor	none	Pyranometer	Illegible
15	7/21/2017	Temperature2meter	Vaisala	none	HMP45AC	C2730143
16	7/21/2017	Wind Direction	Met One	none	024	D3049
17	7/21/2017	Wind Speed	Met One	none	014	K2275
18	7/21/2017	Zero air pump	Thomas	none	107CAB18	081000036785



# Flow Data Form

Ifg		mber Ta S			hnician	Site Visit I			Owner ID
Omega	324333-1		NEC602	Ма	rtin Valvur	07/21/2017	7 Flow F	Rate	none
Mfg	Sceptre				Mfg	BIOS	F	arameter Flo	ow Rate
SN/Owner ID	295106-8	none			Serial Number	148613	1	fer Desc. Blo	OS 220-H
Parameter	MFC power s	ınnly		,	Tfer ID	01421			
1 arameter	Will O power 3	арріу					00450 -		0.0000
				;	Slope	1.	00153 Int	ercept	0.0036
					Cert Date	1/2	5/2017 <b>Co</b>	rrCoff	1.0000
DAS 1:		<b>DAS 2:</b>			Cal Factor Z	ero	0.:	29	
A Avg % Diff:	A Max % Di	A Avg %I	Dif A Max	% <b>Di</b>	Cal Factor F	ull Scale	1.1	18	
3.01%	4.16%				Rotometer R	leading:		0	
Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	I PctDifference
primary	pump off	0.000	0.000	0.00	0.000	0.29	l/m	1/m	
primary	leak check	0.000	0.000	0.00	0.000	0.29	l/m	1/m	
primary	test pt 1	3.709	3.700	0.00	0.000	3.64	l/m	1/m	-1.51%
primary	test pt 2	3.766	3.760	0.00	0.000	3.63	l/m	1/m	-3.35%
primary	test pt 3	3.812	3.800	0.00	0.000	3.64	l/m	l/m	-4.16%
Sensor Compo	onent Leak Te	est		Condition	1		Status	pass	
Sensor Compo	onent Tubing	Condition		Condition	Good		Status	pass	
Sensor Compo	onent Filter Po	sition		Condition	Poor	Poor		Fail	
Sensor Compo	onent Rotome	ter Condition	l	Condition	N/A		Status	pass	
Sensor Compo				Condition	No moisture p	resent	Status	pass	
Sensor Compo	onent Filter D	stance		Condition	4.5 cm		Status	pass	
Sensor Compo				Condition			Status	Fail	
Sensor Component Filter Azimuth			Condition				pass		
Sensor Component System Memo				Condition	,			pass	

# **Ozone Data Form**

Mfg Se	erial Number Ta	Site	Te	chnician		Site Visi	it Date	Parame	eter Owner	( <b>D</b>
ThermoElectron Inc 1	214552974	NEC602	Ma	artin Valv	ur	07/21/2	017	Ozone	none	
Intercept -0.1	Slope: Intercept CorrCoff	0.00000	D	Mfg Serial N Tfer ID	umber	Thermole 49CPS-7			rameter ozone er Desc. Ozone primar	y stan
DAS 1: A Avg % Diff: A Ma: 4.3%	DAS 2: x % Di	6Dif A Max 9	% Di	Slope Cert Da	te		1.0046			1298 0000
UseDescription	ConcGroup	Tfer Raw	Tfer	Corr	Si	te	Site	e Unit	PctDifference	
primary	1	0.17	0.1		0.3		ppb		1.00	
primary primary	3	15.21 37.16	15. 36.			.20	ppb		-6.08% -3.90%	
primary	4	65.59	65.		62		ppb ppb		-3.78%	
primary	5	107.60	107		103		ppb		-3.44%	
Sensor Component	Sample Train		Condition	Good				Status	pass	
Sensor Component	22.5 degree rule		Condition	on				Status	pass	
Sensor Component	Inlet Filter Conditio	n	Condition	n Clean				Status	pass	
Sensor Component	Battery Backup		Conditio	n N/A				Status	pass	
Sensor Component	Offset		Conditio	on -0.6				Status	pass	
Sensor Component	Span		Conditio	n 1.013				Status	pass	
Sensor Component	Zero Voltage		Condition	n N/A				Status	pass	
Sensor Component	Fullscale Voltage		Condition	n N/A				Status	pass	
Sensor Component	Cell A Freq.		Condition	98.8 k	Hz			Status	pass	
Sensor Component	Cell A Noise		Condition	0.9 pp	b			Status	pass	
Sensor Component	Cell A Flow		Condition	on 0.63 l	om			Status	pass	
Sensor Component	Cell A Pressure		Conditio	on 628.9	mmHg			Status	pass	
Sensor Component	Cell A Tmp.		Conditio	35.0 C	)			Status	pass	
Sensor Component	Cell B Freq.		Conditio	on 82.5 k	Hz			Status	pass	
Sensor Component	Cell B Noise		Conditio	0.8 pp	b			Status	pass	
Sensor Component	Cell B Flow		Conditio	o.65 l	om			Status	pass	
Sensor Component	Cell B Pressure		Condition	on 628.9	mmHg			Status	pass	
Sensor Component	Cell B Tmp.		Condition	on				Status	pass	
Sensor Component	Line Loss		Condition	Not te	sted			Status	pass	
Sensor Component	System Memo		Condition	on				Status	pass	

#### **Wind Speed Data Form** Mfg Serial Number Ta **Technician** Site Visit Date Parameter Owner ID NEC602 Wind Speed Met One K2275 Martin Valvur 07/21/2017 none Parameter wind speed Mfg RM Young Tfer Desc. wind speed motor (I **Serial Number** 01261 Tfer ID 1.00000 0.00000 **Slope Intercept** N/A Prop or Cups SN 0 **to** 0 **Prop or Cups Torque** 1/26/2017 **Cert Date CorrCoff** 1.00000 **Prop Correction Fact** N/A RM Young Parameter wind speed Mfg CA4353 Tfer Desc. wind speed motor (h **Serial Number** 01457 Tfer ID 1.00000 0.00000 **Slope Intercept** 4/13/2017 1.00000 **Cert Date** CorrCoff **DAS 1: DAS 2:** Low Range **High Range** Low Range **High Range** 0.15 0.89% Abs Avg Err 0.25 1.94% Abs Max Er UseDescription: Input RPM Out V Diff/ % Diff Diff WsM Input Device Input m/s DAS m/s primary none 0.20 0.0 0.5 0.25 0 01261 40 1.67 0.0 1.6 -0.03 primary primary 01261 80 2.75 0.0 2.9 0.10 4.26 0.0 4.1 -0.21 01261 140 primary 6.1 primary 01261 210 6.07 0.0 -0.33% 400 11.11 0.0 11.3 primary 01457 1.26% 22.22 01457 800 0.0 22.7 1.94% primary primary 01457 1800 48.44 0.0 48.5 0.02% Sensor Component | Condition **Condition** Good **Status** pass Sensor Component Prop or Cups Condition **Condition** Good **Status** pass Sensor Component | Sensor Heater **Condition** N/A **Status** pass Sensor Component | Torque **Condition** Not tested **Status** pass

**Condition** Plumb

Condition | See comments

**Status** pass

Status pass

Sensor Component | Sensor Plumb

**Sensor Component** System Memo

#### Wind Direction Data Form **Technician** Site Visit Date Parameter Owner ID Mfg Serial Number Ta Martin Valvur Wind Direction Met One D3049 NEC602 07/21/2017 none Mfg RM Young Parameter wind direction Tfer Desc. wind direction wheel **Serial Number** 01266 Tfer ID Slope 1.00000 **Intercept** 0.00000 Vane SN: N/A C. A. Align. deg. true: 0 **to** 352 0 VaneTorque 1/1/2006 1.00000 Cert Date CorrCoff Parameter wind direction Ushikata Mfg **Serial Number** 190037 Tfer Desc. transit Tfer ID 01265 1.00000 0.00000 **Slope Intercept Cert Date** 2/8/2017 CorrCoff 1.00000 **DAS 1: DAS 2:** Orientation **Linearity: Orientation Linearity:** 18.3 Abs Avg Err Abs Max Er 21 Input Raw UseDescription TferID Linearity Output V Output Deg. Difference Change Error primary 01265 82 0.000 65 17 17 01265 172 0.000 157 15 15 primary 01265 262 0.000 241 21 21 primary 01265 352 0.000 332 20 20 primary **Condition** Good Sensor Component | Condition Status pass **Condition** Poor **Sensor Component** Mast **Status** Fail Sensor Component | Sensor Heater **Condition** N/A **Status** pass Sensor Component | Sensor Plumb Status pass **Condition** Plumb **Condition** Not tested Sensor Component | Torque Status pass

**Condition** Good

**Condition** See comments

**Status** pass

Status pass

Sensor Component Vane Condition

**Sensor Component** System Memo

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Vaisala NEC602 Martin Valvur 07/21/2017 Temperature C2730143 none Mfg Fluke Parameter Temperature Tfer Desc. RTD 3275143 **Serial Number** 01229 **Tfer ID** 0.03191 **Slope** 1.00006 **Intercept DAS 1: DAS 2:** 1/23/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.63 1.10 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.16 0.13 0.000 1.2 $\mathbf{C}$ 1.1 C Temp Mid Range 24.20 24.17 0.000 24.8 0.63 primary 47.9 C primary Temp High Range 47.80 47.77 0.000 0.17 Sensor Component | Shield Condition Clean **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Condition See comments Status pass

#### **Humidity Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg NEC602 Martin Valvur 07/21/2017 Relative Humidity Vaisala C2730143 none Mfg Rotronic **Parameter** Relative Humidity Tfer Desc. GTL 75296 **Serial Number** 01220 **Tfer ID** 0.06850 **Slope** 0.99780 **Intercept Cert Date** 1/23/2017 0.99994 CorrCoff **DAS 1: DAS 2:** Low Range **High Range** Low Range **High Range** 0.9 1.2 **Abs Avg Err** 1.6 1.2 **Abs Max Er** UseDesc. Test type Device Input RH GTL Raw RH Corr. **DAS Volts** DAS %RH Difference RH Low Range GTL 40.6 0.000 0.2 primary 32.8 32.8 33.0 55.0 0.000 1.6 primary RH Low Range GTL 52.9 52.9 54.5 primary RH High Range GTL 93.6 88.5 93.6 0.000 92.4 -1.2 Condition Clean Status pass Sensor Component | RH Filter 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 NEC602 Martin Valvur 07/21/2017 Solar Radiation Licor Illegible none Mfg Eppley Parameter solar radiation Tfer Desc. SR transfer sensor 23824 **Serial Number** 01247 **Tfer ID** 1.00000 0.00000 **Slope Intercept DAS 1: DAS 2:** 2/16/2017 1.00000 % Diff of Avg %Diff of Max %Diff of Avg %Diff of Max **Cert Date** CorrCoff 3.6% 6.5% 0.0% 0.0% UseDescription Measure Date MeasureTime Tfer Corr PctDifference Tfer Raw DAS w/m2 -10.7% primary 7/21/2017 10:00 583 583 521 7/21/2017 11:00 736 736 747 1.5% primary 7/21/2017 primary 12:00 672 672 677 0.7% -6.5% primary 7/21/2017 13:00 821 821 768 Status pass Sensor Component | Sensor Clean Condition Clean Sensor Component | Sensor Level Condition Level **Status** pass Condition Properly sited Sensor Component | Properly Sited Status pass Sensor Component | System Memo Status pass Condition

# **Precipitation Data Form**

Mfg	S	erial N	lumber Ta	Site		Tecl	hnician		Site	Visit Date	Paramo	eter		Owner ID
Met One		Г15381		NEC602		Mai	rtin Valvur		07/2	21/2017	Precipit	ation		none
						I	Mfg		PMF	)	Pa	ramete	Pre	cipitation
DAS 1:			<b>DAS 2:</b>			9	Serial Nun	ıber	Non	е	Tf	er Desc	250	ml graduate
<b>A Avg % Dif</b>		<b>x % D</b> 3.5	<u>_</u>	oDif A N	Max % Di	7	Tfer ID		0124	19				
1.070	<u> </u>	0.0	70			5	Slope			1.0000	0 Inte	rcept		0.00000
						•	Cert Date			4/26/201	3 Corr	Coff		1.00000
UseDesc.	Test t	ype	TferVolume	Iteration	TimePerT	ip	Eq.Ht	DAS	Seng	Eq.HtUnit	OSE Ur	it Tfer	Units	PctDifference
primary	test 1		231.5	1	13 sec		7.11		11	mm	mm		ml	0.0%
primary	test 2		231.5	2	15 sec		7.11	7.	36	mm	mm	r	nl	3.5%
Sensor Con	ponent	Prope	rly Sited		Cond	itior	Properly sited Status pass			pass				
Sensor Com	ponent	Gauge	e Drain Scree	en	Cond	itior	on Installed				Status	pass		
Sensor Con	ponent	Funne	el Clean		Cond	itior	n Clean				Status	pass		
Sensor Con	ponent	Condi	tion		Cond	itior	Good				Status	pass		
Sensor Con	ponent	Gauge	e Screen		Cond	itior	on Installed				Status	pass		
Sensor Con	ponent	Gauge	e Clean		Cond	itior	Clean				Status	pass		
Sensor Com	Sensor Component Level			Cond	itior	Level				Status	pass			
Sensor Component		Senso	or Heater		Cond	itior	N/A				Status	pass		
Sensor Component		Syste	m Memo		Cond	itior	ı				Status	pass		

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Martin Valvur ARS NEC602 07/21/2017 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** 0.49 0.97 01229 **Tfer ID** 1.00006 0.03191 **Slope** Intercept 1/23/2017 1.00000 **Cert Date** CorrCoff OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. 0.000-0.97 primary Temp Mid Range 26.88 26.85 25.9 C 27.50 27.47 0.000 C 0.23 Temp Mid Range 27.7

0.000

27.7

C

Status pass

-0.28

27.99

Condition

28.02

primary primary

Temp Mid Range

Sensor Component | System Memo

### **Infrastructure Data For**

Site ID NEC602 Technician Martin Valvur Site Visit Date 07/21/2017

Shelter Make	Shelter Model	Shelter Size
Shelter One	AR 263648	24 cuft

Sensor Component	Sample Tower Type	Condition	Other	Status pa	ass
Sensor Component	Conduit	Condition	Good	Status pa	ass
Sensor Component	Met Tower	Condition	Good	Status pa	ass
Sensor Component	Moisture Trap	Condition	Not installed	Status pa	ass
Sensor Component	Power Cables	Condition	Fair	Status pa	ass
Sensor Component	Shelter Temp Control	Condition	Functioning	Status pa	ass
Sensor Component	Rotometer	Condition	Not installed	Status pa	ass
Sensor Component	Sample Tower	Condition	Good	Status pa	ass
Sensor Component	Shelter Condition	Condition	Good	Status pa	ass
Sensor Component	Shelter Door	Condition	Good	Status pa	ass
Sensor Component	Shelter Roof	Condition	Good	Status pa	ass
Sensor Component	Shelter Floor	Condition	N/A	Status pa	ass
Sensor Component	Signal Cable	Condition	Good	Status pa	ass
Sensor Component	Tubing Type	Condition	3/8 teflon	Status pa	ass
Sensor Component	Sample Train	Condition	Good	Status pa	ass

# **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate The filter attachment	NEC602	Martin Valvur	07/21/2017	Filter Position	Omega	3842	Standard o	<b>✓</b>
orientation.	place is mounted	too low in the enclos	sure resulting in	the finer being expo	osed to wind-dr	iven ram and m the	standard g	cometre
Wind Direction	NEC602	Martin Valvur	07/21/2017	System Memo	Met One	4367		
The wind direction ser	nsor mast is loose	e on the tower causin	ng inaccurate wir	nd direction measur	ement.			
Wind Speed	NEC602	Martin Valvur	07/21/2017	System Memo	Met One	4368		
One set screw is stripp	ped.			•				

## **Field Systems Comments**

### 1 Parameter: SiteOpsProcComm

The site operator is doing a good job with filter change and filter handling. The site operator reported that sometimes it requires a few requests to ARS before assistance is received.

### 2 Parameter: SiteOpsProcedures

The site operator is aware that the desiccant is in need of replacement. Some of the items on the SSRF were discussed and the site operator's questions were answered regarding the correct procedures.

### 3 Parameter: DocumentationCo

The site operator received a disc with the current QAPP which is kept at his office.

### 4 Parameter: SitingCriteriaCom

The site is located approximately 2 km northeast of Newcastle WY which has a population of approximately 3500. There is an oil refinery in Newcastle. A heavily traveled road is approximately 100m west of the site.

### 5 Parameter: ShelterCleanNotes

The shelter houses the ozone, DAS, and MFC only.

### **6 Parameter:** MetSensorComme

Some objects violate the 45 degree rule for the tipping bucket rain gage. The wind sensor mast is loose on the sample tower. The site operator reported that the tower was dropped a couple of weeks before by the backup site operator. This may have caused the damage to the wind sensor mast.

### 7 Parameter: MetOpMaintCom

The temperature / humidity sensor had fallen out of the naturally aspirated shield and was hanging by the signal cable from the top of the tower. The site operator reported that it had been that way probably since the tower was dropped by the backup site operator a couple of weeks before. It was reinstalled in the shield by the audit team following the audit.

### F-02058-1500-S1-rev002 Field Systems Data Form Technician Martin Valvur Site Visit Date 07/21/2017 Site ID NEC602 **USGS Map EPA** Site Sponsor (agency) **Map Scale** BLM **Operating Group Map Date** 560450003 AQS# Met One **Meteorological Type Air Pollutant Analyzer QAPP** Latitude **Deposition Measurement QAPP** Longitude **Land Use QAPP Elevation Meters** Terrain **QAPP Declination** Conforms to MLM **OAPP Declination Date** 43.8731 **Site Telephone Audit Latitude** -104.192009 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 1469 Weston 8.2 County **Audit Declination** Newcastle, WY City, State **Present** Fire Extinguisher 82701 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 AR 263648 24 cuft Make Shelter One **Shelter Size** Notes The shelter houses the ozone, DAS, and MFC only. **Shelter Clean** Site OK Notes

**Driving Directions** 

# **Field Systems Data Form**

F-02058-1500-S2-rev002

Site ID	NEC602	Technician	Martin Valvur	Site Visit Date	07/21/2017
Site ID	INECOUZ	1 echnician	iviai iiii vaivui	Site visit Date	01/21/2011

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

Siting Distances OK  $\Box$ 

**Siting Criteria Comment** 

The site is located approximately 2 km northeast of Newcastle WY which has a population of approximately 3500. There is an oil refinery in Newcastle. A heavily traveled road is approximately 100m west of the site.

### **Field Systems Data Form** F-02058-1500-S3-rev002 Site Visit Date 07/21/2017 Technician | Martin Valvur Site ID NEC602 **~** 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? **~** 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:

Some objects violate the 45 degree rule for the tipping bucket rain gage. The wind sensor mast is loose on the sample tower. The site operator reported that the tower was dropped a couple of weeks before by the backup site operator. This may have caused the damage to the wind sensor mast.

## **Field Systems Data Form** F-02058-1500-S4-rev002 Site ID NEC602 Technician | Martin Valvur Site Visit Date 07/21/2017 **~** Do all the meterological sensors appear to be intact, in good condition, and well maintained? **~** Are all the meteorological sensors operational online, and reporting data? **~** Are the shields for the temperature and RH sensors clean? 3 **✓** N/A Are the aspirated motors working? **~** Is the solar radiation sensor's lens clean and free of scratches? **✓** N/A Is the surface wetness sensor grid clean and undamaged? **~** Are the sensor signal and power cables intact, in good condition, and well maintained? **✓** Are the sensor signal and power cable connections protected from the elements and well maintained? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters: The temperature / humidity sensor had fallen out of the naturally aspirated shield and was hanging by the signal cable from the top of the tower. The site operator reported that it had been that way probably since the tower was dropped by the backup site operator a couple of weeks before. It was reinstalled in the shield by the audit team following the audit.

## Field Systems Data Form F-02058-1500-S5-rev002 NEC602 Technician | Martin Valvur Site Visit Date 07/21/2017 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 Nylon by 10 meters **~** 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 Not present 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

e ID	NEC602	Technician	Martin Valvur		Site Vis	sit Date 07/21/20	17	
DAS, se	ensor translators, and	neripheral equi	oment operation	ns an	d maintena	ance		
			_			<u> </u>		
Do the well ma	DAS instruments appe iintained?	ear to be in good	condition and	<b>V</b>				
		DAS operationa	al? (printers,	<b>✓</b>				
			hrough		Not present			
		otected from the	e weather and	<b>✓</b>				
Are the	signal leads connected	d to the correct l	DAS channel?	<b>✓</b>				
		ors, and shelter p	properly	<b>✓</b>				
Does th	e instrument shelter h	ave a stable pow	ver source?	<b>✓</b>				
Is the in	nstrument shelter temp	perature control	led?	<b>✓</b>				
Is the n	net tower stable and gr	ounded?			Stable		Grounded	
Is the sa	ample tower stable and	d grounded?						
Tower	comments?				<b>V</b>		<b>V</b>	
					y) regardin	g conditions liste	d above, or a	any other features,
	DAS, so Do the well ma Are all modem Do the lightnin Are the well ma Are the ground Does th Is the in Is the so Tower of the solution of the s	DAS, sensor translators, and Do the DAS instruments apperwell maintained? Are all the components of the modem, backup, etc) Do the analyzer and sensor significant circuitry. Are the signal connections prowell maintained? Are the signal leads connected are the DAS, sensor translated grounded? Does the instrument shelter had sensor the instrument shelter temporary. It is the met tower stable and grounded and the sample tower stable and grounded and grounded and the sample tower stable and grounded and the sample tower stable and grounded and	DAS, sensor translators, and peripheral equipments of the DAS instruments appear to be in good well maintained?  Are all the components of the DAS operations modem, backup, etc)  Do the analyzer and sensor signal leads pass the lightning protection circuitry?  Are the signal connections protected from the well maintained?  Are the signal leads connected to the correct of the large of the larg	DAS, sensor translators, and peripheral equipment operation  Do the DAS instruments appear to be in good condition and well maintained?  Are all the components of the DAS operational? (printers, modem, backup, etc)  Do the analyzer and sensor signal leads pass through lightning protection circuitry?  Are the signal connections protected from the weather and well maintained?  Are the signal leads connected to the correct DAS channel?  Are the DAS, sensor translators, and shelter properly grounded?  Does the instrument shelter have a stable power source?  Is the instrument shelter temperature controlled?  Is the met tower stable and grounded?  Tower comments?	DAS, sensor translators, and peripheral equipment operations and well maintained?  Are all the components of the DAS operational? (printers, modem, backup, etc)  Do the analyzer and sensor signal leads pass through lightning protection circuitry?  Are the signal connections protected from the weather and well maintained?  Are the signal leads connected to the correct DAS channel?  Are the DAS, sensor translators, and shelter properly grounded?  Does the instrument shelter have a stable power source?  Is the instrument shelter temperature controlled?  Is the sample tower stable and grounded?  Tower comments?	DAS, sensor translators, and peripheral equipment operations and maintens well maintained?  Are all the components of the DAS operational? (printers, modem, backup, etc)  Do the analyzer and sensor signal leads pass through lightning protection circuitry?  Are the signal connections protected from the weather and well maintained?  Are the signal leads connected to the correct DAS channel?  Are the DAS, sensor translators, and shelter properly grounded?  Does the instrument shelter have a stable power source?  Is the instrument shelter temperature controlled?  Stable  Is the sample tower stable and grounded?  Tower comments?	DAS, sensor translators, and peripheral equipment operations and maintenance  Do the DAS instruments appear to be in good condition and well maintained?  Are all the components of the DAS operational? (printers, modem, backup, etc)  Do the analyzer and sensor signal leads pass through lightning protection circuitry?  Are the signal connections protected from the weather and well maintained?  Are the DAS, sensor translators, and shelter properly grounded?  Does the instrument shelter have a stable power source?  Is the instrument shelter temperature controlled?  Is the sample tower stable and grounded?  Is the sample tower stable and grounded?  Tower comments?	DAS, sensor translators, and peripheral equipment operations and maintenance  Do the DAS instruments appear to be in good condition and well maintained?  Are all the components of the DAS operational? (printers, modem, backup, etc)  Do the analyzer and sensor signal leads pass through lightning protection circuitry?  Are the signal connections protected from the weather and well maintained?  Are the signal leads connected to the correct DAS channel?  Are the DAS, sensor translators, and shelter properly grounded?  Does the instrument shelter have a stable power source?  Is the instrument shelter temperature controlled?  Is the met tower stable and grounded?  Tower comments?  Stable  Grounded  Tower comments?

#### Field Systems Data Form F-02058-1500-S7-rev002 NEC602 Site Visit Date 07/21/2017 Site ID Technician | Martin Valvur **Documentation** Does the site have the required instrument and equipment manuals? No Yes N/A No N/A Yes Wind speed sensor **Data logger V** $\checkmark$ П Wind direction sensor **Data logger V** $\checkmark$ П Temperature sensor Strip chart recorder **V** П **V** Relative humidity sensor Computer **V** П ✓ Solar radiation sensor Modem П П **V V Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V Temperature translator V** Filter flow pump **V ~ Humidity sensor translator Surge protector** П **V ~ UPS Solar radiation translator** $\checkmark$ **V** Tipping bucket rain gauge Lightning protection device ~ **✓ Shelter heater** Ozone analyzer ~ $\checkmark$ Filter pack flow controller Shelter air conditioner **~** Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log** Not present **SSRF ✓ V ✓ V Site Ops Manual** 2013 **V HASP ✓** 2013 **✓ Field Ops Manual** 2013 **V Calibration Reports** Not present Ozone z/s/p Control Charts Not present Preventive maintenance schedul Not present Is the station log properly completed during every site visit? Not present Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and

Provide any additional 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 received a disc with the current QAPP which is kept at his office.

current?

### Field Systems Data Form F-02058-1500-S8-rev002 NEC602 Site Visit Date 07/21/2017 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)** Not performed **Manual Rain Gauge Test ✓ V** Weekly **Confirm Reasonableness of Current Values V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **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 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 complete sample train including all filters? Unknown 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:

The site operator is aware that the desiccant is in need of replacement. Some of the items on the SSRF were discussed and the site operator's questions were answered regarding the correct procedures.

reported? If yes, how?

### Field Systems Data Form F-02058-1500-S9-rev002 NEC602 Technician | Martin Valvur Site Visit Date 07/21/2017 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 V** Weekly Flow System Leak Checks **Filter Pack Inspection V ✓** Weekly **Flow Rate Setting Checks** Not present **Visual Check of Flow Rate Rotometer V** ✓ Semiannually **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 site operator is doing a good job with filter change and filter handling. The site operator reported that sometimes it requires a few

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

requests to ARS before assistance is received.

# Field Systems Data Form

## F-02058-1500-S10-rev002

**Technician** Martin Valvur NEC602 Site ID

Site Visit Date 07/21/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR1000	41007	none
elevation	Elevation	none	none	none
Filter pack flow pump	Thomas	107CAB18	061200041880	none
Flow Rate	Omega	FMA6518ST-RS232	324333-1	none
Infrastructure	Infrastructure	none	none	none
MFC power supply	Sceptre	FMA65PWC	295106-8	none
Ozone	ThermoElectron Inc	49i A1NAA	1214552974	none
Ozone Standard	ThermoElectron Inc	49i E3CAA	1214552972	L0534683
Precipitation	Met One	375	T15381	none
Relative Humidity	Vaisala	HMP45AC	C2730143	none
Sample Tower	Unknown	Unknown	None	none
Shelter Temperature	ARS	Thermocouple	none	none
siting criteria	Siting Criteria	none	None	none
Solar Radiation	Licor	Pyranometer	Illegible	none
Temperature	Vaisala	HMP45A	C2730143	none
Wind Direction	Met One	024	D3049	none
Wind Speed	Met One	014	K2275	none
Zero air pump	Thomas	107CAB18	081000036785	none

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number				
PED108-Sandy Grenville-07/25/2017										
1	7/25/2017	Computer	Dell	07013	Inspiron 15	Unknown				
2	7/25/2017	DAS	Campbell	000406	CR3000	2511				
3	7/25/2017	Elevation	Elevation	None	1	None				
4	7/25/2017	Filter pack flow pump	Thomas	00564	107CA18	1088003022				
5	7/25/2017	Flow Rate	Apex	000461	AXMC105LPMDPCV	illegible				
6	7/25/2017	Infrastructure	Infrastructure	none	none	none				
7	7/25/2017	Modem	Raven	06587	V4221-V	0844353122				
8	7/25/2017	Ozone	ThermoElectron Inc	000732	49i A1NAA	1105347319				
9	7/25/2017	Ozone Standard	ThermoElectron Inc	000214	49i A3NAA	0622717855				
10	7/25/2017	Sample Tower	Aluma Tower	000788	В	unknown				
11	7/25/2017	Shelter Temperature	Campbell	none	107-L	none				
12	7/25/2017	Siting Criteria	Siting Criteria	None	1	None				
13	7/25/2017	Temperature	RM Young	06408	41342	14041				
14	7/25/2017	Zero air pump	Werther International	06883	C 70/4	000815257				

#### **DAS Data Form** 0 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2511 PED108 Sandy Grenville 07/25/2017 DAS Primary Das Date: 7 /25/2017 **Audit Date** 7 /25/2017 Datel Parameter DAS Mfg 11:28:51 11:28:51 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** 206 Das Day: 206 **Audit Day** Tfer ID 01320 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0002 0.0001 0.0002 0.0001 2/13/2012 1.00000 **Cert Date** CorrCoff Fluke **Parameter** DAS Mfg **Serial Number** 95740135 Tfer Desc. DVM 01311 Tfer ID 1.00000 0.00000 **Slope Intercept** 1/23/2017 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 0.2997 V V -0.0001 7 0.5000 0.4996 0.4995 V V -0.0001 7 0.7000 V V -0.0002 0.6996 0.6994 7 V V 0.9000 0.8994 0.8992 -0.00027 0.9993 0.9991 V V -0.0002 1.0000

# Flow Data Form

Mfg	Sei	rial Nun	ıber Ta	Site	Teo	chnician Site Visit Date		Date Paran	neter	Owner ID	
Арех	ille	egible		PED108	Sa	ndy Grenville	Grenville 07/25/2017		ate	000461	
						Mfg	BIOS	P	arameter	Flow Rate	
						Serial Number	103471	Т	fer Desc.	nexus	
						Tfer ID	01420				
						Slope	0.	99825 Int	ercept	0.00497	
						Cert Date	2/	7/2017 <b>Co</b>	rrCoff	0.99991	
						Mfg	BIOS	P	arameter	Flow Rate	
						Serial Number	103424	Т	fer Desc.	BIOS cell	
						Tfer ID	01410				
						Slope	0.	99825 Int	ercept	0.00497	
						Cert Date	2/	7/2017 <b>Co</b>	rrCoff	0.99991	
DAS 1:			DAS 2:		L	Cal Factor Z	ero		0		
A Avg % Diff:	A Max	% Di	A Avg %	Dif A Max	% Di	Cal Factor F	ull Scale	1.0	01		
2.04%		2.04%				Rotometer R	eading:	1.0	35		
Desc.	Tes	t type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSig	nall PctDifference	
primary	pump		0.000	0.000	0.01	0.000	0.01	l/m	l/m		
primary	leak cl		0.000	0.000	0.01	0.000	0.01	l/m	l/m		
primary	test pt		1.476	1.470	1.49	0.000	1.50	l/m	l/m	2.04%	
primary	test pt		1.474	1.470	1.49	0.000	1.50	1/m	l/m	2.04%	
primary	test pt		1.473	1.470	1.49	0.000	1.50	l/m	l/m	2.04%	
Sensor Comp	L				Conditio			Status	pass		
Sensor Comp	onent	Fubing C	ondition		Conditio	n Good		Status	pass		
Sensor Comp	onent	Filter Pos	ition		Conditio	n Good		Status	pass		
Sensor Comp	onent	Rotomete	er Conditio	n	Conditio	n Clean and dry		Status	pass		
Sensor Component Moisture Present		Conditio	n No moisture p	Status	pass						
Sensor Component Filter Distance			Conditio	<b>n</b> 5.0 cm	Status	Status pass					
Sensor Comp	onent	Filter Dep	oth			1.0 cm	Status	Status pass			
Sensor Comp	onent	Filter Azir	muth		Conditio	<b>n</b> 360 deg		Status	Status pass		
Sensor Comp	onent	System M	/lemo		Conditio	n		Status	pass		

# **Ozone Data Form**

Mfg S	erial Number Ta	Site	Technician		Site Visi	t Date Parame	ter Owner ID
ThermoElectron Inc 1	105347319	PED108	Sandy Gre	nville	07/25/20	Ozone	000732
Intercept 0.7	27661 Slope: 27925 Intercept 29999 CorrCoff	0.00000 0.00000 0.00000	Serial N	Number	ThermoE 5171121 01111	75 Tf6	rameter ozone er Desc. Ozone primary stan
A Avg % Diff: A Ma		6Dif A Max %					
1.3%	1.7%		Cert Da	ite 		3/21/2017 Corr	<b>Coff</b> 1.00000
UseDescription primary primary primary	ConcGroup 1 2 3	Tfer Raw 0.00 15.01 35.00	Tfer Corr -0.45 14.51 34.45	0. 14 34	.70 .80	Site Unit ppb ppb ppb	PctDifference  1.31%  1.02%
primary primary	5	68.03 110.00	67.40 109.26			ppb ppb	-1.19% -1.70%
Sensor Component			Condition Good			Status	
Sensor Component	22.5 degree rule		Condition			Status	pass
Sensor Component	Inlet Filter Condition	n	Condition Clear	<u> </u>		Status	pass
Sensor Component	Battery Backup		Condition N/A			Status	pass
Sensor Component	Offset		Condition -0.10			Status	pass
Sensor Component	Span		Condition 0.996			Status	pass
Sensor Component	Zero Voltage		Condition N/A			Status	pass
Sensor Component	Fullscale Voltage		Condition N/A			Status	pass
Sensor Component	Cell A Freq.		Condition 89.6	кНz		Status	pass
Sensor Component	Cell A Noise		Condition 0.7 pp	ob		Status	pass
Sensor Component	Cell A Flow		Condition 0.0 lp	m		Status	Fail
Sensor Component	Cell A Pressure		Condition 723.8	mmHg		Status	pass
Sensor Component	Cell A Tmp.		Condition 35.7	0		Status	pass
Sensor Component	Cell B Freq.		Condition 105.4	kHz		Status	pass
Sensor Component	Cell B Noise		Condition 0.7 pp	ob		Status	pass
Sensor Component	Cell B Flow		Condition 0.58	pm		Status	pass
Sensor Component	Cell B Pressure		Condition 722.9	mmHg		Status	pass
Sensor Component	Cell B Tmp.		Condition			Status	pass
Sensor Component	Line Loss		Condition Not to	ested		Status	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 14041 PED108 07/25/2017 Temperature 06408 Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 **Tfer ID** 0.14754 **Slope** 1.00759 **Intercept DAS 1: DAS 2:** 2/4/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.06 0.12 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.17 0.02 0.000 0.1 $\mathbf{C}$ 0.12 C 0.03 Temp Mid Range 25.07 24.73 0.000 24.8 primary 47.60 0.000 47.6 C -0.03 primary Temp High Range 48.11 Condition Clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Sandy Grenville 07/25/2017 Shelter Temperature Campbell PED108 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** 0.41 0.45 01227 **Tfer ID** 1.00759 0.14754 Slope Intercept 2/4/2017 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	23.41	23.09	0.000	23.5	C	0.37
primary	Temp Mid Range	25.35	25.01	0.000	25.4	С	0.42
primary	Temp Mid Range	27.00	26.65	0.000	26.2	С	-0.45
Sensor Con	nponent System Memo		Condition		Status	pass	

### **Infrastructure Data For**

Site ID PED108 Technician Sandy Grenville Site Visit Date 07/25/2017

Shelter Make	Shelter Model	Shelter Size
Ekto	8810 (s/n 2116-13)	640 cuft

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

## **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard Problem			
Ozone	PED108	Sandy Grenville	07/25/2017	Cell A Flow	ThermoElectron	3745				
This analyzer diagnostic check is outside the manufacturer's recommended value.										

## **Field Systems Comments**

1 Parameter: SitingCriteriaCom

The site is in a clearing in an evergreen plantation in the Prince Edward-Gallion State Forest. Trees were cut within the last 11 years to increase the size of the clearing. The tree line is encroaching again and is between 25 and 35 meters from the site.

2 Parameter: ShelterCleanNotes

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

#### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 07/25/2017 PED108 Technician Sandy Grenville Site ID Green Bay **USGS Map EPA** Site Sponsor (agency) Map Scale Private **Operating Group Map Date** 51-147-9991 AQS# Climatronics **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude 37.1653 dry, wet **QAPP** Longitude -78.3070 **Deposition Measurement** 150 Land Use woodland - mixed **QAPP Elevation Meters** -9.1 Terrain rolling **QAPP Declination** Yes 2/22/2006 Conforms to MLM **OAPP Declination Date** 37.165222 **Site Telephone Audit Latitude** SR 629 -78.307067 Site Address 1 **Audit Longitude** Prince Edward-Gallion State Forest Site Address 2 **Audit Elevation** 149 Prince Edward -9.4 County **Audit Declination** Burkesville, VA City, State **Present** Fire Extinguisher 23922 No inspection date 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 (s/n 2116-13) Ekto **Shelter Size** 640 cuft **✓** Notes The shelter is in good condition, clean, neat, and well organized. Shelter Clean **✓** Notes Site OK From Farmville travel east on 460 approximately 1 mile. Turn right (south) onto route 696 toward Twin Lakes State **Driving Directions** Park. Continue approximately 8.5 miles on 696 (do not turn at the next sign for Twin Lakes State Park near the

church) into the state forest. Turn left onto route 629 and continue approximately 1.3 miles. The site is not visible

from the road, and is through a gate on a gravel road to the right.

F-02058-1500-S2-rev002

Site ID PED108 Technician Sandy Grenville Site Visit Date 07/25/2017

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		✓
Limited agricultural operations	200 m		✓
Large parking lot	200 m		✓
Small parking lot	100 m		✓
Tree line	50 m	25 - 35 m	
Obstacles to wind	10 times obstacle height		✓

### Siting Distances OK

#### **Siting Criteria Comment**

The site is in a clearing in an evergreen plantation in the Prince Edward-Gallion State Forest. Trees were cut within the last 11 years to increase the size of the clearing. The tree line is encroaching again and is between 25 and 35 meters from the site.

#### **Field Systems Data Form** F-02058-1500-S3-rev002 Site Visit Date 07/25/2017 Site ID PED108 Technician Sandy Grenville ✓ N/A Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? **✓** N/A Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) **✓** N/A Are the tower and sensors plumb? **~** Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? **V** Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) **✓** N/A Is the solar radiation sensor plumb? N/A Is it sited to avoid shading, or any artificial or reflected light? **✓** N/A Is the rain gauge plumb? ✓ N/A Is it sited to avoid sheltering effects from buildings, trees, towers, etc? N/A 10 Is the surface wetness sensor sited with the grid surface

✓ N/A

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

facing north?

11 Is it inclined approximately 30 degrees?

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

Fic	eld Systems Data Form	F-02058-1500-S4-rev002				
Site	PED108 Technician Sandy Grenville		Site Visit Date 07/25/2017			
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>				
4	Are the aspirated motors working?	<b>✓</b>	N/A			
5	Is the solar radiation sensor's lens clean and free of scratches?	<b>✓</b>	N/A			
6	Is the surface wetness sensor grid clean and undamaged?	<b>✓</b>	N/A			
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	<b>✓</b>				
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	✓				
	ide any additional explanation (photograph or sketch if necestral or man-made, that may affect the monitoring parameters:		regarding conditions listed above, or any other features,			

#### Field Systems Data Form F-02058-1500-S5-rev002 PED108 Technician Sandy Grenville Site Visit Date 07/25/2017 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 18 meters Describe dry dep sample tube. 3/8 teflon by 18 meters At inlet only Are in-line filters used in the ozone sample line? (if ves indicate location) **~** Are sample lines clean, free of kinks, moisture, and obstructions? **V** Is the zero air supply desiccant unsaturated? Flow line only Are there moisture traps in the sample lines? Is there a rotometer in the dry deposition filter line, and is it Clean and dry clean?

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

F-02058-1500-S6-rev002

Site	e ID	PED108	Technician	Sandy Grenville		Site Visi	it Date 07/25/201	7	
	DAS so	nsor translators, an	d norinharal aqui	nment energies	ac or	ad maintana	nao		
	DAS, SC	usor translators, an	u peripheral equi	pinent operation		iu mamiena	<u>nce</u>		
1		OAS instruments ap intained?	pear to be in good	l condition and	✓				
2		he components of t backup, etc)	he DAS operation	al? (printers,	<b>✓</b>				
3		nalyzer and sensor g protection circuit		through	<b>✓</b>	Met sensors	only		
4		signal connections j intained?	protected from the	e weather and	<b>✓</b>				
5	Are the	signal leads connec	ted to the correct	DAS channel?	<b>✓</b>				
6	Are the grounde	DAS, sensor translated?	ators, and shelter	properly	<b>✓</b>				
7	Does the	e instrument shelter	have a stable pov	ver source?	✓				
8	Is the in	strument shelter te	mperature contro	lled?	✓				
9	Is the m	et tower stable and	grounded?			Stable		Grounded	
10	Is the sa	mple tower stable a	and grounded?			✓		<b>✓</b>	
11	Tower c	omments?				Met tower re	moved		
		additional explana nan-made, that may				y) regarding	g conditions listed	d above, or a	nny other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 PED108 Technician Sandy Grenville Site Visit Date 07/25/2017 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 **✓** П Solar radiation sensor **V** Modem П **V V Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V** ✓ **~ 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** Oct 2001 **V HASP ✓** Feb 2014 **✓ Field Ops Manual** July 1999 **Calibration Reports V ✓** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,

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

#### **Field Systems Data Form** F-02058-1500-S8-rev002 PED108 Technician Sandy Grenville Site Visit Date 07/25/2017 Site ID Site operation procedures Has the site operator attended a formal CASTNET training ✓ Trained in FL in 1987 and refresher course in July 2006 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 V** N/A In-line Filter Replacement (at analyze

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

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

F10	eld Systems Data Form		F-02058-1500-89-rev002				
Site	PED108 Technic	ian Sandy Grenville		Site Visit Date	07/25/2017		
	Site operation procedures						
1	Is the filter pack being changed every Tu	esday as scheduled?	<b>V</b>	Fiter changed morin	ings		
2	Are the Site Status Report Forms being correctly?	completed and filed	<b>✓</b>				
3	Are data downloads and backups being p scheduled?	performed as		No longer required			
4	Are general observations being made and	l recorded? How?	<b>✓</b>	SSRF			
5	Are site supplies on-hand and replenished fashion?	d in a timely	<b>✓</b>				
6	Are sample flow rates recorded? How?	<b>✓</b>	SSRF, call-in				
7	Are samples sent to the lab on a regular s fashion?	schedule in a timely	<b>✓</b>				
8	Are filters protected from contamination and shipping? How?	during handling	<b>✓</b>	Clean gloves on and off			
9	Are the site conditions reported regularly operations manager or staff?	to the field	<b>✓</b>				
QC	Check Performed	Frequency			Compliant		
N	Multi-point MFC Calibrations    ✓	Semiannually			✓		
F	low System Leak Checks	Weekly			✓		
F	ilter Pack Inspection						
F	Tow Rate Setting Checks   ✓ [	Weekly			$\checkmark$		
7	isual Check of Flow Rate Rotometer 💆 🛚			$\checkmark$			
I	n-line Filter Inspection/Replacement $\; \Box [$	Unknown					
S	ample Line Check for Dirt/Water	Weekly			$\checkmark$		
	ide any additional explanation (photograp ral or man-made, that may affect the mon		sary	r) regarding condition	ons listed above, or a	ny other features,	

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

Site ID

PED108

Technician Sandy Grenville

Site Visit Date 07/25/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07013
DAS	Campbell	CR3000	2511	000406
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	1088003022	00564
Flow Rate	Apex	AXMC105LPMDPC	illegible	000461
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0844353122	06587
Ozone	ThermoElectron Inc	49i A1NAA	1105347319	000732
Ozone Standard	ThermoElectron Inc	49i A3NAA	0622717855	000214
Sample Tower	Aluma Tower	В	unknown	000788
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	14041	06408
Zero air pump	Werther International	C 70/4	000815257	06883

# Site Inventory by Site Visit

Site V	isit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
ROM	406-Marti	n Valvur-08/01/2017				
1	8/1/2017	Computer	Hewlett Packard	none	6730b	USH01700BR
2	8/1/2017	DAS	Environmental Sys Corp	90535	8816	2025
3	8/1/2017	Elevation	Elevation	None	1	None
4	8/1/2017	flow rate	Tylan	03393	FC280AV	AW9403024
5	8/1/2017	Infrastructure	Infrastructure	none	none	none
6	8/1/2017	Met tower	Rohn	none	unknown	none
7	8/1/2017	MFC power supply	Tylan	none	RO-32	illegible
8	8/1/2017	Ozone	ThermoElectron Inc	none	49i A3NAA	0733726103
9	8/1/2017	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	CM08460008
10	8/1/2017	Sample Tower	Aluma Tower	illegible	В	none
11	8/1/2017	Shelter Temperature	ARS	none	unknown	051
12	8/1/2017	Shield (2 meter)	RM Young	none	unknown	none
13	8/1/2017	Siting Criteria	Siting Criteria	None	1	None
14	8/1/2017	Temperature2meter	RM Young	none	41342	17079
15	8/1/2017	Zero air pump	Werther International	none	PC 70/4	05-2017-112

#### **DAS Data Form DAS Time Max Error:** 0.9 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg **Environmental Sys** 2025 ROM406 Martin Valvur 08/01/2017 DAS Primary Das Date: 8 /1 /2017 **Audit Date** 8 /1 /2017 HY Parameter DAS Mfg 14:48:06 14:49:00 Das Time: **Audit Time** 12010039329 Tfer Desc. Source generator (D **Serial Number** Das Day: 213 **Audit Day** 213 Tfer ID 01322 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope Intercept** 0.0002 0.0011 0.0002 0.0011 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** 1/23/2017 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 0.0000 -0.0002 0.0009 0.0011 V V 4 0.1000 0.0998 0.0998 0.00004 0.3000 0.2994 0.2991 V V -0.0003 4 0.5000 0.4994 V V -0.0002 0.4996 4 0.7000 V V 0.0000 0.6997 0.6997 V V 4 0.9000 0.8997 0.8997 0.00004 V V 1.0000 1.0001 1.0002 0.0001

### Flow Data Form

Mfg	Se	erial Num	iber Ta	Site	Tec	Technician		ate Paran	neter	Owner ID
Tylan	AW9403024 ROM406		Ма	rtin Valvur	08/01/2017	flow ra	te	03393		
Mfg	Tylan					Mfg	BIOS	BIOS		ow Rate
SN/Owner ID	illegib	ble none			Serial Number	148613	T	fer Desc. BIOS 220-H		
Parameter	MFC	C power supply			Tfer ID	01421				
						Slope	1.	00153 Inte	ercept	0.00366
						Cert Date	1/25	5/2017 Col	rCoff	1.00000
DAS 1:			DAS 2:		L	Cal Factor Z	ero	0.09	94	
A Avg % Diff:	A Max	x % Di	A Avg %	Dif A Ma	x % Di	Cal Factor F	ull Scale	5.45	56	
1.17%		1.28%				Rotometer R	eading:	3.7	75	
Desc.	Te	st type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	Il PctDifference
primary	pump	off	0.000	0.000	-0.07	0.0000	0.06	1/m	1/m	
primary	leak c	check	0.000	0.000	-0.06	0.0000	0.06	1/m	1/m	
primary	test pt		3.037	3.030	3.02	0.0000	3.00	1/m	1/m	-0.96%
primary	test pt		3.048	3.040	3.02	0.0000	3.00	1/m	1/m	-1.28%
primary	test pt	t 3	3.049	3.040	3.02	0.0000	3.00	1/m	1/m	-1.28%
Sensor Compo	onent	Leak Tes	t		Condition	dition		Status	Status pass	
Sensor Compo	onent	Tubing Co	ondition		Condition	Good		Status	pass	
Sensor Compo	onent	Filter Pos	ition		Condition	Good		Status	pass	
Sensor Compo	onent	Rotomete	er Conditio	n	Condition	Clean and dry		Status	pass	
Sensor Compo	onent	Moisture	Present		Condition	No moisture p	resent	Status	pass	
Sensor Compo	onent	Filter Dist	ance		Condition	5.5 cm		Status	pass	
Sensor Compo	onent	Filter Dep	oth		Condition	1.0 cm		Status	pass	
Sensor Compo					Condition	160 deg		Status		
Sensor Compo	onent	System M	1emo		Condition	n		Status	pass	

### **Ozone Data Form**

Mfg Se	erial Number Ta	Site	Te	chnician		Site Vis	it Date	Parame	eter Owner	· ID	
ThermoElectron Inc 0	733726103	ROM406	Ma	artin Valv	ur	08/01/2	.017	Ozone	none		
Intercept -0.1	Slope: 4012 Intercept 19997 CorrCoff	0.00000	D	Mfg Serial N Tfer ID		Thermol 49CPS-01110			rameter ozone er Desc. Ozone prima	ary stan	
DAS 1: A Avg % Diff: A Mar 4.7%	DAS 2: x % Di	6Dif A Max (	% Di	Slope Cert Da	ıte		1.0046			01298 00000	
UseDescription	ConcGroup	Tfer Raw	Tfer	Corr	Si	te	Sit	e Unit	PctDifference		
primary	1	0.46	0.4		0.		ppb				
primary	2	14.81	14.			.66	ppb		-7.20%	_	
primary primary	3 4	36.17 64.14	35. 63.		61	46 68	ppb ppb		-4.22% -3.35%	_	
primary	5	106.90	106		102		ppb		-4.03%	_	
Sensor Component	Sample Train		Conditio	Good				Status	pass		
Sensor Component	22.5 degree rule		Condition	on				Status	pass		
Sensor Component	Inlet Filter Condition	n	Condition	Clean				Status	pass		
Sensor Component	Battery Backup		Conditio	n N/A				Status	pass		
Sensor Component	Offset		Conditio	on 0.1				Status	pass		
Sensor Component	Span		Conditio	dition 0.990				Status	pass		
Sensor Component	Zero Voltage		Condition	0.0010				Status	pass		
Sensor Component	Fullscale Voltage		Condition	tion 1.0010				Status	pass		
Sensor Component	Cell A Freq.		Condition	ndition 114.2 kHz				Status	pass		
Sensor Component	Cell A Noise		Condition	on 1.6 pr	bb			Status	pass		
Sensor Component	Cell A Flow		Condition	0.62 I	pm			Status	pass		
Sensor Component	Cell A Pressure		Condition	on 545.6	mmHg			Status	pass		
Sensor Component	Cell A Tmp.		Condition	on 38.9 (	<b>)</b>			Status	pass		
Sensor Component	Cell B Freq.		Condition	on 83.0 H	Hz			Status	pass		
Sensor Component	Cell B Noise		Condition	on 1.3 pp	ob .			Status	pass		
Sensor Component	Cell B Flow		Condition	0.59 I	pm			Status	pass		
Sensor Component	Cell B Pressure		Condition	545.0	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		

#### 2 Meter Temperature Data Form Calc. Difference Serial Number Ta **Technician** Site Visit Date Parameter Mfg Site **Owner ID** ROM406 Martin Valvur RM Young 17079 08/01/2017 Temperature2meter none Mfg Fluke **Parameter** Temperature Tfer Desc. RTD 3275143 **Serial Number** 01229 Tfer ID **Slope** 1.00006 **Intercept** 0.03191 **DAS 1: DAS 2:** 1/23/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.35 0.37 UseDescription InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit Difference Test type 0.0000 primary 0.23 0.20 0.53 C 0.33 24.32 24.29 0.0000 24.66 C 0.37 primary primary 47.35 47.32 0.000047.68 C 0.36 Sensor Component | Properly Sited **Condition** Properly sited **Status** pass Condition Clean Sensor Component | Shield **Status** pass Sensor Component Blower Condition Functioning Status pass Sensor Component Blower Status Switch Status pass **Condition** N/A Sensor Component | System Memo Condition Status pass

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Martin Valvur ARS 051 ROM406 08/01/2017 Shelter Temperature none **DAS 1: DAS 2:** Mfg Fluke Parameter Shelter Temperatur Abs Avg Err Abs Max Er **Abs Avg Err** Abs Max Er Tfer Desc. RTD 3275143 **Serial Number** 1.62 1.86 01229 **Tfer ID** 1.00006 0.03191 **Slope** Intercept 1/23/2017 1.00000 **Cert Date** CorrCoff InputTmpCorr. OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw 0.000primary Temp Mid Range 25.08 25.05 26.9 C 1.86 25.02 0.000 C Temp Mid Range 25.05 26.8 1.81 primary

0.000

C

Status pass

1.18

26.1

24.94

Condition

24.97

primary

Temp Mid Range

Sensor Component | System Memo

#### **Infrastructure Data For**

Site ID	ROM406	Technician	Martin Valvur	Site Visit Date	08/01/2017	
Shelter	Make	Shelter Model	She	lter Size		
Ekto		8814 (s/n 3062-1	896	cuft		

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

## **Field Systems Comments**

1 Parameter: DasComments

Only RH, temperature, and AMoN are mounted on the meteorological tower at approximately 2 meters.

2 Parameter: ShelterCleanNotes

The shelter is clean, neat, organized, and well maintained.

3 Parameter: MetSensorComme

The recorded temperature is being measured at 2.5 meters above the ground and < 1 foot above the AMoN enclosure.

#### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 08/01/2017 Technician Martin Valvur ROM406 Site ID Longs Peak **USGS Map NPS** Site Sponsor (agency) Map Scale NPS **Operating Group Map Date** 08-069-0007 AQS# R.M. Young **Meteorological Type** Ozone, IMPROVE **Air Pollutant Analyzer QAPP** Latitude 40.2778 dry **QAPP** Longitude -105.5453 **Deposition Measurement** woodland - mixed 2743 Land Use **QAPP Elevation Meters** complex **Terrain QAPP Declination** Marginally Conforms to MLM **OAPP Declination Date** (970) 586-8520 40.278129 **Site Telephone Audit Latitude** High Peak Camp -105.545635 Site Address 1 **Audit Longitude** Route 7 Site Address 2 **Audit Elevation** 2742 Larimer 9.0 County **Audit Declination** Estes Park, CO City, State **Present** Fire Extinguisher ✓ 80517 Inspected June 2013 Zip Code **V** 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 (s/n 3062-1) Ekto **Shelter Size** 896 cuft **✓** Notes The shelter is clean, neat, organized, and well maintained. **Shelter Clean ✓** Notes Site OK

From Estes Park take route 7 south approximately 8.5 miles. Turn right onto Preservation Road (dirt road) at the

sign for High Peak Camp operated by the Salvation Army. The site is approximately 100 meters on the left.

**Driving Directions** 

F-02058-1500-S2-rev002

Site ID ROM406 Technician Martin Valvur Site Visit Date 08/01/2017

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

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

Fic	eld Systems Data Form		F-02058-1500-S3-rev002
Site	ROM406 Technician Martin Valvur		Site Visit Date 08/01/2017
1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	<b>✓</b>	N/A
2	Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the	<b>✓</b>	N/A
	tower into the prevailing wind)		
3	Are the tower and sensors plumb?	<b>✓</b>	N/A
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?	<b>✓</b>	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?	✓	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:

The recorded temperature is being measured at 2.5 meters above the ground and < 1 foot above the AMoN enclosure.

Fic	eld Systems Data Form	F-02058-1500-S4-rev002					
Site	ROM406 Technician Martin Valvur	Site Visit Date 08/01/2017					
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?						
2	Are all the meteorological sensors operational online, and reporting data?						
3	Are the shields for the temperature and RH sensors clean?						
4	Are the aspirated motors working?						
5	Is the solar radiation sensor's lens clean and free of scratches?	✓ N/A					
6	Is the surface wetness sensor grid clean and undamaged?	✓ N/A					
7	Are the sensor signal and power cables intact, in good condition, and well maintained?						
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	d 🗸					
	ide any additional explanation (photograph or sketch if necestral or man-made, that may affect the monitoring parameters:	ssary) regarding conditions listed above, or any other features,					

#### Field Systems Data Form F-02058-1500-S5-rev002 ROM406 Technician | Martin Valvur Site Visit Date 08/01/2017 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:

### F-02058-1500-S6-rev002

Site	e ID	ROM406	Technician	Martin Valvur		Site Vis	sit Date 08/01/20	17	
	DAG	4				J ! 4			
	DAS, se	nsor translators, and	<u>peripheral equi</u>	<u>pment operation</u>	<u>is an</u>	<u>a maintena</u>	ance		
1	Do the I well mai	OAS instruments appentained?	ear to be in good	l condition and	<b>✓</b>				
2		he components of the backup, etc)	DAS operation	al? (printers,	✓				
3		nalyzer and sensor sig		through					
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	properly	<b>✓</b>				
7	Does the	instrument shelter h	ave a stable pov	ver source?	<b>✓</b>				
8	Is the in	strument shelter temp	perature control	lled?	<b>✓</b>				
9	Is the m	et tower stable and gr	ounded?			<b>Stable</b>		<b>Grounded</b>	
10	Is the sa	mple tower stable and	d grounded?			<b>✓</b>		<b>✓</b>	
11	Tower c	omments?							
					L				
Pro	ovide anv	additional explanatio	n (photograph (	or sketch if nece	essarv	v) regardin	ng conditions liste	d above, or a	nny other features,
		an-made, that may a				, 6			
Onl	v RH. tem	perature, and AMoN ar	e mounted on th	e meteorological	towe	at approxi	mately 2 meters.		

#### **Field Systems Data Form** F-02058-1500-S7-rev002 ROM406 Site Visit Date 08/01/2017 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** Filter flow pump **Temperature translator V V ~ Humidity sensor translator Surge protector** П П **V ~ UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device** ~ $\checkmark$ **Shelter heater** Ozone analyzer **V ✓** Filter pack flow controller Shelter air conditioner Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V** DataView2 **SSRF V ✓ V V Site Ops Manual HASP V V Field Ops Manual Calibration Reports V V** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Dataview Flow and 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

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

Site	e ID	ROM406	Technician	Marti	n Valvur		Site Visit Date	08/01/2017		
	Cita and	anation nuceadures								
1	Has the	eration procedures e site operator attende I f yes, when and who		STNE	T training	<b>✓</b>	Trained by ARS on	site		
2		e backup operator atte g course? If yes, when								
3	Is the sit	te visited regularly on e?	the required T	Tuesda	y	<b>✓</b>				
4		standard CASTNET of the standard CASTNET of the site operator?		ocedui	es being	<b>✓</b>				
5	Is the sit the requ	te operator(s) knowled nired site activities? (in	lgeable of, and cluding docur	l able t nentat	o perform ion)	<b>✓</b>				
	Are regi	ular operational QA/Q	C checks perf	ormed	l on meteor	rolo	gical instruments?			
QC	Check P	Performed		F	requency			Comp	pliant	
Mu	ltipoint (	Calibrations	•	<b>/</b>	I/A			✓		
	ual Inspe			<b>/</b>	I/A			✓		
	_	Zero/Span Tests (clima	tronics)	<b>/</b>	I/A			<b>V</b>		
Ma	nual Rai	n Gauge Test		<b>/</b>	I/A			✓		
Cor	nfirm Rea	asonableness of Curre	nt Values	<b>/</b>	I/A			<b>V</b>		
Tes	t Surface	e Wetness Response	•	<b>/</b>	I/A			✓		
	Are regi	ular operational QA/Q	C checks perf	ormed	on the ozo	one :	analyzer?			
QC	Check P	erformed		F	requency			Comp	pliant	
Mu	lti-point	Calibrations	•	<b>/</b> N	onthly and	sem	niannually	✓		
Au	tomatic Z	Zero/Span Tests	•	_	aily		<u> </u>	<b>✓</b>		
		o/Span Tests	•	<b>Z</b> E	very 2 wee	ks		✓		
		Precision Level Tests	•	<b>7</b> [	aily			✓		
Ma	nual Pre	cision Level Test						✓		
Ana	alyzer Di	agnostics Tests						✓		
	•	r Replacement (at inle	t)	<b>Z</b> E	very 2 wee	ks		✓		
		r Replacement (at ana			I/A			<b>✓</b>		
		Check for Dirt/Water	_	V	Veekly			<b>✓</b>		
	_	siccant Check		<b>/</b> S	Semiannuall	у		✓		
1		i-point calibration gas train including all filte	0	the co	mplete	<b>✓</b>				
2	Do auto	matic and manual z/s/ e sample train includi	p gasses go thi	rough	the	<b>✓</b>				
3	-	automatic and manua	_	monito	ored and	<b>✓</b>	Dataview			
		d? If yes, how?								
	reported	l? If yes, how? additional explanation an-made, that may aff					y) regarding condit	ions listed abo	ve, or a	ny other features,

Fi	eld Sy	stems Data Fo	rm					F-02058-1	500-S9-rev002
Sit	e ID	ROM406	Technic	ian	Martin Valvur		Site Visit Date	08/01/2017	
	Site ope	ration procedures							
1	Is the fi	lter pack being changed	l every Tı	iesd	ay as scheduled?	<b>V</b>	Filter changed morn	ings	
2	Are the correctl	Site Status Report For	ms being	com	pleted and filed	<b>✓</b>			
3	Are dat	a downloads and backu	ps being	perf	ormed as		no longer required		
4	Are gen	eral observations being	made an	d re	corded? How?	<b>✓</b>	SSRF		
5	Are site fashion	supplies on-hand and i	eplenishe	d in	a timely	<b>✓</b>			
6	Are san	ple flow rates recorded	l? How?			<b>✓</b>	SSRF		
7	Are san	nples sent to the lab on a	a regular	sche	dule in a timely	<b>✓</b>			
8		ers protected from cont oping? How?	aminatior	du:	ring handling	✓	Clean gloves on and	d off	
9		site conditions reported ons manager or staff?	d regularl	y to	the field				
QC	Check P	erformed		Fre	quency			Compliant	
I	Multi-poi	nt MFC Calibrations	✓	Sen	niannually			✓	
I	Flow Syst	em Leak Checks	✓	Wee	ekly			✓	
I	Filter Pac	k Inspection							
I	Flow Rate	<b>Setting Checks</b>		Wee				✓	
•	Visual Ch	eck of Flow Rate Rotor	neter 🔽	Wee	ekly			<b>✓</b>	
I	In-line Fil	ter Inspection/Replace	nent 🔽	Sen	niannually			$\checkmark$	
5	Sample Li	ine Check for Dirt/Wat	er 🗆						
		dditional explanation ( nn-made, that may affec					regarding condition	ons listed above, or a	any other features,

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

Site ID

ROM406

**Technician** Martin Valvur

Site Visit Date 08/01/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	6730b	USH01700BR	none
DAS	Environmental Sys Corp	8816	2025	90535
Elevation	Elevation	1	None	None
flow rate	Tylan	FC280AV	AW9403024	03393
Infrastructure	Infrastructure	none	none	none
Met tower	Rohn	unknown	none	none
MFC power supply	Tylan	RO-32	illegible	none
Ozone	ThermoElectron Inc	49i A3NAA	0733726103	none
Ozone Standard	ThermoElectron Inc	49i A1NAA	CM08460008	none
Sample Tower	Aluma Tower	В	none	illegible
Shelter Temperature	ARS	unknown	051	none
Shield (2 meter)	RM Young	unknown	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature2meter	RM Young	41342	17079	none
Zero air pump	Werther International	PC 70/4	05-2017-112	none

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
RO	M206-Marti	n Valvur-08/08/2017				
1	8/8/2017	Computer	Dell	07068	Inspiron 15	Unknown
2	8/8/2017	DAS	Campbell	000847	CR3000	1144
3	8/8/2017	Dilution system	Teledyne	000791	T700U	111
4	8/8/2017	Elevation	Elevation	None	1	None
5	8/8/2017	Filter pack flow pump	Thomas	04986	107CA18	040400022185
6	8/8/2017	Flow Rate	Apex	000598	AXMC105LPMDPCV	unknown
7	8/8/2017	Infrastructure	Infrastructure	none	none	none
8	8/8/2017	Modem	Raven	06473	H4222-C	0808311135
9	8/8/2017	Noy	Teledyne	000798	T200U	103
10	8/8/2017	Ozone	ThermoElectron Inc	000676	49i A1NAA	1030244794
11	8/8/2017	Ozone Standard	ThermoElectron Inc	000514	49i A3NAA	0922236892
12	8/8/2017	Sample Tower	Aluma Tower	000810	С	Unknowm
13	8/8/2017	Shelter Temperature	Campbell	none	107-L	none
14	8/8/2017	Siting Criteria	Siting Criteria	None	1	None
15	8/8/2017	Temperature	RM Young	02679	41342	none
16	8/8/2017	Zero air pump	Werther International	06917	PC70/4	000829166
17	8/8/2017	Zero air system	Teledyne	000777	701H	607

#### **DAS Data Form** 0.42 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 1144 ROM206 Martin Valvur 08/08/2017 DAS Primary Das Date: 8 /8 /2017 **Audit Date** 8 /8 /2017 HY Parameter DAS Mfg 13:42:00 13:41:35 Das Time: **Audit Time** Tfer Desc. Source generator (D 12010039329 **Serial Number** Das Day: 220 **Audit Day** 220 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** 1/23/2017 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 0.0000 -0.0003 -0.0004 -0.0001 V V 7 0.1000 0.0991 0.0991 0.00007 0.3000 0.2999 0.2996 V V -0.0003 7 0.5000 0.4997 0.4997 V V 0.00007 0.7000 V V -0.0002 0.7000 0.6998 7 V V 0.9000 0.8998 0.8998 0.00007 1.0000 0.9999 V V -0.0003 1.0002

### Flow Data Form

Ifg	Serial Nun	nber Ta S	lite	Tec	hnician	Site Visit I	Oate Paran	neter	Owner ID	
pex	unknown		ROM206	Ма	rtin Valvur	08/08/2017	Flow F	Rate	000598	
					Mfg	BIOS	P	arameter Flo	ow Rate	
				:	Serial Number	148613	Т	fer Desc. Bl	OS 220-H	
				,	Tfer ID	01421				
					Slope	1	00153 <b>Int</b>	ercept	0.00366	
					Ť					
				(	Cert Date	1/25	5/2017 <b>Co</b>	rrCoff	1.00000	
AS 1:		DAS 2:		_	Cal Factor Z	ero	-0.0	05		
Avg % Diff:	A Max % Di	A Avg %I	Dif A Max	% <b>Di</b>	Cal Factor F	ull Scale	0.9	95		
0.77%	0.99%				Rotometer R	eading:	3.5	55		
Desc.	Test type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	II PctDifference	
primary	pump off	0.000	0.000	0.00	0.000	-0.05	l/m	l/m		
primary	leak check	0.000	0.000	0.00	0.000	-0.05	1/m	l/m		
	test pt 1	3.020	3.010	3.05	0.000	2.99	1/m	l/m	-0.66%	
	test pt 2	3.030	3.020	3.05	0.000	2.99	1/m	l/m	-0.99%	
primary	test pt 3	3.030	3.020	3.03	0.000	3.00	1/m	1/m	-0.66%	
Sensor Compo	nent Leak Tes	st		Condition	1		Status	pass		
Sensor Compo	onent Tubing C	ondition		Condition	Good		Status	pass		
Sensor Compo	onent Filter Pos	sition		Condition	Good		Status	Status pass		
Sensor Compo	nent Rotomete	er Condition		Condition	Clean and dry		Status		pass	
Sensor Compo	onent Moisture	Present		Condition	No moisture p	resent	Status	pass		
Sensor Compo	nent Filter Dis	tance		Condition	4.5 cm		Status	pass		
Sensor Compo	onent Filter Dep	oth		Condition	2.0 cm		Status	pass		
Sensor Compo	onent Filter Azi	muth		Condition	Not tested		Status	pass		
g	onent System M	/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	030244794	ROM206	Ma	artin Valv	ur	08/08/2	017	Ozone		000676	
Intercept -0.0	9240 Slope: 4905 Intercept 9998 CorrCoff	0.00000 0.00000 0.00000	)	Mfg Serial N	umber	ThermoE 49CPS-7	Electron I		rameter ozc	one one primary st	tan
DAS 1:	<b>DAS 2:</b>			Slope			1.00466	Inter	cept	0.0129	98
A Avg % Diff: A Max	2.4% A Avg %	Dif A Max 9	% Di	Cert Da	te		1/1/2017	7 Corr	Coff	1.0000	)0
		Tfor Dow	Tfor	Com	C:	ta	Cita	. I Imit	DatDiff	· amam aa	
UseDescription primary	ConcGroup 1	Tfer Raw 0.24	Tfer 0.2		0.0	te 05	ppb	Unit	PctDiff	erence	
primary	2	15.51	15.				ppb			-2.40%	
primary	3	35.43	35.	25	35	.14	ppb			-0.31%	
primary	4	66.68	66.		66		ppb			-0.27%	
primary	5	113.00	112		111	.30	ppb			-1.03%	
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	Conditio	on Clean				Status	pass		
<b>Sensor Component</b>	Battery Backup		Conditio	n N/A				Status	pass		
Sensor Component	Offset		Conditio	on 0.1				Status	pass		
Sensor Component	Span		Conditio	n 1.006				Status	pass		
Sensor Component	Zero Voltage		Conditio	n N/A				Status	pass		
Sensor Component	Fullscale Voltage		Conditio	n N/A				Status	pass		
Sensor Component	Cell A Freq.		Conditio	on 90.7 kHz			Status	pass			
Sensor Component	Cell A Noise		Conditio	0.6 pp	b			Status	pass		
Sensor Component	Cell A Flow		Conditio	0.0 lpi	n			Status	Fail		
Sensor Component	Cell A Pressure		Conditio	on 524.2	mmHg			Status	pass		
Sensor Component	Cell A Tmp.		Conditio	37.7 C	;			Status	pass		
Sensor Component	Cell B Freq.		Conditio	93.6 k	Hz			Status	pass		
Sensor Component	Cell B Noise		Conditio	0.5 pp	b			Status	pass		
Sensor Component	Cell B Flow		Conditio	0.38 lj	om			Status	Fail		
Sensor Component	Cell B Pressure		Conditio	525.6	mmHg			Status	pass		
Sensor Component	Cell B Tmp.		Conditio	on				Status	pass		
Sensor Component	Line Loss		Conditio	Not te	sted			Status	pass		
Sensor Component	System Memo		Conditio	on				Status	pass		

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg RM Young ROM206 Martin Valvur 08/08/2017 Temperature 02679 none Mfg Fluke Parameter Temperature Tfer Desc. RTD 3275143 **Serial Number** 01229 **Tfer ID** 0.03191 **Slope** 1.00006 **Intercept DAS 1: DAS 2:** 1/23/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.15 0.22 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.13 0.10 0.000 0.3 C 0.17 C Temp Mid Range 24.40 24.37 0.000 24.4 0.06 primary 48.24 0.000 48.0 C -0.22 primary Temp High Range 48.27 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** ROM206 Martin Valvur 08/08/2017 Shelter Temperature Campbell 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** 0.84 0.99 01229 **Tfer ID** 1.00006 0.03191 Slope Intercept 1/23/2017 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference	
primary	Temp Mid Range	24.36	24.33	0.000	25.1	C	0.73	
primary	Temp Mid Range	22.94	22.91	0.000	23.9	С	0.99	
primary	Temp Mid Range	22.31	22.28	0.000	23.1	C	0.79	
Sensor Com	ponent System Memo	)	Condition	<b>Condition</b> Status				

### **Infrastructure Data For**

Si	te ID	ROM206	Technician	Martin Valvur	Site Visit Date	08/08/2017	
	Shelter Ma	ake	Shelter Model	She	elter Size		
	Ekto		8810 (s/n 2182-	1) 640	) cuft		

Sensor Component	Sample Tower Type	Condition	Type B	Status	pass
Sensor Component	Conduit	Condition	N/A	Status	pass
Sensor Component	Met Tower	Condition	N/A	Status	pass
Sensor Component	Moisture Trap	Condition	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
<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
<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

## **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	l Problem
Ozone This analyzer diagnostic	ROM206 check is outside	Martin Valvur the manufacturer's	08/08/2017 recommended	Cell B Flow value.	ThermoElectron	3725		
Ozone This analyzer diagnostic	ROM206 check is outside	Martin Valvur the manufacturer's	08/08/2017 recommended	Cell A Flow	ThermoElectron	3725		

## **Field Systems Comments**

1 Parameter: SiteOpsProcComm

The Noy analyzer has a blinking "fault" light and the message "system service" is displayed.

2 Parameter: ShelterCleanNotes

The shelter is clean, neat, and well organized. There are signs of previous roof leaks, but they have been repaired. The floor and counter top have been replaced.

3 Parameter: MetSensorComme

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

### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 08/08/2017 ROM206 Technician | Martin Valvur Site ID Longs Peak **USGS Map EPA** Site Sponsor (agency) Map Scale private **Operating Group Map Date** 08-069-9991 AQS# R.M. Young **Meteorological Type** Ozone, IMPROVE **Air Pollutant Analyzer QAPP** Latitude 40.2778 -105.5453 dry **QAPP** Longitude **Deposition Measurement** woodland - mixed 2743 **Land Use QAPP Elevation Meters** complex 10.3 **Terrain QAPP Declination** Marginally 2/22/2006 Conforms to MLM **OAPP Declination Date** (970) 586-2598 40.278129 **Site Telephone Audit Latitude** High Peak Camp -105.545635 Site Address 1 **Audit Longitude** Route 7 Site Address 2 **Audit Elevation** 2742 Larimer 9.0 County **Audit Declination** Estes Park, CO City, State **Present** Fire Extinguisher 80517 New in 2015 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 (s/n 2182-1) Ekto **Shelter Size** 640 cuft **✓** Notes The shelter is clean, neat, and well organized. There are signs of previous roof leaks, but they have Shelter Clean been repaired. The floor and counter top have been replaced.

From Estes Park take route 7 south approximately 8.5 miles. Turn right onto Preservation Road (dirt road) at the

sign for High Peak Camp operated by the Salvation Army. The site is approximately 100 meters on the left.

**✓** Notes

Site OK

**Driving Directions** 

## Field Systems Data Form

F-02058-1500-S2-rev002

Site ID ROM206 Technician Martin Valvur Site Visit Date 08/08/2017

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

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

<b>Field Systems Data F</b>	orm			F-02058	-1500-S3-rev002
Site ID ROM206	<b>Technician</b> Martin Valvur		Site Visit Date	08/08/2017	
1 Are wind speed and direction being influenced by obstruct		<b>✓</b>	N/A		
			N/A		
3 Are the tower and sensors pl		<b>✓</b>	N/A		
4 Are the temperature shields avoid radiated heat sources s	pointed north or positioned to cuch as buildings, walls, etc?	<b>✓</b>	South		
conditions? (i.e. ground belo	d. Ridges, hollows, and areas	<b>✓</b> of			
6 Is the solar radiation sensor	plumb?	<b>✓</b>	N/A		
7 Is it sited to avoid shading, o light?	r any artificial or reflected	<b>✓</b>	N/A		
8 Is the rain gauge plumb?		✓	N/A		
9 Is it sited to avoid sheltering towers, etc?	effects from buildings, trees,	✓	N/A		
10 Is the surface wetness sensor facing north?	sited with the grid surface	<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:

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

Fic	eld Systems Data Form	F-02058-1500-S4-rev002
Site	ID ROM206 Technician Martin Valvur	Site Visit Date 08/08/2017
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	i 🗸
2	Are all the meteorological sensors operational online, and reporting data?	
3	Are the shields for the temperature and RH sensors clean?	
4	Are the aspirated motors working?	✓ N/A
5	Is the solar radiation sensor's lens clean and free of scratches?	N/A
6	Is the surface wetness sensor grid clean and undamaged?	N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	d 🗸
	de any additional explanation (photograph or sketch if neces cal or man-made, that may affect the monitoring parameters:	essary) regarding conditions listed above, or any other features, s:

### Field Systems Data Form F-02058-1500-S5-rev002 ROM206 Technician | Martin Valvur Site Visit Date 08/08/2017 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:

## Field Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	ROM206	Technician	Martin Valvur		Site Visi	it Date 08/08/201	7	
	DAC so					. d			
	DAS, se	nsor translators, and	peripheral equi	<u>pment operation</u>	is ar	<u>ia maintena</u>	<u>nce</u>		
1		OAS instruments app intained?	ear to be in good	condition and	✓				
2		the components of the backup, etc)	e DAS operation	al? (printers,	<b>✓</b>				
3		nalyzer and sensor si g 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 connecte	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 l	nave a stable pov	ver source?	<b>✓</b>				
8	Is the in	strument shelter tem	perature contro	lled?	<b>✓</b>				
						Stable		Grounded	
9	Is the m	et tower stable and g	rounded?						
10	Is the sa	mple tower stable an	d grounded?			<u> </u>		<b>✓</b>	
11	Tower c	comments?						V	
		additional explanation nan-made, that may a				y) regarding	g conditions listed	d above, or a	ny other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 ROM206 Technician | Martin Valvur Site Visit Date 08/08/2017 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No N/A Yes No N/A Yes **✓** Wind speed sensor **Data logger** П **V** Wind direction sensor **V Data logger** ✓ **V** П Temperature sensor Strip chart recorder **✓ V** Relative humidity sensor Computer **V** Solar radiation sensor **V** Modem П **V V Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V ~ Humidity sensor translator Surge protector** П **V ~ UPS Solar radiation translator ~ V** Tipping bucket rain gauge Lightning protection device ~ **V Shelter heater** Ozone analyzer ~ **✓** Filter pack flow controller Shelter air conditioner 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 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?

Provide any additional 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 ROM206 Site Visit Date 08/08/2017 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 Trained by site operator training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **V** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **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 QC Check Performed** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests Manual Precision Level Test V V** Weekly **Analyzer Diagnostics Tests ~** Every 2 weeks **In-line Filter Replacement (at inlet) V V** N/A In-line Filter Replacement (at analyze **V V** Weekly Sample Line Check for Dirt/Water **~ V Zero Air Desiccant Check** Weekly

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

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

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

	Unknown
<b>/</b>	

cessary) regarding conditions listed above, or any other features.

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 ROM206 Technician | Martin Valvur Site Visit Date 08/08/2017 Site ID Site operation procedures Is the filter pack being changed every Tuesday as scheduled? ✓ Filter changed evenings 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? **✓** one set of gloves only Are filters protected from contamination during handling and shipping? How? **~** Are the site conditions reported regularly to the field operations manager or staff? **QC Check Performed Compliant Frequency V** ✓ Semiannually **Multi-point MFC Calibrations** Weekly **V** Flow System Leak Checks **Filter Pack Inspection V ✓** Weekly **Flow Rate Setting Checks V ✓** Weekly **Visual Check of Flow Rate Rotometer** ✓ Semiannually **V In-line Filter Inspection/Replacement ✓** Weekly Sample Line Check for Dirt/Water Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,

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

The Noy analyzer has a blinking "fault" light and the message "system service" is displayed.

## **Field Systems Data Form**

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

Site ID

ROM206

**Technician** Martin Valvur

Site Visit Date 08/08/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07068
DAS	Campbell	CR3000	1144	000847
Dilution system	Teledyne	T700U	111	000791
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	040400022185	04986
Flow Rate	Apex	AXMC105LPMDPC	unknown	000598
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4222-C	0808311135	06473
Noy	Teledyne	T200U	103	000798
Ozone	ThermoElectron Inc	49i A1NAA	1030244794	000676
Ozone Standard	ThermoElectron Inc	49i A3NAA	0922236892	000514
Sample Tower	Aluma Tower	С	Unknowm	000810
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	none	02679
Zero air pump	Werther International	PC70/4	000829166	06917
Zero air system	Teledyne	701H	607	000777

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
YEL	408-Martin	v Valvur-08/16/2017				
1	8/16/2017	DAS	Environmental Sys Corp	90632	8816	2505
2	8/16/2017	Elevation	Elevation	None	1	None
3	8/16/2017	Filter pack flow pump	Thomas	none	107CA18B	049800008583
4	8/16/2017	Flow Rate	Tylan	none	FC280	AW9403021
5	8/16/2017	Infrastructure	Infrastructure	none	none	none
6	8/16/2017	Mainframe	Climatronics	none	100081	1380
7	8/16/2017	Mainframe power supply	Climatronics	none	101074	688
8	8/16/2017	Met tower	Climatronics	01362	14 inch taper	illegible
9	8/16/2017	MFC power supply	Tylan	00045	RO-32	FP902028
10	8/16/2017	Ozone	ThermoElectron Inc	90607	49C	49C-61985-333
11	8/16/2017	Ozone Standard	ThermoElectron Inc	90606	49C	49C-61991-333
12	8/16/2017	Printer	Hewlett Packard	none	840C	unknown
13	8/16/2017	Sample Tower	Aluma Tower	illegible	В	none
14	8/16/2017	Shelter Temperature	ARS	none	none	none
15	8/16/2017	Shield (2 meter)	Climatronics	01050	100325	illegible
16	8/16/2017	Siting Criteria	Siting Criteria	None	1	None
17	8/16/2017	Temperature Translator	Climatronics	03626	100088-2	396
18	8/16/2017	Temperature2meter	Climatronics	ARS100	100093	none
19	8/16/2017	Zero air pump	Werther International	none	PC70/4	531393

#### **DAS Data Form** 2.53 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg **Environmental Sys** 2505 YEL408 Martin Valvur 08/16/2017 DAS Primary Das Date: 8 /16/2017 **Audit Date** 8 /16/2017 HY Parameter DAS Mfg 7:39:32 7:37:00 Das Time: **Audit Time** Tfer Desc. Source generator (D 12010039329 **Serial Number** Das Day: 228 **Audit Day** 228 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** 1/23/2017 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output **DAS** Output InputUnit OutputUnit Difference 11 0.0000 -0.0005 -0.0006 -0.0001 V V 11 0.1000 0.0997 0.0996 -0.0001 11 0.3000 0.2998 0.2997 V V -0.0001 11 0.5000 0.4995 0.4996 V V 0.00010.7000 V V -0.0001 11 0.6996 0.6995 V V 11 0.9000 0.8993 0.8994 0.0001 11 0.9996 0.9998 V V 1.0000 0.0002

## Flow Data Form

<b>Afg</b>	Serial Nu	ımber Ta	Site	Tec	hnician	Site Visit I	Date Paran	neter	Owner ID
ylan	AW9403	021	YEL408	Ма	rtin Valvur	08/16/2017	Flow F	Rate	none
Mfg Tylan				Mfg	BIOS	F	arameter Flo	ow Rate	
SN/Owner ID	FP902028	00045			Serial Number	148613	Г	fer Desc. Bl	OS 220-H
Parameter	MFC power s	upply		,	Tfer ID	01421			
Parameter	ivii C power s	ирріу							
				}	Slope	1.	00153 Int	ercept	0.0036
					Cert Date	1/25	5/2017 <b>Co</b>	rrCoff	1.0000
DAS 1:		DAS 2:		L	Cal Factor Z	ero	0.0	29	
A Avg % Diff:	A Max % Di	A Avg %l	Dif A Max	% Di	Cal Factor F	ull Scale	5.5	58	
0.57%	1.03%	)			Rotometer R	eading:	4.0	05	
Desc.	Test type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	I PctDifference
primary	pump off	0.000	0.000	0.07	0.0000	0.02	l/m	l/m	
primary	leak check	0.000	0.000	0.14	0.0000	0.08	l/m	l/m	
primary	test pt 1	2.890	2.880	2.55	0.0000	2.89	l/m	l/m	0.35%
primary	test pt 2	2.910	2.900	2.56	0.0000	2.89	1/m	1/m	-0.34%
primary	test pt 3	2.930	2.920	2.55	0.0000	2.89	l/m	l/m	-1.03%
Sensor Compo	onent Leak T	est		Condition	1		Status	pass	
Sensor Comp	onent Tubing	Condition		Condition	Good		Status	pass	
Sensor Comp	onent Filter P	osition		Condition	Good		Status	pass	
Sensor Comp	onent Rotome	eter Condition	1	Condition	Clean and dry		Status	pass	
Sensor Comp	onent Moistu	e Present		Condition	No moisture p	resent	Status	pass	
Sensor Compo	onent Filter D	istance		Condition	5.0 cm		Status	ns pass	
Sensor Compo	onent Filter D	epth		Condition	2.5 cm		Status	pass	
Sensor Compo	onent Filter A	zimuth		Condition	90 deg		Status	pass	
	onent System	Memo		Condition	1		Status	pass	

## **Ozone Data Form**

Mfg S	erial Number Ta	Site	Tec	chnician		Site Vis	sit Date	Parame	eter	Owner II	)
ThermoElectron Inc	19C-61985-333	YEL408	Ma	artin Valv	ur	08/16/2	2017	Ozone		90607	
Intercept -0.3	99392 Slope: 33439 Intercept 99998 CorrCoff	0.00000 0.00000 0.00000	)	Mfg Serial N Tfer ID			Electron 70008-36		rameter 02 er Desc. 0	zone zone primary	stan
DAS 1: A Avg % Diff: A Ma 2.0%	DAS 2: x % Di	6Dif A Max 9	% Di	Slope Cert Da	ıte		1.0046		_	0.012	
UseDescription	ConcGroup	Tfer Raw	Tfer	Corr	Si	ite	Site	e Unit	PctDi	fference	
primary	1	0.27	0.2	25	0.	19	ppb				
primary	2	15.19	15.		14	.39	ppb			-4.70%	
primary	3	38.29	38.			.66	ppb			-1.13%	
primary	4	65.79	65.			.44	ppb		-	-1.57%	
primary	5	109.86	109			3.50	ppb			-0.76%	
Sensor Component	Sample Train		Conditio	Good				Status	pass		_
<b>Sensor Component</b>	22.5 degree rule		Conditio	on				Status	pass		
Sensor Component	Inlet Filter Condition	n	Conditio	Clean				Status	pass		
Sensor Component	Battery Backup		Conditio	n N/A				Status	pass		
Sensor Component	Offset		Conditio	0.08				Status	pass		
Sensor Component	Span		Conditio	n 1.001				Status	pass		
Sensor Component	Zero Voltage		Conditio	0.004	0			Status	pass		
Sensor Component	Fullscale Voltage		Conditio	n 1.003	5			Status	pass		
Sensor Component	Cell A Freq.		Conditio	97.9 k	Hz			Status	pass		
<b>Sensor Component</b>	Cell A Noise		Conditio	0.7 pp	b			Status	pass		
<b>Sensor Component</b>	Cell A Flow		Conditio	on 0.59 l	pm			Status	pass		
Sensor Component	Cell A Pressure		Conditio	555.5	mmHg			Status	pass		]
Sensor Component	Cell A Tmp.		Conditio	34.7 (	)			Status	pass		]
Sensor Component	Cell B Freq.		Conditio	n 101.9	kHz			Status	pass		
Sensor Component	Cell B Noise		Conditio	0.5 pp	bb			Status	pass		
Sensor Component	Cell B Flow		Conditio					Status	pass		
Sensor Component	Cell B Pressure		Conditio	555.0	mmHg			Status	pass		
Sensor Component	Cell B Tmp.		Conditio					Status	pass		
Sensor Component	Line Loss		Conditio	Not te	sted			Status	pass		
<b>Sensor Component</b>	System Memo		Conditio	on				Status	pass		

#### 2 Meter Temperature Data Form Calc. Difference **Technician** Site Visit Date Parameter Mfg Serial Number Ta Site Owner ID Martin Valvur Climatronics YEL408 08/16/2017 Temperature2meter ARS100 none Parameter Temperature Mfg Fluke Climatronics Mfg 3275143 Tfer Desc. RTD **Serial Number** 396 03626 **SN/Owner ID** 01229 Tfer ID Temperature Translator **Parameter Slope** 1.00006 **Intercept** 0.03191 **DAS 1: DAS 2:** 1/23/2017 1.00000 CorrCoff Abs Avg Err **Abs Max Er Abs Avg Err Abs Max Er Cert Date** 0.17 0.26 Test type InputTmpRaw InputTmpCorrected OutputTmpSignal OutputSignalEng | OSE Unit UseDescription Difference primary Temp Low Rang 0.04 0.01 0.0000 $0.05\,\mathrm{C}$ 0.04 23.79 C Temp Mid Rang 24.08 24.05 0.0000 -0.26 primary primary Temp High Rang 48.18 48.15 0.0000 47.94 C -0.21Sensor Component Properly Sited Status pass **Condition** Properly sited Sensor Component | Shield Condition Clean **Status** pass Sensor Component Blower **Condition** Functioning Status pass Sensor Component Blower Status Switch Status pass **Condition** N/A Sensor Component | System Memo Status pass Condition

### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** ARS Martin Valvur 08/16/2017 Shelter Temperature YEL408 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** 0.74 1.07 01229 **Tfer ID** 1.00006 0.03191 Slope Intercept 1/23/2017 CorrCoff 1.00000 **Cert Date**

		InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary To	Temp Mid Range	27.15	27.12	0.000	26.8	C	-0.32
primary To	Temp Mid Range	28.45	28.42	0.000	27.4	С	-1.07
primary To	Temp Mid Range	24.21	24.18	0.000	23.4	С	-0.83
Sensor Component System Memo Condition Status pass							

### Infrastructure Data For

Site ID	YEL408	Technician	Martin Valvur	Site Visit Date	08/16/2017	
Cl14 3.4		CL. V. M. J.I.	CI.	u c		

Shelter Make	Shelter Model	Shelter Size	
Ekto	8810 (s/n 2880-1)	640 cuft	
			BANGET MALE

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

## **Field Systems Comments**

1 Parameter: SiteOpsProcComm

Gloves are not used to handle the filter pack.

2 Parameter: SiteOpsProcedures

The ozone inlet filter is replaced and the system is leak tested every two weeks.

3 Parameter: SitingCriteriaCom

The site is located at the edge of a tree line. Trees as tall as 8 meters are near the sample inlet. Trees taller than 10 meters are 15 meters from the inlet.

4 Parameter: ShelterCleanNotes

The shelter is organized and well maintained.

5 Parameter: MetOpMaintCom

The recorded temperature is now being measured at approximately 2 meters above the ground.

### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 08/16/2017 YEL408 Technician | Martin Valvur Site ID Lake **USGS Map NPS** Site Sponsor (agency) Map Scale NPS **Operating Group Map Date** 56-039-1011 AQS# Climatronics **Meteorological Type** Ozone, IMPROVE **Air Pollutant Analyzer QAPP** Latitude 44.5597 dry **QAPP** Longitude -110.4006 **Deposition Measurement** 2400 **Land Use** woodland - evergreen **QAPP Elevation Meters Terrain** complex **QAPP Declination** Marginally Conforms to MLM **OAPP Declination Date** (307) 242-2410 44.565356 **Site Telephone Audit Latitude** Lake Ranger Station -110.400338 Site Address 1 **Audit Longitude** route 14 Site Address 2 **Audit Elevation** 2430 11.9 Teton County **Audit Declination** Yellowstone National Park, WY City, State **Present** Fire Extinguisher 82190 New in 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 (s/n 2880-1) Ekto **Shelter Size** 640 cuft **✓** Notes The shelter is organized and well maintained. Shelter Clean **✓** Notes Site OK From Jackson take route 191 / 89 north to Yellowstone National Park. At Thumb Junction take 14 east around **Driving Directions** Yellowstone Lake. Turn left just past the Lake Area (and hotel) into the park residence and office compound. Continue through the compound past the housing area. The site is up the hill through the gate to the water supply

tank for the compound.

## Field Systems Data Form

F-02058-1500-S2-rev002

Site ID YEL408 Technician Martin Valvur Site Visit Date 08/16/2017

Potential Interferent	Minimum Distance From Measurement Apparatus	Distance	Pass = Checked
Large Point Source of SO2 or NOx	20 to 40 km		
Major industrial complex	10 to 20 km		✓
City > 50,000 population	40 km		✓
City 10,000 to 50,000 population	10 km		✓
City 1,000 to 10,000 population	5 km		✓
Major highway, airport or rail yard	2 km		✓
Secondary road, heavily traveled	500 m		✓
Secondary road, lightly traveled	200 m		✓
Feedlot operations	500 m		✓
Intensive agricultural ops (including aerial spraying)	500 m		✓
Limited agricultural operations	200 m		✓
Large parking lot	200 m		✓
Small parking lot	100 m		✓
Tree line	50 m	15 m	
Obstacles to wind	10 times obstacle height		✓

**Siting Criteria Comment** 

The site is located at the edge of a tree line. Trees as tall as 8 meters are near the sample inlet. Trees taller than 10 meters are 15 meters from the inlet.

Fie	eld Systems Data Fo	orm		F	-02058-1500-S3	-rev002
Site	e ID YEL408	Technician Mar	tin Valvur	Site Visit Date 08/16	2017	
1	Are wind speed and direction being influenced by obstruction		o avoid	N/A		
2	Are wind sensors mounted so (i.e. wind sensors should be me horizontally extended boom > tower into the prevailing wind	ounted atop the tow 2x the max diamete	ver or on a	N/A		
3	Are the tower and sensors plu		<b>~</b>	N/A		
4	Are the temperature shields peavoid radiated heat sources su			West		
5	Are temperature and RH sens conditions? (i.e. ground below surface and not steeply sloped standing water should be avoir	sensors should be r . Ridges, hollows, an	natural			
6	Is the solar radiation sensor pl	lumb?	$\checkmark$	N/A		
7	Is it sited to avoid shading, or light?	any artificial or ref	lected 🔽	N/A		
8	Is the rain gauge plumb?		<b>✓</b>	N/A		
9	Is it sited to avoid sheltering entowers, etc?	ffects from building	gs, trees,	N/A		
10	Is the surface wetness sensor s facing north?	sited with the grid s	urface 🗸	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 YEL408 Technician Martin Valvur	Site Visit Date 08/16/2017
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	d 🗹
2	Are all the meteorological sensors operational online, and reporting data?	
3	Are the shields for the temperature and RH sensors clean?	Now at 2 meters
4	Are the aspirated motors working?	
5	Is the solar radiation sensor's lens clean and free of scratches?	N/A
6	Is the surface wetness sensor grid clean and undamaged?	N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	ed 🗸
	ide any additional explanation (photograph or sketch if nece cal or man-made, that may affect the monitoring parameters	ressary) regarding conditions listed above, or any other features, rs:
The r	ecorded temperature is now being measured at approximately 2	? meters above the ground.

### Field Systems Data Form F-02058-1500-S5-rev002 YEL408 Technician | Martin Valvur Site Visit Date 08/16/2017 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? 10 to 15 meters from trees 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 9 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	ID	YEL408	Technician	Martin Valvur		Site Visi	it Date 08/16/201	7	
	DAC co					. J			
	DAS, sei	nsor translators, and	i peripheral equi	<u>pment operation</u>	<u>is ar</u>	<u>ia maintena</u>	<u>nce</u>		
1		OAS instruments appintained?	ear to be in good	l condition and	<b>✓</b>				
2	Are all the components of the DAS operational? (printers, modem, backup, etc)								
3	Do the analyzer and sensor signal leads pass through lightning protection circuitry?			<b>✓</b>	Met sensors	only			
4		signal connections printained?	rotected from the	e weather and	<b>✓</b>				
5	Are the	signal leads connecte	ed to the correct	DAS channel?	<b>✓</b>				
6	Are the grounde	DAS, sensor translated?	tors, and shelter	properly	<b>✓</b>				
7	Does the	e instrument shelter	have a stable pov	ver source?	<b>✓</b>				
8	Is the in	strument shelter tem	perature contro	lled?	<b>✓</b>				
9	Is the m	et tower stable and g	grounded?			Stable		Grounded	
						<b>✓</b>		<b>✓</b>	
10	Is the sa	mple tower stable ar	nd grounded?			<b>✓</b>		<b>✓</b>	
11	Tower c	omments?							
		additional explanati nan-made, that may a				y) regarding	g conditions listed	d above, or a	ny other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 YEL408 Technician | Martin Valvur Site Visit Date 08/16/2017 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** П **V** Temperature sensor Strip chart recorder П **V V** Relative humidity sensor Computer **V** Solar radiation sensor **V** Modem П **V ~ Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V ~ Humidity sensor translator Surge protector** П П **V ~ UPS Solar radiation translator ~ V** Tipping bucket rain gauge Lightning protection device ~ $\checkmark$ **Shelter heater** Ozone analyzer **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** DataView2 **SSRF V ✓ ✓ V Site Ops Manual** July 2009 **V HASP ✓** July 2009 **✓ Field Ops Manual V** July 2009 **Calibration Reports ✓** Not current Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Dataview Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and

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

current?

### **Field Systems Data Form** F-02058-1500-S8-rev002 YEL408 Site Visit Date 08/16/2017 Site ID Technician | Martin Valvur Site operation procedures Trained by ARS on site 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** Monthly and semiannually **V V Automatic Zero/Span Tests** Daily **V V** Every 2 weeks Manual Zero/Span Tests **V ~** Daily **Automatic Precision Level Tests V Manual Precision Level Test V ✓** Alarm values only **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 ✓** 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:

✓

Dataview

The ozone inlet filter is replaced and the system is leak tested every two weeks.

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

complete sample train including all filters?

reported? If yes, how?

Field Systems Data F	orm	F-02058-1500-59-revoc				
Site ID YEL408	Technician Martin Valvur	Site Visit Dat	08/16/2017			
Site operation procedures						
1 Is the filter pack being chan	ged every Tuesday as scheduled	Filter changed mo	prinings			
2 Are the Site Status Report F correctly?	orms being completed and filed	<b>V</b>				
3 Are data downloads and bac scheduled?	ekups being performed as	No longer require	d			
4 Are general observations be	ing made and recorded? How?	✓ Dataview, SSRF				
5 Are site supplies on-hand an fashion?	d replenished in a timely	<b>V</b>				
6 Are sample flow rates record	ded? How?	SSRF				
7 Are samples sent to the lab of fashion?	on a regular schedule in a timely	<b>V</b>				
8 Are filters protected from co and shipping? How?	ontamination during handling					
9 Are the site conditions report operations manager or staff						
QC Check Performed	Frequency		Compliant			
Multi-point MFC Calibrations	Semiannually		✓			
Flow System Leak Checks	<b>✓</b> Weekly		✓			
Filter Pack Inspection						
Flow Rate Setting Checks	<b>✓</b> Weekly		<b>✓</b>			
Visual Check of Flow Rate Ro	tometer <a>Weekly</a>		✓			
In-line Filter Inspection/Replacement						
Sample Line Check for Dirt/W	ater					
Provide any additional explanation natural or man-made, that may at			itions listed above, or any other features,			

Gloves are not used to handle the filter pack.

## Field Systems Data Form

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

Site ID

YEL408

**Technician** Martin Valvur

Site Visit Date 08/16/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Environmental Sys Corp	8816	2505	90632
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18B	049800008583	none
Flow Rate	Tylan	FC280	AW9403021	none
Infrastructure	Infrastructure	none	none	none
Mainframe	Climatronics	100081	1380	none
Mainframe power supply	Climatronics	101074	688	none
Met tower	Climatronics	14 inch taper	illegible	01362
MFC power supply	Tylan	RO-32	FP902028	00045
Ozone	ThermoElectron Inc	49C	49C-61985-333	90607
Ozone Standard	ThermoElectron Inc	49C	49C-61991-333	90606
Printer	Hewlett Packard	840C	unknown	none
Sample Tower	Aluma Tower	В	none	illegible
Shelter Temperature	ARS	none	none	none
Shield (2 meter)	Climatronics	100325	illegible	01050
Siting Criteria	Siting Criteria	1	None	None
Temperature Translator	Climatronics	100088-2	396	03626
Temperature2meter	Climatronics	100093	none	ARS100
Zero air pump	Werther International	PC70/4	531393	none

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number				
LRL	LRL117-Sandy Grenville-08/17/2017									
1	8/17/2017	Computer	Dell	07010	D520	unknown				
2	8/17/2017	DAS	Campbell	000402	CR3000	2514				
3	8/17/2017	Elevation	Elevation	None	1	None				
4	8/17/2017	Filter pack flow pump	Thomas	02741	107CA18	Unknown				
5	8/17/2017	Flow Rate	Apex	000591	AXMC105LPMDPCV	illegible				
6	8/17/2017	Infrastructure	Infrastructure	none	none	none				
7	8/17/2017	Ozone	ThermoElectron Inc	000701	49i A1NAA	1030244808				
8	8/17/2017	Ozone Standard	ThermoElectron Inc	000444	49i A3NAA	CM08200020				
9	8/17/2017	Sample Tower	Aluma Tower	000783	В	none				
10	8/17/2017	Shelter Temperature	Campbell	none	107-L	none				
11	8/17/2017	Siting Criteria	Siting Criteria	None	1	None				
12	8/17/2017	Temperature	RM Young	06245	41342VC	12792				
13	8/17/2017	Zero air pump	Werther International	06904	C 70/4	000821901				

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2514 LRL117 Sandy Grenville 08/17/2017 DAS Primary Das Date: 8 /17/2017 **Audit Date** 8 /17/2017 Datel Parameter DAS Mfg 16:09:17 16:09:17 Das Time: **Audit Time** Tfer Desc. Source generator (D 15510194 **Serial Number** Das Day: 229 **Audit Day** 229 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** 1/23/2017 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 0.4997 0.4996 V V -0.0001 7 0.7000 V V -0.0001 0.6996 0.6995 7 V V 0.9000 0.8994 0.8994 0.00007 1.0000 0.9993 0.9992 V V -0.0001

## Flow Data Form

Mfg	Serial Nun	nber Ta	Site	Teo	chnician	Site Visit D	Oate Param	eter	Owner ID
Apex	illegible	illegible		Sa	ndy Grenville	08/17/2017	Flow R	ate	000591
					Mfg	BIOS	P	arameter Flo	ow Rate
					Serial Number	103471	Т	fer Desc. ne	xus
					Tfer ID	01420			
					Slope	0.9	99825 <b>Inte</b>	ercept	0.00497
					Cert Date	2/7	7/2017 <b>Cor</b>	rCoff	0.99991
	Mfg BIOS		BIOS	BIOS Parameter Flow Rate					
					Serial Number			Tfer Desc. BIOS cell	
					Tfer ID	01410			
					Slope	0.9	99825 Inte	ercept	0.00497
					Cert Date			rCoff	0.99991
DAS 1:		DAC 2.			Cal Factor 7	070	-0.00	)5	
	A Mar. 0/ D:	DAS 2:	Dif A Mon	. 0/ <b>D</b> :	Cal Factor Z		0.98		
A Avg % Diff: 0.45%	0.67%	A Avg %	Dif A Max	. % DI	Cal Factor F Rotometer R		1.4	=	
Desc.		Input 1/n	n Input Corr_	MfcDisp.	OutputSignal			<u> </u>	I PctDifference
primary	Test type pump off	0.000	0.000	0.00	0.000	0.00	1/m	l/m	i i ctDifference
primary	leak check	0.000	0.000	0.00	0.000	0.00	1/m	1/m	
primary	test pt 1	1.496	1.490	1.52	0.000	1.50	1/m	1/m	0.67%
primary	test pt 1	1.494	1.490	1.52	0.000	1.50	1/m	1/m	0.67%
primary	test pt 3	1.500	1.500	1.52	0.000	1.50	1/m	1/m	0.00%
	onent Leak Tes		11000	Conditio		1.00	Status		0.007
Sensor Component Tubing Condition		Condition	Conditio		Good		Status	Status pass	
Sensor Component Filter Position		sition		<b>Condition</b> G		Statu		pass	
Sensor Component Rotometer Condition			n	Conditio	Condition Clean and dry			pass	
Sensor Component Moisture Present				Conditio	Condition No moisture present			pass	
Sensor Component Filter Distance			Conditio	3.5 cm	Status	pass			
Sensor Component Filter Depth			Conditio	n 1.5 cm	Status	pass			
Sensor Component Filter Azimuth			Conditio	n 180 deg	Status	pass			
Sensor Component System Memo			Conditio	n		Status	Status pass		

## **Ozone Data Form**

Mfg	Serial Number Ta	Site	Technician		Site Visit D	Oate Parame	eter Owner ID	
ThermoElectron Inc	1030244808	LRL117	Sandy Gre	Sandy Grenville		Ozone Ozone	000701	
Intercept 0.	99010 Slope: 82411 Intercept 00000 CorrCoff	0.00000 0.00000 0.00000	Serial N		ThermoElect 517112175 01111 1.0		rameter ozone er Desc. Ozone primary stan cept 0.45870	
A Avg % Diff: A Ma		6Dif A Max %	% Di	Cert Date			*Coff 1.00000	
1.4%	3.7%		CCIT Di					
UseDescription primary primary primary	ConcGroup  1 2 3	Tfer Raw 0.25 14.99 35.00	Tfer Corr -0.20 14.49 34.45	Si 0.7 15. 35.	70 pp 02 pp	b	3.66% 1.65%	
primary	4	68.01	67.38	67.	1.1		0.22%	
primary	5	110.00	109.26	109			-0.24%	
Sensor Component	Sample Train		Condition Good			Status	pass	
Sensor Component	22.5 degree rule		Condition			Status	pass	
Sensor Component	Inlet Filter Condition		<b>Condition</b> Clean			Status	pass	
Sensor Component	Battery Backup		<b>Condition</b> N/A			Status	pass	
Sensor Component	Offset	set		<b>Condition</b> -0.10			pass	
Sensor Component	Span	pan		Condition 1.011			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 124.7 kHz			Status	pass	
Sensor Component	Cell A Noise		Condition 2.5 pp		Status	pass		
Sensor Component	Cell A Flow		Condition 0.67	pm		Status	pass	
Sensor Component	Cell A Pressure	Cell A Pressure		Condition 688.0 mmHg			pass	
Sensor Component Cell A Tmp.			Condition 32.8	dition 32.8 C		Status	pass	
Sensor Component Cell B Freq.			Condition 96.3	dition 96.3 kHz		Status	pass	
Sensor Component Cell B Noise			Condition 2.0 pp	dition 2.0 ppb		Status	pass	
Sensor Component Cell B Flow			Condition 0.67	ition 0.67 lpm		Status	pass	
Sensor Component Cell B Pressure			Condition 687.7	687.7 mmHg		Status	pass	
Sensor Component Cell B Tmp.			Condition	lition		Status	pass	
Sensor Component Line Loss			Condition Not to	dition Not tested		Status	pass	
Sensor Component	System Memo		Condition			Status	pass	

### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg Sandy Grenville RM Young 12792 LRL117 08/17/2017 Temperature 06245 Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 **Tfer ID** 0.14754 **Slope** 1.00759 **Intercept DAS 1: DAS 2:** 2/4/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.15 0.26 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.20 0.05 0.000 0.3 $\mathbf{C}$ 0.26 C Temp Mid Range 25.23 24.89 0.000 25.1 0.16 primary C 0.02 primary Temp High Range 49.32 48.80 0.000 48.8 Condition Moderately clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Sandy Grenville Shelter Temperature Campbell LRL117 08/17/2017 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** 0.61 0.92 01227 **Tfer ID** 1.00759 0.14754 Slope Intercept 2/4/2017 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference	
primary	Temp Mid Range	23.72	23.39	0.000	23.7	C	0.26	
primary	Temp Mid Range	20.81	20.51	0.000	21.2	С	0.65	
primary	Temp Mid Range	26.16	25.82	0.000	24.9	C	-0.92	
Sensor Con	ponent System Memo	)	Condition	Status pass				

#### Infrastructure Data For

Si	te ID	LRL117	Technician	Sandy Grenville	Site Visit Date	08/17/2017	
	Shelter Ma	ake	Shelter Model	Sh	elter Size		
	Ekto		8810	640	0 cuft		

	<u> </u>	 1	F 5		
<b>Sensor Component</b>	Sample Tower Type	Condition	Туре В	Status	pass
<b>Sensor Component</b>	Conduit	Condition	N/A	Status	pass
<b>Sensor Component</b>	Met Tower	Condition	N/A	Status	pass
<b>Sensor Component</b>	Moisture Trap	Condition	Installed	Status	pass
<b>Sensor Component</b>	Power Cables	Condition	Good	Status	pass
<b>Sensor Component</b>	Shelter Temp Control	Condition	Functioning	Status	pass
<b>Sensor Component</b>	Rotometer	Condition	Installed	Status	pass
<b>Sensor Component</b>	Sample Tower	Condition	Good	Status	pass
<b>Sensor Component</b>	Shelter Condition	Condition	Good	Status	pass
<b>Sensor Component</b>	Shelter Door	Condition	Good	Status	pass
<b>Sensor Component</b>	Shelter Roof	Condition	Good	Status	pass
<b>Sensor Component</b>	Shelter Floor	Condition	Good	Status	pass
<b>Sensor Component</b>	Signal Cable	Condition	Good	Status	pass
<b>Sensor Component</b>	Tubing Type	Condition	3/8 teflon	Status	pass
<b>Sensor Component</b>	Sample Train	Condition	Good	Status	pass

## **Field Systems Comments**

1 Parameter: DasComments

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

2 Parameter: SiteOpsProcedures

Ozone sample line leak checks conducted every other week following the inlet filter replacements.

3 Parameter: SitingCriteriaCom

Logging activities are underway surrounding the site. The site is being used as a loading area.

4 Parameter: ShelterCleanNotes

The shelter has been repaired and is in very good condition. A new peaked roof has been installed.

#### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 08/17/2017 LRL117 Site ID Technician Sandy Grenville **USGS Map** EPA Site Sponsor (agency) Map Scale private/PADNR **Operating Group Map Date** 42-111-9991 AQS# Climatronics **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude **Deposition Measurement** dry, wet **QAPP** Longitude woodland - mixed Land Use **QAPP Elevation Meters** complex Terrain **QAPP Declination** No Conforms to MLM **OAPP Declination Date** 39.988309 **Site Telephone Audit Latitude** Laurel Hill State Park -79.251573 Site Address 1 **Audit Longitude** 1447 Laurel Hill State Park Rd. Site Address 2 **Audit Elevation** 609 County **Audit Declination** Somerset, PA City, State **Present** Fire Extinguisher ✓ 15501 New in 2015 Zip Code Eastern First Aid Kit Time Zone ✓ **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # Primary Op. E-mail **Climbing Belt Backup Operator Security Fence** Locked gate **V Secure Shelter** Backup Op. Phone # Stable Entry Step Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 640 cuft Ekto **Shelter Size ✓** Notes The shelter has been repaired and is in very good condition. A new peaked roof has been installed. **Shelter Clean**

**✓** Notes

From Somerset take 30 west

Site OK

**Driving Directions** 

## **Field Systems Data Form**

F-02058-1500-S2-rev002

Site ID LRL117 Technician Sandy Grenville Site Visit Date 08/17/2017

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

Siting Distances OK ✓

**Siting Criteria Comment** 

Logging activities are underway surrounding the site. The site is being used as a loading area.

Fic	eld Systems Data Form		F-02058-1500-S3-rev002
Site	LRL117 Technician Sandy Grenville		Site Visit Date 08/17/2017
1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	<b>✓</b> [	V/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)	<u> </u>	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>	I/A
7	Is it sited to avoid shading, or any artificial or reflected light?	<b>✓</b>	N/A
8	Is the rain gauge plumb?	<b>✓</b> N	N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	<b>✓</b>	N/A
10	Is the surface wetness sensor sited with the grid 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?

Fic	eld Systems Data Form	F-02058-1500-S4-rev00					
Site	LRL117 Technician Sandy Grenville		Site Visit Date 08/17/2017				
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>	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:	sary]	) regarding conditions listed above, or any other features,				

#### Field Systems Data Form F-02058-1500-S5-rev002 LRL117 Technician Sandy Grenville Site Visit Date 08/17/2017 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

e ID	LRL117	Technician	Sandy Grenville		Site Visit Date	08/17/2017		
DAS, se	nsor translators, and p	oeripheral equi	pment operation	ns aı	nd maintenance			
		ar to be in good	l condition and	<b>✓</b>				
		DAS operation	al? (printers,	<b>✓</b>				
			through	<b>✓</b>	Met sensors only			
		otected from the	e weather and	<b>✓</b>				
Are the	signal leads connected	to the correct	DAS channel?	<b>✓</b>				
		rs, and shelter	properly	<b>✓</b>				
Does the	e instrument shelter h	ave a stable pov	ver source?	<b>✓</b>				
Is the in	strument shelter temp	erature contro	lled?	<b>✓</b>				
Is the m	et tower stable and gr	ounded?			Stable	(	Grounded	
Is the sa	ample tower stable and	l grounded?			_		<u> </u>	
Tower c	comments?							
	DAS, see Do the I well mai Are all t modem, Do the a lightnin Are the well mai Are the Grounde Does the Is the in Is the mai	DAS, sensor translators, and provided processing the signal connections provided processing the signal leads connected are the DAS, sensor translator grounded?  Does the instrument shelter temporary to the signal connection of the signal leads connected are the DAS, sensor translator grounded?  Does the instrument shelter temporary the signal leads connected are the DAS, sensor translator grounded?	DAS, sensor translators, and peripheral equipments of the DAS instruments appear to be in good well maintained?  Are all the components of the DAS operation modem, backup, etc)  Do the analyzer and sensor signal leads pass lightning protection circuitry?  Are the signal connections protected from the well maintained?  Are the signal leads connected to the correct of the correct of the correct of the correct of the instrument shelter have a stable power. Is the instrument shelter temperature control of the sample tower stable and grounded?  Is the sample tower stable and grounded?	DAS, sensor translators, and peripheral equipment operation  Do the DAS instruments appear to be in good condition and well maintained?  Are all the components of the DAS operational? (printers, modem, backup, etc)  Do the analyzer and sensor signal leads pass through lightning protection circuitry?  Are the signal connections protected from the weather and well maintained?  Are the signal leads connected to the correct DAS channel?  Are the DAS, sensor translators, and shelter properly grounded?  Does the instrument shelter have a stable power source?  Is the instrument shelter temperature controlled?  Is the met tower stable and grounded?  Is the sample tower stable and grounded?	DAS, sensor translators, and peripheral equipment operations as Do the DAS instruments appear to be in good condition and well maintained?  Are all the components of the DAS operational? (printers, modem, backup, etc)  Do the analyzer and sensor signal leads pass through lightning protection circuitry?  Are the signal connections protected from the weather and well maintained?  Are the signal leads connected to the correct DAS channel?  Are the DAS, sensor translators, and shelter properly grounded?  Does the instrument shelter have a stable power source?  Is the instrument shelter temperature controlled?  Is the sample tower stable and grounded?	Do the DAS instruments appear to be in good condition and well maintained?  Are all the components of the DAS operational? (printers, modem, backup, etc)  Do the analyzer and sensor signal leads pass through lightning protection circuitry?  Are the signal connections protected from the weather and well maintained?  Are the signal leads connected to the correct DAS channel?  Are the DAS, sensor translators, and shelter properly grounded?  Does the instrument shelter have a stable power source?  Is the instrument shelter temperature controlled?  Stable  Is the sample tower stable and grounded?	DAS, sensor translators, and peripheral equipment operations and maintenance  Do the DAS instruments appear to be in good condition and well maintained?  Are all the components of the DAS operational? (printers, modem, backup, etc)  Do the analyzer and sensor signal leads pass through lightning protection circuitry?  Are the signal connections protected from the weather and well maintained?  Are the signal leads connected to the correct DAS channel?  Are the DAS, sensor translators, and shelter properly grounded?  Does the instrument shelter have a stable power source?  Is the instrument shelter temperature controlled?  Stable  Is the sample tower stable and grounded?	DAS, sensor translators, and peripheral equipment operations and maintenance  Do the DAS instruments appear to be in good condition and well maintained?  Are all the components of the DAS operational? (printers, modem, backup, etc)  Do the analyzer and sensor signal leads pass through lightning protection circuitry?  Are the signal connections protected from the weather and well maintained?  Are the signal leads connected to the correct DAS channel?  Are the DAS, sensor translators, and shelter properly grounded?  Does the instrument shelter have a stable power source?  Is the instrument shelter temperature controlled?  Stable  Grounded  Is the sample tower stable and grounded?

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

The meteorological tower has been removed and the temperature sensor has been installed on the sample tower in a naturally aspirated

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

shield.

#### **Field Systems Data Form** F-02058-1500-S7-rev002 LRL117 Technician Sandy Grenville Site Visit Date 08/17/2017 Site ID **Documentation** Does the site have the required instrument and equipment manuals? N/A Yes No No N/A Yes **✓** Wind speed sensor **Data logger V** Wind direction sensor **V Data logger** ✓ **V** Temperature sensor Strip chart recorder **V V** Relative humidity sensor Computer **V** Solar radiation sensor **V** Modem П **V V Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V V Humidity sensor translator** Surge protector П П **V V UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device** ~ $\checkmark$ Ozone analyzer **Shelter heater** ~ **✓** Filter pack flow controller Shelter air conditioner **~** Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V ✓ SSRF ✓ V Site Ops Manual** Not present **HASP** Not present **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 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 LRL117 Technician Sandy Grenville Site Visit Date 08/17/2017 Site ID Site operation procedures Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **V** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency Compliant ✓ V** Semiannually **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** 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** Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests V Manual Precision Level Test 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 V** Do multi-point calibration gases go through the complete sample train including all filters? **✓** Do automatic and manual z/s/p gasses go through the complete sample train including all filters? ✓ Logbook, call-in Are the automatic and manual z/s/p checks monitored and 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 sample line leak checks conducted every other week following the inlet filter replacements.

Fi	eld Sy	stems Data Form			F-02058-1500-S9-rev00					
Site	e ID	LRL117 Tec	hnicia	n Sandy Grenville	)	Site Visit Date	08/17/2017			
	Site ope	ration procedures			_					
1	Is the fi	ter pack being changed ever	y Tues	day as scheduled	? <b>~</b>	Filter changed morr	nings			
2	Are the correctl	Site Status Report Forms be y?	ing coi	mpleted and filed	✓					
3	Are data	a downloads and backups be ed?	ing per	rformed as		No longer required				
4	Are gen	eral observations being made	and r	recorded? How?	<b>✓</b>	SSRF, logbook				
5	Are site fashion	supplies on-hand and replen	ished i	in a timely	<b>✓</b>					
6	Are san	aple flow rates recorded? Ho	w?		<b>✓</b>	SSRF, logbook, cal	l-in			
7	Are san	uples sent to the lab on a regu	lar scl	nedule in a timely	✓					
8		ers protected from contamina oping? How?	tion d	uring handling	✓	Clean gloves on and off				
9		site conditions reported regu ons manager or staff?	larly t	o the field	✓					
QC	Check P	erformed	Fr	requency			Compliant			
N	Multi-poi	nt MFC Calibrations	✓ Se	emiannually			✓			
F	Flow Syst	em Leak Checks	<b>✓</b> W	eekly			✓			
F	Filter Pac	k Inspection								
F	Flow Rate Setting Checks Weekly					✓				
1	Visual Check of Flow Rate Rotometer Weekly						✓			
Ι	n-line Fil	ter Inspection/Replacement	<b>✓</b> Se	emiannually		✓				
S	Sample Line Check for Dirt/Water   ✓ Weekly						✓			
		ndditional explanation (photo nn-made, that may affect the				y) regarding conditi	ons listed above, or a	ny other features,		

## Field Systems Data Form

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

Site ID LRL117 Technician Sandy Grenville Site Vi

Site Visit Date 08/17/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	D520	unknown	07010
DAS	Campbell	CR3000	2514	000402
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	Unknown	02741
Flow Rate	Apex	AXMC105LPMDPC	illegible	000591
Infrastructure	Infrastructure	none	none	none
Ozone	ThermoElectron Inc	49i A1NAA	1030244808	000701
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200020	000444
Sample Tower	Aluma Tower	В	none	000783
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	12792	06245
Zero air pump	Werther International	C 70/4	000821901	06904

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
GLI	R468-Martii	n Valvur-08/17/2017				
1	8/17/2017	Computer	Hewlett Packard	none	6560 b	5CB1520H65
2	8/17/2017	DAS	Environmental Sys Corp	90647	8816	2560
3	8/17/2017	Elevation	Elevation	None	1	None
4	8/17/2017	Filter pack flow pump	Thomas	none	107CAB11A	109500000039
5	8/17/2017	Flow Rate	Tylan	none	FC280	AW9710138
6	8/17/2017	Infrastructure	Infrastructure	none	none	none
7	8/17/2017	MFC power supply	Tylan	03687	RO-32	FP9403014
8	8/17/2017	Modem	US Robotics	none	56k	unknown
9	8/17/2017	Ozone	ThermoElectron Inc	none	49i A3NAA	1023943901
10	8/17/2017	Ozone Standard	ThermoElectron Inc	none	49i A3NAA	0733726104
11	8/17/2017	Sample Tower	Aluma Tower	none	В	none
12	8/17/2017	Shelter Temperature	ARS	77	none	none
13	8/17/2017	Siting Criteria	Siting Criteria	None	1	None
14	8/17/2017	Temperature2meter	RM Young	none	41342	17625
15	8/17/2017	Zero air pump	Werther International	none	PC70/4	000756725

#### **DAS Data Form** 1.17 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg **Environmental Sys** 2560 GLR468 Martin Valvur 08/17/2017 DAS Primary Das Date: 8 /17/2017 **Audit Date** 8 /17/2017 HY Parameter DAS Mfg 8:39:00 8:40:10 Das Time: **Audit Time** Tfer Desc. Source generator (D 12010039329 **Serial Number** Das Day: 229 **Audit Day** 229 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** 1/23/2017 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 15 0.0000 -0.0002 -0.0003 -0.0001 V V 15 0.1000 0.0998 0.0995 -0.0003 15 0.3000 0.2995 0.2997 V V 0.0002 15 0.5000 0.4994 V V -0.0003 0.4997 15 0.7000 V V -0.0003 0.7001 0.6998 V V 15 0.9000 0.9003 0.9002 -0.0001 15 V V 1.0000 1.0000 1.0003 0.0003

## Flow Data Form

Гуlan	<u> </u>	W971013	38	GLR468	Ma	rtin Valvur	08/17/201	7 Flow F	Rate	none
						Mfg	BIOS		_	Dw Pata
Mfg	Tylan					Mig	ыоз		Parameter Flow Rate	
SN/Owner ID	FP94	03014	014 03687			Serial Number	148613 <b>T</b>		fer Desc. Bl	OS 220-H
Parameter	MFC	power supply				Tfer ID	01421			
						Slope	1.	.00153 Int	ercept	0.00366
						Cert Date	1/2	5/2017 <b>Co</b>	rrCoff	1.00000
DAS 1:			DAS 2:		L	Cal Factor Z	ero	0.3	37	
A Avg % Diff:	A Ma	x % Di	A Avg %	Dif A Max	x % Di	Cal Factor F	ull Scale	6.	01	
2.38%		2.38%				Rotometer R	eading:	3	3.2	
Desc.	Te	st type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	I PctDifference
primary	pump	off	0.000	0.000	-0.36	0.0000	0.01	1/m	l/m	
primary	leak o	heck	0.000	0.000	-0.36	0.0000	0.00	1/m	l/m	
primary	test p		2.950	2.940	2.34	0.0000	3.01	l/m	l/m	2.38%
primary	test p		2.950	2.940	2.34	0.0000	3.01	1/m	l/m	2.38%
primary	test p	t 3	2.950	2.940	2.34	0.0000	3.01	1/m	l/m	2.38%
<b>Sensor Comp</b>	onent	Leak Tes	t		Conditio	n		Statu	pass	
Sensor Comp	onent	Tubing C	ondition		Conditio	<b>n</b> Good	Status		pass	
Sensor Comp	onent	Filter Pos	sition		Conditio	<b>n</b> Good	Good		pass	
Sensor Comp	onent	Rotomete	er Conditio	n	Conditio	n Clean and dry	Clean and dry		pass	
Sensor Comp	onent	Moisture	Present		Conditio	n No moisture p	esent	Statu	pass	
Sensor Comp	onent	Filter Dist	tance		Conditio	<b>n</b> 4.5 cm		Statu	pass	
Sensor Comp	onent	Filter Dep	oth		Conditio	0.5 cm		Statu	pass	
Sensor Comp	onent	Filter Azir	muth		Conditio	360 deg		Status		
Sensor Component System Memo		System N	Conditio	n		Status pass				

## **Ozone Data Form**

Mfg Se	erial Number Ta	Site	Tee	chnician		Site Visi	t Date	Parame	eter Owner	· ID
ThermoElectron Inc 1	023943901	GLR468	Ma	artin Valv	ur	08/17/20	017	Ozone	none	
Intercept 0.4	1.05210       Slope:       0.00000         0.44679       Intercept       0.00000         0.99994       CorrCoff       0.00000			Serial Number 4			Electron I		rameter ozone er Desc. Ozone prima	ary stan
DAS 1: A Avg % Diff: A Ma: 6.3%	DAS 2: x % Di	6Dif A Max 9	% Di	Slope Cert Da	te		1.00466 1/1/2017			01298 00000
UseDescription	ConcGroup	Tfer Raw	Tfer	Corr	Si	te	Site	Unit	PctDifference	
primary	1	0.40	0.3		1.		ppb			
primary	2	15.07	14.				ppb		7.88%	
primary primary	3 4	35.04 65.60	34. 65.		68		ppb ppb		6.88%	_
primary	5	112.02	111		118		ppb		6.03%	
Sensor Component	Sample Train		Conditio	on Good				Status	pass	
Sensor Component	22.5 degree rule		Conditio	on				Status	pass	
Sensor Component	Inlet Filter Conditio	n	Conditio	on Clean				Status	s pass	
Sensor Component	Battery Backup		Conditio	on N/A				Status	pass	
Sensor Component	Offset		Conditio					Status	pass	
Sensor Component			Conditio					Status		
Sensor Component				Condition 0.000				Status		=
Sensor Component	Fullscale Voltage		Conditio	ondition 0.9999				Status	pass	
Sensor Component	Cell A Freq.			Condition 61.3 kHz				Status	pass	
Sensor Component	Cell A Noise		Conditio					Status		
Sensor Component			Conditio					Status		
Sensor Component	Cell A Pressure		Conditio	n 668.2	mmHg			Status	pass	
Sensor Component	Cell A Tmp.		Conditio					Status		=
Sensor Component	Cell B Freq.		Conditio					Status	Fail	
Sensor Component	Cell B Noise		Conditio	0.5 pp	b			Status	pass	
Sensor Component	Cell B Flow		Conditio	o.56 lj	om			Status	pass	
Sensor Component	Cell B Pressure		Conditio					Status	pass	
Sensor Component	Cell B Tmp.		Conditio	on				Status	pass	
Sensor Component	Line Loss		Conditio	ion Not tested				Status	pass	
Sensor Component	System Memo		Conditio					Status	pass	
_										

#### 2 Meter Temperature Data Form Calc. Difference Serial Number Ta **Technician** Site Visit Date Parameter Mfg Site **Owner ID** Martin Valvur RM Young 17625 GLR468 08/17/2017 Temperature2meter none Parameter Temperature Mfg Fluke Tfer Desc. RTD 3275143 **Serial Number** 01229 Tfer ID **Slope** 1.00006 **Intercept** 0.03191 **DAS 1: DAS 2:** 1/23/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 1.15 1.65 Test type UseDescription InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit Difference 0.0000 primary Temp Low Rang 0.06 0.03 -0.62 C -0.65 Temp Mid Rang 24.23 24.20 0.0000 25.34 C 1.14 primary primary Temp High Rang 47.77 47.74 0.0000 46.09 C -1.65 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 77 ARS GLR468 08/17/2017 Shelter Temperature none **DAS 1: DAS 2:** Parameter Shelter Temperatur Mfg Fluke Abs Avg Err Abs Max Er **Abs Avg Err** Abs Max Er Tfer Desc. RTD 3275143 **Serial Number** 0.86 1.28 01229 **Tfer ID** 1.00006 0.03191 **Slope** Intercept 1/23/2017 CorrCoff 1.00000 **Cert Date** InputTmpCorr. OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw Temp Mid Range 0.000-1.28 primary 25.30 25.27 24.0 C 25.39 25.36 0.000 C -1.21 Temp Mid Range 24.2 primary

0.000

25.1

C

Status pass

0.09

24.98

Condition

25.01

primary

Temp Mid Range

Sensor Component | System Memo

#### **Infrastructure Data For**

Site	ID GLR468	Technician Martin Va	vur Site Visit Date	08/17/2017
S	Shelter Make	Shelter Model	Shelter Size	
E	Ekto	8810 (s/n 2149-20)	640 cuft	2.000

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

## **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	d Problem
Ozone	GLR468	Martin Valvur	08/17/2017	Cell B Freq.	ThermoElectron	3383		

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

## **Field Systems Comments**

1 Parameter: SiteOpsProcedures

The ozone inlet filter is being changed weekly while smoke from forest fires is present.

2 Parameter: SitingCriteriaCom

The site is located in a small clearing within 100 meters of a horse stable. There is a plywood and aluminum processing plant within 20 km of the site.

3 Parameter: ShelterCleanNotes

The shelter is in good condition. Evidence of repairs to roof leaks attempted. Some floor tiles are loose.

4 Parameter: MetSensorComme

The recorded temperature data at this site is measured at approximately 2 meters above the ground.

#### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 08/17/2017 GLR468 Technician | Martin Valvur Site ID Lake McDonald West **USGS Map NPS** Site Sponsor (agency) Map Scale NPS **Operating Group Map Date** 30-029-8001 AQS# R.M. Young **Meteorological Type** Ozone, IMPROVE **Air Pollutant Analyzer QAPP** Latitude 48.5103 dry, wet, Hg -113.9956 **Deposition Measurement QAPP** Longitude woodland - mixed 976 Land Use **QAPP Elevation Meters** 18 **Terrain** complex **QAPP Declination** No 12/27/2004 Conforms to MLM **OAPP Declination Date** (406) 888-7983 48.510301 **Site Telephone Audit Latitude** Horse Stables -113.996807 Site Address 1 **Audit Longitude** Quarter Circle Bridge Rd Site Address 2 **Audit Elevation** 964 Flathead 14.1 County **Audit Declination** West Glacier, MT City, State **Present** Fire Extinguisher 59936 Inspected June 2011 Zip Code Mountain **Time Zone First Aid Kit ✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **V Climbing Belt** Primary Op. E-mail **Security Fence Backup Operator V Secure Shelter** Backup Op. Phone # Stable Entry Step Backup Op. E-mail Shelter Working Room ✓ Make Model 8810 (s/n 2149-20) Ekto **Shelter Size** 640 cuft **✓** Notes The shelter is in good condition. Evidence of repairs to roof leaks attempted. Some floor tiles are Shelter Clean loose.

From Kalispell proceed north on route 2 to West Glacier. Turn left onto Going To The Sun Road into Glacier National

Park. Proceed approximately 0.2 miles past the entrance and fee station, and turn left toward the horse stables. Bear right at the fork and continue through the gate past the stables. The site is visible in the clearing on the left.

**✓** Notes

Site OK

**Driving Directions** 

## Field Systems Data Form

F-02058-1500-S2-rev002

Site ID GLR468 Technician Martin Valvur Site Visit Date 08/17/2017

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

Siting Distances OK  $\Box$ 

**Siting Criteria Comment** 

The site is located in a small clearing within 100 meters of a horse stable. There is a plywood and aluminum processing plant within 20 km of the site.

#### **Field Systems Data Form** F-02058-1500-S3-rev002 Site Visit Date 08/17/2017 Technician | Martin Valvur Site ID GLR468 ✓ N/A Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? **✓** N/A Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) **V** N/A Are the tower and sensors plumb? **~** Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? Temperature now at 2 meters Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) **✓** N/A Is the solar radiation sensor plumb? N/A Is it sited to avoid shading, or any artificial or reflected light? **✓** N/A Is the rain gauge plumb? ✓ N/A Is it sited to avoid sheltering effects from buildings, trees, towers, etc? N/A 10 Is the surface wetness sensor sited with the grid surface facing north? ✓ N/A 11 Is it inclined approximately 30 degrees?

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

The recorded temperature data at this site is measured at approximately 2 meters above the ground.

Fic	eld Systems Data Form	F-02058-1500-S4-rev002
Site	ID GLR468 Technician Martin Valvur	Site Visit Date 08/17/2017
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	
2	Are all the meteorological sensors operational online, and reporting data?	
3	Are the shields for the temperature and RH sensors clean?	
4	Are the aspirated motors working?	
5	Is the solar radiation sensor's lens clean and free of scratches?	
6	Is the surface wetness sensor grid clean and undamaged?	✓ N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	
	ide any additional explanation (photograph or sketch if neces ral 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 GLR468 Technician | Martin Valvur Site Visit Date 08/17/2017 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	GLR468	Technician	Martin Valvur		Site Vis	sit Date 08/17/201	17	
	DAS, ser	nsor translators, and j	peripheral equip	ment operation	ıs ar	nd maintena	<u>ance</u>		
1		OAS instruments appeintained?	ar to be in good	condition and	<b>✓</b>				
2		he components of the backup, etc)	DAS operationa	l? (printers,	<b>✓</b>				
3		nalyzer and sensor sig g protection circuitry		hrough	<b>✓</b>	Met sensors	s only		
4		signal connections prointained?	otected from the	weather and	<b>✓</b>				
5	Are the	signal leads connected	to the correct D	OAS channel?	<b>✓</b>				
6	Are the grounde	DAS, sensor translato	rs, and shelter p	roperly	<b>✓</b>				
7	Does the	e instrument shelter ha	ave a stable pow	er source?	<b>✓</b>				
8	Is the in	strument shelter temp	erature controll	ed?	<b>✓</b>				
9	Is the m	et tower stable and gr	ounded?			<b>Stable</b>		Grounded	
10	Is the sa	mple tower stable and	grounded?			<b>✓</b>			
11	Tower c	omments?							
		additional explanatio nan-made, that may af				y) regardin	ng conditions liste	d above, or a	any other features,

#### **Field Systems Data Form** F-02058-1500-S7-rev002 GLR468 Technician | Martin Valvur Site Visit Date 08/17/2017 Site ID **Documentation** Does the site have the required instrument and equipment manuals? N/A Yes No Yes No N/A **✓ ✓** Wind speed sensor **Data logger V** Wind direction sensor **V Data logger** ✓ **V** Temperature sensor Strip chart recorder **V V** Relative humidity sensor Computer **V** Solar radiation sensor **V** Modem П **V ~ Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V ~ Humidity sensor translator Surge protector** П П **V ~ UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device** ~ $\checkmark$ **Shelter heater** Ozone analyzer **✓** $\checkmark$ 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 ✓ ✓** Dataview **SSRF V ✓ ✓ Site Ops Manual** Jan 2006 **✓ HASP** April 2004 **✓ Field Ops Manual** April 2004 **Calibration Reports ✓** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Dataview Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and

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

current?

#### **Field Systems Data Form** F-02058-1500-S8-rev002 GLR468 Site Visit Date 08/17/2017 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** 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 ~** Daily **Automatic Precision Level Tests Manual Precision Level Test V** Alarm values only **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 ozone inlet filter is being changed weekly while smoke from forest fires is present.

Field Systems Data Form						F-02058-1500-S9-rev002				
Site	e ID	GLR468 Te	chnicia	Martin Valvur		Site Visit Date	e 08/17/2017			
	Site ope	ration procedures								
1	Is the fil	ter pack being changed eve	ry Tue	sday as scheduled	<b>V</b>	Filter changed vari	ous times			
2	Are the correctl	Site Status Report Forms b	eing co	ompleted and filed	<b>✓</b>					
3	Are data	a downloads and backups bed?	eing pe	erformed as		No longer required				
4	Are gen	eral observations being mad	le and	recorded? How?	<b>✓</b>	Dataview				
5	Are site fashion	supplies on-hand and reple	nished	in a timely	<b>✓</b>					
6	Are sam	aple flow rates recorded? H	)w?		<b>✓</b>	SSRF				
7	Are sam	ples sent to the lab on a reg	ular sc	chedule in a timely	<b>✓</b>					
8		ers protected from contaminoping? How?	ation o	during handling	<b>✓</b>	One set of gloves only				
9		site conditions reported reg ons manager or staff?	ularly	to the field						
QC	Check Po	erformed	F	requency			Compliant			
N	Aulti-poi	nt MFC Calibrations	<b>✓</b> S	emiannually			$\checkmark$			
F	low Syste	em Leak Checks	<b>✓</b> M	/eekly			✓			
F	ilter Pac	k Inspection								
F	low Rate	<b>Setting Checks</b>		/eekly			✓			
7	isual Ch	eck of Flow Rate Rotometer	_	/eekly			<b>✓</b>			
I	In-line Filter Inspection/Replacement  As needed					<b>V</b>				
S	Sample Line Check for Dirt/Water									
		dditional explanation (photon-made, that may affect the				y) regarding condit	tions listed above, or any other features,			

## Field Systems Data Form

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

Site ID GLR468 Technician Martin Valvur Site V

Site Visit Date 08/17/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	6560 b	5CB1520H65	none
DAS	Environmental Sys Corp	8816	2560	90647
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB11A	109500000039	none
Flow Rate	Tylan	FC280	AW9710138	none
Infrastructure	Infrastructure	none	none	none
MFC power supply	Tylan	RO-32	FP9403014	03687
Modem	US Robotics	56k	unknown	none
Ozone	ThermoElectron Inc	49i A3NAA	1023943901	none
Ozone Standard	ThermoElectron Inc	49i A3NAA	0733726104	none
Sample Tower	Aluma Tower	В	none	none
Shelter Temperature	ARS	none	none	77
Siting Criteria	Siting Criteria	1	None	None
Temperature2meter	RM Young	41342	17625	none
Zero air pump	Werther International	PC70/4	000756725	none

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number			
THI	THR422-Martin Valvur-08/29/2017								
1	8/29/2017	Computer	Hewlett Packard	none	65606	5CB1520H68			
2	8/29/2017	DAS	Environmental Sys Corp	90656	8816	2600			
3	8/29/2017	Elevation	Elevation	None	1	None			
4	8/29/2017	Filter pack flow pump	Thomas	03634	107CAB18	049400004441			
5	8/29/2017	flow rate	Tylan	none	FC280SAV	AW02213004			
6	8/29/2017	Infrastructure	Infrastructure	none	none	none			
7	8/29/2017	Mainframe	Climatronics	none	100081	1911			
8	8/29/2017	Mainframe power supply	Climatronics	none	101074	unknown			
9	8/29/2017	Met tower	Rohn	none	unknown	none			
10	8/29/2017	MFC power supply	Tylan	00042	RO-32	FP902022			
11	8/29/2017	Ozone	ThermoElectron Inc	E00051	49i A1NAA	1153170017			
12	8/29/2017	Sample Tower	Aluma Tower	none	В	AT-81077-J5			
13	8/29/2017	Shelter Temperature	ARS	none	none	none			
14	8/29/2017	Siting Criteria	Siting Criteria	None	1	None			
15	8/29/2017	Temperature Translator	Climatronics	01545	100088-2	217			
16	8/29/2017	Temperature2meter	Climatronics	none	100093	7974			
17	8/29/2017	Zero air pump	Thomas	none	607CA22C	039500000348			

#### **DAS Data Form** 1.25 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg **Environmental Sys** 2600 THR422 Martin Valvur 08/29/2017 DAS Primary Das Date: 8 /29/2017 **Audit Date** 8 /29/2017 HY Parameter DAS Mfg 7:14:15 7:15:30 Das Time: **Audit Time** Tfer Desc. Source generator (D 12010039329 **Serial Number** Das Day: 241 **Audit Day** 241 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** 1/23/2017 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 0.0000 -0.0005 -0.0005 0.0000 V V 7 0.1000 0.0996 0.0996 0.00007 0.3000 0.2991 0.2992 V V 0.0001 7 0.5000 0.4998 V V -0.0002 0.5000 7 0.7000 V V -0.0002 0.6998 0.6996 V V 7 0.9000 0.8999 0.9001 0.00027 V V 1.0000 1.0004 1.0004 0.0000

## Flow Data Form

<b>Afg</b>	Serial Number Ta Site Technician Site Vi		Site Visit I	Oate Paran	neter	Owner ID			
ylan	AW022	13004	THR422	Ма	rtin Valvur	o8/29/2017		te	none
Mfg	Tylan Mfg BIOS		P	arameter Flo	ow Rate				
SN/Owner ID	FP902022	00042			Serial Number	148613 <b>T</b>		fer Desc. Bl	OS 220-H
Parameter	MFC power	cupply		,	Tfer ID	01421			
Parameter	ivii C powei	зирріу							
				}	Slope	1.	00153 Int	ercept	0.0036
					Cert Date	1/25	5/2017 <b>Co</b>	rrCoff	1.0000
DAS 1:		<b>DAS 2:</b>			Cal Factor Z	ero	0.17	71	
A Avg % Diff:	A Max % D	i A Avg %	Dif A Max	% Di	Cal Factor F	ull Scale	,	11	
0.22%	0.33	%			Rotometer R	eading:	3.2	25	
Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	I PctDifference
primary	pump off	0.000	0.000	-0.22	0.0000	-0.02	1/m	1/m	
primary	leak check	0.000	0.000	-0.22	0.0000	-0.03	1/m	1/m	
primary	test pt 1	2.999	2.990	2.61	0.0000	3.00	l/m	l/m	0.33%
primary	test pt 2	3.007	3.000	2.61	0.0000	3.00	1/m	1/m	0.00%
primary	test pt 3	3.002	2.990	2.60	0.0000	3.00	l/m	l/m	0.33%
Sensor Comp	onent Leak	est		Condition	1		Status	pass	
Sensor Comp	onent Tubin	g Condition		Condition	Good		Status	pass	
Sensor Comp	onent Filter	Position		Condition	Fair		Status	pass	
Sensor Comp	onent Rotor	eter Condition	า	Condition	Clean and dry		Status	pass	
Sensor Comp	onent Moist	Moisture Present			No moisture p	resent	Status	pass	
Sensor Comp	onent Filter	Distance		Condition	5.0 cm	Status	pass		
Sensor Comp	onent Filter	Depth		Condition	0.0 cm		Status	pass	
Sensor Component Filter Azimuth		Condition	135 deg		Status	pass			
	onant Systa	t System Memo			1		Status	pass	

## **Ozone Data Form**

Mfg So	erial Number Ta	Site	Teo	chnician		Site Visi	t Date Paramo	eter Owner ID		
ThermoElectron Inc 1	153170017	THR422	Ma	artin Valv	ur	08/29/20	Ozone	E00051		
Intercept -0.2	Slope: 7325 Intercept 9995 CorrCoff	0.00000	)	Mfg Serial N Tfer ID	lumber			rameter ozone  er Desc. Ozone primary stan		
DAS 1: A Avg % Diff: A Mar 5.2%	DAS 2: x % Di	6Dif A Max 9	% Di	Slope Cert Da	te	1		rcept 0.01298 rCoff 1.00000		
UseDescription	ConcGroup	Tfer Raw	Tfer	Corr	Si	te	Site Unit	PctDifference		
primary	1	0.18	0.1		0		ppb			
primary	2	15.86	15.		14.		ppb	-5.83%		
primary	3 4	35.31 67.24	35. 66.		63.		ppb ppb	-5.66% -5.25%		
primary	5	112.36	111		107		ppb ppb	-3.86%		
Sensor Component	Sample Train		Conditio	Good		·	Status	pass		
Sensor Component	22.5 degree rule		Conditio	n			Status	pass		
Sensor Component	Inlet Filter Conditio	n	Conditio	dition Clean			Status	pass		
Sensor Component	Battery Backup		Conditio	ndition N/A			Status	atus pass		
Sensor Component	Offset		Conditio	Condition 0.30			Status	pass		
Sensor Component	Span		Conditio	Condition 0.969			Status	pass		
Sensor Component	Zero Voltage		Conditio	Condition N/A			Status	pass		
Sensor Component	Fullscale Voltage		Condition N/A				Status	pass		
Sensor Component	Cell A Freq.		Condition 48.1 kHz				Status	Fail		
Sensor Component	Cell A Noise		Conditio	Condition 0.8 ppb			Status	pass		
Sensor Component	Cell A Flow		Conditio	Condition 0.67 lpm			Status	pass		
Sensor Component	Cell A Pressure		Conditio	ndition 670.1 mmHg			Status	pass		
<b>Sensor Component</b>	Cell A Tmp.		Conditio	32.8 C	)		Status	pass		
Sensor Component	Cell B Freq.		Conditio	72.4 k	Hz		Status	pass		
Sensor Component	Cell B Noise		Conditio	0.6 pp	b		Status	pass		
Sensor Component	Cell B Flow		Conditio	0.67 l	om		Status	pass		
Sensor Component	Cell B Pressure		Conditio	669.8	mmHg		Status	pass		
Sensor Component	Cell B Tmp.		Conditio	on			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 **Technician** Site Visit Date Parameter Mfg Serial Number Ta Site **Owner ID** Martin Valvur Climatronics 7974 THR422 08/29/2017 Temperature2meter none Parameter Temperature Mfg Fluke Climatronics Mfg 3275143 Tfer Desc. RTD **Serial Number** 01545 **SN/Owner ID** 01229 Tfer ID Temperature Translator **Parameter Slope** 1.00006 **Intercept** 0.03191 **DAS 1: DAS 2:** 1/23/2017 1.00000 CorrCoff Abs Avg Err **Abs Max Er Abs Avg Err** Abs Max Er **Cert Date** 0.11 0.15 InputTmpRaw InputTmpCorrected OutputTmpSignal OutputSignalEng | OSE Unit UseDescription Test type Difference Temp Low Rang primary 0.11 0.08 0.0000 0.23 C 0.15 Temp Mid Rang 24.61 24.58 0.0000 24.63 C 0.05 primary primary Temp High Rang 46.93 46.90 0.0000 47.03 C 0.13 Sensor Component Properly Sited **Condition** Properly sited **Status** pass Sensor Component | Shield Condition Clean **Status** pass Sensor Component Blower **Condition** N/A Status pass Sensor Component Blower Status Switch Status pass **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Martin Valvur ARS THR422 08/29/2017 Shelter Temperature none none **DAS 1: DAS 2:** Parameter Shelter Temperatur Mfg Fluke **Abs Avg Err** Abs Max Er **Abs Avg Err** Abs Max Er Tfer Desc. RTD 3275143 **Serial Number** 1.93 2.17 01229 **Tfer ID** 1.00006 0.03191 **Slope** Intercept 1/23/2017 1.00000 **Cert Date** CorrCoff OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. 22.97 0.000primary Temp Mid Range 23.00 24.4C 1.47 25.53 25.50 0.000 27.7 C Temp Mid Range 2.16 primary

26.46

Condition

0.000

C

Status pass

2.17

28.6

26.49

primary

Temp Mid Range

Sensor Component | System Memo

### **Infrastructure Data For**

Site ID THR422 Technician Martin Valvur Site Visit Date 08/29/2017

Shelter Make Shelter Model Shelter Size

Ekto 8814 (s/n 3028-1) 896 cuft

ensor Component	Sample Tower Type	Condition	Туре В	Status	pass
ensor Component	Conduit	Condition	Good	Status	pass
nsor Component	Met Tower	Condition	Good	Status	pass
ensor Component	Moisture Trap	Condition	Not installed	Status	pass
ensor Component	Power Cables	Condition	Good	Status	pass
ensor Component	Shelter Temp Control	Condition	Functioning	Status	pass
ensor Component	Rotometer	Condition	Installed	Status	pass
ensor Component	Sample Tower	Condition	Good	Status	pass
ensor Component	Shelter Condition	Condition	Good	Status	pass
ensor Component	Shelter Door	Condition	Good	Status	pass
ensor Component	Shelter Roof	Condition	Good	Status	pass
ensor Component	Shelter Floor	Condition	Good	Status	pass
nsor Component	Signal Cable	Condition	Good	Status	pass
ensor Component	Tubing Type	Condition	3/8 teflon	Status	pass
ensor Component	Sample Train	Condition	Good	Status	pass

# **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	d Problem
Ozone	THR422	Martin Valvur	08/29/2017	Cell A Freq.	ThermoElectron	4382		

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

## **Field Systems Comments**

### 1 Parameter: SiteOpsProcedures

The ozone sample train does not have a means to introduce test gas at the sample inlet. Results of routine zero, span, precision, and any multipoint calibration checks are maintained by the state personnel who perform the tests.

### 2 Parameter: SitingCriteriaCom

The site is located 200 meters from an interstate rest area, and 300 meters from interstate 94. The rest area can have parked and idling vehicles for extended periods.

### 3 Parameter: ShelterCleanNotes

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

### 4 Parameter: PollAnalyzerCom

The ozone analyzer is operated by the state of North Dakota. The sample train contains a glass manifold. There is no means to introduce on-site generated test gas at the sample inlet. A through-the-probe audit was conducted using the EEMS system.

#### **Field Systems Data Form** F-02058-1500-S1-rev002 Site Visit Date 08/29/2017 Technician Martin Valvur THR422 Site ID Fryburg NW **USGS Map** NPS Site Sponsor (agency) Map Scale NPS and state of ND **Operating Group Map Date** 38-007-0002 AQS# Climatronics **Meteorological Type** Ozone, SO2, IMPROVE, PM2.5 46.8947 **Air Pollutant Analyzer QAPP** Latitude **Deposition Measurement** dry, wet **QAPP** Longitude -103.3778 850 Land Use prairie **QAPP Elevation Meters** rolling - complex **Terrain QAPP Declination** Marginally Conforms to MLM **OAPP Declination Date** 46.894844 **Site Telephone Audit Latitude** Painted Canyon Visitor Center -103.377719 Site Address 1 **Audit Longitude** Exit 32 Interstate 94 Site Address 2 **Audit Elevation** 840 Billings 8.2 County **Audit Declination** Medora, ND City, State **Present** Fire Extinguisher 58645 Zip Code **V** Mountain **Time Zone First Aid Kit 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 8814 (s/n 3028-1) Ekto **Shelter Size** 896 cuft

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

From Interstate 94 take exit 32 to the Painted Canyon rest area and visitor center. The site is just east of the parking

**✓** Notes

**✓** Notes

lot on a gravel road.

Shelter Clean

**Driving Directions** 

Site OK

## **Field Systems Data Form**

F-02058-1500-S2-rev002

Site ID	THR422	Technician	Martin Valvur	Site Visit Date	08/29/2017

Potential Interferent	Minimum Distance From Measurement Apparatus	Distance	Pass = Checked
Large Point Source of SO2 or NOx	20 to 40 km		
Major industrial complex	10 to 20 km		✓
City > 50,000 population	40 km		✓
City 10,000 to 50,000 population	10 km		✓
City 1,000 to 10,000 population	5 km		<b>✓</b>
Major highway, airport or rail yard	2 km	300 m	
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	200 m	
Small parking lot	100 m		✓
Tree line	50 m		✓
Obstacles to wind	10 times obstacle height		✓

Siting Distances OK  $\Box$ 

**Siting Criteria Comment** 

The site is located 200 meters from an interstate rest area, and 300 meters from interstate 94. The rest area can have parked and idling vehicles for extended periods.

Fic	eld Systems Data Form			F-02058-1500-S3-r				
Site	e ID THR422 Technician Martin V	alvur	Site Visit Date	08/29/2017				
1	Are wind speed and direction sensors sited so as to avbeing influenced by obstructions?	oid 🗸	N/A					
2	Are wind sensors mounted so as to minimize tower eff (i.e. wind sensors should be mounted atop the tower o horizontally extended boom >2x the max diameter of tower into the prevailing wind)	r on a	N/A					
3	Are the tower and sensors plumb?	<b>✓</b>	N/A					
4	Are the temperature shields pointed north or position avoid radiated heat sources such as buildings, walls, e							
5	Are temperature and RH sensors sited to avoid unnat conditions? (i.e. ground below sensors should be natus surface and not steeply sloped. Ridges, hollows, and a standing water should be avoided)	ral						
6	Is the solar radiation sensor plumb?	<b>✓</b>	N/A					
7	Is it sited to avoid shading, or any artificial or reflecte light?	ed 🗸	N/A					
8	Is the rain gauge plumb?	<b>✓</b>	N/A					
9	Is it sited to avoid sheltering effects from buildings, tr towers, etc?	ees,	N/A					
10	Is the surface wetness sensor sited with the grid surfact facing north?	ce 🗸	N/A					
11	Is it inclined approximately 30 degrees?	<b>✓</b>	N/A					

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

Fic	eld S	ystems Da	ata Fo	orm		F-02058-1500-S4-rev00						
Site	e ID	THR422		Technicia	Martin Valvur		Site Visit Date 08/29/2017					
1		the meterologic			be intact, in good	<b>✓</b>						
2		the meteorologing data?	gical sens	sors operatio	onal online, and	<b>✓</b>						
3	Are the	e shields for the	e temper	ature and R	H sensors clean?	<b>✓</b>						
4	Are the	e aspirated mo	tors worl	king?		<b>✓</b>						
5	Is the s	solar radiation nes?	sensor's	lens clean ai	nd free of	<b>✓</b>	N/A					
6	Is the s	surface wetness	s sensor g	grid clean an	nd undamaged?	✓	N/A					
7		e sensor signal on, and well m			act, in good	<b>✓</b>	Signs of wear					
8		e sensor signal he elements and			nections protected	· ·						
					n or sketch if nece toring parameters		regarding conditions listed above, or any other features,					

### Field Systems Data Form F-02058-1500-S5-rev002 THR422 Technician | Martin Valvur Site Visit Date 08/29/2017 Site ID Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E **~** Do the sample inlets have at least a 270 degree arc of unrestricted airflow? **~** Are the sample inlets 3 - 15 meters above the ground? **~** Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and maintenance **~** Do the analyzers and equipment appear to be in good condition and well maintained? **V** Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. 3/8 teflon by 10 meters and glass manifold Describe dry dep sample tube. 3/8 teflon by 12 meters At inlet and analyzer 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:

The ozone analyzer is operated by the state of North Dakota. The sample train contains a glass manifold. There is no means to introduce on-site generated test gas at the sample inlet. A through-the-probe audit was conducted using the EEMS system.

# Field Systems Data Form

F-02058-1500-S6-rev002

Site	ID	THR422	Technician	Martin Valvur		Site Visi	it Date 08/29/201	7			
	DAC as					. J					
	DAS, se	nsor translators, an	<u>ia peripheral equi</u>	<u>pment operation</u>	<u>is ar</u>	<u>ia maintena</u>	<u>nce</u>				
1		DAS instruments ap intained?	pear to be in good	l condition and	<b>✓</b>						
2		the components of the backup, etc)	he DAS operation	al? (printers,	<b>✓</b>						
3		analyzer and sensor g protection circuit		through	<b>✓</b>	Met sensors	only				
4		signal connections jintained?	protected from the	e weather and	<b>✓</b>						
5	Are the	signal leads connec	ted to the correct	DAS channel?	<b>✓</b>						
6	Are the grounde	DAS, sensor translated?	ators, and shelter	properly	<b>✓</b>						
7	Does the	e instrument shelter	have a stable pov	ver source?	<b>✓</b>						
8	Is the in	strument shelter te	mperature contro	lled?	<b>✓</b>						
9	Is the m	net tower stable and	grounded?			Stable		Grounded			
						✓		<b>✓</b>			
10	Is the sa	ample tower stable a	and grounded?			<b>✓</b>		<b>✓</b>			
11	Tower o	comments?									
		additional explanar				y) regarding	g conditions listed	d above, or a	any other features,		

#### **Field Systems Data Form** F-02058-1500-S7-rev002 THR422 Technician | Martin Valvur Site Visit Date 08/29/2017 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** 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 ~ 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** $\checkmark$ 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 ✓ 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? ✓ Dataview Flow section only 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** THR422 Site Visit Date 08/29/2017 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** 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 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** N/A **Automatic Zero/Span Tests V** Every 2 weeks Manual Zero/Span Tests **V Automatic Precision Level Tests V** Every 2 weeks **Manual Precision Level Test V V** Semiannually **Analyzer Diagnostics Tests V** Quarterly **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze Sample Line Check for Dirt/Water **V** Semiannually **Zero Air Desiccant Check** Not performed 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 Not performed complete sample train including all filters? Are the automatic and manual z/s/p checks monitored and reported? If yes, how? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

The ozone sample train does not have a means to introduce test gas at the sample inlet. Results of routine zero, span, precision, and any

multipoint calibration checks are maintained by the state personnel who perform the tests.

F-02058-1500-S8-rev002

Fi	eld Sy	stems Data Forn	ı			F-02058-1500-S9-rev00					
Sit	e ID	THR422 <b>T</b>	echnici	an Martin Valvur		Site Visit Date	e 08/29/2017				
	Site ope	ration procedures									
1	Is the fil	ter pack being changed ev	ery Tue	esday as scheduled	? ✓	Filter changed mo	rinings				
2	Are the correctly	Site Status Report Forms I y?	eing co	ompleted and filed	<b>✓</b>						
3	Are data	a downloads and backups led?	eing p	erformed as		No longer required					
4	Are gen	eral observations being ma	de and	recorded? How?	<b>✓</b>	SSRF					
5	Are site fashion?	supplies on-hand and repl	enished	l in a timely	<b>✓</b>						
6	6 Are sample flow rates recorded? How?				<b>✓</b>	SSRF					
7	Are sam	ples sent to the lab on a re	gular s	chedule in a timely	✓						
8		ers protected from contami oping? How?	nation	during handling	✓	One set of gloves only					
9		site conditions reported reons manager or staff?	gularly	to the field							
QC	Check Po	erformed	F	requency			Compliant				
I	Multi-poir	nt MFC Calibrations	✓ 5	Semiannually			$\checkmark$				
]	Flow Syste	em Leak Checks	<b>✓</b> [v	Veekly			✓				
]	Filter Pac	k Inspection									
]	Flow Rate	<b>Setting Checks</b>		Veekly			✓				
1	Visual Check of Flow Rate Rotometer Weekly					✓					
]	In-line Filter Inspection/Replacement ✓ As needed					✓					
	Sample Li	ne Check for Dirt/Water									
		dditional explanation (pho n-made, that may affect th				y) regarding condi	tions listed above, or any other features,				

# Field Systems Data Form

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

THR422 Site ID

**Technician** Martin Valvur

Site Visit Date 08/29/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	65606	5CB1520H68	none
DAS	Environmental Sys Corp	8816	2600	90656
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	049400004441	03634
flow rate	Tylan	FC280SAV	AW02213004	none
Infrastructure	Infrastructure	none	none	none
Mainframe	Climatronics	100081	1911	none
Mainframe power supply	Climatronics	101074	unknown	none
Met tower	Rohn	unknown	none	none
MFC power supply	Tylan	RO-32	FP902022	00042
Ozone	ThermoElectron Inc	49i A1NAA	1153170017	E00051
Sample Tower	Aluma Tower	В	AT-81077-J5	none
Shelter Temperature	ARS	none	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature Translator	Climatronics	100088-2	217	01545
Temperature2meter	Climatronics	100093	7974	none
Zero air pump	Thomas	607CA22C	039500000348	none

# Site Inventory by Site Visit

Site V	isit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
VOY4	413-Martir	n Valvur-09/01/2017				
1	9/1/2017	DAS	Environmental Sys Corp	none	8816	4059
2	9/1/2017	Elevation	Elevation	None	1	None
3	9/1/2017	Filter pack flow pump	Thomas	none	107CAB18	111500052144
4	9/1/2017	flow rate	Tylan	none	FC280SAV	AW9806012
5	9/1/2017	Infrastructure	Infrastructure	none	none	none
6	9/1/2017	MFC power supply	Tylan	none	RO-32	FP9806001
7	9/1/2017	Ozone	ThermoElectron Inc	90730	49C	49C-70522-366
8	9/1/2017	Ozone Standard	ThermoElectron Inc	90569	49C	49C-59260-322
9	9/1/2017	Sample Tower	Aluma Tower	none	В	AT-51159-11-G
10	9/1/2017	Shelter Temperature	ARS	none	none	none
11	9/1/2017	Siting Criteria	Siting Criteria	None	1	None
12	9/1/2017	Temperature Translator	Climatronics	01341	100088-2	229
13	9/1/2017	Temperature2meter	Climatronics	none	100093	04767
14	9/1/2017	Zero air pump	Twin Tower Engineering	90719	TT70/E4	526294

#### **DAS Data Form** 3.08 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg **Environmental Sys** 4059 VOY413 Martin Valvur 09/01/2017 DAS Primary Das Date: 9 /1 /2017 **Audit Date** 9 /1 /2017 HY Parameter DAS Mfg 9:51:00 9:54:05 Das Time: **Audit Time** Tfer Desc. Source generator (D 12010039329 **Serial Number** Das Day: 244 **Audit Day** 244 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** 1/23/2017 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 15 0.0000 -0.0002 0.0001 0.0003 V V 15 0.1000 0.0998 0.0997 -0.0001 15 0.3000 0.2999 0.2998 V V -0.0001 15 0.5000 0.4998 0.4998 V V 0.000015 0.7000 V V 0.0000 0.7000 0.7000 V V 15 0.9000 0.8996 0.8997 0.0001 15 0.9999 V V -0.0001 1.0000 1.0000

### Flow Data Form

ylan	AW98060	12	VOY413	Ma	Martin Valvur		7 flow ra	te	none
Mfg	Tylan				Mfg	BIOS	P	arameter Flo	ow Rate
SN/Owner ID	FP9806001	none			Serial Number	148613	1	fer Desc. Blo	OS 220-H
Parameter MFC power supply			,	Tfer ID	01421				
					Slope	1.	00153 Int	ercept	0.0036
					Cert Date	1/2	5/2017 <b>Co</b>	rrCoff	1.0000
DAS 1:		DAS 2:			Cal Factor Z	ero	0.	12	
A Avg % Diff:	A Max % Di	A Avg %I	Dif A Max	% Di	Cal Factor F	ull Scale	5.60	06	
0.33%	0.33%				<b>Rotometer R</b>	eading:		3	
Desc.	Test type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	I PctDifference
primary	pump off	0.000	0.000	-0.15	0.0000	0.00	1/m	1/m	
primary	leak check	0.000	0.000	-0.11	0.0000	0.03	l/m	1/m	
primary	test pt 1	2.996	2.990	2.62	0.0000	3.00	l/m	1/m	0.33%
primary	test pt 2	2.997	2.990	2.63	0.0000	3.00	l/m	1/m	0.33%
primary	test pt 3	2.996	2.990	2.62	0.0000	3.00	1/m	1/m	0.33%
Sensor Compo	onent Leak Tes	st		Condition	n		Status	pass	
Sensor Compo	onent Tubing C	ondition		Condition	Good		Status	pass	
Sensor Compo	onent Filter Pos	sition		Condition	Good		Status	pass	
Sensor Compe	onent Rotomete	er Condition		Condition	Clean and dry		Status	pass	
Sensor Component Moisture Present			Condition	No moisture p	resent	Status	pass		
Sensor Component Filter Distance			Condition	5.5 cm		Status	pass		
Sensor Component Filter Depth			Condition	0.25 cm		Status	pass		
Sensor Compo	onent Filter Azi	muth		Condition	270 deg		Status	pass	
Sensor Component System Memo		Condition	n	Status pass					

# **Ozone Data Form**

A Avg % Diff: A Max % Di A Avg %Dif A Max % Di	Mfg Se	erial Number Ta	Site	Tee	chnician		Site Vis	it Date	Parame	eter (	Owner ID	
Therept	ThermoElectron Inc 4	9C-70522-366	VOY413	Ma	artin Valv	ur	09/01/2	.017	Ozone	9	0730	
Avg % Diff: A Max % Di	Intercept -0.12822 Intercept 0.0000				Serial Number							
UseDescription   ConcGroup   Tfer Raw   Tfer Corr   Site   Site Unit   PetDifference   primary   1   0.40   0.38   0.20   ppb   2.61%   primary   2   15.05   14.96   15.35   ppb   2.61%   primary   3   35.03   34.85   36.10   ppb   3.59%   primary   4   65.03   64.71   67.45   ppb   4.23%   primary   5   110.01   109.48   113.50   ppb   3.67%   Sensor Component   Sample Train   Condition   Good   Status   pass   Sensor Component   Inlet Filter Condition   Condition   Condition   Condition   Status   pass   Sensor Component   Span   Condition   Condition   Condition   Condition   Condition   Status   pass   Sensor Component   Span   Condition   Condition   Condition   Condition   Condition   Status   pass   Sensor Component   Span   Condition   Condit			(D10 ) 175 (	V 5.	Slope			1.0046	6 Inter	cept	0.01298	
UseDescription			oDif A Max S	% Di	Cert Da	te		1/1/201	7 Corr	·Coff	1.00000	
primary   1		ConcGroup	Tfer Raw	Tfer	Corr	Si	te	Sit	e I Init	PctDiffere	nce	
Primary   2   15.05   14.96   15.35   Ppb   2.61%	•								Come	Tetbillete	lice	
primary 4 65.03 64.71 67.45 ppb 4.23% primary 5 110.01 109.48 113.50 ppb 3.67%  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  Sensor Component Offset Condition 0.40 Status pass  Sensor Component Span Condition 1.009 Status pass  Sensor Component Zero Voltage Condition 0.9996 Status pass  Sensor Component Cell A Freq. Condition 0.99pb Status pass  Sensor Component Cell A Flow Condition 0.89 lpm Status pass  Sensor Component Cell A Tmp. Condition 1.05.9 kHz Status pass  Sensor Component Cell B Freq. Condition 1.05.9 kHz Status pass  Sensor Component Cell B Noise Condition 1.05.9 kHz Status pass  Sensor Component Cell B Noise Condition 1.05.9 kHz Status pass  Sensor Component Cell B Freq. Condition 1.05.9 kHz Status pass		2	15.05	14.	96	15	.35				2.61%	
primary 5 110.01 109.48 113.50 ppb 3.67%  Sensor Component Sample Train Condition Good Status pass  Sensor Component 22.5 degree rule Condition Glean Status pass  Sensor Component Inlet Filter Condition Clean Status pass  Sensor Component Battery Backup Condition N/A Status pass  Sensor Component Offset Condition 0.40 Status pass  Sensor Component Span Condition 1.009 Status pass  Sensor Component Zero Voltage Condition 0.0002 Status pass  Sensor Component Fullscale Voltage Condition 0.9996 Status pass  Sensor Component Cell A Freq. Condition 88.9 kHz Status pass  Sensor Component Cell A Flow Condition 0.89 lpm Status pass  Sensor Component Cell A Freq. Condition 0.89 lpm Status pass  Sensor Component Cell A Freq. Condition 0.89 lpm Status pass  Sensor Component Cell A Freq. Condition 0.89 lpm Status pass  Sensor Component Cell A Freq. Condition 174.0 mmHg Status pass  Sensor Component Cell A Tmp. Condition 105.9 kHz Status pass  Sensor Component Cell B Freq. Condition 105.9 kHz Status pass	primary	3	35.03			36	.10	ppb				
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         Sensor Component       Offset       Condition       0.40       Status       pass         Sensor Component       Span       Condition       0.009       Status       pass         Sensor Component       Zero Voltage       Condition       0.0002       Status       pass         Sensor Component       Fullscale Voltage       Condition       0.9996       Status       pass         Sensor Component       Cell A Freq.       Condition       0.9 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.89 lpm       Status       pass         Sensor Component       Cell A Freq.       Condition       714.0 mmHg       Status       pass         Sensor Component       Cell B Freq.       Condition       105.9 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>				-								
Sensor Component       22.5 degree rule       Condition       Status       Fail         Sensor Component       Inlet Filter Condition       Condition       Clean       Status       pass         Sensor Component       Battery Backup       Condition       N/A       Status       pass         Sensor Component       Offset       Condition       0.40       Status       pass         Sensor Component       Span       Condition       1.009       Status       pass         Sensor Component       Zero Voltage       Condition       0.0002       Status       pass         Sensor Component       Fullscale Voltage       Condition       0.9996       Status       pass         Sensor Component       Cell A Freq.       Condition       0.9 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.89 lpm       Status       pass         Sensor Component       Cell A Pressure       Condition       714.0 mmHg       Status       pass         Sensor Component       Cell B Freq.       Condition       105.9 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass			110.01			113	5.50	ppb			3.67%	
Sensor ComponentInlet Filter ConditionConditionCleanStatuspassSensor ComponentBattery BackupConditionN/AStatuspassSensor ComponentOffsetCondition0.40StatuspassSensor ComponentSpanCondition1.009StatuspassSensor ComponentZero VoltageCondition-0.0002StatuspassSensor ComponentFullscale VoltageCondition0.9996StatuspassSensor ComponentCell A Freq.Condition88.9 kHzStatuspassSensor ComponentCell A NoiseCondition0.9 ppbStatuspassSensor ComponentCell A FlowCondition0.89 lpmStatuspassSensor ComponentCell A PressureCondition714.0 mmHgStatuspassSensor ComponentCell A Tmp.Condition31.8 CStatuspassSensor ComponentCell B Freq.Condition105.9 kHzStatuspassSensor ComponentCell B NoiseCondition0.6 ppbStatuspass	Sensor Component	Sample Train		Conditio	Good				Status	pass		
Sensor Component       Battery Backup       Condition       N/A       Status       pass         Sensor Component       Offset       Condition       0.40       Status       pass         Sensor Component       Span       Condition       1.009       Status       pass         Sensor Component       Zero Voltage       Condition       0.9002       Status       pass         Sensor Component       Cell A Freq.       Condition       88.9 kHz       Status       pass         Sensor Component       Cell A Noise       Condition       0.9 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       714.0 mmHg       Status       pass         Sensor Component       Cell A Tmp.       Condition       31.8 C       Status       pass         Sensor Component       Cell B Freq.       Condition       105.9 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass	<b>Sensor Component</b>	22.5 degree rule		Conditio	on				Status	Fail		
Sensor ComponentOffsetCondition0.40StatuspassSensor ComponentSpanCondition1.009StatuspassSensor ComponentZero VoltageCondition0.0002StatuspassSensor ComponentFullscale VoltageCondition0.9996StatuspassSensor ComponentCell A Freq.Condition88.9 kHzStatuspassSensor ComponentCell A NoiseCondition0.9 ppbStatuspassSensor ComponentCell A FlowCondition0.89 lpmStatuspassSensor ComponentCell A PressureCondition714.0 mmHgStatuspassSensor ComponentCell A Tmp.Condition31.8 CStatuspassSensor ComponentCell B Freq.Condition105.9 kHzStatuspassSensor ComponentCell B NoiseCondition0.6 ppbStatuspass	Sensor Component	Inlet Filter Conditio	n	Conditio	Clean				Status	pass		
Sensor ComponentSpanCondition1.009StatuspassSensor ComponentZero VoltageCondition-0.0002StatuspassSensor ComponentFullscale VoltageCondition0.9996StatuspassSensor ComponentCell A Freq.Condition88.9 kHzStatuspassSensor ComponentCell A NoiseCondition0.9 ppbStatuspassSensor ComponentCell A FlowCondition0.89 lpmStatuspassSensor ComponentCell A PressureCondition714.0 mmHgStatuspassSensor ComponentCell A Tmp.Condition31.8 CStatuspassSensor ComponentCell B Freq.Condition105.9 kHzStatuspassSensor ComponentCell B NoiseCondition0.6 ppbStatuspass	Sensor Component	ent Battery Backup		Conditio	n N/A				Status	pass		
Sensor ComponentZero VoltageCondition-0.0002StatuspassSensor ComponentFullscale VoltageCondition0.9996StatuspassSensor ComponentCell A Freq.Condition88.9 kHzStatuspassSensor ComponentCell A NoiseCondition0.9 ppbStatuspassSensor ComponentCell A FlowCondition0.89 lpmStatuspassSensor ComponentCell A PressureCondition714.0 mmHgStatuspassSensor ComponentCell A Tmp.Condition31.8 CStatuspassSensor ComponentCell B Freq.Condition105.9 kHzStatuspassSensor ComponentCell B NoiseCondition0.6 ppbStatuspass	Sensor Component	Offset		Conditio	0.40				Status	pass		
Sensor ComponentFullscale VoltageCondition0.9996StatuspassSensor ComponentCell A Freq.Condition88.9 kHzStatuspassSensor ComponentCell A NoiseCondition0.9 ppbStatuspassSensor ComponentCell A FlowCondition0.89 lpmStatuspassSensor ComponentCell A PressureCondition714.0 mmHgStatuspassSensor ComponentCell A Tmp.Condition31.8 CStatuspassSensor ComponentCell B Freq.Condition105.9 kHzStatuspassSensor ComponentCell B NoiseCondition0.6 ppbStatuspass	Sensor Component	Span		Conditio	n 1.009				Status	pass		
Sensor ComponentCell A Freq.Condition88.9 kHzStatuspassSensor ComponentCell A NoiseCondition0.9 ppbStatuspassSensor ComponentCell A FlowCondition0.89 lpmStatuspassSensor ComponentCell A PressureCondition714.0 mmHgStatuspassSensor ComponentCell A Tmp.Condition31.8 CStatuspassSensor ComponentCell B Freq.Condition105.9 kHzStatuspassSensor ComponentCell B NoiseCondition0.6 ppbStatuspass	Sensor Component	Zero Voltage		Conditio	Condition -0.0002				Status	ıs pass		
Sensor ComponentCell A NoiseCondition0.9 ppbStatuspassSensor ComponentCell A FlowCondition0.89 lpmStatuspassSensor ComponentCell A PressureCondition714.0 mmHgStatuspassSensor ComponentCell A Tmp.Condition31.8 CStatuspassSensor ComponentCell B Freq.Condition105.9 kHzStatuspassSensor ComponentCell B NoiseCondition0.6 ppbStatuspass	Sensor Component	Fullscale Voltage		Conditio	ondition 0.9996				Status	pass		
Sensor ComponentCell A FlowCondition0.89 lpmStatuspassSensor ComponentCell A PressureCondition714.0 mmHgStatuspassSensor ComponentCell A Tmp.Condition31.8 CStatuspassSensor ComponentCell B Freq.Condition105.9 kHzStatuspassSensor ComponentCell B NoiseCondition0.6 ppbStatuspass	Sensor Component	Cell A Freq.		Conditio	Condition 88.9 kHz				Status	pass		
Sensor ComponentCell A PressureCondition714.0 mmHgStatuspassSensor ComponentCell A Tmp.Condition31.8 CStatuspassSensor ComponentCell B Freq.Condition105.9 kHzStatuspassSensor ComponentCell B NoiseCondition0.6 ppbStatuspass	Sensor Component	Cell A Noise		Conditio	ondition 0.9 ppb				Status	pass		
Sensor Component       Cell A Tmp.       Condition       31.8 C       Status       pass         Sensor Component       Cell B Freq.       Condition       105.9 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass	Sensor Component	Cell A Flow		Conditio	0.89 l	om			Status	pass		
Sensor Component       Cell B Freq.       Condition       105.9 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.6 ppb       Status       pass	Sensor Component	Cell A Pressure		Conditio	714.0	mmHg			Status	pass		
Sensor Component Cell B Noise Condition 0.6 ppb Status pass	Sensor Component	sor Component Cell A Tmp.		Conditio	31.8 C				Status	pass		
	Sensor Component	Cell B Freq.		Conditio	n 105.9	kHz			Status	pass		
Sensor Component Cell B Flow Condition 0.75 lpm Status pass	Sensor Component	omponent Cell B Noise		Conditio	0.6 pp	b			Status	pass		
	Sensor Component	ent Cell B Flow		Conditio	0.75 l	om			Status	pass		
Sensor Component Cell B Pressure Condition 713.4 mmHg Status pass	Sensor Component	ensor Component Cell B Pressure		Conditio	713.4	mmHg			Status	pass		
Sensor Component Cell B Tmp. Condition Status pass	Sensor Component	Cell B Tmp.		Conditio	on				Status	us pass		
Sensor Component Line Loss Condition Not tested Status pass	Sensor Component	Line Loss		Conditio	ion Not tested				Status	pass		
Sensor Component System Memo Condition See comments Status pass	Sensor Component	System Memo		Conditio	See c	omments			Status	pass		

#### 2 Meter Temperature Data Form Calc. Difference Serial Number Ta **Technician** Site Visit Date Parameter Mfg Site **Owner ID** VOY413 Martin Valvur Climatronics 04767 09/01/2017 Temperature2meter none Parameter Temperature Mfg Fluke Climatronics Mfg 3275143 Tfer Desc. RTD **Serial Number** 229 01341 **SN/Owner ID** 01229 Tfer ID Temperature Translator **Parameter Slope** 1.00006 **Intercept** 0.03191 **DAS 1: DAS 2:** 1/23/2017 1.00000 CorrCoff Abs Avg Err **Abs Max Er Abs Avg Err** Abs Max Er **Cert Date** 0.38 0.52 InputTmpRaw InputTmpCorrected OutputTmpSignal OutputSignalEng | OSE Unit UseDescription Test type Difference Temp Low Rang primary 0.12 0.09 0.0000 0.42 C 0.33 Temp Mid Rang 23.84 23.81 0.0000 24.09 C 0.28 primary primary Temp High Rang 44.64 44.61 0.0000 45.13 C 0.52 Sensor Component Properly Sited **Condition** Properly sited **Status** pass Sensor Component | Shield Condition Clean **Status** pass Sensor Component Blower **Condition** Functioning Status pass Sensor Component Blower Status Switch Status pass **Condition** N/A Sensor Component | System Memo Status pass Condition

#### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** VOY413 Martin Valvur ARS 09/01/2017 Shelter Temperature none none **DAS 1: DAS 2:** Parameter Shelter Temperatur Mfg Fluke Abs Avg Err Abs Max Er **Abs Avg Err** Abs Max Er Tfer Desc. RTD 3275143 **Serial Number** 0.73 0.80 01229 **Tfer ID** 1.00006 0.03191 **Slope** Intercept 1/23/2017 1.00000 **Cert Date** CorrCoff OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. 0.000primary Temp Mid Range 23.09 23.06 22.3 C -0.740.000 C

0.000

22.7

24.4

C

Status pass

0.8

0.66

21.92

23.71

Condition

Temp Mid Range

Temp Mid Range

Sensor Component | System Memo

primary

primary

21.95

23.74

### **Infrastructure Data For**

Si	te ID	VOY413	Technician	Martin Valvur	Site Visit Date	09/01/2017	
	Shelter Ma	ake	Shelter Model	Sl	helter Size		
	Ekto		8810 (s/n 2880-	2) 64	40 cuft		
				8		ALC: THE RESERVE OF THE PARTY O	

Sensor Component	Sample Tower Type	Condition	Туре В	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
<b>Sensor Component</b>	Power Cables	Condition	Good	Status	pass
<b>Sensor Component</b>	Shelter Temp Control	Condition	Functioning	Status	pass
<b>Sensor Component</b>	Rotometer	Condition	Installed	Status	pass
<b>Sensor Component</b>	Sample Tower	Condition	Good	Status	pass
<b>Sensor Component</b>	Shelter Condition	Condition	Good	Status	pass
Sensor Component	Shelter Door	Condition	Good	Status	pass
Sensor Component	Shelter Roof	Condition	Good	Status	pass
Sensor Component	Shelter Floor	Condition	Good	Status	pass
Sensor Component	Signal Cable	Condition	Good	Status	pass
Sensor Component	Tubing Type	Condition	3/8 teflon	Status	pass
Sensor Component	Sample Train	Condition	Good	Status	pass

# **Field Systems Comments**

1 Parameter: DasComments

The sample tower itself is not grounded, however it is bolted to the shelter which is grounded.

2 Parameter: DocumentationCo

Correctly completing the general observations section of the SSRF on the day of filter installation was discussed with the operator.

3 Parameter: SitingCriteriaCom

The site is located at the top of a hill in a forest. There are trees surrounding the site which are below the tower height.

4 Parameter: ShelterCleanNotes

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

5 Parameter: PollAnalyzerCom

There are no trees violating the 22.5 degree cone above the ozone sample inlet. However, there is a communication tower which is above the 22.5 degree threshold.

#### Field Systems Data Form F-02058-1500-S1-rev002 VOY413 Site Visit Date 09/01/2017 Technician | Martin Valvur Site ID Ash River NE **USGS Map NPS** Site Sponsor (agency) Map Scale NPS **Operating Group Map Date** 27-137-0034 AQS# Climatronics **Meteorological Type** Ozone, IMPROVE **Air Pollutant Analyzer QAPP** Latitude 48.4128 dry, wet **QAPP** Longitude -92.8292 **Deposition Measurement** woodland - mixed 429 Land Use **QAPP Elevation Meters Terrain** rolling **QAPP Declination** Marginally Conforms to MLM **OAPP Declination Date** 48.412518 **Site Telephone Audit Latitude** CR 129 -92.829225 Site Address 1 **Audit Longitude** Ash River Visitor Center Rd. Site Address 2 **Audit Elevation** 427 St. Louis 0.5 County **Audit Declination** Orr, MN City, State **Present** Fire Extinguisher 55771 Zip Code Central **First Aid Kit** Time Zone **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **V Climbing Belt** Primary Op. E-mail **Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Step Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 (s/n 2880-2) Ekto **Shelter Size** 640 cuft **✓** Notes The shelter is clean, neat, and well organized. The shelter is in good condition. Shelter Clean **✓** Notes Site OK From Duluth take route 53 north towards International Falls. Approximately 20 miles south of International Falls and **Driving Directions**

just north of Orr, turn right (east) on County Road 129. Continue approximately 9.5 miles and turn left toward the Ash

River Visitor Center. Continue approximately 1.5 miles and look for a closed gate on the right. The site is

approximately 1 mile up the trail from the road.

## Field Systems Data Form

F-02058-1500-S2-rev002

Site ID VOY413 Technician Martin Valvur Site Visit Date 09/01/2017

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

Siting Distances OK

**Siting Criteria Comment** 

The site is located at the top of a hill in a forest. There are trees surrounding the site which are below the tower height.

Fie	eld Systems Data Form		F-02058-1500-S3-rev002
Site	VOY413 Technician Martin Valvur		Site Visit Date 09/01/2017
1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	<b>✓</b>	N/A
2	Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the	<b>✓</b>	N/A
	tower into the prevailing wind)		
3	Are the tower and sensors plumb?	<b>✓</b>	N/A
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?	<b>✓</b>	
5	Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)	<b>✓</b>	
6	Is the solar radiation sensor plumb?	<b>✓</b>	N/A
7	Is it sited to avoid shading, or any artificial or reflected light?	✓	N/A
8	Is the rain gauge plumb?	<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>V</b>	N/A

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

Fie	eld Systems Data Form		F-02058-1500-S4-rev002
Site	VOY413 Technician Martin Valvur		Site Visit Date 09/01/2017
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?	✓	
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,

### Field Systems Data Form F-02058-1500-S5-rev002 VOY413 Technician | Martin Valvur Site Visit Date 09/01/2017 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 within 5 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 12 meters Describe dry dep sample tube. 3/8 teflon by 9 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:

There are no trees violating the 22.5 degree cone above the ozone sample inlet. However, there is a communication tower which is above the 22.5 degree threshold.

# Field Systems Data Form

F-02058-1500-S6-rev002

Site	e <b>ID</b>	VOY413	Technician	Martin Valvur		Site Vis	it Date 09/01/20	17	
	DAS, ser	nsor translators, and	peripheral equi	pment operation	ns ai	nd maintena	<u>ınce</u>		
1	Do the I	OAS instruments appe							
2		he components of the backup, etc)	DAS operation	al? (printers,	<b>✓</b>				
3		nalyzer and sensor sig		through	<b>✓</b>	Met sensors	s only		
4		signal connections prontained?	otected from the	e weather and	✓				
5	Are the	signal leads connected	d to the correct	DAS channel?	<b>✓</b>				
6	Are the grounde	DAS, sensor translated?	ors, and shelter	properly	<b>✓</b>				
7	Does the	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?							
		additional explanationan-made, that may a				ry) regardin	g conditions liste	d above, or a	nny other features,
The	sample t	ower itself is not ground	ded, however it is	bolted to the she	elter	which is grou	unded.		

#### VOY413 Site Visit Date 09/01/2017 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 П **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 Temperature translator V** Filter flow pump **V ~ Humidity sensor translator Surge protector** П **V ~ UPS Solar radiation translator ~ V** Tipping bucket rain gauge Lightning protection device ~ **✓ Shelter heater** Ozone analyzer **V** ~ 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 V Site Ops Manual** Jan 2006 **HASP Field Ops Manual V Calibration Reports** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Dataview Flow section only 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? 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,

Correctly completing the general observations section of the SSRF on the day of filter installation was discussed with the operator.

F-02058-1500-S7-rev002

**Field Systems Data Form** 

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

#### **Field Systems Data Form** F-02058-1500-S8-rev002 VOY413 Site Visit Date 09/01/2017 Site ID Technician | Martin Valvur Site operation procedures Trained by previous operator Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **✓** 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 QC Check Performed** Frequency **Multi-point Calibrations V V** Monthly and semiannually **V V Automatic Zero/Span Tests** Daily **V** Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests Manual Precision Level Test ✓ V** Alarm values only **Analyzer Diagnostics Tests ~** Every 2 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 V Zero Air Desiccant Check** Weekly

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

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

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

	Unknown
<b>✓</b>	
<b>✓</b>	Dataview

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

Field Systems Data Form				F-02058-1500-89-rev002			
Site	VOY413 Tec	hnician Martin Valvur		Site Visit Date	09/01/2017		
	Site operation procedures						
1	Is the filter pack being changed ever	y Tuesday as scheduled?	<b>✓</b>	Filter changed vario	us times		
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 and	d off		
9	Are the site conditions reported reguloperations manager or staff?	larly to the field					
QC	Check Performed	Frequency			Compliant		
N	Aulti-point MFC Calibrations	<b>✓</b> Semiannually			✓		
F	Flow System Leak Checks	Weekly			✓		
F	ilter Pack Inspection						
F	Flow Rate Setting Checks	Weekly			✓		
7	isual Check of Flow Rate Rotometer	✓ Weekly			$\checkmark$		
I	n-line Filter Inspection/Replacement	✓ As needed			$\checkmark$		
S	ample Line Check for Dirt/Water	Weekly			$\checkmark$		
	ride any additional explanation (photo ral or man-made, that may affect the			y) regarding conditi	ons listed above, or an	y other features,	

# Field Systems Data Form

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

Site ID

VOY413

Technician Martin Valvur

Site Visit Date 09/01/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Environmental Sys Corp	8816	4059	none
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	111500052144	none
flow rate	Tylan	FC280SAV	AW9806012	none
Infrastructure	Infrastructure	none	none	none
MFC power supply	Tylan	RO-32	FP9806001	none
Ozone	ThermoElectron Inc	49C	49C-70522-366	90730
Ozone Standard	ThermoElectron Inc	49C	49C-59260-322	90569
Sample Tower	Aluma Tower	В	AT-51159-11-G	none
Shelter Temperature	ARS	none	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature Translator	Climatronics	100088-2	229	01341
Temperature2meter	Climatronics	100093	04767	none
Zero air pump	Twin Tower Engineering	TT70/E4	526294	90719

# Site Inventory by Site Visit

Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number					
SAN189-Martin Valvur-09/07/2017										
9/7/2017	Computer	Dell	07051	Inspiron 15	Unknown					
9/7/2017	DAS	Campbell	000360	CR3000	2138					
9/7/2017	Elevation	Elevation	None	1	None					
9/7/2017	Filter pack flow pump	Thomas	06019	107CAB18	050400022576					
9/7/2017	Flow Rate	Apex	000861	AXMC105LPMDPCV	illegible					
9/7/2017	Infrastructure	Infrastructure	none	none	none					
9/7/2017	Modem	Raven	06453	V4221-V	0808337397					
9/7/2017	Ozone	ThermoElectron Inc	000729	49i A1NAA	1105347323					
9/7/2017	Ozone Standard	ThermoElectron Inc	000367	49i A3NAA	0726124683					
9/7/2017	Sample Tower	Aluma Tower	000207	В	none					
9/7/2017	Shelter Temperature	Campbell	none	107-L	223461					
9/7/2017	Siting Criteria	Siting Criteria	None	1	None					
9/7/2017	Temperature	RM Young	06537	41342VC	14798					
9/7/2017	Zero air pump	Werther International	06875	C 70/4	000814272					
	9/7/2017 9/7/2017 9/7/2017 9/7/2017 9/7/2017 9/7/2017 9/7/2017 9/7/2017 9/7/2017 9/7/2017 9/7/2017 9/7/2017	9/7/2017 Computer  9/7/2017 DAS  9/7/2017 Elevation  9/7/2017 Filter pack flow pump  9/7/2017 Flow Rate  9/7/2017 Infrastructure  9/7/2017 Modem  9/7/2017 Ozone  9/7/2017 Ozone Standard  9/7/2017 Sample Tower  9/7/2017 Shelter Temperature  9/7/2017 Siting Criteria  9/7/2017 Temperature	9/7/2017 Computer Dell 9/7/2017 DAS Campbell 9/7/2017 Elevation Elevation 9/7/2017 Filter pack flow pump Thomas 9/7/2017 Flow Rate Apex 9/7/2017 Infrastructure Infrastructure 9/7/2017 Modem Raven 9/7/2017 Ozone ThermoElectron Inc 9/7/2017 Sample Tower Aluma Tower 9/7/2017 Shelter Temperature Campbell 9/7/2017 Siting Criteria Siting Criteria 9/7/2017 Temperature RM Young	189-Martin Valvur-09/07/2017           9/7/2017 Computer         Dell         07051           9/7/2017 DAS         Campbell         000360           9/7/2017 Elevation         Elevation         None           9/7/2017 Filter pack flow pump         Thomas         06019           9/7/2017 Flow Rate         Apex         000861           9/7/2017 Infrastructure         Infrastructure         none           9/7/2017 Modem         Raven         06453           9/7/2017 Ozone         ThermoElectron Inc         000729           9/7/2017 Ozone Standard         ThermoElectron Inc         000367           9/7/2017 Sample Tower         Aluma Tower         000207           9/7/2017 Shelter Temperature         Campbell         none           9/7/2017 Siting Criteria         Siting Criteria         None           9/7/2017 Temperature         RM Young         06537	9/7/2017   Computer   Dell   07051   Inspiron 15					

#### **DAS Data Form DAS Time Max Error:** 0 **Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2138 SAN189 Martin Valvur 09/07/2017 DAS Primary Das Date: 9 /7 /2017 **Audit Date** 9 /7 /2017 HY Parameter DAS Mfg 8:22:00 8:22:00 Das Time: **Audit Time** Tfer Desc. Source generator (D 12010039329 **Serial Number** Das Day: 250 **Audit Day** 250 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** 1/23/2017 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 0.0000 -0.0004 -0.0002 0.0002 V V 7 0.1000 0.0998 0.0997 -0.0001 7 0.3000 0.2997 0.2998 V V 0.0001 7 0.5000 0.5004 V V 0.00000.5004 7 0.7000 V V 0.0002 0.6993 0.6995 7 V V 0.9000 0.8995 0.8995 0.00007 1.0000 0.9993 0.9992 V V -0.0001

### Flow Data Form

		Serial Number Ta				chnician		Date Parar		Owner ID	
Apex		legible		SAN189	IMa	artin Valvur	09/07/2017	Flow F	Rate	000861	
						Mfg	BIOS	I	Parameter Flo	w Rate	
						Serial Number	148613	7	Tfer Desc. BIC	OS 220-H	
						Tfer ID	01421				
						CI.	4	00450	,	0.0000	
						Slope			ercept	0.00366	
						Cert Date	1/2	5/2017 <b>Co</b>	rrCoff	1.0000	
DAS 1:			DAS 2:		_	Cal Factor Z	ero	-0.	01		
A Avg % Diff:	A Max	x % Di	A Avg %	Dif A Max	% Di	Cal Factor F	ull Scale		1		
0.78%		1.01%				Rotometer R	eading:	3	3.2		
Desc.	Te	st type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	PctDifference	
primary	pump		0.000	0.000	0.01	0.000	0.00	1/m	1/m		
primary	leak c		0.000	0.000	0.00	0.000	-0.02	1/m	1/m		
primary	test pt		2.990	2.980	2.97	0.000	3.00	1/m	1/m	0.67%	
primary	test pt		2.990	2.980	2.97	0.000	3.01	1/m	1/m	1.01%	
primary	test pt		2.990	2.980	2.97	0.000	3.00	1/m	1/m	0.67%	
Sensor Compo	onent	Leak Tes	t		Conditio	1		Statu	Status pass		
Sensor Compo	onent	Tubing Condition		Conditio	n Good	Good		Status pass			
Sensor Compo	onent	Filter Pos	Filter Position		Conditio	n Good		Statu	s pass		
Sensor Compo	onent	Rotomete	er Condition	ndition Cond		n Clean and dry		Statu	Status pass		
Sensor Compo	onent	Moisture	Present		Conditio	ition No moisture present			spass		
Sensor Compo	onent	Filter Dist	ance		Conditio	<b>n</b> 4.0 cm		Statu	Status pass		
Sensor Compo	onent	Filter Dep	oth		Conditio	<b>n</b> 4.0 cm		Statu	spass		
Sensor Compo	onent	Filter Azir	muth		Conditio	n 180 deg		Statu	spass		
Sensor Component		System Memo (			Conditio	n		Statu	Status pass		

# **Ozone Data Form**

Mfg S	erial Number Ta	Site	Technician	L	Site Visit	Date Parame	eter Owner ID
ThermoElectron Inc 1	105347323	SAN189	Martin Valv	/ur	09/07/20	17 Ozone	000729
Intercept -2.3	Slope: 15573 Intercept 19979 CorrCoff	0.00000 0.00000 0.00000	Serial I	Number	ThermoEl 49CPS-70 01110		rameter ozone er Desc. Ozone primary stan
DAS 1:	<b>DAS 2:</b>		Slope			1.00466 <b>Inter</b>	ccept 0.01298
A Avg % Diff: A Ma	<b>x % Di A Avg %</b> 16.9%	6Dif A Max %	6 Di Cert Da	ate	1	1/1/2017 <b>Corr</b>	*Coff 1.00000
		TIC D	Tr. C	a.	.,	G': II ':	D Dicc
UseDescription primary	ConcGroup 1	Tfer Raw 0.16	Tfer Corr 0.14		ite .28 p	Site Unit	PctDifference
primary	2	15.32	15.23			ppb	-16.94%
primary	3	36.66	36.47			opb	-10.20%
primary primary	5	65.21 106.63	64.89			opb opb	-10.48% -8.59%
Sensor Component			Condition Good		.00 р	Status	
Sensor Component			Condition			Status	
Sensor Component			Condition Clear	1		Status	
Sensor Component			Condition N/A			Status	pass
Sensor Component	Offset		Condition 0.10			Status	pass
Sensor Component	Span		Condition 1.001			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 90.9	kHz		Status	pass
Sensor Component	Cell A Noise		Condition 0.6 p	ob		Status	pass
Sensor Component	Cell A Flow		Condition 0.71	pm		Status	pass
<b>Sensor Component</b>	Cell A Pressure		Condition 659.8	mmHg		Status	pass
<b>Sensor Component</b>	Cell A Tmp.		Condition 33.8	С		Status	pass
Sensor Component	Cell B Freq.		Condition 83.8	kHz		Status	pass
Sensor Component	Cell B Noise	· · · · · · · · · · · · · · · · · · ·	Condition 0.6 p			Status	pass
Sensor Component	Cell B Flow		Condition 0.68			Status	
Sensor Component	Cell B Pressure		Condition 695.2	! mmHg		Status	pass
<b>Sensor Component</b>	Cell B Tmp.		Condition			Status	pass
<b>Sensor Component</b>	Line Loss		<b>Condition</b> 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 RM Young 14798 SAN189 Martin Valvur 09/07/2017 Temperature 06537 Mfg Fluke Parameter Temperature Tfer Desc. RTD 3275143 **Serial Number** 01229 Tfer ID 0.03191 **Slope** 1.00006 **Intercept DAS 1: DAS 2:** 1/23/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.06 0.13 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.30 0.27 0.000 0.3 C 0.02 22.33 22.5 C Temp Mid Range 22.36 0.000 0.13 primary 0.000 47.9 C 0.02 primary Temp High Range 47.87 47.84 Sensor Component | Shield **Condition** Clean **Status** pass Sensor Component Blower Status pass **Condition** N/A Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

### **Shelter Temperature Data For** Mfg Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Martin Valvur 09/07/2017 Shelter Temperature Campbell 223461 SAN189 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** 0.75 1.11 01229 **Tfer ID** 1.00006 0.03191 Slope Intercept 1/23/2017 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	25.30	25.27	0.000	24.2	C	-1.11
primary	Temp Mid Range	25.79	25.76	0.000	24.9	С	-0.88
primary	Temp Mid Range	25.83	25.80	0.000	25.5	С	-0.26
Sensor Con	ponent System Memo	1	Condition		Status	pass	

### **Infrastructure Data For**

Site ID SAN189 Technician Martin Valvur Site Visit Date 09/07/2017

Shelter Make	Shelter Model	Shelter Size
Shelter One	E8109-26012	720 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 in very good condition, however somewhat cluttered.

### Field Systems Data Form F-02058-1500-S1-rev002 Site Visit Date 09/07/2017 **SAN189** Technician | Martin Valvur Site ID Santee **USGS Map EPA** Site Sponsor (agency) Map Scale Santee Sioux Nation **Operating Group Map Date** 31-107-9991 AQS# R.M. Young **Meteorological Type** Ozone, SO2, NOx, CO **Air Pollutant Analyzer QAPP** Latitude dry **Deposition Measurement QAPP** Longitude 429 Land Use range **QAPP Elevation Meters Terrain** rolling **QAPP Declination** Yes 6/21/2006 Conforms to MLM **OAPP Declination Date** (402) 857-2546 42.829154 **Site Telephone Audit Latitude** SR S54D **Audit Longitude** -97.854128 Site Address 1 Santee Sioux Indian Reservation Site Address 2 **Audit Elevation** 434 Knox 5.0 County **Audit Declination** Niobrara, NE City, State **Present** Fire Extinguisher 68760 No inspection date Zip Code Central First Aid Kit Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **Climbing Belt** Primary Op. E-mail **Security Fence Backup Operator V Secure Shelter** Backup Op. Phone # Stable Entry Step Backup Op. E-mail Shelter Working Room ✓ Make **Model** E8109-26012 Shelter One **Shelter Size** 720 cuft **✓** Notes The shelter is in very good condition, however somewhat cluttered. Shelter Clean **✓** Notes Site OK

From Yankton, South Dakota go south on route 81. Turn right (south) at the intersection of route 12 and continue

approximately 26 miles. Just past the casino and gas station, turn right (north) onto SR 54 toward Santee. Continue approximately 6.5 miles. The site will be visible through the farm gate on the left at the top of a hill just before

**Driving Directions** 

reaching Santee.

# Field Systems Data Form

F-02058-1500-S2-rev002

Site ID SAN189 Technician Martin Valvur Site Visit Date 09/07/2017

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

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

Fie	eld Systems Data Form	F-02058-1500-S3-rev002
Site	SAN189 Technician Martin Valvur	Site Visit Date 09/07/2017
1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	✓ N/A
2	Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind)	N/A
3	Are the tower and sensors plumb?	✓ N/A
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?	
5	Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)	
6	Is the solar radiation sensor plumb?	✓ N/A
7	Is it sited to avoid shading, or any artificial or reflected light?	N/A
8	Is the rain gauge plumb?	✓ N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	N/A
10	Is the surface wetness sensor sited with the grid surface facing porth?	✓ N/A

✓ N/A

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

11 Is it inclined approximately 30 degrees?

Fic	eld Systems Data Form		F-02058-1500-S4-rev002
Site	SAN189 Technician Martin Valvur		Site Visit Date 09/07/2017
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>	N/A
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	✓	N/A
	ide any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:		regarding conditions listed above, or any other features,

### Field Systems Data Form F-02058-1500-S5-rev002 SAN189 Technician | Martin Valvur Site Visit Date 09/07/2017 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 16 meters Describe dry dep sample tube. 1/4 teflon by 16 meters At inlet only Are in-line filters used in the ozone sample line? (if ves indicate location) **✓** Are sample lines clean, free of kinks, moisture, and obstructions? **V** Is the zero air supply desiccant unsaturated? **~** Are there moisture traps in the sample lines? **✓** Is there a rotometer in the dry deposition filter line, and is it clean?

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

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

# Field Systems Data Form F-02058-1500-S6-rev002 Site ID SAN189 Technician Martin Valvur Site Visit Date 09/07/2017 DAS, sensor translators, and peripheral equipment operations and maintenance 1 Do the DAS instruments appear to be in good condition and well maintained? 2 Are all the components of the DAS operational? (printers, modem, backup, etc)

Met sensors only Do the analyzer and sensor signal leads pass through lightning protection circuitry? **V** Are the signal connections protected from the weather and well maintained? **V** Are the signal leads connected to the correct DAS channel? Are the DAS, sensor translators, and shelter properly **~** grounded? **✓** Does the instrument shelter have a stable power source? 7 **✓** Is the instrument shelter temperature controlled? Grounded Stable Is the met tower stable and grounded? **V ✓** Is the sample tower stable and grounded? **V V** 11 Tower comments?

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

### **Field Systems Data Form** F-02058-1500-S7-rev002 SAN189 Technician | Martin Valvur Site Visit Date 09/07/2017 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** П **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 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** ~ Filter pack flow controller Shelter air conditioner **~** Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF ✓ V ✓ V Site Ops Manual** 2014 **V HASP V** 2014 **Field Ops Manual Calibration Reports V ✓** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab?

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

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 SAN189 Technician Martin Valvur Site Visit Date 09/07/2017 Site ID Site operation procedures Trained by previous site operator Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **✓** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed** Frequency **Compliant ✓ V** 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 Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests Manual Precision Level Test ✓ V** Weekly **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 **~ ~** Weekly **Zero Air Desiccant Check**

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

- 2 Do automatic and manual z/s/p gasses go through the complete sample train including all filters?
- 3 Are the automatic and manual z/s/p checks monitored and reported? If yes, how?

Unknown

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-rev	v002	
Sit	e ID	SAN189 Tee	<b>Fechnician</b> Martin Valvur		Site Visit Date	09/07/2017	
	Site op	eration procedures					
1	Is the f	lter pack being changed ever	ry Tuesday as scheduled?	<b>~</b>	Filter changed morin	nings	
2	Are the	Site Status Report Forms boly?	eing completed and filed	<b>✓</b>			
3	Are da	a downloads and backups be	eing performed as		No longer required		
4	Are ger	neral observations being mad	e and recorded? How?	<b>✓</b>	SSRF, logbook, call	-in	
5	Are site	e supplies on-hand and replem?	nished in a timely	<b>✓</b>			
6	Are sar	nple flow rates recorded? Ho	w?	<b>~</b>	SSRF, logbook, call	-in	
7	Are sar	nples sent to the lab on a reg	ular schedule in a timely	<b>✓</b>			
8		ers protected from contamin pping? How?	ation during handling	<b>✓</b>	Clean gloves on and	d off	
9		site conditions reported regrons manager or staff?	ularly to the field	<b>✓</b>			
QC	Check F	erformed	Frequency			Compliant	
I	Multi-poi	nt MFC Calibrations	✓ Semiannually			✓	
J	Flow Sys	tem Leak Checks	✓ Weekly			✓	
J	Filter Pa	k Inspection					
]	Flow Rat	e Setting Checks	✓ Weekly			✓	
1	Visual Cl	neck of Flow Rate Rotometer	Weekly			✓	
]	In-line Fi	lter Inspection/Replacement	Semiannually			✓	
5	Sample L	ine Check for Dirt/Water	✓ Weekly			✓	
		additional explanation (photo an-made, that may affect the		sary	y) regarding condition	ons listed above, or any other featur	es,

# Field Systems Data Form

## F-02058-1500-S10-rev002

Site ID

SAN189

Technician Martin Valvur

Site Visit Date 09/07/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07051
DAS	Campbell	CR3000	2138	000360
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	050400022576	06019
Flow Rate	Apex	AXMC105LPMDPC	illegible	000861
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0808337397	06453
Ozone	ThermoElectron Inc	49i A1NAA	1105347323	000729
Ozone Standard	ThermoElectron Inc	49i A3NAA	0726124683	000367
Sample Tower	Aluma Tower	В	none	000207
Shelter Temperature	Campbell	107-L	223461	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	14798	06537
Zero air pump	Werther International	C 70/4	000814272	06875

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
NIC	'001-Eric H	ebert-09/26/2017				
1	9/26/2017	DAS	Campbell	000801	CR850	23268
2	9/26/2017	elevation	Elevation	none	none	none
3	9/26/2017	Filter pack flow pump	Permotec	none	BL30EB	Illegible
4	9/26/2017	Flow Rate	Apex	000594	AXMC105LPMDPCV	unknown
5	9/26/2017	Infrastructure	Infrastructure	none	none	none
6	9/26/2017	Modem	Sierra wireless	06989	GX440	Unknown
7	9/26/2017	Sample Tower	Aluma Tower	000785	В	AT-212125X73
8	9/26/2017	siting criteria	Siting Criteria	none	none	None
9	9/26/2017	Temperature	RM Young	04943	41342	none

# Flow Data Form

<b>Afg</b>	Serial Nun	nber Ta S	lite	Tecl	hnician	Site Visit I	Date Param	eter	Owner ID
pex	unknown		NIC001	Eric	Hebert	09/26/2017	7 Flow R	ate	000594
				I	Mfg	BIOS	P	arameter Flo	w Rate
					Serial Number	122974	Т	fer Desc. BIC	S 220-H
				r	Гfer ID	01416			
						1	00732 Inte	4	-0.02202
					Slope			ercept	
					Cert Date	3/8	3/2017 Cor	rCoff	0.9997
DAS 1:		DAS 2:			Cal Factor Z	ero	-0.05	55	
A Avg % Diff:	A Max % Di	A Avg %I	Dif A Max	w % Di	Cal Factor F	ull Scale	0.96	64	
0.89%	0.89%				Rotometer R	eading:	2.9	95	
Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignall	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	0.000 -0.06		1/m	
primary	leak check	0.000	0.000	0.00	0.000	-0.06	1/m	1/m	
primary	test pt 1	3.031	3.030	3.00	0.000	3.00	1/m	1/m	-0.89%
primary	test pt 2	3.035	3.030	3.00	0.000	3.00	1/m	1/m	-0.89%
primary	test pt 3	3.032	3.030	3.00	0.000	3.00	1/m	1/m	-0.89%
Sensor Compo	onent Leak Tes	st		Condition	1		Status	pass	
Sensor Compo	onent Tubing C	ondition		Condition	Good		Status	pass	
Sensor Compo	onent Filter Pos	sition		Condition	Good	Status	pass		
Sensor Compo	onent Rotomete	er Condition		Condition	Clean and dry	Status	pass		
	onent Moisture			Condition	ondition See comments			pass	
	onent Filter Dis			Condition		Status			
Sensor Component Filter Depth		Condition		Status					
_	onent Filter Azi			Condition			Status		
Sensor Compo	onent System N	Лето		Condition	ı		Status	pass	

### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg RM Young NIC001 Eric Hebert 09/26/2017 Temperature 04943 none Mfg Extech Parameter Temperature Tfer Desc. RTD H232679 **Serial Number** 01228 Tfer ID -0.03341 **Slope** 1.00656 **Intercept DAS 1: DAS 2:** 2/4/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.20 0.35 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.01 0.04 0.000 0.4 $\mathbf{C}$ 0.35 C Temp Mid Range 26.39 26.25 0.000 26.2 -0.07 primary 0.000 49.0 C -0.18 primary Temp High Range 49.46 49.17 Condition Clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** N/A **Status** pass Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

Infrastructure Data F	or				
Site ID NIC001	Technician Eric	Hebert	Site Visit Date 09/26/20	017	
Shelter Make	Shelter Model		Shelter Size		
		and the second			
Sensor Component	Sample Tower Type	Condition	Type B	Status	pass
Sensor Component	Conduit	Condition	N/A	Status	pass
Sensor Component	Met Tower	Condition	N/A	Status	pass
Sensor Component	Moisture Trap	Condition	Not installed	Status	pass
Sensor Component	Power Cables	Condition	Good	Status	pass
Sensor Component	Shelter Temp Control	Condition	N/A	Status	pass
Sensor Component	Rotometer	Condition	Installed	Status	pass
Sensor Component	Sample Tower	Condition	Good	Status	pass
Sensor Component	Shelter Condition	Condition	N/A	Status	pass
Sensor Component	Shelter Door	Condition	N/A	Status	pass
Sensor Component	Shelter Roof	Condition	N/A	Status	pass
Sensor Component	Shelter Floor	Condition	N/A	Status	pass
Sensor Component	Signal Cable	Condition	Good	Status	pass
Sensor Component	Tubing Type	Condition	3/8 Bevline	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	NIC001	Eric Hebert	09/26/2017	Moisture Present	Apex	3963	
				_			

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

# **Field Systems Comments**

1 Parameter: DasComments

Single tower with filter pack mounted at 10 meters and temperature mounted at 9 meters.

2 Parameter: DocumentationCo

There is no logbook onsite to record information regarding site status or filter information.

3 Parameter: ShelterCleanNotes

Small footprint site with no shelter. Equipment housed in enclosure on sample tower. The NY DEC operators a full monitoring shelter at the same location.

4 Parameter: PollAnalyzerCom

There is water accumulating in a low section of the filter pack tubing below the enclosure. It was pointed out to the site operator so corrective action can be taken before winter and the water freezes causing blockage.

### Field Systems Data Form F-02058-1500-S1-rev002 NIC001 Site Visit Date 09/26/2017 Technician Eric Hebert Site ID **USGS Map EPA** Site Sponsor (agency) **Map Scale** NY DEC **Operating Group Map Date** AQS# **Meteorological Type Air Pollutant Analyzer QAPP** Latitude **Deposition Measurement QAPP** Longitude Woodland - mixed **Land Use QAPP Elevation Meters** Complex **Terrain QAPP Declination** No Conforms to MLM **OAPP Declination Date** 43.68596 **Site Telephone Audit Latitude** -74.9857 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 526 Herkimer County **Audit Declination** Old Forge, NY City, State **Present** Fire Extinguisher ✓ 13420 Inspected May 2017 Zip Code Eastern **First Aid Kit** Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # Primary Op. E-mail **Climbing Belt V Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Step Backup Op. E-mail Shelter Working Room Model **Shelter Size** Small footprint site with no shelter. Equipment housed in enclosure on sample tower. The NY DEC Shelter Clean Notes operators a full monitoring shelter at the same location. Site OK **Notes**

**Driving Directions** 

# Field Systems Data Form

F-02058-1500-S2-rev002

Site ID	NIC001	Technician	Eric Hebert	Site Visit Date	09/26/2017

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		<b>~</b>
Feedlot operations	500 m		<b>~</b>
Intensive agricultural ops (including aerial spraying)	500 m		<b>✓</b>
Limited agricultural operations	200 m		<b>✓</b>
Large parking lot	200 m		<b>✓</b>
Small parking lot	100 m	20 m	
Tree line	50 m		<b>~</b>
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	NIC001 Technician Eric Hebert		Site Visit Date 09/26/2017
1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	<b>✓</b>	N/A
2	Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind)	<b>✓</b>	N/A
3	Are the tower and sensors plumb?	✓	N/A
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?	<b>✓</b>	
5	Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)	<b>✓</b>	
6	Is the solar radiation sensor plumb?	<b>✓</b>	N/A
7	Is it sited to avoid shading, or any artificial or reflected light?	<b>✓</b>	N/A
8	Is the rain gauge plumb?	✓	N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	<b>✓</b>	N/A
10	Is the surface wetness sensor sited with the grid surface facing north?	<b>✓</b>	N/A
11	Is it inclined approximately 30 degrees?	<b>V</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:

condition, and well maintained?  2 Are all the meteorological sensors operational online, and reporting data?  3 Are the shields for the temperature and RH sensors clean?  4 Are the aspirated motors working?  5 Is the solar radiation sensor's lens clean and free of scratches?  6 Is the surface wetness sensor grid clean and undamaged?  7 Are the sensor signal and power cables intact, in good condition, and well maintained?	Fic	eld Systems Data Form	F-02058-1500-S4-rev002
condition, and well maintained?  2 Are all the meteorological sensors operational online, and reporting data?  3 Are the shields for the temperature and RH sensors clean?  4 Are the aspirated motors working?  5 Is the solar radiation sensor's lens clean and free of scratches?  6 Is the surface wetness sensor grid clean and undamaged?  7 Are the sensor signal and power cables intact, in good condition, and well maintained?  8 Are the sensor signal and power cable connections protected from the elements and well maintained?  8 Are the sensor signal and power cable connections protected word any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	Site	ID NIC001 Technician Eric Hebert	Site Visit Date 09/26/2017
reporting data?  3 Are the shields for the temperature and RH sensors clean?  4 Are the aspirated motors working?  5 Is the solar radiation sensor's lens clean and free of scratches?  6 Is the surface wetness sensor grid clean and undamaged?  7 Are the sensor signal and power cables intact, in good condition, and well maintained?  8 Are the sensor signal and power cable connections protected from the elements and well maintained?  8 Are the sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable connections protected will be sensor signal and power cable sintact, in good conditions listed above, or any other features,	1		
4 Are the aspirated motors working?  5 Is the solar radiation sensor's lens clean and free of scratches?  6 Is the surface wetness sensor grid clean and undamaged?  7 Are the sensor signal and power cables intact, in good condition, and well maintained?  8 Are the sensor signal and power cable connections protected from the elements and well maintained?  8 Are the sensor signal and power cable connections protected from the elements and well maintained?  8 rovide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	2		
Is the solar radiation sensor's lens clean and free of scratches?  Is the surface wetness sensor grid clean and undamaged?  Are the sensor signal and power cables intact, in good condition, and well maintained?  Are the sensor signal and power cable connections protected from the elements and well maintained?  Are the sensor signal and power cable connections protected from the elements and well maintained?  Tovide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	3	Are the shields for the temperature and RH sensors clean?	
scratches?  Is the surface wetness sensor grid clean and undamaged?  Are the sensor signal and power cables intact, in good condition, and well maintained?  Are the sensor signal and power cable connections protected from the elements and well maintained?  rovide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	4	Are the aspirated motors working?	<b>✓</b> N/A
Are the sensor signal and power cables intact, in good condition, and well maintained?  Are the sensor signal and power cable connections protected from the elements and well maintained?  Are the sensor signal and power cable connections protected from the elements and well maintained?  To vide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	5		✓ N/A
condition, and well maintained?  Are the sensor signal and power cable connections protected from the elements and well maintained?  rovide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	6	Is the surface wetness sensor grid clean and undamaged?	<b>✓</b> N/A
from the elements and well maintained?  rovide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	7		
	8		1 <b>v</b>

### Field Systems Data Form F-02058-1500-S5-rev002 NIC001 Technician | Eric Hebert Site Visit Date 09/26/2017 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 Bevline by 10 meters **✓** N/A Are in-line filters used in the ozone sample line? (if ves indicate location) Water in low section of tubing Are sample lines clean, free of kinks, moisture, and obstructions? ✓ N/A Is the zero air supply desiccant unsaturated? Not present 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:

There is water accumulating in a low section of the filter pack tubing below the enclosure. It was pointed out to the site operator so corrective action can be taken before winter and the water freezes causing blockage.

# Field Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	NIC001	Technician	Eric Hebert		Site Visit D	ate 09/26/2017	7	
	DAS, se	ensor translators, and	nerinheral equi	nment oneratio	กร ๑เ	nd maintenance			
				_		<u>Id mamtenance</u>			
1	Do the l	DAS instruments appointained?	ear to be in good	l condition and	<b>✓</b>				
2		the components of the , backup, etc)	DAS operation	al? (printers,	<b>✓</b>				
3		analyzer and sensor sig protection circuitry		through	<b>✓</b>				
4		signal connections prointained?	otected from the	e weather and	<b>✓</b>				
5	Are the	signal leads connected	d to the correct	DAS channel?	<b>✓</b>				
6	Are the ground	DAS, sensor translateded?	ors, and shelter	properly	<b>✓</b>				
7	Does th	e instrument shelter h	ave a stable pov	ver source?	✓				
8	Is the in	strument shelter temp	perature contro	lled?	<b>✓</b>	N/A			
9	Is the m	net tower stable and gr	ounded?			Stable		Grounded	
10	Is the sa	ample tower stable and	d grounded?			<b>✓</b>		<b>✓</b>	
11	Tower o	comments?							
		additional explanationan-made, that may a				y) regarding co	nditions listed	above, or a	any other features,
Sin	gle tower	with filter pack mounted	at 10 meters an	d temperature m	ount	ed at 9 meters.			

### **Field Systems Data Form** NIC001 Technician | Eric Hebert Site Visit Date 09/26/2017 Site ID **Documentation** Does the site have the required instrument and equipment manuals? N/A Yes No No N/A Yes **✓** Wind speed sensor **Data logger V V** Wind direction sensor **Data logger** ✓ **V** 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 ~ UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device V V Shelter heater** Ozone analyzer **V V** Filter pack flow controller Shelter air conditioner **~** Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log** No logbook **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? No logbook 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? **~** 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 logbook onsite to record information regarding site status or filter information.

F-02058-1500-S7-rev002

### **Field Systems Data Form** F-02058-1500-S8-rev002 NIC001 Technician Eric Hebert Site Visit Date 09/26/2017 Site ID Site operation procedures Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **✓** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed** Frequency **Compliant V** N/A **Multipoint Calibrations V V** Weekly **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) V** N/A **Manual Rain Gauge Test V** 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** N/A **V** N/A **Automatic Zero/Span Tests V** N/A Manual Zero/Span Tests **V** N/A **Automatic Precision Level Tests V** N/A **Manual Precision Level Test V** N/A **Analyzer Diagnostics Tests ~** N/A **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V** N/A Sample Line Check for Dirt/Water **~** N/A **Zero Air Desiccant Check ✓** N/A Do multi-point calibration gases go through the complete sample train including all filters? Do automatic and manual z/s/p gasses go through the N/A complete sample train including all filters?

✓ N/A

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

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

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

reported? If yes, how?

Fi	eld Sy	stems Data Form					F-02058-1500-S9-rev002
Site	e ID	NIC001 Te	chnic	ian Eric Hebert		Site Visit Date	09/26/2017
	Site ope	ration procedures					
1	Is the fil	ter pack being changed ever	y Tu	esday as scheduled?	<b>V</b>	Filter changed morn	ings
2	Are the correctly	Site Status Report Forms boy?	eing c	ompleted and filed	<b>✓</b>		
3	Are data	a downloads and backups beed?	eing p	erformed as	<b>✓</b>	No longer required	
4	Are gen	eral observations being mad	e and	l recorded? How?	<b>✓</b>	SSRF	
5	Are site fashion?	supplies on-hand and reple	nished	d in a timely	<b>✓</b>		
6	Are sam	ple flow rates recorded? Ho	w?		<b>✓</b>	SSRF	
7	Are sam	aples sent to the lab on a reg	ular s	chedule in a timely	<b>✓</b>		
8		ers protected from contamin oping? How?	ation	during handling	✓	Clean gloves on and	d off
9		site conditions reported regions manager or staff?	ularly	to the field	<b>✓</b>		
QC	Check Po	erformed	]	Frequency			Compliant
N	/ <b>Iulti-poi</b> r	nt MFC Calibrations	✓ (	Semiannually			$\checkmark$
F	low Syste	em Leak Checks	<b>✓</b> \	Weekly			$\checkmark$
F	ilter Pac	k Inspection	<b>✓</b> [	Weekly			✓
F	low Rate	Setting Checks	<b>✓</b> \	Weekly			✓
7	isual Ch	eck of Flow Rate Rotometer	<b>V</b>	Weekly			$\checkmark$
I	n-line Fil	ter Inspection/Replacement	<b>✓</b>	As needed			$\checkmark$
S	ample Li	ne Check for Dirt/Water	<b>✓</b> \	Weekly			✓
		dditional explanation (photon-made, that may affect the				r) regarding condition	ons listed above, or any other features,

# Field Systems Data Form

## F-02058-1500-S10-rev002

Site ID NIC001 Technician Eric Hebert Site Visit Date 09/26/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR850	23268	000801
elevation	Elevation	none	none	none
Filter pack flow pump	Permotec	BL30EB	Illegible	none
Flow Rate	Apex	AXMC105LPMDPC	unknown	000594
Infrastructure	Infrastructure	none	none	none
Modem	Sierra wireless	GX440	Unknown	06989
Sample Tower	Aluma Tower	В	AT-212125X73	000785
siting criteria	Siting Criteria	none	None	none
Temperature	RM Young	41342	none	04943

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
WF	M105-Eric I	Hebert-09/27/2017				
1	9/27/2017	DAS	Campbell	none	CR850	23270
2	9/27/2017	elevation	Elevation	none	none	none
3	9/27/2017	Filter pack flow pump	Permotec	none	BL30EB	Illegible
4	9/27/2017	Flow Rate	Apex	000651	AXMC105LPMDPCV	illegible
5	9/27/2017	Infrastructure	Infrastructure	none	none	none
6	9/27/2017	Modem	Sierra wireless	06983	unknown	unknown
7	9/27/2017	Sample Tower	Aluma Tower	000748	В	AT-212125X75
8	9/27/2017	siting criteria	Siting Criteria	none	none	None
9	9/27/2017	Temperature	RM Young	04683	41342VC	6697

# Flow Data Form

Mfg	Se	rial Num	ber Ta S	ite	Tec	hnician	Site Visit I	Date Parar	neter	Owner ID		
Apex	ille	egible	\	WFM105	Erio	Hebert	09/27/2017	7 Flow F	Rate	000651		
					-	Mfg	BIOS	]	Parameter FI	ow Rate		
						Serial Number	122974		Tfer Desc. BIOS 220-H			
						Tfer ID	01416					
						G1	1	00722	, [	0.02202		
						Slope			ercept	-0.02202		
						Cert Date	3/8	3/2017 <b>C</b> 0	rrCoff	0.99970		
DAS 1:			DAS 2:		_	Cal Factor Z	ero		0			
A Avg % Diff:	A Max	« % Di	A Avg %I	Dif A Max	% Di	Cal Factor F	ull Scale		0			
1.43% 1.64% Ro					Rotometer R	eading:	3	3.1				
Desc.	Tes	st type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSigna	ll PctDifference		
primary	pump		0.000	0.000	0.00	0.000			1/m			
primary	leak c		0.000	0.000	0.00	0.000	-0.04	1/m	l/m			
primary	test pt		3.051	3.050	2.82	0.000 3.00		1/m	1/m	-1.64%		
primary	test pt		3.039	3.040	2.82	0.000	3.00	1/m	1/m	-1.32%		
primary	test pt		3.043	3.040	2.82	0.000	3.00	1/m	1/m	-1.32%		
Sensor Compo	onent	Leak Test			Condition	n		Statu	pass			
Sensor Compo	onent	Tubing Co	ondition		Condition	Good		Statu	s pass			
Sensor Compo	onent	Filter Posi	ition		Condition	Good		Statu	s pass			
Sensor Compo	onent	Rotomete	r Condition		Condition	Clean and dry		Statu	s pass			
Sensor Compo	ensor Component Moisture Present Condition No moisture present		resent	Statu	pass							
Sensor Compo	onent	Filter Distance Condition 5.0 cm			Statu	pass						
Sensor Compo	ponent Filter Depth Condition 3.0 cm			Statu	pass							
Sensor Compo	onent	Filter Azin	nuth		Condition	315 deg		Statu	pass			
Common Comm	onent	System M	lemo		Condition	n		Statu	s pass			

### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg 09/27/2017 RM Young 6697 WFM105 Eric Hebert Temperature 04683 Mfg Extech Parameter Temperature Tfer Desc. RTD H232679 **Serial Number** 01228 Tfer ID -0.03341 **Slope** 1.00656 **Intercept DAS 1: DAS 2:** 2/4/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.18 0.44 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range 0.37 0.40 0.000 0.8 C 0.44 C Temp Mid Range 26.74 26.60 0.000 26.7 0.06 primary 49.70 49.41 0.000 49.5 C 0.04 primary Temp High Range Condition Clean Sensor Component | Shield **Status** pass Sensor Component Blower Status pass **Condition** N/A Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

Infrastructure Data For								
Site II	e ID WFM105		Technician Eric Hebert		Site Visit Date 09/27/2017			
She	elter Make		Shelter Model		Shelter Size			
G		Comple Tow	- T		T. m. a. D.	- G		
Sens	sor Component	Sample Tow	егтуре	Condition	туре Б	Status	pass	
Sens	sor Component	Conduit		Condition	N/A	Status	pass	
Sens	sor Component	Met Tower		Condition	N/A	Status	pass	
Sens	sor Component	Moisture Tra	р	Condition	Not installed	Status	pass	
Sens	sor Component	Power Cable	s	Condition	Good	Status	pass	
Sens	sor Component	Shelter Temp	p Control	Condition	N/A	Status	pass	
Sens	sor Component	Rotometer		Condition	Installed	Status	pass	
Sens	sor Component	Sample Tow	er	Condition	Good	Status	pass	
Sens	sor Component	Shelter Cond	dition	Condition	N/A	Status	pass	
Sens	sor Component	Shelter Door	,	Condition	N/A	Status	pass	
Sens	sor Component	Shelter Roof		Condition	N/A	Status	pass	
Sens	sor Component	Shelter Floor	r	Condition	N/A	Status	pass	
Sens	sor Component	Signal Cable		Condition	Good	Status	pass	
Sens	sor Component	Tubing Type		Condition	3/8 Bevline	Status	pass	
Sens	sor Component	Sample Trair	n	Condition	Good	Status	pass	

# **Field Systems Comments**

1 Parameter: DasComments

Single tower, with filter pack at 10 meters and temperature at 9 meters.

2 Parameter: DocumentationCo

There is no logbook present to record the status of the site equipment, calibration information, or filter information.

3 Parameter: SitingCriteriaCom

The site is located at the Atmospheric Science Research Center (ASRC) operated by the NY University (SUNY) system.

4 Parameter: ShelterCleanNotes

Small footprint site with no shelter. Equipment housed in enclosure on sample tower.

#### F-02058-1500-S1-rev002 Field Systems Data Form WFM105 Site Visit Date 09/27/2017 Site ID Technician Eric Hebert **USGS Map** EPA Site Sponsor (agency) **Map Scale** SUNY **Operating Group Map Date** AQS# **Meteorological Type Air Pollutant Analyzer QAPP** Latitude **Deposition Measurement** dry, wet **QAPP** Longitude Woodland - mixed **Land Use QAPP Elevation Meters** Complex Terrain **QAPP Declination** No Conforms to MLM **OAPP Declination Date** 44.39322 **Site Telephone Audit Latitude** -73.85874 Site Address 1 **Audit Longitude** 608 Site Address 2 **Audit Elevation** County **Audit Declination** Wilmington, NY City, State **Present** Fire Extinguisher ✓ 12997 Zip Code **✓** Eastern First Aid Kit Time Zone **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # Primary Op. E-mail **Climbing Belt Backup Operator Security Fence** Backup Op. Phone # **Secure Shelter** Stable Entry Step Backup Op. E-mail Shelter Working Room Model **Shelter Size** Notes Small footprint site with no shelter. Equipment housed in enclosure on sample tower. **Shelter Clean ✓** Notes Site OK

**Driving Directions** 

## Field Systems Data Form

F-02058-1500-S2-rev002

Site ID	WFM105	Technician	Eric Hebert	Site Visit Date	09/27/2017
Site ID	VVI 1VI 100	1 ecililician	LIICTICDCIT	Site visit Date	03/21/2011

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		<b>✓</b>
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		<b>✓</b>
Major highway, airport or rail yard	2 km		<b>✓</b>
Secondary road, heavily traveled	500 m		<b>✓</b>
Secondary road, lightly traveled	200 m		<b>✓</b>
Feedlot operations	500 m		<b>✓</b>
Intensive agricultural ops (including aerial spraying)	500 m		<b>✓</b>
Limited agricultural operations	200 m		<b>✓</b>
Large parking lot	200 m		<b>✓</b>
Small parking lot	100 m	75 m	
Tree line	50 m	25 m	
Obstacles to wind	10 times obstacle height		<b>~</b>

**Siting Criteria Comment** 

The site is located at the Atmospheric Science Research Center (ASRC) operated by the NY University (SUNY) system.

<b>17.</b>	IIC A DA E		E 02050 1500 C2 002
FI	eld Systems Data Form		F-02058-1500-S3-rev002
Site	WFM105 Technician Eric Hebert		Site Visit Date 09/27/2017
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
11	Is it inclined approximately 30 degrees?	✓	N/A

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

Fie	eld Systems Data Form	F-02058-1500-S4-rev002
Site	ID WFM105 Technician Eric Hebert	Site Visit Date 09/27/2017
1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	✓ Temperature only
2	Are all the meteorological sensors operational online, and reporting data?	✓ Temperature only
3	Are the shields for the temperature and RH sensors clean?	
4	Are the aspirated motors working?	✓ N/A
5	Is the solar radiation sensor's lens clean and free of scratches?	✓ N/A
6	Is the surface wetness sensor grid clean and undamaged?	<b>✓</b> N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	
	de any additional explanation (photograph or sketch if necesseal or man-made, that may affect the monitoring parameters:	ssary) regarding conditions listed above, or any other features,

### Field Systems Data Form F-02058-1500-S5-rev002 WFM105 Technician | Eric Hebert Site Visit Date 09/27/2017 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 Bevline by 10 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? Not present Are there moisture traps in the sample lines? **✓** Is there a rotometer in the dry deposition filter line, and is it clean? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,

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

# Field Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	WFM105	Technician	Eric Hebert		Site Vis	it Date 09/27/201	7	
	DAG	sensor translators, and	novinhoval oguiv	amant anavation	3.C. O.Y	nd maintana	maa		
	DAS,	sensor translators, and	peripheral equi	oment operation	18 a1	<u>lu mamiena</u>	<u>ince</u>		
1	Do th	e DAS instruments appenaintained?	ear to be in good	condition and	✓				
2		ll the components of the m, backup, etc)	DAS operations	al? (printers,	<b>✓</b>				
3		e analyzer and sensor signing protection circuitry		hrough	✓				
4		he signal connections pro naintained?	otected from the	weather and	<b>✓</b>				
5	Are t	he signal leads connected	l to the correct	DAS channel?	<b>✓</b>				
6	Are the ground	he DAS, sensor translatonded?	ors, and shelter p	properly	<b>✓</b>				
7	Does	the instrument shelter h	ave a stable pov	ver source?	<b>✓</b>				
8	Is the	instrument shelter temp	oerature control	led?		N/A			
9	Is the	met tower stable and gr	ounded?			Stable		Grounded	
10	Is the	sample tower stable and	d grounded?			<u> </u>		<u> </u>	
11	Towe	r comments?							
		ny additional explanatio r man-made, that may af				y) regardin	g conditions listed	l above, or a	any other features,
Sin	Single tower, with filter pack at 10 meters and temperature at 9 meters.								

#### WFM105 Technician | Eric Hebert Site Visit Date 09/27/2017 Site ID **Documentation** Does the site have the required instrument and equipment manuals? Yes No N/A No N/A Yes **✓** Wind speed sensor **Data logger V V** Wind direction sensor **Data logger** ✓ **V** П Temperature sensor Strip chart recorder **V V** Relative humidity sensor Computer **V** П Solar radiation sensor **V** Modem П **V V Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V Temperature translator V** Filter flow pump **V ~ Humidity sensor translator Surge protector** П **V ~ UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device V V Shelter heater** Ozone analyzer $\checkmark$ **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** No logbook **SSRF ✓ Site Ops Manual HASP Field Ops Manual Calibration Reports** Ozone z/s/p Control Charts Preventive maintenance schedul Is the station log properly completed during every site visit? No logbook 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? **~** 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,

F-02058-1500-S7-rev002

**Field Systems Data Form** 

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

There is no logbook present to record the status of the site equipment, calibration information, or filter information.

#### **Field Systems Data Form** F-02058-1500-S8-rev002 WFM105 Technician | Eric Hebert Site Visit Date 09/27/2017 Site ID Site operation procedures Trained onsite by AMEC personnel 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 Visual Inspections V** N/A Translator Zero/Span Tests (climatronics) **V** N/A **Manual Rain Gauge Test 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 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** Manual Procision Level Tost

Manual Frecision Level Test			
<b>Analyzer Diagnostics Tests</b>	□ N/A		$\checkmark$
<b>In-line Filter Replacement (at inlet)</b>	□ N/A		$\checkmark$
In-line Filter Replacement (at analyze	□ N/A		$\checkmark$
Sample Line Check for Dirt/Water	□ N/A		$\checkmark$
Zero Air Desiccant Check	□ N/A		$\checkmark$
1 Do multi-point calibration gases go throug sample train including all filters?	gh the complete	✓ N/A	
2 Do automatic and manual z/s/p gasses go to complete sample train including all filters		N/A	
3 Are the automatic and manual z/s/p check reported? If yes, how?	as monitored and	<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:

#### Field Systems Data Form F-02058-1500-S9-rev002 WFM105 Technician Eric Hebert Site Visit Date 09/27/2017 Site ID Site operation procedures Is the filter pack being changed every Tuesday as scheduled? ✓ Filter changed mornings Are the Site Status Report Forms being completed and filed correctly? No longer required Are data downloads and backups being performed as scheduled? **✓** SSRF Are general observations being made and recorded? How? **~** Are site supplies on-hand and replenished in a timely fashion? SSRF Are sample flow rates recorded? How? Are samples sent to the lab on a regular schedule in a timely fashion? **✓** Clean gloves on and off Are filters protected from contamination during handling and shipping? How? **~** Are the site conditions reported regularly to the field operations manager or staff? **QC Check Performed** Compliant **Frequency V** ✓ Semiannually **Multi-point MFC Calibrations** Weekly **V** Flow System Leak Checks Weekly **V Filter Pack Inspection ✓** Weekly **V Flow Rate Setting Checks ✓** Weeklv **V Visual Check of Flow Rate Rotometer** ✓ As needed **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 WFM105 Technician Eric Hebert Site Visit Date 09/27/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR850	23270	none
elevation	Elevation	none	none	none
Filter pack flow pump	Permotec	BL30EB	Illegible	none
Flow Rate	Apex	AXMC105LPMDPC	illegible	000651
Infrastructure	Infrastructure	none	none	none
Modem	Sierra wireless	unknown	unknown	06983
Sample Tower	Aluma Tower	В	AT-212125X75	000748
siting criteria	Siting Criteria	none	None	none
Temperature	RM Young	41342VC	6697	04683

# Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number			
UNI	UND002-Eric Hebert-09/28/2017								
1	9/28/2017	DAS	Campbell	000802	CR850	23269			
2	9/28/2017	elevation	Elevation	none	none	none			
3	9/28/2017	Filter pack flow pump	Permotec	none	BL30EB	Illegible			
4	9/28/2017	Flow Rate	Apex	000658	AXMC105LPMDPCV	unknown			
5	9/28/2017	Infrastructure	Infrastructure	none	none	none			
6	9/28/2017	Modem	Sierra wireless	06982	unknown	unknown			
7	9/28/2017	Sample Tower	Aluma Tower	000778	В	AT-212125X77			
8	9/28/2017	siting criteria	Siting Criteria	none	none	None			
9	9/28/2017	Temperature	RM Young	04688	41342	6702			

### Flow Data Form

Mfg	Serial Nun	nber Ta	Site	Tec	hnician	Site Visit I	Date Paran	neter	Owner ID
Apex	unknown		UND002	Erio	Hebert	09/28/2017	Flow F	Rate	000658
				]	Mfg	BIOS	F	arameter Flo	w Rate
					Serial Number	122974	1	fer Desc. BIC	OS 220-H
				,	Tfer ID	01416			
							00700 -		
					Slope	1.0	00732 Int	ercept	-0.0220
				•	Cert Date	3/8	3/2017 <b>Co</b>	rrCoff	0.9997
DAS 1:		DAS 2:			Cal Factor Z	ero	0.0	13	
A Avg % Diff:	A Max % Di	A Avg %I	Dif A Max	% Di	Cal Factor F	ull Scale	1.0	53	
1.46%	2.03%				Rotometer R	eading:	2.9	95	
Desc.	Test type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignall	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.01	l/m	1/m	
primary	test pt 1	3.016	3.020	2.88	0.000	3.01	l/m	l/m	-0.33%
primary	test pt 2	2.954	2.950	2.88	0.000	3.01	l/m	1/m	2.03%
primary	test pt 3	2.947	2.950	2.88	0.000	3.01	1/m	1/m	2.03%
Sensor Comp	onent Leak Tes	st		Condition	1		Status	pass	
Sensor Comp	onent Tubing C	ondition		Condition	Good		Status	pass	
Sensor Compo	onent Filter Pos	sition		Condition	Good		Status	pass	
Sensor Compo	onent Rotomete	er Condition		Condition	Clean and dry		Status	pass	
Sensor Compo	onent Moisture	Present		Condition	No moisture p	resent	Status	pass	
Sensor Compo	onent Filter Dis	tance		Condition	4.5 cm		Status	pass	
Sensor Component Filter Depth		Condition	1.5 cm		Status	pass			
Sensor Compo	onent Filter Azi	muth		Condition	180 deg		Status	pass	_
	onent System N	/lemo		Condition			Status	pass	

#### **Temperature Data Form** Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg RM Young 6702 UND002 Eric Hebert 09/28/2017 Temperature 04688 Mfg Extech Parameter Temperature Tfer Desc. RTD H232679 **Serial Number** 01228 **Tfer ID** -0.03341 **Slope** 1.00656 **Intercept DAS 1: DAS 2:** 2/4/2017 1.00000 Abs Avg Err Abs Max Er Abs Avg Err Abs Max Er **Cert Date** CorrCoff 0.17 0.19 OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. Test type InputTmpRaw InputTmpCorr. primary Temp Low Range -0.03 0.00 0.000 0.2 C 0.18 C Temp Mid Range 25.41 25.28 0.000 25.2 -0.13 primary 47.01 0.000 C -0.19 primary Temp High Range 47.28 46.8 Sensor Component | Shield **Condition** Clean **Status** pass Sensor Component Blower Status pass **Condition** N/A Status pass Sensor Component Blower Status Switch **Condition** N/A Sensor Component | System Memo Status pass Condition

Infrastructure Data Fo	or				
Site ID UND002	Technician	Eric Hebert	Site Visit Date 09/28/2	017	
Shelter Make	Shelter Model		Shelter Size		
<b>Sensor Component</b>	Sample Tower Type	Condition	Туре В	Status	pass
Sensor Component	Conduit	Condition	N/A	Status	pass
<b>Sensor Component</b>	Met Tower	Condition	N/A	Status	pass
Sensor Component	Moisture Trap	Condition	Not installed	Status	pass
Sensor Component	Power Cables	Condition	Good	Status	pass
Sensor Component	Shelter Temp Control	Condition	N/A	Status	pass
Sensor Component	Rotometer	Condition	Installed	Status	pass
Sensor Component	Sample Tower	Condition	Good	Status	pass
Sensor Component	Shelter Condition	Condition	N/A	Status	pass
Sensor Component	Shelter Door	Condition	N/A	Status	pass
Sensor Component	Shelter Roof	Condition	N/A	Status	pass
Sensor Component	Shelter Floor	Condition	N/A	Status	pass
Sensor Component		Condition		Status	
Sensor Component		Condition	3/8 Bevline	Status	
Sensor Component		Condition		Status	

## **Field Systems Comments**

1 Parameter: DasComments

Single tower with filer pack mounted at 10 meters and temperature mounted at 9 meters.

2 Parameter: DocumentationCo

Although there is no CASTNET logbook present onsite, the site operator records CASTNET information in the VT Monitoring Coop logbook.

3 Parameter: ShelterCleanNotes

Small footprint site with no shelter. Equipment housed in enclosure on sample tower.

#### F-02058-1500-S1-rev002 Field Systems Data Form UND002 Site Visit Date 09/28/2017 Site ID Technician Eric Hebert **USGS Map** EPA Site Sponsor (agency) **Map Scale** VT Monitoring Coop **Operating Group Map Date** AQS# **Meteorological Type Air Pollutant Analyzer QAPP** Latitude **Deposition Measurement** dry, wet **QAPP** Longitude Woodland - mixed **Land Use QAPP Elevation Meters** Complex Terrain **QAPP Declination** No Conforms to MLM **OAPP Declination Date** 44.52843 **Site Telephone Audit Latitude** -72.86804 Site Address 1 **Audit Longitude** 402 Site Address 2 **Audit Elevation** Chittenden County **Audit Declination** Underhill Center, VT City, State **Present** Fire Extinguisher 05489 Zip Code Eastern **First Aid Kit** Time Zone **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # Primary Op. E-mail **Climbing Belt Backup Operator Security Fence** Backup Op. Phone # **Secure Shelter** Stable Entry Step Backup Op. E-mail Shelter Working Room Model **Shelter Size** Notes Small footprint site with no shelter. Equipment housed in enclosure on sample tower. **Shelter Clean ✓** Notes Site OK

**Driving Directions** 

# Field Systems Data Form

F-02058-1500-S2-rev002

Site ID	UND002	<b>Technician</b>	Eric Hebert	Site Visit Date	09/28/2017

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		$\checkmark$
Intensive agricultural ops (including aerial spraying)	500 m		$\checkmark$
Limited agricultural operations	200 m		<b>~</b>
Large parking lot	200 m		$\checkmark$
Small parking lot	100 m		$\checkmark$
Tree line	50 m	30 m	
Obstacles to wind	10 times obstacle height		✓

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

Fi	eld Systems	Data Fo	rm				F-0205	8-1500	-S3-rev002
Site	UND002	2	Technician	Eric Hebert		Site Visit Date	09/28/2017		
1	Are wind speed a being influenced			as to avoid	<b>✓</b>	N/A			
2	Are wind sensors (i.e. wind sensors horizontally exte tower into the pr	s should be mo nded boom >2	ounted atop the 2x the max diar	tower or on a	<b>✓</b>	N/A			
3	Are the tower an	· ·			<b>✓</b>	N/A			
4	Are the temperar	•		•	<b>✓</b>				
5	Are temperature conditions? (i.e. surface and not standing water s	ground below steeply sloped.	sensors should Ridges, hollow	be natural	<b>✓</b>				
6	Is the solar radia	tion sensor pl	umb?		<b>✓</b>	N/A			
7	Is it sited to avoid light?	d shading, or	any artificial o	r reflected	<b>✓</b>	N/A			
8	Is the rain gauge	plumb?			<b>✓</b>	N/A			
9	Is it sited to avoid towers, etc?	d sheltering ef	fects from buil	dings, trees,	<b>✓</b>	N/A			
10	Is the surface we facing north?	tness sensor s	ited with the gr	id surface	<b>✓</b>	N/A			
11	Is it inclined app	oroximately 30	degrees?		<b>~</b>	N/A			

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

Fie	eld Sy	ystems Data I	Form		F-02058-1500-S4-rev002					
Site	e ID	UND002	Technician Eric H	Hebert		Site Visit Date 09/28/2017				
1		the meterological sens	sors appear to be intact	t, in good	✓	Temperature only				
2		the meteorological seing data?	ensors operational onlin	ne, and	<b>✓</b>	Temperature only				
3	Are the	e shields for the temp	erature and RH sensors	es clean?	<b>✓</b>					
4	Are the	e aspirated motors wo	orking?	3	<b>✓</b>	N/A				
5	Is the s		's lens clean and free of	f .	<b>✓</b>	N/A				
6	Is the s	surface wetness sensor	r grid clean and undam	naged?	<b>✓</b>	N/A				
7		e sensor signal and po on, and well maintair	ower cables intact, in go	ood	<b>✓</b>					
8		e sensor signal and po he elements and well i	ower cable connections maintained?	protected	<b>✓</b>					
			on (photograph or sketc ffect the monitoring pa		ry)	regarding conditions listed above, or any other features,				

### Field Systems Data Form F-02058-1500-S5-rev002 UND002 Technician | Eric Hebert Site Visit Date 09/28/2017 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 Bevline by 10 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? Not present Are there moisture traps in the sample lines? **✓** Is there a rotometer in the dry deposition filter line, and is it clean? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,

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

# Field Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	UND002	Technician	Eric Hebert		Site Visi	t Date 09/28/201	17	
	DAS 6	ensor translators, and	narinharal aqui	amont anaration	nc o	nd maintanau	noo		
	DAS, S	ensor translators, and	peripheral equi	oment operation	18 a	<u>na mamtenai</u>	<u>iice</u>		
1		DAS instruments appeaintained?	ear to be in good	condition and	✓				
2		the components of the a, backup, etc)	DAS operations	al? (printers,	<b>✓</b>				
3		analyzer and sensor sing protection circuitry		hrough	✓				
4		e signal connections pro aintained?	weather and	✓					
5	Are the	e signal leads connected	d to the correct	DAS channel?	<b>✓</b>				
6	Are the ground	e DAS, sensor translated?	ors, and shelter j	properly	<b>✓</b>				
7	Does th	ne instrument shelter h	ave a stable pov	ver source?	<b>✓</b>				
8	Is the i	nstrument shelter temj	perature control	led?	<b>✓</b>	N/A			
9	Is the n	net tower stable and gr	counded?			<b>Stable</b>		Grounded	
10	Is the s	ample tower stable and	d grounded?			<b>✓</b>		<b>✓</b>	
11	Tower	comments?							
Pro	ovide an	y additional explanatio	on (photograph o	or sketch if nece	essai	v) regarding	conditions liste	d above. or a	nny other features.
nat	ural or	man-made, that may a	ffect the monito	ring parameter	s:				
Sin	gle towei	with filer pack mounted	at 10 meters and	temperature mo	ounte	ed at 9 meters	S.		

#### UND002 Technician | Eric Hebert Site Visit Date 09/28/2017 Site ID **Documentation** Does the site have the required instrument and equipment manuals? Yes No N/A No N/A Yes **✓** Wind speed sensor **Data logger V V** Wind direction sensor **Data logger** ✓ **V** П Temperature sensor Strip chart recorder **V V** Relative humidity sensor Computer **V** П Solar radiation sensor **V** Modem П **V V Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V Temperature translator V** Filter flow pump **V V Humidity sensor translator Surge protector** П **V V UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device V V Shelter heater** Ozone analyzer $\checkmark$ **V** Filter pack flow controller Shelter air conditioner **~** Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF V V Site Ops Manual 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? ✓ 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? **~** 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:

Although there is no CASTNET logbook present onsite, the site operator records CASTNET information in the VT Monitoring Coop logbook.

F-02058-1500-S7-rev002

**Field Systems Data Form** 

#### **Field Systems Data Form** F-02058-1500-S8-rev002 UND002 Technician Eric Hebert Site Visit Date 09/28/2017 Site ID Site operation procedures Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **V** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed** Frequency **Compliant ✓ V** N/A **Multipoint Calibrations V V** Weekly **Visual Inspections ✓ V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test ✓ V** Weekly **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **QC Check Performed Compliant** Frequency **Multi-point Calibrations V** N/A **V** N/A **Automatic Zero/Span Tests V** N/A Manual Zero/Span Tests **V** N/A **Automatic Precision Level Tests V** N/A **Manual Precision Level Test V** N/A **Analyzer Diagnostics Tests ~** N/A **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V** N/A Sample Line Check for Dirt/Water **~** N/A **Zero Air Desiccant Check ✓** N/A Do multi-point calibration gases go through the complete sample train including all filters? Do automatic and manual z/s/p gasses go through the N/A

✓ N/A

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

complete sample train including all filters?

reported? If yes, how?

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

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

#### Field Systems Data Form F-02058-1500-S9-rev002 UND002 Technician Eric Hebert Site Visit Date 09/28/2017 Site ID Site operation procedures Is the filter pack being changed every Tuesday as scheduled? ✓ Filter changed mornings Are the Site Status Report Forms being completed and filed correctly? No longer required Are data downloads and backups being performed as scheduled? **✓** SSRF Are general observations being made and recorded? How? **~** Are site supplies on-hand and replenished in a timely fashion? SSRF Are sample flow rates recorded? How? Are samples sent to the lab on a regular schedule in a timely fashion? **✓** Clean gloves on and off Are filters protected from contamination during handling and shipping? How? **~** Are the site conditions reported regularly to the field operations manager or staff? **QC Check Performed** Compliant **Frequency V** ✓ Semiannually **Multi-point MFC Calibrations** Weekly **V** Flow System Leak Checks Weekly **V Filter Pack Inspection ✓** Weekly **V Flow Rate Setting Checks** Weekly **V Visual Check of Flow Rate Rotometer** ✓ As needed **V In-line Filter Inspection/Replacement ✓** 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:

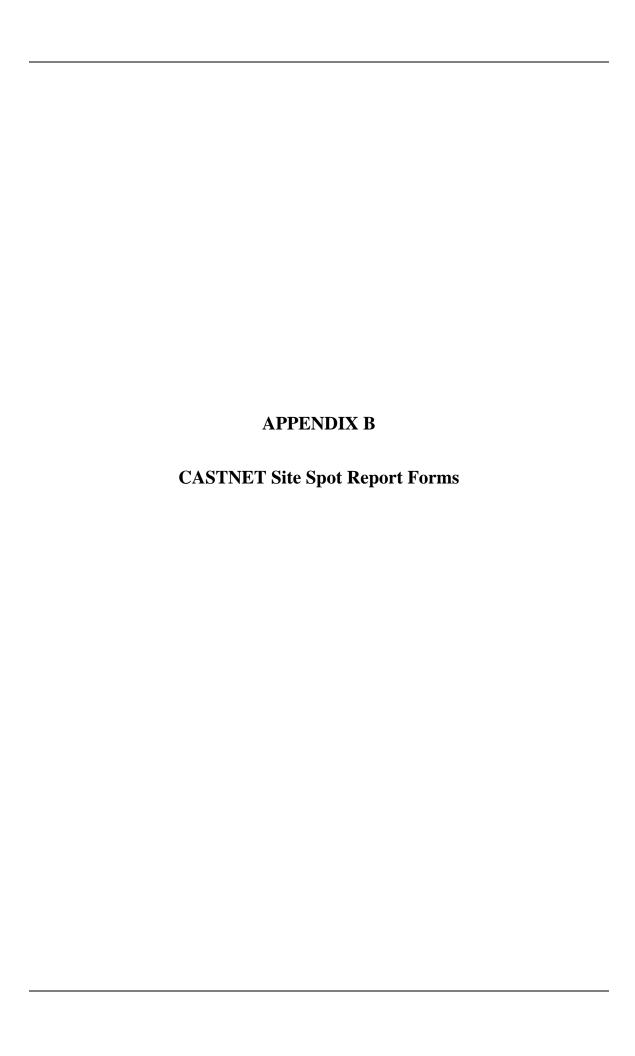
## Field Systems Data Form

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

Site ID UND002 Technician Eric Hebert Site Visit Date 09/28/2017

**Site Visit Sensors** 

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR850	23269	000802
elevation	Elevation	none	none	none
Filter pack flow pump	Permotec	BL30EB	Illegible	none
Flow Rate	Apex	AXMC105LPMDPC	unknown	000658
Infrastructure	Infrastructure	none	none	none
Modem	Sierra wireless	unknown	unknown	06982
Sample Tower	Aluma Tower	В	AT-212125X77	000778
siting criteria	Siting Criteria	none	None	none
Temperature	RM Young	41342	6702	04688



# **EEMS Spot Report**

Data Compiled: 8/29

8/29/2017 9:08:02 PM

SiteVisitDate Site Technician

08/21/2017 ABT147 Sandy Grenville

### Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.98064	unitless	P
2	Ozone Intercept	P	0	5	4	0.48616	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
4	Ozone % difference avg	P	7	10	4	1.1	%	P
5	Ozone % difference max	P	7	10	4	1.6	%	P

# **EEMS Spot Report**

**Data Compiled:** 7/27/2017 12:51:06 PM

SiteVisitDate Site Technician

07/17/2017 BAS601 Martin Valvur

### Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	2.31	c	Fail
2	Temperature2meter max error	P	5	0.5	3	3.17	c	Fail
3	Wind Speed average error below 5m/s in m/s	P	3	0.5	8	0.18	m/s	P
4	Wind Speed max error below 5m/s in m/s	P	3	0.5	8	0.30	m/s	P
5	Wind Speed average % difference above 5 m/s	P	3	5	8	1.0	%	P
6	Wind Speed max % difference above 5 m/s	P	3	5	8	2.6	%	P
7	Wind Speed Torque average error	P	3	0.5	1	0.40	g-cm	P
8	Wind Speed Torque max error	P	3	0.5	1	0.4	g-cm	P
9	Wind Direction Input Deg True average error (de	P	2	5	4	1.8	degrees	P
10	Wind Direction Input Deg True max error (deg)	P	2	5	4	3	degrees	P
11	Relative Humidity average above 85%	P	6	10	1	7.4	%	P
12	Relative Humidity max above 85%	P	6	10	1	7.4	%	P
13	Relative Humidity average below 85%	P	6	10	2	1.2	%	P
14	Relative Humidity max below 85%	P	6	10	2	1.4	%	P
15	Solar Radiation % diff of avg	P	9	10	21	2.45	%	P
16	Solar Radiation % diff of max STD value	P	9	10	21	4.4	%	P
17	Precipitation average % difference	P	1	10	3	9.7	%	P
18	Precipitation max % difference	P	1	10	3	14.5	%	Fail
19	Ozone Slope	P	0	1.1	4	0.99633	unitless	P
20	Ozone Intercept	P	0	5	4	0.22520	ppb	P
21	Ozone correlation	P	0	0.995	4	1.00000	unitless	P
22	Ozone % difference avg	P	7	10	4	0.5	%	P
23	Ozone % difference max	P	7	10	4	1.5	%	P
24	Flow Rate average % difference	P	10	5	4	3.98	%	P
25	Flow Rate max % difference	P	10	5	4	4.9	%	P
26	Shelter Temperature average error	P	5	2	9	2.16	c	Fail
27	Shelter Temperature max error	P	5	2	9	2.72	c	Fail

SiteVisitDate Site Technician

07/17/2017 BAS601 Martin Valvur

### Records without valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Shelter Temperature standard deviation		5	0	9			
2	Temperature2meter Standard Deviation		5	0	3			
3	Precipitation total of % diff		1	0	3			
4	Precipitation total of abs diff mm or in		1	0	3			
5	Precipitation total of DAS mm or in		1	0	3			
6	Precipitation total of equivalent mm or in		1	0	3			
7	DAS Time maximum error		0	5	1			Fail

BAS601

Martin Valvur

### **Field Performance Comments**

1 Parameter: Flow Rate SensorComponent: Filter Depth 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.

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

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

### **Field Systems Comments**

1 Parameter: SiteOpsProcComm

There are no clean spare filter caps or Ziploc filter bags on site as was the case during the previous site audit visit. The bag and caps for the received filter are being used to send the removed filter back to the lab. The importance of keeping the shipping material with each filter was discussed with the operator. Some additional information regarding completion of the SSRF was provided to the site operator.

2 Parameter: DocumentationCo

The filter pack chain-of-custody labels are not being used.

3 Parameter: SiteOpsProcedures

The ozone inlet filter is replaced each month.

4 Parameter: ShelterCleanNotes

The enclosure houses the ozone, DAS, and MFC only.

5 Parameter: MetSensorComme

Some objects violate the 45 degree rule for the tipping bucket rain gage. The Temperature shield is mounted on the south side of the tower tripod at 2 meters.

6 Parameter: MetOpMaintCom

The site utilizes a combination sensor for humidity and temperature. It was audited without submersion in a water bath. The temperature sensor is mounted at approximately 2 meters from the ground. The accuracy of the DAS was not tested due to no available channels for the test equipment. The wind direction sensor was not functioning upon arrival for the site audit. The site operator provided a replacement sensor which had been shipped from ARS. EEMS assisted the operator with the installation of the replacement sensor. The wind direction audit results are provided for the replacement sensor.

# **EEMS Spot Report**

Data Compiled:

7/28/2017 2:55:38 PM

SiteVisitDate	Site	Technician
07/19/2017	BUF603	Martin Valvur

### Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	1.62	c	Fail
2	Temperature2meter max error	P	5	0.5	3	4.38	c	Fail
3	Wind Speed average error below 5m/s in m/s	P	3	0.5	4	0.19	m/s	P
4	Wind Speed max error below 5m/s in m/s	P	3	0.5	4	0.30	m/s	P
5	Wind Speed average % difference above 5 m/s	P	3	5	4	0.6	%	P
6	Wind Speed max % difference above 5 m/s	P	3	5	4	1.3	%	P
7	Wind Speed Torque average error	P	3	0.5	1	0.20	g-cm	P
8	Wind Speed Torque max error	P	3	0.5	1	0.2	g-cm	P
9	Wind Direction Input Deg True average error (de	P	2	5	4	1.5	degrees	P
10	Wind Direction Input Deg True max error (deg)	P	2	5	4	3	degrees	P
11	Relative Humidity average above 85%	P	6	10	3	5.9	%	P
12	Relative Humidity max above 85%	P	6	10	3	5.9	%	P
13	Relative Humidity average below 85%	P	6	10	6	2.3	%	P
14	Relative Humidity max below 85%	P	6	10	6	3.0	%	P
15	Solar Radiation % diff of avg	P	9	10	6	1.24	%	P
16	Solar Radiation % diff of max STD value	P	9	10	6	0.80	%	P
17	Precipitation average % difference	P	1	10	2	1.5	%	P
18	Precipitation max % difference	P	1	10	2	1.5	%	P
19	Flow Rate average % difference	P	10	5	4	2.11	%	P
20	Flow Rate max % difference	P	10	5	4	3.38	%	P
21	DAS Voltage average error	P	4	0.003	3	0.0000	V	P

### Records without valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	DAS Voltage maximum error		4	0	3			
2	Temperature2meter Standard Deviation		5	0	3			
3	Precipitation total of % diff		1	0	2			
4	Precipitation total of abs diff mm or in		1	0	2			
5	Precipitation total of DAS mm or in		1	0	2			
6	Precipitation total of equivalent mm or in		1	0	2			
7	DAS Time maximum error		0	5	1			Fail

BUF603

Martin Valvur

### **Field Performance Comments**

1 Parameter: Wind Speed SensorComponent: Condition CommentCode: 146

One set screw is stripped.

### **Field Systems Comments**

1 Parameter: DasComments

The NEMA enclosure has a cooling fan.

2 Parameter: DocumentationCo

A disc with the current QAPP has been received and is kept at the site operator's office. The site operator completes and files a hardcopy checklist developed by ARS for BLM each week.

3 Parameter: ShelterCleanNotes NEMA enclosure, 120 VAC power

Parameter: PollAnalyzerCom

The dry deposition filter pack enclosure is not the standard "pot" size that is used at the other CASTNET sites. The diameter of the enclosure is much smaller and the filter is mounted much deeper inside the opening. The geometry of the filter pack and enclosure is likely to impact particle collection efficiency.

5 Parameter: MetSensorComme

The temperature and RH are measured using a combined sensor which cannot be immersed making a temperature audit difficult. The temperature and RH are measured at 2.5 meters above the ground.

6 Parameter: MetOpMaintCom

Some of the signal cables are beginning to show signs of wear.

# **EEMS Spot Report**

Data Compiled:

8/6/2017 6:00:41 PM

SiteVisitDate Site Technician

07/20/2017 CDR119 Sandy Grenville

### Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	18	0.18	c	P
2	Temperature max error	P	4	0.5	18	0.27	c	P
3	Ozone Slope	P	0	1.1	4	0.97705	unitless	P
4	Ozone Intercept	P	0	5	4	0.99177	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99996	unitless	P
6	Ozone % difference avg	P	7	10	4	1.6	%	P
7	Ozone % difference max	P	7	10	4	3.7	%	P
8	Flow Rate average % difference	P	10	5	4	1.09	%	P
9	Flow Rate max % difference	P	10	5	4	1.31	%	P
10	DAS Voltage average error	P	7	0.003	7	0.0001	V	P
11	Shelter Temperature average error	P	5	2	15	0.18	c	P
12	Shelter Temperature max error	P	5	2	15	0.35	c	P

07/20/2017

CDR119

Sandy Grenville

## **Field Performance Comments**

1 Parameter: Ozone SensorComponent: 22.5 degree rule CommentCode 216

Trees violate the 22.5 degree clearance rule for the ozone sample inlet.

## **Field Systems Comments**

1 Parameter: SiteOpsProcComm

The filter handling procedures have again improved since the previous site audit visit.

2 Parameter: SitingCriteriaCom

Site is in a wooded valley, within 30 meters of a lightly traveled road. Large diesel trucks use the road. Trees are taller than the sample tower and within 20 meters of the sample tower.

3 Parameter: ShelterCleanNotes

The shelter is in good condition with only a small amount of rot on the walls below the air conditioner.

# **EEMS Spot Report**

**Data Compiled:** 10/8/2017 5:41:18 PM

SiteVisitDate Site Technician

07/21/2017 CNT169 Martin Valvur

### Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.11	c	P
2	Temperature max error	P	4	0.5	6	0.21	c	P
3	Ozone Slope	P	0	1.1	4	1.05083	unitless	P
4	Ozone Intercept	P	0	5	4	0.66404	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99992	unitless	P
6	Ozone % difference avg	P	7	10	4	7.1	%	P
7	Ozone % difference max	P	7	10	4	8.2	%	P
8	Flow Rate average % difference	P	10	5	6	0.55	%	P
9	Flow Rate max % difference	P	10	5	6	0.99	%	P
10	DAS Voltage average error	P	7	0.003	56	0.0001	V	P
11	Shelter Temperature average error	P	5	2	15	1.74	c	P
12	Shelter Temperature max error	P	5	2	15	1.92	c	P

SiteVisitDate	Site	Technician

07/21/2017

CNT169

Martin Valvur

## **Field Systems Comments**

1 Parameter: SiteOpsProcedures

The ozone inlet filter is changed once each month and the ozone sample line is leak tested every two weeks.

2 Parameter: ShelterCleanNotes

The shelter is dirty. Some floor tiles are old and broken

**Data Compiled:** 8/29/2017 9:01:19 PM

SiteVisitDate Site Technician

08/17/2017 GLR468 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	1.15	c	Fail
2	Temperature2meter max error	P	5	0.5	3	1.65	c	Fail
3	Ozone Slope	P	0	1.1	4	1.0521	unitless	P
4	Ozone Intercept	P	0	5	4	0.44679	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99994	unitless	P
6	Ozone % difference avg	P	7	10	4	6.3	%	P
7	Ozone % difference max	P	7	10	4	7.9	%	P
8	Flow Rate average % difference	P	10	5	3	2.38	%	P
9	Flow Rate max % difference	P	10	5	3	2.38	%	P
10	DAS Voltage average error	P	15	0.003	49	0.0002	V	P
11	Shelter Temperature average error	P	5	2	15	0.86	c	P
12	Shelter Temperature max error	P	5	2	15	1.28	c	P

SiteVisitDate	Site	Technician
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08/17/2017

GLR468

Martin Valvur

### **Field Performance Comments**

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

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

### **Field Systems Comments**

1 Parameter: SiteOpsProcedures

The ozone inlet filter is being changed weekly while smoke from forest fires is present.

2 Parameter: SitingCriteriaCom

The site is located in a small clearing within 100 meters of a horse stable. There is a plywood and aluminum processing plant within 20 km of the site.

3 Parameter: ShelterCleanNotes

The shelter is in good condition. Evidence of repairs to roof leaks attempted. Some floor tiles are loose.

4 Parameter: MetSensorComme

The recorded temperature data at this site is measured at approximately 2 meters above the ground.

**Data Compiled:** 8/29/2017 7:03:58 PM

SiteVisitDate Site Technician

08/16/2017 KEF112 Sandy Grenville

#### Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.99672	unitless	P
2	Ozone Intercept	P	0	5	4	1.07383	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99998	unitless	P
4	Ozone % difference avg	P	7	10	4	2.4	%	P
5	Ozone % difference max	P	7	10	4	5.1	%	P

### **Field Performance Comments**

1 Parameter: Ozone SensorComponent: Cell A Flow CommentCode 99

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

Data Compiled:

8/29/2017 8:28:46 PM

SiteVisitDate Site Technician

08/17/2017 LRL117 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	12	0.15	c	P
2	Temperature max error	P	4	0.5	12	0.26	c	P
3	Ozone Slope	P	0	1.1	4	0.99010	unitless	P
4	Ozone Intercept	P	0	5	4	0.82411	ppb	P
5	Ozone correlation	P	0	0.995	4	1.00000	unitless	P
6	Ozone % difference avg	P	7	10	4	1.4	%	P
7	Ozone % difference max	P	7	10	4	3.7	%	P
8	Flow Rate average % difference	P	10	5	4	0.45	%	P
9	Flow Rate max % difference	P	10	5	4	0.67	%	P
10	DAS Voltage average error	P	7	0.003	63	0.0000	V	P
11	Shelter Temperature average error	P	5	2	15	0.61	c	P
12	Shelter Temperature max error	P	5	2	15	0.92	c	P

08/17/2017

LRL117

Sandy Grenville

### **Field Systems Comments**

1 Parameter: DasComments

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

2 Parameter: SiteOpsProcedures

Ozone sample line leak checks conducted every other week following the inlet filter replacements.

3 Parameter: SitingCriteriaCom

Logging activities are underway surrounding the site. The site is being used as a loading area.

4 Parameter: ShelterCleanNotes

The shelter has been repaired and is in very good condition. A new peaked roof has been installed.

**Data Compiled:** 8/29/2017 7:10:57 PM

SiteVisitDate Site Technician

08/17/2017 MKG113 Sandy Grenville

#### Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.98678	unitless	P
2	Ozone Intercept	P	0	5	4	0.92740	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99993	unitless	P
4	Ozone % difference avg	P	7	10	4	1.1	%	P
5	Ozone % difference max	P	7	10	4	3.5	%	P

## **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.

**Data Compiled:** 7/29/2017 9:03:30 AM

SiteVisitDate Site Technician

07/21/2017 NEC602 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Wind Speed average error below 5m/s in m/s	P	3	0.5	4	0.15	m/s	P
2	Wind Speed max error below 5m/s in m/s	P	3	0.5	4	0.25	m/s	P
3	Wind Speed average % difference above 5 m/s	P	3	5	4	0.9	%	P
4	Wind Speed max % difference above 5 m/s	P	3	5	4	1.9	%	P
5	Wind Speed Torque average error	P	3	0.5	1	0.00	g-cm	P
6	Wind Speed Torque max error	P	3	0.5	1	0.0	g-cm	P
7	Wind Direction Input Deg True average error (de	P	2	5	4	18.2	degrees	Fail
8	Wind Direction Input Deg True max error (deg)	P	2	5	4	21	degrees	Fail
9	Temperature average error	P	4	0.5	3	0.63	c	Fail
10	Temperature max error	P	4	0.5	3	1.1	c	Fail
11	Relative Humidity average above 85%	P	6	10	1	1.2	%	P
12	Relative Humidity max above 85%	P	6	10	1	1.2	%	P
13	Relative Humidity average below 85%	P	6	10	2	0.9	%	P
14	Relative Humidity max below 85%	P	6	10	2	1.6	%	P
15	Solar Radiation % diff of avg	P	9	10	4	3.56	%	P
16	Solar Radiation % diff of max STD value	P	9	10	4	6.5	%	P
17	Precipitation average % difference	P	1	10	2	1.8	%	P
18	Precipitation max % difference	P	1	10	2	3.5	%	P
19	Ozone Slope	P	0	1.1	4	0.96612	unitless	P
20	Ozone Intercept	P	0	5	4	-0.15807	ppb	P
21	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
22	Ozone % difference avg	P	7	10	4	4.3	%	P
23	Ozone % difference max	P	7	10	4	6.1	%	P
24	Flow Rate average % difference	P	10	5	4	3.01	%	P
25	Flow Rate max % difference	P	10	5	4	4.16	%	P
26	DAS Voltage average error	P	7	0.003	5	0.0000	V	P
27	Shelter Temperature average error	P	5	2	9	0.49	c	P
28	Shelter Temperature max error	P	5	2	9	0.97	c	P

SiteVisitDate Site

**Technician** 

07/21/2017

NEC602

Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	DAS Voltage maximum error		7	0	5			
2	Shelter Temperature standard deviation		5	0	9			
3	Temperature standard deviation		4	0	3			
4	Precipitation total of % diff		1	0	2			
5	Precipitation total of abs diff mm or in		1	0	2			
6	Precipitation total of DAS mm or in		1	0	2			
7	Precipitation total of equivalent mm or in		1	0	2			
8	DAS Time maximum error		0	5	1			Fail

07/21/2017

NEC602

Martin Valvur

### **Field Performance Comments**

1 Parameter: Flow Rate SensorComponent: Filter Position CommentCode: 71

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

2 Parameter: Wind Direction SensorComponent: System Memo CommentCode: 155

The wind direction sensor mast is loose on the tower causing inaccurate wind direction measurement.

3 Parameter: Wind Speed SensorComponent: System Memo CommentCode: 146

One set screw is stripped.

### **Field Systems Comments**

1 Parameter: SiteOpsProcComm

The site operator is doing a good job with filter change and filter handling. The site operator reported that sometimes it requires a few requests to ARS before assistance is received.

2 Parameter: SiteOpsProcedures

The site operator is aware that the desiccant is in need of replacement. Some of the items on the SSRF were discussed and the site operator's questions were answered regarding the correct procedures.

3 Parameter: DocumentationCo

The site operator received a disc with the current QAPP which is kept at his office.

4 Parameter: SitingCriteriaCom

The site is located approximately 2 km northeast of Newcastle WY which has a population of approximately 3500. There is an oil refinery in Newcastle. A heavily traveled road is approximately 100m west of the site.

5 Parameter: ShelterCleanNotes

The shelter houses the ozone, DAS, and MFC only.

6 Parameter: MetSensorComme

Some objects violate the 45 degree rule for the tipping bucket rain gage. The wind sensor mast is loose on the sample tower. The site operator reported that the tower was dropped a couple of weeks before by the backup site operator. This may have caused the damage to the wind sensor mast.

7 Parameter: MetOpMaintCom

The temperature / humidity sensor had fallen out of the naturally aspirated shield and was hanging by the signal cable from the top of the tower. The site operator reported that it had been that way probably since the tower was dropped by the backup site operator a couple of weeks before. It was reinstalled in the shield by the audit team following the audit.

**Data Compiled:** 10/9/2017 9:21:03 PM

SiteVisitDate Site Technician

09/26/2017 NIC001 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	9	0.20	c	P
2	Temperature max error	P	4	0.5	9	0.35	c	P
3	Flow Rate average % difference	P	10	5	4	0.89	%	P
4	Flow Rate max % difference	P	10	5	4	0.89	%	P

09/26/2017

NIC001

Eric Hebert

### **Field Performance Comments**

1 Parameter: Flow Rate SensorComponent: Moisture Present CommentCode 72

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

### **Field Systems Comments**

1 Parameter: DasComments

Single tower with filter pack mounted at 10 meters and temperature mounted at 9 meters.

2 Parameter: DocumentationCo

There is no logbook onsite to record information regarding site status or filter information.

3 Parameter: ShelterCleanNotes

Small footprint site with no shelter. Equipment housed in enclosure on sample tower. The NY DEC operators a full monitoring shelter at the same location.

4 Parameter: PollAnalyzerCom

There is water accumulating in a low section of the filter pack tubing below the enclosure. It was pointed out to the site operator so corrective action can be taken before winter and the water freezes causing blockage.

**Data Compiled:** 8/29/2017 9:15:39 PM

SiteVisitDate Site Technician

08/22/2017 NPT006 Martin Valvur

#### Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.98264	unitless	P
2	Ozone Intercept	P	0	5	4	-0.30433	ppb	P
3	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
4	Ozone % difference avg	P	7	10	4	2.8	%	P
5	Ozone % difference max	P	7	10	4	3.6	%	P

### **Field Performance Comments**

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

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

Data Compiled:

8/6/2017 7:25:32 PM

SiteVisitDate Site Technician

07/21/2017 PAR107 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	15	0.06	c	P
2	Temperature max error	P	4	0.5	15	0.08	c	P
3	Ozone Slope	P	0	1.1	4	0.99332	unitless	P
4	Ozone Intercept	P	0	5	4	0.51699	ppb	P
5	Ozone correlation	P	0	0.995	4	1.00000	unitless	P
6	Ozone % difference avg	P	7	10	4	1.3	%	P
7	Ozone % difference max	P	7	10	4	4.3	%	P
8	Flow Rate average % difference	P	10	5	4	2.81	%	P
9	Flow Rate max % difference	P	10	5	4	3.25	%	P
10	DAS Voltage average error	P	7	0.003	56	0.0000	V	P
11	Shelter Temperature average error	P	5	2	15	0.49	c	P
12	Shelter Temperature max error	P	5	2	15	0.60	c	P

SiteVisitDate Site Technician

07/21/2017

PAR107

Sandy Grenville

## **Field Systems Comments**

1 Parameter: SitingCriteriaCom

The city of Parsons, estimated population 1500, is within 5 km of the site.

2 Parameter: ShelterCleanNotes

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

Data Compiled:

8/6/2017 7:57:40 PM

SiteVisitDate Site Technician

07/25/2017 PED108 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.06	c	P
2	Temperature max error	P	4	0.5	6	0.12	c	P
3	Ozone Slope	P	0	1.1	4	0.97661	unitless	P
4	Ozone Intercept	P	0	5	4	0.77925	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
6	Ozone % difference avg	P	7	10	4	1.3	%	P
7	Ozone % difference max	P	7	10	4	1.7	%	P
8	Flow Rate average % difference	P	10	5	3	2.04	%	P
9	Flow Rate max % difference	P	10	5	3	2.04	%	P
10	DAS Voltage average error	P	7	0.003	56	0.0001	V	P
11	Shelter Temperature average error	P	5	2	15	0.41	c	P
12	Shelter Temperature max error	P	5	2	15	0.45	c	P

SiteVisitDate	Site	Technician

07/25/2017

PED108

Sandy Grenville

## **Field Performance Comments**

1 Parameter: Ozone SensorComponent: Cell A Flow CommentCode 99

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

## **Field Systems Comments**

1 Parameter: SitingCriteriaCom

The site is in a clearing in an evergreen plantation in the Prince Edward-Gallion State Forest. Trees were cut within the last 11 years to increase the size of the clearing. The tree line is encroaching again and is between 25 and 35 meters from the site.

2 Parameter: ShelterCleanNotes

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

**Data Compiled:** 7/24/2017 12:46:15 PM

SiteVisitDate Site Technician

07/15/2017 PND165 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	0.48	c	P
3	Wind Speed average error below 5m/s in m/s	P	3	0.5	4	0.05	m/s	P
4	Wind Speed max error below 5m/s in m/s	P	3	0.5	4	0.20	m/s	P
5	Wind Speed average % difference above 5 m/s	P	3	5	4	0.0	%	P
6	Wind Speed max % difference above 5 m/s	P	3	5	4	0.0	%	P
7	Wind Speed Torque average error	P	3	0.5	1	0.30	g-cm	P
8	Wind Speed Torque max error	P	3	0.5	1	0.3	g-cm	P
9	Wind Direction Input Deg True average error (de	P	2	5	4	2.8	degrees	P
10	Wind Direction Input Deg True max error (deg)	P	2	5	4	4	degrees	P
11	Wind Direction Linearity average error (deg)	P	2	5	8	0.7	degrees	P
12	Wind Direction Linearity max error (deg)	P	2	5	8	2	degrees	P
13	Wind Direction Torque average error	P	2	30	1	10	g-cm	P
14	Wind Direction Torque max error	P	2	30	1	10	g-cm	P
15	Temperature average error	P	4	0.5	12	0.20	c	P
16	Temperature max error	P	4	0.5	12	0.30	c	P
17	Relative Humidity average above 85%	P	6	10	3	0.7	%	P
18	Relative Humidity max above 85%	P	6	10	3	0.7	%	P
19	Relative Humidity average below 85%	P	6	10	6	3.6	%	P
20	Relative Humidity max below 85%	P	6	10	6	4.6	%	P
21	Solar Radiation % diff of avg	P	9	10	4	2.6	%	P
22	Solar Radiation % diff of max STD value	P	9	10	4	3.00	%	P
23	Precipitation average % difference	P	1	10	2	4.6	%	P
24	Precipitation max % difference	P	1	10	2	5.6	%	P
25	Ozone Slope	P	0	1.1	4	0.97341	unitless	P
26	Ozone Intercept	P	0	5	4	-0.24393	ppb	P
27	Ozone correlation	P	0	0.995	4	0.99995	unitless	P
28	Ozone % difference avg	P	7	10	4	4.2	%	P
29	Ozone % difference max	P	7	10	4	6.4	%	P
30	Flow Rate average % difference	P	10	5	3	1.31	%	P
31	Flow Rate max % difference	P	10	5	3	1.31	%	P
32	Surface Wetness Response	P	12	0.5	1	1.01		P
33	Shelter Temperature average error	P	5	2	15	0.60	c	P

SiteVisitDate	e Site	Technician				
7/15/2017	PND165	Martin Valvur				
elter '	Temperature may error	p	5	2	15	1 12

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Surface Wetness Manual Test Pass Fail		12	0	1			
2	Shelter Temperature standard deviation		5	0	15			
3	Temperature standard deviation		4	0	12			
4	Temperature2meter Standard Deviation		5	0	3			
5	Precipitation total of % diff		1	0	2			
6	Precipitation total of abs diff mm or in		1	0	2			
7	Precipitation total of DAS mm or in		1	0	2			
8	Precipitation total of equivalent mm or in		1	0	2			
9	DAS Time maximum error		0	5	1			Fail

07/15/2017

PND165

Martin Valvur

### **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.

3 Parameter: Surface Wetness SensorComponent: System Memo CommentCode: 179

This measurement system is damaged and not functioning.

### **Field Systems Comments**

1 Parameter: SiteOpsProcComm

The site operator was unable to meet the audit team during the site audit. Audit data was obtained by reviewing the on-site documentation and from previous audits.

2 Parameter: SitingCriteriaCom

Construction at the bottom of the hill and entrance to the site access road has been completed.

3 Parameter: ShelterCleanNotes

The shelter is well maintained.

4 Parameter: MetSensorComme

The RH sensor is now mounted in a shield. Both the RH and temperature sensors are mounted above the shelter. The surface wetness sensor is no longer functioning and always indicates a wet response.

**Data Compiled:** 8/29/2017 6:09:49 PM

SiteVisitDate Site Technician

08/08/2017 ROM206 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	15	0.15	c	P
2	Temperature max error	P	4	0.5	15	0.22	c	P
3	Ozone Slope	P	0	1.1	4	0.99240	unitless	P
4	Ozone Intercept	P	0	5	4	-0.04905	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99998	unitless	P
6	Ozone % difference avg	P	7	10	4	1.0	%	P
7	Ozone % difference max	P	7	10	4	2.4	%	P
8	Flow Rate average % difference	P	10	5	8	0.77	%	P
9	Flow Rate max % difference	P	10	5	8	0.99	%	P
10	DAS Voltage average error	P	7	0.003	7	0.0001	V	P
11	Shelter Temperature average error	P	5	2	15	0.84	c	P
12	Shelter Temperature max error	P	5	2	15	0.99	c	P

08/08/2017

**ROM206** 

Martin Valvur

### **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: SiteOpsProcComm

The Noy analyzer has a blinking "fault" light and the message "system service" is displayed.

2 Parameter: ShelterCleanNotes

The shelter is clean, neat, and well organized. There are signs of previous roof leaks, but they have been repaired. The floor and counter top have been replaced.

3 Parameter: MetSensorComme

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

Data Compiled:

8/29/2017 5:38:25 PM

SiteVisitDate Site Technician

08/01/2017 ROM406 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.35	c	P
2	Temperature2meter max error	P	5	0.5	3	0.37	c	P
3	Ozone Slope	P	0	1.1	4	0.96260	unitless	P
4	Ozone Intercept	P	0	5	4	-0.14012	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99997	unitless	P
6	Ozone % difference avg	P	7	10	4	4.7	%	P
7	Ozone % difference max	P	7	10	4	7.2	%	P
8	Flow Rate average % difference	P	10	5	9	1.17	%	P
9	Flow Rate max % difference	P	10	5	9	1.28	%	P
10	DAS Voltage average error	P	4	0.003	56	0.0002	V	P
11	Shelter Temperature average error	P	5	2	6	1.62	c	P
12	Shelter Temperature max error	P	5	2	6	1.86	c	P

SiteVisitDate	Site	Technician

08/01/2017

ROM406

Martin Valvur

## **Field Systems Comments**

1 Parameter: DasComments

Only RH, temperature, and AMoN are mounted on the meteorological tower at approximately 2 meters.

2 Parameter: ShelterCleanNotes

The shelter is clean, neat, organized, and well maintained.

3 Parameter: MetSensorComme

The recorded temperature is being measured at 2.5 meters above the ground and < 1 foot above the AMoN enclosure.

Data Compiled:

10/9/2017 6:35:47 PM

SiteVisitDate Site Technician

09/07/2017 SAN189 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	12	0.06	c	P
2	Temperature max error	P	4	0.5	12	0.13	c	P
3	Ozone Slope	P	0	1.1	4	0.93780	unitless	P
4	Ozone Intercept	P	0	5	4	-2.35573	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99979	unitless	P
6	Ozone % difference avg	P	7	10	4	11.6	%	Fail
7	Ozone % difference max	P	7	10	4	16.9	%	Fail
8	Flow Rate average % difference	P	10	5	2	0.78	%	P
9	Flow Rate max % difference	P	10	5	2	1.01	%	P
10	DAS Voltage average error	P	7	0.003	49	0.0001	V	P
11	Shelter Temperature average error	P	5	2	15	0.75	c	P
12	Shelter Temperature max error	P	5	2	15	1.11	c	P

SiteVisitDate	Site	Technician

09/07/2017

SAN189

Martin Valvur

## **Field Systems Comments**

Parameter: ShelterCleanNotes

The shelter is in very good condition, however somewhat cluttered.

Data Compiled: 7/27

7/27/2017 5:07:50 PM

SiteVisitDate	Site	Technician
07/18/2017	SHE604	Martin Valvur

### Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.56	c	Fail
2	Temperature2meter max error	P	5	0.5	3	0.83	c	Fail
3	Wind Speed average error below 5m/s in m/s	P	3	0.5	4	0.22	m/s	P
4	Wind Speed max error below 5m/s in m/s	P	3	0.5	4	0.40	m/s	P
5	Wind Speed average % difference above 5 m/s	P	3	5	4	0.8	%	P
6	Wind Speed max % difference above 5 m/s	P	3	5	4	1.2	%	P
7	Wind Speed Torque average error	P	3	0.5	1	0.30	g-cm	P
8	Wind Speed Torque max error	P	3	0.5	1	0.3	g-cm	P
9	Wind Direction Input Deg True average error (de	P	2	5	4	2.0	degrees	P
10	Wind Direction Input Deg True max error (deg)	P	2	5	4	5	degrees	P
11	Relative Humidity average above 85%	P	6	10	2	6.0	%	P
12	Relative Humidity max above 85%	P	6	10	2	6.0	%	P
13	Relative Humidity average below 85%	P	6	10	4	0.6	%	P
14	Relative Humidity max below 85%	P	6	10	4	0.7	%	P
15	Solar Radiation % diff of avg	P	9	10	12	0.80	%	P
16	Solar Radiation % diff of max STD value	P	9	10	12	1.7	%	P
17	Precipitation average % difference	P	1	10	2	5.4	%	P
18	Precipitation max % difference	P	1	10	2	7.2	%	P
19	Flow Rate average % difference	P	10	5	4	1.36	%	P
20	Flow Rate max % difference	P	10	5	4	2.37	%	P

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter Standard Deviation		5	0	3			
2	Precipitation total of % diff		1	0	2			
3	Precipitation total of abs diff mm or in		1	0	2			
4	Precipitation total of DAS mm or in		1	0	2			
5	Precipitation total of equivalent mm or in		1	0	2			
6	DAS Time maximum error		0	5	1			Fail

07/18/2017

SHE604

Martin Valvur

### **Field Performance Comments**

1 Parameter: Wind Speed SensorComponent: Prop or Cups Cond CommentCode: 146

One set screw is stripped.

### **Field Systems Comments**

1 Parameter: DasComments

The site power source is solar and wind with battery storage. The NEMA enclosure has a cooling fan.

2 Parameter: SiteOpsProcedures

observations of current meteorological measurements are recorded on a hardcopy checklist for ARS and not on the SSRF.

3 Parameter: DocumentationCo

The site operator received a disc with the 2013 QAPP, operating procedures, and HASP which is kept at his office. A hard copy BLM check list developed by ARS is completed and sent to ARS each week.

4 Parameter: SitingCriteriaCom

The site is located in range land. There is an active rail line with coal trains within one kilometer of the site.

5 Parameter: ShelterCleanNotes

NEMA enclosure, solar power

6 Parameter: PollAnalyzerCom

The dry deposition filter pack enclosure is not the standard "pot" size as at the other CASTNET sites. The diameter is much smaller. It is not clear if this will impact particle collection efficiency.

7 Parameter: MetSensorComme

The site is a small footprint solar powered site that has been operating as part of the WARMS network for 10 years. Objects violate the 45 degree rule for the tipping bucket rain gage. Temperature and RH are measured with a combined sensor that cannot be immersed making a temperature audit difficult. The temperature and RH are being measured at 2.5 meters above the ground.

8 Parameter: MetOpMaintCom

The accuracy of the DAS was not tested with a voltage source since there were no available test channels.

**Data Compiled:** 10/8/2017 9:08:33 PM

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SiteVisitDate Site Technician

08/29/2017 THR422 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.11	c	P
2	Temperature2meter max error	P	5	0.5	3	0.15	c	P
3	Ozone Slope	P	0	1.1	4	0.95995	unitless	P
4	Ozone Intercept	P	0	5	4	-0.27325	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99995	unitless	P
6	Ozone % difference avg	P	7	10	4	5.2	%	P
7	Ozone % difference max	P	7	10	4	5.8	%	P
8	Flow Rate average % difference	P	10	5	9	0.22	%	P
9	Flow Rate max % difference	P	10	5	9	0.33	%	P
10	DAS Voltage average error	P	7	0.003	56	0.0001	V	P
11	Shelter Temperature average error	P	5	2	18	1.93	c	P
12	Shelter Temperature max error	P	5	2	18	2.17	c	Fail

08/29/2017

**THR422** 

Martin Valvur

### **Field Performance Comments**

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

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

### **Field Systems Comments**

1 Parameter: SiteOpsProcedures

The ozone sample train does not have a means to introduce test gas at the sample inlet. Results of routine zero, span, precision, and any multipoint calibration checks are maintained by the state personnel who perform the tests.

2 Parameter: SitingCriteriaCom

The site is located 200 meters from an interstate rest area, and 300 meters from interstate 94. The rest area can have parked and idling vehicles for extended periods.

3 Parameter: ShelterCleanNotes

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

4 Parameter: PollAnalyzerCom

The ozone analyzer is operated by the state of North Dakota. The sample train contains a glass manifold. There is no means to introduce on-site generated test gas at the sample inlet. A through-the-probe audit was conducted using the EEMS system.

**Data Compiled:** 10/15/2017 3:29:55 PM

SiteVisitDate Site Technician

09/28/2017 UND002 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	3	0.17	c	P
2	Temperature max error	P	4	0.5	3	0.19	c	P
3	Flow Rate average % difference	P	10	5	4	1.47	%	P
4	Flow Rate max % difference	P	10	5	4	2.03	%	P

SiteVisitDate	Site	Technician

09/28/2017

UND002

Eric Hebert

## **Field Systems Comments**

1 Parameter: DasComments

Single tower with filer pack mounted at 10 meters and temperature mounted at 9 meters.

2 Parameter: DocumentationCo

Although there is no CASTNET logbook present onsite, the site operator records CASTNET information in the VT Monitoring Coop logbook.

3 Parameter: ShelterCleanNotes

Small footprint site with no shelter. Equipment housed in enclosure on sample tower.

**Data Compiled:** 10/8/2017 9:06:50 PM

SiteVisitDate Site Technician

09/01/2017 VOY413 Martin Valvur

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.38	c	P
2	Temperature2meter max error	P	5	0.5	3	0.52	c	Fail
3	Ozone Slope	P	0	1.1	4	1.03949	unitless	P
4	Ozone Intercept	P	0	5	4	-0.12822	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
6	Ozone % difference avg	P	7	10	4	3.5	%	P
7	Ozone % difference max	P	7	10	4	4.2	%	P
8	Flow Rate average % difference	P	10	5	9	0.33	%	P
9	Flow Rate max % difference	P	10	5	9	0.33	%	P
10	DAS Voltage average error	P	15	0.003	49	0.0001	V	P
11	Shelter Temperature average error	P	5	2	18	0.73	c	P
12	Shelter Temperature max error	P	5	2	18	0.80	c	P

09/01/2017

VOY413

Martin Valvur

### **Field Systems Comments**

1 Parameter: DasComments

The sample tower itself is not grounded, however it is bolted to the shelter which is grounded.

2 Parameter: DocumentationCo

Correctly completing the general observations section of the SSRF on the day of filter installation was discussed with the operator.

3 Parameter: SitingCriteriaCom

The site is located at the top of a hill in a forest. There are trees surrounding the site which are below the tower height.

4 Parameter: ShelterCleanNotes

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

5 Parameter: PollAnalyzerCom

There are no trees violating the 22.5 degree cone above the ozone sample inlet. However, there is a communication tower which is above the 22.5 degree threshold.

Data Compiled:

8/6/2017 4:57:25 PM

SiteVisitDate Site Technician

07/18/2017 VPI120 Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	9	0.21	c	P
2	Temperature max error	P	4	0.5	9	0.43	c	P
3	Ozone Slope	P	0	1.1	4	0.99078	unitless	P
4	Ozone Intercept	P	0	5	4	0.53153	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	P
6	Ozone % difference avg	P	7	10	4	0.6	%	P
7	Ozone % difference max	P	7	10	4	1.2	%	P
8	Flow Rate average % difference	P	10	5	3	0.67	%	P
9	Flow Rate max % difference	P	10	5	3	0.67	%	P
10	DAS Voltage average error	P	7	0.003	56	0.0000	V	P
11	Shelter Temperature average error	P	5	2	15	0.99	c	P
12	Shelter Temperature max error	P	5	2	15	1.64	c	P

SiteVisitDate	Site	Technician

07/18/2017

VPI120

Sandy Grenville

# **Field Systems Comments**

1 Parameter: SitingCriteriaCom

The site is on a wooded hillside. The temperature sensor and sample inlet are at the tree tops of the downhill trees. The uphill tree line is 30 meters away.

2 Parameter: ShelterCleanNotes

The shelter is clean, neat, and well organized.

**Data Compiled:** 10/15/2017 3:11:36 PM

SiteVisitDate Site Technician

09/27/2017 WFM105 Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	12	0.18	c	P
2	Temperature max error	P	4	0.5	12	0.44	c	P
3	Flow Rate average % difference	P	10	5	3	1.42	%	P
4	Flow Rate max % difference	Р	10	5	3	1.64	%	P

SiteVisitDate	Site	Technician

09/27/2017

WFM105

Eric Hebert

### **Field Systems Comments**

1 Parameter: DasComments

Single tower, with filter pack at 10 meters and temperature at 9 meters.

2 Parameter: DocumentationCo

There is no logbook present to record the status of the site equipment, calibration information, or filter information.

3 Parameter: SitingCriteriaCom

The site is located at the Atmospheric Science Research Center (ASRC) operated by the NY University (SUNY) system.

4 Parameter: ShelterCleanNotes

Small footprint site with no shelter. Equipment housed in enclosure on sample tower.

## **EEMS Spot Report**

**Data Compiled:** 8/29/2017 6:44:06 PM

SiteVisitDate Site Technician

08/16/2017 YEL408 Martin Valvur

#### Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.17	c	P
2	Temperature2meter max error	P	5	0.5	3	0.26	c	P
3	Ozone Slope	P	0	1.1	4	0.99392	unitless	P
4	Ozone Intercept	P	0	5	4	-0.33439	ppb	P
5	Ozone correlation	P	0	0.995	4	0.99998	unitless	P
6	Ozone % difference avg	P	7	10	4	2.0	%	P
7	Ozone % difference max	P	7	10	4	4.7	%	P
8	Flow Rate average % difference	P	10	5	3	0.57	%	P
9	Flow Rate max % difference	P	10	5	3	1.03	%	P
10	DAS Voltage average error	P	11	0.003	49	0.0001	V	P
11	Shelter Temperature average error	P	5	2	18	0.74	c	P
12	Shelter Temperature max error	P	5	2	18	1.07	c	P

08/16/2017

YEL408

Martin Valvur

### **Field Systems Comments**

1 Parameter: SiteOpsProcComm

Gloves are not used to handle the filter pack.

**2 Parameter:** SiteOpsProcedures

The ozone inlet filter is replaced and the system is leak tested every two weeks.

3 Parameter: SitingCriteriaCom

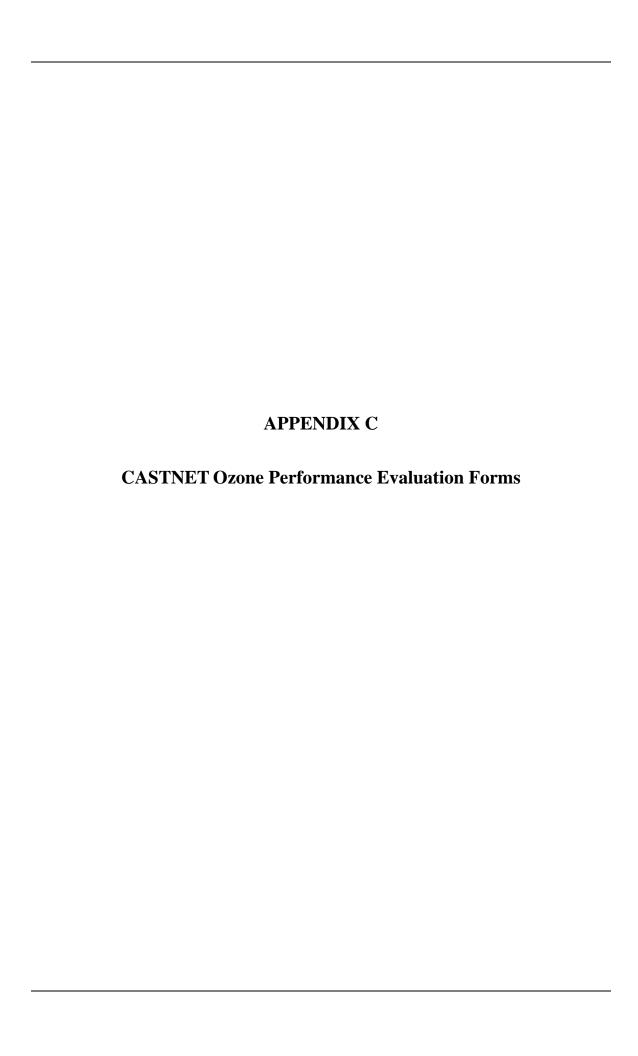
The site is located at the edge of a tree line. Trees as tall as 8 meters are near the sample inlet. Trees taller than 10 meters are 15 meters from the inlet.

4 Parameter: ShelterCleanNotes

The shelter is organized and well maintained.

5 Parameter: MetOpMaintCom

The recorded temperature is now being measured at approximately 2 meters above the ground.



Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
KEF	112-Sandy	Grenville-08/16/2017				
1	8/16/2017	DAS	Campbell	000414	CR3000	2537
2	8/16/2017	Ozone	ThermoElectron Inc	000728	49i A1NAA	1105347306
3	8/16/2017	Ozone Standard	ThermoElectron Inc	000432	49i A3NAA	CM08200008
4	8/16/2017	Zero air pump	Werther International	06922	C 70/4	000836217

Mfg	Serial Number Ta	Site	Technician	ı	Site Visit	Date Parame	eter Owner ID	
ThermoElectron Inc	1105347306	KEF112	Sandy Gre	/ Grenville 08/16/2017		Ozone	000728	
Intercept 1.	99672 Slope: 07383 Intercept 99998 CorrCoff	0.00000 0.00000 0.00000	Serial Number		51711217		rameter ozone er Desc. Ozone primary stan	
A Avg % Diff: A Ma		6Dif A Max %		-4		/21/2017 Corr		
2.4%	5.1%		Cert D	ate	3/	(21/2017 Corr	Coff 1.00000	
UseDescription primary primary primary primary	ConcGroup  1 2 3 4	Tfer Raw 0.00 15.00 34.85 68.04	Tfer Corr -0.45 14.50 34.30 67.41	0. 15 35	.24 <sub>1</sub>	Site Unit ppb ppb ppb	5.10% 2.19% 1.60%	
primary	5	110.06	109.32			ppb ppb	0.62%	
Sensor Component	Sample Train		Condition Good		,-	Status	pass	
Sensor Component	22.5 degree rule		Condition			Status	pass	
Sensor Component	Inlet Filter Condition	n	Condition Clean			Status	pass	
Sensor Component		Condition N/A			Status	pass		
Sensor Component	Sensor Component Offset			)		Status	pass	
Sensor Component	Span		Condition 1.011			Status	pass	
Sensor Component	Zero Voltage		Condition N/A			Status	pass	
Sensor Component	Fullscale Voltage		Condition N/A			Status	pass	
Sensor Component	Cell A Freq.		Condition 92.6 kHz			Status	pass	
Sensor Component	Cell A Noise		Condition 0.9 p	pb		Status	pass	
Sensor Component	Cell A Flow		Condition 0.0 lp	m		Status	Fail	
Sensor Component	Cell A Pressure		Condition 683.0	) mmHg		Status	pass	
Sensor Component	Cell A Tmp.		Condition 37.6	С		Status	pass	
Sensor Component	Cell B Freq.		Condition 89.8	kHz		Status	pass	
Sensor Component	Cell B Noise		Condition 0.8 p	pb		Status	pass	
Sensor Component	Cell B Flow		Condition 0.72	lpm		Status	pass	
Sensor Component	ensor Component Cell B Pressure			ondition 682.7 mmHg			pass	
Sensor Component	Cell B Tmp.			ndition			pass	
Sensor Component	Line Loss	Condition Not to	ndition Not tested			pass		
Sensor Component	System Memo		Condition				pass	

### **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Ozone	KEF112	Sandy Grenville	08/16/2017	Cell A Flow	ThermoElectron	4128		

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

Site	Visit Date	Parameter Mfg		Owner ID Model Number		Serial Number
MKC	G113-Sandy	y Grenville-08/17/2017				
1	8/17/2017	DAS	Campbell	000404	CR3000	2521
2	8/17/2017	Ozone	ThermoElectron Inc	000703	49i A1NAA	1030244805
3	8/17/2017	Ozone Standard	ThermoElectron Inc	000374	49i A3NAA	0726124694
4	8/17/2017	Zero air pump	Werther International	06937	C 70/4	000821896

Mfg S	erial Number Ta	Site	Technic	cian	Site Visit Date	Paramet	ter Owner ID	
ThermoElectron Inc	1030244805	MKG113	Sandy (	Grenville	08/17/2017	Ozone	000703	
Intercept 0.9	98678 Slope: 92740 Intercept 99993 CorrCoff	0.00000	Seri	al Number	ThermoElectron 517112175 01111		rameter ozone er Desc. Ozone primary stan	
DAS 1: A Avg % Diff: A Ma 1.1%	DAS 2: AX % Di	6Dif A Max (		oe t Date	1.0025			
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Si	te Sit	e Unit	PctDifference	
primary	1	0.03	-0.42	0.0	1.1			
primary	2	15.57	15.07	15.	1.1		0.20%	
primary primary	3 4	34.99 68.00	34.44 67.37	35. 67.	1.1		3.54%	
primary	5	110.29	109.55	109	11		-0.21%	
Sensor Component	Sample Train		Condition G	ood		Status	pass	
Sensor Component			Condition			Status		
Sensor Component	Inlet Filter Condition	n	<b>Condition</b> Cl	lean		Status	pass	
Sensor Component	Battery Backup		<b>Condition</b> N	/A		Status	pass	
Sensor Component	Offset		Condition 0.	10		Status	pass	
Sensor Component	Span		Condition 1.	010		Status	pass	
Sensor Component	Zero Voltage		<b>Condition</b> N	/A		Status	pass	
Sensor Component	Fullscale Voltage		<b>Condition</b> N	/A		Status	pass	
Sensor Component	Cell A Freq.		Condition 97	7.3 kHz		Status	pass	
Sensor Component	Cell A Noise		Condition 0.	9 ppb		Status	pass	
Sensor Component	Cell A Flow		Condition 1.	42 lpm		Status	Fail	
Sensor Component	Cell A Pressure		Condition 70	01.3 mmHg		Status	pass	
Sensor Component	Cell A Tmp.		Condition 33	3.46 C		Status	pass	
Sensor Component	Cell B Freq.		Condition 87	7.9 kHz		Status	pass	
Sensor Component	Cell B Noise		Condition 0.	7 ppb		Status	pass	
Sensor Component	Cell B Flow		Condition 0.	0 lpm		Status	Fail	
Sensor Component	Cell B Pressure		Condition 70	01.6 mmHg		Status	pass	
Sensor Component	Cell B Tmp.		Condition			Status	pass	
Sensor Component	Line Loss		<b>Condition</b> No	ot tested		Status	pass	
Sensor Component	System Memo		Condition			Status	pass	

### **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	l Problem			
Ozone MKG113 Sandy Grenville 08/17/2017 Cell B Flow ThermoElectron 3408   This analyzer diagnostic check is outside the manufacturer's recommended value.											
Ozone This analyzer diagnostic	MKG113 check is outside	Sandy Grenville the manufacturer's		Cell A Flow	ThermoElectron	3408					

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
ABT	147-Sandy	Grenville-08/21/2017				
1	8/21/2017	DAS	Campbell	000413	CR3000	2519
2	8/21/2017	Ozone	ThermoElectron Inc	000627	49i A1NAA	1009241772
3	8/21/2017	Ozone Standard	ThermoElectron Inc	000449	49i A3NAA	CM08200025
4	8/21/2017	UPS	APC	06795	RS900	unknown
5	8/21/2017	Zero air pump	Werther International	06930	P 70/4	000829168

Mfg S	erial Number Ta	Site	Technicia	ı	Site Visi	it Date Parame	eter Owner ID	
ThermoElectron Inc 1	1009241772	ABT147 Sandy 0		enville	08/21/2017 Ozor		000627	
Intercept 0.4 CorrCoff 0.9  DAS 1:	98064 Slope: 18616 Intercept 99999 CorrCoff  DAS 2:	0.00000 Mfg 0.00000 Serial Nur Tfer ID Slope			ThermoE 5171121 01111		rameter ozone er Desc. Ozone primary stan ccept 0.45870	
A Avg % Diff: A Ma	<b>x % Di</b> A Avg % 1.6%	6Dif A Max %	Cert D	ate	3	3/21/2017 Corr	*Coff 1.00000	
UseDescription primary primary primary primary primary primary	ConcGroup  1 2 3 4 5	Tfer Raw 0.14 15.00 35.00 68.03 110.00	Tfer Corr -0.31 14.50 34.45 67.40 109.26	0. 14 34 66 107	.65 .31 .30	Site Unit ppb ppb ppb ppb ppb	PctDifference  1.03% -0.41% -1.63% -1.34%	
Sensor Component			Condition Good	d ————————————————————————————————————		Status		
Sensor Component			Condition			Status		
Sensor Component		Condition Clea			Status			
Sensor Component Battery Backup			Condition Not f	unctioning	]	Status		
Sensor Component			Condition 0.20	_		Status		
Sensor Component			Condition 0.99	/		Status		
Sensor Component			Condition N/A			Status		
Sensor Component			Condition N/A			Status		
Sensor Component	Cell A Freq.		Condition 82.2 kHz			Status	pass	
Sensor Component	Cell A Noise		Condition 0.8 p	pb		Status	pass	
<b>Sensor Component</b>	Cell A Flow		Condition 0.69	lpm		Status	pass	
Sensor Component	Cell A Pressure		Condition 715.9	9 mmHg		Status	pass	
Sensor Component	Cell A Tmp.		Condition 33.6	С		Status	pass	
Sensor Component	Cell B Freq.		Condition 88.1	kHz		Status	pass	
Sensor Component	Cell B Noise		Condition 0.4 p	pb		Status	pass	
Sensor Component	Cell B Flow		Condition 0.66	lpm		Status	pass	
Sensor Component	ensor Component Cell B Pressure			ested		Status	pass	
Sensor Component	nsor Component Cell B Tmp.			ndition			pass	
Sensor Component	Line Loss	Condition Not t	ndition Not tested			pass		
Sensor Component	System Memo		Condition			Status	pass	

Site	Visit Date	Parameter Mfg		Owner ID	Model Number	Serial Number
NPT	006-Martir	ı Valvur-08/22/2017				
1	8/22/2017	DAS	Campbell	none	CR850	28381
2	8/22/2017	Ozone	ThermoElectron Inc	000612	49i A1NAA	1009241779
3	8/22/2017	Ozone Standard	ThermoElectron Inc	000448	49i A3NAA	CM08200024
4	8/22/2017	Zero air pump	Werther International	000626	PC 70/4	000815300

Network   Netw	Mfg Se	erial Number Ta	Site	Technician			Site Visit Date Parame			eter	Owner ID	
Intercept	ThermoElectron Inc 1	009241779	NPT006	Martin Valvur			08/22/20	017	Ozone		000612	
A Avg % Diff: A Max % Di	Intercept -0.3	0433 Intercept	0.00000	)	Serial Number			49CPS-70008-364 <b>Tfe</b>				an
UseDescription					Slope			1.00466	Inter	cept	0.01298	8
UseDescription   ConcGroup   Tfer Raw   Tfer Corr   Site   Site Unit   PctDifference   primary   1   0.19   0.17   0.06   ppb			6Dif A Max 9	% Di	Cert Da	te		1/1/2017	Corr	Coff	1.00000	0
primary			Tfor Dow	Tfor	Com	C	ta	Cita	Linit	DotDiff.	Faman aa	
primary   2   15.44   15.35   14.80   ppb   -3.58%   primary   3   36.89   36.70   35.50   ppb   -3.27%   primary   4   66.39   66.06   64.49   ppb   -2.38%   primary   5   107.32   106.80   104.80   ppb   -1.87%	•	ConcGroup							Unit	PCIDII	ierence	
primary 4 66.39 66.06 64.49 ppb -2.38% primary 5 107.32 106.80 104.80 ppb -2.38% primary 5 107.32 106.80 104.80 ppb -1.87%  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 Sensor Component Offset Condition 0.10 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 57.1 kHz Status Fail Sensor Component Cell A Flow Condition 0.68 lpm Status pass Sensor Component Cell A Pressure Condition 675.1 mmHg Status pass Sensor Component Cell B Freq. Condition 675.1 mmHg Status pass Sensor Component Cell B Freq. Condition 89.5 kHz Status pass Sensor Component Cell B Freq. Condition 675.1 mmHg Status pass Sensor Component Cell B Freq. Condition 675.1 mmHg Status pass Sensor Component Cell B Freq. Condition 675.1 mmHg Status pass Sensor Component Cell B Freq. Condition 675.1 mmHg Status pass Sensor Component Cell B Freq. Condition 675.1 mmHg Status pass Sensor Component Cell B Freq. Condition 675.1 mmHg Status pass Sensor Component Cell B Freq. Condition 674.5 mmHg Status pass Sensor Component Cell B Freq. Condition 674.5 mmHg Status pass		2									-3.58%	
Primary   5   107.32   106.80   104.80   ppb   -1.87%	primary	3	36.89	36.	.70	35	.50	ppb			-3.27%	
Sensor Component Sample Train  Condition Good  Status pass  Sensor Component 22.5 degree rule  Condition  Condition  Condition  Condition  Clean  Status pass  Sensor Component  Inlet Filter Condition  Condition  Clean  Status pass  Sensor Component  Sensor Component  Sensor Component  Span  Condition  Condition  Inlet Filter Condition  N/A  Status pass  Sensor Component  Span  Condition  Sensor Component  Span  Condition  Inlet Filter								ppb				
Sensor Component         22.5 degree rule         Condition         Status         pass           Sensor Component         Inlet Filter Condition         Condition         Clean         Status         pass           Sensor Component         Battery Backup         Condition         N/A         Status         pass           Sensor Component         Offset         Condition         0.10         Status         pass           Sensor Component         Span         Condition         I.019         Status         pass           Sensor Component         Zero Voltage         Condition         N/A         Status         pass           Sensor Component         Fullscale Voltage         Condition         N/A         Status         pass           Sensor Component         Cell A Freq.         Condition         57.1 kHz         Status         Fail           Sensor Component         Cell A Noise         Condition         0.6 ppb         Status         pass           Sensor Component         Cell A Pressure         Condition         675.1 mmHg         Status         pass           Sensor Component         Cell B Noise         Condition         0.9 ppb         Status         pass           Sensor Component         Cell B Pressure	primary	5	107.32			104	.80	ppb			-1.87%	
Sensor Component         Inlet Filter Condition         Condition         Clean         Status         pass           Sensor Component         Battery Backup         Condition         N/A         Status         pass           Sensor Component         Offset         Condition         0.10         Status         pass           Sensor Component         Span         Condition         1.019         Status         pass           Sensor Component         Zero Voltage         Condition         N/A         Status         pass           Sensor Component         Fullscale Voltage         Condition         N/A         Status         pass           Sensor Component         Cell A Freq.         Condition         57.1 kHz         Status         Fail           Sensor Component         Cell A Flow         Condition         0.6 ppb         Status         pass           Sensor Component         Cell A Flow         Condition         675.1 mmHg         Status         pass           Sensor Component         Cell A Tmp.         Condition         36.6 C         Status         pass           Sensor Component         Cell B Freq.         Condition         0.9 ppb         Status         pass           Sensor Component         Cell B Frow <td><b>Sensor Component</b></td> <td>Sample Train</td> <td></td> <td>Condition</td> <td>Good</td> <td></td> <td></td> <td></td> <td>Status</td> <td>pass</td> <td></td> <td></td>	<b>Sensor Component</b>	Sample Train		Condition	Good				Status	pass		
Sensor Component       Battery Backup       Condition       N/A       Status       pass         Sensor Component       Offset       Condition       0.10       Status       pass         Sensor Component       Span       Condition       I.019       Status       pass         Sensor Component       Zero Voltage       Condition       N/A       Status       pass         Sensor Component       Fullscale Voltage       Condition       N/A       Status       pass         Sensor Component       Cell A Freq.       Condition       57.1 kHz       Status       Fail         Sensor Component       Cell A Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       675.1 mmHg       Status       pass         Sensor Component       Cell B Treq.       Condition       89.5 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.68 lpm       Status       pass         Sensor Component       Cell B Flow       Condition       674.5 mmHg       Status       pass         Sensor Component       Cell B Trp.       Condition       674.5 mmHg       Status       pass	Sensor Component	22.5 degree rule		Conditio	on				Status	pass		
Sensor Component       Offset       Condition       0.10       Status       pass         Sensor Component       Span       Condition       1.019       Status       pass         Sensor Component       Zero Voltage       Condition       N/A       Status       pass         Sensor Component       Fullscale Voltage       Condition       N/A       Status       pass         Sensor Component       Cell A Freq.       Condition       57.1 kHz       Status       Fail         Sensor Component       Cell A Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.68 lpm       Status       pass         Sensor Component       Cell A Tmp.       Condition       89.5 kHz       Status       pass         Sensor Component       Cell B Freq.       Condition       0.9 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.68 lpm       Status       pass         Sensor Component       Cell B Fressure       Condition       674.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Ondition       Status       Pass	Sensor Component	Inlet Filter Conditio	Conditio	ion Clean				Status	ıs pass			
Sensor Component       Span       Condition       1.019       Status       pass         Sensor Component       Zero Voltage       Condition       N/A       Status       pass         Sensor Component       Fullscale Voltage       Condition       N/A       Status       pass         Sensor Component       Cell A Freq.       Condition       57.1 kHz       Status       Fail         Sensor Component       Cell A Flow       Condition       0.6 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       675.1 mmHg       Status       pass         Sensor Component       Cell A Tmp.       Condition       36.6 C       Status       pass         Sensor Component       Cell B Freq.       Condition       0.9 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.68 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       674.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Condition       Status       pass	<b>Sensor Component</b>	Battery Backup	Conditio	n 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       57.1 kHz       Status       Fail         Sensor Component       Cell A Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       675.1 mmHg       Status       pass         Sensor Component       Cell A Tmp.       Condition       36.6 C       Status       pass         Sensor Component       Cell B Freq.       Condition       89.5 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.9 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       674.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Condition       Status       pass	Sensor Component	Offset	Conditio	on 0.10				Status	pass			
Sensor Component       Fullscale Voltage       Condition       N/A       Status       pass         Sensor Component       Cell A Freq.       Condition       57.1 kHz       Status       Fail         Sensor Component       Cell A Noise       Condition       0.6 ppb       Status       pass         Sensor Component       Cell A Flow       Condition       0.68 lpm       Status       pass         Sensor Component       Cell A Tmp.       Condition       36.6 C       Status       pass         Sensor Component       Cell B Freq.       Condition       89.5 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.9 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       674.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass	Sensor Component	Span		Conditio	n 1.019				Status	pass		
Sensor ComponentCell A Freq.Condition57.1 kHzStatusFailSensor ComponentCell A NoiseCondition0.6 ppbStatuspassSensor ComponentCell A FlowCondition0.68 lpmStatuspassSensor ComponentCell A PressureCondition675.1 mmHgStatuspassSensor ComponentCell A Tmp.Condition36.6 CStatuspassSensor ComponentCell B Freq.Condition89.5 kHzStatuspassSensor ComponentCell B NoiseCondition0.9 ppbStatuspassSensor ComponentCell B FlowCondition0.68 lpmStatuspassSensor ComponentCell B PressureCondition674.5 mmHgStatuspassSensor ComponentCell B Tmp.ConditionStatuspass	Sensor Component	Zero Voltage		Condition	Condition N/A				Status	pass		
Sensor ComponentCell A NoiseCondition0.6 ppbStatuspassSensor ComponentCell A FlowCondition0.68 lpmStatuspassSensor ComponentCell A PressureCondition675.1 mmHgStatuspassSensor ComponentCell A Tmp.Condition36.6 CStatuspassSensor ComponentCell B Freq.Condition89.5 kHzStatuspassSensor ComponentCell B NoiseCondition0.9 ppbStatuspassSensor ComponentCell B FlowCondition0.68 lpmStatuspassSensor ComponentCell B PressureCondition674.5 mmHgStatuspassSensor ComponentCell B Tmp.ConditionStatuspass	Sensor Component	Fullscale Voltage		Condition N/A				Status	pass			
Sensor ComponentCell A FlowCondition0.68 lpmStatuspassSensor ComponentCell A PressureCondition675.1 mmHgStatuspassSensor ComponentCell A Tmp.Condition36.6 CStatuspassSensor ComponentCell B Freq.Condition89.5 kHzStatuspassSensor ComponentCell B NoiseCondition0.9 ppbStatuspassSensor ComponentCell B FlowCondition0.68 lpmStatuspassSensor ComponentCell B PressureCondition674.5 mmHgStatuspassSensor ComponentCell B Tmp.ConditionStatuspass	Sensor Component	Cell A Freq.		Conditio	Condition 57.1 kHz				Status	Fail		
Sensor Component       Cell A Pressure       Condition       675.1 mmHg       Status       pass         Sensor Component       Cell A Tmp.       Condition       36.6 C       Status       pass         Sensor Component       Cell B Freq.       Condition       89.5 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.9 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.68 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       674.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass	Sensor Component	Cell A Noise		Conditio	0.6 pp	b			Status	pass		
Sensor ComponentCell A Tmp.Condition36.6 CStatuspassSensor ComponentCell B Freq.Condition89.5 kHzStatuspassSensor ComponentCell B NoiseCondition0.9 ppbStatuspassSensor ComponentCell B FlowCondition0.68 lpmStatuspassSensor ComponentCell B PressureCondition674.5 mmHgStatuspassSensor ComponentCell B Tmp.ConditionStatuspass	Sensor Component	Cell A Flow		Conditio	0.68 l	om			Status	pass		
Sensor Component       Cell B Freq.       Condition       89.5 kHz       Status       pass         Sensor Component       Cell B Noise       Condition       0.9 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.68 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       674.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass	<b>Sensor Component</b>	Cell A Pressure		Conditio	on 675.1	mmHg			Status	pass		
Sensor Component       Cell B Noise       Condition       0.9 ppb       Status       pass         Sensor Component       Cell B Flow       Condition       0.68 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       674.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass	Sensor Component	Cell A Tmp.		Conditio	on 36.6 (	)			Status	pass		
Sensor Component       Cell B Flow       Condition       0.68 lpm       Status       pass         Sensor Component       Cell B Pressure       Condition       674.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass	<b>Sensor Component</b>	Cell B Freq.		Conditio	on 89.5 k	Hz			Status	pass		
Sensor Component       Cell B Pressure       Condition       674.5 mmHg       Status       pass         Sensor Component       Cell B Tmp.       Condition       Status       pass	Sensor Component	Cell B Noise		Conditio	0.9 pp	b			Status	pass		
Sensor Component Cell B Tmp. Condition Status pass	Sensor Component	Cell B Flow				om			Status	s pass		
	Sensor Component	Cell B Pressure	Conditio	on 674.5	mmHg			Status	pass			
Sensor Component Line Loss Condition Not tested Status pass	Sensor Component	Cell B Tmp.	Conditio	ion				Status	ıs pass			
	Sensor Component	Line Loss		Conditio	ion Not tested				Status	ıs pass		
Sensor Component System Memo Condition Status pass	Sensor Component	System Memo		Conditio	on				Status	pass		

### **Site Visit Comments**

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	d Problem
Ozone	NPT006	Martin Valvur	08/22/2017	Cell A Freq.	ThermoElectron	3362		

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