2015 – 3rd Quarter Report
Support for Conducting Systems & Performance Audits of CASTNET Sites and NADP Monitoring Stations

EPA Contract No. EPW12019

Prepared for:

U. S. Environmental Protection Agency

Prepared by:

environmental engineering
& measurement services, inc.

1128 NW 39th Drive
Gainesville, FL 32605

October 2015

Table of Contents

List of Appendices

List of Tables

List of Acronyms and Abbreviations

% diff	percent difference
A/D	analog to digital converter
ARS	Air Resource Specialist, Inc.
ASTM	American Society for Testing and Materials
CASTNET	Clean Air Status and Trends Network
DAS	data acquisition system
DC	direct current
deg	degree
DVM	digital voltmeter
EEMS	Environmental, Engineering & Measurement Services, Inc.
EPA	U.S. Environmental Protection Agency
ESC	Environmental Systems Corporation
FSAD	Field Site Audit Database
GPS	geographical positioning system
lpm	liters per minute
MLM	Multilayer Model
m/s	meters per second
mv	milivolt
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
QAPP	Quality Assurance Project Plan
SOP	standard operating procedure
TEI	Thermo Environmental Instruments
USNO	United States Naval Observatory
V	volts
WRR	World Radiation Reference

1.0 CASTNET Quarterly Report

1.1 Introduction

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

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

CASTNET pollutant flux estimates are calculated as the aggregate product of weekly measured chemical concentrations and model-estimated deposition velocities. Currently, the National Oceanic and Atmospheric Administration's multilayer inferential model (NOAA-MLM) described by Meyers et al. [1998] is used to derive deposition velocity estimates.

As of October 2015, the network is comprised of 94 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. AMEC 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 AMEC continue to operate meteorological sensors. Those sites are BEL116, BVL30, CHE185, and PAL190. Five new sites sponsored by EPA and operated by the BLM in WY also operate meteorological sensors and are BAS601, NEC602, BUF603, FOR604, and SHE604.

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, ROM206, and BEL116. Those variables were audited at the ROM206, PND165, and BVL130 stations during third quarter 2015. All of the SO_2 and NOy results for those audits were found to be within acceptance criteria. The preliminary reports of those results were delivered following the audits; however the results 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
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
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

Sensor	Parameter	Audit Challenge	Acceptance Criteria
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
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 2015

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 2015. The locations and dates of the audits are presented in Table 2.

Table 2. Site Audit Visits

Side ID	Audit Type	Sponsor	Site Visit Date	Station Name
GTH161	without met	EPA	7/2/2015	Gothic
CNT169	without met	EPA	7/24/2015	Centennial
GLR468	without met	NPS	7/28/2015	Glacier NP
ROM206	without met	EPA	8/3/2015	Rocky Mountain NP
ROM406	without met	NPS	8/4/2015	Rocky Mountain NP
THR422	without met	NPS	8/4/2015	Theodore Roosevelt NP
PND165	with met	EPA / BLM	8/10/2015	Pinedale
YEL408	without met	NPS	8/13/2015	Yellowstone NP
BAS601	with met	EPA / BLM	8/14/2015	Basin
SHE604	Flow & met	EPA / BLM	8/18/2015	Sheridan
BUF603	Flow & met	EPA / BLM	8/19/2015	Buffalo
NEC602	with met	EPA / BLM	8/20/2015	Newcastle
WNC429	without met	NPS	8/21/2015	Wind Cave NP
PRK134	without met	EPA	9/3/2015	Perkinstown
VIN140	without met	EPA	9/7/2015	Vincennes
VOY413	without met	NPS	9/8/2015	Voyageurs NP
STK138	without met	EPA	9/11/2015	Stockton
BVL130	with met	EPA	9/14/2015	Bondville
BVL130	NO_y CO SO_2	EPA	9/14/2015	Bondville
ALH157	without met	EPA	9/16/2015	Alhambra

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) ozone Performance Evaluations (PE).

Table 3. Site Ozone PE Visits

Side ID	**Audit Type**	**Sponsor**	**Site Visit Date**	**Station Name**
DEN417	Ozone PE	NPS	7/16/2015	Denali NP
UVL124	Ozone PE	EPA	8/27/2015	Unionville
HOX148	Ozone PE	EPA	8/28/2015	Hoxeyville
SAL133	Ozone PE	EPA	9/8/2015	Salamonie Reservoir

1.4 Audit Results

The observations and results of the systems and performance audits are included in Appendix A, *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, *Site Spot Report Forms*.

The Ozone PE results and observations are included in Appendix C, *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 200 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 100 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 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 Sites Visited Third Quarter 2015

This report covers the results from the NADP sites surveyed during the third quarter (July through September) of 2015. The station names and dates of the audits are presented in Table 4.

Table 4. Sites Surveyed – Third Quarter 2015

Side ID	Network	Visit Date	Station Name
CO08	NTN	7/1/2015	Four Mile Park
CO92	NTN	7/1/2015	Sunlight Peak
CO10	AMoN	7/2/2015	Gothic
CO98	NTN	7/7/2015	Rocky Mountain National Park-Loch Vale
AB13	MDN	7/13/2015	Henry Kroeger
AK04	MDN	7/14/2015	Nome
SK20	NTN	7/14/2015	Cactus Lake
SK21	NTN	7/16/2015	Hudson Bay
AK02	NTN	7/18/2015	Juneau
CO21	NTN	7/20/2015	Manitou
BC24	NTN	7/21/2015	Port Edward
CO02	NTN	7/21/2015	Niwot Saddle
CO90	NTN	7/21/2015	Niwot Ridge-Southeast
BC22	NTN	7/22/2015	Haul Road Station
BC23	NTN	7/22/2015	Lakelse Lake
CO94	NTN	7/22/2015	Sugarloaf
CO09	NTN	7/23/2015	Kawaneechee Meadow
WY00	NTN	7/25/2015	Snowy Range
WY95	NTN / AMoN	7/25/2015	Brooklyn Lake
MT98	NTN	7/27/2015	Havre - Northern Agricultural Research Center
BC16	MDN	7/28/2015	Saturna Island
WY94	NTN / AMoN	7/29/2015	Grand Tetons National Park
WY98	NTN	7/30/2015	Gypsum Creek

Side ID	**Network**	**Visit Date**	**Station Name**
WY02	NTN	7/31/2015	Sinks Canyon
WY97	NTN	7/31/2015	South Pass City
CO22	NTN	8/1/2015	Pawnee
MT96	NTN	8/3/2015	Poplar River
SD08	NTN	8/5/2015	Cottonwood
AB14	MDN	8/7/2015	Genesee
WY06	NTN/AMoN	8/10/2015	Pinedale
KS32	MDN/NTN	8/24/2015	Lake Scott State Park
IN21	MDN	8/25/2015	Clifty Falls State Park
IN21	MDN	8/25/2015	Clifty Falls State Park
OH52	MDN	8/26/2015	South Bass Island
OH52	MDN	8/26/2015	South Bass Island
MI51	NTN/AMoN	8/27/2015	Unionville
MI53	NTN	8/28/2015	Wellston
MI09	MDN/NTN	8/29/2015	Douglas Lake
MI48	MDN/NTN	8/29/2015	Seney National Wildlife Refuge-Headquarters
MI98	NTN	8/31/2015	Raco
WI10	MDN/NTN	9/1/2015	Potawatomi
WI07	MDN/AMoN	9/2/2015	Horicon Marsh
WI31	MDN/NTN	9/2/2015	Devil's Lake
IL63	MDN/NTN	9/6/2015	Dixon Springs Agricultural Center
IN34	MDN/NTN	9/8/2015	Indiana Dunes National Lakeshore
IN20	AMoN	9/9/2015	Salamonie Reservoir
MN01	NTN	9/9/2015	Cedar Creek
MN98	MDN	9/9/2015	Blaine
IL78	NTN	9/10/2015	Monmouth
IL18	NTN	9/11/2015	Shabbona

Side ID	**Network**	**Visit Date**	**Station Name**
MN06	MDN	9/11/2015	Leech Lake
WI99	MDN	9/12/2015	Lake Geneva
IL11	MDN/NTN/AMoN	9/15/2015	Bondville
IL11/11IL	AIRMoN	9/15/2015	Bondville
IN22	MDN/AMoN	9/17/2015	Southwest Purdue Agriculture Center
MN27	MDN/NTN	9/18/2015	Lamberton
KS97	NTN/AMoN	9/24/2015	Kickapoo Tribe - Powhattan

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

GTH161-Alison Ray-07/02/2015

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
1	7/2/2015	Computer	Dell	000251	D520	5HFNHB1
2	7/2/2015	DAS	Campbell	000416	CR3000	2513
3	7/2/2015	Elevation	Elevation	None	1	None
4	7/2/2015	Filter pack flow pump	Thomas	00517	107CAB18	100300020817
5	7/2/2015	Flow Rate	Apex	000558	AXMC105LPMDPCV	50735
6	7/2/2015	Infrastructure	Infrastructure	none	none	none
7	7/2/2015	Modem	Raven	06611	H4223-C	0844355568
8	7/2/2015	Ozone	ThermoElectron Inc	000618	49i A1NAA	1009241789
9	7/2/2015	Ozone Standard	ThermoElectron Inc	000439	49i A3NAA	CM08200015
10	7/2/2015	Sample Tower	Aluma Tower	03564	A	none
11	7/2/2015	Shelter Temperature	Campbell	none	107-L	none
12	7/2/2015	Siting Criteria	Siting Criteria	None	1	None
13	7/2/2015	Temperature	RM Young	06120	41342VC	11742
14	7/2/2015	Zero air pump	Werther International	06927	P 70/4	000836211

DAS Data Form

DAS Time Max Error: 0.03

Mfg	**Serial Number**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Use Desc.**
Campbell	2513	GTH161	Alison Ray	07/02/2015	DAS	Primary

Das Date: 7 /3 /2015

Das Time: 8:32:30

Das Day: 184

Audit Date 7 /3 /2015

Audit Time 8:32:32

Audit Day 184

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	1/22/2015	**CorrCoff**	1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	-0.0001	0.0002	V	V	0.0003
7	0.1000	0.1005	0.1006	V	V	0.0001
7	0.3000	0.3002	0.3003	V	V	0.0001
7	0.5000	0.5004	0.5003	V	V	-0.0001
7	0.7000	0.7005	0.7003	V	V	-0.0002
7	0.9000	0.9004	0.9001	V	V	-0.0003
7	1.0000	1.0000	1.0002	V	V	0.0002

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	50735	GTH161	Alison Ray	07/02/2015	Flow Rate	000558

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	131818	**Tfer Desc.**	BIOS 220-H
Tfer ID	01417		
Slope	1.00316	**Intercept**	-0.00540
Cert Date	1/7/2015	**CorrCoff**	1.00000

DAS 1:

DAS 2:

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
1.21%	1.32%		

Cal Factor Zero -0.023

Cal Factor Full Scale 0.983

Rotometer Reading: 3.9

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	0.00	l/m	l/m	
primary	test pt 1	3.037	3.030	2.99	0.000	2.99	l/m	l/m	-1.32%
primary	test pt 2	3.030	3.030	2.99	0.000	2.99	l/m	l/m	-1.32%
primary	test pt 3	3.028	3.020	2.99	0.000	2.99	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**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	0.5 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 Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241789	GTH161	Alison Ray	07/02/2015	Ozone	000618

Slope: 0.98457 **Slope:** 0.00000
Intercept -0.91907 **Intercept** 0.00000
CorrCoff 0.99986 **CorrCoff** 0.00000

DAS 1: **DAS 2:**

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
3.5%	4.8%		

Mfg ThermoElectron Inc **Parameter** ozone
Serial Number 49CPS-70008-364 **Tfer Desc.** Ozone primary stan
Tfer ID 01110
Slope 1.00952 **Intercept** -0.24284
Cert Date 1/7/2015 **CorrCoff** 1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.33	0.56	-0.01	ppb	
primary	2	28.99	28.95	27.89	ppb	-3.66%
primary	3	48.99	48.76	46.42	ppb	-4.80%
primary	4	79.36	78.85	75.93	ppb	-3.70%
primary	5	108.99	108.20	106.40	ppb	-1.66%

Sensor Component Sample Train **Condition** Good **Status** pass
Sensor Component Inlet Filter Condition **Condition** Clean **Status** pass
Sensor Component Battery Backup **Condition** N/A **Status** pass
Sensor Component Offset **Condition** 0.000 **Status** pass
Sensor Component Span **Condition** 1.002 **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** 97.2 kHz **Status** pass
Sensor Component Cell A Noise **Condition** 0.8ppb **Status** pass
Sensor Component Cell A Flow **Condition** 0.56 lpm **Status** pass
Sensor Component Cell A Pressure **Condition** 519.2 mmHg **Status** pass
Sensor Component Cell A Tmp. **Condition** 38.3 C **Status** pass
Sensor Component Cell B Freq. **Condition** 101.1 kHz **Status** pass
Sensor Component Cell B Noise **Condition** 0.8 ppb **Status** pass
Sensor Component Cell B Flow **Condition** 0.56 lpm **Status** pass
Sensor Component Cell B Pressure **Condition** **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 Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	11742	GTH161	Alison Ray	07/02/2015	Temperature	06120

Mfg	Eutechnics	**Parameter**	Temperature
Serial Number	01D102193	**Tfer Desc.**	RTD translator
Tfer ID	01231		
Slope	0.99950	**Intercept**	-0.03156
Cert Date	1/28/2015	**CorrCoff**	0.99999

Mfg	Eutechnics	**Parameter**	Temperature
Serial Number	01H0060	**Tfer Desc.**	RTD probe
Tfer ID	01230		
Slope	0.99950	**Intercept**	-0.03156
Cert Date	1/28/2015	**CorrCoff**	0.99999

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.32	0.71		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.14	0.17	0.000	0.9	C	0.71
primary	Temp Mid Range	19.23	19.27	0.000	19.2	C	-0.07
primary	Temp High Range	41.29	41.34	0.000	41.2	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**		**Status**	pass

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	GTH161	Alison Ray	07/02/2015	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.36	0.36

DAS 2:

Abs Avg Err	Abs Max Er

Mfg	Eutechnics	**Parameter**	Shelter Temperatur
Serial Number	01D102193	**Tfer Desc.**	RTD translator
Tfer ID	01231		
Slope	0.99950	**Intercept**	-0.03156
Cert Date	1/28/2015	**CorrCoff**	0.99999
Mfg	Eutechnics	**Parameter**	Shelter Temperatur
Serial Number	01H0060	**Tfer Desc.**	RTD probe
Tfer ID	01230		
Slope	0.99950	**Intercept**	-0.03156
Cert Date	1/28/2015	**CorrCoff**	0.99999

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	26.69	26.73	0.000	27.1	C	0.36
primary	Temp Mid Range	25.43	25.47	0.000	25.8	C	0.35

Infrastructure Data For

Site ID GTH161 **Technician** Alison Ray **Site Visit Date** 07/02/2015

Shelter Make	Shelter Model	Shelter Size
Ekto	8810 (s/n 2149-12)	640 cuft

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

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

Due to the remote location of the site, it can take up to a week to return the filter sample to the lab after it is removed from the tower in the winter.

2 **Parameter:** ShelterCleanNotes

Some floor tiles are damaged.

3 **Parameter:** MetSensorComme

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

4 **Parameter:** MetOpMaintCom

The temperature signal cable is showing signs of wear.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID GTH161 **Technician** Alison Ray **Site Visit Date** 07/02/2015

Site Sponsor (agency)	EPA	**USGS Map**	Gothic
Operating Group	RMBL	**Map Scale**	
AQS #	08-051-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	38.9573
Deposition Measurement	dry, wet	**QAPP Longitude**	-106.9854
Land Use	mountain meadow, woodland - mixed	**QAPP Elevation Meters**	2926
Terrain	complex	**QAPP Declination**	10.75
Conforms to MLM	No	**QAPP Declination Date**	2/23/2006
Site Telephone	(970) 349-5691	**Audit Latitude**	38.95627
Site Address 1	RMBL	**Audit Longitude**	-106.98587
Site Address 2	Gothic	**Audit Elevation**	2915
County	Gunnison	**Audit Declination**	9.6

City, State	Crested Butte, CO		**Present**	
Zip Code	81224	**Fire Extinguisher**	☑	Inspected Nov 1987
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 Steps**	☑	

Shelter Working Room ☑ **Make** Ekto **Model** 8810 (s/n 2149-12) **Shelter Size** 640 cuft

Shelter Clean ☑ **Notes** Some floor tiles are damaged.

Site OK ☑ **Notes**

Driving Directions From Gunnison take route 135 north to Crested Butte. Continue through town to Mount Crested Butte. Continue through town past the fire station and the road maintenance facility onto the dirt road to Gothic. Continue approximately three miles and park at the visitor area at the bottom of the hill below the site. The site is approximately 200 meters on the path up the hill.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID GTH161 **Technician** Alison Ray **Site Visit Date** 07/02/2015

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 GTH161 **Technician** Alison Ray **Site Visit Date** 07/02/2015

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)	☐	Over shelter
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 moved to the sample tower and mounted in a naturally aspirated shield facing south and over the shelter roof. The met tower has been removed.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID GTH161

Technician Alison Ray

Site Visit Date 07/02/2015

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:

The temperature signal cable is showing signs of wear.

Field Systems Data Form F-02058-1500-S5-rev002

Site ID GTH161 **Technician** Alison Ray **Site Visit Date** 07/02/2015

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 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?	☑	
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 GTH161 **Technician** Alison Ray **Site Visit Date** 07/02/2015

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?** Tower does not have ground rod but is bolted to shelter.

Provide any additional 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 GTH161 **Technician** Alison Ray **Site Visit Date** 07/02/2015

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	☐		☐
Field Ops Manual	☑	July 1990	☐
Calibration Reports	☐		☐
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedule	☐		☐

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 GTH161 **Technician** Alison Ray **Site Visit Date** 07/02/2015

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	☑	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	☑	Semiannually	☑

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 GTH161 **Technician** Alison Ray **Site Visit Date** 07/02/2015

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, 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:

Due to the remote location of the site, it can take up to a week to return the filter sample to the lab after it is removed from the tower in the winter.

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID GTH161 **Technician** Alison Ray **Site Visit Date** 07/02/2015

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	D520	5HFNHB1	000251
DAS	Campbell	CR3000	2513	000416
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	100300020817	00517
Flow Rate	Apex	AXMC105LPMDPC	50735	000558
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4223-C	0844355568	06611
Ozone	ThermoElectron Inc	49i A1NAA	1009241789	000618
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200015	000439
Sample Tower	Aluma Tower	A	none	03564
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	11742	06120
Zero air pump	Werther International	P 70/4	000836211	06927

Site Inventory by Site Visit

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
CNT169-Sandy Grenville-07/24/2015						
1	7/24/2015	Computer	Dell	000241	D520	unknown
2	7/24/2015	DAS	Campbell	000417	CR3000	2515
3	7/24/2015	Elevation	Elevation	None	1	None
4	7/24/2015	Filter pack flow pump	Thomas	02753	107CAB18	1192001900
5	7/24/2015	Flow Rate	Apex	000823	AXMC105LPMDPCV	illegible
6	7/24/2015	Infrastructure	Infrastructure	none	none	none
7	7/24/2015	Modem	Raven	06600	V4221-V	0844349098
8	7/24/2015	Ozone	ThermoElectron Inc	000699	49i A1NAA	1030244804
9	7/24/2015	Ozone Standard	ThermoElectron Inc	000328	49i A3NAA	0622717850
10	7/24/2015	Sample Tower	Aluma Tower	000179	B	unknown
11	7/24/2015	Shelter Temperature	Campbell	none	107-L	none
12	7/24/2015	Siting Criteria	Siting Criteria	None	1	None
13	7/24/2015	Temperature	RM Young	06501	41342	14606
14	7/24/2015	Zero air pump	Werther International	06925	P 70/4	000836220

DAS Data Form

DAS Time Max Error: 0.02

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2515	CNT169	Sandy Grenville	07/24/2015	DAS	Primary

Das Date: 7 /25/2015
Das Time: 10:40:00
Das Day: 213

Audit Date 7 /25/2015
Audit Time 10:40:01
Audit Day 213

Low Channel:

Avg Diff: 0.0001
Max Diff: 0.0001

High Channel:

Avg Diff: 0.0001
Max Diff: 0.0001

Mfg Datel
Parameter DAS
Serial Number 15510194
Tfer Desc. Source generator (D
Tfer ID 01320

Mfg Fluke
Parameter DAS
Serial Number 95740135
Tfer Desc. DVM
Tfer ID 01311

Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
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	0.0999	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	0.6996	V	V	0.0001
7	0.9000	0.8994	0.8994	V	V	0.0000
7	1.0000	0.9994	0.9993	V	V	-0.0001

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	CNT169	Sandy Grenville	07/24/2015	Flow Rate	000823

Mfg BIOS
Parameter Flow Rate
Serial Number 103471
Tfer Desc. nexus
Tfer ID 01420
Slope 0.96664
Intercept 0.03078
Cert Date 2/5/2015
CorrCoff 0.99996

Mfg BIOS
Parameter Flow Rate
Serial Number 103424
Tfer Desc. BIOS cell
Tfer ID 01410
Slope 0.96664
Intercept 0.03078
Cert Date 2/5/2015
CorrCoff 0.99996

DAS 1:

DAS 2:

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
1.32%	1.64%		

Cal Factor Zero 0.02
Cal Factor Full Scale 1.011
Rotometer Reading: 3.6

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	0.01	0.000	0.01	l/m	l/m	
primary	test pt 1	2.978	3.050	2.93	2.920	3.00	l/m	l/m	-1.64%
primary	test pt 2	2.974	3.040	2.93	2.920	3.00	l/m	l/m	-1.32%
primary	test pt 3	2.959	3.030	2.93	2.920	3.00	l/m	l/m	-0.99%

Sensor Component		Condition		Status	
Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	360 deg	**Status**	pass
Sensor Component	Filter Depth	**Condition**	0.5 cm	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.5 cm	**Status**	pass
Sensor Component	Tubing Condition	**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	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
ThermoElectron Inc	1030244804	CNT169	Sandy Grenville	07/24/2015	Ozone	000699

Slope:	0.93852	**Slope:**	0.00000
Intercept	-0.03683	**Intercept**	0.00000
CorrCoff	0.99986	**CorrCoff**	0.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
6.4%	8.3%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	0419606966	**Tfer Desc.**	Ozone primary stan
Tfer ID	01112		
Slope	0.99384	**Intercept**	-0.40946
Cert Date	6/25/2015	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	-0.20	0.21	0.28	ppb	
primary	2	29.63	30.22	27.71	ppb	-8.31%
primary	3	49.82	50.54	48.34	ppb	-4.35%
primary	4	79.71	80.61	74.94	ppb	-7.03%
primary	5	110.05	111.14	104.50	ppb	-5.97%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.90	**Status**	pass
Sensor Component	Span	**Condition**	1.013	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	95.6 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	1.6 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.55 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	526.8 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	35.0 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	92.2 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	1.5 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.55 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**		**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	Sandy Grenville	07/24/2015	Temperature	06501

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00343	**Intercept**	-0.06409
Cert Date	1/30/2015	**CorrCoff**	1.00000

DAS 1: **DAS 2:**

Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.12	0.21		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.02	0.08	0.000	0.2	C	0.12
primary	Temp Mid Range	25.45	25.43	0.000	25.4	C	-0.02
primary	Temp High Range	48.55	48.45	0.000	48.2	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	Sandy Grenville	07/24/2015	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.30	0.36

DAS 2:

Abs Avg Err	Abs Max Er

Mfg	Extech	**Parameter**	Shelter Temperatur
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00343	**Intercept**	-0.06409
Cert Date	1/30/2015	**CorrCoff**	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	20.40	20.39	0.000	20.1	C	-0.25
primary	Temp Mid Range	21.16	21.15	0.000	20.9	C	-0.3
primary	Temp Mid Range	21.94	21.93	0.000	21.6	C	-0.36

Infrastructure Data For

Site ID CNT169 **Technician** Sandy Grenville **Site Visit Date** 07/24/2015

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

Sensor Component	Shelter Roof	**Condition**	Good	**Status**	pass
Sensor Component	Sample Tower Type	**Condition**	Type B	**Status**	pass
Sensor Component	Met Tower	**Condition**	N/A	**Status**	pass
Sensor Component	Power Cables	**Condition**	Good	**Status**	pass
Sensor Component	Conduit	**Condition**	N/A	**Status**	pass
Sensor Component	Sample Tower	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Condition	**Condition**	Fair	**Status**	pass
Sensor Component	Shelter Floor	**Condition**	Fair	**Status**	pass
Sensor Component	Shelter Temp Control	**Condition**	Functioning	**Status**	pass
Sensor Component	Signal Cable	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Door	**Condition**	Fair	**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Tubing Type	**Condition**	3/8 teflon	**Status**	pass
Sensor Component	Rotometer	**Condition**	Installed	**Status**	pass
Sensor Component	Moisture Trap	**Condition**	Installed	**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**	Sandy Grenville	**Site Visit Date**	07/24/2015

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**	☑	No inspection date
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** Sandy Grenville **Site Visit Date** 07/24/2015

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** Sandy Grenville **Site Visit Date** 07/24/2015

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** Sandy Grenville **Site Visit Date** 07/24/2015

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 CNT169 **Technician** Sandy Grenville **Site Visit Date** 07/24/2015

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** Sandy Grenville **Site Visit Date** 07/24/2015

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** Sandy Grenville **Site Visit Date** 07/24/2015

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** Sandy Grenville **Site Visit Date** 07/24/2015

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** Sandy Grenville **Site Visit Date** 07/24/2015

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?	☑	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:

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID CNT169 **Technician** Sandy Grenville **Site Visit Date** 07/24/2015

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	D520	unknown	000241
DAS	Campbell	CR3000	2515	000417
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	1192001900	02753
Flow Rate	Apex	AXMC105LPMDPC	illegible	000823
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0844349098	06600
Ozone	ThermoElectron Inc	49i A1NAA	1030244804	000699
Ozone Standard	ThermoElectron Inc	49i A3NAA	0622717850	000328
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	P 70/4	000836220	06925

Site Inventory by Site Visit

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
GLR468-Sandy Grenville-07/28/2015						
1	7/28/2015	Computer	Hewlett Packard	none	6560 b	5CB1520H65
2	7/28/2015	DAS	Environmental Sys Corp	90653	8816	2566
3	7/28/2015	Elevation	Elevation	None	1	None
4	7/28/2015	Filter pack flow pump	Thomas	01564	107CAB18	0688001769
5	7/28/2015	Flow Rate	Tylan	none	FC280	AW9710138
6	7/28/2015	Infrastructure	Infrastructure	none	none	none
7	7/28/2015	MFC power supply	Tylan	03687	RO-32	FP9403014
8	7/28/2015	Modem	US Robotics	none	56k	unknown
9	7/28/2015	Ozone	ThermoElectron Inc	none	49i A3NAA	1023943901
10	7/28/2015	Ozone Standard	ThermoElectron Inc	none	49i A3NAA	0733726104
11	7/28/2015	Printer	Hewlett Packard	none	842C	unknown
12	7/28/2015	Sample Tower	Aluma Tower	none	B	none
13	7/28/2015	Shelter Temperature	ARS	77	none	none
14	7/28/2015	Siting Criteria	Siting Criteria	None	1	None
15	7/28/2015	Temperature	RM Young	none	41342	17625
16	7/28/2015	Zero air pump	Werther International	none	PC70/4	000756725

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	2566	GLR468	Sandy Grenville	07/28/2015	DAS	Primary

Das Date: 7 /28/2015
Das Time: 11:40:00
Das Day: 216

Audit Date 7 /28/2015
Audit Time 11:40:00
Audit Day 216

Low Channel:

Avg Diff: 0.0001
Max Diff: 0.0003

High Channel:

Avg Diff: 0.0001
Max Diff: 0.0003

Mfg Datel
Parameter DAS
Serial Number 15510194
Tfer Desc. Source generator (D
Tfer ID 01320

Mfg Fluke
Parameter DAS
Serial Number 95740135
Tfer Desc. DVM
Tfer ID 01311

Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
CorrCoff 1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	-0.0001	0.0002	V	V	0.0003
7	0.1000	0.0998	0.0999	V	V	0.0001
7	0.3000	0.2997	0.2998	V	V	0.0001
7	0.5000	0.4996	0.4995	V	V	-0.0001
7	0.7000	0.6995	0.6994	V	V	-0.0001
7	0.9000	0.8993	0.8994	V	V	0.0001
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
Tylan	AW9710138	GLR468	Sandy Grenville	07/28/2015	Flow Rate	none

Mfg	Tylan	
SN/Owner ID	FP9403014	03687
Parameter	MFC power supply	

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	103471	**Tfer Desc.**	nexus
Tfer ID	01420		
Slope	0.96664	**Intercept**	0.03078
Cert Date	2/5/2015	**CorrCoff**	0.99996
Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	103424	**Tfer Desc.**	BIOS cell
Tfer ID	01410		
Slope	0.96664	**Intercept**	0.03078
Cert Date	2/5/2015	**CorrCoff**	0.99996

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
0.41%	0.47%		

Cal Factor Zero 0.366

Cal Factor Full Scale 6.014

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	-0.35	0.000	-0.31	l/m	l/m	
primary	leak check	0.000	0.000	-0.35	0.000	-0.36	l/m	l/m	
primary	test pt 1	2.919	2.990	2.33	2.330	3.00	l/m	l/m	0.47%
primary	test pt 2	2.919	2.990	2.33	2.330	3.00	l/m	l/m	0.40%
primary	test pt 3	2.919	2.990	2.33	2.330	3.00	l/m	l/m	0.37%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	Not tested	**Status**	pass
Sensor Component	Filter Depth	**Condition**	-0.3 cm	**Status**	Fail
Sensor Component	Filter Position	**Condition**	Poor	**Status**	Fail
Sensor Component	Filter Distance	**Condition**	4.0 cm	**Status**	pass
Sensor Component	Tubing Condition	**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	System Memo	**Condition**	See comments	**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1023943901	GLR468	Sandy Grenville	07/28/2015	Ozone	none

Slope:	0.96744	**Slope:**	0.00000
Intercept	-0.47147	**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
4.4%	5.9%		

Mfg ThermoElectron Inc

Parameter ozone

Serial Number 0419606966

Tfer Desc. Ozone primary stan

Tfer ID 01112

Slope 0.99384

Intercept -0.40946

Cert Date 6/25/2015

CorrCoff 1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	-0.18	0.23	0.06	ppb	
primary	2	30.02	30.61	28.81	ppb	-5.88%
primary	3	50.01	50.73	48.31	ppb	-4.77%
primary	4	79.99	80.89	78.13	ppb	-3.41%
primary	5	109.31	110.39	106.30	ppb	-3.71%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Offset	**Condition**	0.6	**Status**	pass
Sensor Component	Span	**Condition**	1.011	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	89.3 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	1.0 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.51 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	672.6 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	32.3 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	84.9 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	1.2 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.77 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**		**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	17625	GLR468	Sandy Grenville	07/28/2015	Temperature	none

Mfg Extech
Parameter Temperature
Serial Number H232734
Tfer Desc. RTD
Tfer ID 01227
Slope 1.00343
Intercept -0.06409
Cert Date 1/30/2015
CorrCoff 1.00000

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.20	0.29		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.24	0.30	0.000	0.5	C	0.19
primary	Temp Mid Range	25.88	25.86	0.000	26.2	C	0.29
primary	Temp High Range	48.74	48.64	0.000	48.5	C	-0.11

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	Sandy Grenville	07/28/2015	Shelter Temperature	77

DAS 1:

Abs Avg Err	Abs Max Er
0.53	0.57

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232734

Tfer Desc. RTD

Tfer ID 01227

Slope 1.00343

Intercept -0.06409

Cert Date 1/30/2015

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	24.05	24.03	0.000	23.6	C	-0.45
primary	Temp Mid Range	26.21	26.18	0.000	25.6	C	-0.57
primary	Temp Mid Range	25.28	25.26	0.000	24.7	C	-0.56

Infrastructure Data For

Site ID GLR468 **Technician** Sandy Grenville **Site Visit Date** 07/28/2015

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**	N/A	**Status**	pass
Sensor Component	Met Tower	**Condition**	Fair	**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**	Fair	**Status**	pass
Sensor Component	Shelter Floor	**Condition**	Good	**Status**	pass
Sensor Component	Signal Cable	**Condition**	Fair	**Status**	pass
Sensor Component	Tubing Type	**Condition**	3/8 teflon	**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	GLR468	Sandy Grenville	07/28/2015	Filter Position	Tylan	4079	☐	☑

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

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator is relatively new and would benefit from additional training.

2 **Parameter:** SiteOpsProcedures

The ozone inlet filter is being changed weekly while smoke from forest fires is present. The site operator was observed to leave the sample tower down with the dry deposition filter installed and the sample pump running for more than one hour.

3 **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.

4 **Parameter:** ShelterCleanNotes

The shelter is in good condition. Evidence of repairs to roof leaks attempted.

5 **Parameter:** MetSensorComme

The recorded temperature data at this site is now being measured at approximately 2 meters above the ground. Current temperature data are no longer comparable to previous temperature measurements at this site.

6 **Parameter:** MetOpMaintCom

The signal cables are showing signs of wear.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID GLR468 **Technician** Sandy Grenville **Site Visit Date** 07/28/2015

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.

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** Sandy Grenville **Site Visit Date** 07/28/2015

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** Sandy Grenville **Site Visit Date** 07/28/2015

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 now being measured at approximately 2 meters above the ground. Current temperature data are no longer comparable to previous temperature measurements at this site.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID GLR468 **Technician** Sandy Grenville **Site Visit Date** 07/28/2015

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?	☑	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:

The signal cables are showing signs of wear.

Field Systems Data Form F-02058-1500-S5-rev002

Site ID GLR468 **Technician** Sandy Grenville **Site Visit Date** 07/28/2015

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 Sandy Grenville

Site Visit Date 07/28/2015

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** Sandy Grenville **Site Visit Date** 07/28/2015

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** Sandy Grenville **Site Visit Date** 07/28/2015

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	☑	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?	☐	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. The site operator was observed to leave the sample tower down with the dry deposition filter installed and the sample pump running for more than one hour.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID GLR468 **Technician** Sandy Grenville **Site Visit Date** 07/28/2015

Site operation procedures

1	Is the filter pack being changed every Tuesday as scheduled?	☑	Filter changed morinings 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?	☑	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:

The site operator is relatively new and would benefit from additional training.

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID GLR468 **Technician** Sandy Grenville **Site Visit Date** 07/28/2015

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	6560 b	5CB1520H65	none
DAS	Environmental Sys Corp	8816	2566	90653
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	0688001769	01564
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
Printer	Hewlett Packard	842C	unknown	none
Sample Tower	Aluma Tower	B	none	none
Shelter Temperature	ARS	none	none	77
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	17625	none
Zero air pump	Werther International	PC70/4	000756725	none

Site Inventory by Site Visit

ROM206-Eric Hebert-08/03/2015

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
1	8/3/2015	Computer	Dell	000454	D530	unknown
2	8/3/2015	DAS	Campbell	000428	CR3000	2534
3	8/3/2015	Dilution system	Teledyne	000791	T700U	111
4	8/3/2015	Elevation	Elevation	None	1	None
5	8/3/2015	Filter pack flow pump	Thomas	04986	107CA18	040400022185
6	8/3/2015	Flow Rate	Apex	000598	AXMC105LPMDPCV	unknown
7	8/3/2015	Infrastructure	Infrastructure	none	none	none
8	8/3/2015	Modem	Raven	06473	V4221-V	0808311135
9	8/3/2015	Noy	Teledyne	missing	T200U	103
10	8/3/2015	Ozone	ThermoElectron Inc	000676	49i A1NAA	1030244794
11	8/3/2015	Ozone Standard	ThermoElectron Inc	000514	49i A3NAA	0922236892
12	8/3/2015	Sample Tower	Aluma Tower	000810	C	Unknowm
13	8/3/2015	Shelter Temperature	Campbell	none	107-L	none
14	8/3/2015	Siting Criteria	Siting Criteria	None	1	None
15	8/3/2015	Temperature	RM Young	02679	41342	none
16	8/3/2015	Zero air pump	Werther International	06917	PC70/4	000829166
17	8/3/2015	Zero air system	Teledyne	000777	701H	607

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2534	ROM206	Eric Hebert	08/03/2015	DAS	Primary

Das Date: 8 /3 /2015
Das Time: 11:12:00
Das Day: 215

Audit Date 8 /3 /2015
Audit Time 11:12:00
Audit Day 215

Low Channel:

High Channel:

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

Mfg Datel
Parameter DAS
Serial Number 4000392
Tfer Desc. Source generator (D
Tfer ID 01321
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
CorrCoff 1.00000

Mfg Fluke
Parameter DAS
Serial Number 86590148
Tfer Desc. DVM
Tfer ID 01310
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
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	0.1000	0.1000	V	V	0.0000
7	0.3000	0.3000	0.3000	V	V	0.0000
7	0.5000	0.5000	0.4999	V	V	-0.0001
7	0.7000	0.7000	0.6999	V	V	-0.0001
7	0.9000	0.9000	0.8999	V	V	-0.0001
7	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
Apex	unknown	ROM206	Eric Hebert	08/03/2015	Flow Rate	000598

Mfg BIOS

Parameter Flow Rate

Serial Number 131818

Tfer Desc. BIOS 220-H

Tfer ID 01417

Slope 1.00316

Intercept -0.00540

Cert Date 1/7/2015

CorrCoff 1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
1.07%	1.35%		

Cal Factor Zero -0.02

Cal Factor Full Scale 0.97

Rotometer Reading: 3.6

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	-0.02	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	3.036	3.030	3.05	0.000	3.00	l/m	l/m	-0.99%
primary	test pt 2	3.047	3.040	3.04	0.000	3.00	l/m	l/m	-1.35%
primary	test pt 3	3.024	3.020	3.04	0.000	2.99	l/m	l/m	-0.86%

Sensor Component	Condition	Status
Leak Test		pass
Filter Azimuth	180 deg	pass
Filter Depth	3.0 cm	pass
Filter Position	Good	pass
Moisture Present	No moisture present	pass
Rotometer Condition	Clean and dry	pass
System Memo		pass
Tubing Condition	Good	pass
Filter Distance	5.0 cm	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244794	ROM206	Eric Hebert	08/03/2015	Ozone	000676

Slope:	0.98937	**Slope:**	0.00000
Intercept	-0.58729	**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**
2.4%	3.8%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00952	**Intercept**	-0.24284
Cert Date	1/7/2015	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.33	0.56	0.13	ppb	
primary	2	26.99	26.97	25.95	ppb	-3.78%
primary	3	49.75	49.52	48.22	ppb	-2.63%
primary	4	83.22	82.67	81.40	ppb	-1.54%
primary	5	117.12	116.25	114.40	ppb	-1.59%

Sensor Component	Cell B Noise	**Condition**	0.9 ppb	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	Offset	**Condition**	0.1	**Status**	pass
Sensor Component	Span	**Condition**	1.006	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	87.2 kHz	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**		**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.6 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	35.6 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	523 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.9 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	93.3 kHz	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.6 lpm	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	none	ROM206	Eric Hebert	08/03/2015	Temperature	02679

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00564	**Intercept**	-0.21981
Cert Date	1/30/2015	**CorrCoff**	1.00000

DAS 1: Abs Avg Err	DAS 1: Abs Max Er	DAS 2: Abs Avg Err	DAS 2: Abs Max Er
0.23	0.36		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	-0.05	0.17	0.000	0.0	C	-0.17
primary	Temp Mid Range	12.13	12.28	0.000	12.1	C	-0.15
primary	Temp High Range	43.96	43.93	0.000	43.6	C	-0.36

Sensor Component	Shield	**Condition**	Clean	**Status**	pass
Sensor Component	Blower Status Switch	**Condition**	N/A	**Status**	pass
Sensor Component	Blower	**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	Eric Hebert	08/03/2015	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.26	0.40

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232679

Tfer Desc. RTD

Tfer ID 01228

Slope 1.00564

Intercept -0.21981

Cert Date 1/30/2015

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	26.19	26.26	0.000	25.9	C	-0.4
primary	Temp Mid Range	25.75	25.82	0.000	25.7	C	-0.13

Infrastructure Data For

Site ID ROM206 **Technician** Eric Hebert **Site Visit Date** 08/03/2015

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8810 (s/n 2182-1)	640 cuft

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

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

It was suggested that the dry deposition filter not be installed and uncovered on the sample tower while the ozone inlet filter is replaced and other activities are performed with the tower down. 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**	Eric Hebert	**Site Visit Date**	08/03/2015

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**	☑	No inspection date
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** Eric Hebert **Site Visit Date** 08/03/2015

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** Eric Hebert **Site Visit Date** 08/03/2015

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** Eric Hebert **Site Visit Date** 08/03/2015

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?	☑	

Parameter	Manufacturer	Model	S/N	Client ID
Temperature	RM Young	41342	none	02679

Provide any additional 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** Eric Hebert **Site Visit Date** 08/03/2015

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** Eric Hebert **Site Visit Date** 08/03/2015

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** Eric Hebert **Site Visit Date** 08/03/2015

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** Eric Hebert **Site Visit Date** 08/03/2015

Site operation procedures

1	Has the site operator attended a formal CASTNET training course? If yes, when and who instructed?	☑	Trained on site by MACTEC employee during site installation
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** Eric Hebert **Site Visit Date** 08/03/2015

Site operation procedures

1	Is the filter pack being changed every Tuesday as scheduled?	☑	Filter changed afternoons 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?	☑	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:

It was suggested that the dry deposition filter not be installed and uncovered on the sample tower while the ozone inlet filter is replaced and other activities are performed with the tower down. 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 Eric Hebert

Site Visit Date 08/03/2015

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	D530	unknown	000454
DAS	Campbell	CR3000	2534	000428
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	V4221-V	0808311135	06473
Noy	Teledyne	T200U	103	missing
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
ROM406-Eric Hebert-08/04/2015						
1	8/4/2015	DAS	Environmental Sys Corp	90535	8816	2025
2	8/4/2015	Elevation	Elevation	None	1	None
3	8/4/2015	flow rate	Tylan	03393	FC280AV	AW9403024
4	8/4/2015	Infrastructure	Infrastructure	none	none	none
5	8/4/2015	Met tower	Rohn	none	unknown	none
6	8/4/2015	MFC power supply	Tylan	none	RO-32	illegible
7	8/4/2015	Ozone	ThermoElectron Inc	none	49i A3NAA	1030745085
8	8/4/2015	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	CM08460008
9	8/4/2015	Printer	Hewlett Packard	none	842C	unknown
10	8/4/2015	Sample Tower	Aluma Tower	illegible	B	none
11	8/4/2015	Shelter Temperature	ARS	none	unknown	051
12	8/4/2015	Shield (2 meter)	RM Young	none	unknown	none
13	8/4/2015	Siting Criteria	Siting Criteria	None	1	None
14	8/4/2015	Temperature	RM Young	none	41342	17079
15	8/4/2015	Zero air pump	Werther International	none	PC70/4	531392

DAS Data Form

DAS Time Max Error: 0.37

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	2025	ROM406	Eric Hebert	08/04/2015	DAS	Primary

Das Date: 8 /4 /2015
Das Time: 7:53:38
Das Day: 216

Audit Date 8 /4 /2015
Audit Time 7:54:00
Audit Day 216

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 Datel
Parameter DAS
Serial Number 4000392
Tfer Desc. Source generator (D
Tfer ID 01321
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
CorrCoff 1.00000

Mfg Fluke
Parameter DAS
Serial Number 86590148
Tfer Desc. DVM
Tfer ID 01310
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
CorrCoff 1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
2	0.0000	0.0000	0.0000	V	V	0.0000
2	0.1000	0.1000	0.1000	V	V	0.0000
2	0.3000	0.3000	0.3000	V	V	0.0000
2	0.5000	0.5000	0.5000	V	V	0.0000
2	0.7000	0.7000	0.7000	V	V	0.0000
2	0.9000	0.9000	0.9000	V	V	0.0000
2	1.0000	1.0000	1.0000	V	V	0.0000

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Tylan	AW9403024	ROM406	Eric Hebert	08/04/2015	flow rate	03393

Mfg Tylan

SN/Owner ID illegible none

Parameter MFC power supply

Mfg BIOS

Parameter Flow Rate

Serial Number 131818

Tfer Desc. BIOS 220-H

Tfer ID 01417

Slope 1.00316

Intercept -0.00540

Cert Date 1/7/2015

CorrCoff 1.00000

DAS 1: A Avg % Diff:	DAS 1: A Max % Di	DAS 2: A Avg %Dif	DAS 2: A Max % Di
0.55%	0.66%		

Cal Factor Zero 0.98

Cal Factor Full Scale 5.319

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	-0.06	-0.0240	0.07	l/m	l/m	
primary	leak check	0.000	0.000	-0.05	-0.0230	0.08	l/m	l/m	
primary	test pt 1	3.036	3.030	3.11	2.7870	3.01	l/m	l/m	-0.66%
primary	test pt 2	3.038	3.030	3.11	2.7870	3.01	l/m	l/m	-0.66%
primary	test pt 3	3.024	3.020	3.11	2.7870	3.01	l/m	l/m	-0.33%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	180 deg	**Status**	pass
Sensor Component	Filter Depth	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030745085	ROM406	Eric Hebert	08/04/2015	Ozone	none

Slope:	0.96560	**Slope:**	0.00000
Intercept	-0.10314	**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
3.9%	5.0%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00952	**Intercept**	-0.24284
Cert Date	1/7/2015	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.17	0.40	0.55	ppb	
primary	2	27.41	27.39	26.01	ppb	-5.04%
primary	3	49.76	49.53	47.73	ppb	-3.63%
primary	4	83.73	83.18	80.17	ppb	-3.62%
primary	5	118.42	117.54	113.50	ppb	-3.44%

Sensor Component	Cell B Noise	**Condition**	0.7 ppb	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	1.0061	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	Offset	**Condition**	0.000	**Status**	pass
Sensor Component	Span	**Condition**	1.000	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	92.3 kHz	**Status**	pass
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**		**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.0 L/m	**Status**	Fail
Sensor Component	Cell A Tmp.	**Condition**	34.2 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	545 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.6 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	97.3 kHz	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.41 l/m	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	0.0002	**Status**	pass

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	17079	ROM406	Eric Hebert	08/04/2015	Temperature	none

Mfg Extech
Parameter Temperature
Serial Number H232679
Tfer Desc. RTD
Tfer ID 01228
Slope 1.00564
Intercept -0.21981
Cert Date 1/30/2015
CorrCoff 1.00000

DAS 1: Abs Avg Err	DAS 1: Abs Max Er	DAS 2: Abs Avg Err	DAS 2: Abs Max Er
0.29	0.75		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	-0.06	0.16	0.0000	0.9	C	0.75
primary	Temp Mid Range	26.35	26.42	0.0000	26.5	C	0.11
primary	Temp High Range	45.02	44.99	0.0000	45.0	C	-0.02

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

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

Sensor Component Blower **Condition** Functioning **Status** pass

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

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	051	ROM406	Eric Hebert	08/04/2015	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
1.79	3.14		

Mfg	Extech	**Parameter**	Shelter Temperatur
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00564	**Intercept**	-0.21981
Cert Date	1/30/2015	**CorrCoff**	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	27.29	27.36	0.000	25.7	C	-1.65
primary	Temp Mid Range	21.86	21.96	0.000	25.1	C	3.14
primary	Temp Mid Range	25.38	25.46	0.000	24.9	C	-0.58

Infrastructure Data For

Site ID ROM406 **Technician** Eric Hebert **Site Visit Date** 08/04/2015

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8814 (s/n 3062-1)	896 cuft

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

Site Visit Comments

<table>
<tr><th>Parameter</th><th>Site</th><th>Technician</th><th>S.V. Date</th><th>Component</th><th>Mfg</th><th>Serial No.</th><th>Hazard</th><th>Problem</th></tr>
<tr><td>Ozone</td><td>ROM406</td><td>Eric Hebert</td><td>08/04/2015</td><td>System Memo</td><td>ThermoElectron</td><td>3590</td><td>☐</td><td>☐</td></tr>
<tr><td colspan="9">Additional details can be found in the hardcopy of the site audit report.</td></tr>
<tr><td>Ozone</td><td>ROM406</td><td>Eric Hebert</td><td>08/04/2015</td><td>Cell B Flow</td><td>ThermoElectron</td><td>3590</td><td>☐</td><td>☐</td></tr>
<tr><td colspan="9">This analyzer diagnostic check is outside the manufacturer's recommended value.</td></tr>
<tr><td>Temperature</td><td>ROM406</td><td>Eric Hebert</td><td>08/04/2015</td><td>System Memo</td><td>RM Young</td><td>3774</td><td>☐</td><td>☐</td></tr>
<tr><td colspan="9">Additional details can be found in the hardcopy of the site audit report.</td></tr>
</table>

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator is doing a very good job performing the site duties and expressed an interest in trying to improve any deficiencies. The sample flow rate systems for both the dry deposition and ozone sample trains were explained during the audit at the request of the site operator. Although gloves are not used to handle the filter pack, the operator is careful to touch only the bag and caps and not the filter.

2 **Parameter:** DasComments

Only RH, temperature, and AMoN are mounted on the meteorological tower.

3 **Parameter:** SiteOpsProcedures

The ozone analyzer display is indicating a low flow alarm for cell B. The analyzer is functioning properly and the flow meter is likely suspect.

4 **Parameter:** ShelterCleanNotes

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

5 **Parameter:** MetSensorComme

The recorded temperature is being measured at 2.5 meters above the ground (and < 1 foot above the AMoN enclosure) and not 10 meters. Current temperature measurements are no longer comparable to previous temperature measurements at this site.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID ROM406 **Technician** Eric Hebert **Site Visit Date** 08/04/2015

Site Sponsor (agency)	NPS	**USGS Map**		Longs Peak
Operating Group	NPS	**Map Scale**		
AQS #	08-069-0007	**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**		
Conforms to MLM	Marginally	**QAPP Declination Date**		
Site Telephone	(970) 586-8520	**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**	☑	Inspected June 2013
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 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** Eric Hebert **Site Visit Date** 08/04/2015

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** Eric Hebert **Site Visit Date** 08/04/2015

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) and not 10 meters. Current temperature measurements are no longer comparable to previous temperature measurements at this site.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID ROM406 **Technician** Eric Hebert **Site Visit Date** 08/04/2015

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?	☑	

Parameter	Manufacturer	Model	S/N	Client ID
Temperature	RM Young	41342	17079	none
Shield (2 meter)	RM Young	unknown	none	none
Met tower	Rohn	unknown	none	none

Provide any additional 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** Eric Hebert **Site Visit Date** 08/04/2015

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?	☐	No
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** Eric Hebert **Site Visit Date** 08/04/2015

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.

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID ROM406 **Technician** Eric Hebert **Site Visit Date** 08/04/2015

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	☑	3/11/2015	☑
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** Eric Hebert **Site Visit Date** 08/04/2015

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:

The ozone analyzer display is indicating a low flow alarm for cell B. The analyzer is functioning properly and the flow meter is likely suspect.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID ROM406 **Technician** Eric Hebert **Site Visit Date** 08/04/2015

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?	☑	
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:

The site operator is doing a very good job performing the site duties and expressed an interest in trying to improve any deficiencies. The sample flow rate systems for both the dry deposition and ozone sample trains were explained during the audit at the request of the site operator. Although gloves are not used to handle the filter pack, the operator is careful to touch only the bag and caps and not the filter.

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID ROM406 **Technician** Eric Hebert **Site Visit Date** 08/04/2015

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
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	1030745085	none
Ozone Standard	ThermoElectron Inc	49i A1NAA	CM08460008	none
Printer	Hewlett Packard	842C	unknown	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
Temperature	RM Young	41342	17079	none
Zero air pump	Werther International	PC70/4	531392	none

DAS Data Form

DAS Time Max Error: 0.13

Mfg	**Serial Number**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Use Desc.**
Environmental Sys	2600	THR422	Sandy Grenville	08/04/2015	DAS	Primary

Das Date: 8 /5 /2015
Audit Date 8 /5 /2015
Das Time: 13:59:32
Audit Time 13:59:40
Das Day: 217
Audit Day 217

Low Channel:

Avg Diff: 0.0002
Max Diff: 0.0004

High Channel:

Avg Diff: 0.0002
Max Diff: 0.0004

Mfg Datel
Parameter DAS
Serial Number 15510194
Tfer Desc. Source generator (D
Tfer ID 01320

Mfg Fluke
Parameter DAS
Serial Number 95740135
Tfer Desc. DVM
Tfer ID 01311
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
CorrCoff 1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
2	0.0000	0.0000	0.0000	V	V	0.0000
2	0.1000	0.0999	0.1000	V	V	0.0001
2	0.3000	0.2998	0.2999	V	V	0.0001
2	0.5000	0.4997	0.4998	V	V	0.0001
2	0.7000	0.6996	0.6998	V	V	0.0002
2	0.9000	0.8994	0.8998	V	V	0.0004
2	1.0000	0.9993	0.9997	V	V	0.0004

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Tylan	AW02213004	THR422	Sandy Grenville	08/04/2015	flow rate	none

Mfg Tylan

SN/Owner ID FP902022 00042

Parameter MFC power supply

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	103471	**Tfer Desc.**	nexus
Tfer ID	01420		
Slope	0.96664	**Intercept**	0.03078
Cert Date	2/5/2015	**CorrCoff**	0.99996
Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	103424	**Tfer Desc.**	BIOS cell
Tfer ID	01410		
Slope	0.96664	**Intercept**	0.03078
Cert Date	2/5/2015	**CorrCoff**	0.99996

DAS 1: **DAS 2:**

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
2.32%	2.38%		

Cal Factor Zero 0.189

Cal Factor Full Scale 11

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	-0.27	-0.110	-0.05	l/m	l/m	
primary	leak check	0.000	0.000	-0.26	-0.110	-0.05	l/m	l/m	
primary	test pt 1	2.997	3.070	2.59	1.300	3.00	l/m	l/m	-2.38%
primary	test pt 2	2.998	3.070	2.59	1.301	3.00	l/m	l/m	-2.38%
primary	test pt 3	2.998	3.070	2.59	1.298	3.00	l/m	l/m	-2.21%

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**	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**	-0.3 cm	**Status**	Fail
Sensor Component	Filter Azimuth	**Condition**	180 deg	**Status**	pass
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	0632119500	THR422	Sandy Grenville	08/04/2015	Ozone	none

Slope:	0.94939	**Slope:**	0.00000
Intercept	1.15039	**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**
2.8%	4.1%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	0419606966	**Tfer Desc.**	Ozone primary stan
Tfer ID	01112		
Slope	0.99384	**Intercept**	-0.40946
Cert Date	6/25/2015	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	-0.04	0.37	0.98	ppb	
primary	2	29.93	30.52	30.78	ppb	0.85%
primary	3	49.92	50.64	49.41	ppb	-2.43%
primary	4	79.80	80.70	77.57	ppb	-3.88%
primary	5	110.00	111.09	106.50	ppb	-4.13%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Battery Backup	**Condition**	Functioning	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Moderately clean	**Status**	pass
Sensor Component	Offset	**Condition**	0.1	**Status**	pass
Sensor Component	Span	**Condition**	0.974	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	96.4 kHz	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	1.5 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.64 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	656.7 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	29.7 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	60.4 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	1.2 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.68 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**		**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
Climatronics	7974	THR422	Sandy Grenville	08/04/2015	Temperature	none

Mfg	Climatronics	
SN/Owner ID	217	01545
Parameter	Temperature Translator	

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00343	**Intercept**	-0.06409
Cert Date	1/30/2015	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.15	0.20		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.22	0.28	0.000	0.2	C	-0.07
primary	Temp Mid Range	25.86	25.84	0.000	25.6	C	-0.2
primary	Temp High Range	49.41	49.31	0.000	49.1	C	-0.17

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**	See comments	**Status**	pass

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	THR422	Sandy Grenville	08/04/2015	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
1.30	1.49

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232734

Tfer Desc. RTD

Tfer ID 01227

Slope 1.00343

Intercept -0.06409

Cert Date 1/30/2015

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	23.10	23.08	0.000	24.3	C	1.22
primary	Temp Mid Range	22.54	22.53	0.000	24.0	C	1.49
primary	Temp Mid Range	22.94	22.93	0.000	24.1	C	1.18

Infrastructure Data For

Site ID THR422 **Technician** Sandy Grenville **Site Visit Date** 08/04/2015

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**	N/A	**Status**	pass
Sensor Component	Met Tower	**Condition**	Fair	**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**	Fair	**Status**	pass
Sensor Component	Shelter Condition	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Door	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Roof	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Floor	**Condition**	Good	**Status**	pass
Sensor Component	Signal Cable	**Condition**	Good	**Status**	pass
Sensor Component	Tubing Type	**Condition**	3/8 teflon	**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	THR422	Sandy Grenville	08/04/2015	Filter Position	Tylan	1862	☐	☑

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

Field Systems Comments

1 **Parameter:** 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.

5 **Parameter:** MetSensorComme

The recorded temperature data is being measured at approximately 2 meters above the ground. The current temperature data are no longer comparable to previous temperature data at this site.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID THR422 **Technician** Sandy Grenville **Site Visit Date** 08/04/2015

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** Sandy Grenville **Site Visit Date** 08/04/2015

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** Sandy Grenville **Site Visit Date** 08/04/2015

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:

The recorded temperature data is being measured at approximately 2 meters above the ground. The current temperature data are no longer comparable to previous temperature data at this site.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID THR422 **Technician** Sandy Grenville **Site Visit Date** 08/04/2015

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** Sandy Grenville **Site Visit Date** 08/04/2015

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** Sandy Grenville **Site Visit Date** 08/04/2015

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** Sandy Grenville **Site Visit Date** 08/04/2015

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** Sandy Grenville **Site Visit Date** 08/04/2015

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** Sandy Grenville **Site Visit Date** 08/04/2015

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** Sandy Grenville **Site Visit Date** 08/04/2015

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
Modem	US Robotics	14.4 fax modem	9244894	none
Ozone	ThermoElectron Inc	49i A3NAA	0632119500	none
Sample Tower	Aluma Tower	B	AT-81077-J5	none
Shelter Temperature	ARS	none	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	Climatronics	100093	7974	none
Temperature Translator	Climatronics	100088-2	217	01545
Zero air pump	Thomas	607CA22C	039500000348	none

Site Inventory by Site Visit

PND165-Eric Hebert-08/10/2015

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
1	8/10/2015	Computer	Dell	000257	D520	unknown
2	8/10/2015	DAS	Campbell	000403	CR3000	2516
3	8/10/2015	Elevation	Elevation	None	1	None
4	8/10/2015	Filter pack flow pump	Thomas	03631	107CAB18	049400004449
5	8/10/2015	Flow Rate	Apex	000549	AXMC105LPMDPCV	illegible
6	8/10/2015	Infrastructure	Infrastructure	none	none	none
7	8/10/2015	Modem	Raven	06608	V4221-V	0844349088
8	8/10/2015	Noy	Teledyne	000807	T200U	112
9	8/10/2015	Ozone	ThermoElectron Inc	000619	49i A1NAA	1009241791
10	8/10/2015	Ozone Standard	ThermoElectron Inc	000329	49i A3NAA	0622717853
11	8/10/2015	Precipitation	Texas Electronics	none	TR-525i-HT	59576-414
12	8/10/2015	Relative Humidity	Vaisala	05026	HMP50	Z4320017
13	8/10/2015	Sample Tower	Aluma Tower	000055	B	AT-81213-J12
14	8/10/2015	Shelter Temperature	Campbell	none	107-L	none
15	8/10/2015	Siting Criteria	Siting Criteria	None	1	None
16	8/10/2015	Solar Radiation	Licor	missing	LI-200	illegible
17	8/10/2015	Solar Radiation Translator	RM Young	02532	70101-X	none
18	8/10/2015	Surface Wetness	RM Young	illegible	58101	none
19	8/10/2015	Temperature	RM Young	06539	41342	14800
20	8/10/2015	Temperature2meter	RM Young	06305	41342VC	12544
21	8/10/2015	Wind Direction	RM Young	03924	AQ05103-5	21835wdr
22	8/10/2015	Wind Speed	RM Young	03924	AQ05103-5	21835wsp
23	8/10/2015	Zero air system	Teledyne	000773	701H	609

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2516	PND165	Eric Hebert	08/10/2015	DAS	Primary

Das Date: 8 /10/2015
Das Time: 9:08:00
Das Day: 222

Audit Date 8 /10/2015
Audit Time 9:08:00
Audit Day 222

Low Channel:

Avg Diff:	Max Diff:
0.0001	0.0001

High Channel:

Avg Diff:	Max Diff:
0.0001	0.0001

Mfg Datel
Parameter DAS
Serial Number 4000392
Tfer Desc. Source generator (D
Tfer ID 01321
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
CorrCoff 1.00000

Mfg Fluke
Parameter DAS
Serial Number 86590148
Tfer Desc. DVM
Tfer ID 01310
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
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	0.1000	0.0999	V	V	-0.0001
7	0.3000	0.3000	0.2999	V	V	-0.0001
7	0.5000	0.5000	0.4999	V	V	-0.0001
7	0.7000	0.7000	0.6999	V	V	-0.0001
7	0.9000	0.9000	0.8999	V	V	-0.0001
7	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
Apex	illegible	PND165	Eric Hebert	08/10/2015	Flow Rate	000549

Mfg BIOS

Parameter Flow Rate

Serial Number 131818

Tfer Desc. BIOS 220-H

Tfer ID 01417

Slope 1.00316

Intercept -0.00540

Cert Date 1/7/2015

CorrCoff 1.00000

DAS 1: A Avg % Diff:	DAS 1: A Max % Di	DAS 2: A Avg %Dif	DAS 2: A Max % Di
1.74%	1.95%		

Cal Factor Zero -0.06

Cal Factor Full Scale 0.96

Rotometer Reading: 3.65

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	-0.05	l/m	l/m	
primary	leak check	0.000	0.000	0.02	0.000	-0.04	l/m	l/m	
primary	test pt 1	3.055	3.050	3.01	0.000	3.00	l/m	l/m	-1.64%
primary	test pt 2	3.058	3.050	3.02	0.000	3.00	l/m	l/m	-1.64%
primary	test pt 3	3.074	3.070	3.02	0.000	3.01	l/m	l/m	-1.95%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	180 deg	**Status**	pass
Sensor Component	Filter Depth	**Condition**	4.0 cm	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass

Ozone Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
ThermoElectron Inc	1009241791	PND165	Eric Hebert	08/10/2015	Ozone	000619

Slope:	0.98497	**Slope:**	0.00000
Intercept	0.16680	**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%	1.5%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00952	**Intercept**	-0.24284
Cert Date	1/7/2015	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.17	0.40	0.44	ppb	
primary	2	29.01	28.97	28.70	ppb	-0.93%
primary	3	50.64	50.40	49.95	ppb	-0.89%
primary	4	74.92	74.45	73.66	ppb	-1.06%
primary	5	106.27	105.50	103.90	ppb	-1.52%

Sensor Component	Cell B Noise	**Condition**	0.3 ppb	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	Offset	**Condition**	-0.60	**Status**	pass
Sensor Component	Span	**Condition**	1.033	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	91.2 kHz	**Status**	pass
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**		**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.64 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	33.1 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	568.6 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.8 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	100.2 kHz	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	1.45 lpm	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass

Wind Speed Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
RM Young	21835wsp	PND165	Eric Hebert	08/10/2015	Wind Speed	03924

Mfg	RM Young	**Parameter**	wind speed
Serial Number		**Tfer Desc.**	wind speed motor (h
Tfer ID	01262		
Slope	1.00000	**Intercept**	0.00000
Cert Date	12/22/2014	**CorrCoff**	1.00000

Prop or Cups SN 54461

Prop or Cups Torque 0.2 **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	01262	200	1.02	0.0	1.0		0.00	
primary	01262	400	2.05	0.0	2.1		0.00	
primary	01262	800	4.10	0.0	4.1		0.00	
primary	01262	1200	6.14	0.0	6.1	0.00%		
primary	01262	2400	12.29	0.0	12.3	0.00%		
primary	01262	4000	20.48	0.0	20.5	0.00%		
primary	01262	9400	48.13	0.0	48.1	0.00%		

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

Wind Direction Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	21835wdr	PND165	Eric Hebert	08/10/2015	Wind Direction	03924

Mfg RM Young **Parameter** wind direction

Serial Number **Tfer Desc.** wind direction wheel

Tfer ID 01264

Slope 1.00000 **Intercept** 0.00000

Cert Date 1/16/2015 **CorrCoff** 1.00000

Mfg Ushikata **Parameter** wind direction

Serial Number 191832 **Tfer Desc.** transit

Tfer ID 01272

Slope 1.00000 **Intercept** 0.00000

Cert Date 2/19/2015 **CorrCoff** 1.00000

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

VaneTorque 5 **to** 10

	DAS 1:		DAS 2:	
	Orientation	Linearity:	Orientation	Linearity:
Abs Avg Err	1.0	2.0		
Abs Max Er	2	4		

UseDescription	TferID	Input Raw	Linearity	Output V	Output Deg.	Difference	Change	Error
primary	01264	0	☑	0.000	1	1	48	3
primary	01264	45	☑	0.000	42	3	41	-4
primary	01264	90	☑	0.000	89	1	47	2
primary	01264	135	☑	0.000	131	4	42	-3
primary	01264	180	☑	0.000	178	2	47	2
primary	01264	225	☑	0.000	224	1	46	1
primary	01264	270	☑	0.000	268	2	44	-1
primary	01264	315	☑	0.000	313	2	45	0
primary	01272	89	☐	0.000	89	0		0
primary	01272	179	☐	0.000	178	1		1
primary	01272	269	☐	0.000	268	1		1
primary	01272	359	☐	0.000	1	2		2

Sensor Component Mast **Condition** Good **Status** pass

Sensor Component Condition **Condition** Good **Status** pass

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

Sensor Component Sensor Plumb **Condition** Plumb **Status** pass

Sensor Component Vane Condition **Condition** Good **Status** pass

Sensor Component Torque **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	Eric Hebert	08/10/2015	Temperature	06539

Mfg Extech
Parameter Temperature
Serial Number H232679
Tfer Desc. RTD
Tfer ID 01228
Slope 1.00564
Intercept -0.21981
Cert Date 1/30/2015
CorrCoff 1.00000

DAS 1: Abs Avg Err	Abs Max Er	DAS 2: Abs Avg Err	Abs Max Er
0.33	0.53		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	-0.07	0.15	0.000	0.68	C	0.53
primary	Temp Mid Range	20.27	20.37	0.000	20.36	C	-0.01
primary	Temp High Range	43.90	43.87	0.000	43.41	C	-0.46

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

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

Sensor Component Blower **Condition** Functioning **Status** pass

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

2 Meter Temperature Data For

Calc. Difference

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	12544	PND165	Eric Hebert	08/10/2015	Temperature2meter	06305

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00564	**Intercept**	-0.21981
Cert Date	1/30/2015	**CorrCoff**	1.00000

DAS 1: | **DAS 2:**

Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.35	0.67		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	-0.07	0.15	0.000	0.05	C	-0.1
primary	Temp Mid Rang	20.27	20.37	0.000	20.10	C	-0.27
primary	Temp High Rang	43.90	43.87	0.000	43.20	C	-0.67

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

Humidity Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	Z4320017	PND165	Eric Hebert	08/10/2015	Relative Humidity	05026

Mfg	Rotronic	**Parameter**	Relative Humidity
Serial Number	124432	**Tfer Desc.**	Hygroclip
Tfer ID	01225		
Slope	0.91000	**Intercept**	4.53330
Cert Date	1/21/2015	**CorrCoff**	0.99800

	DAS 1:		DAS 2:	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	2.2	5.9		
Abs Max Er	3.3	5.9		

UseDesc.	Test type	Device	Input RH	GTL Raw	RH Corr.	DAS Volts	DAS %RH	Difference
primary	RH Low Range	Hygroclip	23.1	23.1	16.1	0.000	16.8	0.7
primary	RH Low Range	Hygroclip	32.8	34.0	32.8	0.000	30.2	-2.6
primary	RH Low Range	Hygroclip	52.9	56.4	52.9	0.000	49.6	-3.3
primary	RH High Range	Hygroclip	93.6	83.1	93.6	0.000	87.7	-5.9

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

Solar Radiation Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Licor	illegible	PND165	Eric Hebert	08/10/2015	Solar Radiation	missing

Mfg RM Young

SN/Owner ID none 02532

Parameter Solar Radiation Translator

Mfg Eppley **Parameter** solar radiation

Serial Number 34341F3 **Tfer Desc.** SR transfer sensor

Tfer ID 01245

Slope 1.00000 **Intercept** 0.00000

Cert Date 1/16/2015 **CorrCoff** 1.00000

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

UseDescription	Measure Date	MeasureTime	Tfer Raw	Tfer Corr	DAS w/m2	PctDifference
primary	8/10/2015	10:00	731	731	716	-2.1%
primary	8/10/2015	11:00	862	862	847	-1.7%
primary	8/10/2015	12:00	940	940	928	-1.3%
primary	8/10/2015	13:00	977	977	973	-0.4%
primary	8/10/2015	14:00	987	987	999	1.2%
primary	8/10/2015	15:00	450	450	460	2.2%
primary	8/10/2015	16:00	495	495	560	13.1%
primary	8/10/2015	17:00	430	430	458	6.5%

Sensor Component Sensor Level **Condition** Level **Status** pass

Sensor Component Sensor Clean **Condition** Clean **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	Eric Hebert	08/10/2015	Precipitation	none

Mfg PMP **Parameter** Precipitation

Serial Number EW-06134-50 **Tfer Desc.** 250ml graduate

Tfer ID 01250

Slope 1.00000 **Intercept** 0.00000

Cert Date 9/5/2005 **CorrCoff** 1.00000

DAS 1:

A Avg % Diff:	A Max % Di
3.0%	6.0%

DAS 2:

A Avg %Dif	A Max % Di

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	0.50	0.50	in	in	ml	0.0%
primary	test 2	231.5	2	8 - 10 sec	0.50	0.47	in	in	ml	-6.0%

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

Surface Wetness Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	none	PND165	Eric Hebert	08/10/2015	Surface Wetness	illegible

Mfg Ohmite

Parameter surface wetness

Serial Number 296-1200

Tfer Desc. decade box

Tfer ID 01210

☐ **Manual Test Pass**

UseDescription	Test Type	Tfer kOhms	OutputSignal	DAS eng	OutputSignalEngUni	TferUnits	OutputSignalUnit
primary	dry	N/A	0.000	0.01	V	N/A	V
primary	wet	N/A	0.000	1.01	V	N/A	V

Sensor Component Grid Orientation **Condition** North **Status** pass

Sensor Component Grid Clean **Condition** Clean **Status** pass

Sensor Component Grid Angle **Condition** about 45 deg **Status** pass

Sensor Component Grid Condition **Condition** Poor **Status** Fail

Sensor Component Properly Sited **Condition** Properly sited **Status** pass

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

Sensor Component Grid Type **Condition** Grid without holes **Status** pass

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	PND165	Eric Hebert	08/10/2015	Shelter Temperature	none

DAS 1:

DAS 2:

Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.81	1.52		

Mfg	Extech	**Parameter**	Shelter Temperatur
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00564	**Intercept**	-0.21981
Cert Date	1/30/2015	**CorrCoff**	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	25.77	25.84	0.000	26.3	C	0.47
primary	Temp Mid Range	24.10	24.18	0.000	25.7	C	1.52
primary	Temp Mid Range	25.70	25.77	0.000	26.2	C	0.43

Infrastructure Data For

Site ID PND165 **Technician** Eric Hebert **Site Visit Date** 08/10/2015

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

Sensor Component	Shelter Roof	**Condition**	Fair	**Status**	pass
Sensor Component	Sample Tower Type	**Condition**	Type B	**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	Rotometer	**Condition**	Installed	**Status**	pass
Sensor Component	Conduit	**Condition**	Good	**Status**	pass
Sensor Component	Sample Tower	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Condition	**Condition**	Fair	**Status**	pass
Sensor Component	Shelter Floor	**Condition**	Fair	**Status**	pass
Sensor Component	Shelter Temp Control	**Condition**	Functioning	**Status**	pass
Sensor Component	Signal Cable	**Condition**	Fair	**Status**	pass
Sensor Component	Tubing Type	**Condition**	3/8 teflon	**Status**	pass
Sensor Component	Shelter Door	**Condition**	Fair	**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	Eric Hebert	08/10/2015	Cell A Flow	ThermoElectron	3360	☐	☐
This analyzer diagnostic check is outside the manufacturer's recommended value.								
Surface Wetness	PND165	Eric Hebert	08/10/2015	System Memo	RM Young	2855	☐	☐
The surface wetness sensor did not respond to one drop of water placed in the center of the grid.								
Temperature	PND165	Eric Hebert	08/10/2015	System Memo	RM Young	2851	☐	☐
The temperature sensor is mounted directly above the shelter roof.								

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator does not use gloves to handle the filter. He handles the filter by the stem and carries it upside down to reduce the chance of contamination from the shelter to the tower.

2 **Parameter:** DasComments

The site operator recently replaced the shelter air conditioner.

3 **Parameter:** SitingCriteriaCom

There is new construction at the entrance to the access road approximately 200 meters to the west of the site. The area is to be used as a staging and rock crushing site for the road improvement project scheduled to take place for the next two years.

4 **Parameter:** ShelterCleanNotes

The shelter is well maintained.

5 **Parameter:** MetSensorComme

The RH sensor is not mounted in a shield, but rather in a plastic funnel taped to the meteorological tower. Both the RH and temperature sensors are mounted above the shelter. The surface wetness sensor grid is in poor condition and only responded as wet after excessive amounts of water were applied to the entire surface of the grid.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID PND165 **Technician** Eric Hebert **Site Visit Date** 08/10/2015

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**	11.4
City, State	Pinedale, WY	**Present**	
Zip Code	82941	**Fire Extinguisher** ☑	No inspection date
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** Eric Hebert **Site Visit Date** 08/10/2015

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

There is new construction at the entrance to the access road approximately 200 meters to the west of the site. The area is to be used as a staging and rock crushing site for the road improvement project scheduled to take place for the next two years.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID PND165

Technician Eric Hebert

Site Visit Date 08/10/2015

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 not mounted in a shield, but rather in a plastic funnel taped to the meteorological tower. Both the RH and temperature sensors are mounted above the shelter. The surface wetness sensor grid is in poor condition and only responded as wet after excessive amounts of water were applied to the entire surface of the grid.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID PND165 **Technician** Eric Hebert **Site Visit Date** 08/10/2015

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?	☑	

Parameter	Manufacturer	Model	S/N	Client ID
Temperature	RM Young	41342	14800	06539
Surface Wetness	RM Young	58101	none	illegible
Temperature2meter	RM Young	41342VC	12544	06305
Relative Humidity	Vaisala	HMP50	Z4320017	05026
Precipitation	Texas Electronics	TR-525i-HT	59576-414	none
Solar Radiation	Licor	LI-200	illegible	missing
Wind Direction	RM Young	AQ05103-5	21835wdr	03924
Wind Speed	RM Young	AQ05103-5	21835wsp	03924

Provide any additional 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 Eric Hebert

Site Visit Date 08/10/2015

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** Eric Hebert **Site Visit Date** 08/10/2015

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 site operator recently replaced the shelter air conditioner.

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID PND165 **Technician** Eric Hebert **Site Visit Date** 08/10/2015

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** Eric Hebert **Site Visit Date** 08/10/2015

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	☐	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** Eric Hebert **Site Visit Date** 08/10/2015

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 does not use gloves to handle the filter. He handles the filter by the stem and carries it upside down to reduce the chance of contamination from the shelter to the tower.

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID PND165 **Technician** Eric Hebert **Site Visit Date** 08/10/2015

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	D520	unknown	000257
DAS	Campbell	CR3000	2516	000403
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	049400004449	03631
Flow Rate	Apex	AXMC105LPMDPC	illegible	000549
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0844349088	06608
Noy	Teledyne	T200U	112	000807
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	LI-200	illegible	missing
Solar Radiation Translator	RM Young	70101-X	none	02532
Surface Wetness	RM Young	58101	none	illegible
Temperature	RM Young	41342	14800	06539
Temperature2meter	RM Young	41342VC	12544	06305
Wind Direction	RM Young	AQ05103-5	21835wdr	03924
Wind Speed	RM Young	AQ05103-5	21835wsp	03924
Zero air system	Teledyne	701H	609	000773

Site Inventory by Site Visit

YEL408-Eric Hebert-08/13/2015

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
1	8/13/2015	Computer	Hewlett Packard	none	8470p	CNU347CS5G
2	8/13/2015	DAS	Environmental Sys Corp	90632	8816	2505
3	8/13/2015	Elevation	Elevation	None	1	None
4	8/13/2015	Filter pack flow pump	Thomas	none	107CA18B	049800008583
5	8/13/2015	flow rate	Tylan	none	FC280SAV	AW9706012
6	8/13/2015	Infrastructure	Infrastructure	none	none	none
7	8/13/2015	Mainframe	Climatronics	none	100081	1380
8	8/13/2015	Mainframe power supply	Climatronics	none	101074	688
9	8/13/2015	Met tower	Climatronics	01362	14 inch taper	illegible
10	8/13/2015	MFC power supply	Tylan	03944	RO-32	FP9605010
11	8/13/2015	Ozone	ThermoElectron Inc	90714	49C	49C-66828-354
12	8/13/2015	Ozone Standard	ThermoElectron Inc	90606	49C	49C-61991-333
13	8/13/2015	Printer	Hewlett Packard	none	840C	unknown
14	8/13/2015	Sample Tower	Aluma Tower	illegible	B	none
15	8/13/2015	Shelter Temperature	ARS	none	none	none
16	8/13/2015	Shield (2 meter)	Climatronics	01050	100325	illegible
17	8/13/2015	Siting Criteria	Siting Criteria	None	1	None
18	8/13/2015	Temperature	Climatronics	ARS100	100093	none
19	8/13/2015	Temperature Translator	Climatronics	03626	100088-2	396
20	8/13/2015	Zero air pump	Werther International	none	PC70/4	531393

DAS Data Form

DAS Time Max Error: 0.17

Mfg	**Serial Number**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Use Desc.**
Environmental Sys	2505	YEL408	Eric Hebert	08/13/2015	DAS	Primary

Das Date: 8 /13/2015
Das Time: 9:05:10
Das Day: 225

Audit Date 8 /13/2015
Audit Time 9:05:00
Audit Day 225

Low Channel:

Avg Diff: 0.0002
Max Diff: 0.0004

High Channel:

Avg Diff: 0.0000
Max Diff: 0.0002

Mfg Datel
Parameter DAS
Serial Number 4000392
Tfer Desc. Source generator (D
Tfer ID 01321
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
CorrCoff 1.00000

Mfg Fluke
Parameter DAS
Serial Number 86590148
Tfer Desc. DVM
Tfer ID 01310
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
CorrCoff 1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
2	0.0000	0.0000	0.0000	V	V	0.0000
2	0.1000	0.1000	0.1000	V	V	0.0000
2	0.3000	0.3000	0.3001	V	V	0.0001
2	0.5000	0.5000	0.5002	V	V	0.0002
2	0.7000	0.7000	0.7002	V	V	0.0002
2	0.9000	0.9000	0.9003	V	V	0.0003
2	1.0000	1.0000	1.0004	V	V	0.0004
10	0.0000	0.0000	0.0000	V	V	0.0000
10	0.1000	0.1000	0.1000	V	V	0.0000
10	0.3000	0.3000	0.3000	V	V	0.0000
10	0.5000	0.5000	0.4999	V	V	-0.0001
10	0.7000	0.7000	0.7002	V	V	0.0002
10	0.9000	0.9000	0.9000	V	V	0.0000
10	1.0000	1.0000	1.0000	V	V	0.0000

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Tylan	AW9706012	YEL408	Eric Hebert	08/13/2015	flow rate	none

Mfg Tylan

SN/Owner ID FP9605010 03944

Parameter MFC power supply

Mfg BIOS

Parameter Flow Rate

Serial Number 131818

Tfer Desc. BIOS 220-H

Tfer ID 01417

Slope 1.00316

Intercept -0.00540

Cert Date 1/7/2015

CorrCoff 1.00000

DAS 1: A Avg % Diff:	DAS 1: A Max % Di	DAS 2: A Avg %Dif	DAS 2: A Max % Di
0.44%	0.67%		

Cal Factor Zero 0.481

Cal Factor Full Scale 5.486

Rotometer Reading: 3.4

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	-0.37	-0.340	0.14	l/m	l/m	
primary	leak check	0.000	0.000	-0.34	-0.300	0.19	l/m	l/m	
primary	test pt 1	3.015	3.010	2.53	2.539	3.02	l/m	l/m	0.33%
primary	test pt 2	3.019	3.010	2.52	2.539	3.02	l/m	l/m	0.33%
primary	test pt 3	3.007	3.000	2.52	2.539	3.02	l/m	l/m	0.67%

Sensor Component	Condition	Status
Leak Test		pass
Filter Azimuth	90 deg	pass
Filter Depth	2.0 cm	pass
Filter Position	Good	pass
Moisture Present	No moisture present	pass
Rotometer Condition	Clean and dry	pass
System Memo	See comments	pass
Tubing Condition	Good	pass
Filter Distance	5.5 cm	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	49C-66828-354	YEL408	Eric Hebert	08/13/2015	Ozone	90714

Slope:	0.98473	**Slope:**	0.00000
Intercept	-0.90442	**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
3.7%	5.9%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00952	**Intercept**	-0.24284
Cert Date	1/7/2015	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.25	0.48	0.12	ppb	
primary	2	30.26	30.21	28.44	ppb	-5.86%
primary	3	52.68	52.42	50.45	ppb	-3.76%
primary	4	74.01	73.55	71.23	ppb	-3.15%
primary	5	116.42	115.56	113.30	ppb	-1.96%

Sensor Component	Cell B Noise	**Condition**	0.3 ppb	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	1.0015	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	Offset	**Condition**	1.2	**Status**	pass
Sensor Component	Span	**Condition**	1.004	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	76.7 kHz	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**		**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.68 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	39.2 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	565.1 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.5 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	92.1 kHz	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.66 lpm	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	0.0001	**Status**	pass

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Climatronics	none	YEL408	Eric Hebert	08/13/2015	Temperature	ARS100

Mfg	Climatronics	
SN/Owner ID	396	03626
Parameter	Temperature Translator	

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00564	**Intercept**	-0.21981
Cert Date	1/30/2015	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.13	0.18		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	-0.04	0.18	0.000	0.4	C	0.18
primary	Temp Mid Range	22.08	22.17	0.000	22.0	C	-0.17
primary	Temp High Range	46.97	46.93	0.000	46.9	C	-0.03

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

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	YEL408	Eric Hebert	08/13/2015	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
1.26	1.44

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232679

Tfer Desc. RTD

Tfer ID 01228

Slope 1.00564

Intercept -0.21981

Cert Date 1/30/2015

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	24.97	25.05	0.000	26.0	C	0.96
primary	Temp Mid Range	25.79	25.86	0.000	27.3	C	1.39
primary	Temp Mid Range	27.85	27.91	0.000	29.4	C	1.44

Infrastructure Data For

Site ID YEL408 **Technician** Eric Hebert **Site Visit Date** 08/13/2015

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

Sensor Component	Shelter Roof	**Condition**	Good	**Status**	pass
Sensor Component	Sample Tower Type	**Condition**	Type B	**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	Rotometer	**Condition**	Installed	**Status**	pass
Sensor Component	Conduit	**Condition**	Good	**Status**	pass
Sensor Component	Sample Tower	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Condition	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Floor	**Condition**	Fair	**Status**	pass
Sensor Component	Shelter Temp Control	**Condition**	Functioning	**Status**	pass
Sensor Component	Signal Cable	**Condition**	Fair	**Status**	pass
Sensor Component	Tubing Type	**Condition**	3/8 teflon	**Status**	pass
Sensor Component	Shelter Door	**Condition**	Good	**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	YEL408	Eric Hebert	08/13/2015	System Memo	Tylan	648	☐	☐
The recorded flow rate data are accurate as recorded. The flow rate is not at the target flow rate.								
Temperature	YEL408	Eric Hebert	08/13/2015	System Memo	Climatronics	1637	☐	☑
Additional details can be found in the hardcopy of the site audit report.								

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator was not available during the site audit visit. Reported information was obtained from the site documentation.

2 **Parameter:** DasComments

The shelter heat is operating continuously. The air conditioning is cycling and able to overcome the additional heat and maintain the shelter temperature within specifications.

3 **Parameter:** SiteOpsProcedures

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

4 **Parameter:** SitingCriteriaCom

The site is located at the edge of a tree line. Trees as tall as the sample inlet are approximately 10 to 15 meters from the sample tower and cover the area from west to east on the north side of the site. Other trees have been cut and the forest has been thinned. There may be a few trees still in violation of the 22.5 degree rule to the north of the inlet. A new communication tower has been constructed since the previous site audit visit.

5 **Parameter:** ShelterCleanNotes

The shelter is organized and well maintained.

6 **Parameter:** PollAnalyzerCom

The desiccant canister is spent.

7 **Parameter:** MetOpMaintCom

The recorded temperature is now being measured at approximately 2 meters above the ground. Current temperature measurements are no longer comparable to previous temperature measurements at this site.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID ROM406 **Technician** Eric Hebert **Site Visit Date** 08/04/2015

Site Sponsor (agency)	NPS	**USGS Map**	Longs Peak
Operating Group	NPS	**Map Scale**	
AQS #	08-069-0007	**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**	
Conforms to MLM	Marginally	**QAPP Declination Date**	
Site Telephone	(970) 586-8520	**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

			Present	
City, State	Estes Park, CO			
Zip Code	80517	**Fire Extinguisher**	☑	Inspected June 2013
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 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** Eric Hebert **Site Visit Date** 08/04/2015

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 Eric Hebert

Site Visit Date 08/04/2015

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) and not 10 meters. Current temperature measurements are no longer comparable to previous temperature measurements at this site.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID ROM406 **Technician** Eric Hebert **Site Visit Date** 08/04/2015

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?**	☑	

Parameter	Manufacturer	Model	S/N	Client ID
Temperature	RM Young	41342	17079	none
Shield (2 meter)	RM Young	unknown	none	none
Met tower	Rohn	unknown	none	none

Provide any additional 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** Eric Hebert **Site Visit Date** 08/04/2015

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?	☐	No
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** Eric Hebert **Site Visit Date** 08/04/2015

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.

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

Site ID ROM406 **Technician** Eric Hebert **Site Visit Date** 08/04/2015

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	☑	DataView2	☑
SSRF	☑		☑
Site Ops Manual	☑		☑
HASP	☐		☐
Field Ops Manual	☑		☑
Calibration Reports	☑	3/11/2015	☑
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** Eric Hebert **Site Visit Date** 08/04/2015

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:

The ozone analyzer display is indicating a low flow alarm for cell B. The analyzer is functioning properly and the flow meter is likely suspect.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID ROM406 **Technician** Eric Hebert **Site Visit Date** 08/04/2015

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?	☑	
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:

The site operator is doing a very good job performing the site duties and expressed an interest in trying to improve any deficiencies. The sample flow rate systems for both the dry deposition and ozone sample trains were explained during the audit at the request of the site operator. Although gloves are not used to handle the filter pack, the operator is careful to touch only the bag and caps and not the filter.

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID ROM406 **Technician** Eric Hebert **Site Visit Date** 08/04/2015

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
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	1030745085	none
Ozone Standard	ThermoElectron Inc	49i A1NAA	CM08460008	none
Printer	Hewlett Packard	842C	unknown	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
Temperature	RM Young	41342	17079	none
Zero air pump	Werther International	PC70/4	531392	none

Site Inventory by Site Visit

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
BAS601-Eric Hebert-08/14/2015						
1	8/14/2015	DAS	Campbell	none	CR1000	unknown1
2	8/14/2015	elevation	Elevation	none	none	none
3	8/14/2015	Filter pack flow pump	Thomas	none	107CAB18	099800009743
4	8/14/2015	Flow Rate	Omega	none	FMA6518ST-RS232	318559-1
5	8/14/2015	Infrastructure	Infrastructure	none	none	none
6	8/14/2015	Met tower	unknown	none	unknown	none
7	8/14/2015	Ozone	ThermoElectron Inc	L0534684	49i A1NAA	1214552973
8	8/14/2015	Ozone Standard	ThermoElectron Inc	none	49i E3CAA	1214552971
9	8/14/2015	Precipitation	Met One	T15382	385	T15382
10	8/14/2015	Relative Humidity	Vaisala	none	HMP45AC	E3720077
11	8/14/2015	Shelter Temperature	unknown	none	unknown	none
12	8/14/2015	siting criteria	Siting Criteria	none	none	None
13	8/14/2015	Solar Radiation	Licor	none	LI-200	PY47987
14	8/14/2015	Temperature	Vaisala	none	HMP45AC	E3720077
15	8/14/2015	Wind Direction	Met One	illegible	024	Illegible
16	8/14/2015	Wind Speed	Met One	J2228	014	12208
17	8/14/2015	Zero air pump	Thomas	none	107CAB18	100800033636

DAS Data Form

DAS Time Max Error: 3.17

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	unknown1	BAS601	Eric Hebert	08/14/2015	DAS	Primary

Das Date:	8 /14/2015	**Audit Date**	8 /14/2015
Das Time:	9:43:10	**Audit Time**	9:40:00
Das Day:	226	**Audit Day**	226

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

Mfg	Datel	**Parameter**	DAS
Serial Number	4000392	**Tfer Desc.**	Source generator (D
Tfer ID	01321		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/22/2015	**CorrCoff**	1.00000
Mfg	Fluke	**Parameter**	DAS
Serial Number	86590148	**Tfer Desc.**	DVM
Tfer ID	01310		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/22/2015	**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	318559-1	BAS601	Eric Hebert	08/14/2015	Flow Rate	none

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	131818	**Tfer Desc.**	BIOS 220-H
Tfer ID	01417		
Slope	1.00316	**Intercept**	-0.00540
Cert Date	1/7/2015	**CorrCoff**	1.00000

DAS 1:

DAS 2:

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
2.12%	3.01%		

Cal Factor Zero	0.293
Cal Factor Full Scale	1.459
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	3.265	3.260	0.00	0.000	3.21	l/m	l/m	-1.53%
primary	test pt 2	3.286	3.280	0.00	0.000	3.22	l/m	l/m	-1.83%
primary	test pt 3	3.327	3.320	0.00	0.000	3.22	l/m	l/m	-3.01%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	360 deg	**Status**	pass
Sensor Component	Filter Depth	**Condition**	-3.0 cm	**Status**	Fail
Sensor Component	Filter Position	**Condition**	Poor	**Status**	Fail
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	N/A	**Status**	pass
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1214552973	BAS601	Eric Hebert	08/14/2015	Ozone	L0534684

Slope:	0.97563	**Slope:**	0.00000
Intercept	-0.03096	**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
2.6%	3.0%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00952	**Intercept**	-0.24284
Cert Date	1/7/2015	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.28	0.51	0.58	ppb	
primary	2	28.27	28.24	27.52	ppb	-2.55%
primary	3	48.91	48.68	47.49	ppb	-2.44%
primary	4	73.35	72.89	70.73	ppb	-2.96%
primary	5	115.05	114.20	111.60	ppb	-2.28%

Sensor Component	Cell B Noise	**Condition**	0.6 ppb	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	Offset	**Condition**	-0.4	**Status**	pass
Sensor Component	Span	**Condition**	1.024	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	91.3 kHz	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**		**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.68 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	45.4 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	646 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.7 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	112.3 kHz	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.65 lpm	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass

Wind Speed Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	12208	BAS601	Eric Hebert	08/14/2015	Wind Speed	J2228

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	12/22/2014	**CorrCoff**	1.00000

Mfg	RM Young	**Parameter**	wind speed
Serial Number		**Tfer Desc.**	wind speed motor (h
Tfer ID	01262		
Slope	1.00000	**Intercept**	0.00000
Cert Date	12/22/2014	**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	0.01	0.52%		
Abs Max Er	0.05	1.21%		

UseDescription:	Input Device	Input RPM	Input m/s	Out V	DAS m/s	Diff/ %Diff	Diff	WsM
primary	none	0	0.50	0.0	0.5		-0.05	
primary	01261	30	1.25	0.0	1.3		0.00	
primary	01261	60	2.05	0.0	2.1		0.00	
primary	01261	120	3.65	0.0	3.7		0.00	
primary	01262	200	5.78	0.0	5.9	1.21%		
primary	01262	400	11.11	0.0	11.1	-0.54%		
primary	01262	800	21.78	0.0	21.9	0.32%		
primary	01262	1800	48.44	0.0	48.5	0.02%		

Sensor Component	System Memo	**Condition**		**Status**	pass
Sensor Component	Sensor Plumb	**Condition**	Plumb	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	Prop or Cups Condition	**Condition**	Good	**Status**	pass
Sensor Component	Condition	**Condition**	Good	**Status**	pass
Sensor Component	Torque	**Condition**	Not tested	**Status**	pass

Wind Direction Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	Illegible	BAS601	Eric Hebert	08/14/2015	Wind Direction	illegible

Mfg	RM Young	**Parameter**	wind direction
Serial Number		**Tfer Desc.**	wind direction wheel
Tfer ID	01264		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/16/2015	**CorrCoff**	1.00000
Mfg	Ushikata	**Parameter**	wind direction
Serial Number	191832	**Tfer Desc.**	transit
Tfer ID	01272		
Slope	1.00000	**Intercept**	0.00000
Cert Date	2/19/2015	**CorrCoff**	1.00000

Vane SN: N/A

C. A. Align. deg. true: 360

VaneTorque 0 **to** 0

	DAS 1: Orientation	Linearity:	DAS 2: Orientation	Linearity:
Abs Avg Err	1.3			
Abs Max Er	2			

UseDescription	TferID	Input Raw	Linearity	Output V	Output Deg.	Difference	Change	Error
primary	01272	90	☐	0.000	92	2		2
primary	01272	180	☐	0.000	181	1		1
primary	01272	270	☐	0.000	270	0		0
primary	01272	360	☐	0.000	2	2		2

Sensor Component	Mast	**Condition**	Good	**Status**	pass
Sensor Component	Condition	**Condition**	Good	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	Sensor Plumb	**Condition**	Plumb	**Status**	pass
Sensor Component	Vane Condition	**Condition**	Good	**Status**	pass
Sensor Component	Torque	**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
Vaisala	E3720077	BAS601	Eric Hebert	08/14/2015	Temperature	none

Mfg Extech

Parameter Temperature

Serial Number H232679

Tfer Desc. RTD

Tfer ID 01228

Slope 1.00564

Intercept -0.21981

Cert Date 1/30/2015

CorrCoff 1.00000

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.79	1.56		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	8.82	8.99	0.000	10.6	C	1.56
primary	Temp Mid Range	26.53	26.60	0.000	26.8	C	0.23
primary	Temp High Range	44.02	43.99	0.000	43.4	C	-0.59

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

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

Sensor Component Blower **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	E3720077	BAS601	Eric Hebert	08/14/2015	Relative Humidity	none

Mfg	Rotronic	**Parameter**	Relative Humidity
Serial Number	124432	**Tfer Desc.**	Hygroclip
Tfer ID	01225		
Slope	0.91000	**Intercept**	4.53330
Cert Date	1/21/2015	**CorrCoff**	0.99800

	DAS 1:		DAS 2:	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	8.5	3.8		
Abs Max Er	14.5	3.8		

UseDesc.	Test type	Device	Input RH	GTL Raw	RH Corr.	DAS Volts	DAS %RH	Difference
primary	RH Low Range	Hygroclip	32.8	32.9	32.8	0.000	47.3	14.5
primary	RH Low Range	Hygroclip	52.9	54.6	52.9	0.000	55.4	2.5
primary	RH High Range	Hygroclip	93.6	83.8	93.6	0.000	89.8	-3.8

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

Solar Radiation Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
Licor	PY47987	BAS601	Eric Hebert	08/14/2015	Solar Radiation	none

Mfg	Eppley	**Parameter**	solar radiation
Serial Number	34341F3	**Tfer Desc.**	SR transfer sensor
Tfer ID	01245		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/16/2015	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
% Diff of Avg	**%Diff of Max**	**%Diff of Avg**	**%Diff of Max**
0.6%	1.4%	0.0%	0.0%

UseDescription	Measure Date	MeasureTime	Tfer Raw	Tfer Corr	DAS w/m2	PctDifference
primary	8/14/2015	11:00	723	723	723	0.0%
primary	8/14/2015	12:00	833	833	823	-1.2%
primary	8/14/2015	13:00	858	858	846	-1.4%
primary	8/14/2015	14:00	726	726	711	-2.1%
primary	8/14/2015	15:00	440	440	448	1.8%
primary	8/14/2015	16:00	195	195	201	3.3%

Sensor Component	Sensor Level	**Condition**	Level	**Status**	pass
Sensor Component	Sensor Clean	**Condition**	Clean	**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	T15382	BAS601	Eric Hebert	08/14/2015	Precipitation	T15382

DAS 1:

DAS 2:

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
7.0%	7.0%		

Mfg	PMP	**Parameter**	Precipitation
Serial Number	EW-06134-50	**Tfer Desc.**	250ml graduate
Tfer ID	01250		
Slope	1.00000	**Intercept**	0.00000
Cert Date	9/5/2005	**CorrCoff**	1.00000

UseDesc.	Test type	TferVolume	Iteration	TimePerTip	Eq.Ht	DAS eng	Eq.HtUnit	OSE Unit	TferUnits	PctDifference
primary	test 1	231.5	1	10 sec	7.10	6.60	mm	mm	ml	-7.0%
primary	test 2	231.5	2	10 sec	7.10	6.60	mm	mm	ml	-7.0%

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

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
unknown	none	BAS601	Eric Hebert	08/14/2015	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
1.40	2.23		

Mfg	Extech	**Parameter**	Shelter Temperatur
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00564	**Intercept**	-0.21981
Cert Date	1/30/2015	**CorrCoff**	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	28.68	28.74	0.000	29.3	C	0.58
primary	Temp Mid Range	26.56	26.63	0.000	28.9	C	2.23

Infrastructure Data For

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

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

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

Sensor Component	Shelter Roof	**Condition**	Good	**Status**	pass
Sensor Component	Sample Tower Type	**Condition**	Pole type	**Status**	pass
Sensor Component	Met Tower	**Condition**	Fair	**Status**	pass
Sensor Component	Moisture Trap	**Condition**	Not installed	**Status**	pass
Sensor Component	Power Cables	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer	**Condition**	Not installed	**Status**	Fail
Sensor Component	Conduit	**Condition**	N/A	**Status**	pass
Sensor Component	Sample Tower	**Condition**	Fair	**Status**	pass
Sensor Component	Shelter Condition	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Floor	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Temp Control	**Condition**	Functioning	**Status**	pass
Sensor Component	Signal Cable	**Condition**	Good	**Status**	pass
Sensor Component	Tubing Type	**Condition**	3/8 Nylon	**Status**	pass
Sensor Component	Shelter Door	**Condition**	Good	**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

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**		10.5
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 shelter houses the ozone, DAS, and MFC only.

Site OK ☐ **Notes**

Driving Directions

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

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

Operating Group BLM **Map Scale**

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

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

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

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

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

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** Eric Hebert **Site Visit Date** 08/14/2015

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)	☐	

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

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?	☑	

Parameter	Manufacturer	Model	S/N	Client ID
Solar Radiation	Licor	LI-200	PY47987	none
Wind Speed	Met One	014	12208	J2228
Met tower	unknown	unknown	none	none
Relative Humidity	Vaisala	HMP45AC	E3720077	none
Temperature	Vaisala	HMP45AC	E3720077	none
Precipitation	Met One	385	T15382	T15382
Wind Direction	Met One	024	Illegible	illegible

Provide any additional 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 now mounted at approximately 2 meters from the ground. Current recorded temperature at this site is not comparable to previously measured temperature data. The accuracy of the DAS was not tested due to no available channels for the test equipment.

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

Field Systems Data Form F-02058-1500-S5-rev002

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

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)	☑	
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** Eric Hebert **Site Visit Date** 08/14/2015

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?	☐	

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

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** Eric Hebert **Site Visit Date** 08/14/2015

DAS, sensor translators, and peripheral equipment operations and maintenance

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

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 use of the filter pack chain-of-custody was discussed with the site operator.

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

Documentation

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

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 and the system is leak tested each month.

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

Site operation procedures

1	Is the filter pack being changed every Tuesday as scheduled?	☑	Filter changed mid-day 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:

The proper completion of the filter chain-of-custody form was discussed with the site operator. 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.

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

Site operation procedures

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

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	E3720077	none
Shelter Temperature	unknown	unknown	none	none
siting criteria	Siting Criteria	none	None	none
Solar Radiation	Licor	LI-200	PY47987	none
Temperature	Vaisala	HMP45AC	E3720077	none
Wind Direction	Met One	024	Illegible	illegible
Wind Speed	Met One	014	12208	J2228
Zero air pump	Thomas	107CAB18	100800033636	none

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 08/14/2015

Site Visit Sensors

Site Inventory by Site Visit

SHE604-Eric Hebert-08/18/2015

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
1	8/18/2015	DAS	Campbell	49923	CR1000	unknown2
2	8/18/2015	elevation	Elevation	none	none	none
3	8/18/2015	Flow Rate	Omega	none	FMA6518ST-RS232	32433-2
4	8/18/2015	Infrastructure	Infrastructure	none	none	none
5	8/18/2015	Precipitation	Met One	none	370C	N8139
6	8/18/2015	Relative Humidity	Vaisala	none	HMP45AC	C2730121
7	8/18/2015	Sample Tower	Unknown	none	Unknown	None
8	8/18/2015	siting criteria	Siting Criteria	none	none	None
9	8/18/2015	Solar Radiation	Licor	none	LI-200	illegible
10	8/18/2015	Temperature	Vaisala	none	HMP45AC	C2730121
11	8/18/2015	Wind Direction	Met One	none	024	W4808
12	8/18/2015	Wind Speed	Met One	J1234	014	J1234

DAS Data Form

DAS Time Max Error: 0.5

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	unknown2	SHE604	Eric Hebert	08/18/2015	DAS	Primary

Das Date: 8 /18/2015
Das Time: 8:45:30
Das Day: 230

Audit Date 8 /18/2015
Audit Time 8:45:00
Audit Day 230

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

Mfg Datel
Parameter DAS
Serial Number 4000392
Tfer Desc. Source generator (D
Tfer ID 01321
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
CorrCoff 1.00000

Mfg Fluke
Parameter DAS
Serial Number 86590148
Tfer Desc. DVM
Tfer ID 01310
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
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	32433-2	SHE604	Eric Hebert	08/18/2015	Flow Rate	none

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	131818	**Tfer Desc.**	BIOS 220-H
Tfer ID	01417		
Slope	1.00316	**Intercept**	-0.00540
Cert Date	1/7/2015	**CorrCoff**	1.00000

DAS 1: **DAS 2:**

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
4.80%	5.09%		

Cal Factor Zero 0.373

Cal Factor Full Scale 0.933

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	0.37	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.37	l/m	l/m	
primary	test pt 1	3.341	3.340	0.00	0.000	3.17	l/m	l/m	-5.09%
primary	test pt 2	3.336	3.330	0.00	0.000	3.17	l/m	l/m	-4.80%
primary	test pt 3	3.322	3.320	0.00	0.000	3.17	l/m	l/m	-4.52%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	270 deg	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.5 cm	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Filter Distance	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Tubing Condition	**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	System Memo	**Condition**	See comments	**Status**	pass

Wind Speed Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	J1234	SHE604	Eric Hebert	08/18/2015	Wind Speed	J1234

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	12/22/2014	**CorrCoff**	1.00000
Mfg	RM Young	**Parameter**	wind speed
Serial Number		**Tfer Desc.**	wind speed motor (h
Tfer ID	01262		
Slope	1.00000	**Intercept**	0.00000
Cert Date	12/22/2014	**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	0.01	1.03%		
Abs Max Er	0.05	2.25%		

UseDescription:	Input Device	Input RPM	Input m/s	Out V	DAS m/s	Diff/ %Diff	Diff	WsM
primary	00000	0	0.50	0.0	0.5		-0.05	
primary	01261	30	1.25	0.0	1.3		0.00	
primary	01261	60	2.05	0.0	2.1		0.00	
primary	01261	120	3.65	0.0	3.7		0.00	
primary	01262	200	5.78	0.0	5.7	-2.25%		
primary	01262	400	11.11	0.0	11.3	1.26%		
primary	01262	800	21.78	0.0	21.7	-0.60%		
primary	01262	1800	48.44	0.0	48.5	0.02%		

Sensor Component	Condition	**Condition**	Good	**Status**	pass
Sensor Component	Sensor Plumb	**Condition**	Plumb	**Status**	pass
Sensor Component	Torque	**Condition**	Not tested	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	Prop or Cups Condition	**Condition**	Good	**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	W4808	SHE604	Eric Hebert	08/18/2015	Wind Direction	none

Mfg RM Young

Parameter wind direction

Serial Number

Tfer Desc. wind direction wheel

Tfer ID 01264

Slope 1.00000

Intercept 0.00000

Cert Date 1/16/2015

CorrCoff 1.00000

Mfg Ushikata

Parameter wind direction

Serial Number 191832

Tfer Desc. transit

Tfer ID 01272

Slope 1.00000

Intercept 0.00000

Cert Date 2/19/2015

CorrCoff 1.00000

Vane SN: N/A

C. A. Align. deg. true: 2

VaneTorque 0 **to** 0

	DAS 1: Orientation	DAS 1: Linearity:	DAS 2: Orientation	DAS 2: Linearity:
Abs Avg Err	2.0			
Abs Max Er	3			

UseDescription	TferID	Input Raw	Linearity	Output V	Output Deg.	Difference	Change	Error
primary	01272	2	☐	0.000	1	1		1
primary	01272	92	☐	0.000	94	2		2
primary	01272	182	☐	0.000	184	2		2
primary	01272	272	☐	0.000	269	3		3

Sensor Component		Condition		Status	
Sensor Component	Mast	**Condition**	Good	**Status**	pass
Sensor Component	Condition	**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**	Not tested	**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
Vaisala	C2730121	SHE604	Eric Hebert	08/18/2015	Temperature	none

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00564	**Intercept**	-0.21981
Cert Date	1/30/2015	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
1.54	3.28		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	15.65	15.78	0.000	17.0	C	1.25
primary	Temp Mid Range	17.00	17.12	0.000	17.0	C	-0.08
primary	Temp Mid Range	22.99	23.08	0.000	19.8	C	-3.28

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	C2730121	SHE604	Eric Hebert	08/18/2015	Relative Humidity	none

Mfg	Rotronic	**Parameter**	Relative Humidity
Serial Number	124432	**Tfer Desc.**	Hygroclip
Tfer ID	01225		
Slope	0.91000	**Intercept**	4.53330
Cert Date	1/21/2015	**CorrCoff**	0.99800

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

UseDesc.	Test type	Device	Input RH	GTL Raw	RH Corr.	DAS Volts	DAS %RH	Difference
primary	RH Low Range	Hygroclip	52.9	50.8	52.9	0.000	53.6	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

Precipitation Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	N8139	SHE604	Eric Hebert	08/18/2015	Precipitation	none

Mfg PMP

Parameter Precipitation

Serial Number EW-06134-50

Tfer Desc. 250ml graduate

Tfer ID 01250

Slope 1.00000

Intercept 0.00000

Cert Date 9/5/2005

CorrCoff 1.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
9.8%	9.8%		

UseDesc.	Test type	TferVolume	Iteration	TimePerTip	Eq.Ht	DAS eng	Eq.HtUnit	OSE Unit	TferUnits	PctDifference
primary	test 1	465.0	1	10 sec	14.34	15.75	mm	mm	ml	9.8%

Sensor Component	Properly Sited	**Condition**	45 degree rule	**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** Eric Hebert **Site Visit Date** 08/18/2015

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

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	SHE604	Eric Hebert	08/18/2015	System Memo	Omega	3819	☐	☐

Additional details can be found in the hardcopy of the site audit report.

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Temperature	SHE604	Eric Hebert	08/18/2015	System Memo	Vaisala	4058	☐	☐

Additional details can be found in the hardcopy of the site audit report.

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator uses the caps and bag from the received filter to seal and send back the removed filter. A spare set of caps and bag should be sent to the site. This was reported during the previous site audit.

2 **Parameter:** DasComments

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

3 **Parameter:** SiteOpsProcedures

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

4 **Parameter:** DocumentationCo

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

5 **Parameter:** SitingCriteriaCom

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

6 **Parameter:** ShelterCleanNotes

NEMA enclosure, solar power

7 **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.

8 **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.

9 **Parameter:** MetOpMaintCom

Due to limited time at the site caused by approaching thunder storm, only ambient comparisons of temperature were performed using the EEMS RTD standard. One standard salt solution was used for the RH comparison. 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** Eric Hebert **Site Visit Date** 08/18/2015

Site Sponsor (agency)	EPA	**USGS Map**	
Operating Group	BLM	**Map Scale**	
AQS #		**Map Date**	
Meteorological Type	Climatronics		
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**	10.0

			Present	
City, State	Sheridan, WY			
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** Eric Hebert **Site Visit Date** 08/18/2015

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** Eric Hebert **Site Visit Date** 08/18/2015

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** Eric Hebert **Site Visit Date** 08/18/2015

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:

Due to limited time at the site caused by approaching thunder storm, only ambient comparisons of temperature were performed using the EEMS RTD standard. One standard salt solution was used for the RH comparison. 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** Eric Hebert **Site Visit Date** 08/18/2015

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 Eric Hebert

Site Visit Date 08/18/2015

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** Eric Hebert **Site Visit Date** 08/18/2015

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.

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID SHE604 **Technician** Eric Hebert **Site Visit Date** 08/18/2015

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** Eric Hebert **Site Visit Date** 08/18/2015

Site operation procedures

1	Is the filter pack being changed every Tuesday as scheduled?	☑	Filter changed mornings 90%
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 uses the caps and bag from the received filter to seal and send back the removed filter. A spare set of caps and bag should be sent to the site. This was reported during the previous site audit.

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID SHE604 **Technician** Eric Hebert **Site Visit Date** 08/18/2015

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
Temperature	Vaisala	HMP45AC	C2730121	none
Wind Direction	Met One	024	W4808	none
Wind Speed	Met One	014	J1234	J1234

Site Inventory by Site Visit

BUF603-Eric Hebert-08/19/2015

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
1	8/19/2015	DAS	Campbell	49917	CR1000	43073
2	8/19/2015	elevation	Elevation	none	none	none
3	8/19/2015	Filter pack flow pump	Thomas	none	107CAB18	Illegible
4	8/19/2015	Flow Rate	Omega	none	FMA6518ST-RS232	315688-1
5	8/19/2015	Infrastructure	Infrastructure	none	none	none
6	8/19/2015	MFC power supply	Sceptre	none	FMA65PWC	295106-12
7	8/19/2015	Precipitation	Met One	none	385	J7547
8	8/19/2015	Relative Humidity	Vaisala	none	HMP45AC	C2730144
9	8/19/2015	Sample Tower	Unknown	none	Unknown	None
10	8/19/2015	siting criteria	Siting Criteria	none	none	None
11	8/19/2015	Solar Radiation	Licor	none	LI-200	illegible
12	8/19/2015	Temperature	Vaisala	none	HMP45AC	C2730144
13	8/19/2015	Wind Direction	Met One	none	024	J7269
14	8/19/2015	Wind Speed	Met One	K2277	014	K2277

DAS Data Form

DAS Time Max Error: 2.33

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	43073	BUF603	Eric Hebert	08/19/2015	DAS	Primary

Das Date: 8 /19/2015
Das Time: 9:44:20
Das Day: 231

Audit Date 8 /19/2015
Audit Time 9:42:00
Audit Day 231

Low Channel:

Avg Diff:	Max Diff:
0.0000	0.0000

High Channel:

Avg Diff:	Max Diff:
0.0000	0.0000

Mfg Datel
Parameter DAS
Serial Number 4000392
Tfer Desc. Source generator (D
Tfer ID 01321
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
CorrCoff 1.00000

Mfg Fluke
Parameter DAS
Serial Number 86590148
Tfer Desc. DVM
Tfer ID 01310
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
CorrCoff 1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
4	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	315688-1	BUF603	Eric Hebert	08/19/2015	Flow Rate	none

Mfg Sceptre

SN/Owner ID 295106-12 none

Parameter MFC power supply

Mfg BIOS

Parameter Flow Rate

Serial Number 131818

Tfer Desc. BIOS 220-H

Tfer ID 01417

Slope 1.00316

Intercept -0.00540

Cert Date 1/7/2015

CorrCoff 1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
0.89%	1.19%		

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	3.365	3.360	0.00	0.000	3.33	l/m	l/m	-0.89%
primary	test pt 2	3.355	3.350	0.00	0.000	3.31	l/m	l/m	-1.19%
primary	test pt 3	3.359	3.350	0.00	0.000	3.33	l/m	l/m	-0.60%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	135 deg	**Status**	pass
Sensor Component	Filter Depth	**Condition**	10.0 cm	**Status**	pass
Sensor Component	Filter Position	**Condition**	Poor	**Status**	Pass
Sensor Component	Filter Distance	**Condition**	2.5 cm	**Status**	pass
Sensor Component	Tubing Condition	**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	System Memo	**Condition**	See comments	**Status**	pass

Wind Speed Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	K2277	BUF603	Eric Hebert	08/19/2015	Wind Speed	K2277

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	12/22/2014	**CorrCoff**	1.00000
Mfg	RM Young	**Parameter**	wind speed
Serial Number		**Tfer Desc.**	wind speed motor (h
Tfer ID	01262		
Slope	1.00000	**Intercept**	0.00000
Cert Date	12/22/2014	**CorrCoff**	1.00000

Prop or Cups SN N/A

Prop or Cups Torque 0 **to** 0

Prop Correction Fact N/A

	DAS 1: Low Range	High Range	DAS 2: Low Range	High Range
Abs Avg Err	0.01	0.78%		
Abs Max Er	0.05	2.25%		

UseDescription:	Input Device	Input RPM	Input m/s	Out V	DAS m/s	Diff/ %Diff	Diff	WsM
primary	00000	0	0.50	0.0	0.5		-0.05	
primary	01261	30	1.25	0.0	1.3		0.00	
primary	01261	60	2.05	0.0	2.1		0.00	
primary	01261	120	3.65	0.0	3.7		0.00	
primary	01262	200	5.78	0.0	5.7	-2.25%		
primary	01262	400	11.11	0.0	11.1	-0.54%		
primary	01262	800	21.78	0.0	21.9	0.32%		
primary	01262	1800	48.44	0.0	48.5	0.02%		

Sensor Component	Condition	**Condition**	Good	**Status**	pass
Sensor Component	Sensor Plumb	**Condition**	Plumb	**Status**	pass
Sensor Component	Torque	**Condition**	Not tested	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	Prop or Cups Condition	**Condition**	Good	**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	J7269	BUF603	Eric Hebert	08/19/2015	Wind Direction	none

Mfg RM Young
Parameter wind direction
Serial Number
Tfer Desc. wind direction wheel
Tfer ID 01264
Slope 1.00000
Intercept 0.00000
Cert Date 1/16/2015
CorrCoff 1.00000

Mfg Ushikata
Parameter wind direction
Serial Number 191832
Tfer Desc. transit
Tfer ID 01272
Slope 1.00000
Intercept 0.00000
Cert Date 2/19/2015
CorrCoff 1.00000

Vane SN: N/A
C. A. Align. deg. true: 1.5
VaneTorque 0 **to** 0

	DAS 1: Orientation	DAS 1: Linearity:	DAS 2: Orientation	DAS 2: Linearity:
Abs Avg Err	1.8			
Abs Max Er	4			

UseDescription	TferID	Input Raw	Linearity	Output V	Output Deg.	Difference	Change	Error
primary	01272	1	☐	0.000	2	1		1
primary	01272	91	☐	0.000	91	0		0
primary	01272	181	☐	0.000	179	2		2
primary	01272	271	☐	0.000	267	4		4

Sensor Component		Condition		Status	
Sensor Component	Mast	**Condition**	Good	**Status**	pass
Sensor Component	Condition	**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**	Not tested	**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
Vaisala	C2730144	BUF603	Eric Hebert	08/19/2015	Temperature	none

Mfg Extech
Parameter Temperature
Serial Number H232679
Tfer Desc. RTD
Tfer ID 01228
Slope 1.00564
Intercept -0.21981
Cert Date 1/30/2015
CorrCoff 1.00000

DAS 1: Abs Avg Err	DAS 1: Abs Max Er	DAS 2: Abs Avg Err	DAS 2: Abs Max Er
0.23	0.39		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	7.62	7.80	0.000	7.5	C	-0.27
primary	Temp Mid Range	25.90	25.97	0.000	26.0	C	0.03
primary	Temp High Range	42.71	42.69	0.000	42.3	C	-0.39

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

Humidity Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	C2730144	BUF603	Eric Hebert	08/19/2015	Relative Humidity	none

Mfg	Rotronic	**Parameter**	Relative Humidity
Serial Number	124432	**Tfer Desc.**	Hygroclip
Tfer ID	01225		
Slope	0.91000	**Intercept**	4.53330
Cert Date	1/21/2015	**CorrCoff**	0.99800

	DAS 1:		DAS 2:	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	1.8	2.4		
Abs Max Er	2.6	2.4		

UseDesc.	Test type	Device	Input RH	GTL Raw	RH Corr.	DAS Volts	DAS %RH	Difference
primary	RH Low Range	Hygroclip	32.8	34.7	32.8	0.000	31.8	-1.0
primary	RH Low Range	Hygroclip	52.9	56.1	52.9	0.000	50.3	-2.6
primary	RH High Range	Hygroclip	93.6	86.8	93.6	0.000	91.2	-2.4

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

Solar Radiation Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Licor	illegible	BUF603	Eric Hebert	08/19/2015	Solar Radiation	none

Mfg Eppley
Parameter solar radiation
Serial Number 34341F3
Tfer Desc. SR transfer sensor
Tfer ID 01245
Slope 1.00000
Intercept 0.00000
Cert Date 1/16/2015
CorrCoff 1.00000

DAS 1:		DAS 2:	
% Diff of Avg	%Diff of Max	%Diff of Avg	%Diff of Max
1.3%	1.3%	0.0%	0.0%

UseDescription	Measure Date	MeasureTime	Tfer Raw	Tfer Corr	DAS w/m2	PctDifference
primary	8/19/2015	11:00	840	840	861	2.5%
primary	8/19/2015	12:00	901	901	920	2.1%
primary	8/19/2015	13:00	910	910	922	1.3%
primary	8/19/2015	14:00	869	868	868	0.0%
primary	8/19/2015	15:00	758	758	762	0.6%

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	Eric Hebert	08/19/2015	Precipitation	none

Mfg	PMP	**Parameter**	Precipitation
Serial Number	EW-06134-50	**Tfer Desc.**	250ml graduate
Tfer ID	01250		
Slope	1.00000	**Intercept**	0.00000
Cert Date	9/5/2005	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
5.2%	9.0%		

UseDesc.	Test type	TferVolume	Iteration	TimePerTip	Eq.Ht	DAS eng	Eq.HtUnit	OSE Unit	TferUnits	PctDifference
primary	test 1	231	1	10 sec	3.35	3.05	mm	mm	ml	-9.0%
primary	test 2	231	2	10 sec	3.35	3.30	mm	mm	ml	-1.5%

Sensor Component	Properly Sited	**Condition**	45 degree rule	**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**	Functioning	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Infrastructure Data For

Site ID BUF603 **Technician** Eric Hebert **Site Visit Date** 08/19/2015

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

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	BUF603	Eric Hebert	08/19/2015	System Memo	Omega	3827	☐	☐

The filter attachment plate is mounted too high in the enclosure resulting in the filter being recessed in the enclosure and not exposed in the standard geometric orientation.

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.

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.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID BUF603 **Technician** Eric Hebert **Site Visit Date** 08/19/2015

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**	9.5
City, State	Buffalo, WY		
Zip Code	82834		
Time Zone	Mountain		
Primary Operator			
Primary Op. Phone #			
Primary Op. E-mail			
Backup Operator			
Backup Op. Phone #			
Backup Op. E-mail			

	Present	
Fire Extinguisher	☐	
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** NEMA enclosure, 120 VAC power

Site OK ☐ **Notes**

Driving Directions

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID BUF603 **Technician** Eric Hebert **Site Visit Date** 08/19/2015

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** Eric Hebert **Site Visit Date** 08/19/2015

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** Eric Hebert **Site Visit Date** 08/19/2015

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:

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID BUF603 **Technician** Eric Hebert **Site Visit Date** 08/19/2015

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** Eric Hebert **Site Visit Date** 08/19/2015

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** Eric Hebert **Site Visit Date** 08/19/2015

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	☐	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.

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID BUF603 **Technician** Eric Hebert **Site Visit Date** 08/19/2015

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** Eric Hebert **Site Visit Date** 08/19/2015

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
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:

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID BUF603 **Technician** Eric Hebert **Site Visit Date** 08/19/2015

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	107CAB18	Illegible	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	C2730144	none
Sample Tower	Unknown	Unknown	None	none
siting criteria	Siting Criteria	none	None	none
Solar Radiation	Licor	LI-200	illegible	none
Temperature	Vaisala	HMP45AC	C2730144	none
Wind Direction	Met One	024	J7269	none
Wind Speed	Met One	014	K2277	K2277

Site Inventory by Site Visit

NEC602-Eric Hebert-08/20/2015

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
1	8/20/2015	DAS	Campbell	none	CR1000	41007
2	8/20/2015	elevation	Elevation	none	none	none
3	8/20/2015	Filter pack flow pump	Thomas	none	107CAB18	061200041880
4	8/20/2015	Flow Rate	Omega	none	FMA6518ST-RS232	324333-1
5	8/20/2015	Infrastructure	Infrastructure	none	none	none
6	8/20/2015	MFC power supply	Sceptre	none	FMA65PWC	295106-8
7	8/20/2015	Ozone	ThermoElectron Inc	none	49i A1NAA	1214552974
8	8/20/2015	Ozone Standard	ThermoElectron Inc	L0534683	49i E3CAA	1214552972
9	8/20/2015	Precipitation	Met One	none	099C-1	J3064
10	8/20/2015	Relative Humidity	Vaisala	none	HMP45AC	Z1050067
11	8/20/2015	Sample Tower	Unknown	none	Unknown	None
12	8/20/2015	Shelter Temperature	ARS	none	Thermocouple	none
13	8/20/2015	siting criteria	Siting Criteria	none	none	None
14	8/20/2015	Solar Radiation	Licor	none	LI-200	PY18362
15	8/20/2015	Temperature	Vaisala	none	HMP45AC	Z1050067
16	8/20/2015	Wind Direction	Met One	none	024	Illegible
17	8/20/2015	Wind Speed	Met One	W4806	014	W4806
18	8/20/2015	Zero air pump	Thomas	none	107CAB18	081000036785

DAS Data Form

DAS Time Max Error: 2.58

Mfg	**Serial Number**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Use Desc.**
Campbell	41007	NEC602	Eric Hebert	08/20/2015	DAS	Primary

Das Date:	8 /20/2015	**Audit Date**	8 /20/2015
Das Time:	9:32:35	**Audit Time**	9:30:00
Das Day:	232	**Audit Day**	232

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

Mfg	Datel	**Parameter**	DAS
Serial Number	4000392	**Tfer Desc.**	Source generator (D
Tfer ID	01321		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/22/2015	**CorrCoff**	1.00000

Mfg	Fluke	**Parameter**	DAS
Serial Number	86590148	**Tfer Desc.**	DVM
Tfer ID	01310		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/22/2015	**CorrCoff**	1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
4	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	Eric Hebert	08/20/2015	Flow Rate	none

Mfg	Sceptre	
SN/Owner ID	295106-8	none
Parameter	MFC power supply	

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	131818	**Tfer Desc.**	BIOS 220-H
Tfer ID	01417		
Slope	1.00316	**Intercept**	-0.00540
Cert Date	1/7/2015	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
1.74%	3.49%		

Cal Factor Zero	0.2
Cal Factor Full Scale	1.03
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	3.268	3.260	0.00	0.000	3.27	l/m	l/m	0.31%
primary	test pt 2	3.159	3.150	0.00	0.000	3.26	l/m	l/m	3.49%
primary	test pt 3	3.229	3.220	0.00	0.000	3.30	l/m	l/m	2.48%
primary	test pt 4	3.288	3.280	0.00	0.000	3.33	l/m	l/m	1.52%
primary	test pt 5	3.315	3.310	0.00	0.000	3.34	l/m	l/m	0.91%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	90 deg	**Status**	pass
Sensor Component	Filter Depth	**Condition**	0 cm	**Status**	pass
Sensor Component	Filter Position	**Condition**	Fair	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Tubing Condition	**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	System Memo	**Condition**	See comments	**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1214552974	NEC602	Eric Hebert	08/20/2015	Ozone	none

Slope:	0.97150	**Slope:**	0.00000
Intercept	-0.47079	**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**
3.9%	5.1%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00952	**Intercept**	-0.24284
Cert Date	1/7/2015	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.17	0.40	0.04	ppb	
primary	2	26.39	26.38	25.03	ppb	-5.12%
primary	3	46.77	46.56	44.76	ppb	-3.87%
primary	4	78.19	77.69	74.92	ppb	-3.57%
primary	5	109.26	108.47	105.00	ppb	-3.20%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**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	Cell A Freq.	**Condition**	73.3 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.6 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.60 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	628.3 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	37.2 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	57.5 kHz	**Status**	Fail
Sensor Component	Cell B Noise	**Condition**	0.4 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.59 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**		**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

Wind Speed Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	W4806	NEC602	Eric Hebert	08/20/2015	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	12/22/2014	**CorrCoff**	1.00000
Mfg	RM Young	**Parameter**	wind speed
Serial Number		**Tfer Desc.**	wind speed motor (h
Tfer ID	01262		
Slope	1.00000	**Intercept**	0.00000
Cert Date	12/22/2014	**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	0.00	0.52%		
Abs Max Er	0.01	1.21%		

UseDescription:	Input Device	Input RPM	Input m/s	Out V	DAS m/s	Diff/ %Diff	Diff	WsM
primary	00000	0	0.45	0.0	0.5		0.00	
primary	01261	30	1.25	0.0	1.3		0.00	
primary	01261	60	2.05	0.0	2.0		-0.01	
primary	01261	120	3.65	0.0	3.7		0.00	
primary	01262	200	5.78	0.0	5.9	1.21%		
primary	01262	400	11.11	0.0	11.1	-0.54%		
primary	01262	800	21.78	0.0	21.9	0.32%		
primary	01262	1800	48.44	0.0	48.5	0.02%		

Sensor Component	Condition	**Condition**	Good	**Status**	pass
Sensor Component	Sensor Plumb	**Condition**	Plumb	**Status**	pass
Sensor Component	Torque	**Condition**	Not tested	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	Prop or Cups Condition	**Condition**	Good	**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	Illegible	NEC602	Eric Hebert	08/20/2015	Wind Direction	none

Mfg	RM Young	**Parameter**	wind direction
Serial Number		**Tfer Desc.**	wind direction wheel
Tfer ID	01264		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/16/2015	**CorrCoff**	1.00000
Mfg	Ushikata	**Parameter**	wind direction
Serial Number	191832	**Tfer Desc.**	transit
Tfer ID	01272		
Slope	1.00000	**Intercept**	0.00000
Cert Date	2/19/2015	**CorrCoff**	1.00000

Vane SN: N/A

C. A. Align. deg. true: 360

VaneTorque 0 **to** 0

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

UseDescription	TferID	Input Raw	Linearity	Output V	Output Deg.	Difference	Change	Error
primary	01272	90	☐	0.000	90	0		0
primary	01272	180	☐	0.000	178	2		2
primary	01272	270	☐	0.000	267	3		3
primary	01272	360	☐	0.000	1	1		1

Sensor Component	Mast	**Condition**	Good	**Status**	pass
Sensor Component	Condition	**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**	Not tested	**Status**	pass
Sensor Component	Vane Condition	**Condition**	Fair	**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	Z1050067	NEC602	Eric Hebert	08/20/2015	Temperature	none

Mfg Extech **Parameter** Temperature

Serial Number H232679 **Tfer Desc.** RTD

Tfer ID 01228

Slope 1.00564 **Intercept** -0.21981

Cert Date 1/30/2015 **CorrCoff** 1.00000

DAS 1: Abs Avg Err	DAS 1: Abs Max Er	DAS 2: Abs Avg Err	DAS 2: Abs Max Er
0.26	0.37		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	5.51	5.70	0.000	5.8	C	0.13
primary	Temp Mid Range	23.00	23.09	0.000	22.8	C	-0.29
primary	Temp High Range	41.33	41.32	0.000	41.0	C	-0.37

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

Humidity Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	Z1050067	NEC602	Eric Hebert	08/20/2015	Relative Humidity	none

Mfg	Rotronic	**Parameter**	Relative Humidity
Serial Number	124432	**Tfer Desc.**	Hygroclip
Tfer ID	01225		
Slope	0.91000	**Intercept**	4.53330
Cert Date	1/21/2015	**CorrCoff**	0.99800

	DAS 1:		DAS 2:	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	0.6	3.2		
Abs Max Er	1.0	3.2		

UseDesc.	Test type	Device	Input RH	GTL Raw	RH Corr.	DAS Volts	DAS %RH	Difference
primary	RH Low Range	Hygroclip	32.8	35.2	32.8	0.000	32.7	-0.1
primary	RH Low Range	Hygroclip	52.9	50.4	52.9	0.000	53.9	1.0
primary	RH High Range	Hygroclip	93.6	86.9	93.6	0.000	90.4	-3.2

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	PY18362	NEC602	Eric Hebert	08/20/2015	Solar Radiation	none

Mfg Eppley

Parameter solar radiation

Serial Number 34341F3

Tfer Desc. SR transfer sensor

Tfer ID 01245

Slope 1.00000

Intercept 0.00000

Cert Date 1/16/2015

CorrCoff 1.00000

DAS 1: **% Diff of Avg**	 **%Diff of Max**	**DAS 2:** **%Diff of Avg**	 **%Diff of Max**
9.3%	10.0%	0.0%	0.0%

UseDescription	Measure Date	MeasureTime	Tfer Raw	Tfer Corr	DAS w/m2	PctDifference
primary	8/20/2015	11:00	803	803	726	-9.6%
primary	8/20/2015	12:00	864	864	778	-10.0%
primary	8/20/2015	13:00	858	858	774	-9.7%
primary	8/20/2015	14:00	816	816	742	-9.1%
primary	8/20/2015	15:00	693	693	638	-8.0%

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	J3064	NEC602	Eric Hebert	08/20/2015	Precipitation	none

Mfg PMP **Parameter** Precipitation

Serial Number EW-06134-50 **Tfer Desc.** 250ml graduate

Tfer ID 01250

Slope 1.00000 **Intercept** 0.00000

Cert Date 9/5/2005 **CorrCoff** 1.00000

DAS 1:

DAS 2:

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
3.6%	3.6%		

UseDesc.	Test type	TferVolume	Iteration	TimePerTip	Eq.Ht	DAS eng	Eq.HtUnit	OSE Unit	TferUnits	PctDifference
primary	test 1	231.5	1	10 sec	0.28	0.29	in	in	ml	3.6%
primary	test 2	231.5	2	10 sec	0.28	0.29	in	in	ml	3.6%

Sensor Component	Properly Sited	**Condition**	45 degree rule	**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**	Not installed	**Status**	Fail
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	Eric Hebert	08/20/2015	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.29	0.79

DAS 2:

Abs Avg Err	Abs Max Er

Mfg	Extech	**Parameter**	Shelter Temperatur
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00564	**Intercept**	-0.21981
Cert Date	1/30/2015	**CorrCoff**	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	28.22	28.28	0.000	28.3	C	0.02
primary	Temp Mid Range	25.52	25.60	0.000	26.4	C	0.79
primary	Temp Mid Range	28.38	28.44	0.000	28.5	C	0.07

Infrastructure Data For

Site ID NEC602 **Technician** Eric Hebert **Site Visit Date** 08/20/2015

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

Sensor Component	Shelter Roof	**Condition**	Good	**Status**	pass
Sensor Component	Sample Tower Type	**Condition**	Pole type	**Status**	pass
Sensor Component	Met Tower	**Condition**	Good	**Status**	pass
Sensor Component	Power Cables	**Condition**	Good	**Status**	pass
Sensor Component	Conduit	**Condition**	N/A	**Status**	pass
Sensor Component	Sample Tower	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Condition	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Floor	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Temp Control	**Condition**	Functioning	**Status**	pass
Sensor Component	Signal Cable	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Door	**Condition**	Good	**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Tubing Type	**Condition**	3/8 Nylon	**Status**	pass
Sensor Component	Rotometer	**Condition**	Not installed	**Status**	pass
Sensor Component	Moisture Trap	**Condition**	Not installed	**Status**	pass

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	NEC602	Eric Hebert	08/20/2015	System Memo	Omega	3842	☐	☐
An excessive amount of fluctuation in the signal recorded by the DAS for this variable was observed during the audit.								
Ozone	NEC602	Eric Hebert	08/20/2015	Cell B Freq.	ThermoElectron	3838	☐	☑
This analyzer diagnostic check is outside the manufacturer's recommended value.								
Wind Direction	NEC602	Eric Hebert	08/20/2015	Vane Condition	Met One	4071	☐	☑
The wind direction vane is slightly bent and could be causing additional bias in wind direction measurements.								

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator is doing a good job with filter change and filter handling.

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. The purpose and procedures for "upping" and "downing" channels was discussed during the audit.

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.

7 **Parameter:** MetOpMaintCom

Met One wind direction and wind speed sensors have been added to the tower with the Climatronics AIO all-in-one weather sensor for wind direction, wind speed, and temperature. The Met One sensors were audited.
A separate sensor for humidity and temperature was audited.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID NEC602 **Technician** Eric Hebert **Site Visit Date** 08/20/2015

Site Sponsor (agency)	EPA	**USGS Map**		
Operating Group	BLM	**Map Scale**		
AQS #		**Map Date**		
Meteorological Type	Climatronics			
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**		8.4
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** Eric Hebert **Site Visit Date** 08/20/2015

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** Eric Hebert **Site Visit Date** 08/20/2015

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.

Field Systems Data Form **F-02058-1500-S4-rev002**

Site ID NEC602 **Technician** Eric Hebert **Site Visit Date** 08/20/2015

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:

Met One wind direction and wind speed sensors have been added to the tower with the Climatronics AIO all-in-one weather sensor for wind direction, wind speed, and temperature. The Met One sensors were audited.
A separate sensor for humidity and temperature was audited.

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID NEC602 **Technician** Eric Hebert **Site Visit Date** 08/20/2015

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 Eric Hebert

Site Visit Date 08/20/2015

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** Eric Hebert **Site Visit Date** 08/20/2015

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. The purpose and procedures for "upping" and "downing" channels was discussed during the audit.

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

Site ID NEC602 **Technician** Eric Hebert **Site Visit Date** 08/20/2015

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	☑	As needed	☑
Automatic Precision Level Tests	☑	Daily	☑
Manual Precision Level Test	☑	As needed	☑
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** Eric Hebert **Site Visit Date** 08/20/2015

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.

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID NEC602 **Technician** Eric Hebert **Site Visit Date** 08/20/2015

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	099C-1	J3064	none
Relative Humidity	Vaisala	HMP45AC	Z1050067	none
Sample Tower	Unknown	Unknown	None	none
Shelter Temperature	ARS	Thermocouple	none	none
siting criteria	Siting Criteria	none	None	none
Solar Radiation	Licor	LI-200	PY18362	none
Temperature	Vaisala	HMP45AC	Z1050067	none
Wind Direction	Met One	024	Illegible	none
Wind Speed	Met One	014	W4806	W4806
Zero air pump	Thomas	107CAB18	081000036785	none

Site Inventory by Site Visit

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
WNC429-Eric Hebert-08/21/2015						
1	8/21/2015	Computer	Hewlett Packard	none	6560 b	5CB1520H5J
2	8/21/2015	DAS	Environmental Sys Corp	missing	8816	4159
3	8/21/2015	Elevation	Elevation	None	1	None
4	8/21/2015	Filter pack flow pump	Thomas	none	107CAB18B	070000013426
5	8/21/2015	Flow Rate	Mykrolis	02270	FC280SAV-4S	AW901295
6	8/21/2015	Infrastructure	Infrastructure	none	none	none
7	8/21/2015	Met tower	unknown	none	unknown	none
8	8/21/2015	MFC power supply	Tylan	02176	RO-32	FP902017
9	8/21/2015	Modem	US Robotics	none	56k fax modem	unknown
10	8/21/2015	Ozone	ThermoElectron Inc	none	49i A3NAA	0615817056
11	8/21/2015	Ozone Standard	ThermoElectron Inc	none	49i PSA2AB	0807328333
12	8/21/2015	Sample Tower	Aluma Tower	none	B	none
13	8/21/2015	Shelter Temperature	RM Young	none	41342	018819
14	8/21/2015	Shield (2 meter)	RM Young	none	43532	none
15	8/21/2015	Siting Criteria	Siting Criteria	None	1	None
16	8/21/2015	Temperature	RM Young	none	41342	14264
17	8/21/2015	Zero air pump	ThermoElectron Inc	none	111	111-78387-388

DAS Data Form

DAS Time Max Error: 0.33

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	4159	WNC429	Eric Hebert	08/21/2015	DAS	Primary

Das Date: 8 /21/2015
Das Time: 7:58:40
Das Day: 233

Audit Date 8 /21/2015
Audit Time 7:59:00
Audit Day 233

Low Channel:		High Channel:	
Avg Diff:	**Max Diff:**	**Avg Diff:**	**Max Diff:**
0.0002	0.0004	0.0002	0.0004

Mfg Datel
Parameter DAS
Serial Number 4000392
Tfer Desc. Source generator (D
Tfer ID 01321
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
CorrCoff 1.00000

Mfg Fluke
Parameter DAS
Serial Number 86590148
Tfer Desc. DVM
Tfer ID 01310
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
CorrCoff 1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
2	0.0000	0.0000	0.0000	V	V	0.0000
2	0.1000	0.1000	0.1000	V	V	0.0000
2	0.3000	0.3000	0.2999	V	V	-0.0001
2	0.5000	0.5000	0.4998	V	V	-0.0002
2	0.7000	0.7000	0.6997	V	V	-0.0003
2	0.9000	0.9000	0.8997	V	V	-0.0003
2	1.0000	1.0000	0.9996	V	V	-0.0004

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Mykrolis	AW901295	WNC429	Eric Hebert	08/21/2015	Flow Rate	02270

Mfg Tylan

SN/Owner ID FP902017 02176

Parameter MFC power supply

Mfg BIOS

Parameter Flow Rate

Serial Number 131818

Tfer Desc. BIOS 220-H

Tfer ID 01417

Slope 1.00316

Intercept -0.00540

Cert Date 1/7/2015

CorrCoff 1.00000

DAS 1:

DAS 2:

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
0.56%	0.67%		

Cal Factor Zero 0

Cal Factor Full Scale 0

Rotometer Reading: 3.3

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.19	0.097	0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.19	0.097	0.01	l/m	l/m	
primary	test pt 1	2.996	2.990	2.93	2.863	3.01	l/m	l/m	0.67%
primary	test pt 2	2.998	2.990	2.93	2.863	3.01	l/m	l/m	0.67%
primary	test pt 3	3.005	3.000	2.93	2.863	3.01	l/m	l/m	0.33%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	360 deg	**Status**	pass
Sensor Component	Filter Depth	**Condition**	-2.0 cm	**Status**	Fail
Sensor Component	Filter Position	**Condition**	Poor	**Status**	Fail
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Tubing Condition	**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	System Memo	**Condition**	See comments	**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	0615817056	WNC429	Eric Hebert	08/21/2015	Ozone	none

Slope:	0.96256	**Slope:**	0.00000
Intercept	-0.47649	**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
4.7%	6.0%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00952	**Intercept**	-0.24284
Cert Date	1/7/2015	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.21	0.44	-0.07	ppb	
primary	2	33.55	33.47	31.45	ppb	-6.04%
primary	3	52.96	52.70	50.29	ppb	-4.57%
primary	4	76.67	76.18	73.46	ppb	-3.57%
primary	5	114.41	113.57	108.50	ppb	-4.46%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	0.9976	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Dirty	**Status**	Fail
Sensor Component	Zero Voltage	**Condition**	0.0060	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.000	**Status**	pass
Sensor Component	Span	**Condition**	1.368	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	54.1 kHz	**Status**	Fail
Sensor Component	Cell A Noise	**Condition**	0.9 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.64 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	638 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	34.3 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	62.4 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.6 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	1.33 lpm	**Status**	Fail
Sensor Component	Cell B Pressure	**Condition**		**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

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	14264	WNC429	Eric Hebert	08/21/2015	Temperature	none

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00564	**Intercept**	-0.21981
Cert Date	1/30/2015	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.04	0.04		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.33	0.55	0.000	0.5	C	-0.04
primary	Temp Mid Range	19.12	19.23	0.000	19.3	C	0.03
primary	Temp High Range	45.65	45.61	0.000	45.6	C	-0.04

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**	See comments	**Status**	pass

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	018819	WNC429	Eric Hebert	08/21/2015	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.16	0.20

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232679

Tfer Desc. RTD

Tfer ID 01228

Slope 1.00564

Intercept -0.21981

Cert Date 1/30/2015

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	23.22	23.31	0.000	23.4	C	0.11
primary	Temp Mid Range	24.08	24.16	0.000	24.0	C	-0.2

Infrastructure Data For

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 08/21/2015

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8810 (s/n 3034-1)	640 cuft

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

Site Visit Comments

<table>
<tr><th>Parameter</th><th>Site</th><th>Technician</th><th>S.V. Date</th><th>Component</th><th>Mfg</th><th>Serial No.</th><th>Hazard</th><th>Problem</th></tr>
<tr><td>Flow Rate</td><td>WNC429</td><td>Eric Hebert</td><td>08/21/2015</td><td>Filter Position</td><td>Mykrolis</td><td>4073</td><td>☐</td><td>☑</td></tr>
<tr><td colspan="9">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.</td></tr>
<tr><td>Ozone</td><td>WNC429</td><td>Eric Hebert</td><td>08/21/2015</td><td>System Memo</td><td>ThermoElectron</td><td>3398</td><td>☐</td><td>☑</td></tr>
<tr><td colspan="9">The ozone sample train does not include a means to introduce the zero/span/precision test gas, or the multi-point test gas, to the complete sample train. The inlet filter at the analyzer is not conditioned as described in the station procedures.</td></tr>
<tr><td>Ozone</td><td>WNC429</td><td>Eric Hebert</td><td>08/21/2015</td><td>Cell B Flow</td><td>ThermoElectron</td><td>3398</td><td>☐</td><td>☑</td></tr>
<tr><td colspan="9">This analyzer diagnostic check is outside the manufacturer's recommended value.</td></tr>
<tr><td>Ozone</td><td>WNC429</td><td>Eric Hebert</td><td>08/21/2015</td><td>Cell A Freq.</td><td>ThermoElectron</td><td>3398</td><td>☐</td><td>☑</td></tr>
<tr><td colspan="9">This analyzer diagnostic check is outside the manufacturer's recommended value.</td></tr>
<tr><td>Temperature</td><td>WNC429</td><td>Eric Hebert</td><td>08/21/2015</td><td>System Memo</td><td>RM Young</td><td>3859</td><td>☐</td><td>☑</td></tr>
<tr><td colspan="9">Additional details can be found in the hardcopy of the site audit report.</td></tr>
</table>

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The general observations section of the SSRF is still not completed. Gloves are not used when handling the filter pack.

2 **Parameter:** SiteOpsProcedures

The ozone analyzer is operated by the state of South Dakota. There is no means for introducing routine test gas at the sample inlet and all routine checks are performed at the back of the analyzer. Audit test gas was introduced through the sample inlet flooding the glass manifold.

3 **Parameter:** DocumentationCo

Records of the routine checks performed by the state personnel are kept onsite in a logbook.

4 **Parameter:** ShelterCleanNotes

One shelter houses the gas analyzers and is in good condition and clean. The analyzer sample train is a glass manifold with an exhaust fan. The second shelter houses the flow system, met translator, and IMPROVE. It is older and not climate controlled.

5 **Parameter:** PollAnalyzerCom

The dry deposition filter is mounted low in the enclosure which changes the particle collection characteristics, and can allow precipitation to enter. The ozone sample train is a 3 meter glass manifold with a 1/4 inch Teflon tubing connection to the analyzer.

6 **Parameter:** MetSensorComme

The recorded temperature is measured at approximately 2 meters above the ground. Previously measured temperature data are no longer comparable to the current temperature measurements.

7 **Parameter:** MetOpMaintCom

The temperature sensor signal cable insulation is cracked and showing signs of extreme wear.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 08/21/2015

Site Sponsor (agency)	NPS	**USGS Map**		Wind Cave
Operating Group	NPS and state of SD	**Map Scale**		
AQS #	46-033-0132	**Map Date**		
Meteorological Type	R.M. Young			
Air Pollutant Analyzer	Ozone, SO2, NOx, PM2.5, PM10, IMP	**QAPP Latitude**		43.5578
Deposition Measurement	dry, wet	**QAPP Longitude**		-103.4839
Land Use	prairie - woodland - evergreen	**QAPP Elevation Meters**		1292
Terrain	rolling	**QAPP Declination**		
Conforms to MLM	Marginally	**QAPP Declination Date**		
Site Telephone		**Audit Latitude**		43.557639
Site Address 1	Visitor Center	**Audit Longitude**		-103.483856
Site Address 2	Route 385 Wind Cave National Park	**Audit Elevation**		1288
County	Custer	**Audit Declination**		8.1
City, State	Hot Springs, SD		**Present**	
Zip Code	57747	**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** 8810 (s/n 3034-1) **Shelter Size** 640 cuft

Shelter Clean ☑ **Notes** One shelter houses the gas analyzers and is in good condition and clean. The analyzer sample train is a glass manifold with an exhaust fan. The second shelter houses the flow system, met translator, and IMPROVE. It is older and not climate controlled.

Site OK ☑ **Notes**

Driving Directions From Hot Springs proceed north on 385 into Wind Cave National Park. Turn left onto the visitor center loop road. The site operator's office is in the visitors center. The site is up the gravel access road to the park water supply on the opposite side of the parking lot from the visitor center.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 08/21/2015

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 WNC429 **Technician** Eric Hebert **Site Visit Date** 08/21/2015

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:

The recorded temperature is measured at approximately 2 meters above the ground. Previously measured temperature data are no longer comparable to the current temperature measurements.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 08/21/2015

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:

The temperature sensor signal cable insulation is cracked and showing signs of extreme wear.

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 08/21/2015

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 meter glass
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 meter glass manifold and 1/4 inch teflon with tee fittings
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 analyzer 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:

The dry deposition filter is mounted low in the enclosure which changes the particle collection characteristics, and can allow precipitation to enter. The ozone sample train is a 3 meter glass manifold with a 1/4 inch Teflon tubing connection to the analyzer.

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

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 08/21/2015

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?	☑	Signs of wear
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?	☑	Both on

		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 WNC429 **Technician** Eric Hebert **Site Visit Date** 08/21/2015

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	☐		☐
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?	☑	
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:

Records of the routine checks performed by the state personnel are kept onsite in a logbook.

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 08/21/2015

Site operation procedures

1	Has the site operator attended a formal CASTNET training course? If yes, when and who instructed?	☑	Trained during site installation
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	☑	Quarterly	☑
Automatic Zero/Span Tests	☐		☐
Manual Zero/Span Tests	☑	Every 2 weeks	☐
Automatic Precision Level Tests	☐		☐
Manual Precision Level Test	☑	Every 2 weeks	☐
Analyzer Diagnostics Tests	☐		☐
In-line Filter Replacement (at inlet)	☐		☐
In-line Filter Replacement (at analyze	☐		☐
Sample Line Check for Dirt/Water	☐		☐
Zero Air Desiccant Check	☐		☐

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

Provide any additional 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 South Dakota. There is no means for introducing routine test gas at the sample inlet and all routine checks are performed at the back of the analyzer. Audit test gas was introduced through the sample inlet flooding the glass manifold.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 08/21/2015

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?	☐	
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?	☐	Gloves not used
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:

The general observations section of the SSRF is still not completed. Gloves are not used when handling the filter pack.

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 08/21/2015

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	6560 b	5CB1520H5J	none
DAS	Environmental Sys Corp	8816	4159	missing
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18B	070000013426	none
Flow Rate	Mykrolis	FC280SAV-4S	AW901295	02270
Infrastructure	Infrastructure	none	none	none
Met tower	unknown	unknown	none	none
MFC power supply	Tylan	RO-32	FP902017	02176
Modem	US Robotics	56k fax modem	unknown	none
Ozone	ThermoElectron Inc	49i A3NAA	0615817056	none
Ozone Standard	ThermoElectron Inc	49i PSA2AB	0807328333	none
Sample Tower	Aluma Tower	B	none	none
Shelter Temperature	RM Young	41342	018819	none
Shield (2 meter)	RM Young	43532	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	14264	none
Zero air pump	ThermoElectron Inc	111	111-78387-388	none

Site Inventory by Site Visit

PRK134-Sandy Grenville-09/03/2015

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
1	9/3/2015	Computer	Dell	07021	Inspiron 15	2884848822
2	9/3/2015	DAS	Campbell	000411	CR3000	2509
3	9/3/2015	Elevation	Elevation	None	1	None
4	9/3/2015	Filter pack flow pump	Thomas	03633	107CAB18	049400004507
5	9/3/2015	Flow Rate	Apex	000656	AXMC105LPMDPCV	illegible
6	9/3/2015	Infrastructure	Infrastructure	none	none	none
7	9/3/2015	Modem	Raven	06460	H4223-C	0808334384
8	9/3/2015	Ozone	ThermoElectron Inc	000690	49i A1NAA	1030244800
9	9/3/2015	Ozone Standard	ThermoElectron Inc	000432	49i A3NAA	CM08200008
10	9/3/2015	Sample Tower	Aluma Tower	03518	A	none
11	9/3/2015	Shelter Temperature	Campbell	none	107-L	unknown
12	9/3/2015	Siting Criteria	Siting Criteria	None	1	None
13	9/3/2015	Temperature	RM Young	06306	41342VC	12545
14	9/3/2015	UPS	APC	06744	RS900	unknown
15	9/3/2015	Zero air pump	Werther International	06905	C 70/4	000821907

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2509	PRK134	Sandy Grenville	09/03/2015	DAS	Primary

Das Date: 9 /3 /2015
Das Time: 15:27:00
Das Day: 246

Audit Date 9 /3 /2015
Audit Time 15:27:00
Audit Day 246

Low Channel:

Avg Diff: 0.0000
Max Diff: 0.0001

High Channel:

Avg Diff: 0.0000
Max Diff: 0.0001

Mfg Datel
Parameter DAS
Serial Number 15510194
Tfer Desc. Source generator (D
Tfer ID 01320

Mfg Fluke
Parameter DAS
Serial Number 95740135
Tfer Desc. DVM
Tfer ID 01311
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
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	0.9993	0.9993	V	V	0.0000

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	PRK134	Sandy Grenville	09/03/2015	Flow Rate	000656

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	103471	**Tfer Desc.**	nexus
Tfer ID	01420		
Slope	0.96664	**Intercept**	0.03078
Cert Date	2/5/2015	**CorrCoff**	0.99996
Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	103424	**Tfer Desc.**	BIOS cell
Tfer ID	01410		
Slope	0.96664	**Intercept**	0.03078
Cert Date	2/5/2015	**CorrCoff**	0.99996

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
1.53%	1.96%		

Cal Factor Zero -0.01

Cal Factor Full Scale 0.99

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	0.00	0.000	-0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.02	0.000	0.00	l/m	l/m	
primary	test pt 1	1.505	1.530	1.51	1.510	1.50	l/m	l/m	-1.96%
primary	test pt 2	1.503	1.520	1.51	1.500	1.50	l/m	l/m	-1.32%
primary	test pt 3	1.502	1.520	1.50	1.500	1.50	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**	4.1 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	1030244800	PRK134	Sandy Grenville	09/03/2015	Ozone	000690

Slope:	0.99199	**Slope:**	0.00000
Intercept	0.68477	**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
0.8%	1.2%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	0419606966	**Tfer Desc.**	Ozone primary stan
Tfer ID	01112		
Slope	0.99384	**Intercept**	-0.40946
Cert Date	6/25/2015	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.00	0.41	1.33	ppb	
primary	2	30.03	30.62	30.98	ppb	1.18%
primary	3	50.02	50.74	51.08	ppb	0.67%
primary	4	80.05	80.95	80.20	ppb	-0.93%
primary	5	110.05	111.14	111.50	ppb	0.32%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	Functioning	**Status**	pass
Sensor Component	Offset	**Condition**	-0.4	**Status**	pass
Sensor Component	Span	**Condition**	1.020	**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**	115.9 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.7 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.71 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	704 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	39.4 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	99.9 Khz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.7 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.69 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**		**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	12545	PRK134	Sandy Grenville	09/03/2015	Temperature	06306

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00343	**Intercept**	-0.06409
Cert Date	1/30/2015	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.22	0.46		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.14	0.20	0.000	0.1	C	-0.08
primary	Temp Mid Range	25.30	25.28	0.000	25.2	C	-0.11
primary	Temp High Range	49.97	49.86	0.000	49.4	C	-0.46

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	unknown	PRK134	Sandy Grenville	09/03/2015	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.30	0.76

DAS 2:

Abs Avg Err	Abs Max Er

Mfg	Extech	**Parameter**	Shelter Temperatur
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00343	**Intercept**	-0.06409
Cert Date	1/30/2015	**CorrCoff**	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	28.01	27.98	0.000	28.0	C	0.06
primary	Temp Mid Range	26.78	26.75	0.000	26.7	C	-0.09
primary	Temp Mid Range	24.29	24.27	0.000	25.0	C	0.76

Infrastructure Data For

Site ID PRK134 **Technician** Sandy Grenville **Site Visit Date** 09/03/2015

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8810 (s/n 2116-11)	640 cuft

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

Field Systems Comments

1 **Parameter:** DasComments

The tower guy wires are rusted and should be replaced. The sample tower is damaged at the hinge point and bent. Both of these items were observed and reported during the previous two audit visits.

2 **Parameter:** SitingCriteriaCom

Clover and Barley have been planted for hay within 20m of the site starting in 2008.

3 **Parameter:** ShelterCleanNotes

The shelter is clean, neat, and well organized. The counter top has been repaired since the previous audit visit.

4 **Parameter:** MetSensorComme

The temperature sensor has been moved to a naturally aspirated shield mounted to the sample tower.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID PRK134 **Technician** Sandy Grenville **Site Visit Date** 09/03/2015

Site Sponsor (agency)	EPA	**USGS Map**		Perkinstown
Operating Group	Private	**Map Scale**		
AQS #	55-119-9991	**Map Date**		
Meteorological Type	R.M. Young			
Air Pollutant Analyzer	Ozone, PM2.5	**QAPP Latitude**		45.2066
Deposition Measurement	dry, wet	**QAPP Longitude**		-90.5972
Land Use	woodland - mixed	**QAPP Elevation Meters**		472
Terrain	gently rolling	**QAPP Declination**		1.6
Conforms to MLM	Yes	**QAPP Declination Date**		2/22/2006
Site Telephone		**Audit Latitude**		45.206525
Site Address 1	W 10776 CTH M	**Audit Longitude**		-90.597209
Site Address 2		**Audit Elevation**		462
County	Taylor	**Audit Declination**		-1.3
City, State	Medford, WI		**Present**	
Zip Code	54451	**Fire Extinguisher**	☑	new in 2015
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 2116-11) **Shelter Size** 640 cuft

Shelter Clean ☑ **Notes** The shelter is clean, neat, and well organized. The counter top has been repaired since the previous audit visit.

Site OK ☑ **Notes**

Driving Directions From Medford continue north on 13 approximately 4.5 miles and turn left (west) onto county route M. Continue approximately 13 miles. Before reaching Perkinstown, and just after crossing a small creek and two sharp curves, the site will be visible behind the landowners house on the right.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID PRK134 **Technician** Sandy Grenville **Site Visit Date** 09/03/2015

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	20 m	☐
Large parking lot	200 m		☑
Small parking lot	100 m		☑
Tree line	50 m		☑
Obstacles to wind	10 times obstacle height		☑

Siting Distances OK ☑

Siting Criteria Comment

Clover and Barley have been planted for hay within 20m of the site starting in 2008.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID PRK134 **Technician** Sandy Grenville **Site Visit Date** 09/03/2015

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?	☑	Moved to sample tower
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 moved to a naturally aspirated shield mounted to the sample tower.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID PRK134 **Technician** Sandy Grenville **Site Visit Date** 09/03/2015

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 PRK134 **Technician** Sandy Grenville **Site Visit Date** 09/03/2015

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 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?	☑	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 PRK134 **Technician** Sandy Grenville **Site Visit Date** 09/03/2015

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 tower guy wires are rusted and should be replaced. The sample tower is damaged at the hinge point and bent. Both of these items were observed and reported during the previous two audit visits.

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID PRK134 **Technician** Sandy Grenville **Site Visit Date** 09/03/2015

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 2001	☐
HASP	☑	Nov2011	☐
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 PRK134 **Technician** Sandy Grenville **Site Visit Date** 09/03/2015

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?	☑	Channels up during ozone diagnostics
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?	☑	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 PRK134 **Technician** Sandy Grenville **Site Visit Date** 09/03/2015

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	☑	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 PRK134 **Technician** Sandy Grenville **Site Visit Date** 09/03/2015

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	2884848822	07021
DAS	Campbell	CR3000	2509	000411
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	049400004507	03633
Flow Rate	Apex	AXMC105LPMDPC	illegible	000656
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4223-C	0808334384	06460
Ozone	ThermoElectron Inc	49i A1NAA	1030244800	000690
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200008	000432
Sample Tower	Aluma Tower	A	none	03518
Shelter Temperature	Campbell	107-L	unknown	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	12545	06306
UPS	APC	RS900	unknown	06744
Zero air pump	Werther International	C 70/4	000821907	06905

Site Inventory by Site Visit

VIN140-Sandy Grenville-09/07/2015

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
1	9/7/2015	Computer	Dell	07040	Inspiron 15	6K2MC12
2	9/7/2015	DAS	Campbell	000358	CR3000	2136
3	9/7/2015	Elevation	Elevation	None	1	None
4	9/7/2015	Filter pack flow pump	Thomas	04920	107CAB18	060300019956
5	9/7/2015	Flow Rate	Apex	000657	AXMC105LPMDPCV	54772
6	9/7/2015	Infrastructure	Infrastructure	none	none	none
7	9/7/2015	Modem	Raven	06461	V4221-V	0808338875
8	9/7/2015	Ozone	ThermoElectron Inc	000630	49i A1NAA	1009241798
9	9/7/2015	Ozone Standard	ThermoElectron Inc	000513	49i A3NAA	0922236889
10	9/7/2015	Sample Tower	Aluma Tower	000137	B	none
11	9/7/2015	Shelter Temperature	Campbell	none	107-L	none
12	9/7/2015	Siting Criteria	Siting Criteria	None	1	None
13	9/7/2015	Temperature	RM Young	04449	41342VC	4547
14	9/7/2015	Zero air pump	Werther International	06906	C 70/4	000821908

DAS Data Form

DAS Time Max Error: 0.02

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2136	VIN140	Sandy Grenville	09/07/2015	DAS	Primary

Das Date: 9 /7 /2015
Das Time: 12:58:00
Das Day: 250

Audit Date 9 /7 /2015
Audit Time 12:58:01
Audit Day 250

Low Channel:

Avg Diff:	Max Diff:
0.0001	0.0001

High Channel:

Avg Diff:	Max Diff:
0.0001	0.0001

Mfg Datel
Parameter DAS
Serial Number 15510194
Tfer Desc. Source generator (D
Tfer ID 01320

Mfg Fluke
Parameter DAS
Serial Number 95740135
Tfer Desc. DVM
Tfer ID 01311

Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
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	0.2998	0.2998	V	V	0.0000
7	0.5000	0.4997	0.4997	V	V	0.0000
7	0.7000	0.6996	0.6996	V	V	0.0000
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	54772	VIN140	Sandy Grenville	09/07/2015	Flow Rate	000657

Mfg BIOS **Parameter** Flow Rate

Serial Number 103471 **Tfer Desc.** nexus

Tfer ID 01420

Slope 0.96664 **Intercept** 0.03078

Cert Date 2/5/2015 **CorrCoff** 0.99996

Mfg BIOS **Parameter** Flow Rate

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

Tfer ID 01410

Slope 0.96664 **Intercept** 0.03078

Cert Date 2/5/2015 **CorrCoff** 0.99996

DAS 1: **DAS 2:**

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
1.54%	1.97%		

Cal Factor Zero -0.02

Cal Factor Full Scale 0.99

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	-0.02	l/m	l/m	
primary	leak check	0.000	0.000	0.03	0.020	0.01	l/m	l/m	
primary	test pt 1	1.499	1.520	1.50	1.500	1.50	l/m	l/m	-1.32%
primary	test pt 2	1.497	1.520	1.50	1.500	1.49	l/m	l/m	-1.97%
primary	test pt 3	1.499	1.520	1.50	1.500	1.50	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**	2.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	300 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241798	VIN140	Sandy Grenville	09/07/2015	Ozone	000630

Slope:	0.97984	**Slope:**	0.00000
Intercept	0.39413	**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
1.0%	2.2%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	0419606966	**Tfer Desc.**	Ozone primary stan
Tfer ID	01112		
Slope	0.99384	**Intercept**	-0.40946
Cert Date	6/25/2015	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.02	0.43	0.35	ppb	
primary	2	29.79	30.38	30.30	ppb	-0.26%
primary	3	50.06	50.78	50.51	ppb	-0.53%
primary	4	80.25	81.15	80.50	ppb	-0.80%
primary	5	111.50	112.60	110.10	ppb	-2.22%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.30	**Status**	pass
Sensor Component	Span	**Condition**	1.015	**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**	94.1 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.7 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	1.41 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	723.5 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	39.0 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	101.9 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.4 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.74 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**		**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

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	4547	VIN140	Sandy Grenville	09/07/2015	Temperature	04449

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00343	**Intercept**	-0.06409
Cert Date	1/30/2015	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.07	0.11		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.63	0.69	0.000	0.7	C	-0.03
primary	Temp Mid Range	25.36	25.34	0.000	25.3	C	-0.08
primary	Temp High Range	48.33	48.23	0.000	48.1	C	-0.11

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	VIN140	Sandy Grenville	09/07/2015	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.77	1.25

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232734

Tfer Desc. RTD

Tfer ID 01227

Slope 1.00343

Intercept -0.06409

Cert Date 1/30/2015

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	31.08	31.04	0.000	29.8	C	-1.25
primary	Temp Mid Range	27.74	27.71	0.000	27.3	C	-0.43
primary	Temp Mid Range	28.28	28.25	0.000	27.6	C	-0.62

Infrastructure Data For

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 09/07/2015

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8810 (s/n 2116-1)	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**	Installed	**Status**	pass
Sensor Component	Power Cables	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Temp Control	**Condition**	Functioning	**Status**	pass
Sensor Component	Rotometer	**Condition**	Installed	**Status**	pass
Sensor Component	Sample Tower	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Condition	**Condition**	Fair	**Status**	pass
Sensor Component	Shelter Door	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Roof	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Floor	**Condition**	Fair	**Status**	pass
Sensor Component	Signal Cable	**Condition**	Good	**Status**	pass
Sensor Component	Tubing Type	**Condition**	3/8 teflon	**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Ozone	VIN140	Sandy Grenville	09/07/2015	Cell A Flow	ThermoElectron	3454	☐	☐

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

Field Systems Comments

1 **Parameter:** SitingCriteriaCom

The site is in an agricultural research center with farm activities adjacent to the site. A train track is approximately 200 meters to the north.

2 **Parameter:** ShelterCleanNotes

The shelter is in good condition and well maintained, however rot is beginning to form at the bottom of the walls.

3 **Parameter:** MetSensorComme

The temperature sensor has been mounted on the sample tower.

4 **Parameter:** MetOpMaintCom

The temperature sensor in now mounted in a naturally aspirated shield.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 09/07/2015

Site Sponsor (agency)	EPA	**USGS Map**		Fritchton
Operating Group	Purdue University	**Map Scale**		
AQS #	18-083-9991	**Map Date**		
Meteorological Type	Climatronics			
Air Pollutant Analyzer	Ozone	**QAPP Latitude**		38.7406
Deposition Measurement	dry, wet	**QAPP Longitude**		-87.4844
Land Use	agriculture	**QAPP Elevation Meters**		134
Terrain	flat	**QAPP Declination**		4.25
Conforms to MLM	Yes	**QAPP Declination Date**		2/23/2006
Site Telephone		**Audit Latitude**		38.740792
Site Address 1	Southwest Purdue Agricultural Center	**Audit Longitude**		-87.484923
Site Address 2	4669 North Purdue Road	**Audit Elevation**		136
County	Knox	**Audit Declination**		-2.7
City, State	Vincennes, IN		**Present**	
Zip Code	47591	**Fire Extinguisher**	☑	New in 2015
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 2116-1) **Shelter Size** 640 cuft

Shelter Clean ☑ **Notes** The shelter is in good condition and well maintained, however rot is beginning to form at the bottom of the walls.

Site OK ☑ **Notes**

Driving Directions From Vincennes go approximately 3 miles north on route 41. Turn left at the sign for the Southwest Purdue Agricultural Center. The site is just over the hill on the dirt road to the right.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 09/07/2015

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	200 m	☐
Limited agricultural operations	200 m	10 m	☐
Large parking lot	200 m		☑
Small parking lot	100 m		☑
Tree line	50 m		☑
Obstacles to wind	10 times obstacle height		☑

Siting Distances OK ☑

Siting Criteria Comment

The site is in an agricultural research center with farm activities adjacent to the site. A train track is approximately 200 meters to the north.

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

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 09/07/2015

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:

The temperature sensor has been mounted on the sample tower.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 09/07/2015

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:

The temperature sensor in now mounted in a naturally aspirated shield.

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 09/07/2015

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 VIN140 **Technician** Sandy Grenville **Site Visit Date** 09/07/2015

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, new sample tower installed

Provide any additional 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 VIN140 **Technician** Sandy Grenville **Site Visit Date** 09/07/2015

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	☑	Oct 2001	☑
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 VIN140

Technician Sandy Grenville

Site Visit Date 09/07/2015

Site operation procedures

1	Has the site operator attended a formal CASTNET training course? If yes, when and who instructed?	☐	Trained by the 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	☑	Semiannually	☑
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?	☐	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 VIN140 **Technician** Sandy Grenville **Site Visit Date** 09/07/2015

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?	☑	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:

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 09/07/2015

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	6K2MC12	07040
DAS	Campbell	CR3000	2136	000358
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	060300019956	04920
Flow Rate	Apex	AXMC105LPMDPC	54772	000657
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0808338875	06461
Ozone	ThermoElectron Inc	49i A1NAA	1009241798	000630
Ozone Standard	ThermoElectron Inc	49i A3NAA	0922236889	000513
Sample Tower	Aluma Tower	B	none	000137
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	4547	04449
Zero air pump	Werther International	C 70/4	000821908	06906

Site Inventory by Site Visit

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
VOY413-Eric Hebert-09/08/2015						
1	9/8/2015	DAS	Environmental Sys Corp	none	8816	4059
2	9/8/2015	Elevation	Elevation	None	1	None
3	9/8/2015	Filter pack flow pump	Thomas	none	107CAB18	120000014367
4	9/8/2015	flow rate	Tylan	none	FC280SAV	AW9806012
5	9/8/2015	Infrastructure	Infrastructure	none	none	none
6	9/8/2015	MFC power supply	Tylan	none	RO-32	FP9806001
7	9/8/2015	Ozone	ThermoElectron Inc	90730	49C	49C-70522-366
8	9/8/2015	Ozone Standard	ThermoElectron Inc	90569	49C	49C-59260-322
9	9/8/2015	Printer	Hewlett Packard	none	842C	unknown
10	9/8/2015	Sample Tower	Aluma Tower	none	B	AT-51159-11-G
11	9/8/2015	Shelter Temperature	ARS	none	none	none
12	9/8/2015	Siting Criteria	Siting Criteria	None	1	None
13	9/8/2015	Temperature	Climatronics	none	100093	04767
14	9/8/2015	Temperature Translator	Climatronics	01341	100088-2	229
15	9/8/2015	Zero air pump	Twin Tower Engineering	90719	TT70/E4	526294

DAS Data Form

DAS Time Max Error: 1.72

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	4059	VOY413	Eric Hebert	09/08/2015	DAS	Primary

Das Date: 9 /8 /2015
Audit Date 9 /8 /2015
Das Time: 10:59:17
Audit Time 11:01:00
Das Day: 251
Audit Day 251

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 4000392
Tfer Desc. Source generator (D
Tfer ID 01321
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
CorrCoff 1.00000

Mfg Fluke
Parameter DAS
Serial Number 86590148
Tfer Desc. DVM
Tfer ID 01310
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
CorrCoff 1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
2	0.0000	0.0000	0.0000	V	V	0.0000
2	0.1000	0.1000	0.1000	V	V	0.0000
2	0.3000	0.3000	0.3000	V	V	0.0000
2	0.5000	0.5000	0.5001	V	V	0.0001
2	0.7000	0.7000	0.7001	V	V	0.0001
2	0.9000	0.9000	0.9001	V	V	0.0001
2	1.0000	1.0000	1.0001	V	V	0.0001

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Tylan	AW9806012	VOY413	Eric Hebert	09/08/2015	flow rate	none

Mfg Tylan

SN/Owner ID FP9806001 none

Parameter MFC power supply

Mfg BIOS

Parameter Flow Rate

Serial Number 131818

Tfer Desc. BIOS 220-H

Tfer ID 01417

Slope 1.00316

Intercept -0.00540

Cert Date 1/7/2015

CorrCoff 1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
5.01%	8.26%		

Cal Factor Zero 0.134

Cal Factor Full Scale 6.633

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	-0.14	-0.104	0.02	l/m	l/m	
primary	leak check	0.000	0.000	0.14	-0.104	0.03	l/m	l/m	
primary	test pt 1	3.118	3.110	2.61	2.604	3.00	l/m	l/m	-3.54%
primary	test pt 2	3.102	3.100	2.61	2.604	3.00	l/m	l/m	-3.23%
primary	test pt 3	3.279	3.270	2.61	2.604	3.00	l/m	l/m	-8.26%

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**	6.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.5 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	Eric Hebert	09/08/2015	Ozone	90730

Slope:	0.99793	**Slope:**	0.00000
Intercept	1.79471	**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
3.4%	6.2%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	0517112167	**Tfer Desc.**	Ozone primary stan
Tfer ID	01113		
Slope	1.00565	**Intercept**	-0.01252
Cert Date	4/29/2015	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	-0.17	-0.15	1.59	ppb	
primary	2	27.16	27.01	28.69	ppb	6.22%
primary	3	48.91	48.64	50.52	ppb	3.87%
primary	4	78.81	78.37	79.99	ppb	2.07%
primary	5	109.20	108.59	110.10	ppb	1.39%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	-0.8	**Status**	pass
Sensor Component	Span	**Condition**	0.988	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	-0.0006	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	1.0018	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	66.7 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.6 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.69 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	708 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	34.9 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	78.5 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.3 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.73 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**		**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
Climatronics	04767	VOY413	Eric Hebert	09/08/2015	Temperature	none

Mfg Climatronics

SN/Owner ID 229 01341

Parameter Temperature Translator

Mfg Extech

Parameter Temperature

Serial Number H232679

Tfer Desc. RTD

Tfer ID 01228

Slope 1.00564

Intercept -0.21981

Cert Date 1/30/2015

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	-0.16	0.06	0.000	0.2	C	0.16
primary	Temp Mid Range	23.54	23.63	0.000	23.7	C	0.1
primary	Temp High Range	43.35	43.33	0.000	43.7	C	0.35

Sensor Component	Shield	**Condition**	Moderately 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**	See comments	**Status**	pass

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	VOY413	Eric Hebert	09/08/2015	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.63	0.88

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232679

Tfer Desc. RTD

Tfer ID 01228

Slope 1.00564

Intercept -0.21981

Cert Date 1/30/2015

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	22.58	22.67	0.000	23.6	C	0.88
primary	Temp Mid Range	23.62	23.71	0.000	24.2	C	0.5
primary	Temp Mid Range	24.13	24.21	0.000	24.7	C	0.52

Infrastructure Data For

Site ID VOY413 **Technician** Eric Hebert **Site Visit Date** 09/08/2015

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**	Fair	**Status**	pass
Sensor Component	Signal Cable	**Condition**	Fair	**Status**	pass
Sensor Component	Tubing Type	**Condition**	3/8 teflon	**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass

Field Systems Comments

1 **Parameter:** DocumentationCo

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

2 **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.

3 **Parameter:** ShelterCleanNotes

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

4 **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.

5 **Parameter:** MetSensorComme

The recorded temperature is currently being measured at approximately 2.5 meters above the ground and not at 10 meters as previously measured. Current temperature data are no longer comparable with previously measured data.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID VOY413 **Technician** Eric Hebert **Site Visit Date** 09/08/2015

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** Eric Hebert **Site Visit Date** 09/08/2015

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** Eric Hebert **Site Visit Date** 09/08/2015

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:

The recorded temperature is currently being measured at approximately 2.5 meters above the ground and not at 10 meters as previously measured. Current temperature data are no longer comparable with previously measured data.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID VOY413 **Technician** Eric Hebert **Site Visit Date** 09/08/2015

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** Eric Hebert **Site Visit Date** 09/08/2015

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** Eric Hebert **Site Visit Date** 09/08/2015

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 VOY413 **Technician** Eric Hebert **Site Visit Date** 09/08/2015

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	☐		☐
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** Eric Hebert **Site Visit Date** 09/08/2015

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** Eric Hebert **Site Visit Date** 09/08/2015

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	☑	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** Eric Hebert **Site Visit Date** 09/08/2015

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	120000014367	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
Printer	Hewlett Packard	842C	unknown	none
Sample Tower	Aluma Tower	B	AT-51159-11-G	none
Shelter Temperature	ARS	none	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	Climatronics	100093	04767	none
Temperature Translator	Climatronics	100088-2	229	01341
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
STK138-Sandy Grenville-09/11/2015						
1	9/11/2015	Computer	Dell	000248	D520	unknown
2	9/11/2015	DAS	Campbell	000349	CR3000	2128
3	9/11/2015	Elevation	Elevation	None	1	None
4	9/11/2015	Filter pack flow pump	Thomas	04923	107CAB18	060300019959
5	9/11/2015	Flow Rate	Apex	000661	AXMC105LPMDPCV	illegible
6	9/11/2015	Infrastructure	Infrastructure	none	none	none
7	9/11/2015	Modem	Raven	06603	H4223-C	0844356279
8	9/11/2015	Ozone	ThermoElectron Inc	000743	49i A1NAA	1105347321
9	9/11/2015	Ozone Standard	ThermoElectron Inc	000687	49i A3NAA	1030244809
10	9/11/2015	Sample Tower	Aluma Tower	03554	A	none
11	9/11/2015	Shelter Temperature	Campbell	none	107-L	unknown
12	9/11/2015	Siting Criteria	Siting Criteria	None	1	None
13	9/11/2015	Temperature	RM Young	06407	41342VC	14040
14	9/11/2015	Zero air pump	Werther International	06915	C 70/4	000829162

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2128	STK138	Sandy Grenville	09/11/2015	DAS	Primary

Das Date: 9 /11/2015
Das Time: 14:17:00
Das Day: 254

Audit Date 9 /11/2015
Audit Time 14:17:00
Audit Day 254

Low Channel:

Avg Diff: 0.0001
Max Diff: 0.0001

High Channel:

Avg Diff: 0.0001
Max Diff: 0.0001

Mfg Datel
Parameter DAS
Serial Number 15510194
Tfer Desc. Source generator (D
Tfer ID 01320

Mfg Fluke
Parameter DAS
Serial Number 95740135
Tfer Desc. DVM
Tfer ID 01311

Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
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	0.2998	0.2998	V	V	0.0000
7	0.5000	0.4997	0.4996	V	V	-0.0001
7	0.7000	0.6996	0.6996	V	V	0.0000
7	0.9000	0.8995	0.8994	V	V	-0.0001
7	1.0000	0.9993	0.9993	V	V	0.0000

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	STK138	Sandy Grenville	09/11/2015	Flow Rate	000661

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	103471	**Tfer Desc.**	nexus
Tfer ID	01420		
Slope	0.96664	**Intercept**	0.03078
Cert Date	2/5/2015	**CorrCoff**	0.99996
Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	103424	**Tfer Desc.**	BIOS cell
Tfer ID	01410		
Slope	0.96664	**Intercept**	0.03078
Cert Date	2/5/2015	**CorrCoff**	0.99996

DAS 1:

DAS 2:

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
0.22%	0.67%		

Cal Factor Zero -0.02

Cal Factor Full Scale 1.02

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	-0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.08	0.080	0.06	l/m	l/m	
primary	test pt 1	1.485	1.500	1.47	1.470	1.51	l/m	l/m	0.67%
primary	test pt 2	1.489	1.510	1.47	1.470	1.51	l/m	l/m	0.00%
primary	test pt 3	1.491	1.510	1.47	1.470	1.51	l/m	l/m	0.00%

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**	1.5 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	1105347321	STK138	Sandy Grenville	09/11/2015	Ozone	000743

Slope:	0.99668	**Slope:**	0.00000
Intercept	0.38943	**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
0.7%	2.2%		

Mfg ThermoElectron Inc **Parameter** ozone

Serial Number 0419606966 **Tfer Desc.** Ozone primary stan

Tfer ID 01112

Slope 0.99384 **Intercept** -0.40946

Cert Date 6/25/2015 **CorrCoff** 1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.00	0.41	0.68	ppb	
primary	2	29.83	30.42	31.10	ppb	2.24%
primary	3	50.04	50.76	50.80	ppb	0.08%
primary	4	80.03	80.93	80.80	ppb	-0.16%
primary	5	110.03	111.12	111.30	ppb	0.16%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	-0.50	**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**	97.1 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.5 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.61 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	712 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	36.5 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	91.4 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.5 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.53 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**		**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	14040	STK138	Sandy Grenville	09/11/2015	Temperature	06407

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00343	**Intercept**	-0.06409
Cert Date	1/30/2015	**CorrCoff**	1.00000

DAS 1: **DAS 2:**

Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.20	0.28		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.70	0.76	0.000	0.9	C	0.12
primary	Temp Mid Range	25.98	25.96	0.000	25.8	C	-0.21
primary	Temp High Range	48.67	48.57	0.000	48.3	C	-0.28

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	unknown	STK138	Sandy Grenville	09/11/2015	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.07	0.11

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232734

Tfer Desc. RTD

Tfer ID 01227

Slope 1.00343

Intercept -0.06409

Cert Date 1/30/2015

CorrCoff 1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	26.84	26.81	0.000	26.7	C	-0.11
primary	Temp Mid Range	26.65	26.62	0.000	26.7	C	0.06
primary	Temp Mid Range	27.70	27.67	0.000	27.6	C	-0.03

Infrastructure Data For

Site ID STK138 **Technician** Sandy Grenville **Site Visit Date** 09/11/2015

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8810 (s/n 2149-21)	640 cuft

Sensor Component	Sample Tower Type	**Condition**	Type A	**Status**	pass
Sensor Component	Conduit	**Condition**	N/A	**Status**	pass
Sensor Component	Met Tower	**Condition**	N/A	**Status**	pass
Sensor Component	Moisture Trap	**Condition**	Installed	**Status**	pass
Sensor Component	Power Cables	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Temp Control	**Condition**	Functioning	**Status**	pass
Sensor Component	Rotometer	**Condition**	Installed	**Status**	pass
Sensor Component	Sample Tower	**Condition**	Fair	**Status**	pass
Sensor Component	Shelter Condition	**Condition**	Fair	**Status**	pass
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:** SiteOpsProcedures

The ozone sample train is leak tested every 2 weeks.

2 **Parameter:** SitingCriteriaCom

The site is located in a hay field on a cattle farm. Clover is planted within 20 meters and will be used as pasture this fall.

3 **Parameter:** ShelterCleanNotes

The shelter is somewhat dirty and cluttered. There are signs of leaks on the walls and floor rot.

4 **Parameter:** MetSensorComme

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

5 **Parameter:** MetOpMaintCom

The met tower is no longer in use.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID STK138 **Technician** Sandy Grenville **Site Visit Date** 09/11/2015

Site Sponsor (agency) EPA

Operating Group Private

AQS # 17-085-9991

Meteorological Type R.M. Young

Air Pollutant Analyzer Ozone

Deposition Measurement dry

Land Use agricultural

Terrain rolling

Conforms to MLM Yes

Site Telephone

Site Address 1 10939 E. Parker Road

Site Address 2

County Jo Daviess

City, State Stockton, IL

Zip Code 61085

Time Zone Central

Primary Operator

Primary Op. Phone #

Primary Op. E-mail

Backup Operator

Backup Op. Phone #

Backup Op. E-mail

USGS Map Kent

Map Scale

Map Date

QAPP Latitude 42.2872

QAPP Longitude -89.9998

QAPP Elevation Meters 274

QAPP Declination 1.3

QAPP Declination Date 2/22/2006

Audit Latitude 42.287216

Audit Longitude -89.99995

Audit Elevation 281

Audit Declination -1.3

	Present	
Fire Extinguisher	☑	new in 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 (s/n 2149-21) **Shelter Size** 640 cuft

Shelter Clean ☐ **Notes** The shelter is somewhat dirty and cluttered. There are signs of leaks on the walls and floor rot.

Site OK ☑ **Notes**

Driving Directions From Stockton go south on 78 (Main Street) for approximately 2.5 miles. As the road turns sharply to the right, continue straight onto a dirt road. There will be a stop sign at another dirt road intersection within 100 yards. Continue through that intersection, the site will be visible in the distance on a hill-side to the left. Continue another 1.5 miles bearing to the left on dirt roads to the Evans farm. The site is past both houses in the hay field.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID STK138 **Technician** Sandy Grenville **Site Visit Date** 09/11/2015

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	20 m	☐
Large parking lot	200 m		☑
Small parking lot	100 m		☑
Tree line	50 m		☑
Obstacles to wind	10 times obstacle height		☑

Siting Distances OK ☑

Siting Criteria Comment

The site is located in a hay field on a cattle farm. Clover is planted within 20 meters and will be used as pasture this fall.

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

Site ID STK138 **Technician** Sandy Grenville **Site Visit Date** 09/11/2015

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?**	☑	Moved to sample tower
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 is now mounted in a naturally aspirated shield on the sample tower.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID STK138 **Technician** Sandy Grenville **Site Visit Date** 09/11/2015

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:

The met tower is no longer in use.

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID STK138 **Technician** Sandy Grenville **Site Visit Date** 09/11/2015

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 STK138 **Technician** Sandy Grenville **Site Visit Date** 09/11/2015

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 STK138 **Technician** Sandy Grenville **Site Visit Date** 09/11/2015

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	☑	Oct 2010	☑
HASP	☑	Oct 2010	☑
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?	☑	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 STK138 **Technician** Sandy Grenville **Site Visit Date** 09/11/2015

Site operation procedures

1	Has the site operator attended a formal CASTNET training course? If yes, when and who instructed?	☑	Trained on site during installation
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?	☐	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:

The ozone sample train is leak tested every 2 weeks.

Field Systems Data Form F-02058-1500-S9-rev002

Site ID STK138 **Technician** Sandy Grenville **Site Visit Date** 09/11/2015

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, 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 STK138 **Technician** Sandy Grenville **Site Visit Date** 09/11/2015

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	D520	unknown	000248
DAS	Campbell	CR3000	2128	000349
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	060300019959	04923
Flow Rate	Apex	AXMC105LPMDPC	illegible	000661
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4223-C	0844356279	06603
Ozone	ThermoElectron Inc	49i A1NAA	1105347321	000743
Ozone Standard	ThermoElectron Inc	49i A3NAA	1030244809	000687
Sample Tower	Aluma Tower	A	none	03554
Shelter Temperature	Campbell	107-L	unknown	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	14040	06407
Zero air pump	Werther International	C 70/4	000829162	06915

Site Inventory by Site Visit

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number

BVL130-Eric Hebert-09/14/2015

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
1	9/14/2015	CO	Teledyne	000760	T300U	87
2	9/14/2015	Computer	Dell	07073	Inspiron 15	B94MC12
3	9/14/2015	DAS	Campbell	000424	CR3000	2539
4	9/14/2015	Elevation	Elevation	None	1	None
5	9/14/2015	Filter pack flow pump	Thomas	06019	107CAB18	050400022576
6	9/14/2015	Flow Rate	Apex	000595	AXMC105LPMDPCV	illegible
7	9/14/2015	Infrastructure	Infrastructure	none	none	none
8	9/14/2015	Met tower	Climatronics	02738	14 inch taper	none
9	9/14/2015	Modem	Raven	06610	H4223-C	0844355827
10	9/14/2015	Noy	Teledyne	000805	T200U	110
11	9/14/2015	Ozone	ThermoElectron Inc	000625	49i A1NAA	1009241797
12	9/14/2015	Ozone Standard	ThermoElectron Inc	000512	49i A3NAA	0922236890
13	9/14/2015	Precipitation	Climatronics	810899	100508-2	illegible
14	9/14/2015	Relative Humidity	Vaisala	06820	HMP50UAB1A1A	E4920060
15	9/14/2015	Sample Tower	Aluma Tower	000182	B	unknown
16	9/14/2015	Shelter Temperature	Campbell	none	107-L	unknown
17	9/14/2015	Shield (10 meter)	RM Young	06206	Aspirated 43408	none
18	9/14/2015	Shield (2 meter)	RM Young	06635	Aspirated 43408	none
19	9/14/2015	Siting Criteria	Siting Criteria	None	1	None
20	9/14/2015	SO2	Teledyne	000765	T100U	79
21	9/14/2015	Solar Radiation	Licor	04566	LI-200	PY10653
22	9/14/2015	Solar Radiation Translator	RM Young	04340	70101-X	none
23	9/14/2015	Temperature	RM Young	04690	41342	6704
24	9/14/2015	Temperature2meter	RM Young	06404	41342	14037
25	9/14/2015	Wind Direction	RM Young	04695	AQ05103-5	49437wdr
26	9/14/2015	Wind Speed	RM Young	04695	AQ05103-5	49437wsp
27	9/14/2015	Zero air pump	Teledyne	000759	701H	576

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2539	BVL130	Eric Hebert	09/14/2015	DAS	Primary

Das Date: 9 /14/2015
Das Time: 9:00:00
Das Day: 257

Audit Date 9 /14/2015
Audit Time 9:00:00
Audit Day 257

Low Channel:

Avg Diff: 0.0000
Max Diff: 0.0000

High Channel:

Avg Diff: 0.0000
Max Diff: 0.0000

Mfg Datel
Parameter DAS
Serial Number 4000392
Tfer Desc. Source generator (D
Tfer ID 01321
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
CorrCoff 1.00000

Mfg Fluke
Parameter DAS
Serial Number 86590148
Tfer Desc. DVM
Tfer ID 01310
Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
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	0.1000	0.1000	V	V	0.0000
7	0.3000	0.3000	0.3000	V	V	0.0000
7	0.5000	0.5000	0.5000	V	V	0.0000
7	0.7000	0.7000	0.7000	V	V	0.0000
7	0.9000	0.9000	0.9000	V	V	0.0000
7	1.0000	1.0000	1.0000	V	V	0.0000

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	BVL130	Eric Hebert	09/14/2015	Flow Rate	000595

Mfg BIOS

Parameter Flow Rate

Serial Number 131818

Tfer Desc. BIOS 220-H

Tfer ID 01417

Slope 1.00316

Intercept -0.00540

Cert Date 1/7/2015

CorrCoff 1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
0.22%	0.67%		

Cal Factor Zero 0

Cal Factor Full Scale 0

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	-0.01	0.000	-0.03	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	1.495	1.500	1.58	0.000	1.50	l/m	l/m	0.00%
primary	test pt 2	1.499	1.500	1.58	0.000	1.49	l/m	l/m	-0.67%
primary	test pt 3	1.501	1.500	1.58	0.000	1.50	l/m	l/m	0.00%

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**	3.3 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.5 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	1009241797	BVL130	Eric Hebert	09/14/2015	Ozone	000625

Slope:	0.97902	**Slope:**	0.00000
Intercept	0.42831	**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**
1.5%	1.8%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	0517112167	**Tfer Desc.**	Ozone primary stan
Tfer ID	01113		
Slope	1.00565	**Intercept**	-0.01252
Cert Date	4/29/2015	**CorrCoff**	1.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00952	**Intercept**	-0.24284
Cert Date	1/7/2015	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.00	0.01	0.61	ppb	
primary	2	28.74	28.59	28.24	ppb	-1.22%
primary	3	53.81	53.52	52.61	ppb	-1.70%
primary	4	84.82	84.35	83.30	ppb	-1.24%
primary	5	115.49	114.85	112.80	ppb	-1.78%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	-0.40	**Status**	pass
Sensor Component	Span	**Condition**	1.012	**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**	81.4 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.4 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.79 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	719.4 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	34.2 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	84.9 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.6 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.74 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**		**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	49437wsp	BVL130	Eric Hebert	09/14/2015	Wind Speed	04695

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	12/22/2014	**CorrCoff**	1.00000

Mfg	RM Young	**Parameter**	wind speed
Serial Number		**Tfer Desc.**	wind speed motor (h
Tfer ID	01262		
Slope	1.00000	**Intercept**	0.00000
Cert Date	12/22/2014	**CorrCoff**	1.00000

Prop or Cups SN 68622

Prop or Cups Torque 0.4 **to** 0.5

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	01262	200	1.02	0.0	1.0		0.00	
primary	01262	400	2.05	0.0	2.1		0.00	
primary	01262	800	4.10	0.0	4.1		0.00	
primary	01262	1200	6.14	0.0	6.1	0.00%		
primary	01262	2400	12.29	0.0	12.3	0.00%		
primary	01262	4000	20.48	0.0	20.5	0.00%		
primary	01262	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**	Good	**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
RM Young	49437wdr	BVL130	Eric Hebert	09/14/2015	Wind Direction	04695

Mfg	RM Young	**Parameter**	wind direction
Serial Number		**Tfer Desc.**	wind direction wheel
Tfer ID	01264		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/16/2015	**CorrCoff**	1.00000
Mfg	Ushikata	**Parameter**	wind direction
Serial Number	191832	**Tfer Desc.**	transit
Tfer ID	01272		
Slope	1.00000	**Intercept**	0.00000
Cert Date	2/19/2015	**CorrCoff**	1.00000

Vane SN: N/A **C. A. Align. deg. true:** 4

VaneTorque 12 **to** 25

	DAS 1: Orientation	DAS 1: Linearity:	DAS 2: Orientation	DAS 2: Linearity:
Abs Avg Err	6.2	1.3		
Abs Max Er	9	3		

UseDescription	TferID	Input Raw	Linearity	Output V	Output Deg.	Difference	Change	Error
primary	01264	0	☑	0.000	354	6	44	-1
primary	01264	45	☑	0.000	41	4	47	2
primary	01264	90	☑	0.000	88	2	47	2
primary	01264	135	☑	0.000	133	2	45	0
primary	01264	180	☑	0.000	179	1	46	1
primary	01264	225	☑	0.000	224	1	45	0
primary	01264	270	☑	0.000	268	2	44	-1
primary	01264	315	☑	0.000	310	5	42	-3
primary	01272	94	☐	0.000	88	6		6
primary	01272	184	☐	0.000	175	9		9
primary	01272	239	☐	0.000	232	7		7
primary	01272	274	☐	0.000	272	2		2
primary	01272	313	☐	0.000	306	7		7

Sensor Component	Mast	**Condition**	Good	**Status**	pass
Sensor Component	Condition	**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

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	6704	BVL130	Eric Hebert	09/14/2015	Temperature	04690

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00564	**Intercept**	-0.21981
Cert Date	1/30/2015	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.17	0.26		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	-0.04	0.18	0.000	0.18	C	0
primary	Temp Mid Range	29.06	29.12	0.000	28.87	C	-0.25
primary	Temp High Range	46.12	46.08	0.000	45.82	C	-0.26

Sensor Component	Shield	**Condition**	Moderately 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 For

Calc. Difference

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	14037	BVL130	Eric Hebert	09/14/2015	Temperature2meter	06404

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00564	**Intercept**	-0.21981
Cert Date	1/30/2015	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.16	0.2		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	-0.04	0.18	0.000	0.30	C	0.12
primary	Temp Mid Rang	29.06	29.12	0.000	28.92	C	-0.2
primary	Temp High Rang	46.12	46.08	0.000	45.93	C	-0.15

Sensor Component	Properly Sited	**Condition**	Properly sited	**Status**	pass
Sensor Component	Shield	**Condition**	Moderately 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**	See comments	**Status**	pass

Solar Radiation Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Licor	PY10653	BVL130	Eric Hebert	09/14/2015	Solar Radiation	04566

Mfg RM Young

SN/Owner ID none 04340

Parameter Solar Radiation Translator

Mfg Eppley **Parameter** solar radiation

Serial Number 10765 **Tfer Desc.** SR transfer translat

Tfer ID 01246

Mfg Eppley **Parameter** solar radiation

Serial Number 34341F3 **Tfer Desc.** SR transfer sensor

Tfer ID 01245

Slope 1.00000 **Intercept** 0.00000

Cert Date 1/16/2015 **CorrCoff** 1.00000

DAS 1:		DAS 2:	
% Diff of Avg	%Diff of Max	%Diff of Avg	%Diff of Max
2.6%	4.3%	0.0%	0.0%

UseDescription	Measure Date	MeasureTime	Tfer Raw	Tfer Corr	DAS w/m2	PctDifference
primary	9/16/2015	10:00		665	668	0.5%
primary	9/16/2015	11:00		764	782	2.4%
primary	9/16/2015	12:00		810	845	4.3%
primary	9/16/2015	13:00		799	831	4.0%
primary	9/16/2015	14:00		766	776	1.3%

Sensor Component	Sensor Clean	**Condition**	Clean	**Status**	pass
Sensor Component	Sensor Level	**Condition**	1/2 bubble off level	**Status**	pass
Sensor Component	Properly Sited	**Condition**	Properly sited	**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	E4920060	BVL130	Eric Hebert	09/14/2015	Relative Humidity	06820

Mfg	Rotronic	**Parameter**	Relative Humidity
Serial Number	124432	**Tfer Desc.**	Hygroclip
Tfer ID	01225		
Slope	0.91000	**Intercept**	4.53330
Cert Date	1/21/2015	**CorrCoff**	0.99800

	DAS 1:		DAS 2:	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	5.3			
Abs Max Er	7.2			

UseDesc.	Test type	Device	Input RH	GTL Raw	RH Corr.	DAS Volts	DAS %RH	Difference
primary	RH Low Range	Hygroclip	32.8	0.0	32.8	0.000	29.1	-3.7
primary	RH Low Range	Hygroclip	52.9	0.0	52.9	0.000	48.0	-4.9
primary	RH High Range	Hygroclip	75.3	0.0	75.3	0.000	68.1	-7.2

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

Precipitation Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Climatronics	illegible	BVL130	Eric Hebert	09/14/2015	Precipitation	810899

Mfg	PMP	**Parameter**	Precipitation
Serial Number	EW-06134-50	**Tfer Desc.**	250ml graduate
Tfer ID	01250		
Slope	1.00000	**Intercept**	0.00000
Cert Date	9/5/2005	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
5.0%	6.0%		

UseDesc.	Test type	TferVolume	Iteration	TimePerTip	Eq.Ht	DAS eng	Eq.HtUnit	OSE Unit	TferUnits	PctDifference
primary	tip check	10 manual	1	2 sec	0.10	0.10	in	in	ml	
primary	test 1	231.5	1	12 sec	0.50	0.52	in	in	ml	4.0%
primary	test 2	231.5	2	8 sec	0.50	0.47	in	in	ml	-6.0%

Sensor Component	Properly Sited	**Condition**	See comments	**Status**	pass
Sensor Component	Gauge Drain Screen	**Condition**	Not installed	**Status**	Fail
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**	Functioning	**Status**	pass
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass

Surface Wetness Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	none	BVL130	Eric Hebert	09/14/2015	Surface Wetness	03652

Mfg Ohmite

Parameter surface wetness

Serial Number 296-1200

Tfer Desc. decade box

Tfer ID 01210

☑ **Manual Test Pass**

UseDescription	Test Type	Tfer kOhms	OutputSignal	DAS eng	OutputSignalEngUni	TferUnits	OutputSignalUnit
primary	wet	N/A	0.000	1.01	V	N/A	V
primary	dry	N/A	0.000	0.01	V	N/A	V

Sensor Component	Properly Sited	**Condition**	See comments	**Status**	Fail
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 with holes	**Status**	pass
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	unknown	BVL130	Eric Hebert	09/14/2015	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.26	0.55		

Mfg	Extech	**Parameter**	Shelter Temperatur
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00564	**Intercept**	-0.21981
Cert Date	1/30/2015	**CorrCoff**	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	26.60	26.67	0.000	26.5	C	-0.13
primary	Temp Mid Range	27.22	27.29	0.000	27.2	C	-0.1
primary	Temp Mid Range	26.27	26.34	0.000	26.9	C	0.55

Infrastructure Data For

Site ID BVL130 **Technician** Eric Hebert **Site Visit Date** 09/14/2015

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8810 (s/n 2140-1)	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**	Fair	**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**	Fair	**Status**	pass
Sensor Component	Shelter Roof	**Condition**	Good	**Status**	pass
Sensor Component	Shelter Floor	**Condition**	Good	**Status**	pass
Sensor Component	Signal Cable	**Condition**	Good	**Status**	pass
Sensor Component	Tubing Type	**Condition**	3/8 teflon	**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Precipitation	BVL130	Eric Hebert	09/14/2015	Properly Sited	Climatronics	3422	☐	☐
Objects violate the 45 degree rule for the tipping bucket rain gage.								
Surface Wetness	BVL130	Eric Hebert	09/14/2015	Properly Sited	RM Young	4098	☐	☑
Additional details can be found in the hardcopy of the site audit report.								
Temperature2meter	BVL130	Eric Hebert	09/14/2015	System Memo	RM Young	4091	☐	☑
The forced-air shield is mounted on the tower up-side down. It is functioning properly but the orientation allows precipitation to enter the blower area which could cause premature failure of the blower.								

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

Ozone and NCORE sample line filters are replaced, and the sample lines are leaked tested, every 2 weeks.

2 **Parameter:** SitingCriteriaCom

The site is located in an agricultural and atmospheric research center. There are crops within 50 meters.

3 **Parameter:** ShelterCleanNotes

The shelter is somewhat cluttered and mice are present.

4 **Parameter:** MetSensorComme

The tipping bucket rain gage is mounted near the meteorological tower and in violation of the 45 degree rule. The surface wetness sensor is covered by tall grass.

5 **Parameter:** MetOpMaintCom

The meteorological sensors have been replaced with RM Young sensors since the previous audit. It appears as though the wind direction alignment was set to +3 degrees magnetic declination and not -3 degrees at the time of the replacement.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID BVL130 **Technician** Eric Hebert **Site Visit Date** 09/14/2015

Site Sponsor (agency)	EPA	**USGS Map**	Bondville
Operating Group	ISWS	**Map Scale**	
AQS #	17-019-1001	**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone, IMPROVE	**QAPP Latitude**	40.0520
Deposition Measurement	dry, wet, Hg	**QAPP Longitude**	-88.3725
Land Use	agricultural	**QAPP Elevation Meters**	212
Terrain	flat	**QAPP Declination**	-2.1
Conforms to MLM	Yes	**QAPP Declination Date**	9/16/2005
Site Telephone	(217) 863-2602	**Audit Latitude**	40.052021
Site Address 1	Bondville Road Research Station	**Audit Longitude**	-88.372481
Site Address 2		**Audit Elevation**	213
County	Champaign	**Audit Declination**	-2.9
City, State	Seymour, IL		
Zip Code	61875		
Time Zone	Central		
Primary Operator			
Primary Op. Phone #			
Primary Op. E-mail			
Backup Operator			
Backup Op. Phone #			
Backup Op. E-mail			

	Present	
Fire Extinguisher	☑	No inspection date
First Aid Kit	☑	
Safety Glasses	☐	
Safety Hard Hat	☑	
Climbing Belt	☑	
Security Fence	☐	
Secure Shelter	☑	
Stable Entry Step	☑	

Shelter Working Room ☑ **Make** Ekto **Model** 8810 (s/n 2140-1) **Shelter Size** 640 cuft

Shelter Clean ☑ **Notes** The shelter is somewhat cluttered and mice are present.

Site OK ☑ **Notes**

Driving Directions From Champaign take I-57 south to exit 229, route CR 18. Go west on CR 18 approximately 2.5 miles and turn right (north) on CR 500E. Continue approximately 1.7 miles to the Bondville Road Research Center on the left. The site is visible in the field on the right.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID BVL130 **Technician** Eric Hebert **Site Visit Date** 09/14/2015

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	50 m	☐
Large parking lot	200 m		☑
Small parking lot	100 m		☑
Tree line	50 m		☑
Obstacles to wind	10 times obstacle height		☑

Siting Distances OK ☑

Siting Criteria Comment

The site is located in an agricultural and atmospheric research center. There are crops within 50 meters.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID BVL130 **Technician** Eric Hebert **Site Visit Date** 09/14/2015

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?	☑	1/2 bubble off level
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?	☐	Violation of 45 degree rule
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 tipping bucket rain gage is mounted near the meteorological tower and in violation of the 45 degree rule. The surface wetness sensor is covered by tall grass.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID BVL130 **Technician** Eric Hebert **Site Visit Date** 09/14/2015

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:

The meteorological sensors have been replaced with RM Young sensors since the previous audit. It appears as though the wind direction alignment was set to +3 degrees magnetic declination and not -3 degrees at the time of the replacement.

Field Systems Data Form F-02058-1500-S5-rev002

Site ID BVL130 **Technician** Eric Hebert **Site Visit Date** 09/14/2015

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, SO2, and CO 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 BVL130 **Technician** Eric Hebert **Site Visit Date** 09/14/2015

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 BVL130 **Technician** Eric Hebert **Site Visit Date** 09/14/2015

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	☑	Nov 2014	☑
HASP	☑	Nov 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 BVL130 **Technician** Eric Hebert **Site Visit Date** 09/14/2015

Site operation procedures

1	Has the site operator attended a formal CASTNET training course? If yes, when and who instructed?	☑	at ESE in 1986
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	☑	Daily	☑
Translator Zero/Span Tests (climatronics)	☐	N/A	☑
Manual Rain Gauge Test	☑	Weekly	☑
Confirm Reasonableness of Current Values	☑	Weekly	☑
Test Surface Wetness Response	☑	Weekly	☑

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?	☐	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:

Ozone and NCORE sample line filters are replaced, and the sample lines are leaked tested, every 2 weeks.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID BVL130 **Technician** Eric Hebert **Site Visit Date** 09/14/2015

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, 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 BVL130 **Technician** Eric Hebert **Site Visit Date** 09/14/2015

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
CO	Teledyne	T300U	87	000760
Computer	Dell	Inspiron 15	B94MC12	07073
DAS	Campbell	CR3000	2539	000424
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	050400022576	06019
Flow Rate	Apex	AXMC105LPMDPC	illegible	000595
Infrastructure	Infrastructure	none	none	none
Met tower	Climatronics	14 inch taper	none	02738
Modem	Raven	H4223-C	0844355827	06610
Noy	Teledyne	T200U	110	000805
Ozone	ThermoElectron Inc	49i A1NAA	1009241797	000625
Ozone Standard	ThermoElectron Inc	49i A3NAA	0922236890	000512
Precipitation	Climatronics	100508-2	illegible	810899
Relative Humidity	Vaisala	HMP50UAB1A1A	E4920060	06820
Sample Tower	Aluma Tower	B	unknown	000182
Shelter Temperature	Campbell	107-L	unknown	none
Shield (10 meter)	RM Young	Aspirated 43408	none	06206
Shield (2 meter)	RM Young	Aspirated 43408	none	06635
Siting Criteria	Siting Criteria	1	None	None
SO2	Teledyne	T100U	79	000765
Solar Radiation	Licor	LI-200	PY10653	04566
Solar Radiation Translator	RM Young	70101-X	none	04340
Surface Wetness	RM Young	58101	none	03652
Temperature	RM Young	41342	6704	04690
Temperature2meter	RM Young	41342	14037	06404
Wind Direction	RM Young	AQ05103-5	49437wdr	04695
Wind Speed	RM Young	AQ05103-5	49437wsp	04695
Zero air pump	Teledyne	701H	576	000759

Site Inventory by Site Visit

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
ALH157-Sandy Grenville-09/16/2015						
1	9/16/2015	Computer	Dell	000299	D520	unknown
2	9/16/2015	DAS	Campbell	000405	CR3000	2522
3	9/16/2015	Elevation	Elevation	None	1	None
4	9/16/2015	Filter pack flow pump	Thomas	06285	107CA18	0990007057
5	9/16/2015	Flow Rate	Apex	000647	AXMC105LPMDPCV	54749
6	9/16/2015	Infrastructure	Infrastructure	none	none	none
7	9/16/2015	Modem	Raven	06605	H4222-C	0844355805
8	9/16/2015	Ozone	ThermoElectron Inc	000683	49i A1NAA	1030244798
9	9/16/2015	Ozone Standard	ThermoElectron Inc	000440	49i A3NAA	CM08200016
10	9/16/2015	Sample Tower	Aluma Tower	illegible	B	none
11	9/16/2015	Shelter Temperature	Campbell	none	107-L	none
12	9/16/2015	Siting Criteria	Siting Criteria	None	1	None
13	9/16/2015	Temperature	RM Young	04942	41342	8894
14	9/16/2015	Zero air pump	Werther International	06910	C 70/4	000829160

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2522	ALH157	Sandy Grenville	09/16/2015	DAS	Primary

Das Date: 9 /16/2015
Das Time: 15:06:00
Das Day: 259

Audit Date 9 /16/2015
Audit Time 15:06:00
Audit Day 259

Low Channel:

High Channel:

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

Mfg Fluke
Parameter DAS
Serial Number 95740135
Tfer Desc. DVM
Tfer ID 01311

Slope 1.00000
Intercept 0.00000
Cert Date 1/22/2015
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	0.0999	V	V	0.0000
7	0.3000	0.2998	0.2998	V	V	0.0000
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	0.8993	V	V	-0.0001
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	54749	ALH157	Sandy Grenville	09/16/2015	Flow Rate	000647

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	103471	**Tfer Desc.**	nexus
Tfer ID	01420		
Slope	0.96664	**Intercept**	0.03078
Cert Date	2/5/2015	**CorrCoff**	0.99996
Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	103424	**Tfer Desc.**	BIOS cell
Tfer ID	01410		
Slope	0.96664	**Intercept**	0.03078
Cert Date	2/5/2015	**CorrCoff**	0.99996

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
1.53%	1.96%		

Cal Factor Zero -0.01

Cal Factor Full Scale 1

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	0.00	0.000	-0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.03	0.150	0.11	l/m	l/m	
primary	test pt 1	1.507	1.530	1.50	1.500	1.50	l/m	l/m	-1.96%
primary	test pt 2	1.503	1.520	1.50	1.500	1.50	l/m	l/m	-1.32%
primary	test pt 3	1.504	1.520	1.50	1.500	1.50	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**	1.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.5 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	1030244798	ALH157	Sandy Grenville	09/16/2015	Ozone	000683

Slope:	0.99259	**Slope:**	0.00000
Intercept	-0.42179	**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**
1.7%	3.1%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	0419606966	**Tfer Desc.**	Ozone primary stan
Tfer ID	01112		
Slope	0.99384	**Intercept**	-0.40946
Cert Date	6/25/2015	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.02	0.43	0.25	ppb	
primary	2	30.02	30.61	29.98	ppb	-2.06%
primary	3	49.98	50.70	49.11	ppb	-3.14%
primary	4	80.28	81.18	80.80	ppb	-0.47%
primary	5	110.07	111.16	109.80	ppb	-1.22%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	-0.1	**Status**	pass
Sensor Component	Span	**Condition**	0.989	**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**	93.6 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.6 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.70 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	725.2 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	38.4 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**	1.43	**Status**	Fail
Sensor Component	Cell B Pressure	**Condition**		**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

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	8894	ALH157	Sandy Grenville	09/16/2015	Temperature	04942

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00343	**Intercept**	-0.06409
Cert Date	1/30/2015	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.12	0.21		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.07	0.13	0.000	0.3	C	0.21
primary	Temp Mid Range	24.85	24.83	0.000	24.9	C	0.03
primary	Temp High Range	48.88	48.78	0.000	48.7	C	-0.11

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	ALH157	Sandy Grenville	09/16/2015	Shelter Temperature	none

DAS 1:

Abs Avg Err	**Abs Max Er**
0.44	0.77

DAS 2:

Abs Avg Err	**Abs Max Er**

Mfg	Extech	**Parameter**	Shelter Temperatur
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00343	**Intercept**	-0.06409
Cert Date	1/30/2015	**CorrCoff**	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	27.88	27.85	0.000	28.0	C	0.17
primary	Temp Mid Range	28.25	28.22	0.000	28.6	C	0.38
primary	Temp Mid Range	26.61	26.58	0.000	27.4	C	0.77

Infrastructure Data For

Site ID ALH157 **Technician** Sandy Grenville **Site Visit Date** 09/16/2015

Shelter Make	Shelter Model	Shelter Size
Ekto	8810 (2149-7)	640 cuft

Sensor Component	Sample Tower Type	**Condition**	Type B	**Status**	pass
Sensor Component	Conduit	**Condition**	N/A	**Status**	pass
Sensor Component	Met Tower	**Condition**	N/A	**Status**	pass
Sensor Component	Moisture Trap	**Condition**	Installed	**Status**	pass
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	ALH157	Sandy Grenville	09/16/2015	Cell B Flow	ThermoElectron	4106	☐	☐

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

Field Systems Comments

1 **Parameter:** SitingCriteriaCom

The site is located in a corn field on a privately operated farm.

2 **Parameter:** MetSensorComme

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

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID ALH157 **Technician** Sandy Grenville **Site Visit Date** 09/16/2015

Site Sponsor (agency)	EPA	**USGS Map**	Pocahontas
Operating Group	private	**Map Scale**	
AQS #	17-119-9991	**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	38.8690
Deposition Measurement	dry, wet	**QAPP Longitude**	-89.6229
Land Use	agricultural	**QAPP Elevation Meters**	164
Terrain	flat	**QAPP Declination**	0.9
Conforms to MLM	Yes	**QAPP Declination Date**	1/28/2004
Site Telephone		**Audit Latitude**	38.869001
Site Address 1	Fairview Road	**Audit Longitude**	-89.622815
Site Address 2		**Audit Elevation**	164
County	Madison	**Audit Declination**	-1.1

			Present	
City, State	Pocahontas, IL			
Zip Code	62275	**Fire Extinguisher**	☑	new in 2015
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 (2149-7) **Shelter Size** 640 cuft

Shelter Clean ☑ **Notes**

Site OK ☑ **Notes**

Driving Directions From I-70 take exit 36 (Pokey Road) north to the intersection of route 140. Turn left (west) on route 140 and continue approximately 1.5 miles. Turn left (south) onto CR 5. At the first intersection turn right (west) onto Meffert road. After the road turns left 90 degrees, turn at the first farm on the left. The site is approximately 1/2 mile on the dirt road under the power lines.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID ALH157 **Technician** Sandy Grenville **Site Visit Date** 09/16/2015

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	20 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 a corn field on a privately operated farm.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID ALH157

Technician Sandy Grenville

Site Visit Date 09/16/2015

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:

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID ALH157 **Technician** Sandy Grenville **Site Visit Date** 09/16/2015

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 ALH157 **Technician** Sandy Grenville **Site Visit Date** 09/16/2015

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?	☑	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 ALH157 **Technician** Sandy Grenville **Site Visit Date** 09/16/2015

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 ALH157 **Technician** Sandy Grenville **Site Visit Date** 09/16/2015

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	☑	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?	☑	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 ALH157 **Technician** Sandy Grenville **Site Visit Date** 09/16/2015

Site operation procedures

1	Has the site operator attended a formal CASTNET training course? If yes, when and who instructed?	☑	1987 at ESE in FL
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	☐		☐

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 ALH157 **Technician** Sandy Grenville **Site Visit Date** 09/16/2015

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, 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 ALH157 **Technician** Sandy Grenville **Site Visit Date** 09/16/2015

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	D520	unknown	000299
DAS	Campbell	CR3000	2522	000405
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	0990007057	06285
Flow Rate	Apex	AXMC105LPMDPC	54749	000647
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4222-C	0844355805	06605
Ozone	ThermoElectron Inc	49i A1NAA	1030244798	000683
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200016	000440
Sample Tower	Aluma Tower	B	none	illegible
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	8894	04942
Zero air pump	Werther International	C 70/4	000829160	06910

APPENDIX B

CASTNET Site Spot Report Forms

EEMS Spot Report

Data Compiled: 10/1/2015 4:33:12 PM

SiteVisitDate	Site	Technician
09/16/2015	ALH157	Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	3	0.12	c	**P**
2	Temperature max error	P	4	0.5	3	0.21	c	**P**
3	Ozone Slope	P	0	1.1	4	0.99259	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.42179	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99992	unitless	**P**
6	Ozone % difference avg	P	7	10	4	1.7	%	**P**
7	Ozone % difference max	P	7	10	4	3.1	%	**P**
8	Flow Rate average % difference	P	10	5	3	1.53	%	**P**
9	Flow Rate max % difference	P	10	5	3	1.96	%	**P**
10	DAS Time maximum error	P	0	5	1	0.00	min	**P**
11	DAS Voltage average error	P	7	0.003	42	0.0000	V	**P**
12	Shelter Temperature average error	P	5	1	12	0.44	c	**P**
13	Shelter Temperature max error	P	5	1	12	0.77	c	**P**

Field Performance Comments

1 **Parameter:** Ozone **SensorComponent:** Cell B Flow **CommentCode** 99

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

Field Systems Comments

1 **Parameter:** SitingCriteriaCom

The site is located in a corn field on a privately operated farm.

2 **Parameter:** MetSensorComme

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

EEMS Spot Report

Data Compiled: 8/17/2015 6:45:22 PM

SiteVisitDate	Site	Technician
08/14/2015	BAS601	Eric Hebert

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	8	0.01	m/s	**P**
2	Wind Speed max error below 5m/s in m/s	P	3	0.5	8	0.05	m/s	**P**
3	Wind Speed average % difference above 5 m/s	P	3	5	8	0.5	%	**P**
4	Wind Speed max % difference above 5 m/s	P	3	5	8	1.2	%	**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	1.2	degrees	**P**
8	Wind Direction Input Deg True max error (deg)	P	2	5	4	2	degrees	**P**
9	Temperature average error	P	4	0.5	6	0.79	c	**Fail**
10	Temperature max error	P	4	0.5	6	1.56	c	**Fail**
11	Relative Humidity average above 85%	P	6	10	2	3.8	%	**P**
12	Relative Humidity max above 85%	P	6	10	2	3.8	%	**P**
13	Relative Humidity average below 85%	P	6	10	4	8.5	%	**P**
14	Relative Humidity max below 85%	P	6	10	4	14.5	%	**Fail**
15	Solar Radiation % diff of avg	P	9	10	12	0.61	%	**P**
16	Solar Radiation % diff of max STD value	P	9	10	12	1.4	%	**P**
17	Precipitation average % difference	P	1	10	2	7.0	%	**P**
18	Precipitation max % difference	P	1	10	2	7.0	%	**P**
19	Ozone Slope	P	0	1.1	4	0.97563	unitless	**P**
20	Ozone Intercept	P	0	5	4	-0.03096	ppb	**P**
21	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
22	Ozone % difference avg	P	7	10	4	2.6	%	**P**
23	Ozone % difference max	P	7	10	4	3.0	%	**P**
24	Flow Rate average % difference	P	10	5	3	2.13	%	**P**
25	Flow Rate max % difference	P	10	5	3	3.01	%	**P**
26	DAS Time maximum error	P	0	5	1	3.17	min	**P**
27	DAS Voltage average error	P	4	0.003	3	0.0000	V	**P**
28	Shelter Temperature average error	P	5	1	4	1.41	c	**Fail**
29	Shelter Temperature max error	P	5	1	4	2.23	c	**Fail**

SiteVisitDate	**Site**	**Technician**
08/14/2015	BAS601	Eric Hebert

Field Performance Comments

1 **Parameter:** DAS **SensorComponent:** System Memo **CommentCode** 174

Additional details can be found in the hardcopy of the site audit report.

2 **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.

3 **Parameter:** Flow Rate **SensorComponent:** System Memo **CommentCode** 77

The recorded flow rate data are accurate as recorded. The flow rate is not at the target flow rate.

4 **Parameter:** Relative Humidity **SensorComponent:** System Memo **CommentCode** 174

Additional details can be found in the hardcopy of the site audit report.

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The proper completion of the filter chain-of-custody form was discussed with the site operator. 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.

2 **Parameter:** SiteOpsProcedures

The ozone inlet filter is replaced and the system is leak tested each month.

3 **Parameter:** DocumentationCo

The use of the filter pack chain-of-custody was discussed with the site operator.

4 **Parameter:** ShelterCleanNotes

The shelter 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 now mounted at approximately 2 meters from the ground. Current recorded temperature at this site is not comparable to previously measured temperature data. The accuracy of the DAS was not tested due to no available channels for the test equipment.

EEMS Spot Report

Data Compiled: 8/21/2015 7:39:37 PM

SiteVisitDate	Site	Technician
08/19/2015	BUF603	Eric Hebert

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	0.01	m/s	**P**
2	Wind Speed max error below 5m/s in m/s	P	3	0.5	4	0.05	m/s	**P**
3	Wind Speed average % difference above 5 m/s	P	3	5	4	0.8	%	**P**
4	Wind Speed max % difference above 5 m/s	P	3	5	4	2.2	%	**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	1.8	degrees	**P**
8	Wind Direction Input Deg True max error (deg)	P	2	5	4	4	degrees	**P**
9	Temperature average error	P	4	0.5	3	0.23	c	**P**
10	Temperature max error	P	4	0.5	3	0.39	c	**P**
11	Relative Humidity average above 85%	P	6	10	1	2.4	%	**P**
12	Relative Humidity max above 85%	P	6	10	1	2.4	%	**P**
13	Relative Humidity average below 85%	P	6	10	2	1.8	%	**P**
14	Relative Humidity max below 85%	P	6	10	2	2.6	%	**P**
15	Solar Radiation % diff of avg	P	9	10	5	1.32	%	**P**
16	Solar Radiation % diff of max STD value	P	9	10	5	1.3	%	**P**
17	Precipitation average % difference	P	1	10	2	5.2	%	**P**
18	Precipitation max % difference	P	1	10	2	9.0	%	**P**
19	Flow Rate average % difference	P	10	5	3	0.89	%	**P**
20	Flow Rate max % difference	P	10	5	3	1.19	%	**P**
21	DAS Time maximum error	P	0	5	1	2.33	min	**P**
22	DAS Voltage average error	P	4	0.003	2	0.0000	V	**P**

SiteVisitDate	**Site**	**Technician**
08/19/2015	BUF603	Eric Hebert

Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** System Memo **CommentCode** 202

The filter attachment plate is mounted too high in the enclosure resulting in the filter being recessed in the enclosure and not exposed in the standard geometric orientation.

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.

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.

EEMS Spot Report

Data Compiled: 9/20/2015 11:01:33 PM

SiteVisitDate	Site	Technician
09/14/2015	BVL130	Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.16	c	**P**
2	Temperature2meter max error	P	5	0.5	3	0.20	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	0.45	g-cm	**P**
8	Wind Speed Torque max error	P	3	0.5	1	0.5	g-cm	**Fail**
9	Wind Direction Input Deg True average error (de	P	2	5	5	6.2	degrees	**Fail**
10	Wind Direction Input Deg True max error (deg)	P	2	5	5	9	degrees	**Fail**
11	Wind Direction Linearity average error (deg)	P	2	5	8	1.2	degrees	**P**
12	Wind Direction Linearity max error (deg)	P	2	5	8	3	degrees	**P**
13	Wind Direction Torque average error	P	2	20	1	18	g-cm	**P**
14	Wind Direction Torque max error	P	2	20	1	25	g-cm	**Fail**
15	Temperature average error	P	4	0.5	3	0.17	c	**P**
16	Temperature max error	P	4	0.5	3	0.26	c	**P**
17	Relative Humidity average below 85%	P	6	10	3	5.2	%	**P**
18	Relative Humidity max below 85%	P	6	10	3	7.2	%	**P**
19	Solar Radiation % diff of avg	P	9	10	20	2.58	%	**P**
20	Solar Radiation % diff of max STD value	P	9	10	20	4.3	%	**P**
21	Precipitation average % difference	P	1	10	2	5.0	%	**P**
22	Precipitation max % difference	P	1	10	2	6.0	%	**P**
23	Ozone Slope	P	0	1.1	4	0.97902	unitless	**P**
24	Ozone Intercept	P	0	5	4	0.42831	ppb	**P**
25	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
26	Ozone % difference avg	P	7	10	4	1.5	%	**P**
27	Ozone % difference max	P	7	10	4	1.8	%	**P**
28	Flow Rate average % difference	P	10	5	2	0.22	%	**P**
29	Flow Rate max % difference	P	10	5	2	0.67	%	**P**
30	DAS Time maximum error	P	0	5	1	0.00	min	**P**
31	DAS Voltage average error	P	7	0.003	42	0.0000	V	**P**
32	Surface Wetness Response	P	12	0.5	1	1.01		**P**
33	Shelter Temperature average error	P	5	1	12	0.26	c	**P**
34	Shelter Temperature max error	P	5	1	12	0.55	c	**P**

SiteVisitDate	**Site**	**Technician**
09/14/2015	BVL130	Eric Hebert

Field Performance Comments

1 **Parameter:** Precipitation **SensorComponent:** Properly Sited **CommentCode** 193

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

2 **Parameter:** Surface Wetness **SensorComponent:** Properly Sited **CommentCode** 174

Additional details can be found in the hardcopy of the site audit report.

3 **Parameter:** Temperature2mete **SensorComponent:** System Memo **CommentCode** 32

The forced-air shield is mounted on the tower up-side down. It is functioning properly but the orientation allows precipitation to enter the blower area which could cause premature failure of the blower.

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

Ozone and NCORE sample line filters are replaced, and the sample lines are leaked tested, every 2 weeks.

2 **Parameter:** SitingCriteriaCom

The site is located in an agricultural and atmospheric research center. There are crops within 50 meters.

3 **Parameter:** ShelterCleanNotes

The shelter is somewhat cluttered and mice are present.

4 **Parameter:** MetSensorComme

The tipping bucket rain gage is mounted near the meteorological tower and in violation of the 45 degree rule. The surface wetness sensor is covered by tall grass.

5 **Parameter:** MetOpMaintCom

The meteorological sensors have been replaced with RM Young sensors since the previous audit. It appears as though the wind direction alignment was set to +3 degrees magnetic declination and not -3 degrees at the time of the replacement.

EEMS Spot Report

Data Compiled: 9/1/2015 9:00:10 PM

SiteVisitDate	Site	Technician
07/24/2015	CNT169	Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	3	0.12	c	**P**
2	Temperature max error	P	4	0.5	3	0.21	c	**P**
3	Ozone Slope	P	0	1.1	4	0.93852	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.03683	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99986	unitless	**P**
6	Ozone % difference avg	P	7	10	4	6.4	%	**P**
7	Ozone % difference max	P	7	10	4	8.3	%	**P**
8	Flow Rate average % difference	P	10	5	2	1.32	%	**P**
9	Flow Rate max % difference	P	10	5	2	1.64	%	**P**
10	DAS Time maximum error	P	0	5	1	0.02	min	**P**
11	DAS Voltage average error	P	7	0.003	42	0.0001	V	**P**
12	Shelter Temperature average error	P	5	1	12	0.30	c	**P**
13	Shelter Temperature max error	P	5	1	12	0.36	c	**P**

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: 10/7/2015 9:06:17 PM

SiteVisitDate	Site	Technician
07/16/2015	DEN417	Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.98063	unitless	**P**
2	Ozone Intercept	P	0	5	4	0.41240	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	1.7	%	**P**

EEMS Spot Report

Data Compiled: 9/1/2015 10:15:10 PM

SiteVisitDate	Site	Technician
07/28/2015	GLR468	Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.20	c	**P**
2	Temperature max error	P	4	0.5	6	0.29	c	**P**
3	Ozone Slope	P	0	1.1	4	0.96744	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.47147	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99997	unitless	**P**
6	Ozone % difference avg	P	7	10	4	4.4	%	**P**
7	Ozone % difference max	P	7	10	4	5.9	%	**P**
8	Flow Rate average % difference	P	10	5	2	0.41	%	**P**
9	Flow Rate max % difference	P	10	5	2	0.47	%	**P**
10	DAS Time maximum error	P	0	5	1	0.00	min	**P**
11	DAS Voltage average error	P	7	0.003	49	0.0001	V	**P**
12	Shelter Temperature average error	P	5	1	12	0.53	c	**P**
13	Shelter Temperature max error	P	5	1	12	0.57	c	**P**

SiteVisitDate	Site	Technician
07/28/2015	GLR468	Sandy Grenville

Field Performance Comments

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

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

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator is relatively new and would benefit from additional training.

2 **Parameter:** SiteOpsProcedures

The ozone inlet filter is being changed weekly while smoke from forest fires is present. The site operator was observed to leave the sample tower down with the dry deposition filter installed and the sample pump running for more than one hour.

3 **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.

4 **Parameter:** ShelterCleanNotes

The shelter is in good condition. Evidence of repairs to roof leaks attempted.

5 **Parameter:** MetSensorComme

The recorded temperature data at this site is now being measured at approximately 2 meters above the ground. Current temperature data are no longer comparable to previous temperature measurements at this site.

6 **Parameter:** MetOpMaintCom

The signal cables are showing signs of wear.

EEMS Spot Report

Data Compiled: 10/12/2015 9:22:15 PM

SiteVisitDate	Site	Technician
07/02/2015	GTH161	Alison Ray

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	12	0.32	c	**P**
2	Temperature max error	P	4	0.5	12	0.71	c	**Fail**
3	Ozone Slope	P	0	1.1	4	0.98457	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.91907	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99986	unitless	**P**
6	Ozone % difference avg	P	7	10	4	3.5	%	**P**
7	Ozone % difference max	P	7	10	4	4.8	%	**P**
8	Flow Rate average % difference	P	10	5	2	1.21	%	**P**
9	Flow Rate max % difference	P	10	5	2	1.32	%	**P**
10	DAS Time maximum error	P	0	5	1	0.03	min	**P**
11	DAS Voltage average error	P	7	0.003	42	0.0002	V	**P**
12	Shelter Temperature average error	P	5	1	8	0.36	c	**P**
13	Shelter Temperature max error	P	5	1	8	0.36	c	**P**

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

Due to the remote location of the site, it can take up to a week to return the filter sample to the lab after it is removed from the tower in the winter.

2 **Parameter:** ShelterCleanNotes

Some floor tiles are damaged.

3 **Parameter:** MetSensorComme

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

4 **Parameter:** MetOpMaintCom

The temperature signal cable is showing signs of wear.

EEMS Spot Report

Data Compiled: 10/1/2015 4:56:51 PM

SiteVisitDate	Site	Technician
08/28/2015	HOX148	Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.00507	unitless	**P**
2	Ozone Intercept	P	0	5	4	0.44431	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	1.3	%	**P**

EEMS Spot Report

Data Compiled: 8/21/2015 8:58:56 PM

SiteVisitDate	Site	Technician
08/20/2015	NEC602	Eric Hebert

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	0.00	m/s	**P**
2	Wind Speed max error below 5m/s in m/s	P	3	0.5	4	0.01	m/s	**P**
3	Wind Speed average % difference above 5 m/s	P	3	5	4	0.5	%	**P**
4	Wind Speed max % difference above 5 m/s	P	3	5	4	1.2	%	**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	1.5	degrees	**P**
8	Wind Direction Input Deg True max error (deg)	P	2	5	4	3	degrees	**P**
9	Temperature average error	P	4	0.5	3	0.26	c	**P**
10	Temperature max error	P	4	0.5	3	0.37	c	**P**
11	Relative Humidity average above 85%	P	6	10	1	3.2	%	**P**
12	Relative Humidity max above 85%	P	6	10	1	3.2	%	**P**
13	Relative Humidity average below 85%	P	6	10	2	0.5	%	**P**
14	Relative Humidity max below 85%	P	6	10	2	1.0	%	**P**
15	Solar Radiation % diff of avg	P	9	10	10	9.34	%	**P**
16	Solar Radiation % diff of max STD value	P	9	10	10	10.00	%	**P**
17	Precipitation average % difference	P	1	10	2	3.6	%	**P**
18	Precipitation max % difference	P	1	10	2	3.6	%	**P**
19	Ozone Slope	P	0	1.1	4	0.97150	unitless	**P**
20	Ozone Intercept	P	0	5	4	-0.47079	ppb	**P**
21	Ozone correlation	P	0	0.995	4	1.00000	unitless	**P**
22	Ozone % difference avg	P	7	10	4	3.9	%	**P**
23	Ozone % difference max	P	7	10	4	5.1	%	**P**
24	Flow Rate average % difference	P	10	5	5	1.74	%	**P**
25	Flow Rate max % difference	P	10	5	5	3.49	%	**P**
26	DAS Time maximum error	P	0	5	1	2.58	min	**P**
27	DAS Voltage average error	P	4	0.003	3	0.0000	V	**P**
28	Shelter Temperature average error	P	5	1	6	0.29	c	**P**
29	Shelter Temperature max error	P	5	1	6	0.79	c	**P**

SiteVisitDate	**Site**	**Technician**
08/20/2015	NEC602	Eric Hebert

Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** System Memo **CommentCode** 180

An excessive amount of fluctuation in the signal recorded by the DAS for this variable was observed during the audit.

2 **Parameter:** Ozone **SensorComponent:** Cell B Freq. **CommentCode** 99

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

3 **Parameter:** Wind Direction **SensorComponent:** Vane Condition **CommentCode** 211

The wind direction vane is slightly bent and could be causing additional bias in wind direction measurements.

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator is doing a good job with filter change and filter handling.

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. The purpose and procedures for "upping" and "downing" channels was discussed during the audit.

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.

7 **Parameter:** MetOpMaintCom

Met One wind direction and wind speed sensors have been added to the tower with the Climatronics AIO all-in-one weather sensor for wind direction, wind speed, and temperature. The Met One sensors were audited.
A separate sensor for humidity and temperature was audited.

EEMS Spot Report

Data Compiled: 8/12/2015 1:08:49 PM

SiteVisitDate	Site	Technician
08/10/2015	PND165	Eric Hebert

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	0.67	c	**Fail**
3	Wind Speed average error below 5m/s in m/s	P	3	0.5	4	0.05	m/s	**P**
4	Wind Speed max error below 5m/s in m/s	P	3	0.5	4	0.20	m/s	**P**
5	Wind Speed average % difference above 5 m/s	P	3	5	4	0.0	%	**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	0.25	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	1.0	degrees	**P**
10	Wind Direction Input Deg True max error (deg)	P	2	5	4	2	degrees	**P**
11	Wind Direction Linearity average error (deg)	P	2	5	8	2.0	degrees	**P**
12	Wind Direction Linearity max error (deg)	P	2	5	8	4	degrees	**P**
13	Wind Direction Torque average error	P	2	20	1	8	g-cm	**P**
14	Wind Direction Torque max error	P	2	20	1	10	g-cm	**P**
15	Temperature average error	P	4	0.5	9	0.33	c	**P**
16	Temperature max error	P	4	0.5	9	0.53	c	**Fail**
17	Relative Humidity average above 85%	P	6	10	2	5.9	%	**P**
18	Relative Humidity max above 85%	P	6	10	2	5.9	%	**P**
19	Relative Humidity average below 85%	P	6	10	6	2.2	%	**P**
20	Relative Humidity max below 85%	P	6	10	6	3.3	%	**P**
21	Solar Radiation % diff of avg	P	9	10	8	1.18	%	**P**
22	Solar Radiation % diff of max STD value	P	9	10	8	1.2	%	**P**
23	Precipitation average % difference	P	1	10	2	3.0	%	**P**
24	Precipitation max % difference	P	1	10	2	6.0	%	**P**
25	Ozone Slope	P	0	1.1	4	0.98497	unitless	**P**
26	Ozone Intercept	P	0	5	4	0.16680	ppb	**P**
27	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
28	Ozone % difference avg	P	7	10	4	1.1	%	**P**
29	Ozone % difference max	P	7	10	4	1.5	%	**P**
30	Flow Rate average % difference	P	10	5	2	1.74	%	**P**
31	Flow Rate max % difference	P	10	5	2	1.95	%	**P**
32	DAS Time maximum error	P	0	5	1	0.00	min	**P**
33	DAS Voltage average error	P	7	0.003	42	0.0001	V	**P**

34	Surface Wetness Response	P	12	0.5	1	1.01		**P**
35	Shelter Temperature average error	P	5	1	12	0.81	c	**P**
36	Shelter Temperature max error	P	5	1	12	1.52	c	**Fail**

Field Performance Comments

1 **Parameter:** Ozone **SensorComponent:** Cell A Flow **CommentCode** 99

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

2 **Parameter:** Surface Wetness **SensorComponent:** System Memo **CommentCode** 135

The surface wetness sensor did not respond to one drop of water placed in the center of the grid.

3 **Parameter:** Temperature **SensorComponent:** System Memo **CommentCode** 141

The temperature sensor is mounted directly above the shelter roof.

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator does not use gloves to handle the filter. He handles the filter by the stem and carries it upside down to reduce the chance of contamination from the shelter to the tower.

2 **Parameter:** DasComments

The site operator recently replaced the shelter air conditioner.

3 **Parameter:** SitingCriteriaCom

There is new construction at the entrance to the access road approximately 200 meters to the west of the site. The area is to be used as a staging and rock crushing site for the road improvement project scheduled to take place for the next two years.

4 **Parameter:** ShelterCleanNotes

The shelter is well maintained.

5 **Parameter:** MetSensorComme

The RH sensor is not mounted in a shield, but rather in a plastic funnel taped to the meteorological tower. Both the RH and temperature sensors are mounted above the shelter. The surface wetness sensor grid is in poor condition and only responded as wet after excessive amounts of water were applied to the entire surface of the grid.

EEMS Spot Report

Data Compiled: 10/1/2015 2:35:38 PM

SiteVisitDate	Site	Technician
09/03/2015	PRK134	Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.22	c	**P**
2	Temperature max error	P	4	0.5	6	0.46	c	**P**
3	Ozone Slope	P	0	1.1	4	0.99199	unitless	**P**
4	Ozone Intercept	P	0	5	4	0.68477	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99993	unitless	**P**
6	Ozone % difference avg	P	7	10	4	0.8	%	**P**
7	Ozone % difference max	P	7	10	4	1.2	%	**P**
8	Flow Rate average % difference	P	10	5	2	1.53	%	**P**
9	Flow Rate max % difference	P	10	5	2	1.96	%	**P**
10	DAS Time maximum error	P	0	5	1	0.00	min	**P**
11	DAS Voltage average error	P	7	0.003	42	0.0000	V	**P**
12	Shelter Temperature average error	P	5	1	12	0.30	c	**P**
13	Shelter Temperature max error	P	5	1	12	0.76	c	**P**

Field Systems Comments

1 **Parameter:** DasComments

The tower guy wires are rusted and should be replaced. The sample tower is damaged at the hinge point and bent. Both of these items were observed and reported during the previous two audit visits.

2 **Parameter:** SitingCriteriaCom

Clover and Barley have been planted for hay within 20m of the site starting in 2008.

3 **Parameter:** ShelterCleanNotes

The shelter is clean, neat, and well organized. The counter top has been repaired since the previous audit visit.

4 **Parameter:** MetSensorComme

The temperature sensor has been moved to a naturally aspirated shield mounted to the sample tower.

EEMS Spot Report

Data Compiled: 8/4/2015 9:59:47 PM

SiteVisitDate	Site	Technician
08/03/2015	ROM206	Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	12	0.23	c	**P**
2	Temperature max error	P	4	0.5	12	0.36	c	**P**
3	Ozone Slope	P	0	1.1	4	0.98937	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.58729	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
6	Ozone % difference avg	P	7	10	4	2.4	%	**P**
7	Ozone % difference max	P	7	10	4	3.8	%	**P**
8	Flow Rate average % difference	P	10	5	6	1.07	%	**P**
9	Flow Rate max % difference	P	10	5	6	1.35	%	**P**
10	DAS Time maximum error	P	0	5	1	0.00	min	**P**
11	DAS Voltage average error	P	7	0.003	14	0.0001	V	**P**
12	Shelter Temperature average error	P	5	1	8	0.27	c	**P**
13	Shelter Temperature max error	P	5	1	8	0.40	c	**P**

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

It was suggested that the dry deposition filter not be installed and uncovered on the sample tower while the ozone inlet filter is replaced and other activities are performed with the tower down. 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: 8/4/2015 5:23:22 PM

SiteVisitDate	Site	Technician
08/04/2015	ROM406	Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.29	c	**P**
2	Temperature max error	P	4	0.5	6	0.75	c	**Fail**
3	Ozone Slope	P	0	1.1	4	0.96560	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.10314	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
6	Ozone % difference avg	P	7	10	4	3.9	%	**P**
7	Ozone % difference max	P	7	10	4	5.0	%	**P**
8	Flow Rate average % difference	P	10	5	8	0.55	%	**P**
9	Flow Rate max % difference	P	10	5	8	0.66	%	**P**
10	DAS Time maximum error	P	0	5	1	0.37	min	**P**
11	DAS Voltage average error	P	2	0.003	49	0.0000	V	**P**
12	Shelter Temperature average error	P	5	1	3	1.79	c	**Fail**
13	Shelter Temperature max error	P	5	1	3	3.14	c	**Fail**

SiteVisitDate	**Site**	**Technician**
08/04/2015	ROM406	Eric Hebert

Field Performance Comments

1 **Parameter:** Ozone **SensorComponent:** System Memo **CommentCode** 174

Additional details can be found in the hardcopy of the site audit report.

2 **Parameter:** Ozone **SensorComponent:** Cell B Flow **CommentCode** 99

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

3 **Parameter:** Temperature **SensorComponent:** System Memo **CommentCode** 174

Additional details can be found in the hardcopy of the site audit report.

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator is doing a very good job performing the site duties and expressed an interest in trying to improve any deficiencies. The sample flow rate systems for both the dry deposition and ozone sample trains were explained during the audit at the request of the site operator. Although gloves are not used to handle the filter pack, the operator is careful to touch only the bag and caps and not the filter.

2 **Parameter:** DasComments

Only RH, temperature, and AMoN are mounted on the meteorological tower.

3 **Parameter:** SiteOpsProcedures

The ozone analyzer display is indicating a low flow alarm for cell B. The analyzer is functioning properly and the flow meter is likely suspect.

4 **Parameter:** ShelterCleanNotes

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

5 **Parameter:** MetSensorComme

The recorded temperature is being measured at 2.5 meters above the ground (and < 1 foot above the AMoN enclosure) and not 10 meters. Current temperature measurements are no longer comparable to previous temperature measurements at this site.

EEMS Spot Report

Data Compiled: 10/1/2015 5:04:38 PM

SiteVisitDate	Site	Technician
09/08/2015	SAL133	Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.99968	unitless	**P**
2	Ozone Intercept	P	0	5	4	-0.17228	ppb	**P**
3	Ozone correlation	P	0	0.995	4	0.99994	unitless	**P**
4	Ozone % difference avg	P	7	10	4	0.4	%	**P**
5	Ozone % difference max	P	7	10	4	0.7	%	**P**

EEMS Spot Report

Data Compiled: 8/21/2015 7:44:46 PM

SiteVisitDate	Site	Technician
08/18/2015	SHE604	Eric Hebert

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	0.01	m/s	**P**
2	Wind Speed max error below 5m/s in m/s	P	3	0.5	4	0.05	m/s	**P**
3	Wind Speed average % difference above 5 m/s	P	3	5	4	1.0	%	**P**
4	Wind Speed max % difference above 5 m/s	P	3	5	4	2.2	%	**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	2.0	degrees	**P**
8	Wind Direction Input Deg True max error (deg)	P	2	5	4	3	degrees	**P**
9	Temperature average error	P	4	0.5	3	1.54	c	**Fail**
10	Temperature max error	P	4	0.5	3	3.28	c	**Fail**
11	Relative Humidity average below 85%	P	6	10	1	0.7	%	**P**
12	Relative Humidity max below 85%	P	6	10	1	0.7	%	**P**
13	Precipitation average % difference	P	1	10	1	9.8	%	**P**
14	Precipitation max % difference	P	1	10	1	9.8	%	**P**
15	Flow Rate average % difference	P	10	5	3	4.8	%	**P**
16	Flow Rate max % difference	P	10	5	3	5.09	%	**Fail**
17	DAS Time maximum error	P	0	5	1	0.50	min	**P**
18	DAS Voltage average error	P	4	0.003	2	0.0000	V	**P**

SiteVisitDate	**Site**	**Technician**
08/18/2015	SHE604	Eric Hebert

Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** System Memo **CommentCode** 174

Additional details can be found in the hardcopy of the site audit report.

2 **Parameter:** Temperature **SensorComponent:** System Memo **CommentCode** 174

Additional details can be found in the hardcopy of the site audit report.

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator uses the caps and bag from the received filter to seal and send back the removed filter. A spare set of caps and bag should be sent to the site. This was reported during the previous site audit.

2 **Parameter:** DasComments

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

3 **Parameter:** SiteOpsProcedures

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

4 **Parameter:** DocumentationCo

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

5 **Parameter:** SitingCriteriaCom

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

6 **Parameter:** ShelterCleanNotes

NEMA enclosure, solar power

7 **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.

8 **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.

9 **Parameter:** MetOpMaintCom

Due to limited time at the site caused by approaching thunder storm, only ambient comparisons of temperature were performed using the EEMS RTD standard. One standard salt solution was used for the RH comparison. The accuracy of the DAS was not tested with a voltage source since there were no available test channels.

EEMS Spot Report

Data Compiled: 10/1/2015 3:54:03 PM

SiteVisitDate	Site	Technician
09/11/2015	STK138	Sandy Grenville

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	0.28	c	**P**
3	Ozone Slope	P	0	1.1	4	0.99668	unitless	**P**
4	Ozone Intercept	P	0	5	4	0.38943	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99998	unitless	**P**
6	Ozone % difference avg	P	7	10	4	0.7	%	**P**
7	Ozone % difference max	P	7	10	4	2.2	%	**P**
8	Flow Rate average % difference	P	10	5	2	0.22	%	**P**
9	Flow Rate max % difference	P	10	5	2	0.67	%	**P**
10	DAS Time maximum error	P	0	5	1	0.00	min	**P**
11	DAS Voltage average error	P	7	0.003	42	0.0001	V	**P**
12	Shelter Temperature average error	P	5	1	12	0.07	c	**P**
13	Shelter Temperature max error	P	5	1	12	0.11	c	**P**

SiteVisitDate	**Site**	**Technician**
09/11/2015	STK138	Sandy Grenville

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The ozone sample train is leak tested every 2 weeks.

2 **Parameter:** SitingCriteriaCom

The site is located in a hay field on a cattle farm. Clover is planted within 20 meters and will be used as pasture this fall.

3 **Parameter:** ShelterCleanNotes

The shelter is somewhat dirty and cluttered. There are signs of leaks on the walls and floor rot.

4 **Parameter:** MetSensorComme

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

5 **Parameter:** MetOpMaintCom

The met tower is no longer in use.

EEMS Spot Report

Data Compiled: 9/1/2015 11:14:05 PM

SiteVisitDate	Site	Technician
08/04/2015	THR422	Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	12	0.15	c	**P**
2	Temperature max error	P	4	0.5	12	0.20	c	**P**
3	Ozone Slope	P	0	1.1	4	0.94939	unitless	**P**
4	Ozone Intercept	P	0	5	4	1.15039	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99994	unitless	**P**
6	Ozone % difference avg	P	7	10	4	2.8	%	**P**
7	Ozone % difference max	P	7	10	4	4.1	%	**P**
8	Flow Rate average % difference	P	10	5	8	2.32	%	**P**
9	Flow Rate max % difference	P	10	5	8	2.38	%	**P**
10	DAS Time maximum error	P	0	5	1	0.13	min	**P**
11	DAS Voltage average error	P	2	0.003	49	0.0002	V	**P**
12	Shelter Temperature average error	P	5	1	15	1.3	c	**Fail**
13	Shelter Temperature max error	P	5	1	15	1.49	c	**Fail**

SiteVisitDate	**Site**	**Technician**
08/04/2015	THR422	Sandy Grenville

Field Performance Comments

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

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

Field Systems Comments

1 **Parameter:** 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.

5 **Parameter:** MetSensorComme

The recorded temperature data is being measured at approximately 2 meters above the ground. The current temperature data are no longer comparable to previous temperature data at this site.

EEMS Spot Report

Data Compiled: 10/1/2015 4:47:25 PM

SiteVisitDate	Site	Technician
08/27/2015	UVL124	Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.00291	unitless	**P**
2	Ozone Intercept	P	0	5	4	0.21520	ppb	**P**
3	Ozone correlation	P	0	0.995	4	0.99998	unitless	**P**
4	Ozone % difference avg	P	7	10	4	0.8	%	**P**
5	Ozone % difference max	P	7	10	4	1.3	%	**P**

Field Performance Comments

1 **Parameter:** Ozone **SensorComponent:** Cell B Flow **CommentCode** 99

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

EEMS Spot Report

Data Compiled: 10/1/2015 3:55:20 PM

SiteVisitDate	Site	Technician
09/07/2015	VIN140	Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	9	0.07	c	**P**
2	Temperature max error	P	4	0.5	9	0.11	c	**P**
3	Ozone Slope	P	0	1.1	4	0.97984	unitless	**P**
4	Ozone Intercept	P	0	5	4	0.39413	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99992	unitless	**P**
6	Ozone % difference avg	P	7	10	4	1.0	%	**P**
7	Ozone % difference max	P	7	10	4	2.2	%	**P**
8	Flow Rate average % difference	P	10	5	3	1.54	%	**P**
9	Flow Rate max % difference	P	10	5	3	1.97	%	**P**
10	DAS Time maximum error	P	0	5	1	0.02	min	**P**
11	DAS Voltage average error	P	7	0.003	42	0.0001	V	**P**
12	Shelter Temperature average error	P	5	1	12	0.77	c	**P**
13	Shelter Temperature max error	P	5	1	12	1.25	c	**Fail**

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 an agricultural research center with farm activities adjacent to the site. A train track is approximately 200 meters to the north.

2 **Parameter:** ShelterCleanNotes

The shelter is in good condition and well maintained, however rot is beginning to form at the bottom of the walls.

3 **Parameter:** MetSensorComme

The temperature sensor has been mounted on the sample tower.

4 **Parameter:** MetOpMaintCom

The temperature sensor in now mounted in a naturally aspirated shield.

EEMS Spot Report

Data Compiled: 9/13/2015 7:20:39 PM

SiteVisitDate	Site	Technician
09/08/2015	VOY413	Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	3	0.20	c	**P**
2	Temperature max error	P	4	0.5	3	0.35	c	**P**
3	Ozone Slope	P	0	1.1	4	0.99793	unitless	**P**
4	Ozone Intercept	P	0	5	4	1.79471	ppb	**P**
5	Ozone correlation	P	0	0.995	4	1.00000	unitless	**P**
6	Ozone % difference avg	P	7	10	4	3.4	%	**P**
7	Ozone % difference max	P	7	10	4	6.2	%	**P**
8	Flow Rate average % difference	P	10	5	8	5.01	%	**Fail**
9	Flow Rate max % difference	P	10	5	8	8.26	%	**Fail**
10	DAS Time maximum error	P	0	5	1	1.72	min	**P**
11	DAS Voltage average error	P	2	0.003	35	0.0001	V	**P**
12	Shelter Temperature average error	P	5	1	15	0.63	c	**P**
13	Shelter Temperature max error	P	5	1	15	0.88	c	**P**

SiteVisitDate	Site	Technician
09/08/2015	VOY413	Eric Hebert

Field Systems Comments

1 **Parameter:** DocumentationCo

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

2 **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.

3 **Parameter:** ShelterCleanNotes

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

4 **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.

5 **Parameter:** MetSensorComme

The recorded temperature is currently being measured at approximately 2.5 meters above the ground and not at 10 meters as previously measured. Current temperature data are no longer comparable with previously measured data.

EEMS Spot Report

Data Compiled: 8/22/2015 11:06:58 AM

SiteVisitDate	Site	Technician
08/21/2015	WNC429	Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.04	c	**P**
2	Temperature max error	P	4	0.5	6	0.04	c	**P**
3	Ozone Slope	P	0	1.1	4	0.96256	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.47649	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99996	unitless	**P**
6	Ozone % difference avg	P	7	10	4	4.7	%	**P**
7	Ozone % difference max	P	7	10	4	6.0	%	**P**
8	Flow Rate average % difference	P	10	5	2	0.56	%	**P**
9	Flow Rate max % difference	P	10	5	2	0.67	%	**P**
10	DAS Time maximum error	P	0	5	1	0.33	min	**P**
11	DAS Voltage average error	P	2	0.003	35	0.0002	V	**P**
12	Shelter Temperature average error	P	5	1	2	0.16	c	**P**
13	Shelter Temperature max error	P	5	1	2	0.20	c	**P**

SiteVisitDate	**Site**	**Technician**
08/21/2015	WNC429	Eric Hebert

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:** Ozone **SensorComponent:** System Memo **CommentCode** 97

The ozone sample train does not include a means to introduce the zero/span/precision test gas, or the multi-point test gas, to the complete sample train. The inlet filter at the analyzer is not conditioned as described in the station procedures.

3 **Parameter:** Ozone **SensorComponent:** Cell B Flow **CommentCode** 99

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

4 **Parameter:** Ozone **SensorComponent:** Cell A Freq. **CommentCode** 99

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

5 **Parameter:** Temperature **SensorComponent:** System Memo **CommentCode** 174

Additional details can be found in the hardcopy of the site audit report.

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The general observations section of the SSRF is still not completed. Gloves are not used when handling the filter pack.

2 **Parameter:** SiteOpsProcedures

The ozone analyzer is operated by the state of South Dakota. There is no means for introducing routine test gas at the sample inlet and all routine checks are performed at the back of the analyzer. Audit test gas was introduced through the sample inlet flooding the glass manifold.

3 **Parameter:** DocumentationCo

Records of the routine checks performed by the state personnel are kept onsite in a logbook.

4 **Parameter:** ShelterCleanNotes

One shelter houses the gas analyzers and is in good condition and clean. The analyzer sample train is a glass manifold with an exhaust fan. The second shelter houses the flow system, met translator, and IMPROVE. It is older and not climate controlled.

5 **Parameter:** MetSensorComme

The recorded temperature is measured at approximately 2 meters above the ground. Previously measured temperature data are no longer comparable to the current temperature measurements.

6 **Parameter:** PollAnalyzerCom

The dry deposition filter is mounted low in the enclosure which changes the particle collection characteristics, and can allow precipitation to enter. The ozone sample train is a 3 meter glass manifold with a 1/4 inch Teflon tubing connection to the analyzer.

7 **Parameter:** MetOpMaintCom

The temperature sensor signal cable insulation is cracked and showing signs of extreme wear.

EEMS Spot Report

Data Compiled: 8/17/2015 4:04:59 PM

SiteVisitDate	Site	Technician
08/13/2015	YEL408	Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	12	0.13	c	**P**
2	Temperature max error	P	4	0.5	12	0.18	c	**P**
3	Ozone Slope	P	0	1.1	4	0.98473	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.90442	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99995	unitless	**P**
6	Ozone % difference avg	P	7	10	4	3.7	%	**P**
7	Ozone % difference max	P	7	10	4	5.9	%	**P**
8	Flow Rate average % difference	P	10	5	3	0.44	%	**P**
9	Flow Rate max % difference	P	10	5	3	0.67	%	**P**
10	DAS Time maximum error	P	0	5	1	0.17	min	**P**
11	DAS Voltage average error	P	10	0.003	35	0.0000	V	**P**
12	DAS Voltage average error	P	2	0.003	35	0.0002	V	**P**
13	Shelter Temperature average error	P	5	1	15	1.26	c	**Fail**
14	Shelter Temperature max error	P	5	1	15	1.44	c	**Fail**

SiteVisitDate	Site	Technician
08/13/2015	YEL408	Eric Hebert

Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** System Memo **CommentCode** 77

The recorded flow rate data are accurate as recorded. The flow rate is not at the target flow rate.

2 **Parameter:** Temperature **SensorComponent:** System Memo **CommentCode** 174

Additional details can be found in the hardcopy of the site audit report.

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator was not available during the site audit visit. Reported information was obtained from the site documentation.

2 **Parameter:** DasComments

The shelter heat is operating continuously. The air conditioning is cycling and able to overcome the additional heat and maintain the shelter temperature within specifications.

3 **Parameter:** SiteOpsProcedures

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

4 **Parameter:** SitingCriteriaCom

The site is located at the edge of a tree line. Trees as tall as the sample inlet are approximately 10 to 15 meters from the sample tower and cover the area from west to east on the north side of the site. Other trees have been cut and the forest has been thinned. There may be a few trees still in violation of the 22.5 degree rule to the north of the inlet. A new communication tower has been constructed since the previous site audit visit.

5 **Parameter:** ShelterCleanNotes

The shelter is organized and well maintained.

6 **Parameter:** PollAnalyzerCom

The desiccant canister is spent.

7 **Parameter:** MetOpMaintCom

The recorded temperature is now being measured at approximately 2 meters above the ground. Current temperature measurements are no longer comparable to previous temperature measurements at this site.

APPENDIX C

CASTNET Ozone Performance Evaluation Forms

Site Inventory by Site Visit

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
DEN417-Eric Hebert-07/16/2015						
1	7/16/2015	DAS	Environmental Sys Corp	90600	8816	2274
2	7/16/2015	Ozone	ThermoElectron Inc	90778	49C	49C-77033-384
3	7/16/2015	Ozone Standard	ThermoElectron Inc	90831	49C	0520012325
4	7/16/2015	Zero air pump	Werther International	none	PC70/4	526281

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	49C-77033-384	DEN417	Eric Hebert	07/16/2015	Ozone	90778

Slope:	0.98063	**Slope:**	0.00000
Intercept	0.41240	**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%	1.7%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	0517112167	**Tfer Desc.**	Ozone primary stan
Tfer ID	01113		
Slope	1.00565	**Intercept**	-0.01252
Cert Date	4/29/2015	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	-0.08	-0.06	0.39	ppb	
primary	2	27.42	27.27	27.21	ppb	-0.22%
primary	3	49.04	48.77	48.22	ppb	-1.13%
primary	4	79.34	78.90	77.53	ppb	-1.74%
primary	5	108.60	108.00	106.50	ppb	-1.39%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**		**Status**	pass
Sensor Component	Span	**Condition**		**Status**	pass
Sensor Component	Zero Voltage	**Condition**		**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**		**Status**	pass
Sensor Component	Cell A Freq.	**Condition**		**Status**	pass
Sensor Component	Cell A Noise	**Condition**		**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.65 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**		**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**		**Status**	pass
Sensor Component	Cell B Freq.	**Condition**		**Status**	pass
Sensor Component	Cell B Noise	**Condition**		**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.68 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**		**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

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
UVL124-Sandy Grenville-08/27/2015						
1	8/27/2015	DAS	Campbell	000423	CR3000	2517
2	8/27/2015	Ozone	ThermoElectron Inc	000746	49i A1NAA	1105347315
3	8/27/2015	Ozone Standard	ThermoElectron Inc	000362	49i A3NAA	0726124686
4	8/27/2015	Zero air pump	Werther International	06936	C 70/4	000829169

EEMS Spot Report

Data Compiled: 10/1/2015 4:47:25 PM

SiteVisitDate	Site	Technician
08/27/2015	UVL124	Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.00291	unitless	**P**
2	Ozone Intercept	P	0	5	4	0.21520	ppb	**P**
3	Ozone correlation	P	0	0.995	4	0.99998	unitless	**P**
4	Ozone % difference avg	P	7	10	4	0.8	%	**P**
5	Ozone % difference max	P	7	10	4	1.3	%	**P**

Field Performance Comments

1 **Parameter:** Ozone **SensorComponent:** Cell B Flow **CommentCode** 99

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
HOX148-Sandy Grenville-08/28/2015						
1	8/28/2015	DAS	Campbell	000426	CR3000	2533
2	8/28/2015	Ozone	ThermoElectron Inc	000614	49i A1NAA	1009241794
3	8/28/2015	Ozone Standard	ThermoElectron Inc	000448	49i A3NAA	CM08200024
4	8/28/2015	Zero air pump	Werther International	06938	C 70/4	000829164

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241794	HOX148	Sandy Grenville	08/28/2015	Ozone	000614

Slope:	1.00507	**Slope:**	0.00000
Intercept	0.44431	**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%	1.3%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	0419606966	**Tfer Desc.**	Ozone primary stan
Tfer ID	01112		
Slope	0.99384	**Intercept**	-0.40946
Cert Date	6/25/2015	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.00	0.41	1.09	ppb	
primary	2	29.99	30.58	30.97	ppb	1.28%
primary	3	50.01	50.73	51.36	ppb	1.24%
primary	4	80.00	80.90	81.60	ppb	0.87%
primary	5	110.00	111.09	112.30	ppb	1.09%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	-0.50	**Status**	pass
Sensor Component	Span	**Condition**	1.022	**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**	94.9 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.9 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.73 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	716 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	35.5 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	100.0 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.9 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.74 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**		**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

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
SAL133-Sandy Grenville-09/08/2015						
1	9/8/2015	DAS	Campbell	000351	CR3000	2129
2	9/8/2015	Ozone	ThermoElectron Inc	000741	49i A1NAA	1105347316
3	9/8/2015	Ozone Standard	ThermoElectron Inc	000370	49i A3NAA	0726124689
4	9/8/2015	Zero air pump	Werther International	06935	C 70/4	000829172

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347316	SAL133	Sandy Grenville	09/08/2015	Ozone	000741

Slope:	0.99968	**Slope:**	0.00000
Intercept	-0.17228	**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**
0.4%	0.7%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	0419606966	**Tfer Desc.**	Ozone primary stan
Tfer ID	01112		
Slope	0.99384	**Intercept**	-0.40946
Cert Date	6/25/2015	**CorrCoff**	1.00000

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	PctDifference
primary	1	0.00	0.41	-0.08	ppb	
primary	2	30.03	30.62	30.50	ppb	-0.39%
primary	3	50.34	51.06	51.06	ppb	0.00%
primary	4	79.97	80.87	81.30	ppb	0.53%
primary	5	109.68	110.77	110.00	ppb	-0.70%

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.10	**Status**	pass
Sensor Component	Span	**Condition**	1.020	**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**	108.7 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.9 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.61 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	723 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	35.7 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	95.2 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.6 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.56 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**		**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