2017 – 3rd 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:

environmental engineering
& measurement services, inc.

1128 NW 39th 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_2 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	Orientation Accuracy	Parallel to alignment rod/crossarm, or sighted to distant point	≤ ±5° from degrees true
Wind Direction	Linearity	Eight cardinal points on test fixture	≤ ±5° mean absolute error
Wind Direction	Response Threshold	Starting torque tested with torque gauge	< 10 g-cm Climatronics; < 20 g-cm R.M. Young

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

Side ID	**Network**	**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.

APPENDIX A

CASTNET Audit Report Forms

Site Inventory by Site Visit

Site Visit Date		**Parameter**	**Mfg**	**Owner ID**	**Model Number**	**Serial Number**
PND165-Martin 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	B	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

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
Apex	illegible	PND165	Martin Valvur	07/15/2017	Flow Rate	000549

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

DAS 1:

A Avg % Diff:	**A Max % Di**
1.31%	1.31%

DAS 2:

A Avg %Dif	**A Max % Di**

Cal Factor Zero -0.04
Cal Factor Full Scale 0.94
Rotometer Reading: 3.45

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.01	0.000	-0.03	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.000	-0.03	l/m	l/m	
primary	test pt 1	3.057	3.050	3.03	0.000	3.01	l/m	l/m	-1.31%
primary	test pt 2	3.060	3.050	3.03	0.000	3.01	l/m	l/m	-1.31%
primary	test pt 3	3.062	3.050	3.04	0.000	3.01	l/m	l/m	-1.31%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	225 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241791	PND165	Martin Valvur	07/15/2017	Ozone	000619

Slope:	0.97341	**Slope:**	0.00000
Intercept	-0.24393	**Intercept**	0.00000
CorrCoff	0.99995	**CorrCoff**	0.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
4.2%	6.4%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00466	**Intercept**	0.01298
Cert Date	1/1/2017	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.23	0.21	0.55	ppb	
primary	2	15.63	15.54	14.55	ppb	-6.37%
primary	3	34.69	34.51	33.08	ppb	-4.14%
primary	4	63.81	63.50	61.29	ppb	-3.48%
primary	5	110.92	110.39	107.50	ppb	-2.62%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	-0.60	**Status**	pass
Sensor Component	Span	**Condition**	1.033	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	100.7 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.8 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.0 lpm	**Status**	Fail
Sensor Component	Cell A Pressure	**Condition**	568.0 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	35.7 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	92.5 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.4 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.0 lpm	**Status**	Fail
Sensor Component	Cell B Pressure	**Condition**	567.4 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Wind Speed Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
RM Young	39243wsp	PND165	Martin Valvur	07/15/2017	Wind Speed	00853

Mfg	RM Young	**Parameter**	wind speed
Serial Number	CA4353	**Tfer Desc.**	wind speed motor (h
Tfer ID	01457		
Slope	1.00000	**Intercept**	0.00000
Cert Date	4/13/2017	**CorrCoff**	1.00000

Prop or Cups SN 54461

Prop or Cups Torque 0.3 **to** 0.3

Prop Correction Fact 0.0512

	DAS 1:		**DAS 2:**	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	0.05	0.00%		
Abs Max Er	0.20	0.00%		

UseDescription:	Input Device	Input RPM	Input m/s	Out V	DAS m/s	Diff/ %Diff	Diff	WsM
primary	none	0	0.20	0.0	0.0		-0.20	
primary	01457	200	1.02	0.0	1.0		0.00	
primary	01457	400	2.05	0.0	2.1		0.00	
primary	01457	800	4.10	0.0	4.1		0.00	
primary	01457	1200	6.14	0.0	6.1	0.00%		
primary	01457	2400	12.29	0.0	12.3	0.00%		
primary	01457	4000	20.48	0.0	20.5	0.00%		
primary	01457	9400	48.13	0.0	48.1	0.00%		

Sensor Component	Condition	**Condition**	Good	**Status**	pass
Sensor Component	Prop or Cups Condition	**Condition**	Good	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	Torque	**Condition**		**Status**	pass
Sensor Component	Sensor Plumb	**Condition**	Plumb	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Wild Direction Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	39243wdr	PND165	Martin Valvur	07/15/2017	Wind Direction	00853

Mfg	RM Young	**Parameter**	wind direction
Serial Number		**Tfer Desc.**	wind direction wheel
Tfer ID	01266		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/1/2006	**CorrCoff**	1.00000
Mfg	Ushikata	**Parameter**	wind direction
Serial Number	190037	**Tfer Desc.**	transit
Tfer ID	01265		
Slope	1.00000	**Intercept**	0.00000
Cert Date	2/8/2017	**CorrCoff**	1.00000

Vane SN: N/A **C. A. Align. deg. true:** 181

VaneTorque 10 **to** 10

	DAS 1:		DAS 2:	
	Orientation	Linearity:	Orientation	Linearity:
Abs Avg Err	2.8	0.7		
Abs Max Er	4	2		

UseDescription	TferID	Input Raw	Linearity	Output V	Output Deg.	Difference	Change	Error
primary	01266	0	☑	0.000	2	2	46.3	1.3
primary	01266	45	☑	0.000	47	2	44.6	###########
primary	01266	90	☑	0.000	93	2	45.6	###########
primary	01266	135	☑	0.000	137	2	44.4	###########
primary	01266	180	☑	0.000	180	0	43.4	###########
primary	01266	225	☑	0.000	226	1	45.5	0.5
primary	01266	270	☑	0.000	271	0	44.7	###########
primary	01266	315	☑	0.000	316	1	45.5	0.5
primary	01265	1	☐	0.000	4	3		3
primary	01265	91	☐	0.000	95	4		4
primary	01265	181	☐	0.000	180	1		1
primary	01265	271	☐	0.000	274	3		3

Sensor Component	Condition	**Condition**	Good	**Status**	pass
Sensor Component	Mast	**Condition**	Good	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	Sensor Plumb	**Condition**	Plumb	**Status**	pass
Sensor Component	Torque	**Condition**		**Status**	pass
Sensor Component	Vane Condition	**Condition**	Good	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	14800	PND165	Martin Valvur	07/15/2017	Temperature	06539

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

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.20	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
primary	Temp Mid Range	24.29	24.26	0.000	24.27	C	0.01
primary	Temp High Range	47.52	47.49	0.000	47.77	C	0.28

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

2 Meter Temperature Data Form

Calc. Difference

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
RM Young	12544	PND165	Martin Valvur	07/15/2017	Temperature2meter	06305

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

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.21	0.48		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	0.07	0.04	0.000	0.52	C	0.48
primary	Temp Mid Rang	24.29	24.26	0.000	24.18	C	-0.08
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
Sensor Component	Blower	**Condition**	Functioning	**Status**	pass
Sensor Component	Blower Status Switch	**Condition**	N/A	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Humidity Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	Z4320017	PND165	Martin Valvur	07/15/2017	Relative Humidity	05026

Mfg	Rotronic	**Parameter**	Relative Humidity
Serial Number	75296	**Tfer Desc.**	GTL
Tfer ID	01220		
Slope	0.99780	**Intercept**	0.06850
Cert Date	1/23/2017	**CorrCoff**	0.99994

	DAS 1:		DAS 2:	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	3.6	0.7		
Abs Max Er	4.6	0.7		

UseDesc.	Test type	Device	Input RH	GTL Raw	RH Corr.	DAS Volts	DAS %RH	Difference
primary	RH Low Range	GTL	32.8	31.7	32.8	0.000	30.2	-2.6
primary	RH Low Range	GTL	52.9	50.3	52.9	0.000	48.3	-4.6
primary	RH High Range	GTL	93.6	88.9	93.6	0.000	92.9	-0.7

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

Solar Radiation Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Licor	PY77051	PND165	Martin Valvur	07/15/2017	Solar Radiation	missing

Mfg Eppley

Parameter solar radiation

Serial Number 23824

Tfer Desc. SR transfer sensor

Tfer ID 01247

Slope 1.00000

Intercept 0.00000

Cert Date 2/16/2017

CorrCoff 1.00000

DAS 1:		DAS 2:	
% Diff of Avg	%Diff of Max	%Diff of Avg	%Diff of Max
2.6%	3.0%	0.0%	0.0%

UseDescription	Measure Date	MeasureTime	Tfer Raw	Tfer Corr	DAS w/m2	PctDifference
primary	7/15/2017	12:00	880	880	906	3.0%
primary	7/15/2017	13:00	558	558	550	-1.5%
primary	7/15/2017	14:00	123	122	96	-21.1%
primary	7/15/2017	15:00	266	266	226	-14.9%

Sensor Component		Condition		Status	
Sensor Component	Sensor Clean	Condition	Clean	Status	pass
Sensor Component	Sensor Level	Condition	Level	Status	pass
Sensor Component	Properly Sited	Condition	Properly sited	Status	pass
Sensor Component	System Memo	Condition		Status	pass

Precipitation Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Texas Electronics	59576-414	PND165	Martin Valvur	07/15/2017	Precipitation	none

Mfg PMP

Parameter Precipitation

Serial Number None

Tfer Desc. 250ml graduate

Tfer ID 01249

Slope 1.00000

Intercept 0.00000

Cert Date 4/26/2013

CorrCoff 1.00000

DAS 1:

DAS 2:

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
4.6%	5.6%		

UseDesc.	Test type	TferVolume	Iteration	TimePerTip	Eq.Ht	DAS eng	Eq.HtUnit	OSE Unit	TferUnits	PctDifference
primary	test 1	250	1	8 - 10 sec	0.54	0.51	in	in	ml	-5.6%
primary	test 2	250	2	8 - 10 sec	0.54	0.52	in	in	ml	-3.7%

Sensor Component	Properly Sited	**Condition**	Properly sited	**Status**	pass
Sensor Component	Gauge Drain Screen	**Condition**	Installed	**Status**	pass
Sensor Component	Funnel Clean	**Condition**	Clean	**Status**	pass
Sensor Component	Condition	**Condition**	Good	**Status**	pass
Sensor Component	Gauge Screen	**Condition**	Installed	**Status**	pass
Sensor Component	Gauge Clean	**Condition**	Clean	**Status**	pass
Sensor Component	Level	**Condition**	Level	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Surface Wetness Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	none	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	**CorrCoff**	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

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

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	PND165	Martin Valvur	07/15/2017	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.60	1.12

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Fluke

Parameter Shelter Temperatur

Serial Number 3275143

Tfer Desc. RTD

Tfer ID 01229

Slope 1.00006

Intercept 0.03191

Cert Date 1/23/2017

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	25.64	25.61	0.000	26.7	C	1.12
primary	Temp Mid Range	26.90	26.87	0.000	27.1	C	0.2
primary	Temp Mid Range	27.12	27.09	0.000	27.6	C	0.47

Sensor Component System Memo

Condition

Status pass

Infrastructure Data For

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

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8810 (s/n 2149-22)	640 cuft

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

Site Visit Comments

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

Field Systems Data Form

F-02058-1500-S1-rev002

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

Site Sponsor (agency)	EPA	**USGS Map**		Fremont Lake South
Operating Group	Private / BLM	**Map Scale**		
AQS #	56-035-9991	**Map Date**		
Meteorological Type	R.M. Young			
Air Pollutant Analyzer	Ozone	**QAPP Latitude**		42.9214
Deposition Measurement	dry, wet	**QAPP Longitude**		-109.7900
Land Use	range	**QAPP Elevation Meters**		2388
Terrain	complex	**QAPP Declination**		12.75
Conforms to MLM	Marginally	**QAPP Declination Date**		2/22/2006
Site Telephone	(307) 367-6584	**Audit Latitude**		42.929031
Site Address 1	Skyline Drive	**Audit Longitude**		-109.787796
Site Address 2	Fremont Lake Rd.	**Audit Elevation**		2386
County	Sublette	**Audit Declination**		10.9
City, State	Pinedale, WY		**Present**	
Zip Code	82941	**Fire Extinguisher**	☑	New in 2015
Time Zone	Mountain	**First Aid Kit**	☑	
Primary Operator		**Safety Glasses**	☐	
Primary Op. Phone #		**Safety Hard Hat**	☑	
Primary Op. E-mail		**Climbing Belt**	☑	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

Shelter Working Room ☑ **Make** Ekto **Model** 8810 (s/n 2149-22) **Shelter Size** 640 cuft

Shelter Clean ☑ **Notes** The shelter is well maintained.

Site OK ☑ **Notes**

Driving Directions 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.

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		☑

Siting Distances OK ☑

Siting Criteria Comment

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

Field Systems Data Form F-02058-1500-S3-rev002

Site ID 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?	☑	

Provide any additional 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 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-S4-rev002

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

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

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

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID PND165

Technician Martin Valvur

Site Visit Date 07/15/2017

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

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

Site operation procedures

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

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

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

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

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

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

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

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

Site operation procedures

1	Is the filter pack being changed every Tuesday as scheduled?	☑	Filter changed afternoons approximately 80%
2	Are the Site Status Report Forms being completed and filed correctly?	☑	
3	Are data downloads and backups being performed as scheduled?	☐	No longer required
4	Are general observations being made and recorded? How?	☑	SSRF
5	Are site supplies on-hand and replenished in a timely fashion?	☑	
6	Are sample flow rates recorded? How?	☑	SSRF, call-in
7	Are samples sent to the lab on a regular schedule in a timely fashion?	☑	
8	Are filters protected from contamination during handling and shipping? How?	☑	
9	Are the site conditions reported regularly to the field operations manager or staff?	☑	

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

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

The 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
Infrastructure	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	B	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

BAS601-Martin Valvur-07/17/2017

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
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

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	unknown1	BAS601	Martin Valvur	07/17/2017	DAS	Primary

Das Date: 7 /17/2017
Das Time: 7:00:00
Das Day: 198

Audit Date 7 /17/2017
Audit Time 7:00:00
Audit Day 198

Low Channel:

High Channel:

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

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

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

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Omega	318559-1	BAS601	Martin Valvur	07/17/2017	Flow Rate	none

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

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
3.98%	4.90%		

Cal Factor Zero	0.298
Cal Factor Full Scale	0.993
Rotometer Reading:	0

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	0.30	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.30	l/m	l/m	
primary	test pt 1	3.129	3.120	0.00	0.000	3.27	l/m	l/m	4.90%
primary	test pt 2	3.172	3.160	0.00	0.000	3.28	l/m	l/m	3.70%
primary	test pt 3	3.179	3.170	0.00	0.000	3.28	l/m	l/m	3.34%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Poor	**Status**	Fail
Sensor Component	Rotometer Condition	**Condition**	N/A	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	6.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	-3.0 cm	**Status**	Fail
Sensor Component	Filter Azimuth	**Condition**	30 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1214552973	BAS601	Martin Valvur	07/17/2017	Ozone	L0534684

Slope:	0.99633	**Slope:**	0.00000
Intercept	0.22520	**Intercept**	0.00000
CorrCoff	1.00000	**CorrCoff**	0.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
0.5%	1.5%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00466	**Intercept**	0.01298
Cert Date	1/1/2017	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.25	0.23	0.55	ppb	
primary	2	15.26	15.17	15.39	ppb	1.45%
primary	3	37.23	37.04	36.98	ppb	-0.16%
primary	4	63.29	62.98	62.88	ppb	-0.16%
primary	5	110.21	109.68	109.60	ppb	-0.07%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	-0.4	**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**	0.6 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	System Memo	**Condition**		**Status**	pass

Wind Speed Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	W4806	BAS601	Martin Valvur	07/17/2017	Wind Speed	W4806

Mfg	RM Young	**Parameter**	wind speed
Serial Number		**Tfer Desc.**	wind speed motor (l
Tfer ID	01261		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/26/2017	**CorrCoff**	1.00000
Mfg	RM Young	**Parameter**	wind speed
Serial Number	CA4353	**Tfer Desc.**	wind speed motor (h
Tfer ID	01457		
Slope	1.00000	**Intercept**	0.00000
Cert Date	4/13/2017	**CorrCoff**	1.00000

Prop or Cups SN N/A

Prop or Cups Torque 0.4 **to** 0.4

Prop Correction Fact N/A

	DAS 1:		DAS 2:	
	Low Range	High Range	Low Range	High Range
Abs Avg Err	0.18	1.03%		
Abs Max Er	0.30	2.61%		

UseDescription:	Input Device	Input RPM	Input m/s	Out V	DAS m/s	Diff/ %Diff	Diff	WsM
primary	none	0	0.20	0.0	0.0		-0.20	
primary	01261	40	1.67	0.0	1.7		-0.02	
primary	01261	80	2.75	0.0	2.5		-0.30	
primary	01261	140	4.26	0.0	4.5		0.19	
primary	01261	210	6.07	0.0	6.1	-0.33%		
primary	01457	400	11.11	0.0	11.2	1.17%		
primary	01457	800	22.22	0.0	21.6	-2.61%		
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	**Condition**		**Status**	pass
Sensor Component	Sensor Plumb	**Condition**	Plumb	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Wind Direction Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	M5198	BAS601	Martin Valvur	07/17/2017	Wind Direction	none

Mfg RM Young **Parameter** wind direction
Serial Number **Tfer Desc.** wind direction wheel
Tfer ID 01266
Slope 1.00000 **Intercept** 0.00000
Cert Date 1/1/2006 **CorrCoff** 1.00000

Mfg Ushikata **Parameter** wind direction
Serial Number 190037 **Tfer Desc.** transit
Tfer ID 01265
Slope 1.00000 **Intercept** 0.00000
Cert Date 2/8/2017 **CorrCoff** 1.00000

Vane SN: N/A **C. A. Align. deg. true:** 182
VaneTorque 5 **to** 5

	DAS 1: Orientation	DAS 1: Linearity:	DAS 2: Orientation	DAS 2: Linearity:
Abs Avg Err	1.8			
Abs Max Er	3			

UseDescription	TferID	Input Raw	Linearity	Output V	Output Deg.	Difference	Change	Error
primary	01265	2	☐	0.000	2	0		0
primary	01265	92	☐	0.000	91	1		1
primary	01265	182	☐	0.000	179	3		3
primary	01265	272	☐	0.000	269	3		3

Sensor Component		Condition		Status	
Sensor Component	Condition	**Condition**	Good	**Status**	pass
Sensor Component	Mast	**Condition**	Good	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	Sensor Plumb	**Condition**	Plumb	**Status**	pass
Sensor Component	Torque	**Condition**	Good	**Status**	pass
Sensor Component	Vane Condition	**Condition**	Good	**Status**	pass
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	C2410012	BAS601	Martin Valvur	07/17/2017	Temperature2meter	none

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

DAS 1: Abs Avg Err	DAS 1: Abs Max Er	DAS 2: Abs Avg Err	DAS 2: Abs Max Er
2.31	3.17		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	4.50	4.47	0.000	7.20	C	2.73
primary	Temp Mid Rang	24.50	24.47	0.000	25.50	C	1.03
primary	Temp High Rang	42.70	42.67	0.000	39.50	C	-3.17

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	**Condition**	N/A	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Humidity Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	C2410012	BAS601	Martin Valvur	07/17/2017	Relative Humidity	none

Mfg	Rotronic	**Parameter**	Relative Humidity
Serial Number	75296	**Tfer Desc.**	GTL
Tfer ID	01220		
Slope	0.99780	**Intercept**	0.06850
Cert Date	1/23/2017	**CorrCoff**	0.99994

	DAS 1:		DAS 2:	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	1.3	7.4		
Abs Max Er	1.4	7.4		

UseDesc.	Test type	Device	Input RH	GTL Raw	RH Corr.	DAS Volts	DAS %RH	Difference
primary	RH Low Range	GTL	32.8	32.6	32.8	0.000	31.4	-1.4
primary	RH Low Range	GTL	52.9	52.4	52.9	0.000	51.8	-1.1
primary	RH High Range	GTL	93.6	89.5	93.6	0.000	86.2	-7.4

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

Precipitation Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	T15382	BAS601	Martin Valvur	07/17/2017	Precipitation	T15382

Mfg	PMP	**Parameter**	Precipitation
Serial Number	None	**Tfer Desc.**	250ml graduate
Tfer ID	01249		
Slope	1.00000	**Intercept**	0.00000
Cert Date	4/26/2013	**CorrCoff**	1.00000

DAS 1:

DAS 2:

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
9.7%	14.5%		

UseDesc.	Test type	TferVolume	Iteration	TimePerTip	Eq.Ht	DAS eng	Eq.HtUnit	OSE Unit	TferUnits	PctDifference
primary	test 1	250	1	8 - 10 sec	7.67	6.56	mm	mm	ml	-14.5%
primary	test 2	250	2	13 - 15 sec	7.67	7.11	mm	mm	ml	-7.3%
primary	test 3	250	3	13 - 15 sec	7.67	7.11	mm	mm	ml	-7.3%

Sensor Component	Properly Sited	**Condition**	Properly sited	**Status**	pass
Sensor Component	Gauge Drain Screen	**Condition**	Installed	**Status**	pass
Sensor Component	Funnel Clean	**Condition**	Clean	**Status**	pass
Sensor Component	Condition	**Condition**	Good	**Status**	pass
Sensor Component	Gauge Screen	**Condition**	Installed	**Status**	pass
Sensor Component	Gauge Clean	**Condition**	Clean	**Status**	pass
Sensor Component	Level	**Condition**	Level	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Solar Radiation Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
Licor	PY47987	BAS601	Martin Valvur	07/17/2017	Solar Radiation	none

Mfg Eppley

Parameter solar radiation

Serial Number 23824

Tfer Desc. SR transfer sensor

Tfer ID 01247

Slope 1.00000

Intercept 0.00000

Cert Date 2/16/2017

CorrCoff 1.00000

DAS 1:		**DAS 2:**	
% Diff of Avg	**%Diff of Max**	**%Diff of Avg**	**%Diff of Max**
2.5%	4.4%	0.0%	0.0%

UseDescription	Measure Date	MeasureTime	Tfer Raw	Tfer Corr	DAS w/m2	PctDifference
primary	7/17/2017	7:00	443	443	453	2.2%
primary	7/17/2017	8:00	621	621	624	0.5%
primary	7/17/2017	9:00	793	793	783	-1.2%
primary	7/17/2017	10:00	893	893	862	-3.5%
primary	7/17/2017	11:00	959	958	920	-4.0%
primary	7/17/2017	12:00	985	985	942	-4.4%
primary	7/17/2017	13:00	809	809	783	-3.2%

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
unknown	none	BAS601	Martin Valvur	07/17/2017	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
2.16	2.72

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Fluke

Parameter Shelter Temperatur

Serial Number 3275143

Tfer Desc. RTD

Tfer ID 01229

Slope 1.00006

Intercept 0.03191

Cert Date 1/23/2017

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	27.41	27.38	0.000	30.1	C	2.72
primary	Temp Mid Range	28.89	28.86	0.000	30.4	C	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

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

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

Sensor Component	Sample Tower Type	**Condition**	Other	**Status**	pass
Sensor Component	Conduit	**Condition**	Good	**Status**	pass
Sensor Component	Met Tower	**Condition**	Good	**Status**	pass
Sensor Component	Moisture Trap	**Condition**	Not installed	**Status**	pass
Sensor Component	Power Cables	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Temp Control	**Condition**	Functioning	**Status**	pass
Sensor Component	Rotometer	**Condition**	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.	Hazard	Problem
Flow Rate	BAS601	Martin Valvur	07/17/2017	Filter Depth	Omega	3806	☐	☑

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.

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Ozone	BAS601	Martin Valvur	07/17/2017	Cell A Tmp.	ThermoElectron	3802	☐	☐

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:** 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

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

Site Sponsor (agency)	EPA	**USGS Map**	
Operating Group	BLM	**Map Scale**	
AQS #	56-003-0002	**Map Date**	
Meteorological Type			
Air Pollutant Analyzer		**QAPP Latitude**	
Deposition Measurement		**QAPP Longitude**	
Land Use		**QAPP Elevation Meters**	
Terrain		**QAPP Declination**	
Conforms to MLM		**QAPP Declination Date**	
Site Telephone		**Audit Latitude**	44.279947
Site Address 1		**Audit Longitude**	-108.04082
Site Address 2		**Audit Elevation**	1241
County	Big Horn	**Audit Declination**	10.3
City, State	Basin, WY		

			Present	
Zip Code	82410	**Fire Extinguisher**	☐	
Time Zone	Mountain	**First Aid Kit**	☐	
Primary Operator		**Safety Glasses**	☐	
Primary Op. Phone #		**Safety Hard Hat**	☐	
Primary Op. E-mail		**Climbing Belt**	☐	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

Shelter Working Room ☐ **Make** Shelter One **Model** AR 263648 **Shelter Size** 24 cuft

Shelter Clean ☑ **Notes** The enclosure houses the ozone, DAS, and MFC only.

Site OK ☐ **Notes**

Driving Directions

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

Site Sponsor (agency) EPA **USGS Map**

Operating Group BLM **Map Scale**

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

Shelter Working Room ☐ **Make** **Model** **Shelter Size**

Shelter Clean ☐ **Notes**

Site OK ☐ **Notes**

Driving Directions

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		☑

Siting Distances OK ☑

Siting Criteria Comment

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

Siting Distances OK ☐

Siting Criteria Comment

Field Systems Data Form

F-02058-1500-S3-rev002

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

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?	☐	Pointing 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)	☑	
6	Is the solar radiation sensor plumb?	☑	
7	Is it sited to avoid shading, or any artificial or reflected light?	☑	
8	Is the rain gauge plumb?	☑	
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	☐	45 degree rule violation
10	Is the surface wetness sensor sited with the grid surface facing north?	☑	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:

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.

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

1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	☐	
2	Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind)	☐	

3 Are the tower and sensors plumb? ☐

4 Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? ☐

5 Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) ☐

6 Is the solar radiation sensor plumb? ☐

7 Is it sited to avoid shading, or any artificial or reflected light? ☐

8 Is the rain gauge plumb? ☐

9 Is it sited to avoid sheltering effects from buildings, trees, towers, etc? ☐

10 Is the surface wetness sensor sited with the grid surface facing north? ☐

11 Is it inclined approximately 30 degrees? ☐

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID 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?	☑	N/A
5	Is the solar radiation sensor's lens clean and free of scratches?	☑	
6	Is the surface wetness sensor grid clean and undamaged?	☑	N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	☑	
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	☑	

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

The 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.

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 from the elements and well maintained?**	☐	

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

Field Systems Data Form

F-02058-1500-S5-rev002

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

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 15 meters
4	Describe dry dep sample tube.		3/8 nylon by 15 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☐	Not present
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☐	Not present

Provide any additional 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

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☐	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☐	
3	Describe ozone sample tube.		
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?	☐	

Provide any additional 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 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?	☐	Not present
4	Are the signal connections protected from the weather and well maintained?	☑	
5	Are the signal leads connected to the correct DAS channel?	☑	
6	Are the DAS, sensor translators, and shelter properly grounded?	☑	
7	Does the instrument shelter have a stable power source?	☑	
8	Is the instrument shelter temperature controlled?	☑	

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

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

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? ☐

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

11 Tower comments?

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

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

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

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

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

Documentation

Field Systems Data Form

F-02058-1500-S8-rev002

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

Site operation procedures

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

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

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

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

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

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

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

The ozone inlet filter is replaced each month.

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

Field Systems Data Form

F-02058-1500-S9-rev002

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

Site operation procedures

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

QC Check Performed		Frequency	Compliant
Multi-point MFC Calibrations	☑	Semiannually	☑
Flow System Leak Checks	☑	Weekly	☑
Filter Pack Inspection	☐		☐
Flow Rate Setting Checks	☑	Weekly	☑
Visual Check of Flow Rate Rotometer	☐	Not present	☐
In-line Filter Inspection/Replacement	☑	Semiannually	☑
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 ID BAS601 **Technician** Martin Valvur **Site Visit Date** 07/17/2017

Site operation procedures

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID BAS601 **Technician** Martin Valvur **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

VPI120-Sandy Grenville-07/18/2017

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
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	B	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

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2514	VPI120	Sandy Grenville	07/18/2017	DAS	Primary

Das Date: 7 /18/2017
Das Time: 15:11:02
Das Day: 199

Audit Date 7 /18/2017
Audit Time 15:11:02
Audit Day 199

Low Channel:		High Channel:	
Avg Diff:	**Max Diff:**	**Avg Diff:**	**Max Diff:**
0.0000	0.0001	0.0000	0.0001

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0000	0.0000	V	V	0.0000
7	0.1000	0.0999	0.0999	V	V	0.0000
7	0.3000	0.2997	0.2998	V	V	0.0001
7	0.5000	0.4996	0.4996	V	V	0.0000
7	0.7000	0.6996	0.6996	V	V	0.0000
7	0.9000	0.8994	0.8994	V	V	0.0000
7	1.0000	0.9992	0.9993	V	V	0.0001

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	VPI120	Sandy Grenville	07/18/2017	Flow Rate	000591

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

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

DAS 1:

DAS 2:

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
0.67%	0.67%		

Cal Factor Zero -0.01
Cal Factor Full Scale 0.99
Rotometer Reading: 1.45

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.02	0.000	0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.000	0.00	l/m	l/m	
primary	test pt 1	1.489	1.490	1.51	0.000	1.50	l/m	l/m	0.67%
primary	test pt 2	1.489	1.490	1.51	0.000	1.50	l/m	l/m	0.67%
primary	test pt 3	1.493	1.490	1.51	0.000	1.50	l/m	l/m	0.67%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	180 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241786	VPI120	Sandy Grenville	07/18/2017	Ozone	000628

Slope:	0.99078	**Slope:**	0.00000
Intercept	0.53153	**Intercept**	0.00000
CorrCoff	0.99999	**CorrCoff**	0.00000

DAS 1:

DAS 2:

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
0.6%	1.2%		

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.02	-0.43	0.41	ppb	
primary	2	15.00	14.50	14.68	ppb	1.24%
primary	3	35.11	34.56	34.72	ppb	0.46%
primary	4	68.00	67.37	67.07	ppb	-0.45%
primary	5	110.04	109.30	109.00	ppb	-0.27%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.60	**Status**	pass
Sensor Component	Span	**Condition**	1.007	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	79.1 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.68 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.68 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	664.8 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	37.4 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	85.4 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.68 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.68 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	665.1 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	4037	VPI120	Sandy Grenville	07/18/2017	Temperature	04318

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

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.21	0.43		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.16	0.01	0.000	-0.1	C	-0.08
primary	Temp Mid Range	25.81	25.47	0.000	25.3	C	-0.13
primary	Temp High Range	49.47	48.95	0.000	48.5	C	-0.43

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

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	VPI120	Sandy Grenville	07/18/2017	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.99	1.64

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232734

Tfer Desc. RTD

Tfer ID 01227

Slope 1.00759

Intercept 0.14754

Cert Date 2/4/2017

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	23.53	23.21	0.000	24.9	C	1.64
primary	Temp Mid Range	24.71	24.38	0.000	25.6	C	1.25
primary	Temp Mid Range	27.68	27.32	0.000	27.4	C	0.09

Sensor Component System Memo

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

Site Sponsor (agency)	EPA	**USGS Map**	Eggleston
Operating Group	VA Tech	**Map Scale**	
AQS #	51-071-9991	**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	37.3300
Deposition Measurement	dry, wet	**QAPP Longitude**	-80.5573
Land Use	woodland - mixed	**QAPP Elevation Meters**	920
Terrain	complex	**QAPP Declination**	7.9
Conforms to MLM	No	**QAPP Declination Date**	1/31/2007
Site Telephone		**Audit Latitude**	37.329832
Site Address 1	Mountain Lake Rd.	**Audit Longitude**	-80.55751
Site Address 2	Jefferson National Forest	**Audit Elevation**	920
County	Giles	**Audit Declination**	-7.8

			Present	
City, State	Newport, VA			
Zip Code	24128	**Fire Extinguisher**	☑	New in 2015
Time Zone	Eastern	**First Aid Kit**	☑	
Primary Operator		**Safety Glasses**	☑	
Primary Op. Phone #		**Safety Hard Hat**	☑	
Primary Op. E-mail		**Climbing Belt**	☑	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

Shelter Working Room ☑ **Make** Ekto **Model** 8810 (s/n 2107-3) **Shelter Size** 640 cuft

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

Site OK ☑ **Notes**

Driving Directions 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.

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 Distances OK ☑

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.

Field Systems Data Form

F-02058-1500-S3-rev002

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

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

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

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

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

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

11 Tower comments? Met tower removed

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

Field Systems Data Form

F-02058-1500-S7-rev002

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

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

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

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

Site operation procedures

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

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

Provide any additional 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 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	B	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

Site Visit	Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
SHE604-Martin Valvur-07/18/2017						
1	7/18/2017	DAS	Campbell	49923	CR1000	unknown2
2	7/18/2017	elevation	Elevation	none	none	none
3	7/18/2017	Flow Rate	Omega	none	FMA6518ST-RS232	32433-2
4	7/18/2017	Infrastructure	Infrastructure	none	none	none
5	7/18/2017	Precipitation	Met One	none	370C	N8139
6	7/18/2017	Relative Humidity	Vaisala	none	HMP45AC	C2730121
7	7/18/2017	Sample Tower	Unknown	none	Unknown	None
8	7/18/2017	siting criteria	Siting Criteria	none	none	None
9	7/18/2017	Solar Radiation	Licor	none	LI-200	illegible
10	7/18/2017	Temperature2meter	Vaisala	none	HMP45AC	C2730121
11	7/18/2017	Wind Direction	Met One	none	024	D3050
12	7/18/2017	Wind Speed	Met One	none	014	K2273

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	unknown2	SHE604	Martin Valvur	07/18/2017	DAS	Primary

Das Date:	7 /18/2017	**Audit Date**	7 /18/2017
Das Time:	8:00:00	**Audit Time**	8:00:00
Das Day:	199	**Audit Day**	199

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

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

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

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Omega	32433-2	SHE604	Martin Valvur	07/18/2017	Flow Rate	none

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

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
1.36%	2.37%		

Cal Factor Zero 0.199

Cal Factor Full Scale 1.003

Rotometer Reading: 0

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	0.20	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.20	l/m	l/m	
primary	test pt 1	3.296	3.290	0.00	0.000	3.21	l/m	l/m	-2.37%
primary	test pt 2	3.245	3.240	0.00	0.000	3.21	l/m	l/m	-0.99%
primary	test pt 3	3.236	3.230	0.00	0.000	3.21	l/m	l/m	-0.71%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	N/A	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	3.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Wind Speed Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	K2273	SHE604	Martin Valvur	07/18/2017	Wind Speed	none

Mfg	RM Young	**Parameter**	wind speed
Serial Number		**Tfer Desc.**	wind speed motor (l
Tfer ID	01261		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/26/2017	**CorrCoff**	1.00000
Mfg	RM Young	**Parameter**	wind speed
Serial Number	CA4353	**Tfer Desc.**	wind speed motor (h
Tfer ID	01457		
Slope	1.00000	**Intercept**	0.00000
Cert Date	4/13/2017	**CorrCoff**	1.00000

Prop or Cups SN	N/A		
Prop or Cups Torque	0.3	**to**	0.3
Prop Correction Fact	N/A		

	DAS 1:		DAS 2:	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	0.22	0.83%		
Abs Max Er	0.40	1.17%		

UseDescription:	Input Device	Input RPM	Input m/s	Out V	DAS m/s	Diff/ %Diff	Diff	WsM
primary	none	0	0.20	0.0	0.6		0.40	
primary	01261	40	1.67	0.0	1.6		-0.03	
primary	01261	80	2.75	0.0	2.5		-0.27	
primary	01261	140	4.26	0.0	4.4		0.18	
primary	01261	210	6.07	0.0	6.1	-0.33%		
primary	01457	400	11.11	0.0	11.2	1.17%		
primary	01457	800	22.22	0.0	22.0	-0.81%		
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	**Condition**		**Status**	pass
Sensor Component	Sensor Plumb	**Condition**	Plumb	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Wind Direction Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	D3050	SHE604	Martin Valvur	07/18/2017	Wind Direction	none

Mfg	RM Young	**Parameter**	wind direction
Serial Number		**Tfer Desc.**	wind direction wheel
Tfer ID	01266		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/1/2006	**CorrCoff**	1.00000

Mfg	Ushikata	**Parameter**	wind direction
Serial Number	190037	**Tfer Desc.**	transit
Tfer ID	01265		
Slope	1.00000	**Intercept**	0.00000
Cert Date	2/8/2017	**CorrCoff**	1.00000

Vane SN: N/A

C. A. Align. deg. true: 181

VaneTorque 7 **to** 7

	DAS 1: Orientation	Linearity:	DAS 2: Orientation	Linearity:
Abs Avg Err	2.0			
Abs Max Er	5			

UseDescription	TferID	Input Raw	Linearity	Output V	Output Deg.	Difference	Change	Error
primary	01265	1	☐	0.000	1	0		0
primary	01265	91	☐	0.000	88	3		3
primary	01265	181	☐	0.000	181	0		0
primary	01265	271	☐	0.000	266	5		5

Sensor Component	Condition	**Condition**	Good	**Status**	pass
Sensor Component	Mast	**Condition**	Good	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	Sensor Plumb	**Condition**	Plumb	**Status**	pass
Sensor Component	Torque	**Condition**		**Status**	pass
Sensor Component	Vane Condition	**Condition**	Good	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	C2730121	SHE604	Martin Valvur	07/18/2017	Temperature2meter	none

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

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.56	0.83		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	2.90	2.87	0.000	3.70	C	0.83
primary	Temp Mid Rang	23.50	23.47	0.000	23.60	C	0.13
primary	Temp High Rang	48.77	48.74	0.000	48.01	C	-0.73

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	**Condition**	N/A	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Humidity Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	C2730121	SHE604	Martin Valvur	07/18/2017	Relative Humidity	none

Mfg	Rotronic	**Parameter**	Relative Humidity
Serial Number	75296	**Tfer Desc.**	GTL
Tfer ID	01220		
Slope	0.99780	**Intercept**	0.06850
Cert Date	1/23/2017	**CorrCoff**	0.99994

	DAS 1:		**DAS 2:**	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	0.6	6.0		
Abs Max Er	0.7	6.0		

UseDesc.	Test type	Device	Input RH	GTL Raw	RH Corr.	DAS Volts	DAS %RH	Difference
primary	RH Low Range	GTL	32.8	32.0	32.8	0.000	33.3	0.5
primary	RH Low Range	GTL	52.9	53.6	52.9	0.000	52.2	-0.7
primary	RH High Range	GTL	93.6	95.8	93.6	0.000	87.6	-6.0

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

Solar Radiation Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Licor	illegible	SHE604	Martin Valvur	07/18/2017	Solar Radiation	none

Mfg	Eppley	**Parameter**	solar radiation
Serial Number	23824	**Tfer Desc.**	SR transfer sensor
Tfer ID	01247		
Slope	1.00000	**Intercept**	0.00000
Cert Date	2/16/2017	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
% Diff of Avg	%Diff of Max	%Diff of Avg	%Diff of Max
0.8%	1.7%	0.0%	0.0%

UseDescription	Measure Date	MeasureTime	Tfer Raw	Tfer Corr	DAS w/m2	PctDifference
primary	7/18/2017	8:00	443	443	437	-1.3%
primary	7/18/2017	9:00	611	610	613	0.5%
primary	7/18/2017	10:00	757	756	765	1.2%
primary	7/18/2017	11:00	862	862	877	1.7%

Sensor Component	Sensor Clean	**Condition**	Clean	**Status**	pass
Sensor Component	Sensor Level	**Condition**	Level	**Status**	pass
Sensor Component	Properly Sited	**Condition**	Properly sited	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Precipitation Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
Met One	N8139	SHE604	Martin Valvur	07/18/2017	Precipitation	none

Mfg PMP

Parameter Precipitation

Serial Number None

Tfer Desc. 250ml graduate

Tfer ID 01249

Slope 1.00000

Intercept 0.00000

Cert Date 4/26/2013

CorrCoff 1.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
5.4%	7.2%		

UseDesc.	Test type	TferVolume	Iteration	TimePerTip	Eq.Ht	DAS eng	Eq.HtUnit	OSE Unit	TferUnits	PctDifference
primary	test 1	231.5	1	8 - 10 sec	7.11	7.37	mm	mm	ml	3.7%
primary	test 2	231.5	2	8 - 10 sec	7.11	7.62	mm	mm	ml	7.2%

Sensor Component	Properly Sited	**Condition**	Properly sited	**Status**	pass
Sensor Component	Gauge Drain Screen	**Condition**	Installed	**Status**	pass
Sensor Component	Funnel Clean	**Condition**	Clean	**Status**	pass
Sensor Component	Condition	**Condition**	Good	**Status**	pass
Sensor Component	Gauge Screen	**Condition**	Installed	**Status**	pass
Sensor Component	Gauge Clean	**Condition**	Clean	**Status**	pass
Sensor Component	Level	**Condition**	Level	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Infrastructure Data For

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

Shelter Make	**Shelter Model**	**Shelter Size**

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Wind Speed	SHE604	Martin Valvur	07/18/2017	Prop or Cups Con	Met One	4357	☐	☐

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.

Field Systems Data Form

F-02058-1500-S1-rev002

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

Site Sponsor (agency)	EPA	**USGS Map**	
Operating Group	BLM	**Map Scale**	
AQS #		**Map Date**	
Meteorological Type	Met One		
Air Pollutant Analyzer		**QAPP Latitude**	
Deposition Measurement		**QAPP Longitude**	
Land Use		**QAPP Elevation Meters**	
Terrain		**QAPP Declination**	
Conforms to MLM		**QAPP Declination Date**	
Site Telephone		**Audit Latitude**	44.933601
Site Address 1		**Audit Longitude**	-106.847161
Site Address 2		**Audit Elevation**	1141
County	Sheridan	**Audit Declination**	9.8
City, State	Sheridan, WY	**Present**	
Zip Code	82801	**Fire Extinguisher** ☐	
Time Zone	Mountain	**First Aid Kit** ☐	
Primary Operator		**Safety Glasses** ☐	
Primary Op. Phone #		**Safety Hard Hat** ☐	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Step** ☑	

Shelter Working Room ☐ **Make** **Model** **Shelter Size**

Shelter Clean ☑ **Notes** NEMA enclosure, solar power

Site OK ☐ **Notes**

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

Siting Distances OK ☑

Siting Criteria Comment

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

Field Systems Data Form

F-02058-1500-S3-rev002

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

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

The 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.

Field 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
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?	☑	

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

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

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	N/A
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	N/A
3	Describe ozone sample tube.		N/A
4	Describe dry dep sample tube.		3/8 teflon by 10 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	N/A
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	N/A
8	Are there moisture traps in the sample lines?	☐	Not present
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☐	Not present

Provide any additional 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 as at the other CASTNET sites. The diameter is much smaller. It is not clear if this will impact particle collection efficiency.

Field Systems Data Form

F-02058-1500-S6-rev002

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

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?	☐	Not present
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?	☐	Marginally

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

11 Tower comments?

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☐	Not present	☐
SSRF	☑		☑
Site Ops Manual	☑	2013	☑
HASP	☑	2013	☑
Field Ops Manual	☑	2013	☑
Calibration Reports	☐	Not present	☐
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedul	☐		☐

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

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

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.

Field Systems Data Form

F-02058-1500-S8-rev002

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

Site operation procedures

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

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

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

Site operation procedures

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

QC Check Performed		Frequency	Compliant
Multi-point MFC Calibrations	☑	Semiannually	☑
Flow System Leak Checks	☑	Weekly	☑
Filter Pack Inspection	☐		☐
Flow Rate Setting Checks	☑	Weekly	☑
Visual Check of Flow Rate Rotometer	☐	Not present	☐
In-line Filter Inspection/Replacement	☑	Semiannually	☑
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 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

BUF603-Martin Valvur-07/19/2017

Site Visit Date		*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
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

DAS Data Form

DAS Time Max Error: 5

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	43073	BUF603	Martin Valvur	07/19/2017	DAS	Primary

Das Date: 7 /19/2017
Das Time: 14:08:00
Das Day: 200

Audit Date 7 /19/2017
Audit Time 14:03:00
Audit Day 200

Low Channel:

Avg Diff: 0.0000
Max Diff: 0.0000

High Channel:

Avg Diff: 0.0000
Max Diff: 0.0000

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
4	0.0000	0.0000	0.0000	V	V	0.0000

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Omega	315688-1	BUF603	Martin Valvur	07/19/2017	Flow Rate	none

Mfg Sceptre

SN/Owner ID 295106-12 none

Parameter MFC power supply

Mfg BIOS

Parameter Flow Rate

Serial Number 148613

Tfer Desc. BIOS 220-H

Tfer ID 01421

Slope 1.00153

Intercept 0.00366

Cert Date 1/25/2017

CorrCoff 1.00000

DAS 1:

DAS 2:

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
2.11%	3.38%		

Cal Factor Zero 0.36

Cal Factor Full Scale 0.99

Rotometer Reading: 0

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	0.36	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.36	l/m	l/m	
primary	test pt 1	3.414	3.410	0.00	0.000	3.34	l/m	l/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	3.390	0.00	0.000	3.36	l/m	l/m	-0.86%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	N/A	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	3.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	7.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	180 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Wind Speed Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	1506	BUF603	Martin Valvur	07/19/2017	Wind Speed	none

Mfg	RM Young	**Parameter**	wind speed
Serial Number		**Tfer Desc.**	wind speed motor (l
Tfer ID	01261		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/26/2017	**CorrCoff**	1.00000
Mfg	RM Young	**Parameter**	wind speed
Serial Number	CA4353	**Tfer Desc.**	wind speed motor (h
Tfer ID	01457		
Slope	1.00000	**Intercept**	0.00000
Cert Date	4/13/2017	**CorrCoff**	1.00000

Prop or Cups SN N/A

Prop or Cups Torque 0.2 **to** 0.2

Prop Correction Fact N/A

	DAS 1:		DAS 2:	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	0.19	0.60%		
Abs Max Er	0.30	1.26%		

UseDescription:	Input Device	Input RPM	Input m/s	Out V	DAS m/s	Diff/ %Diff	Diff	WsM
primary	none	0	0.20	0.0	0.5		0.25	
primary	01261	40	1.67	0.0	1.7		-0.02	
primary	01261	80	2.75	0.0	2.5		-0.30	
primary	01261	140	4.26	0.0	4.5		0.19	
primary	01261	210	6.07	0.0	6.1	-0.33%		
primary	01457	400	11.11	0.0	11.3	1.26%		
primary	01457	800	22.22	0.0	22.1	-0.77%		
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	**Condition**		**Status**	pass
Sensor Component	Sensor Plumb	**Condition**	Plumb	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Wind Direction Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	J5555	BUF603	Martin Valvur	07/19/2017	Wind Direction	none

Mfg	RM Young	**Parameter**	wind direction
Serial Number		**Tfer Desc.**	wind direction wheel
Tfer ID	01266		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/1/2006	**CorrCoff**	1.00000

Mfg	Ushikata	**Parameter**	wind direction
Serial Number	190037	**Tfer Desc.**	transit
Tfer ID	01265		
Slope	1.00000	**Intercept**	0.00000
Cert Date	2/8/2017	**CorrCoff**	1.00000

Vane SN: N/A **C. A. Align. deg. true:** 359

VaneTorque 7 **to** 7

	DAS 1: Orientation	DAS 1: Linearity:	DAS 2: Orientation	DAS 2: Linearity:
Abs Avg Err	1.5			
Abs Max Er	3			

UseDescription	TferID	Input Raw	Linearity	Output V	Output Deg.	Difference	Change	Error
primary	01265	89	☐	0.000	92	3		3
primary	01265	179	☐	0.000	178	1		1
primary	01265	269	☐	0.000	269	0		0
primary	01265	359	☐	0.000	2	2		2

Sensor Component	Condition	**Condition**	Good	**Status**	pass
Sensor Component	Mast	**Condition**	Good	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	Sensor Plumb	**Condition**	Plumb	**Status**	pass
Sensor Component	Torque	**Condition**		**Status**	pass
Sensor Component	Vane Condition	**Condition**	Good	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	E3720077	BUF603	Martin Valvur	07/19/2017	Temperature2meter	none

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

DAS 1: Abs Avg Err	DAS 1: Abs Max Er	DAS 2: Abs Avg Err	DAS 2: Abs Max Er
1.62	4.38		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	0.06	0.03	0.000	0.43	C	0.4
primary	Temp Mid Rang	28.40	28.37	0.000	28.30	C	-0.07
primary	Temp High Rang	48.35	48.32	0.000	52.70	C	4.38

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	**Condition**	N/A	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Humidity Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	E3720077	BUF603	Martin Valvur	07/19/2017	Relative Humidity	none

Mfg	Rotronic	**Parameter**	Relative Humidity
Serial Number	75296	**Tfer Desc.**	GTL
Tfer ID	01220		
Slope	0.99780	**Intercept**	0.06850
Cert Date	1/23/2017	**CorrCoff**	0.99994

	DAS 1:		DAS 2:	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	2.4	5.9		
Abs Max Er	3.0	5.9		

UseDesc.	Test type	Device	Input RH	GTL Raw	RH Corr.	DAS Volts	DAS %RH	Difference
primary	RH Low Range	GTL	32.8	31.5	32.8	0.000	31.1	-1.7
primary	RH Low Range	GTL	52.9	51.3	52.9	0.000	49.9	-3.0
primary	RH High Range	GTL	93.6	89.6	93.6	0.000	87.7	-5.9

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

Solar Radiation Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Licor	illegible	BUF603	Martin Valvur	07/19/2017	Solar Radiation	none

Mfg	Eppley	**Parameter**	solar radiation
Serial Number	23824	**Tfer Desc.**	SR transfer sensor
Tfer ID	01247		
Slope	1.00000	**Intercept**	0.00000
Cert Date	2/16/2017	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
% Diff of Avg	**%Diff of Max**	**%Diff of Avg**	**%Diff of Max**
1.2%	0.8%	0.0%	0.0%

UseDescription	Measure Date	MeasureTime	Tfer Raw	Tfer Corr	DAS w/m2	PctDifference
primary	7/19/2017	11:00	942	942	950	0.8%
primary	7/19/2017	12:00	931	931	951	2.1%
primary	7/19/2017	13:00	878	878	884	0.7%

Sensor Component	Sensor Clean	**Condition**	Clean	**Status**	pass
Sensor Component	Sensor Level	**Condition**	Level	**Status**	pass
Sensor Component	Properly Sited	**Condition**	Properly sited	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Precipitation Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
Met One	J7547	BUF603	Martin Valvur	07/19/2017	Precipitation	none

Mfg	PMP	**Parameter**	Precipitation
Serial Number	None	**Tfer Desc.**	250ml graduate
Tfer ID	01249		
Slope	1.00000	**Intercept**	0.00000
Cert Date	4/26/2013	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
1.5%	1.5%		

UseDesc.	Test type	TferVolume	Iteration	TimePerTip	Eq.Ht	DAS eng	Eq.HtUnit	OSE Unit	TferUnits	PctDifference
primary	test 1	231.5	1	20 sec	3.35	3.30	mm	mm	ml	-1.5%
primary	test 2	231.5	2	20 sec	3.35	3.30	mm	mm	ml	-1.5%

Sensor Component	Properly Sited	**Condition**	Properly sited	**Status**	pass
Sensor Component	Gauge Drain Screen	**Condition**	Installed	**Status**	pass
Sensor Component	Funnel Clean	**Condition**	Clean	**Status**	pass
Sensor Component	Condition	**Condition**	Good	**Status**	pass
Sensor Component	Gauge Screen	**Condition**	Installed	**Status**	pass
Sensor Component	Gauge Clean	**Condition**	Clean	**Status**	pass
Sensor Component	Level	**Condition**	Level	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Infrastructure Data For

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

Shelter Make	**Shelter Model**	**Shelter Size**

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Wind Speed	BUF603	Martin Valvur	07/19/2017	Condition	Met One	4361	☐	☐

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

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.

Field Systems Data Form

F-02058-1500-S1-rev002

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

Site Sponsor (agency)	EPA	**USGS Map**		
Operating Group	BLM	**Map Scale**		
AQS #		**Map Date**		
Meteorological Type				
Air Pollutant Analyzer		**QAPP Latitude**		
Deposition Measurement		**QAPP Longitude**		
Land Use		**QAPP Elevation Meters**		
Terrain		**QAPP Declination**		
Conforms to MLM		**QAPP Declination Date**		
Site Telephone		**Audit Latitude**		44.144135
Site Address 1		**Audit Longitude**		-106.108771
Site Address 2		**Audit Elevation**		1320
County	Johnson	**Audit Declination**		9.3
City, State	Buffalo, WY		**Present**	
Zip Code	82834	**Fire Extinguisher**	☐	
Time Zone	Mountain	**First Aid Kit**	☐	
Primary Operator		**Safety Glasses**	☐	
Primary Op. Phone #		**Safety Hard Hat**	☐	
Primary Op. E-mail		**Climbing Belt**	☐	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

Shelter Working Room ☐ **Make** **Model** **Shelter Size**

Shelter Clean ☐ **Notes** NEMA enclosure, 120 VAC power

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

Siting Distances OK ☑

Siting Criteria Comment

Field Systems Data Form

F-02058-1500-S3-rev002

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

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

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

The temperature 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.

Field Systems Data Form

F-02058-1500-S4-rev002

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

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

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

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

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	N/A
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	N/A
3	Describe ozone sample tube.		N/A
4	Describe dry dep sample tube.		3/8 teflon by 10 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	N/A
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	N/A
8	Are there moisture traps in the sample lines?	☐	Not present
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☐	Not present

Provide any additional 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

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

DAS, sensor translators, and peripheral equipment operations and maintenance

1	Do the DAS instruments appear to be in good condition and well maintained?	☑	
2	Are all the components of the DAS operational? (printers, modem, backup, etc)	☑	
3	Do the analyzer and sensor signal leads pass through lightning protection circuitry?	☐	Not present
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?	☑	Marginally

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

11 Tower comments?

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

The NEMA enclosure has a cooling fan.

Field Systems Data Form

F-02058-1500-S7-rev002

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☐	Not present	☐
SSRF	☑		☑
Site Ops Manual	☑	2013	☑
HASP	☑	2013	☑
Field Ops Manual	☑	2013	☑
Calibration Reports	☐	Not present	☐
Ozone z/s/p Control Charts	☐	N/A	☑
Preventive maintenance schedul	☐	Not present	☐

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

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

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

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

Site operation procedures

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

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

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

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

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

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

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

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

Site operation procedures

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

QC Check Performed		Frequency	Compliant
Multi-point MFC Calibrations	☑	Semiannually	☑
Flow System Leak Checks	☑	Weekly	☑
Filter Pack Inspection	☐		☐
Flow Rate Setting Checks	☑	Weekly	☑
Visual Check of Flow Rate Rotometer	☐	Not present	☐
In-line Filter Inspection/Replacement	☑	Semiannually	☑
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 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
CDR119-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	B	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

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	4935	CDR119	Sandy Grenville	07/20/2017	DAS	Primary

Das Date: 7 /20/2017
Audit Date 7 /20/2017
Das Time: 15:57:00
Audit Time 15:57:00
Das Day: 201
Audit Day 201

Low Channel:		High Channel:	
Avg Diff:	**Max Diff:**	**Avg Diff:**	**Max Diff:**
0.0001	0.0001	0.0001	0.0001

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0000	0.0001	V	V	0.0001
7	0.1000	0.0999	0.1000	V	V	0.0001
7	0.3000	0.2997	0.2998	V	V	0.0001
7	0.5000	0.4996	0.4997	V	V	0.0001
7	0.7000	0.6995	0.6996	V	V	0.0001
7	0.9000	0.8994	0.8995	V	V	0.0001
7	1.0000	0.9993	0.9994	V	V	0.0001

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	54747	CDR119	Sandy Grenville	07/20/2017	Flow Rate	000660

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

DAS 1: **DAS 2:**

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
1.09%	1.31%		

Cal Factor Zero -0.006

Cal Factor Full Scale 1.005

Rotometer Reading: 1.55

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.00	l/m	l/m	
primary	test pt 1	1.530	1.530	1.50	0.000	1.51	l/m	l/m	-1.31%
primary	test pt 2	1.533	1.530	1.50	0.000	1.51	l/m	l/m	-1.31%
primary	test pt 3	1.527	1.520	1.50	0.000	1.51	l/m	l/m	-0.66%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	3
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	120 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
ThermoElectron Inc	1009241790	CDR119	Sandy Grenville	07/20/2017	Ozone	000623

Slope:	0.97705	**Slope:**	0.00000
Intercept	0.99177	**Intercept**	0.00000
CorrCoff	0.99996	**CorrCoff**	0.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
1.6%	3.7%		

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.03	-0.42	1.01	ppb	
primary	2	14.90	14.40	14.93	ppb	3.68%
primary	3	34.77	34.22	34.21	ppb	-0.03%
primary	4	67.95	67.32	66.33	ppb	-1.47%
primary	5	110.00	109.26	108.10	ppb	-1.06%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**	See comments	**Status**	Fail
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.3	**Status**	pass
Sensor Component	Span	**Condition**	0.993	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	87.0 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.7 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.69 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	713.0 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	37.5 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	88.3 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.7 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.70 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	713.3 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	4546	CDR119	Sandy Grenville	07/20/2017	Temperature	04448

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

DAS 1: Abs Avg Err	DAS 1: Abs Max Er	DAS 2: Abs Avg Err	DAS 2: Abs Max Er
0.18	0.27		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.30	0.15	0.000	0.1	C	-0.05
primary	Temp Mid Range	25.63	25.29	0.000	25.5	C	0.21
primary	Temp High Range	49.58	49.06	0.000	48.8	C	-0.27

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

Shelter Temperature Data For

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
Campbell	none	CDR119	Sandy Grenville	07/20/2017	Shelter Temperature	none

DAS 1:

Abs Avg Err	**Abs Max Er**
0.18	0.35

DAS 2:

Abs Avg Err	**Abs Max Er**

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	31.27	30.89	0.000	31.0	C	0.14
primary	Temp Mid Range	31.65	31.27	0.000	31.6	C	0.35
primary	Temp Mid Range	33.66	33.26	0.000	33.3	C	0.05

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

Infrastructure Data For

Site ID CDR119 **Technician** Sandy Grenville **Site Visit Date** 07/20/2017

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8810	640 cuft

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

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.

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Site ID CDR119 **Technician** Sandy Grenville **Site Visit Date** 07/20/2017

Site Sponsor (agency)	EPA	**USGS Map**		Glenville
Operating Group	private, WV parks dept	**Map Scale**		
AQS #	54-021-9991	**Map Date**		
Meteorological Type	Climatronics			
Air Pollutant Analyzer	Ozone	**QAPP Latitude**		
Deposition Measurement	dry, wet	**QAPP Longitude**		
Land Use	woodland - mixed	**QAPP Elevation Meters**		
Terrain	complex	**QAPP Declination**		
Conforms to MLM	No	**QAPP Declination Date**		
Site Telephone		**Audit Latitude**		38.879503
Site Address 1	Cedar Creek St. Park	**Audit Longitude**		-80.847677
Site Address 2		**Audit Elevation**		240
County	Gilmer	**Audit Declination**		-8
City, State	Glenville, WV		**Present**	
Zip Code	26351	**Fire Extinguisher**	☑	Inspected Oct 2015
Time Zone	Eastern	**First Aid Kit**	☑	
Primary Operator		**Safety Glasses**	☑	
Primary Op. Phone #		**Safety Hard Hat**	☑	
Primary Op. E-mail		**Climbing Belt**	☑	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

Shelter Working Room ☑ **Make** Ekto **Model** 8810 **Shelter Size** 640 cuft

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

Site OK ☑ **Notes**

Driving Directions

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID CDR119 **Technician** 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		☑
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		☑
Intensive agricultural ops (including aerial spraying)	500 m		☑
Limited agricultural operations	200 m		☑
Large parking lot	200 m		☑
Small parking lot	100 m		☑
Tree line	50 m	20 m	☐
Obstacles to wind	10 times obstacle height		☐

Siting Distances OK ☐

Siting Criteria Comment

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 ID CDR119 **Technician** Sandy Grenville **Site Visit Date** 07/20/2017

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID CDR119 **Technician** Sandy Grenville **Site Visit Date** 07/20/2017

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID CDR119 **Technician** Sandy Grenville **Site Visit Date** 07/20/2017

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID CDR119 **Technician** Sandy Grenville **Site Visit Date** 07/20/2017

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

11 Tower comments? Met tower removed

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID CDR119 **Technician** Sandy Grenville **Site Visit Date** 07/20/2017

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑		☑
SSRF	☑		☑
Site Ops Manual	☑		☐
HASP	☑	no longer on site	☐
Field Ops Manual	☑		☐
Calibration Reports	☑		☐
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedul	☐		☐

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID CDR119 **Technician** Sandy Grenville **Site Visit Date** 07/20/2017

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID CDR119 **Technician** Sandy Grenville **Site Visit Date** 07/20/2017

Site operation procedures

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

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

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

The 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	B	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

PAR107-Sandy Grenville-07/21/2017

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
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	B	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

DAS Time Max Error: 0.02

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2112	PAR107	Sandy Grenville	07/21/2017	DAS	Primary

Das Date: 7 /21/2017
Das Time: 12:30:35
Das Day: 202

Audit Date 7 /21/2017
Audit Time 12:30:36
Audit Day 202

Low Channel:		High Channel:	
Avg Diff:	**Max Diff:**	**Avg Diff:**	**Max Diff:**
0.0000	0.0001	0.0000	0.0001

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0000	0.0000	V	V	0.0000
7	0.1000	0.0999	0.0999	V	V	0.0000
7	0.3000	0.2997	0.2998	V	V	0.0001
7	0.5000	0.4996	0.4996	V	V	0.0000
7	0.7000	0.6995	0.6995	V	V	0.0000
7	0.9000	0.8994	0.8994	V	V	0.0000
7	1.0000	0.9992	0.9992	V	V	0.0000

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	50752	PAR107	Sandy Grenville	07/21/2017	Flow Rate	000803

Mfg BIOS **Parameter** Flow Rate

Serial Number 103471 **Tfer Desc.** nexus

Tfer ID 01420

Slope 0.99825 **Intercept** 0.00497

Cert Date 2/7/2017 **CorrCoff** 0.99991

Mfg BIOS **Parameter** Flow Rate

Serial Number 103424 **Tfer Desc.** BIOS cell

Tfer ID 01410

Slope 0.99825 **Intercept** 0.00497

Cert Date 2/7/2017 **CorrCoff** 0.99991

DAS 1:		DAS 2:	
A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
2.82%	3.25%		

Cal Factor Zero -0.02

Cal Factor Full Scale 0.964

Rotometer Reading: 1.5

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.01	0.000	-0.02	l/m	l/m	
primary	leak check	0.000	0.000	-0.02	0.000	-0.02	l/m	l/m	
primary	test pt 1	1.544	1.540	1.54	0.000	1.50	l/m	l/m	-2.60%
primary	test pt 2	1.543	1.540	1.54	0.000	1.49	l/m	l/m	-3.25%
primary	test pt 3	1.542	1.540	1.54	0.000	1.50	l/m	l/m	-2.60%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	270 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244789	PAR107	Sandy Grenville	07/21/2017	Ozone	000685

Slope:	0.99332	**Slope:**	0.00000
Intercept	0.51699	**Intercept**	0.00000
CorrCoff	1.00000	**CorrCoff**	0.00000

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

DAS 1: **DAS 2:**

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
1.3%	4.3%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.07	-0.38	0.04	ppb	
primary	2	15.04	14.54	15.16	ppb	4.26%
primary	3	34.94	34.39	34.54	ppb	0.44%
primary	4	68.06	67.43	67.55	ppb	0.18%
primary	5	110.07	109.33	109.10	ppb	-0.21%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.10	**Status**	pass
Sensor Component	Span	**Condition**	1.009	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	90.9 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.7 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.55 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	693.1 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	35.3 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	89.0 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.8 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.47 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	692.8 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	4013	PAR107	Sandy Grenville	07/21/2017	Temperature	04316

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

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.06	0.08		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.17	0.02	0.000	0.1	C	0.08
primary	Temp Mid Range	25.28	24.94	0.000	25.0	C	0.01
primary	Temp High Range	49.14	48.62	0.000	48.7	C	0.08

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

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	PAR107	Sandy Grenville	07/21/2017	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.49	0.60

DAS 2:

Abs Avg Err	Abs Max Er

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	28.37	28.01	0.000	27.5	C	-0.5
primary	Temp Mid Range	28.00	27.64	0.000	27.3	C	-0.37
primary	Temp Mid Range	24.08	23.75	0.000	24.4	C	0.6

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

Infrastructure Data For

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

Shelter Make	Shelter Model	Shelter Size
Ekto	8810	640 cuft

Sensor Component	Sample Tower Type	**Condition**	Type B	**Status**	pass
Sensor Component	Conduit	**Condition**	N/A	**Status**	pass
Sensor Component	Met Tower	**Condition**	N/A	**Status**	pass
Sensor Component	Moisture Trap	**Condition**	Installed	**Status**	pass
Sensor Component	Power Cables	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Temp Control	**Condition**	Functioning	**Status**	pass
Sensor Component	Rotometer	**Condition**	Installed	**Status**	pass
Sensor Component	Sample Tower	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Condition	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Door	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Roof	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Floor	**Condition**	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 ID PAR107 **Technician** Sandy Grenville **Site Visit Date** 07/21/2017

Site Sponsor (agency)	EPA/USFS
Operating Group	USFS
AQS #	54-093-9991
Meteorological Type	Climatronics
Air Pollutant Analyzer	Ozone
Deposition Measurement	dry, wet
Land Use	woodland - mixed
Terrain	complex
Conforms to MLM	No
Site Telephone	
Site Address 1	USFS Timber & Watershed Lab
Site Address 2	Rt. 219, Nursery Bottom
County	Parsons
City, State	Parsons, WV
Zip Code	26287
Time Zone	Eastern
Primary Operator	
Primary Op. Phone #	
Primary Op. E-mail	
Backup Operator	
Backup Op. Phone #	
Backup Op. E-mail	

USGS Map	Parsons
Map Scale	
Map Date	
QAPP Latitude	
QAPP Longitude	
QAPP Elevation Meters	
QAPP Declination	
QAPP Declination Date	
Audit Latitude	39.090434
Audit Longitude	-79.661742
Audit Elevation	510
Audit Declination	-9

	Present	
Fire Extinguisher	☑	Inspected Nov 2015
First Aid Kit	☑	
Safety Glasses	☑	
Safety Hard Hat	☑	
Climbing Belt	☐	
Security Fence	☑	
Secure Shelter	☑	
Stable Entry Step	☑	

Shelter Working Room ☑ **Make** Ekto **Model** 8810 **Shelter Size** 640 cuft

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

Site OK ☑ **Notes**

Driving Directions Take highway 33W to Elkins WV. Turn onto 19N to Parsons. Continue through town to the Nursery Bottom Reservoir. The site entrance is on the right next to the visitors center.

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		☑

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

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

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

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

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

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

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

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

11 Tower comments? Met tower removed

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

Field Systems Data Form

F-02058-1500-S7-rev002

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

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

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

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

Site operation procedures

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

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

Provide any additional 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 PAR107 **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	B	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

CNT169-Martin Valvur-07/21/2017

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
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	B	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

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2515	CNT169	Martin Valvur	07/21/2017	DAS	Primary

Das Date: 7 /22/2017
Das Time: 7:39:00
Das Day: 203

Audit Date 7 /22/2017
Audit Time 7:39:00
Audit Day 203

Low Channel:

Avg Diff: 0.0001
Max Diff: 0.0002

High Channel:

Avg Diff: 0.0001
Max Diff: 0.0002

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0006	0.0005	V	V	-0.0001
7	0.1000	0.0995	0.0993	V	V	-0.0002
7	0.3000	0.2997	0.2997	V	V	0.0000
7	0.5000	0.4991	0.4992	V	V	0.0001
7	0.7000	0.6997	0.6996	V	V	-0.0001
7	0.9000	0.8993	0.8993	V	V	0.0000
7	1.0000	0.9994	0.9994	V	V	0.0000

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	CNT169	Martin Valvur	07/21/2017	Flow Rate	000559

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

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
0.55%	0.99%		

Cal Factor Zero	-0.06
Cal Factor Full Scale	0.97
Rotometer Reading:	3.7

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.06	l/m	l/m	
primary	leak check	0.000	0.000	0.05	0.000	0.00	l/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	l/m	l/m	-0.33%
primary	test pt 3	3.040	3.030	3.00	0.000	3.00	l/m	l/m	-0.99%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	360 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241793	CNT169	Martin Valvur	07/21/2017	Ozone	000620

Slope:	1.05083	**Slope:**	0.00000
Intercept	0.66404	**Intercept**	0.00000
CorrCoff	0.99992	**CorrCoff**	0.00000

DAS 1: **DAS 2:**

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
7.1%	8.2%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00466	**Intercept**	0.01298
Cert Date	1/1/2017	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.30	0.28	0.59	ppb	
primary	2	14.83	14.74	15.87	ppb	7.67%
primary	3	34.96	34.78	37.63	ppb	8.19%
primary	4	68.26	67.93	72.88	ppb	7.29%
primary	5	112.01	111.47	117.20	ppb	5.14%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	-0.30	**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**	91.0 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.6 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.61 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	508.6 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	34.1 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	91.0 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.6 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.61 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	508.3 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	14606	CNT169	Martin Valvur	07/21/2017	Temperature	06501

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

DAS 1:

DAS 2:

Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.11	0.21		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.26	0.23	0.000	0.3	C	0.08
primary	Temp Mid Range	19.02	18.99	0.000	19.0	C	0.03
primary	Temp High Range	47.07	47.04	0.000	46.8	C	-0.21

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

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	CNT169	Martin Valvur	07/21/2017	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
1.74	1.92		

Mfg Fluke

Parameter Shelter Temperatur

Serial Number 3275143

Tfer Desc. RTD

Tfer ID 01229

Slope 1.00006

Intercept 0.03191

Cert Date 1/23/2017

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	25.68	25.65	0.000	24.1	C	-1.51
primary	Temp Mid Range	25.71	25.68	0.000	23.8	C	-1.92
primary	Temp Mid Range	27.61	27.58	0.000	25.8	C	-1.8

Sensor Component System Memo

Condition

Status pass

Infrastructure Data For

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

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8810 (s/n 2149-19)	640 cuft

Sensor Component	Sample Tower Type	**Condition**	Type B	**Status**	pass
Sensor Component	Conduit	**Condition**	N/A	**Status**	pass
Sensor Component	Met Tower	**Condition**	N/A	**Status**	pass
Sensor Component	Moisture Trap	**Condition**	Installed	**Status**	pass
Sensor Component	Power Cables	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Temp Control	**Condition**	Functioning	**Status**	pass
Sensor Component	Rotometer	**Condition**	Installed	**Status**	pass
Sensor Component	Sample Tower	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Condition	**Condition**	Fair	**Status**	pass
Sensor Component	Shelter Door	**Condition**	Fair	**Status**	pass
Sensor Component	Shelter Roof	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Floor	**Condition**	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 ID CNT169 **Technician** Martin Valvur **Site Visit Date** 07/21/2017

Site Sponsor (agency)	EPA	**USGS Map**	Centennial
Operating Group	Forest Service	**Map Scale**	
AQS #	56-001-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	41.3722
Deposition Measurement	dry, wet	**QAPP Longitude**	-106.2422
Land Use	woodland - evergreen	**QAPP Elevation Meters**	3178
Terrain	complex	**QAPP Declination**	10.9
Conforms to MLM	Marginally	**QAPP Declination Date**	12/28/2004
Site Telephone	(307) 742-7229	**Audit Latitude**	41.364531
Site Address 1	Brooklyn Lake Guard Station	**Audit Longitude**	-106.24002
Site Address 2	Medicine Bow National Forest	**Audit Elevation**	3175
County	Albany	**Audit Declination**	9.5

City, State	Centennial, WY		**Present**	
Zip Code	82055	**Fire Extinguisher**	☑	New in 2015
Time Zone	Mountain	**First Aid Kit**	☑	
Primary Operator		**Safety Glasses**	☐	
Primary Op. Phone #		**Safety Hard Hat**	☐	
Primary Op. E-mail		**Climbing Belt**	☐	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

Shelter Working Room ☑ **Make** Ekto **Model** 8810 (s/n 2149-19) **Shelter Size** 640 cuft

Shelter Clean ☐ **Notes** The shelter is dirty. Some floor tiles are old and broken

Site OK ☑ **Notes**

Driving Directions From Laramie take route 130 west to Centennial. Continue through town and into the Medicine Bow National Forest. 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		☑

Siting Distances OK ☑

Siting Criteria Comment

Field Systems Data Form

F-02058-1500-S3-rev002

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

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID 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?	☑	

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID CNT169

Technician Martin Valvur

Site Visit Date 07/21/2017

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

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

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

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

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

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

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

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

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

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

Site operation procedures

1	Is the filter pack being changed every Tuesday as scheduled?	☑	filter changed afternoons, 80% of the time
2	Are the Site Status Report Forms being completed and filed correctly?	☑	
3	Are data downloads and backups being performed as scheduled?	☐	No longer required
4	Are general observations being made and recorded? How?	☑	SSRF, logbook
5	Are site supplies on-hand and replenished in a timely fashion?	☑	
6	Are sample flow rates recorded? How?	☑	SSRF, call-in
7	Are samples sent to the lab on a regular schedule in a timely fashion?	☑	
8	Are filters protected from contamination during handling and shipping? How?	☑	Clean gloves on and off
9	Are the site conditions reported regularly to the field operations manager or staff?	☑	

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

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

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID CNT169 **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	B	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

NEC602-Martin Valvur-07/21/2017

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
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

DAS Data Form

DAS Time Max Error: 8.15

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	41007	NEC602	Martin Valvur	07/21/2017	DAS	Primary

Das Date: 7 /21/2017
Das Time: 12:05:44
Das Day: 202

Audit Date 7 /21/2017
Audit Time 11:57:35
Audit Day 202

Low Channel:

Avg Diff: 0.0000
Max Diff: 0.0000

High Channel:

Avg Diff: 0.0000
Max Diff: 0.0000

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	1.0000	0.0000	0.0000	V	V	0.0000

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Omega	324333-1	NEC602	Martin Valvur	07/21/2017	Flow Rate	none

Mfg Sceptre

SN/Owner ID 295106-8 none

Parameter MFC power supply

Mfg BIOS **Parameter** Flow Rate

Serial Number 148613 **Tfer Desc.** BIOS 220-H

Tfer ID 01421

Slope 1.00153 **Intercept** 0.00366

Cert Date 1/25/2017 **CorrCoff** 1.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
3.01%	4.16%		

Cal Factor Zero 0.29

Cal Factor Full Scale 1.118

Rotometer Reading: 0

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	0.29	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.29	l/m	l/m	
primary	test pt 1	3.709	3.700	0.00	0.000	3.64	l/m	l/m	-1.51%
primary	test pt 2	3.766	3.760	0.00	0.000	3.63	l/m	l/m	-3.35%
primary	test pt 3	3.812	3.800	0.00	0.000	3.64	l/m	l/m	-4.16%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Poor	**Status**	Fail
Sensor Component	Rotometer Condition	**Condition**	N/A	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	-6.0 cm	**Status**	Fail
Sensor Component	Filter Azimuth	**Condition**	90 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1214552974	NEC602	Martin Valvur	07/21/2017	Ozone	none

Slope:	0.96612	**Slope:**	0.00000
Intercept	-0.15807	**Intercept**	0.00000
CorrCoff	0.99999	**CorrCoff**	0.00000

DAS 1: **DAS 2:**

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
4.3%	6.1%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00466	**Intercept**	0.01298
Cert Date	1/1/2017	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.17	0.15	0.26	ppb	
primary	2	15.21	15.12	14.20	ppb	-6.08%
primary	3	37.16	36.97	35.53	ppb	-3.90%
primary	4	65.59	65.27	62.80	ppb	-3.78%
primary	5	107.60	107.08	103.40	ppb	-3.44%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	-0.6	**Status**	pass
Sensor Component	Span	**Condition**	1.013	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	98.8 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.9 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.63 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	628.9 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	35.0 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	82.5 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.8 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.65 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	628.9 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Wind Speed Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	K2275	NEC602	Martin Valvur	07/21/2017	Wind Speed	none

Mfg	RM Young	**Parameter**	wind speed
Serial Number		**Tfer Desc.**	wind speed motor (l
Tfer ID	01261		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/26/2017	**CorrCoff**	1.00000
Mfg	RM Young	**Parameter**	wind speed
Serial Number	CA4353	**Tfer Desc.**	wind speed motor (h
Tfer ID	01457		
Slope	1.00000	**Intercept**	0.00000
Cert Date	4/13/2017	**CorrCoff**	1.00000

Prop or Cups SN	N/A		
Prop or Cups Torque	0	**to**	0
Prop Correction Fact	N/A		

	DAS 1:		DAS 2:	
	Low Range	High Range	Low Range	High Range
Abs Avg Err	0.15	0.89%		
Abs Max Er	0.25	1.94%		

UseDescription:	Input Device	Input RPM	Input m/s	Out V	DAS m/s	Diff/ %Diff	Diff	WsM
primary	none	0	0.20	0.0	0.5		0.25	
primary	01261	40	1.67	0.0	1.6		-0.03	
primary	01261	80	2.75	0.0	2.9		0.10	
primary	01261	140	4.26	0.0	4.1		-0.21	
primary	01261	210	6.07	0.0	6.1	-0.33%		
primary	01457	400	11.11	0.0	11.3	1.26%		
primary	01457	800	22.22	0.0	22.7	1.94%		
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
Sensor Component	Sensor Plumb	**Condition**	Plumb	**Status**	pass
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass

Wind Direction Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	D3049	NEC602	Martin Valvur	07/21/2017	Wind Direction	none

Mfg	RM Young	**Parameter**	wind direction
Serial Number		**Tfer Desc.**	wind direction wheel
Tfer ID	01266		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/1/2006	**CorrCoff**	1.00000
Mfg	Ushikata	**Parameter**	wind direction
Serial Number	190037	**Tfer Desc.**	transit
Tfer ID	01265		
Slope	1.00000	**Intercept**	0.00000
Cert Date	2/8/2017	**CorrCoff**	1.00000

Vane SN: N/A

C. A. Align. deg. true: 352

VaneTorque 0 **to** 0

	DAS 1: Orientation	DAS 1: Linearity:	DAS 2: Orientation	DAS 2: Linearity:
Abs Avg Err	18.3			
Abs Max Er	21			

UseDescription	TferID	Input Raw	Linearity	Output V	Output Deg.	Difference	Change	Error
primary	01265	82	☐	0.000	65	17		17
primary	01265	172	☐	0.000	157	15		15
primary	01265	262	☐	0.000	241	21		21
primary	01265	352	☐	0.000	332	20		20

Sensor Component	Condition	**Condition**	Good	**Status**	pass
Sensor Component	Mast	**Condition**	Poor	**Status**	Fail
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	Sensor Plumb	**Condition**	Plumb	**Status**	pass
Sensor Component	Torque	**Condition**	Not tested	**Status**	pass
Sensor Component	Vane Condition	**Condition**	Good	**Status**	pass
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass

Temperature Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
Vaisala	C2730143	NEC602	Martin Valvur	07/21/2017	Temperature	none

Mfg Fluke

Parameter Temperature

Serial Number 3275143

Tfer Desc. RTD

Tfer ID 01229

Slope 1.00006

Intercept 0.03191

Cert Date 1/23/2017

CorrCoff 1.00000

DAS 1: **Abs Avg Err**	**Abs Max Er**	**DAS 2:** **Abs Avg Err**	**Abs Max Er**
0.63	1.10		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.16	0.13	0.000	1.2	C	1.1
primary	Temp Mid Range	24.20	24.17	0.000	24.8	C	0.63
primary	Temp High Range	47.80	47.77	0.000	47.9	C	0.17

Sensor Component	Shield	**Condition**	Clean	**Status**	pass
Sensor Component	Blower	**Condition**	N/A	**Status**	pass
Sensor Component	Blower Status Switch	**Condition**	N/A	**Status**	pass
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass

Humidity Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	C2730143	NEC602	Martin Valvur	07/21/2017	Relative Humidity	none

Mfg Rotronic
Parameter Relative Humidity
Serial Number 75296
Tfer Desc. GTL
Tfer ID 01220
Slope 0.99780
Intercept 0.06850
Cert Date 1/23/2017
CorrCoff 0.99994

	DAS 1:		DAS 2:	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	0.9	1.2		
Abs Max Er	1.6	1.2		

UseDesc.	Test type	Device	Input RH	GTL Raw	RH Corr.	DAS Volts	DAS %RH	Difference
primary	RH Low Range	GTL	32.8	40.6	32.8	0.000	33.0	0.2
primary	RH Low Range	GTL	52.9	55.0	52.9	0.000	54.5	1.6
primary	RH High Range	GTL	93.6	88.5	93.6	0.000	92.4	-1.2

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

Solar Radiation Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Licor	Illegible	NEC602	Martin Valvur	07/21/2017	Solar Radiation	none

Mfg	Eppley	**Parameter**	solar radiation
Serial Number	23824	**Tfer Desc.**	SR transfer sensor
Tfer ID	01247		
Slope	1.00000	**Intercept**	0.00000
Cert Date	2/16/2017	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
% Diff of Avg	**%Diff of Max**	**%Diff of Avg**	**%Diff of Max**
3.6%	6.5%	0.0%	0.0%

UseDescription	Measure Date	MeasureTime	Tfer Raw	Tfer Corr	DAS w/m2	PctDifference
primary	7/21/2017	10:00	583	583	521	-10.7%
primary	7/21/2017	11:00	736	736	747	1.5%
primary	7/21/2017	12:00	672	672	677	0.7%
primary	7/21/2017	13:00	821	821	768	-6.5%

Sensor Component	Sensor Clean	**Condition**	Clean	**Status**	pass
Sensor Component	Sensor Level	**Condition**	Level	**Status**	pass
Sensor Component	Properly Sited	**Condition**	Properly sited	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Precipitation Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	T15381	NEC602	Martin Valvur	07/21/2017	Precipitation	none

Mfg	PMP	**Parameter**	Precipitation
Serial Number	None	**Tfer Desc.**	250ml graduate
Tfer ID	01249		
Slope	1.00000	**Intercept**	0.00000
Cert Date	4/26/2013	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
1.8%	3.5%		

UseDesc.	Test type	TferVolume	Iteration	TimePerTip	Eq.Ht	DAS eng	Eq.HtUnit	OSE Unit	TferUnits	PctDifference
primary	test 1	231.5	1	13 sec	7.11	7.11	mm	mm	ml	0.0%
primary	test 2	231.5	2	15 sec	7.11	7.36	mm	mm	ml	3.5%

Sensor Component	Properly Sited	**Condition**	Properly sited	**Status**	pass
Sensor Component	Gauge Drain Screen	**Condition**	Installed	**Status**	pass
Sensor Component	Funnel Clean	**Condition**	Clean	**Status**	pass
Sensor Component	Condition	**Condition**	Good	**Status**	pass
Sensor Component	Gauge Screen	**Condition**	Installed	**Status**	pass
Sensor Component	Gauge Clean	**Condition**	Clean	**Status**	pass
Sensor Component	Level	**Condition**	Level	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	NEC602	Martin Valvur	07/21/2017	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.49	0.97

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Fluke

Parameter Shelter Temperatur

Serial Number 3275143

Tfer Desc. RTD

Tfer ID 01229

Slope 1.00006

Intercept 0.03191

Cert Date 1/23/2017

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	26.88	26.85	0.000	25.9	C	-0.97
primary	Temp Mid Range	27.50	27.47	0.000	27.7	C	0.23
primary	Temp Mid Range	28.02	27.99	0.000	27.7	C	-0.28

Sensor Component System Memo

Condition

Status pass

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**	pass
Sensor Component	Conduit	**Condition**	Good	**Status**	pass
Sensor Component	Met Tower	**Condition**	Good	**Status**	pass
Sensor Component	Moisture Trap	**Condition**	Not installed	**Status**	pass
Sensor Component	Power Cables	**Condition**	Fair	**Status**	pass
Sensor Component	Shelter Temp Control	**Condition**	Functioning	**Status**	pass
Sensor Component	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.	Hazard	Problem
Flow Rate	NEC602	Martin Valvur	07/21/2017	Filter Position	Omega	3842	☐	☑
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.								
Wind Direction	NEC602	Martin Valvur	07/21/2017	System Memo	Met One	4367	☐	☐
The wind direction sensor mast is loose on the tower causing inaccurate wind direction measurement.								
Wind Speed	NEC602	Martin Valvur	07/21/2017	System Memo	Met One	4368	☐	☐
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.

Field Systems Data Form

F-02058-1500-S1-rev002

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

Site Sponsor (agency)	EPA	**USGS Map**	
Operating Group	BLM	**Map Scale**	
AQS #	560450003	**Map Date**	
Meteorological Type	Met One		
Air Pollutant Analyzer		**QAPP Latitude**	
Deposition Measurement		**QAPP Longitude**	
Land Use		**QAPP Elevation Meters**	
Terrain		**QAPP Declination**	
Conforms to MLM		**QAPP Declination Date**	
Site Telephone		**Audit Latitude**	43.8731
Site Address 1		**Audit Longitude**	-104.192009
Site Address 2		**Audit Elevation**	1469
County	Weston	**Audit Declination**	8.2
City, State	Newcastle, WY		

			Present	
Zip Code	82701	**Fire Extinguisher**	☐	
Time Zone	Mountain	**First Aid Kit**	☐	
Primary Operator		**Safety Glasses**	☐	
Primary Op. Phone #		**Safety Hard Hat**	☐	
Primary Op. E-mail		**Climbing Belt**	☐	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

Shelter Working Room ☐ **Make** Shelter One **Model** AR 263648 **Shelter Size** 24 cuft

Shelter Clean ☐ **Notes** The shelter houses the ozone, DAS, and MFC only.

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

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 ☐

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

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

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

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

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

The temperature / 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

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

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 10 meters
4	Describe dry dep sample tube.		3/8 Nylon by 10 meters
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?	☐	Not present

Provide any additional 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 NEC602 **Technician** Martin Valvur **Site Visit Date** 07/21/2017

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?	☐	Not present
4	Are the signal connections protected from the weather and well maintained?	☑	
5	Are the signal leads connected to the correct DAS channel?	☑	
6	Are the DAS, sensor translators, and shelter properly grounded?	☑	
7	Does the instrument shelter have a stable power source?	☑	
8	Is the instrument shelter temperature controlled?	☑	

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

11 Tower comments?

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

Field Systems Data Form

F-02058-1500-S7-rev002

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☐	Not present	☐
SSRF	☑		☑
Site Ops Manual	☑	2013	☑
HASP	☑	2013	☑
Field Ops Manual	☑	2013	☑
Calibration Reports	☐	Not present	☐
Ozone z/s/p Control Charts	☐	Not present	☐
Preventive maintenance schedul	☐	Not present	☐

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

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

Site operation procedures

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

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

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

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

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

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

Provide any additional 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.

Field Systems Data Form

F-02058-1500-S9-rev002

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

Site operation procedures

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

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

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

The site operator is doing 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.

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID NEC602 **Technician** Martin Valvur **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	B	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

DAS Time Max Error: 0

Mfg	**Serial Number**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Use Desc.**
Campbell	2511	PED108	Sandy Grenville	07/25/2017	DAS	Primary

Das Date: 7 /25/2017
Das Time: 11:28:51
Das Day: 206

Audit Date 7 /25/2017
Audit Time 11:28:51
Audit Day 206

Low Channel:

Avg Diff:	**Max Diff:**
0.0001	0.0002

High Channel:

Avg Diff:	**Max Diff:**
0.0001	0.0002

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0000	0.0000	V	V	0.0000
7	0.1000	0.0999	0.0999	V	V	0.0000
7	0.3000	0.2998	0.2997	V	V	-0.0001
7	0.5000	0.4996	0.4995	V	V	-0.0001
7	0.7000	0.6996	0.6994	V	V	-0.0002
7	0.9000	0.8994	0.8992	V	V	-0.0002
7	1.0000	0.9993	0.9991	V	V	-0.0002

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	PED108	Sandy Grenville	07/25/2017	Flow Rate	000461

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

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
2.04%	2.04%		

Cal Factor Zero 0

Cal Factor Full Scale 1.01

Rotometer Reading: 1.35

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.01	0.000	0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.000	0.01	l/m	l/m	
primary	test pt 1	1.476	1.470	1.49	0.000	1.50	l/m	l/m	2.04%
primary	test pt 2	1.474	1.470	1.49	0.000	1.50	l/m	l/m	2.04%
primary	test pt 3	1.473	1.470	1.49	0.000	1.50	l/m	l/m	2.04%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	360 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347319	PED108	Sandy Grenville	07/25/2017	Ozone	000732

Slope:	0.97661	**Slope:**	0.00000
Intercept	0.77925	**Intercept**	0.00000
CorrCoff	0.99999	**CorrCoff**	0.00000

DAS 1: **DAS 2:**

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
1.3%	1.7%		

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.00	-0.45	0.30	ppb	
primary	2	15.01	14.51	14.70	ppb	1.31%
primary	3	35.00	34.45	34.80	ppb	1.02%
primary	4	68.03	67.40	66.60	ppb	-1.19%
primary	5	110.00	109.26	107.40	ppb	-1.70%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	-0.10	**Status**	pass
Sensor Component	Span	**Condition**	0.996	**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 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.7 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.0 lpm	**Status**	Fail
Sensor Component	Cell A Pressure	**Condition**	723.8 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	35.7 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	105.4 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.7 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.58 lpm	**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 tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	14041	PED108	Sandy Grenville	07/25/2017	Temperature	06408

Mfg Extech

Parameter Temperature

Serial Number H232734

Tfer Desc. RTD

Tfer ID 01227

Slope 1.00759

Intercept 0.14754

Cert Date 2/4/2017

CorrCoff 1.00000

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.06	0.12		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.17	0.02	0.000	0.1	C	0.12
primary	Temp Mid Range	25.07	24.73	0.000	24.8	C	0.03
primary	Temp High Range	48.11	47.60	0.000	47.6	C	-0.03

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

Sensor Component Blower **Condition** N/A **Status** pass

Sensor Component Blower Status Switch **Condition** N/A **Status** pass

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

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	PED108	Sandy Grenville	07/25/2017	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.41	0.45

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232734

Tfer Desc. RTD

Tfer ID 01227

Slope 1.00759

Intercept 0.14754

Cert Date 2/4/2017

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	23.41	23.09	0.000	23.5	C	0.37
primary	Temp Mid Range	25.35	25.01	0.000	25.4	C	0.42
primary	Temp Mid Range	27.00	26.65	0.000	26.2	C	-0.45

Sensor Component 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

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

Site Sponsor (agency)	EPA	**USGS Map**	Green Bay
Operating Group	Private	**Map Scale**	
AQS #	51-147-9991	**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	37.1653
Deposition Measurement	dry, wet	**QAPP Longitude**	-78.3070
Land Use	woodland - mixed	**QAPP Elevation Meters**	150
Terrain	rolling	**QAPP Declination**	-9.1
Conforms to MLM	Yes	**QAPP Declination Date**	2/22/2006
Site Telephone		**Audit Latitude**	37.165222
Site Address 1	SR 629	**Audit Longitude**	-78.307067
Site Address 2	Prince Edward-Gallion State Forest	**Audit Elevation**	149
County	Prince Edward	**Audit Declination**	-9.4

City, State	Burkesville, VA		**Present**	
Zip Code	23922	**Fire Extinguisher**	☑	No inspection date
Time Zone	Eastern	**First Aid Kit**	☑	
Primary Operator		**Safety Glasses**	☐	
Primary Op. Phone #		**Safety Hard Hat**	☑	
Primary Op. E-mail		**Climbing Belt**	☑	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

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

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

Site OK ☑ **Notes**

Driving Directions From Farmville travel east on 460 approximately 1 mile. Turn right (south) onto route 696 toward Twin Lakes State 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.

Field Systems Data Form

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

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

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

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

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

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

	Present		Current
Station Log	☑		☑
SSRF	☑		☑
Site Ops Manual	☑	Oct 2001	☐
HASP	☑	Feb 2014	☑
Field Ops Manual	☑	July 1999	☐
Calibration Reports	☑		☑
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedul	☐		☐

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

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

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

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

Site operation procedures

1	Has the site operator attended a formal CASTNET training course? If yes, when and who instructed?	☑	Trained in FL in 1987 and refresher course in July 2006
2	Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed?	☐	
3	Is the site visited regularly on the required Tuesday schedule?	☑	
4	Are the standard CASTNET operational procedures being flollowed by the site operator?	☑	
5	Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation)	☑	

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

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

Site operation procedures

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

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

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

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID 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	B	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

ROM406-Martin Valvur-08/01/2017

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
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	B	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

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	2025	ROM406	Martin Valvur	08/01/2017	DAS	Primary

Das Date: 8 /1 /2017
Das Time: 14:48:06
Das Day: 213

Audit Date 8 /1 /2017
Audit Time 14:49:00
Audit Day 213

Low Channel:

Avg Diff: 0.0002
Max Diff: 0.0011

High Channel:

Avg Diff: 0.0002
Max Diff: 0.0011

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
4	0.0000	-0.0002	0.0009	V	V	0.0011
4	0.1000	0.0998	0.0998	V	V	0.0000
4	0.3000	0.2994	0.2991	V	V	-0.0003
4	0.5000	0.4996	0.4994	V	V	-0.0002
4	0.7000	0.6997	0.6997	V	V	0.0000
4	0.9000	0.8997	0.8997	V	V	0.0000
4	1.0000	1.0001	1.0002	V	V	0.0001

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Tylan	AW9403024	ROM406	Martin Valvur	08/01/2017	flow rate	03393

Mfg Tylan

SN/Owner ID illegible none

Parameter MFC power supply

Mfg BIOS **Parameter** Flow Rate

Serial Number 148613 **Tfer Desc.** BIOS 220-H

Tfer ID 01421

Slope 1.00153 **Intercept** 0.00366

Cert Date 1/25/2017 **CorrCoff** 1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
1.17%	1.28%		

Cal Factor Zero 0.094

Cal Factor Full Scale 5.456

Rotometer Reading: 3.75

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	-0.07	0.0000	0.06	l/m	l/m	
primary	leak check	0.000	0.000	-0.06	0.0000	0.06	l/m	l/m	
primary	test pt 1	3.037	3.030	3.02	0.0000	3.00	l/m	l/m	-0.96%
primary	test pt 2	3.048	3.040	3.02	0.0000	3.00	l/m	l/m	-1.28%
primary	test pt 3	3.049	3.040	3.02	0.0000	3.00	l/m	l/m	-1.28%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	160 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	0733726103	ROM406	Martin Valvur	08/01/2017	Ozone	none

Slope:	0.96260	**Slope:**	0.00000
Intercept	-0.14012	**Intercept**	0.00000
CorrCoff	0.99997	**CorrCoff**	0.00000

DAS 1:

DAS 2:

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
4.7%	7.2%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00466	**Intercept**	0.01298
Cert Date	1/1/2017	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.46	0.44	0.47	ppb	
primary	2	14.81	14.72	13.66	ppb	-7.20%
primary	3	36.17	35.98	34.46	ppb	-4.22%
primary	4	64.14	63.82	61.68	ppb	-3.35%
primary	5	106.90	106.39	102.10	ppb	-4.03%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.1	**Status**	pass
Sensor Component	Span	**Condition**	0.990	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	0.0010	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	1.0010	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	114.2 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	1.6 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.62 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	545.6 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	38.9 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	83.0 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	1.3 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.59 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	545.0 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	17079	ROM406	Martin Valvur	08/01/2017	Temperature2meter	none

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

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.35	0.37		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary		0.23	0.20	0.0000	0.53	C	0.33
primary		24.32	24.29	0.0000	24.66	C	0.37
primary		47.35	47.32	0.0000	47.68	C	0.36

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

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	051	ROM406	Martin Valvur	08/01/2017	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
1.62	1.86

DAS 2:

Abs Avg Err	Abs Max Er

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	25.08	25.05	0.000	26.9	C	1.86
primary	Temp Mid Range	25.05	25.02	0.000	26.8	C	1.81
primary	Temp Mid Range	24.97	24.94	0.000	26.1	C	1.18

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

Infrastructure Data For

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

Shelter Make	Shelter Model	Shelter Size
Ekto	8814 (s/n 3062-1)	896 cuft

Sensor Component	Sample Tower Type	**Condition**	Type B	**Status**	pass
Sensor Component	Conduit	**Condition**	Good	**Status**	pass
Sensor Component	Met Tower	**Condition**	Good	**Status**	pass
Sensor Component	Moisture Trap	**Condition**	Not installed	**Status**	pass
Sensor Component	Power Cables	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Temp Control	**Condition**	Functioning	**Status**	pass
Sensor Component	Rotometer	**Condition**	Installed	**Status**	pass
Sensor Component	Sample Tower	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Condition	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Door	**Condition**	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

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 ID ROM406

Technician Martin Valvur

Site Visit Date 08/01/2017

Site Sponsor (agency) NPS

Operating Group NPS

AQS # 08-069-0007

Meteorological Type R.M. Young

Air Pollutant Analyzer Ozone, IMPROVE

Deposition Measurement dry

Land Use woodland - mixed

Terrain complex

Conforms to MLM Marginally

Site Telephone (970) 586-8520

Site Address 1 High Peak Camp

Site Address 2 Route 7

County Larimer

City, State Estes Park, CO

Zip Code 80517

Time Zone Mountain

Primary Operator

Primary Op. Phone #

Primary Op. E-mail

Backup Operator

Backup Op. Phone #

Backup Op. E-mail

USGS Map Longs Peak

Map Scale

Map Date

QAPP Latitude 40.2778

QAPP Longitude -105.5453

QAPP Elevation Meters 2743

QAPP Declination

QAPP Declination Date

Audit Latitude 40.278129

Audit Longitude -105.545635

Audit Elevation 2742

Audit Declination 9.0

	Present	
Fire Extinguisher	☑	Inspected June 2013
First Aid Kit	☑	
Safety Glasses	☐	
Safety Hard Hat	☐	
Climbing Belt	☐	
Security Fence	☐	
Secure Shelter	☑	
Stable Entry Step	☑	

Shelter Working Room ☑ **Make** Ekto **Model** 8814 (s/n 3062-1) **Shelter Size** 896 cuft

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

Site OK ☑ **Notes**

Driving Directions 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.

Field Systems Data Form

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

Siting Distances OK ☑

Siting Criteria Comment

Field Systems Data Form

F-02058-1500-S3-rev002

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

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

The 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-S4-rev002

Site ID 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?	☑	

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

Field Systems Data Form

F-02058-1500-S5-rev002

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

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 10 meters
4	Describe dry dep sample tube.		3/8 teflon by 10 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	Flow line only
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

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

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

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

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

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

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑	DataView2	☑
SSRF	☑		☑
Site Ops Manual	☑		☑
HASP	☐		☐
Field Ops Manual	☑		☑
Calibration Reports	☑		☑
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedul	☐		☐

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

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

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

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

Site operation procedures

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

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

Provide any additional 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 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	B	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
ROM206-Martin 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	C	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

DAS Time Max Error: 0.42

Mfg	**Serial Number**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Use Desc.**
Campbell	1144	ROM206	Martin Valvur	08/08/2017	DAS	Primary

Das Date:	8 /8 /2017	**Audit Date**	8 /8 /2017
Das Time:	13:42:00	**Audit Time**	13:41:35
Das Day:	220	**Audit Day**	220

Low Channel:		**High Channel:**	
Avg Diff:	**Max Diff:**	**Avg Diff:**	**Max Diff:**
0.0001	0.0003	0.0001	0.0003

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	-0.0003	-0.0004	V	V	-0.0001
7	0.1000	0.0991	0.0991	V	V	0.0000
7	0.3000	0.2999	0.2996	V	V	-0.0003
7	0.5000	0.4997	0.4997	V	V	0.0000
7	0.7000	0.7000	0.6998	V	V	-0.0002
7	0.9000	0.8998	0.8998	V	V	0.0000
7	1.0000	1.0002	0.9999	V	V	-0.0003

Flow Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
Apex	unknown	ROM206	Martin Valvur	08/08/2017	Flow Rate	000598

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

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

Cal Factor Zero	-0.05
Cal Factor Full Scale	0.95
Rotometer Reading:	3.55

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.05	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	-0.05	l/m	l/m	
primary	test pt 1	3.020	3.010	3.05	0.000	2.99	l/m	l/m	-0.66%
primary	test pt 2	3.030	3.020	3.05	0.000	2.99	l/m	l/m	-0.99%
primary	test pt 3	3.030	3.020	3.03	0.000	3.00	l/m	l/m	-0.66%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244794	ROM206	Martin Valvur	08/08/2017	Ozone	000676

Slope:	0.99240	**Slope:**	0.00000
Intercept	-0.04905	**Intercept**	0.00000
CorrCoff	0.99998	**CorrCoff**	0.00000

DAS 1: **DAS 2:**

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
1.0%	2.4%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00466	**Intercept**	0.01298
Cert Date	1/1/2017	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.24	0.22	0.05	ppb	
primary	2	15.51	15.42	15.05	ppb	-2.40%
primary	3	35.43	35.25	35.14	ppb	-0.31%
primary	4	66.68	66.35	66.17	ppb	-0.27%
primary	5	113.00	112.46	111.30	ppb	-1.03%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.1	**Status**	pass
Sensor Component	Span	**Condition**	1.006	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	90.7 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.6 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.0 lpm	**Status**	Fail
Sensor Component	Cell A Pressure	**Condition**	524.2 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	37.7 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	93.6 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.5 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.38 lpm	**Status**	Fail
Sensor Component	Cell B Pressure	**Condition**	525.6 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	none	ROM206	Martin Valvur	08/08/2017	Temperature	02679

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

DAS 1:

DAS 2:

Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.15	0.22		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.13	0.10	0.000	0.3	C	0.17
primary	Temp Mid Range	24.40	24.37	0.000	24.4	C	0.06
primary	Temp High Range	48.27	48.24	0.000	48.0	C	-0.22

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

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	ROM206	Martin Valvur	08/08/2017	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.84	0.99		

Mfg Fluke

Parameter Shelter Temperatur

Serial Number 3275143

Tfer Desc. RTD

Tfer ID 01229

Slope 1.00006

Intercept 0.03191

Cert Date 1/23/2017

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	24.36	24.33	0.000	25.1	C	0.73
primary	Temp Mid Range	22.94	22.91	0.000	23.9	C	0.99
primary	Temp Mid Range	22.31	22.28	0.000	23.1	C	0.79

Sensor Component System Memo

Condition

Status pass

Infrastructure Data For

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

Shelter Make	**Shelter Model**	**Shelter 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
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	ROM206	Martin Valvur	08/08/2017	Cell B Flow	ThermoElectron	3725	☐	☐

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

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Ozone	ROM206	Martin Valvur	08/08/2017	Cell A Flow	ThermoElectron	3725	☐	☐

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.

Field Systems Data Form

F-02058-1500-S1-rev002

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

Site Sponsor (agency)	EPA	**USGS Map**		Longs Peak
Operating Group	private	**Map Scale**		
AQS #	08-069-9991	**Map Date**		
Meteorological Type	R.M. Young			
Air Pollutant Analyzer	Ozone, IMPROVE	**QAPP Latitude**		40.2778
Deposition Measurement	dry	**QAPP Longitude**		-105.5453
Land Use	woodland - mixed	**QAPP Elevation Meters**		2743
Terrain	complex	**QAPP Declination**		10.3
Conforms to MLM	Marginally	**QAPP Declination Date**		2/22/2006
Site Telephone	(970) 586-2598	**Audit Latitude**		40.278129
Site Address 1	High Peak Camp	**Audit Longitude**		-105.545635
Site Address 2	Route 7	**Audit Elevation**		2742
County	Larimer	**Audit Declination**		9.0
City, State	Estes Park, CO		**Present**	
Zip Code	80517	**Fire Extinguisher**	☑	New in 2015
Time Zone	Mountain	**First Aid Kit**	☑	
Primary Operator		**Safety Glasses**	☐	
Primary Op. Phone #		**Safety Hard Hat**	☑	
Primary Op. E-mail		**Climbing Belt**	☑	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

Shelter Working Room ☑ **Make** Ekto **Model** 8810 (s/n 2182-1) **Shelter Size** 640 cuft

Shelter Clean ☑ **Notes** 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.

Site OK ☑ **Notes**

Driving Directions 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.

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

Siting Distances OK ☑

Siting Criteria Comment

Field Systems Data Form F-02058-1500-S3-rev002

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

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

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

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

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

11 Tower comments?

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

Field Systems Data Form

F-02058-1500-S7-rev002

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

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

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

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

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

Site operation procedures

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

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

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

The 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	C	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
YEL408-Martin 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	B	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

DAS Time Max Error: 2.53

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	2505	YEL408	Martin Valvur	08/16/2017	DAS	Primary

Das Date: 8 /16/2017
Das Time: 7:39:32
Das Day: 228

Audit Date 8 /16/2017
Audit Time 7:37:00
Audit Day 228

Low Channel:

Avg Diff: 0.0001
Max Diff: 0.0002

High Channel:

Avg Diff: 0.0001
Max Diff: 0.0002

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
11	0.0000	-0.0005	-0.0006	V	V	-0.0001
11	0.1000	0.0997	0.0996	V	V	-0.0001
11	0.3000	0.2998	0.2997	V	V	-0.0001
11	0.5000	0.4995	0.4996	V	V	0.0001
11	0.7000	0.6996	0.6995	V	V	-0.0001
11	0.9000	0.8993	0.8994	V	V	0.0001
11	1.0000	0.9996	0.9998	V	V	0.0002

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Tylan	AW9403021	YEL408	Martin Valvur	08/16/2017	Flow Rate	none

Mfg Tylan

SN/Owner ID FP902028 00045

Parameter MFC power supply

Mfg BIOS

Parameter Flow Rate

Serial Number 148613

Tfer Desc. BIOS 220-H

Tfer ID 01421

Slope 1.00153

Intercept 0.00366

Cert Date 1/25/2017

CorrCoff 1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
0.57%	1.03%		

Cal Factor Zero 0.029

Cal Factor Full Scale 5.558

Rotometer Reading: 4.05

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.07	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	l/m	l/m	-0.34%
primary	test pt 3	2.930	2.920	2.55	0.0000	2.89	l/m	l/m	-1.03%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	90 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	49C-61985-333	YEL408	Martin Valvur	08/16/2017	Ozone	90607

Slope:	0.99392	**Slope:**	0.00000
Intercept	-0.33439	**Intercept**	0.00000
CorrCoff	0.99998	**CorrCoff**	0.00000

DAS 1: **DAS 2:**

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
2.0%	4.7%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00466	**Intercept**	0.01298
Cert Date	1/1/2017	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.27	0.25	0.19	ppb	
primary	2	15.19	15.10	14.39	ppb	-4.70%
primary	3	38.29	38.09	37.66	ppb	-1.13%
primary	4	65.79	65.47	64.44	ppb	-1.57%
primary	5	109.86	109.33	108.50	ppb	-0.76%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.08	**Status**	pass
Sensor Component	Span	**Condition**	1.001	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	0.0040	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	1.0035	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	87.9 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.7 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.59 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	555.5 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	34.7 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	101.9 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.5 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.60 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	555.0 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Climatronics	none	YEL408	Martin Valvur	08/16/2017	Temperature2meter	ARS100

Mfg Climatronics

SN/Owner ID 396 03626

Parameter Temperature Translator

Mfg Fluke

Parameter Temperature

Serial Number 3275143

Tfer Desc. RTD

Tfer ID 01229

Slope 1.00006

Intercept 0.03191

Cert Date 1/23/2017

CorrCoff 1.00000

DAS 1: Abs Avg Err	DAS 1: Abs Max Er	DAS 2: Abs Avg Err	DAS 2: Abs Max Er
0.17	0.26		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	0.04	0.01	0.0000	0.05	C	0.04
primary	Temp Mid Rang	24.08	24.05	0.0000	23.79	C	-0.26
primary	Temp High Rang	48.18	48.15	0.0000	47.94	C	-0.21

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

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	YEL408	Martin Valvur	08/16/2017	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.74	1.07		

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	27.15	27.12	0.000	26.8	C	-0.32
primary	Temp Mid Range	28.45	28.42	0.000	27.4	C	-1.07
primary	Temp Mid Range	24.21	24.18	0.000	23.4	C	-0.83

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

Infrastructure Data For

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

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

Sensor Component	Sample Tower Type	**Condition**	Type B	**Status**	pass
Sensor Component	Conduit	**Condition**	Good	**Status**	pass
Sensor Component	Met Tower	**Condition**	Good	**Status**	pass
Sensor Component	Moisture Trap	**Condition**	Not installed	**Status**	Pass
Sensor Component	Power Cables	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Temp Control	**Condition**	Functioning	**Status**	pass
Sensor Component	Rotometer	**Condition**	Installed	**Status**	pass
Sensor Component	Sample Tower	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Condition	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Door	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Roof	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Floor	**Condition**	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:** 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 ID YEL408 **Technician** Martin Valvur **Site Visit Date** 08/16/2017

Site Sponsor (agency)	NPS	**USGS Map**		Lake
Operating Group	NPS	**Map Scale**		
AQS #	56-039-1011	**Map Date**		
Meteorological Type	Climatronics			
Air Pollutant Analyzer	Ozone, IMPROVE	**QAPP Latitude**		44.5597
Deposition Measurement	dry	**QAPP Longitude**		-110.4006
Land Use	woodland - evergreen	**QAPP Elevation Meters**		2400
Terrain	complex	**QAPP Declination**		
Conforms to MLM	Marginally	**QAPP Declination Date**		
Site Telephone	(307) 242-2410	**Audit Latitude**		44.565356
Site Address 1	Lake Ranger Station	**Audit Longitude**		-110.400338
Site Address 2	route 14	**Audit Elevation**		2430
County	Teton	**Audit Declination**		11.9
City, State	Yellowstone National Park, WY		**Present**	
Zip Code	82190	**Fire Extinguisher**	☑	New in 2017
Time Zone	Mountain	**First Aid Kit**	☑	
Primary Operator		**Safety Glasses**	☐	
Primary Op. Phone #		**Safety Hard Hat**	☐	
Primary Op. E-mail		**Climbing Belt**	☑	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

Shelter Working Room ☑ **Make** Ekto **Model** 8810 (s/n 2880-1) **Shelter Size** 640 cuft

Shelter Clean ☑ **Notes** The shelter is organized and well maintained.

Site OK ☑ **Notes**

Driving Directions From Jackson take route 191 / 89 north to Yellowstone National Park. At Thumb Junction take 14 east around 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 Distances OK ☑

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.

Field Systems Data Form

F-02058-1500-S3-rev002

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

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?	☑	West
5	Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)	☑	
6	Is the solar radiation sensor plumb?	☑	N/A
7	Is it sited to avoid shading, or any artificial or reflected light?	☑	N/A
8	Is the rain gauge plumb?	☑	N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	☑	N/A
10	Is the surface wetness sensor sited with the grid surface facing north?	☑	N/A
11	Is it inclined approximately 30 degrees?	☑	N/A

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID 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?	☑	
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?	☑	

Provide any additional 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 now being measured at approximately 2 meters above the ground.

Field Systems Data Form

F-02058-1500-S5-rev002

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

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

1	Do the sample inlets have at least a 270 degree arc of unrestricted airflow?	☑	
2	Are the sample inlets 3 - 15 meters above the ground?	☑	
3	Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees?	☐	10 to 15 meters from trees

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

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

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

11 Tower comments?

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

Field Systems Data Form

F-02058-1500-S7-rev002

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑	DataView2	☑
SSRF	☑		☑
Site Ops Manual	☑	July 2009	☑
HASP	☑	July 2009	☑
Field Ops Manual	☑	July 2009	☑
Calibration Reports	☑	Not current	☐
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedul	☐		☐

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

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

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

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

Site operation procedures

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

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID YEL408

Technician Martin Valvur

Site Visit Date 08/16/2017

Site operation procedures

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

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

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	B	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

LRL117-Sandy Grenville-08/17/2017

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
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	B	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

Mfg	**Serial Number**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Use Desc.**
Campbell	2514	LRL117	Sandy Grenville	08/17/2017	DAS	Primary

Das Date: 8 /17/2017
Das Time: 16:09:17
Das Day: 229

Audit Date 8 /17/2017
Audit Time 16:09:17
Audit Day 229

Low Channel:		**High Channel:**	
Avg Diff:	**Max Diff:**	**Avg Diff:**	**Max Diff:**
0.0000	0.0001	0.0000	0.0001

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0000	0.0000	V	V	0.0000
7	0.1000	0.0999	0.0999	V	V	0.0000
7	0.3000	0.2997	0.2997	V	V	0.0000
7	0.5000	0.4997	0.4996	V	V	-0.0001
7	0.7000	0.6996	0.6995	V	V	-0.0001
7	0.9000	0.8994	0.8994	V	V	0.0000
7	1.0000	0.9993	0.9992	V	V	-0.0001

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	LRL117	Sandy Grenville	08/17/2017	Flow Rate	000591

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

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

DAS 1:

A Avg % Diff:	A Max % Di
0.45%	0.67%

DAS 2:

A Avg %Dif	A Max % Di

Cal Factor Zero -0.005
Cal Factor Full Scale 0.982
Rotometer Reading: 1.45

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	0.00	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.000	0.00	l/m	l/m	
primary	test pt 1	1.496	1.490	1.52	0.000	1.50	l/m	l/m	0.67%
primary	test pt 2	1.494	1.490	1.52	0.000	1.50	l/m	l/m	0.67%
primary	test pt 3	1.500	1.500	1.52	0.000	1.50	l/m	l/m	0.00%

Sensor Component		Condition		Status	
Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	3.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	180 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244808	LRL117	Sandy Grenville	08/17/2017	Ozone	000701

Slope:	0.99010	**Slope:**	0.00000
Intercept	0.82411	**Intercept**	0.00000
CorrCoff	1.00000	**CorrCoff**	0.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
1.4%	3.7%		

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.25	-0.20	0.70	ppb	
primary	2	14.99	14.49	15.02	ppb	3.66%
primary	3	35.00	34.45	35.02	ppb	1.65%
primary	4	68.01	67.38	67.53	ppb	0.22%
primary	5	110.00	109.26	109.00	ppb	-0.24%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	-0.10	**Status**	pass
Sensor Component	Span	**Condition**	1.011	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	124.7 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	2.5 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.67 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	688.0 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	32.8 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	96.3 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	2.0 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.67 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	687.7 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	12792	LRL117	Sandy Grenville	08/17/2017	Temperature	06245

Mfg Extech

Parameter Temperature

Serial Number H232734

Tfer Desc. RTD

Tfer ID 01227

Slope 1.00759

Intercept 0.14754

Cert Date 2/4/2017

CorrCoff 1.00000

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.15	0.26		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.20	0.05	0.000	0.3	C	0.26
primary	Temp Mid Range	25.23	24.89	0.000	25.1	C	0.16
primary	Temp High Range	49.32	48.80	0.000	48.8	C	0.02

Sensor Component	Shield	**Condition**	Moderately clean	**Status**	pass
Sensor Component	Blower	**Condition**	N/A	**Status**	pass
Sensor Component	Blower Status Switch	**Condition**	N/A	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	LRL117	Sandy Grenville	08/17/2017	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.61	0.92

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232734

Tfer Desc. RTD

Tfer ID 01227

Slope 1.00759

Intercept 0.14754

Cert Date 2/4/2017

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	23.72	23.39	0.000	23.7	C	0.26
primary	Temp Mid Range	20.81	20.51	0.000	21.2	C	0.65
primary	Temp Mid Range	26.16	25.82	0.000	24.9	C	-0.92

Sensor Component System Memo

Condition

Status pass

Infrastructure Data For

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

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8810	640 cuft

Sensor Component	Sample Tower Type	**Condition**	Type B	**Status**	pass
Sensor Component	Conduit	**Condition**	N/A	**Status**	pass
Sensor Component	Met Tower	**Condition**	N/A	**Status**	pass
Sensor Component	Moisture Trap	**Condition**	Installed	**Status**	pass
Sensor Component	Power Cables	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Temp Control	**Condition**	Functioning	**Status**	pass
Sensor Component	Rotometer	**Condition**	Installed	**Status**	pass
Sensor Component	Sample Tower	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Condition	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Door	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Roof	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Floor	**Condition**	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 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 ID LRL117 **Technician** Sandy Grenville **Site Visit Date** 08/17/2017

Site Sponsor (agency)	EPA	**USGS Map**	
Operating Group	private/PADNR	**Map Scale**	
AQS #	42-111-9991	**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	
Deposition Measurement	dry, wet	**QAPP Longitude**	
Land Use	woodland - mixed	**QAPP Elevation Meters**	
Terrain	complex	**QAPP Declination**	
Conforms to MLM	No	**QAPP Declination Date**	
Site Telephone		**Audit Latitude**	39.988309
Site Address 1	Laurel Hill State Park	**Audit Longitude**	-79.251573
Site Address 2	1447 Laurel Hill State Park Rd.	**Audit Elevation**	609
County		**Audit Declination**	-9
City, State	Somerset, PA		

			Present	
Zip Code	15501	**Fire Extinguisher**	☑	New in 2015
Time Zone	Eastern	**First Aid Kit**	☑	
Primary Operator		**Safety Glasses**	☑	
Primary Op. Phone #		**Safety Hard Hat**	☑	
Primary Op. E-mail		**Climbing Belt**	☐	
Backup Operator		**Security Fence**	☐	Locked gate
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

Shelter Working Room ☑ **Make** Ekto **Model** 8810 **Shelter Size** 640 cuft

Shelter Clean ☑ **Notes** The shelter has been repaired and is in very good condition. A new peaked roof has been installed.

Site OK ☑ **Notes**

Driving Directions From Somerset take 30 west

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		☑
Intensive agricultural ops (including aerial spraying)	500 m		☑
Limited agricultural operations	200 m		☑
Large parking lot	200 m		☑
Small parking lot	100 m		☑
Tree line	50 m	30 m	☐
Obstacles to wind	10 times obstacle height		☑

Siting Distances OK ☑

Siting Criteria Comment

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

Field Systems Data Form

F-02058-1500-S3-rev002

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

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

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

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

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?	☑	Met sensors only
4	Are the signal connections protected from the weather and well maintained?	☑	
5	Are the signal leads connected to the correct DAS channel?	☑	
6	Are the DAS, sensor translators, and shelter properly grounded?	☑	
7	Does the instrument shelter have a stable power source?	☑	
8	Is the instrument shelter temperature controlled?	☑	

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

11 Tower comments?

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

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

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

Site operation procedures

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

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

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

Site operation procedures

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

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

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

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID LRL117 **Technician** Sandy Grenville **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	B	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
GLR468-Martin 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	B	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

DAS Time Max Error: 1.17

Mfg	**Serial Number**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Use Desc.**
Environmental Sys	2560	GLR468	Martin Valvur	08/17/2017	DAS	Primary

Das Date: 8 /17/2017
Das Time: 8:39:00
Das Day: 229

Audit Date 8 /17/2017
Audit Time 8:40:10
Audit Day 229

Low Channel:		**High Channel:**	
Avg Diff:	**Max Diff:**	**Avg Diff:**	**Max Diff:**
0.0002	0.0003	0.0002	0.0003

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
15	0.0000	-0.0002	-0.0003	V	V	-0.0001
15	0.1000	0.0998	0.0995	V	V	-0.0003
15	0.3000	0.2995	0.2997	V	V	0.0002
15	0.5000	0.4997	0.4994	V	V	-0.0003
15	0.7000	0.7001	0.6998	V	V	-0.0003
15	0.9000	0.9003	0.9002	V	V	-0.0001
15	1.0000	1.0000	1.0003	V	V	0.0003

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Tylan	AW9710138	GLR468	Martin Valvur	08/17/2017	Flow Rate	none

Mfg Tylan

SN/Owner ID FP9403014 03687

Parameter MFC power supply

Mfg BIOS

Parameter Flow Rate

Serial Number 148613

Tfer Desc. BIOS 220-H

Tfer ID 01421

Slope 1.00153

Intercept 0.00366

Cert Date 1/25/2017

CorrCoff 1.00000

DAS 1: A Avg % Diff:	DAS 1: A Max % Di	DAS 2: A Avg %Dif	DAS 2: A Max % Di
2.38%	2.38%		

Cal Factor Zero 0.37

Cal Factor Full Scale 6.01

Rotometer Reading: 3.2

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	-0.36	0.0000	0.01	l/m	l/m	
primary	leak check	0.000	0.000	-0.36	0.0000	0.00	l/m	l/m	
primary	test pt 1	2.950	2.940	2.34	0.0000	3.01	l/m	l/m	2.38%
primary	test pt 2	2.950	2.940	2.34	0.0000	3.01	l/m	l/m	2.38%
primary	test pt 3	2.950	2.940	2.34	0.0000	3.01	l/m	l/m	2.38%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	0.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	360 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1023943901	GLR468	Martin Valvur	08/17/2017	Ozone	none

Slope:	1.05210	**Slope:**	0.00000
Intercept	0.44679	**Intercept**	0.00000
CorrCoff	0.99994	**CorrCoff**	0.00000

DAS 1: **DAS 2:**

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
6.3%	7.9%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00466	**Intercept**	0.01298
Cert Date	1/1/2017	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.40	0.38	1.15	ppb	
primary	2	15.07	14.98	16.16	ppb	7.88%
primary	3	35.04	34.86	37.26	ppb	6.88%
primary	4	65.60	65.28	68.27	ppb	4.58%
primary	5	112.02	111.48	118.20	ppb	6.03%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	-0.4	**Status**	pass
Sensor Component	Span	**Condition**	1.007	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	0.000	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	0.9999	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	61.3 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.9 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.65 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	668.2 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	29.7 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	56.1 kHz	**Status**	Fail
Sensor Component	Cell B Noise	**Condition**	0.5 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.56 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	668.2 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	17625	GLR468	Martin Valvur	08/17/2017	Temperature2meter	none

Mfg Fluke **Parameter** Temperature

Serial Number 3275143 **Tfer Desc.** RTD

Tfer ID 01229

Slope 1.00006 **Intercept** 0.03191

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

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
1.15	1.65		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	0.06	0.03	0.0000	-0.62	C	-0.65
primary	Temp Mid Rang	24.23	24.20	0.0000	25.34	C	1.14
primary	Temp High Rang	47.77	47.74	0.0000	46.09	C	-1.65

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

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	GLR468	Martin Valvur	08/17/2017	Shelter Temperature	77

DAS 1:

Abs Avg Err	Abs Max Er
0.86	1.28

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Fluke

Parameter Shelter Temperatur

Serial Number 3275143

Tfer Desc. RTD

Tfer ID 01229

Slope 1.00006

Intercept 0.03191

Cert Date 1/23/2017

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	25.30	25.27	0.000	24.0	C	-1.28
primary	Temp Mid Range	25.39	25.36	0.000	24.2	C	-1.21
primary	Temp Mid Range	25.01	24.98	0.000	25.1	C	0.09

Sensor Component System Memo

Condition

Status pass

Infrastructure Data For

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

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8810 (s/n 2149-20)	640 cuft

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
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 ID GLR468 **Technician** Martin Valvur **Site Visit Date** 08/17/2017

Site Sponsor (agency)	NPS	**USGS Map**		Lake McDonald West
Operating Group	NPS	**Map Scale**		
AQS #	30-029-8001	**Map Date**		
Meteorological Type	R.M. Young			
Air Pollutant Analyzer	Ozone, IMPROVE	**QAPP Latitude**		48.5103
Deposition Measurement	dry, wet, Hg	**QAPP Longitude**		-113.9956
Land Use	woodland - mixed	**QAPP Elevation Meters**		976
Terrain	complex	**QAPP Declination**		18
Conforms to MLM	No	**QAPP Declination Date**		12/27/2004
Site Telephone	(406) 888-7983	**Audit Latitude**		48.510301
Site Address 1	Horse Stables	**Audit Longitude**		-113.996807
Site Address 2	Quarter Circle Bridge Rd	**Audit Elevation**		964
County	Flathead	**Audit Declination**		14.1
City, State	West Glacier, MT		**Present**	
Zip Code	59936	**Fire Extinguisher**	☑	Inspected June 2011
Time Zone	Mountain	**First Aid Kit**	☑	
Primary Operator		**Safety Glasses**	☑	
Primary Op. Phone #		**Safety Hard Hat**	☑	
Primary Op. E-mail		**Climbing Belt**	☑	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

Shelter Working Room ☑ **Make** Ekto **Model** 8810 (s/n 2149-20) **Shelter Size** 640 cuft

Shelter Clean ☑ **Notes** The shelter is in good condition. Evidence of repairs to roof leaks attempted. Some floor tiles are loose.

Site OK ☑ **Notes**

Driving Directions 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.

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 ☐

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

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)**	☑	Temperature now at 2 meters
6	**Is the solar radiation sensor plumb?**	☑	N/A
7	**Is it sited to avoid shading, or any artificial or reflected light?**	☑	N/A
8	**Is the rain gauge plumb?**	☑	N/A
9	**Is it sited to avoid sheltering effects from buildings, trees, towers, etc?**	☑	N/A
10	**Is the surface wetness sensor sited with the grid surface facing north?**	☑	N/A
11	**Is it inclined approximately 30 degrees?**	☑	N/A

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

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

Field 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?	☑	

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

Field Systems Data Form

F-02058-1500-S5-rev002

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

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

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

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

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?	☑	Met sensors only
4	Are the signal connections protected from the weather and well maintained?	☑	
5	Are the signal leads connected to the correct DAS channel?	☑	
6	Are the DAS, sensor translators, and shelter properly grounded?	☑	
7	Does the instrument shelter have a stable power source?	☑	
8	Is the instrument shelter temperature controlled?	☑	

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

11 Tower comments?

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

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

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑	Dataview	☑
SSRF	☑		☑
Site Ops Manual	☑	Jan 2006	☐
HASP	☑	April 2004	☐
Field Ops Manual	☑	April 2004	☐
Calibration Reports	☑		☐
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedul	☐		☐

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

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

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

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

Site operation procedures

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

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

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

Site operation procedures

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

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

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

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID GLR468 **Technician** Martin Valvur **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	B	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*

THR422-Martin Valvur-08/29/2017

Site Visit Date		*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
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	B	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

DAS Time Max Error: 1.25

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	2600	THR422	Martin Valvur	08/29/2017	DAS	Primary

Das Date: 8 /29/2017
Das Time: 7:14:15
Das Day: 241

Audit Date 8 /29/2017
Audit Time 7:15:30
Audit Day 241

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

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	-0.0005	-0.0005	V	V	0.0000
7	0.1000	0.0996	0.0996	V	V	0.0000
7	0.3000	0.2991	0.2992	V	V	0.0001
7	0.5000	0.5000	0.4998	V	V	-0.0002
7	0.7000	0.6998	0.6996	V	V	-0.0002
7	0.9000	0.8999	0.9001	V	V	0.0002
7	1.0000	1.0004	1.0004	V	V	0.0000

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Tylan	AW02213004	THR422	Martin Valvur	08/29/2017	flow rate	none

Mfg Tylan

SN/Owner ID FP902022 00042

Parameter MFC power supply

Mfg BIOS

Parameter Flow Rate

Serial Number 148613

Tfer Desc. BIOS 220-H

Tfer ID 01421

Slope 1.00153

Intercept 0.00366

Cert Date 1/25/2017

CorrCoff 1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
0.22%	0.33%		

Cal Factor Zero 0.171

Cal Factor Full Scale 11

Rotometer Reading: 3.25

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	-0.22	0.0000	-0.02	l/m	l/m	
primary	leak check	0.000	0.000	-0.22	0.0000	-0.03	l/m	l/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	l/m	l/m	0.00%
primary	test pt 3	3.002	2.990	2.60	0.0000	3.00	l/m	l/m	0.33%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Fair	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	0.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	135 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1153170017	THR422	Martin Valvur	08/29/2017	Ozone	E00051

Slope:	0.95995	**Slope:**	0.00000
Intercept	-0.27325	**Intercept**	0.00000
CorrCoff	0.99995	**CorrCoff**	0.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
5.2%	5.8%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00466	**Intercept**	0.01298
Cert Date	1/1/2017	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.18	0.16	0.33	ppb	
primary	2	15.86	15.77	14.85	ppb	-5.83%
primary	3	35.31	35.13	33.14	ppb	-5.66%
primary	4	67.24	66.91	63.40	ppb	-5.25%
primary	5	112.36	111.82	107.50	ppb	-3.86%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.30	**Status**	pass
Sensor Component	Span	**Condition**	0.969	**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**	48.1 kHz	**Status**	Fail
Sensor Component	Cell A Noise	**Condition**	0.8 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.67 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	670.1 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	32.8 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	72.4 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.6 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.67 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	669.8 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Climatronics	7974	THR422	Martin Valvur	08/29/2017	Temperature2meter	none

Mfg Climatronics

SN/Owner ID 217 01545

Parameter Temperature Translator

Mfg Fluke **Parameter** Temperature

Serial Number 3275143 **Tfer Desc.** RTD

Tfer ID 01229

Slope 1.00006 **Intercept** 0.03191

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

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.11	0.15		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	0.11	0.08	0.0000	0.23	C	0.15
primary	Temp Mid Rang	24.61	24.58	0.0000	24.63	C	0.05
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	**Condition**	N/A	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	THR422	Martin Valvur	08/29/2017	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
1.93	2.17

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Fluke

Parameter Shelter Temperatur

Serial Number 3275143

Tfer Desc. RTD

Tfer ID 01229

Slope 1.00006

Intercept 0.03191

Cert Date 1/23/2017

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	23.00	22.97	0.000	24.4	C	1.47
primary	Temp Mid Range	25.53	25.50	0.000	27.7	C	2.16
primary	Temp Mid Range	26.49	26.46	0.000	28.6	C	2.17

Sensor Component System Memo

Condition

Status pass

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

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
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 ID THR422 **Technician** Martin Valvur **Site Visit Date** 08/29/2017

Site Sponsor (agency)	NPS	**USGS Map**		Fryburg NW
Operating Group	NPS and state of ND	**Map Scale**		
AQS #	38-007-0002	**Map Date**		
Meteorological Type	Climatronics			
Air Pollutant Analyzer	Ozone, SO2, IMPROVE, PM2.5	**QAPP Latitude**		46.8947
Deposition Measurement	dry, wet	**QAPP Longitude**		-103.3778
Land Use	prairie	**QAPP Elevation Meters**		850
Terrain	rolling - complex	**QAPP Declination**		
Conforms to MLM	Marginally	**QAPP Declination Date**		
Site Telephone		**Audit Latitude**		46.894844
Site Address 1	Painted Canyon Visitor Center	**Audit Longitude**		-103.377719
Site Address 2	Exit 32 Interstate 94	**Audit Elevation**		840
County	Billings	**Audit Declination**		8.2
City, State	Medora, ND		**Present**	
Zip Code	58645	**Fire Extinguisher**	☐	
Time Zone	Mountain	**First Aid Kit**	☑	
Primary Operator		**Safety Glasses**	☐	
Primary Op. Phone #		**Safety Hard Hat**	☑	
Primary Op. E-mail		**Climbing Belt**	☑	
Backup Operator		**Security Fence**	☑	
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

Shelter Working Room	☑	**Make**	Ekto	**Model**	8814 (s/n 3028-1)	**Shelter Size**	896 cuft
Shelter Clean	☑	**Notes**	The shelter is in good condition, clean and well organized.				
Site OK	☑	**Notes**					

Driving Directions From Interstate 94 take exit 32 to the Painted Canyon rest area and visitor center. The site is just east of the parking lot on a gravel road.

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		☑
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 ☐

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.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID THR422

Technician Martin Valvur

Site Visit Date 08/29/2017

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

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

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

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

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		3/8 teflon by 10 meters and glass manifold
4	Describe dry dep sample tube.		3/8 teflon by 12 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet and analyzer
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☐	
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

The 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 Visit Date** 08/29/2017

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

11 Tower comments?

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

Field Systems Data Form

F-02058-1500-S7-rev002

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

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

Site operation procedures

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

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

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

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

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

1	Do multi-point calibration gases go through the complete sample train including all filters?	☐	Not performed
2	Do automatic and manual z/s/p gasses go through the complete sample train including all filters?	☐	Not performed
3	Are the automatic and manual z/s/p checks monitored and reported? If yes, how?	☐	

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

Field Systems Data Form

F-02058-1500-S9-rev002

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

Site operation procedures

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

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

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

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID THR422 **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	B	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 Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
VOY413-Martin 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	B	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

DAS Time Max Error: 3.08

Mfg	**Serial Number**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Use Desc.**
Environmental Sys	4059	VOY413	Martin Valvur	09/01/2017	DAS	Primary

Das Date: 9 /1 /2017
Das Time: 9:51:00
Das Day: 244

Audit Date 9 /1 /2017
Audit Time 9:54:05
Audit Day 244

Low Channel:

High Channel:

Low Channel: Avg Diff:	**Low Channel: Max Diff:**	**High Channel: Avg Diff:**	**High Channel: Max Diff:**
0.0001	0.0003	0.0001	0.0003

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
15	0.0000	-0.0002	0.0001	V	V	0.0003
15	0.1000	0.0998	0.0997	V	V	-0.0001
15	0.3000	0.2999	0.2998	V	V	-0.0001
15	0.5000	0.4998	0.4998	V	V	0.0000
15	0.7000	0.7000	0.7000	V	V	0.0000
15	0.9000	0.8996	0.8997	V	V	0.0001
15	1.0000	1.0000	0.9999	V	V	-0.0001

Flow Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
Tylan	AW9806012	VOY413	Martin Valvur	09/01/2017	flow rate	none

Mfg	Tylan	
SN/Owner ID	FP9806001	none
Parameter	MFC power supply	

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

DAS 1: **DAS 2:**

A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
0.33%	0.33%		

Cal Factor Zero	0.12
Cal Factor Full Scale	5.606
Rotometer Reading:	3

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	-0.15	0.0000	0.00	l/m	l/m	
primary	leak check	0.000	0.000	-0.11	0.0000	0.03	l/m	l/m	
primary	test pt 1	2.996	2.990	2.62	0.0000	3.00	l/m	l/m	0.33%
primary	test pt 2	2.997	2.990	2.63	0.0000	3.00	l/m	l/m	0.33%
primary	test pt 3	2.996	2.990	2.62	0.0000	3.00	l/m	l/m	0.33%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	0.25 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	270 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	49C-70522-366	VOY413	Martin Valvur	09/01/2017	Ozone	90730

Slope:	1.03949	**Slope:**	0.00000
Intercept	-0.12822	**Intercept**	0.00000
CorrCoff	0.99999	**CorrCoff**	0.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
3.5%	4.2%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00466	**Intercept**	0.01298
Cert Date	1/1/2017	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.40	0.38	0.20	ppb	
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	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**	88.9 kHz	**Status**	pass
Sensor Component	Cell A Noise	**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 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 B Flow	**Condition**	0.75 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	713.4 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Climatronics	04767	VOY413	Martin Valvur	09/01/2017	Temperature2meter	none

Mfg Climatronics

SN/Owner ID 229 01341

Parameter Temperature Translator

Mfg Fluke **Parameter** Temperature

Serial Number 3275143 **Tfer Desc.** RTD

Tfer ID 01229

Slope 1.00006 **Intercept** 0.03191

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

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.38	0.52		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	0.12	0.09	0.0000	0.42	C	0.33
primary	Temp Mid Rang	23.84	23.81	0.0000	24.09	C	0.28
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	**Condition**	N/A	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	VOY413	Martin Valvur	09/01/2017	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.73	0.80

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Fluke

Parameter Shelter Temperatur

Serial Number 3275143

Tfer Desc. RTD

Tfer ID 01229

Slope 1.00006

Intercept 0.03191

Cert Date 1/23/2017

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	23.09	23.06	0.000	22.3	C	-0.74
primary	Temp Mid Range	21.95	21.92	0.000	22.7	C	0.8
primary	Temp Mid Range	23.74	23.71	0.000	24.4	C	0.66

Sensor Component System Memo

Condition

Status pass

Infrastructure Data For

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

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8810 (s/n 2880-2)	640 cuft

Sensor Component	Sample Tower Type	**Condition**	Type B	**Status**	pass
Sensor Component	Conduit	**Condition**	Good	**Status**	pass
Sensor Component	Met Tower	**Condition**	Good	**Status**	pass
Sensor Component	Moisture Trap	**Condition**	Installed	**Status**	pass
Sensor Component	Power Cables	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Temp Control	**Condition**	Functioning	**Status**	pass
Sensor Component	Rotometer	**Condition**	Installed	**Status**	pass
Sensor Component	Sample Tower	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Condition	**Condition**	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

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

Site Sponsor (agency)	NPS	**USGS Map**	Ash River NE
Operating Group	NPS	**Map Scale**	
AQS #	27-137-0034	**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone, IMPROVE	**QAPP Latitude**	48.4128
Deposition Measurement	dry, wet	**QAPP Longitude**	-92.8292
Land Use	woodland - mixed	**QAPP Elevation Meters**	429
Terrain	rolling	**QAPP Declination**	
Conforms to MLM	Marginally	**QAPP Declination Date**	
Site Telephone		**Audit Latitude**	48.412518
Site Address 1	CR 129	**Audit Longitude**	-92.829225
Site Address 2	Ash River Visitor Center Rd.	**Audit Elevation**	427
County	St. Louis	**Audit Declination**	0.5
City, State	Orr, MN	**Present**	
Zip Code	55771	**Fire Extinguisher** ☐	
Time Zone	Central	**First Aid Kit** ☐	
Primary Operator		**Safety Glasses** ☐	
Primary Op. Phone #		**Safety Hard Hat** ☐	
Primary Op. E-mail		**Climbing Belt** ☑	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Step** ☑	

Shelter Working Room ☑ **Make** Ekto **Model** 8810 (s/n 2880-2) **Shelter Size** 640 cuft

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

Site OK ☑ **Notes**

Driving Directions From Duluth take route 53 north towards International Falls. Approximately 20 miles south of International Falls and 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.

Field Systems Data Form F-02058-1500-S3-rev002

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

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

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

1	Do the sample inlets have at least a 270 degree arc of unrestricted airflow?	☑	
2	Are the sample inlets 3 - 15 meters above the ground?	☑	
3	Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees?	☐	Trees within 5 meters

Pollutant analyzers and deposition equipment operations and maintenance

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

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

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

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

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

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

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

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

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

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

Site operation procedures

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

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

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

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID 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	B	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

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
SAN189-Martin Valvur-09/07/2017						
1	9/7/2017	Computer	Dell	07051	Inspiron 15	Unknown
2	9/7/2017	DAS	Campbell	000360	CR3000	2138
3	9/7/2017	Elevation	Elevation	None	1	None
4	9/7/2017	Filter pack flow pump	Thomas	06019	107CAB18	050400022576
5	9/7/2017	Flow Rate	Apex	000861	AXMC105LPMDPCV	illegible
6	9/7/2017	Infrastructure	Infrastructure	none	none	none
7	9/7/2017	Modem	Raven	06453	V4221-V	0808337397
8	9/7/2017	Ozone	ThermoElectron Inc	000729	49i A1NAA	1105347323
9	9/7/2017	Ozone Standard	ThermoElectron Inc	000367	49i A3NAA	0726124683
10	9/7/2017	Sample Tower	Aluma Tower	000207	B	none
11	9/7/2017	Shelter Temperature	Campbell	none	107-L	223461
12	9/7/2017	Siting Criteria	Siting Criteria	None	1	None
13	9/7/2017	Temperature	RM Young	06537	41342VC	14798
14	9/7/2017	Zero air pump	Werther International	06875	C 70/4	000814272

DAS Data Form

DAS Time Max Error: 0

Mfg	**Serial Number**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Use Desc.**
Campbell	2138	SAN189	Martin Valvur	09/07/2017	DAS	Primary

Das Date: 9 /7 /2017
Das Time: 8:22:00
Das Day: 250

Audit Date 9 /7 /2017
Audit Time 8:22:00
Audit Day 250

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

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	-0.0004	-0.0002	V	V	0.0002
7	0.1000	0.0998	0.0997	V	V	-0.0001
7	0.3000	0.2997	0.2998	V	V	0.0001
7	0.5000	0.5004	0.5004	V	V	0.0000
7	0.7000	0.6993	0.6995	V	V	0.0002
7	0.9000	0.8995	0.8995	V	V	0.0000
7	1.0000	0.9993	0.9992	V	V	-0.0001

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	SAN189	Martin Valvur	09/07/2017	Flow Rate	000861

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

DAS 1:

A Avg % Diff:	A Max % Di
0.78%	1.01%

DAS 2:

A Avg %Dif	A Max % Di

Cal Factor Zero -0.01
Cal Factor Full Scale 1
Rotometer Reading: 3.2

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.01	0.000	0.00	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	-0.02	l/m	l/m	
primary	test pt 1	2.990	2.980	2.97	0.000	3.00	l/m	l/m	0.67%
primary	test pt 2	2.990	2.980	2.97	0.000	3.01	l/m	l/m	1.01%
primary	test pt 3	2.990	2.980	2.97	0.000	3.00	l/m	l/m	0.67%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	4.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	180 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347323	SAN189	Martin Valvur	09/07/2017	Ozone	000729

Slope:	0.93780	**Slope:**	0.00000
Intercept	-2.35573	**Intercept**	0.00000
CorrCoff	0.99979	**CorrCoff**	0.00000

DAS 1: **DAS 2:**

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
11.6%	16.9%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00466	**Intercept**	0.01298
Cert Date	1/1/2017	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.16	0.14	-3.28	ppb	
primary	2	15.32	15.23	12.65	ppb	-16.94%
primary	3	36.66	36.47	32.75	ppb	-10.20%
primary	4	65.21	64.89	58.09	ppb	-10.48%
primary	5	106.63	106.12	97.00	ppb	-8.59%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**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 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.71 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	659.8 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	33.8 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	83.8 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.6 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.68 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	695.2 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	14798	SAN189	Martin Valvur	09/07/2017	Temperature	06537

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

DAS 1: Abs Avg Err	DAS 1: Abs Max Er	DAS 2: Abs Avg Err	DAS 2: Abs Max Er
0.06	0.13		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.30	0.27	0.000	0.3	C	0.02
primary	Temp Mid Range	22.36	22.33	0.000	22.5	C	0.13
primary	Temp High Range	47.87	47.84	0.000	47.9	C	0.02

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

Shelter Temperature Data For

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
Campbell	223461	SAN189	Martin Valvur	09/07/2017	Shelter Temperature	none

DAS 1:

DAS 2:

Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.75	1.11		

Mfg Fluke

Parameter Shelter Temperatur

Serial Number 3275143

Tfer Desc. RTD

Tfer ID 01229

Slope 1.00006

Intercept 0.03191

Cert Date 1/23/2017

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	25.30	25.27	0.000	24.2	C	-1.11
primary	Temp Mid Range	25.79	25.76	0.000	24.9	C	-0.88
primary	Temp Mid Range	25.83	25.80	0.000	25.5	C	-0.26

Sensor Component System Memo

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
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:** ShelterCleanNotes

The shelter is in very good condition, however somewhat cluttered.

Field Systems Data Form

F-02058-1500-S1-rev002

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

Site Sponsor (agency)	EPA	**USGS Map**		Santee
Operating Group	Santee Sioux Nation	**Map Scale**		
AQS #	31-107-9991	**Map Date**		
Meteorological Type	R.M. Young			
Air Pollutant Analyzer	Ozone, SO2, NOx, CO	**QAPP Latitude**		
Deposition Measurement	dry	**QAPP Longitude**		
Land Use	range	**QAPP Elevation Meters**		429
Terrain	rolling	**QAPP Declination**		
Conforms to MLM	Yes	**QAPP Declination Date**		6/21/2006
Site Telephone	(402) 857-2546	**Audit Latitude**		42.829154
Site Address 1	SR S54D	**Audit Longitude**		-97.854128
Site Address 2	Santee Sioux Indian Reservation	**Audit Elevation**		434
County	Knox	**Audit Declination**		5.0
City, State	Niobrara, NE		**Present**	
Zip Code	68760	**Fire Extinguisher**	☑	No inspection date
Time Zone	Central	**First Aid Kit**	☑	
Primary Operator		**Safety Glasses**	☑	
Primary Op. Phone #		**Safety Hard Hat**	☐	
Primary Op. E-mail		**Climbing Belt**	☐	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

Shelter Working Room ☑ **Make** Shelter One **Model** E8109-26012 **Shelter Size** 720 cuft

Shelter Clean ☑ **Notes** The shelter is in very good condition, however somewhat cluttered.

Site OK ☑ **Notes**

Driving Directions 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 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		☑

Siting Distances OK ☑

Siting Criteria Comment

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID 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 north?	☑	N/A
11	Is it inclined approximately 30 degrees?	☑	N/A

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

Field Systems Data Form

F-02058-1500-S4-rev002

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

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

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 16 meters
4	Describe dry dep sample tube.		1/4 teflon by 16 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID 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)	☑	
3	Do the analyzer and sensor signal leads pass through lightning protection circuitry?	☐	Met sensors only
4	Are the signal connections protected from the weather and well maintained?	☑	
5	Are the signal leads connected to the correct DAS channel?	☑	
6	Are the DAS, sensor translators, and shelter properly grounded?	☑	
7	Does the instrument shelter have a stable power source?	☑	
8	Is the instrument shelter temperature controlled?	☑	

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

11 Tower comments?

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

Field Systems Data Form

F-02058-1500-S7-rev002

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

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

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

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

Site operation procedures

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

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

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

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID 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	B	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
NIC001-Eric Hebert-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	B	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

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	unknown	NIC001	Eric Hebert	09/26/2017	Flow Rate	000594

Mfg BIOS

Parameter Flow Rate

Serial Number 122974

Tfer Desc. BIOS 220-H

Tfer ID 01416

Slope 1.00732

Intercept -0.02202

Cert Date 3/8/2017

CorrCoff 0.99970

DAS 1:

DAS 2:

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
0.89%	0.89%		

Cal Factor Zero -0.055

Cal Factor Full Scale 0.964

Rotometer Reading: 2.95

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.06	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	-0.06	l/m	l/m	
primary	test pt 1	3.031	3.030	3.00	0.000	3.00	l/m	l/m	-0.89%
primary	test pt 2	3.035	3.030	3.00	0.000	3.00	l/m	l/m	-0.89%
primary	test pt 3	3.032	3.030	3.00	0.000	3.00	l/m	l/m	-0.89%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	See comments	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	45 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Temperature Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
RM Young	none	NIC001	Eric Hebert	09/26/2017	Temperature	04943

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

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.20	0.35		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.01	0.04	0.000	0.4	C	0.35
primary	Temp Mid Range	26.39	26.25	0.000	26.2	C	-0.07
primary	Temp High Range	49.46	49.17	0.000	49.0	C	-0.18

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

Infrastructure Data For

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

Shelter Make	**Shelter Model**	**Shelter Size**

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

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

Site Sponsor (agency) EPA

Operating Group NY DEC

AQS #

Meteorological Type

Air Pollutant Analyzer

Deposition Measurement dry

Land Use Woodland - mixed

Terrain Complex

Conforms to MLM No

Site Telephone

Site Address 1

Site Address 2

County Herkimer

City, State Old Forge, NY

Zip Code 13420

Time Zone Eastern

Primary Operator

Primary Op. Phone #

Primary Op. E-mail

Backup Operator

Backup Op. Phone #

Backup Op. E-mail

USGS Map

Map Scale

Map Date

QAPP Latitude

QAPP Longitude

QAPP Elevation Meters

QAPP Declination

QAPP Declination Date

Audit Latitude 43.68596

Audit Longitude -74.9857

Audit Elevation 526

Audit Declination

	Present	
Fire Extinguisher	☑	Inspected May 2017
First Aid Kit	☑	
Safety Glasses	☑	
Safety Hard Hat	☐	
Climbing Belt	☐	
Security Fence	☑	
Secure Shelter	☑	
Stable Entry Step	☑	

Shelter Working Room ☐ **Make** **Model** **Shelter Size**

Shelter Clean ☐ **Notes** 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.

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		☑
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	20 m	☐
Tree line	50 m		☑
Obstacles to wind	10 times obstacle height		☑

Siting Distances OK ☑

Siting Criteria Comment

Field Systems Data Form

F-02058-1500-S3-rev002

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

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

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

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

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

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

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		N/A
4	Describe dry dep sample tube.		3/8 Bevline by 10 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	N/A
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	Water in low section of tubing
7	Is the zero air supply desiccant unsaturated?	☑	N/A
8	Are there moisture traps in the sample lines?	☐	Not present
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	

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

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

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

11 Tower comments?

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

	Present		Current
Station Log	☐	No logbook	☐
SSRF	☑		☑
Site Ops Manual	☐		☐
HASP	☐		☐
Field Ops Manual	☐		☐
Calibration Reports	☐		☐
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedul	☐		☐

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

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

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

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

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

Site operation procedures

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

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

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

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

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

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

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

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

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

Site operation procedures

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

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

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

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID 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	B	AT-212125X73	000785
siting criteria	Siting Criteria	none	None	none
Temperature	RM Young	41342	none	04943

Site Inventory by Site Visit

WFM105-Eric Hebert-09/27/2017

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
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	B	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	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	WFM105	Eric Hebert	09/27/2017	Flow Rate	000651

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

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
1.43%	1.64%		

Cal Factor Zero 0

Cal Factor Full Scale 0

Rotometer Reading: 3.1

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.04	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	-0.04	l/m	l/m	
primary	test pt 1	3.051	3.050	2.82	0.000	3.00	l/m	l/m	-1.64%
primary	test pt 2	3.039	3.040	2.82	0.000	3.00	l/m	l/m	-1.32%
primary	test pt 3	3.043	3.040	2.82	0.000	3.00	l/m	l/m	-1.32%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	3.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	315 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	6697	WFM105	Eric Hebert	09/27/2017	Temperature	04683

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

DAS 1: Abs Avg Err	DAS 1: Abs Max Er	DAS 2: Abs Avg Err	DAS 2: Abs Max Er
0.18	0.44		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.37	0.40	0.000	0.8	C	0.44
primary	Temp Mid Range	26.74	26.60	0.000	26.7	C	0.06
primary	Temp High Range	49.70	49.41	0.000	49.5	C	0.04

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

Infrastructure Data For

Site ID WFM105 **Technician** Eric Hebert **Site Visit Date** 09/27/2017

Shelter Make	**Shelter Model**	**Shelter Size**

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

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.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID WFM105 **Technician** Eric Hebert **Site Visit Date** 09/27/2017

Site Sponsor (agency)	EPA	**USGS Map**		
Operating Group	SUNY	**Map Scale**		
AQS #		**Map Date**		
Meteorological Type				
Air Pollutant Analyzer		**QAPP Latitude**		
Deposition Measurement	dry, wet	**QAPP Longitude**		
Land Use	Woodland - mixed	**QAPP Elevation Meters**		
Terrain	Complex	**QAPP Declination**		
Conforms to MLM	No	**QAPP Declination Date**		
Site Telephone		**Audit Latitude**		44.39322
Site Address 1		**Audit Longitude**		-73.85874
Site Address 2		**Audit Elevation**		608
County		**Audit Declination**		
City, State	Wilmington, NY		**Present**	
Zip Code	12997	**Fire Extinguisher**	☑	
Time Zone	Eastern	**First Aid Kit**	☑	
Primary Operator		**Safety Glasses**	☐	
Primary Op. Phone #		**Safety Hard Hat**	☐	
Primary Op. E-mail		**Climbing Belt**	☐	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☐	
Backup Op. E-mail		**Stable Entry Step**	☐	

Shelter Working Room ☐ **Make** **Model** **Shelter Size**

Shelter Clean ☐ **Notes** Small footprint site with no shelter. Equipment housed in enclosure on sample tower.

Site OK ☑ **Notes**

Driving Directions

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID WFM105 **Technician** Eric Hebert **Site Visit Date** 09/27/2017

Potential Interferent	Minimum Distance From Measurement Apparatus	Distance	Pass = Checked
Large Point Source of SO2 or NOx	20 to 40 km		☑
Major industrial complex	10 to 20 km		☑
City > 50,000 population	40 km		☑
City 10,000 to 50,000 population	10 km		☑
City 1,000 to 10,000 population	5 km		☑
Major highway, airport or rail yard	2 km		☑
Secondary road, heavily traveled	500 m		☑
Secondary road, lightly traveled	200 m		☑
Feedlot operations	500 m		☑
Intensive agricultural ops (including aerial spraying)	500 m		☑
Limited agricultural operations	200 m		☑
Large parking lot	200 m		☑
Small parking lot	100 m	75 m	☐
Tree line	50 m	25 m	☐
Obstacles to wind	10 times obstacle height		☑

Siting Distances OK ☑

Siting Criteria Comment

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

Field Systems Data Form

F-02058-1500-S3-rev002

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID 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?	☑	N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	☑	
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	☑	

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID WFM105 **Technician** Eric Hebert **Site Visit Date** 09/27/2017

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		N/A
4	Describe dry dep sample tube.		3/8 Bevline by 10 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	N/A
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	N/A
8	Are there moisture traps in the sample lines?	☐	Not present
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID WFM105 **Technician** Eric Hebert **Site Visit Date** 09/27/2017

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID WFM105 **Technician** Eric Hebert **Site Visit Date** 09/27/2017

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☐	No logbook	☐
SSRF	☑		☐
Site Ops Manual	☐		☐
HASP	☐		☐
Field Ops Manual	☐		☐
Calibration Reports	☐		☐
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedul	☐		☐

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID WFM105 **Technician** Eric Hebert **Site Visit Date** 09/27/2017

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID WFM105 **Technician** Eric Hebert **Site Visit Date** 09/27/2017

Site operation procedures

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

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

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

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID 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	B	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
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	B	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 Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	unknown	UND002	Eric Hebert	09/28/2017	Flow Rate	000658

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

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
1.46%	2.03%		

Cal Factor Zero 0.013

Cal Factor Full Scale 1.053

Rotometer Reading: 2.95

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.01	l/m	l/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	l/m	2.03%
primary	test pt 3	2.947	2.950	2.88	0.000	3.01	l/m	l/m	2.03%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	180 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	6702	UND002	Eric Hebert	09/28/2017	Temperature	04688

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

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.17	0.19		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	-0.03	0.00	0.000	0.2	C	0.18
primary	Temp Mid Range	25.41	25.28	0.000	25.2	C	-0.13
primary	Temp High Range	47.28	47.01	0.000	46.8	C	-0.19

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

Infrastructure Data For

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

Shelter Make	**Shelter Model**	**Shelter Size**

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

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.

Field Systems Data Form

F-02058-1500-S1-rev002

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

Site Sponsor (agency)	EPA	**USGS Map**		
Operating Group	VT Monitoring Coop	**Map Scale**		
AQS #		**Map Date**		
Meteorological Type				
Air Pollutant Analyzer		**QAPP Latitude**		
Deposition Measurement	dry, wet	**QAPP Longitude**		
Land Use	Woodland - mixed	**QAPP Elevation Meters**		
Terrain	Complex	**QAPP Declination**		
Conforms to MLM	No	**QAPP Declination Date**		
Site Telephone		**Audit Latitude**		44.52843
Site Address 1		**Audit Longitude**		-72.86804
Site Address 2		**Audit Elevation**		402
County	Chittenden	**Audit Declination**		
City, State	Underhill Center, VT		**Present**	
Zip Code	05489	**Fire Extinguisher**	☐	
Time Zone	Eastern	**First Aid Kit**	☐	
Primary Operator		**Safety Glasses**	☐	
Primary Op. Phone #		**Safety Hard Hat**	☐	
Primary Op. E-mail		**Climbing Belt**	☐	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☐	
Backup Op. E-mail		**Stable Entry Step**	☐	

Shelter Working Room ☐ **Make** **Model** **Shelter Size**

Shelter Clean ☐ **Notes** Small footprint site with no shelter. Equipment housed in enclosure on sample tower.

Site OK ☑ **Notes**

Driving Directions

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID UND002 **Technician** 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		☑
Major industrial complex	10 to 20 km		☑
City > 50,000 population	40 km		☑
City 10,000 to 50,000 population	10 km		☑
City 1,000 to 10,000 population	5 km		☑
Major highway, airport or rail yard	2 km		☑
Secondary road, heavily traveled	500 m		☑
Secondary road, lightly traveled	200 m		☑
Feedlot operations	500 m		☑
Intensive agricultural ops (including aerial spraying)	500 m		☑
Limited agricultural operations	200 m		☑
Large parking lot	200 m		☑
Small parking lot	100 m		☑
Tree line	50 m	30 m	☐
Obstacles to wind	10 times obstacle height		☑

Siting Distances OK ☑

Siting Criteria Comment

Field Systems Data Form

F-02058-1500-S3-rev002

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

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

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

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

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

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

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

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		N/A
4	Describe dry dep sample tube.		3/8 Bevline by 10 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	N/A
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	N/A
8	Are there moisture traps in the sample lines?	☐	Not present
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	

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

Field Systems Data Form

F-02058-1500-S6-rev002

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

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

11 Tower comments?

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

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

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

1	Is the station log properly completed during every site visit?	☑	
2	Are the Site Status Report Forms being completed and current?	☑	
3	Are the chain-of-custody forms properly used to document sample transfer to and from lab?	☑	
4	Are ozone z/s/p control charts properly completed and current?	☑	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:

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID UND002 **Technician** Eric Hebert **Site Visit Date** 09/28/2017

Site operation procedures

1	Has the site operator attended a formal CASTNET training course? If yes, when and who instructed?	☐	
2	Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed?	☐	
3	Is the site visited regularly on the required Tuesday schedule?	☑	
4	Are the standard CASTNET operational procedures being flollowed by the site operator?	☑	
5	Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation)	☑	

Are regular operational QA/QC checks performed on meteorological instruments?

QC Check Performed		Frequency	Compliant
Multipoint Calibrations	☑	N/A	☑
Visual Inspections	☑	Weekly	☑
Translator Zero/Span Tests (climatronics)	☑	N/A	☑
Manual Rain Gauge Test	☑	N/A	☑
Confirm Reasonableness of Current Values	☑	Weekly	☑
Test Surface Wetness Response	☑	N/A	☑

Are regular operational QA/QC checks performed on the ozone analyzer?

QC Check Performed		Frequency	Compliant
Multi-point Calibrations	☐	N/A	☑
Automatic Zero/Span Tests	☐	N/A	☑
Manual Zero/Span Tests	☐	N/A	☑
Automatic Precision Level Tests	☐	N/A	☑
Manual Precision Level Test	☐	N/A	☑
Analyzer Diagnostics Tests	☐	N/A	☑
In-line Filter Replacement (at inlet)	☐	N/A	☑
In-line Filter Replacement (at analyze	☐	N/A	☑
Sample Line Check for Dirt/Water	☐	N/A	☑
Zero Air Desiccant Check	☐	N/A	☑

1	Do multi-point calibration gases go through the complete sample train including all filters?	☑	N/A
2	Do automatic and manual z/s/p gasses go through the complete sample train including all filters?	☑	N/A
3	Are the automatic and manual z/s/p checks monitored and reported? If yes, how?	☑	N/A

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID UND002 **Technician** Eric Hebert **Site Visit Date** 09/28/2017

Site operation procedures

1	Is the filter pack being changed every Tuesday as scheduled?	☑	Filter changed mornings
2	Are the Site Status Report Forms being completed and filed correctly?	☑	
3	Are data downloads and backups being performed as scheduled?	☑	No longer required
4	Are general observations being made and recorded? How?	☑	SSRF
5	Are site supplies on-hand and replenished in a timely fashion?	☑	
6	Are sample flow rates recorded? How?	☑	SSRF
7	Are samples sent to the lab on a regular schedule in a timely fashion?	☑	
8	Are filters protected from contamination during handling and shipping? How?	☑	Clean gloves on and off
9	Are the site conditions reported regularly to the field operations manager or staff?	☑	

QC Check Performed		Frequency	Compliant
Multi-point MFC Calibrations	☑	Semiannually	☑
Flow System Leak Checks	☑	Weekly	☑
Filter Pack Inspection	☑	Weekly	☑
Flow Rate Setting Checks	☑	Weekly	☑
Visual Check of Flow Rate Rotometer	☑	Weekly	☑
In-line Filter Inspection/Replacement	☑	As needed	☑
Sample Line Check for Dirt/Water	☑	Weekly	☑

Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID 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	B	AT-212125X77	000778
siting criteria	Siting Criteria	none	None	none
Temperature	RM Young	41342	6702	04688

APPENDIX B

CASTNET Site Spot Report Forms

EEMS Spot Report

Data Compiled: 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**

SiteVisitDate	Site	Technician
07/17/2017	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**

SiteVisitDate	Site	Technician
07/19/2017	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

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.

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**

SiteVisitDate	**Site**	**Technician**
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

EEMS Spot Report

Data Compiled: 8/29/2017 9:01:19 PM

SiteVisitDate	Site	Technician
08/17/2017	GLR468	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	1.15	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**
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.

EEMS Spot Report

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.

EEMS Spot Report

Data Compiled: 8/29/2017 8:28:46 PM

SiteVisitDate	Site	Technician
08/17/2017	LRL117	Sandy Grenville

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	12	0.15	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**

SiteVisitDate	Site	Technician
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.

EEMS Spot Report

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.

EEMS Spot Report

Data Compiled: 7/29/2017 9:03:30 AM

SiteVisitDate	Site	Technician
07/21/2017	NEC602	Martin Valvur

Records with valid pass/fail criteria

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

Records without valid pass/fail criteria

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**

SiteVisitDate	Site	Technician
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.

EEMS Spot Report

Data Compiled: 10/9/2017 9:21:03 PM

SiteVisitDate	Site	Technician
09/26/2017	NIC001	Eric Hebert

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	9	0.20	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**

SiteVisitDate	**Site**	**Technician**
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.

EEMS Spot Report

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.

EEMS Spot Report

Data Compiled: 8/6/2017 7:25:32 PM

SiteVisitDate	Site	Technician
07/21/2017	PAR107	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	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.

EEMS Spot Report

Data Compiled: 8/6/2017 7:57:40 PM

SiteVisitDate	Site	Technician
07/25/2017	PED108	Sandy Grenville

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.06	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.

EEMS Spot Report

Data Compiled: 7/24/2017 12:46:15 PM

SiteVisitDate	Site	Technician
07/15/2017	PND165	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	0.21	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	Site	Technician
07/15/2017	PND165	Martin Valvur

34	Shelter Temperature max error	P	5	2	15	1.12	c	**P**

Records without valid pass/fail criteria

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**

SiteVisitDate	**Site**	**Technician**
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.

EEMS Spot Report

Data Compiled: 8/29/2017 6:09:49 PM

SiteVisitDate	Site	Technician
08/08/2017	ROM206	Martin Valvur

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	15	0.15	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**

SiteVisitDate	**Site**	**Technician**
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.

EEMS Spot Report

Data Compiled: 8/29/2017 5:38:25 PM

SiteVisitDate	Site	Technician
08/01/2017	ROM406	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	0.35	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.

EEMS Spot Report

Data Compiled: 10/9/2017 6:35:47 PM

SiteVisitDate	Site	Technician
09/07/2017	SAN189	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	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

1 **Parameter:** ShelterCleanNotes

The shelter is in very good condition, however somewhat cluttered.

EEMS Spot Report

Data Compiled: 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**

Records without valid pass/fail criteria

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**

SiteVisitDate	**Site**	**Technician**
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.

EEMS Spot Report

Data Compiled: 10/8/2017 9:08:33 PM

SiteVisitDate	Site	Technician
08/29/2017	THR422	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	0.11	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**

SiteVisitDate	**Site**	**Technician**
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.

EEMS Spot Report

Data Compiled: 10/15/2017 3:29:55 PM

SiteVisitDate	Site	Technician
09/28/2017	UND002	Eric Hebert

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	3	0.17	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.

EEMS Spot Report

Data Compiled: 10/8/2017 9:06:50 PM

SiteVisitDate	Site	Technician
09/01/2017	VOY413	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	0.38	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**

SiteVisitDate	Site	Technician
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.

EEMS Spot Report

Data Compiled: 8/6/2017 4:57:25 PM

SiteVisitDate	Site	Technician
07/18/2017	VPI120	Sandy Grenville

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	9	0.21	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.

EEMS Spot Report

Data Compiled: 10/15/2017 3:11:36 PM

SiteVisitDate	Site	Technician
09/27/2017	WFM105	Eric Hebert

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	12	0.18	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	P	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**

SiteVisitDate	Site	Technician
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.

APPENDIX C

CASTNET Ozone Performance Evaluation Forms

Site Inventory by Site Visit

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
KEF112-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

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347306	KEF112	Sandy Grenville	08/16/2017	Ozone	000728

Slope:	0.99672	**Slope:**	0.00000
Intercept	1.07383	**Intercept**	0.00000
CorrCoff	0.99998	**CorrCoff**	0.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
2.4%	5.1%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	517112175	**Tfer Desc.**	Ozone primary stan
Tfer ID	01111		
Slope	1.00250	**Intercept**	0.45870
Cert Date	3/21/2017	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.00	-0.45	0.93	ppb	
primary	2	15.00	14.50	15.24	ppb	5.10%
primary	3	34.85	34.30	35.05	ppb	2.19%
primary	4	68.04	67.41	68.49	ppb	1.60%
primary	5	110.06	109.32	110.00	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	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.000	**Status**	pass
Sensor Component	Span	**Condition**	1.011	**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 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.0 lpm	**Status**	Fail
Sensor Component	Cell A Pressure	**Condition**	683.0 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	37.6 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	89.8 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.8 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.72 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	682.7 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

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 Inventory by Site Visit

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
MKG113-Sandy 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

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244805	MKG113	Sandy Grenville	08/17/2017	Ozone	000703

Slope:	0.98678	**Slope:**	0.00000
Intercept	0.92740	**Intercept**	0.00000
CorrCoff	0.99993	**CorrCoff**	0.00000

DAS 1:

DAS 2:

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
1.1%	3.5%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	517112175	**Tfer Desc.**	Ozone primary stan
Tfer ID	01111		
Slope	1.00250	**Intercept**	0.45870
Cert Date	3/21/2017	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.03	-0.42	0.67	ppb	
primary	2	15.57	15.07	15.10	ppb	0.20%
primary	3	34.99	34.44	35.66	ppb	3.54%
primary	4	68.00	67.37	67.23	ppb	-0.21%
primary	5	110.29	109.55	109.00	ppb	-0.50%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.10	**Status**	pass
Sensor Component	Span	**Condition**	1.010	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	97.3 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**	701.3 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	33.46 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	87.9 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**	701.6 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Ozone	MKG113	Sandy Grenville	08/17/2017	Cell B Flow	ThermoElectron	3408	☐	☐

This analyzer diagnostic check is outside the manufacturer's recommended value.

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Ozone	MKG113	Sandy Grenville	08/17/2017	Cell A Flow	ThermoElectron	3408	☐	☐

This analyzer diagnostic check is outside the manufacturer's recommended value.

Site Inventory by Site Visit

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
ABT147-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

Ozone Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
ThermoElectron Inc	1009241772	ABT147	Sandy Grenville	08/21/2017	Ozone	000627

Slope:	0.98064	**Slope:**	0.00000
Intercept	0.48616	**Intercept**	0.00000
CorrCoff	0.99999	**CorrCoff**	0.00000

DAS 1: **DAS 2:**

A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
1.1%	1.6%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	517112175	**Tfer Desc.**	Ozone primary stan
Tfer ID	01111		
Slope	1.00250	**Intercept**	0.45870
Cert Date	3/21/2017	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.14	-0.31	0.31	ppb	
primary	2	15.00	14.50	14.65	ppb	1.03%
primary	3	35.00	34.45	34.31	ppb	-0.41%
primary	4	68.03	67.40	66.30	ppb	-1.63%
primary	5	110.00	109.26	107.80	ppb	-1.34%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	Not functioning	**Status**	Fail
Sensor Component	Offset	**Condition**	0.20	**Status**	pass
Sensor Component	Span	**Condition**	0.997	**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**	82.2 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.8 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.69 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	715.9 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	33.6 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	88.1 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.4 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.66 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	Not tested	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Site Inventory by Site Visit

NPT006-Martin Valvur-08/22/2017

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
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

Ozone Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
ThermoElectron Inc	1009241779	NPT006	Martin Valvur	08/22/2017	Ozone	000612

Slope:	0.98264	**Slope:**	0.00000
Intercept	-0.30433	**Intercept**	0.00000
CorrCoff	0.99999	**CorrCoff**	0.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
2.8%	3.6%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00466	**Intercept**	0.01298
Cert Date	1/1/2017	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.19	0.17	0.06	ppb	
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%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.10	**Status**	pass
Sensor Component	Span	**Condition**	1.019	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	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 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	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Ozone	NPT006	Martin Valvur	08/22/2017	Cell A Freq.	ThermoElectron	3362	☐	☐

This analyzer diagnostic check is outside the manufacturer's recommended value.