2013 – 3rd Quarter Report
Support for Conducting Systems & Performance Audits of CASTNET Sites and NADP Monitoring Stations

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Prepared for:

U. S. Environmental Protection Agency

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List of Acronyms and Abbreviations

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

1.0 CASTNET Quarterly Report

1.1 Introduction

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

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

CASTNET pollutant flux estimates are calculated as the aggregate product of weekly measured chemical concentrations and model-estimated deposition velocities. 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 June 2013, the network is comprised of 93 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, 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 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. Four new sites sponsored by EPA and operated by the BLM in WY also operate meteorological sensors and are BAS601, NEC602, BUF603, 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, and BEL116. Those variables were audited at the BVL130 station during third quarter 2013. All results except the lowest concentration challenge for CO were found to be within acceptance criteria. The preliminary report of those results were delivered following the audit, 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 2013

This report consists of the systems and performance audit results from the CASTNET sites audited during the third quarter (July through September) of 2013. 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
GLR468	with met	NPS	7/18/2013	Glacier NP
BAS601	with met	EPA / BLM	7/22/2013	Basin
SHE604	Flow & met	EPA / BLM	7/23/2013	Sheridan
BUF603	Flow & met	EPA / BLM	7/25/2013	Buffalo
NEC602	with met	EPA / BLM	7/29/2013	Newcastle
BVL130	with met	EPA	7/31/2013	Bondville
BVL130	NOy	EPA	8/1/2013	Bondville
BVL130	CO	EPA	8/1/2013	Bondville
BVL130	SO2	EPA	8/1/2013	Bondville
VIN140	without met	EPA	8/23/2013	Vincennes
ALH157	without met	EPA	8/24/2013	Alhambra
PRK134	without met	EPA	9/4/2013	Perkinstown
VOY413	with met	NPS	9/5/2013	Voyageurs NP
THR422	with met	NPS	9/9/2013	Theodore Roosevelt NP
WNC429	with met	NPS	9/11/2013	Wind Cave NP
STK138	without met	EPA	9/19/2013	Stockton

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**
UVL124	Ozone PE	EPA	8/30/2013	Unionville
HOX148	Ozone PE	EPA	8/30/2013	Hoxeyville
ANA115	Ozone PE	EPA	9/17/2013	Ann Arbor
MKG113	Ozone PE	EPA	9/17/2013	MK Goddard
KEF112	Ozone PE	EPA	9/20/2013	Kane Exp. Forest
PSU106	Ozone PE	EPA	9/24/2013	Penn State
SAL133	Ozone PE	EPA	9/28/2013	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 7 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 2013

This report covers the results from the NADP sites surveyed during the third quarter (July through September) of 2013. The station names and dates of the audits are presented in Table 4.

Table 4. Sites Surveyed – Thied Quarter 2013

Side ID	Network	Survey Date	Station Name
CA28	NTN	7/9/2013	Kings River Experimental Watershed
ID02	NTN	7/22/2013	Priest River Experimental Forest
ID03	NTN / AMoN	7/23/2013	Craters of the Moon National Monument
ID11	NTN	7/15/2013	Reynolds Creek
IN22	NTN	8/23/2013	Southwest Purdue Agriculture Center
IN41	NTN	9/16/2013	Agronomy Center for Research and Extension
MI99	NTN	8/29/2013	Chassell
MN23	MDN / NTN	8/22/2013	Camp Ripley
MN28	NTN	8/22/2013	Grindstone Lake
MN32	NTN	9/5/2013	Voyageurs National Park-Sullivan Bay
MT00	NTN	7/22/2013	Little Bighorn Battlefield National Monument
MT05	MDN / NTN	7/18/2013	Glacier National Park-Fire Weather Station
NC29	NTN	7/11/2013	Hofmann Forest
NC35	NTN	7/11/2013	Clinton Crops Research Station
NC36	NTN	7/10/2013	Jordan Creek
ND00	NTN	9/9/2013	Theodore Roosevelt National Park-Painted Canyon
NY10	NTN	9/19/2013	Chautauqua
OR09	NTN	7/16/2013	Silver Lake Ranger Station
OR10	NTN	7/17/2013	H. J. Andrews Experimental Forest
OR18	NTN	7/18/2013	Starkey Experimental Forest
OR97	NTN	7/17/2013	Hyslop Farm
PA13	MDN / NTN	9/24/2013	Allegheny Portage Railroad National Hist. Site
PA18	NTN	9/21/2013	Young Woman's Creek
PA29	NTN MDN / AMoN	9/19/2013	Kane Experimental Forest
PA30	MDN / NTN	9/18/2013	Erie
PA42	MDN / NTN	9/24/2013	Leading Ridge
PA47	MDN / NTN	9/23/2013	Millersville

Side ID	Network	Survey Date	Station Name
PA52	MDN	9/22/2013	Little Pine State Park
PA60	MDN	9/23/2013	Valley Forge
PA90	MDN	9/20/2013	Hills Creek State Park
SC05	MDN / NTN / AMoN	7/12/2013	Cape Romain National Wildlife Refuge
SC06	NTN	7/8/2013	Santee National Wildlife Refuge
SC19	MDN	7/9/2013	Congaree Swamp
SD04	NTN	9/11/2013	Wind Cave National Park-Elk Mountain
UT97	MDN / AMoN	7/5/2013	Salt Lake City
WI08	MDN	8/27/2013	Brule River
WI25	NTN	9/3/2013	Suring
WI36	MDN / NTN	8/28/2013	Trout Lake

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

GLR468-Eric Hebert-07/18/2013

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
1	7/18/2013	DAS	Environmental Sys Corp	90653	8816	2566
2	7/18/2013	Elevation	Elevation	None	1	None
3	7/18/2013	Flow Rate	Millipore	none	LR250	766
4	7/18/2013	Infrastructure	Infrastructure	none	none	none
5	7/18/2013	Modem	US Robotics	none	56k	unknown
6	7/18/2013	Ozone	ThermoElectron Inc	none	49i A3NAA	1023943901
7	7/18/2013	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	CM08460050
8	7/18/2013	Precipitation	Climatronics	none	100508-2	illegible
9	7/18/2013	Printer	Hewlett Packard	none	842C	unknown
10	7/18/2013	Relative Humidity	Rotronic	none	MP 601A	80496
11	7/18/2013	Sample Tower	Aluma Tower	none	B	none
12	7/18/2013	Shelter Temperature	ARS	77	none	none
13	7/18/2013	Siting Criteria	Siting Criteria	None	1	None
14	7/18/2013	Solar Radiation	Licor	none	LI-200	illegible
15	7/18/2013	Solar Radiation Translator	RM Young	03729	70101-X	none
16	7/18/2013	Temperature	RM Young	none	41342	17625
17	7/18/2013	Wind Direction	RM Young	02844	AQ05103-5	none
18	7/18/2013	Wind Speed	RM Young	02844	AQ05103-5	none
19	7/18/2013	Zero air pump	Werther International	none	PC70/4	000756725

DAS Data Form

DAS Time Max Error: 0.72

Mfg	**Serial Number**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Use Desc.**
Environmental Sys	2566	GLR468	Eric Hebert	07/18/2013	DAS	Primary

Das Date: 7 /19/2013
Das Time: 12:43:00
Das Day: 200

Audit Date 7 /19/2013
Audit Time 12:42:17
Audit Day 200

Low Channel:		**High Channel:**	
Avg Diff:	**Max Diff:**	**Avg Diff:**	**Max Diff:**
0.0002	0.0003	0.0002	0.0003

Mfg Datel
Parameter DAS
Serial Number 4000392
Tfer Desc. Source generator (D
Tfer ID 01321
Slope 1.00000
Intercept 0.00000
Cert Date 2/13/2012
CorrCoff 1.00000

Mfg Fluke
Parameter DAS
Serial Number 86590148
Tfer Desc. DVM
Tfer ID 01310
Slope 1.00000
Intercept 0.00000
Cert Date 1/27/2013
CorrCoff 1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
2	0.0000	0.0000	0.0003	V	V	0.0003
2	0.1000	0.1000	0.0998	V	V	-0.0002
2	0.3000	0.3000	0.2999	V	V	-0.0001
2	0.5000	0.4999	0.4998	V	V	-0.0001
2	0.7000	0.6999	0.6998	V	V	-0.0001
2	0.9000	0.8999	0.8998	V	V	-0.0001
2	1.0000	0.9999	0.9997	V	V	-0.0002
9	0.0000	0.0000	-0.0002	V	V	-0.0002
9	0.1000	0.1000	0.0999	V	V	-0.0001
9	0.3000	0.3000	0.3000	V	V	0.0000
9	0.5000	0.5000	0.5001	V	V	0.0001
9	0.7000	0.7000	0.7002	V	V	0.0002
9	0.9000	0.9000	0.9002	V	V	0.0002
9	1.0000	1.0000	1.0003	V	V	0.0003

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Millipore	766	GLR468	Eric Hebert	07/18/2013	Flow Rate	none

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	122974	**Tfer Desc.**	BIOS 220-H
Tfer ID	01416		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/8/2013	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
1.13%	1.26%		

Cal Factor Zero 0.347

Cal Factor Full Scale 11.33

Rotometer Reading: 3.05

UseDescription:	Test type:	Input l/m:	Input STP:	MfcDisp.:	OutputSignal:	Output S E:	InputUnit:	OutputSignalI	PctDifference:
primary	pump off	0.000	0.000	-0.06	-0.1370	0.05	l/m	l/m	
primary	leak check	0.000	0.000	-0.06	-0.1370	0.05	l/m	l/m	
primary	test pt 1	0.000	3.032	2.37	1.2070	3.00	l/m	l/m	-1.04%
primary	test pt 2	0.000	3.033	2.37	1.2070	3.00	l/m	l/m	-1.08%
primary	test pt 3	0.000	3.038	2.37	1.2070	3.00	l/m	l/m	-1.26%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	360 deg	**Status**	pass
Sensor Component	Filter Depth	**Condition**	-1.5 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**	Clean and dry	**Status**	Pass
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.5 cm	**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1023943901	GLR468	Eric Hebert	07/18/2013	Ozone	none

Slope:	1.02524	**Slope:**	0.00000
Intercept	0.15050	**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**
2.5%	3.3%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	517112175	**Tfer Desc.**	Ozone primary stan
Tfer ID	01111		
Slope	0.99720	**Intercept**	0.18428
Cert Date	1/2/2013	**CorrCoff**	1.00000

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	-0.71	-0.89	-0.37	ppb	
primary	2	30.44	30.34	31.09	ppb	2.47%
primary	3	53.94	53.90	55.24	ppb	2.49%
primary	4	83.45	83.49	85.02	ppb	1.83%
primary	5	111.83	111.95	115.60	ppb	3.26%

Sensor Component	Cell B Noise	**Condition**	0.8 ppb	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	1.0002	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Line Loss	**Condition**	< 1 %	**Status**	pass
Sensor Component	Offset	**Condition**	0.8	**Status**	pass
Sensor Component	Span	**Condition**	1.028	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	76.8 kHz	**Status**	Fail
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**	0.62 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	33.2 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	670 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.7 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	75.2 kHz	**Status**	Fail
Sensor Component	Cell A Flow	**Condition**	0.62 lpm	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	0.0003	**Status**	pass

Wind Speed Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	none	GLR468	Eric Hebert	07/18/2013	Wind Speed	02844

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 1/13/2010
CorrCoff 1.00000

Mfg RM Young
Parameter wind speed
Serial Number
Tfer Desc. wind speed motor (l
Tfer ID 01261
Slope 1.00000
Intercept 0.00000
Cert Date 1/13/2010
CorrCoff 1.00000

Prop or Cups SN 59816
Prop or Cups Torque 0.3 **to** 0.3
Prop Correction Fact 0.0512

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

UseDescription:	InputDevice:	Input RPM:	Input m/s:	Output V:	DAS m/s:	Diff/ %Diff:	Difference:
primary	none	0	0.20	0.0000	0.0		-0.20
primary	01262	200	1.02	0.0000	1.0		0.00
primary	01262	400	2.05	0.0000	2.1		0.00
primary	01262	800	4.10	0.0000	4.1		0.00
primary	01262	1200	6.14	0.0000	6.1	0.00%	
primary	01262	2400	12.29	0.0000	12.3	0.00%	
primary	01262	4000	20.48	0.0000	20.5	0.00%	
primary	01262	9400	48.13	0.0000	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**		**Status**	pass

Wind Direction Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	none	GLR468	Eric Hebert	07/18/2013	Wind Direction	02844

Mfg Ushikata **Parameter** wind direction

Serial Number 190037 **Tfer Desc.** transit

Tfer ID 01265

Slope 1.00000 **Intercept** 0.00000

Cert Date 1/4/2011 **CorrCoff** 1.00000

Mfg RM Young **Parameter** wind direction

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

Tfer ID 01266

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

VaneTorque 12 **to** 12 3

	DAS 1: Orientation	Linearity:	**DAS 2:** Orientation	Linearity:
Abs Avg Err	1.5	1.0		
Abs Max Er	3	2		

UseDescription:	TferID:	Input Raw:	Linearity	Output V:	Output Deg.:	Difference:	Change:	Error:
primary	01266	0	☑	0.0000	0	0	44	-1
primary	01266	45	☑	0.0000	45	0	45	0
primary	01266	90	☑	0.0000	91	1	46	1
primary	01266	135	☑	0.0000	138	3	47	2
primary	01266	180	☑	0.0000	182	2	44	-1
primary	01266	225	☑	0.0000	227	2	45	0
primary	01266	270	☑	0.0000	273	3	46	1
primary	01266	315	☑	0.0000	316	1	43	-2
primary	01265	3	☐	0.0000	0	3		3
primary	01265	93	☐	0.0000	91	2		2
primary	01265	183	☐	0.0000	182	1		1
primary	01265	273	☐	0.0000	273	0		0

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** **Status** pass

Sensor Component Vane Condition **Condition** Good **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	17625	GLR468	Eric Hebert	07/18/2013	Temperature	none

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00732	**Intercept**	-0.12380
Cert Date	1/12/2013	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.09	0.13		

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Low Range	0.01	0.13	0.0000	0.3	C	0.13
primary	Temp Mid Range	26.77	26.70	0.0000	26.6	C	-0.06
primary	Temp High Range	49.13	48.90	0.0000	49.0	C	0.08

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

Humidity Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Rotronic	80496	GLR468	Eric Hebert	07/18/2013	Relative Humidity	none

Mfg	Rotronic	**Parameter**	Relative Humidity
Serial Number	124432	**Tfer Desc.**	Hygroclip
Tfer ID	01225		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/29/2013	**CorrCoff**	1.00000

	DAS 1:		**DAS 2:**	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	1.3	4.5		
Abs Max Er	2.2	4.5		

UseDesc.:	Test type:	Device:	Input RH:	GTL Raw:	RH Corr.:	DAS Volts:	DAS %RH:	Difference:
primary	RH Low Range	Hygroclip	32.8	33.0	32.8	0.0000	32.5	-0.3
primary	RH Low Range	Hygroclip	52.9	53.2	52.9	0.0000	50.7	-2.2
primary	RH High Range	Hygroclip	93.6	89.9	93.6	0.0000	89.1	-4.5

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

Solar Radiation Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Licor	illegible	GLR468	Eric Hebert	07/18/2013	Solar Radiation	none

Mfg RM Young

SN/Owner ID none 03729

Parameter Solar Radiation Translator

Mfg Eppley **Parameter** solar radiation

Serial Number 10765 **Tfer Desc.** SR transfer translat

Tfer ID 01246

Slope 1.00000 **Intercept** 0.00000

Cert Date 1/6/2010 **CorrCoff** 1.00000

Mfg Eppley **Parameter** solar radiation

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

Tfer ID 01245

Slope 1.00000 **Intercept** 0.00000

Cert Date 12/16/2010 **CorrCoff** 1.00000

DAS 1:		DAS 2:	
% Diff of Avg	%Diff of Max	%Diff of Avg	%Diff of Max
2.8%	0.1%	0.0%	0.0%

UseDescription:	Measure Date	MeasureTime	Tfer Corr:	DAS w/m2:	PctDifference:
primary	7/18/2013	13:00	831	832	0.1%
primary	7/18/2013	14:00	698	712	2.0%
primary	7/18/2013	15:00	738	757	2.6%
primary	7/18/2013	16:00	580	608	4.8%
primary	7/18/2013	17:00	377	409	8.5%
primary	7/18/2013	18:00	62	61	-1.6%

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
Climatronics	illegible	GLR468	Eric Hebert	07/18/2013	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
3.0%	4.0%		

UseDesc.	Test type:	TferVolume:	Iteration:	TimePerTip:	Eq.Ht:	DAS eng:	Eq.HtUnit:	OSE Unit:	TferUnits:	PctDifference
primary	tip check	10 manual	1	2 sec	1.00	1.00	mm	mm	ml	
primary	test 1	231.5	1	8 sec	5.00	4.90	mm	mm	ml	-2.0%
primary	test 2	231.5	2	8 sec	5.00	4.80	mm	mm	ml	-4.0%

Sensor Component	System Memo	**Condition**	See comments	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	Functioning	**Status**	pass
Sensor Component	Properly Sited	**Condition**	See comments	**Status**	pass
Sensor Component	Gauge Drain Screen	**Condition**	Not installed	**Status**	Fail
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

Infrastructure Data For

Site ID GLR468 **Technician** Eric Hebert **Site Visit Date** 07/18/2013

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8810 (s/n 2149-20)	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**	Not 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**	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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	GLR468	Eric Hebert	07/18/2013	Shelter Temperature	77

DAS 1:

Abs Avg Err	Abs Max Er
1.91	3.37

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232679

Tfer Desc. RTD

Tfer ID 01228

Slope 1.00732

Intercept -0.12380

Cert Date 1/12/2013

CorrCoff 1.00000

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Mid Range	20.94	20.91	0.000	23.0	C	2.11
primary	Temp Mid Range	22.83	22.79	0.000	23.0	C	0.24
primary	Temp Mid Range	19.77	19.75	0.000	23.1	C	3.37

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>GLR468</td><td>Eric Hebert</td><td>07/18/2013</td><td>Filter Position</td><td>Millipore</td><td>3790</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>Precipitation</td><td>GLR468</td><td>Eric Hebert</td><td>07/18/2013</td><td>Properly Sited</td><td>Climatronics</td><td>3789</td><td>☐</td><td>☑</td></tr>
<tr><td colspan="9">Objects violate the 45 degree rule for the tipping bucket rain gage.</td></tr>
<tr><td>Shelter Temperature</td><td>GLR468</td><td>Eric Hebert</td><td>07/18/2013</td><td>Accuracy Mid Ra</td><td>ARS</td><td>2870</td><td>☐</td><td>☑</td></tr>
<tr><td colspan="9">The shelter temperature is going outside CFR requirements for pollutant monitor operation.</td></tr>
<tr><td>Temperature</td><td>GLR468</td><td>Eric Hebert</td><td>07/18/2013</td><td>System Memo</td><td>RM Young</td><td>3786</td><td>☐</td><td>☑</td></tr>
<tr><td colspan="9">The temperature sensor is mounted directly above the shelter roof.</td></tr>
</table>

Field Systems Comments

1 **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.

2 **Parameter:** ShelterCleanNotes

The shelter is in good condition, clean, neat, and well organized. Evidence of repairs to roof leaks attempted.

3 **Parameter:** PollAnalyzerCom

The tygon dry deposition filter flow tubing has been replaced with Teflon since the previous audit visit.

4 **Parameter:** MetSensorComme

The temperature and relative humidity sensors are mounted directly above the metal shelter roof.

5 **Parameter:** MetOpMaintCom

The signal cables are showing signs of wear.

Field Systems Data Form

F-02058-1500-S1-rev001

Site ID GLR468 **Technician** Eric Hebert **Site Visit Date** 07/18/2013

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, clean, neat, and well organized. 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-rev001

Site ID GLR468 **Technician** Eric Hebert **Site Visit Date** 07/18/2013

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-rev001

Site ID GLR468 **Technician** Eric Hebert **Site Visit Date** 07/18/2013

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)	☐	Temperature and RH 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?	☑	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 relative humidity sensors are mounted directly above the metal shelter roof.

Field Systems Data Form

F-02058-1500-S4-rev001

Site ID GLR468

Technician Eric Hebert

Site Visit Date 07/18/2013

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?	☑	

Parameter	Manufacturer	Model	S/N	Client ID
Wind Direction	RM Young	AQ05103-5	none	02844
Wind Speed	RM Young	AQ05103-5	none	02844
Temperature	RM Young	41342	17625	none
Relative Humidity	Rotronic	MP 601A	80496	none
Solar Radiation	Licor	LI-200	illegible	none
Precipitation	Climatronics	100508-2	illegible	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:

The signal cables are showing signs of wear.

Field Systems Data Form

F-02058-1500-S5-rev001

Site ID GLR468 **Technician** Eric Hebert **Site Visit Date** 07/18/2013

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

Parameter	Manufacturer	Model	S/N	Client ID
Sample Tower	Aluma Tower	B	none	none
Ozone	ThermoElectron Inc	49i A3NAA	1023943901	none
Zero air pump	Werther International	PC70/4	000756725	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:

The tygon dry deposition filter flow tubing has been replaced with Teflon since the previous audit visit.

Field Systems Data Form

F-02058-1500-S6-rev001

Site ID GLR468 **Technician** Eric Hebert **Site Visit Date** 07/18/2013

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?

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Environmental Sys Corp	8816	2566	90653
Modem	US Robotics	56k	unknown	none
Printer	Hewlett Packard	842C	unknown	none
Solar Radiation Translator	RM Young	70101-X	none	03729

Provide any additional 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-rev001

Site ID GLR468 **Technician** Eric Hebert **Site Visit Date** 07/18/2013

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	☑	Nov 2012	☐
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-rev001

Site ID GLR468 **Technician** Eric Hebert **Site Visit Date** 07/18/2013

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:

Field Systems Data Form

F-02058-1500-S9-rev001

Site ID GLR468

Technician Eric Hebert

Site Visit Date 07/18/2013

Site operation procedures

1	Is the filter pack being changed every Tuesday as scheduled?	☑	Filter changed morinings 80% - 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?	☑	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?	☑	Clean gloves on and off
9	Are the site conditions reported regularly to the field operations manager or staff?	☐	

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

Provide any additional 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 Inventory by Site Visit

BAS601-Eric Hebert-07/22/2013

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
1	7/22/2013	DAS	Campbell	none	CR1000	unknown
2	7/22/2013	elevation	Elevation	none	none	none
3	7/22/2013	Filter pack flow pump	Thomas	none	107CAB18	061200041881
4	7/22/2013	Flow Rate	Omega	none	FMA6518ST-RS232	318559-1
5	7/22/2013	Infrastructure	Infrastructure	none	none	none
6	7/22/2013	Met tower	unknown	none	unknown	none
7	7/22/2013	Ozone	ThermoElectron Inc	L0534684	49i A1NAA	1214552973
8	7/22/2013	Ozone Standard	ThermoElectron Inc	none	49i E3CAA	1214552971
9	7/22/2013	Precipitation	Met One	none	385	J7547
10	7/22/2013	Relative Humidity	Vaisala	none	HMP45A	Z3210006
11	7/22/2013	Shelter Temperature	unknown	none	unknown	none
12	7/22/2013	siting criteria	Siting Criteria	none	none	None
13	7/22/2013	Solar Radiation	Licor	none	LI-200	PY47987
14	7/22/2013	Temperature	Vaisala	none	HMP45A	Z3210006
15	7/22/2013	Wind Direction	Climatronics	none	102780	622
16	7/22/2013	Wind Speed	Climatronics	none	102780	622
17	7/22/2013	Zero air pump	Thomas	none	107CAB18	100800031636

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Omega	318559-1	BAS601	Eric Hebert	07/22/2013	Flow Rate	none

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	122974	**Tfer Desc.**	BIOS 220-H
Tfer ID	01416		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/8/2013	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
0.93%	1.31%		

Cal Factor Zero	0.22
Cal Factor Full Scale	1
Rotometer Reading:	0

UseDescription:	Test type:	Input l/m:	Input STP:	MfcDisp.:	OutputSignal:	Output S E:	InputUnit:	OutputSignal	PctDifference:
primary	pump off	0.000	0.000	0.00	0.000	0.00	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.22	l/m	l/m	
primary	test pt 1	0.000	3.231	0.00	0.000	3.22	l/m	l/m	-0.34%
primary	test pt 2	0.000	3.255	0.00	0.000	3.22	l/m	l/m	-1.13%
primary	test pt 3	0.000	3.263	0.00	0.000	3.22	l/m	l/m	-1.31%

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**		**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	07/22/2013	Ozone	L0534684

Slope:	0.97762	**Slope:**	0.00000
Intercept	0.89641	**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**
0.9%	1.3%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	517112175	**Tfer Desc.**	Ozone primary stan
Tfer ID	01111		
Slope	0.99720	**Intercept**	0.18428
Cert Date	1/2/2013	**CorrCoff**	1.00000

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	-0.55	-0.73	0.61	ppb	
primary	2	27.30	27.19	27.11	ppb	-0.29%
primary	3	53.45	53.41	52.93	ppb	-0.90%
primary	4	80.45	80.49	79.41	ppb	-1.34%
primary	5	114.80	114.93	113.55	ppb	-1.20%

Sensor Component	Cell B Noise	**Condition**	1.4 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**		**Status**	pass
Sensor Component	Offset	**Condition**	-0.4	**Status**	pass
Sensor Component	Span	**Condition**	0.995	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	86.3 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**	0.67 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	34.4 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	643 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	1.3 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	83.2 kHz	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.64 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 Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	Z3210006	BAS601	Eric Hebert	07/22/2013	Temperature	none

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00732	**Intercept**	-0.12380
Cert Date	1/12/2013	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
2.09	6.41		

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary		6.90	6.97	0.000	13.4	C	6.41
primary		28.99	28.90	0.000	30.0	C	1.08
primary		30.34	30.24	0.000	30.2	C	-0.05
primary		30.83	30.73	0.000	29.9	C	-0.88
primary		46.14	45.93	0.000	43.9	C	-2.03

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

Humidity Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	Z3210006	BAS601	Eric Hebert	07/22/2013	Relative Humidity	none

Mfg	Rotronic	**Parameter**	Relative Humidity
Serial Number	124432	**Tfer Desc.**	Hygroclip
Tfer ID	01225		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/29/2013	**CorrCoff**	1.00000

	DAS 1:		DAS 2:	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	1.1	4.1		
Abs Max Er	1.2	4.1		

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	34.1	1.2
primary	RH Low Range	Hygroclip	52.9	0.0	52.9	0.000	53.9	1.0
primary	RH High Range	Hygroclip	93.6	0.0	93.6	0.000	89.5	-4.1

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**	Clean	**Status**	pass

Solar Radiation Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Licor	PY47987	BAS601	Eric Hebert	07/22/2013	Solar Radiation	none

Mfg	Eppley	**Parameter**	solar radiation
Serial Number	10765	**Tfer Desc.**	SR transfer translat
Tfer ID	01246		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/6/2010	**CorrCoff**	1.00000
Mfg	Eppley	**Parameter**	solar radiation
Serial Number	34341F3	**Tfer Desc.**	SR transfer sensor
Tfer ID	01245		
Slope	1.00000	**Intercept**	0.00000
Cert Date	12/16/2010	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
% Diff of Avg	**%Diff of Max**	**%Diff of Avg**	**%Diff of Max**
1.0%	0.1%	0.0%	0.0%

UseDescription:	Measure Date	MeasureTime	Tfer Corr:	DAS w/m2:	PctDifference:
primary	7/24/2013	10:00	764	767	0.4%
primary	7/24/2013	11:00	799	800	0.1%
primary	7/24/2013	12:00	755	762	0.9%
primary	7/24/2013	13:00	697	714	2.5%

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
Met One	J7547	BAS601	Eric Hebert	07/22/2013	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
0.0%	0.0%		

UseDesc.	Test type:	TferVolume:	Iteration:	TimePerTip:	Eq.Ht:	DAS eng:	Eq.HtUnit:	OSE Unit:	TferUnits:	PctDifference
primary	test 1	500	1	10 sec	0.27	0.27	in	in	ml	0.0%

Sensor Component		Condition		Status	
Sensor Component	System Memo	Condition		Status	pass
Sensor Component	Sensor Heater	Condition	Not tested	Status	pass
Sensor Component	Properly Sited	Condition	45 degree rule	Status	pass
Sensor Component	Gauge Drain Screen	Condition	Installed	Status	pass
Sensor Component	Level	Condition	Level	Status	pass
Sensor Component	Gauge Clean	Condition	Dirty	Status	Fail
Sensor Component	Funnel Clean	Condition	Dirty	Status	Fail
Sensor Component	Condition	Condition	Fair	Status	pass
Sensor Component	Gauge Screen	Condition	Installed	Status	pass

Infrastructure Data For

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 07/22/2013

Sensor Component	Shelter Roof	**Condition**	N/A	**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**	N/A	**Status**	pass
Sensor Component	Shelter Floor	**Condition**	N/A	**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**	N/A	**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass

Shelter Temperature Data For

Mfg	**Serial Number Tag**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
unknown	none	BAS601	Eric Hebert	07/22/2013	Shelter Temperature	none

DAS 1:

Abs Avg Err	**Abs Max Er**
1.57	2.23

DAS 2:

Abs Avg Err	**Abs Max Er**

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232679

Tfer Desc. RTD

Tfer ID 01228

Slope 1.00732

Intercept -0.12380

Cert Date 1/12/2013

CorrCoff 1.00000

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Mid Range	23.76	23.71	0.000	25.6	C	1.86
primary	Temp Mid Range	23.24	23.19	0.000	25.4	C	2.23
primary	Temp Mid Range	28.89	28.80	0.000	28.2	C	-0.63

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The proper completion of the filter chain-of-custody form was discussed with the site operator. The proper observation of the site vegetation and completion of the SSRF was discussed with the site operator. There are no clean spare filter caps or Ziploc filter bags on site. The bag and caps for the received filter are being used to send the removed filter back to the lab.

2 **Parameter:** ShelterCleanNotes

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

3 **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.

4 **Parameter:** MetOpMaintCom

The site utilizes a Climatronics AIO all-in-one weather sensor for wind direction, wind speed, and temperature. The sensor was not audited. A separate sensor for humidity and temperature was audited.

Field Systems Data Form

F-02058-1500-S1-rev001

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 07/22/2013

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**		10.7
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

Field Systems Data Form

F-02058-1500-S2-rev001

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 07/22/2013

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

Field Systems Data Form

F-02058-1500-S3-rev001

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 07/22/2013

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.

Field Systems Data Form

F-02058-1500-S4-rev001

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 07/22/2013

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
Met tower	unknown	unknown	none	none
Solar Radiation	Licor	LI-200	PY47987	none
Temperature	Vaisala	HMP45A	Z3210006	none
Relative Humidity	Vaisala	HMP45A	Z3210006	none
Precipitation	Met One	385	J7547	none
Wind Direction	Climatronics	102780	622	none
Wind Speed	Climatronics	102780	622	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:

The site utilizes a Climatronics AIO all-in-one weather sensor for wind direction, wind speed, and temperature. The sensor was not audited. A separate sensor for humidity and temperature was audited.

Field Systems Data Form

F-02058-1500-S5-rev001

Site ID BAS601

Technician Eric Hebert

Site Visit Date 07/22/2013

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)	☑	
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☐	Not present
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

Parameter	Manufacturer	Model	S/N	Client ID
Ozone	ThermoElectron Inc	49i A1NAA	1214552973	L0534684
Filter pack flow pump	Thomas	107CAB18	061200041881	none
Zero air pump	Thomas	107CAB18	100800031636	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-S6-rev001

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 07/22/2013

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?

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR1000	unknown1	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-S7-rev001

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 07/22/2013

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	☐	Not present	☐
HASP	☐	Not present	☐
Field Ops Manual	☐	Not present	☐
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?	☐	Chain-of-custody not used
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-rev001

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 07/22/2013

Site operation procedures

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

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

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

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

QC Check Performed		Frequency	Compliant
Multi-point Calibrations	☑	Semiannually	☑
Automatic Zero/Span Tests	☑	Daily	☑
Manual Zero/Span Tests	☐		☐
Automatic Precision Level Tests	☐		☐
Manual Precision Level Test	☐		☐
Analyzer Diagnostics Tests	☐		☐
In-line Filter Replacement (at inlet)	☑	Monthly	☑
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?	☐	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:

Field Systems Data Form

F-02058-1500-S9-rev001

Site ID BAS601 **Technician** Eric Hebert **Site Visit Date** 07/22/2013

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?	☐	Not present
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. The proper observation of the site vegetation and completion of the SSRF was discussed with the site operator. There are no clean spare filter caps or Ziploc filter bags on site. The bag and caps for the received filter are being used to send the removed filter back to the lab.

Site Inventory by Site Visit

SHE604-Eric Hebert-07/23/2013

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
1	7/23/2013	DAS	Campbell	49923	CR1000	Unknown2
2	7/23/2013	elevation	Elevation	none	none	none
3	7/23/2013	Flow Rate	Omega	none	FMA6518ST-RS232	32433-2
4	7/23/2013	Infrastructure	Infrastructure	none	none	none
5	7/23/2013	Precipitation	Met One	N8139	8"	370C
6	7/23/2013	Relative Humidity	Vaisala	none	HMP45AC	C2410080
7	7/23/2013	Sample Tower	Unknown	none	Unknown	None
8	7/23/2013	siting criteria	Siting Criteria	none	none	None
9	7/23/2013	Solar Radiation	Licor	none	LI-200	illegible
10	7/23/2013	Temperature	Vaisala	none	HMP45AC	C2410080
11	7/23/2013	Wind Direction	Met One	illegible	Illegible	k5192
12	7/23/2013	Wind Speed	Met One	J2228	014	12208

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Omega	32433-2	SHE604	Eric Hebert	07/23/2013	Flow Rate	none

Mfg BIOS

Parameter Flow Rate

Serial Number 122974

Tfer Desc. BIOS 220-H

Tfer ID 01416

Slope 1.00000

Intercept 0.00000

Cert Date 1/8/2013

CorrCoff 1.00000

DAS 1:

DAS 2:

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
3.50%	3.56%		

Cal Factor Zero 0.15

Cal Factor Full Scale 1.01

Rotometer Reading: 0

UseDescription:	Test type:	Input l/m:	Input STP:	MfcDisp.:	OutputSignal:	Output S E:	InputUnit:	OutputSignalI	PctDifference:
primary	pump off	0.000	0.000	0.00	0.000	0.15	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.15	l/m	l/m	
primary	test pt 1	0.000	3.070	0.00	0.000	3.18	l/m	l/m	3.45%
primary	test pt 2	0.000	3.069	0.00	0.000	3.18	l/m	l/m	3.44%
primary	test pt 3	0.000	3.073	0.00	0.000	3.18	l/m	l/m	3.56%
primary	test pt 4	0.000	3.072	0.00	0.000	3.18	l/m	l/m	3.56%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	Not tested	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.0 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**	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**	2.0 cm	**Status**	pass

Wind Speed Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	12208	SHE604	Eric Hebert	07/23/2013	Wind Speed	J2228

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	1/13/2010	**CorrCoff**	1.00000
Mfg	RM Young	**Parameter**	wind speed
Serial Number		**Tfer Desc.**	wind speed motor (l
Tfer ID	01261		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/13/2010	**CorrCoff**	1.00000

Prop or Cups SN Illegable

Prop or Cups Torque 0.8 **to** 0.8

Prop Correction Fact N/A

	DAS 1:		DAS 2:	
	Low Range	High Range	Low Range	High Range
Abs Avg Err	0.13	0.43%		
Abs Max Er	0.50	0.87%		

UseDescription:	InputDevice:	Input RPM:	Input m/s:	Output V:	DAS m/s:	Diff/ %Diff:	Difference:
primary	00000	0	0.50	0.000	0.0		-0.50
primary	01261	30	1.25	0.000	1.3		0.00
primary	01261	60	2.05	0.000	2.1		0.00
primary	01261	120	3.65	0.000	3.7		0.00
primary	01262	200	5.78	0.000	5.7	-0.87%	
primary	01262	400	11.11	0.000	11.2	0.54%	
primary	01262	800	21.78	0.000	21.7	-0.28%	
primary	01262	1800	48.44	0.000	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**	Poor	**Status**	Fail

Wind Direction Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	k5192	SHE604	Eric Hebert	07/23/2013	Wind Direction	illegible

Mfg	Ushikata	**Parameter**	wind direction
Serial Number	190037	**Tfer Desc.**	transit
Tfer ID	01265		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/4/2011	**CorrCoff**	1.00000
Mfg	RM Young	**Parameter**	wind direction
Serial Number		**Tfer Desc.**	wind direction wheel
Tfer ID	01266		

Vane SN: N/A

C. A. Align. deg. true: 14.5

VaneTorque 20 **to** 30

	DAS 1: Orientation	DAS 1: Linearity:	DAS 2: Orientation	DAS 2: Linearity:
Abs Avg Err	2.3			
Abs Max Er	3			

UseDescription:	TferID:	Input Raw:	Linearity	Output V:	Output Deg.:	Difference:	Change:	Error:
primary	01265	4	☐	0.000	1	3		3
primary	01265	94	☐	0.000	92	2		2
primary	01265	184	☐	0.000	183	1		1
primary	01265	274	☐	0.000	271	3		3

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

Temperature Data Form

Mfg	**Serial Number Tag**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
Vaisala	C2410080	SHE604	Eric Hebert	07/23/2013	Temperature	none

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00732	**Intercept**	-0.12380
Cert Date	1/12/2013	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
2.10	4.65		

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Mid Range	28.39	28.31	0.000	29.8	C	1.44
primary	Temp Mid Range	31.20	31.10	0.000	32.4	C	1.33
primary	Temp Low Range	4.82	4.91	0.000	9.6	C	4.65
primary	Temp High Range	42.40	42.21	0.000	41.2	C	-0.98
primary	Temp Mid Range	34.18	34.05	0.000	36.2	C	2.1

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 Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	C2410080	SHE604	Eric Hebert	07/23/2013	Relative Humidity	none

Mfg Rotronic

Parameter Relative Humidity

Serial Number 124432

Tfer Desc. Hygroclip

Tfer ID 01225

Slope 1.00000

Intercept 0.00000

Cert Date 1/29/2013

CorrCoff 1.00000

	DAS 1:		DAS 2:	
	Low Range	High Range	Low Range	High Range
Abs Avg Err	1.6	6.0		
Abs Max Er	3.1	6.0		

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	32.7	-0.1
primary	RH Low Range	Hygroclip	52.9	0.0	52.9	0.000	49.8	-3.1
primary	RH High Range	Hygroclip	93.6	0.0	93.6	0.000	87.6	-6.0

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**	Clean	**Status**	pass

Solar Radiation Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Licor	illegible	SHE604	Eric Hebert	07/23/2013	Solar Radiation	none

Mfg Eppley **Parameter** solar radiation

Serial Number 10765 **Tfer Desc.** SR transfer translat

Tfer ID 01246

Slope 1.00000 **Intercept** 0.00000

Cert Date 1/6/2010 **CorrCoff** 1.00000

Mfg Eppley **Parameter** solar radiation

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

Tfer ID 01245

Slope 1.00000 **Intercept** 0.00000

Cert Date 12/16/2010 **CorrCoff** 1.00000

DAS 1:		DAS 2:	
% Diff of Avg	%Diff of Max	%Diff of Avg	%Diff of Max
3.1%	2.9%	0.0%	0.0%

UseDescription:	Measure Date	MeasureTime	Tfer Corr:	DAS w/m2:	PctDifference:
primary	7/23/2013	10:00	801	783	-2.2%
primary	7/23/2013	11:00	888	862	-2.9%
primary	7/23/2013	12:00	808	774	-4.2%

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	370C	SHE604	Eric Hebert	07/23/2013	Precipitation	N8139

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
7.1%	7.1%

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	tip check	10 manual	1	2 sec	0.10	0.10	in	in	ml	
primary	test 1	231.5	1	8 sec	0.28	0.30	in	in	ml	7.1%
primary	test 2	231.5	2	10 sec	0.28	0.30	in	in	ml	7.1%

Sensor Component	System Memo	**Condition**		**Status**	pass
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	Properly Sited	**Condition**	See comments	**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

Infrastructure Data For

Site ID SHE604 **Technician** Eric Hebert **Site Visit Date** 07/23/2013

Sensor Component	Shelter Roof	**Condition**	N/A	**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**	Fair	**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**	N/A	**Status**	pass
Sensor Component	Shelter Floor	**Condition**	N/A	**Status**	pass
Sensor Component	Shelter Temp Control	**Condition**	N/A	**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**	N/A	**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	SHE604	Eric Hebert	07/23/2013	System Memo	Omega	3819	☐	☐

An excessive amount of fluctuation in the signal recorded by the DAS for this variable was observed during the audit.

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Precipitation	SHE604	Eric Hebert	07/23/2013	Properly Sited	Met One	3816	☐	☑

Objects violate the 45 degree rule for the tipping bucket rain gage.

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Temperature	SHE604	Eric Hebert	07/23/2013	System Memo	Vaisala	3815	☐	☐

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. Although gloves are used to handle the filter, the site operator put the gloves on while in his truck and touched many things prior to handling the filter. The gloves were not changed prior to installing the new filter.

2 **Parameter:** DasComments

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

3 **Parameter:** SitingCriteriaCom

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

4 **Parameter:** ShelterCleanNotes

NEMA enclosure, solar power

5 **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.

Field Systems Data Form

F-02058-1500-S1-rev001

Site ID SHE604 **Technician** Eric Hebert **Site Visit Date** 07/23/2013

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**		10.2
City, State	Sheridan, WY		**Present**	
Zip Code	82801	**Fire Extinguisher**	☐	
Time Zone	Mountain	**First Aid Kit**	☐	
Primary Operator		**Safety Glasses**	☐	
Primary Op. Phone #		**Safety Hard Hat**	☐	
Primary Op. E-mail		**Climbing Belt**	☐	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

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

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

Site OK ☐ **Notes**

Driving Directions

Field Systems Data Form

F-02058-1500-S2-rev001

Site ID SHE604 **Technician** Eric Hebert **Site Visit Date** 07/23/2013

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-rev001

Site ID SHE604 **Technician** Eric Hebert **Site Visit Date** 07/23/2013

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-rev001

Site ID SHE604 **Technician** Eric Hebert **Site Visit Date** 07/23/2013

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
Wind Direction	Met One	Illegible	k5192	illegible
Solar Radiation	Licor	LI-200	illegible	none
Relative Humidity	Vaisala	HMP45AC	C2410080	none
Temperature	Vaisala	HMP45AC	C2410080	none
Precipitation	Met One	8"	370C	N8139
Wind Speed	Met One	014	12208	J2228

Provide any additional 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-rev001

Site ID SHE604 **Technician** Eric Hebert **Site Visit Date** 07/23/2013

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

Parameter	Manufacturer	Model	S/N	Client ID
Sample Tower	Unknown	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-S6-rev001

Site ID SHE604 **Technician** Eric Hebert **Site Visit Date** 07/23/2013

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?

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR1000	Unknown2	49923

Provide any additional 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 with battery storage. The NEMA enclosure has a cooling fan.

Field Systems Data Form

F-02058-1500-S7-rev001

Site ID SHE604 **Technician** Eric Hebert **Site Visit Date** 07/23/2013

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	☐	Not present	☐
HASP	☐	Not present	☐
Field Ops Manual	☐	Not present	☐
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:

Field Systems Data Form F-02058-1500-S8-rev001

Site ID SHE604 **Technician** Eric Hebert **Site Visit Date** 07/23/2013

Site operation procedures

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

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

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

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

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

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

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

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

QC Check Performed		Frequency	Compliant
Multi-point Calibrations	☐	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-rev001

Site ID SHE604 **Technician** Eric Hebert **Site Visit Date** 07/23/2013

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?	☑	
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	☐	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. Although gloves are used to handle the filter, the site operator put the gloves on while in his truck and touched many things prior to handling the filter. The gloves were not changed prior to installing the new filter.

Site Inventory by Site Visit

Site Visit Date		*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
BUF603-Eric Hebert-07/25/2013						
1	7/25/2013	DAS	Campbell	49917	CR1000	43073
2	7/25/2013	elevation	Elevation	none	none	none
3	7/25/2013	Filter pack flow pump	Thomas	none	107CA18	0191007231
4	7/25/2013	Flow Rate	Omega	none	FMA6518ST-RS232	315688-1
5	7/25/2013	Infrastructure	Infrastructure	none	none	none
6	7/25/2013	MFC power supply	Sceptre	none	FMA65PWC	295106-12
7	7/25/2013	Precipitation	Met One	none	370C	N8140
8	7/25/2013	Relative Humidity	Vaisala	none	HMP45AC	E3720077
9	7/25/2013	Sample Tower	Unknown	none	Unknown	None
10	7/25/2013	siting criteria	Siting Criteria	none	none	None
11	7/25/2013	Solar Radiation	Licor	none	LI-200	PY14330
12	7/25/2013	Temperature	Vaisala	none	HMP45AC	E3720077
13	7/25/2013	Wind Direction	Met One	none	024	1505
14	7/25/2013	Wind Speed	Met One	none	014	M23214

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Omega	315688-1	BUF603	Eric Hebert	07/25/2013	Flow Rate	none

Mfg Sceptre

SN/Owner ID 295106-12 none

Parameter MFC power supply

Mfg BIOS

Parameter Flow Rate

Serial Number 122974

Tfer Desc. BIOS 220-H

Tfer ID 01416

Slope 1.00000

Intercept 0.00000

Cert Date 1/8/2013

CorrCoff 1.00000

DAS 1: A Avg % Diff:	DAS 1: A Max % Di	DAS 2: A Avg %Dif	DAS 2: A Max % Di
1.43%	1.64%		

Cal Factor Zero 0.191

Cal Factor Full Scale 1

Rotometer Reading: 0

UseDescription:	Test type:	Input l/m:	Input STP:	MfcDisp.:	OutputSignal:	Output S E:	InputUnit:	OutputSignalI	PctDifference:
primary	pump off	0.000	0.000	0.00	0.000	0.19	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.19	l/m	l/m	
primary	test pt 1	0.000	3.242	0.00	0.000	3.19	l/m	l/m	-1.64%
primary	test pt 2	0.000	3.253	0.00	0.000	3.20	l/m	l/m	-1.64%
primary	test pt 3	0.000	3.223	0.00	0.000	3.19	l/m	l/m	-1.01%

Sensor Component		Condition		Status	
Sensor Component	Leak Test	Condition		Status	pass
Sensor Component	Filter Azimuth	Condition	180 deg	Status	pass
Sensor Component	Filter Depth	Condition	7.5 cm	Status	pass
Sensor Component	Filter Position	Condition	Fair	Status	pass
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	4.5 cm	Status	pass

Wind Speed Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	M23214	BUF603	Eric Hebert	07/25/2013	Wind Speed	none

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 1/13/2010 **CorrCoff** 1.00000

Mfg RM Young **Parameter** wind speed
Serial Number **Tfer Desc.** wind speed motor (l
Tfer ID 01261
Slope 1.00000 **Intercept** 0.00000
Cert Date 1/13/2010 **CorrCoff** 1.00000

Prop or Cups SN N/A
Prop or Cups Torque 0.9 **to** 0.9
Prop Correction Fact N/A

	DAS 1:		DAS 2:	
	Low Range	High Range	Low Range	High Range
Abs Avg Err	0.11	0.52%		
Abs Max Er	0.45	1.21%		

UseDescription:	InputDevice:	Input RPM:	Input m/s:	Output V:	DAS m/s:	Diff/ %Diff:	Difference:
primary	00000	0	0.45	0.000	0.0		-0.45
primary	01261	30	1.25	0.000	1.3		0.00
primary	01261	60	2.05	0.000	2.1		0.00
primary	01261	120	3.65	0.000	3.7		0.00
primary	01262	200	5.78	0.000	5.9	1.21%	
primary	01262	400	11.11	0.000	11.1	-0.54%	
primary	01262	800	21.78	0.000	21.9	0.32%	
primary	01262	1800	48.44	0.000	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** Fair **Status** pass

Wind Direction Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Met One	1505	BUF603	Eric Hebert	07/25/2013	Wind Direction	none

Mfg Ushikata **Parameter** wind direction

Serial Number 190037 **Tfer Desc.** transit

Tfer ID 01265

Slope 1.00000 **Intercept** 0.00000

Cert Date 1/4/2011 **CorrCoff** 1.00000

Mfg RM Young **Parameter** wind direction

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

Tfer ID 01266

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

VaneTorque 20 **to** 20

	DAS 1: Orientation	DAS 1: Linearity:	DAS 2: Orientation	DAS 2: Linearity:
Abs Avg Err	2.3			
Abs Max Er	4			

UseDescription:	TferID:	Input Raw:	Linearity	Output V:	Output Deg.:	Difference:	Change:	Error:
primary	01265	88	☐	0.000	90	2		2
primary	01265	178	☐	0.000	180	2		2
primary	01265	268	☐	0.000	269	1		1
primary	01265	358	☐	0.000	2	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**	Fair	**Status**	pass
Sensor Component	Vane Condition	**Condition**	Good	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Temperature Data Form

Mfg	**Serial Number Tag**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
Vaisala	E3720077	BUF603	Eric Hebert	07/25/2013	Temperature	none

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00732	**Intercept**	-0.12380
Cert Date	1/12/2013	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.50	0.93		

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Mid Range	27.59	27.51	0.000	27.9	C	0.37
primary	Temp Mid Range	26.23	26.16	0.000	26.6	C	0.42
primary	Temp Low Range	2.44	2.55	0.000	3.5	C	0.93
primary	Temp High Range	38.02	37.87	0.000	38.1	C	0.2
primary	Temp High Range	43.38	43.19	0.000	43.8	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**		**Status**	pass

Humidity Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	E3720077	BUF603	Eric Hebert	07/25/2013	Relative Humidity	none

Mfg	Rotronic	**Parameter**	Relative Humidity
Serial Number	124432	**Tfer Desc.**	Hygroclip
Tfer ID	01225		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/29/2013	**CorrCoff**	1.00000

	DAS 1:		DAS 2:	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	2.1	3.4		
Abs Max Er	4.1	3.4		

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	36.9	4.1
primary	RH Low Range	Hygroclip	52.9	0.0	52.9	0.000	52.9	0.0
primary	RH High Range	Hygroclip	93.6	0.0	93.6	0.000	90.2	-3.4

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**	Clean	**Status**	pass

Solar Radiation Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Licor	PY14330	BUF603	Eric Hebert	07/25/2013	Solar Radiation	none

Mfg Eppley

Parameter solar radiation

Serial Number 10765

Tfer Desc. SR transfer translat

Tfer ID 01246

Slope 1.00000

Intercept 0.00000

Cert Date 1/6/2010

CorrCoff 1.00000

Mfg Eppley

Parameter solar radiation

Serial Number 34341F3

Tfer Desc. SR transfer sensor

Tfer ID 01245

Slope 1.00000

Intercept 0.00000

Cert Date 12/16/2010

CorrCoff 1.00000

DAS 1:		DAS 2:	
% Diff of Avg	%Diff of Max	%Diff of Avg	%Diff of Max
13.7%	14.4%	0.0%	0.0%

UseDescription:	Measure Date	MeasureTime	Tfer Corr:	DAS w/m2:	PctDifference:
primary	7/25/2013	11:00	872	758	-13.0%
primary	7/25/2013	12:00	950	818	-13.9%
primary	7/25/2013	13:00	953	816	-14.4%
primary	7/25/2013	14:00	497	430	-13.4%

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	N8140	BUF603	Eric Hebert	07/25/2013	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
3.3%	3.3%

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	tip check	10 manual	1	2 sec	0.10	0.10	in	in	ml	
primary	test 1	231.5	1	10 sec	0.30	0.29	in	in	ml	-3.3%
primary	test 2	231.5	2	10 sec	0.30	0.29	in	in	ml	-3.3%

Sensor Component		Condition		Status	
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	Properly Sited	**Condition**	See comments	**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

Infrastructure Data For

Site ID BUF603 **Technician** Eric Hebert **Site Visit Date** 07/25/2013

Sensor Component	Shelter Roof	**Condition**	N/A	**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**	N/A	**Status**	pass
Sensor Component	Shelter Floor	**Condition**	N/A	**Status**	pass
Sensor Component	Shelter Temp Control	**Condition**	N/A	**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**	N/A	**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	BUF603	Eric Hebert	07/25/2013	Filter Position	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.

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Precipitation	BUF603	Eric Hebert	07/25/2013	Properly Sited	Met One	3825	☐	☑

Objects violate the 45 degree rule for the tipping bucket rain gage.

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. Although gloves are used to handle the filter, the site operator put the gloves on while in his truck and touched many things prior to handling the filter. The gloves were not changed prior to installing the new filter.

2 **Parameter:** DasComments

The NEMA enclosure has a cooling fan.

3 **Parameter:** ShelterCleanNotes

NEMA enclosure, solar power

4 **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-rev001

Site ID BUF603 **Technician** Eric Hebert **Site Visit Date** 07/25/2013

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**		9.7
City, State	Buffalo, WY		**Present**	
Zip Code	82834	**Fire Extinguisher**	☐	
Time Zone	Mountain	**First Aid Kit**	☐	
Primary Operator		**Safety Glasses**	☐	
Primary Op. Phone #		**Safety Hard Hat**	☐	
Primary Op. E-mail		**Climbing Belt**	☐	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☐	
Backup Op. E-mail		**Stable Entry Step**	☐	

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

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

Site OK ☐ **Notes**

Driving Directions

Field Systems Data Form

F-02058-1500-S2-rev001

Site ID BUF603 **Technician** Eric Hebert **Site Visit Date** 07/25/2013

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-rev001

Site ID BUF603 **Technician** Eric Hebert **Site Visit Date** 07/25/2013

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-rev001

Site ID BUF603 **Technician** Eric Hebert **Site Visit Date** 07/25/2013

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**
Wind Direction	Met One	024	1505	none
Wind Speed	Met One	014	M23214	none
Solar Radiation	Licor	LI-200	PY14330	none
Relative Humidity	Vaisala	HMP45AC	E3720077	none
Temperature	Vaisala	HMP45AC	E3720077	none
Precipitation	Met One	370C	N8140	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-rev001

Site ID BUF603 **Technician** Eric Hebert **Site Visit Date** 07/25/2013

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

Parameter	Manufacturer	Model	S/N	Client ID
Filter pack flow pump	Thomas	107CA18	0191007231	none
Sample Tower	Unknown	Unknown	None	none
MFC power supply	Sceptre	FMA65PWC	295106-12	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-S6-rev001

Site ID BUF603 **Technician** Eric Hebert **Site Visit Date** 07/25/2013

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?

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR1000	43073	49917

Provide any additional 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-rev001

Site ID BUF603 **Technician** Eric Hebert **Site Visit Date** 07/25/2013

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	☐	Not present	☐
HASP	☐	Not present	☐
Field Ops Manual	☐	Not present	☐
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:

Field Systems Data Form

F-02058-1500-S8-rev001

Site ID BUF603 **Technician** Eric Hebert **Site Visit Date** 07/25/2013

Site operation procedures

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

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

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

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

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

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

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

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

QC Check Performed		Frequency	Compliant
Multi-point Calibrations	☐	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-rev001

Site ID BUF603 **Technician** Eric Hebert **Site Visit Date** 07/25/2013

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?	☑	
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	☐	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. Although gloves are used to handle the filter, the site operator put the gloves on while in his truck and touched many things prior to handling the filter. The gloves were not changed prior to installing the new filter.

Site Inventory by Site Visit

Site Visit Date		*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
NEC602-Eric Hebert-07/29/2013						
1	7/29/2013	DAS	Campbell	none	CR1000	41007
2	7/29/2013	elevation	Elevation	none	none	none
3	7/29/2013	Filter pack flow pump	Thomas	none	107CAB18	061200041880
4	7/29/2013	Flow Rate	Omega	none	FMA6518ST-RS232	324333-1
5	7/29/2013	Infrastructure	Infrastructure	none	none	none
6	7/29/2013	MFC power supply	Sceptre	none	FMA65PWC	295106-8
7	7/29/2013	Ozone	ThermoElectron Inc	none	49i A1NAA	1214552974
8	7/29/2013	Ozone Standard	ThermoElectron Inc	L0534683	49i E3CAA	1214552972
9	7/29/2013	Precipitation	Met One	none	099C-1	J3064
10	7/29/2013	Relative Humidity	Vaisala	none	HMP45A	Z3210005
11	7/29/2013	Sample Tower	Unknown	none	Unknown	None
12	7/29/2013	Shelter Temperature	ARS	none	Thermocouple	none
13	7/29/2013	siting criteria	Siting Criteria	none	none	None
14	7/29/2013	Solar Radiation	Licor	none	LI-200	PY18362
15	7/29/2013	Temperature	Vaisala	none	HMP45A	Z3210005
16	7/29/2013	Zero air pump	ThermoElectron Inc	none	107CAB18	106580-00

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Omega	324333-1	NEC602	Eric Hebert	07/29/2013	Flow Rate	none

Mfg Sceptre

SN/Owner ID 295106-8 none

Parameter MFC power supply

Mfg BIOS **Parameter** Flow Rate

Serial Number 122974 **Tfer Desc.** BIOS 220-H

Tfer ID 01416

Slope 1.00000 **Intercept** 0.00000

Cert Date 1/8/2013 **CorrCoff** 1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
1.86%	1.86%		

Cal Factor Zero 0.2

Cal Factor Full Scale 1.03

Rotometer Reading: 0

UseDescription:	Test type:	Input l/m:	Input STP:	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	0.000	3.230	0.00	0.000	3.29	l/m	l/m	1.86%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	360 deg	**Status**	pass
Sensor Component	Filter Depth	**Condition**	0.0 cm	**Status**	pass
Sensor Component	Filter Position	**Condition**	Fair	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	N/A	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Distance	**Condition**	3.5 cm	**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1214552974	NEC602	Eric Hebert	07/29/2013	Ozone	none

Slope:	0.95697	**Slope:**	0.00000
Intercept	0.97691	**Intercept**	0.00000
CorrCoff	0.99991	**CorrCoff**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	517112175	**Tfer Desc.**	Ozone primary stan
Tfer ID	01111		
Slope	0.99720	**Intercept**	0.18428
Cert Date	1/2/2013	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
2.0%	3.8%		

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	-0.20	-0.38	0.09	ppb	
primary	2	26.10	25.98	25.94	ppb	-0.15%
primary	3	53.25	53.21	52.83	ppb	-0.71%
primary	4	83.05	83.09	80.37	ppb	-3.27%
primary	5	108.85	108.97	104.87	ppb	-3.76%

Sensor Component	Cell B Noise	**Condition**	1.4 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**	1.013	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	78.1 kHz	**Status**	Fail
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**	0.64 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	35.8 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	624 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.9 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	101.2 kHz	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.63 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 Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	Z3210005	NEC602	Eric Hebert	07/29/2013	Temperature	none

Mfg Extech **Parameter** Temperature

Serial Number H232679 **Tfer Desc.** RTD

Tfer ID 01228

Slope 1.00732 **Intercept** -0.12380

Cert Date 1/12/2013 **CorrCoff** 1.00000

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
1.81	5.00		

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Mid Range	28.12	28.04	0.000	27.9	C	-0.13
primary	Temp Low Range	1.52	1.63	0.000	6.6	C	5
primary	Temp High Range	47.65	47.43	0.000	46.2	C	-1.21
primary	Temp High Range	47.00	46.78	0.000	45.9	C	-0.9

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 Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	Z3210005	NEC602	Eric Hebert	07/29/2013	Relative Humidity	none

Mfg	Rotronic	**Parameter**	Relative Humidity
Serial Number	124432	**Tfer Desc.**	Hygroclip
Tfer ID	01225		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/29/2013	**CorrCoff**	1.00000

	DAS 1:		**DAS 2:**	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	0.6	4.9		
Abs Max Er	0.9	4.9		

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	31.9	-0.9
primary	RH Low Range	Hygroclip	52.9	0.0	52.9	0.000	53.1	0.2
primary	RH High Range	Hygroclip	93.6	0.0	93.6	0.000	88.7	-4.9

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**	Clean	**Status**	pass

Solar Radiation Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Licor	PY18362	NEC602	Eric Hebert	07/29/2013	Solar Radiation	none

Mfg Eppley
Parameter solar radiation
Serial Number 10765
Tfer Desc. SR transfer translat
Tfer ID 01246
Slope 1.00000
Intercept 0.00000
Cert Date 1/6/2010
CorrCoff 1.00000

Mfg Eppley
Parameter solar radiation
Serial Number 34341F3
Tfer Desc. SR transfer sensor
Tfer ID 01245
Slope 1.00000
Intercept 0.00000
Cert Date 12/16/2010
CorrCoff 1.00000

DAS 1:		DAS 2:	
% Diff of Avg	%Diff of Max	%Diff of Avg	%Diff of Max
9.5%	10.5%	0.0%	0.0%

UseDescription:	Measure Date	MeasureTime	Tfer Corr:	DAS w/m2:	PctDifference:
primary	7/29/2013	11:00	889	795	-10.5%
primary	7/29/2013	12:00	892	800	-10.4%
primary	7/29/2013	13:00	915	819	-10.5%
primary	7/29/2013	14:00	846	764	-9.6%
primary	7/29/2013	15:00	670	613	-8.5%
primary	7/29/2013	16:00	596	561	-5.8%

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	J3064	NEC602	Eric Hebert	07/29/2013	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
5.0%	6.7%		

UseDesc.	Test type:	TferVolume:	Iteration:	TimePerTip:	Eq.Ht:	DAS eng:	Eq.HtUnit:	OSE Unit:	TferUnits:	PctDifference
primary	test 1	231.5	1	10 sec	0.30	0.28	in	in	ml	-6.7%
primary	test 2	231.5	2	10 sec	0.30	0.29	in	in	ml	-3.3%

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

Infrastructure Data For

Site ID NEC602 **Technician** Eric Hebert **Site Visit Date** 07/29/2013

Sensor Component	Shelter Roof	**Condition**	N/A	**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**	N/A	**Status**	pass
Sensor Component	Shelter Floor	**Condition**	N/A	**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**	N/A	**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	NEC602	Eric Hebert	07/29/2013	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.20	0.30		

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232679

Tfer Desc. RTD

Tfer ID 01228

Slope 1.00732

Intercept -0.12380

Cert Date 1/12/2013

CorrCoff 1.00000

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Mid Range	27.06	26.99	0.000	27.3	C	0.29
primary	Temp Mid Range	26.43	26.36	0.000	26.7	C	0.3
primary	Temp Mid Range	28.53	28.45	0.000	28.4	C	-0.02

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Precipitation	NEC602	Eric Hebert	07/29/2013	Properly Sited	Met One	3832	☐	☑

Objects violate the 45 degree rule for the tipping bucket rain gage.

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

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

2 **Parameter:** DocumentationCo

The purpose and procedure to complete the chain-of-custody and observations section of the SSRF was discussed with the operator during the audit.

3 **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.

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.

6 **Parameter:** MetOpMaintCom

The site utilizes a Climatronics AIO all-in-one weather sensor for wind direction, wind speed, and temperature. The sensor was not audited.
A separate sensor for humidity and temperature was audited.

Field Systems Data Form

F-02058-1500-S1-rev001

Site ID NEC602 **Technician** Eric Hebert **Site Visit Date** 07/29/2013

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**		8.5
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-rev001

Site ID NEC602 **Technician** Eric Hebert **Site Visit Date** 07/29/2013

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-rev001

Site ID NEC602 **Technician** Eric Hebert **Site Visit Date** 07/29/2013

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-rev001

Site ID NEC602 **Technician** Eric Hebert **Site Visit Date** 07/29/2013

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	PY18362	none
Relative Humidity	Vaisala	HMP45A	Z3210005	none
Temperature	Vaisala	HMP45A	Z3210005	none
Precipitation	Met One	099C-1	J3064	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:

The site utilizes a Climatronics AIO all-in-one weather sensor for wind direction, wind speed, and temperature. The sensor was not audited. A separate sensor for humidity and temperature was audited.

Field Systems Data Form F-02058-1500-S5-rev001

Site ID NEC602 **Technician** Eric Hebert **Site Visit Date** 07/29/2013

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)	☑	
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

Parameter	Manufacturer	Model	S/N	Client ID
Sample Tower	Unknown	Unknown	None	none
Ozone	ThermoElectron Inc	49i A1NAA	1214552974	none
Filter pack flow pump	Thomas	107CAB18	061200041880	none
MFC power supply	Sceptre	FMA65PWC	295106-8	none
Zero air pump	ThermoElectron Inc	107CAB18	106580-00	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-S6-rev001

Site ID NEC602 **Technician** Eric Hebert **Site Visit Date** 07/29/2013

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?

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR1000	41007	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-S7-rev001

Site ID NEC602 **Technician** Eric Hebert **Site Visit Date** 07/29/2013

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	☐	Not present	☐
HASP	☐	Not present	☐
Field Ops Manual	☐	Not present	☐
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 purpose and procedure to complete the chain-of-custody and observations section of the SSRF was discussed with the operator during the audit.

Field Systems Data Form

F-02058-1500-S8-rev001

Site ID NEC602 **Technician** Eric Hebert **Site Visit Date** 07/29/2013

Site operation procedures

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

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

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

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

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

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

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

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

QC Check Performed		Frequency	Compliant
Multi-point Calibrations	☑	Semiannually	☑
Automatic Zero/Span Tests	☑	Daily	☑
Manual Zero/Span Tests	☐		☑
Automatic Precision Level Tests	☑	Daily	☑
Manual Precision Level Test	☐		☑
Analyzer Diagnostics Tests	☐		☐
In-line Filter Replacement (at inlet)	☑	Monthly	☑
In-line Filter Replacement (at analyze	☐	N/A	☑
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? ☐ 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:

Field Systems Data Form

F-02058-1500-S9-rev001

Site ID NEC602 **Technician** Eric Hebert **Site Visit Date** 07/29/2013

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.

Site Inventory by Site Visit

BVL130-Eric Hebert-07/31/2013

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
1	7/31/2013	Computer	Dell	000297	D520	8SFNHB1
2	7/31/2013	DAS	Campbell	000424	CR3000	2539
3	7/31/2013	Elevation	Elevation	None	1	None
4	7/31/2013	Filter pack flow pump	Thomas	06019	107CAB18	050400022576
5	7/31/2013	Flow Rate	Apex	000651	AXMC105LPMDPCV	illegible
6	7/31/2013	Infrastructure	Infrastructure	none	none	none
7	7/31/2013	Met tower	Climatronics	02738	14 inch taper	none
8	7/31/2013	Modem	Raven	06610	H4223-C	0844355827
9	7/31/2013	Ozone	ThermoElectron Inc	000625	49i A1NAA	1009241797
10	7/31/2013	Precipitation	Climatronics	810899	100508-2	illegible
11	7/31/2013	Relative Humidity	Vaisala	06008	HMP50UA	A2410001
12	7/31/2013	Sample Tower	Aluma Tower	000182	B	unknown
13	7/31/2013	Shelter Temperature	Campbell	none	107-L	unknown
14	7/31/2013	Shield (10 meter)	Climatronics	02042	100325	1494
15	7/31/2013	Shield (2 meter)	Climatronics	05015	100325	missing
16	7/31/2013	Siting Criteria	Siting Criteria	None	1	None
17	7/31/2013	Solar Radiation	Licor	04566	LI-200	PY10653
18	7/31/2013	Solar Radiation Translator	RM Young	04340	70101-X	none
19	7/31/2013	Temperature	Climatronics	06690	100093	none
20	7/31/2013	Temperature2meter	Climatronics	06689	100093	none
21	7/31/2013	Wind Direction	Climatronics	03709	100076	3217
22	7/31/2013	Wind Speed	Climatronics	01029	100075	illegible
23	7/31/2013	Zero air pump	Teledyne	000759	701H	576

DAS Data Form

DAS Time Max Error: 0.02

Mfg	**Serial Number**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Use Desc.**
Campbell	2539	BVL130	Eric Hebert	07/31/2013	DAS	Primary

Das Date: 7 /31/2013
Das Time: 15:05:01
Das Day: 212

Audit Date 7 /31/2013
Audit Time 15:05:00
Audit Day 212

Low Channel:

Avg Diff:	**Max Diff:**
0.0001	0.0003

High Channel:

Avg Diff:	**Max Diff:**
0.0001	0.0003

Mfg Datel
Parameter DAS
Serial Number 4000392
Tfer Desc. Source generator (D
Tfer ID 01321
Slope 1.00000
Intercept 0.00000
Cert Date 2/13/2012
CorrCoff 1.00000

Mfg Fluke
Parameter DAS
Serial Number 86590148
Tfer Desc. DVM
Tfer ID 01310
Slope 1.00000
Intercept 0.00000
Cert Date 1/27/2013
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	0.9001	0.8998	V	V	-0.0003
7	1.0000	1.0001	0.9998	V	V	-0.0003

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	BVL130	Eric Hebert	07/31/2013	Flow Rate	000651

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	122974	**Tfer Desc.**	BIOS 220-H
Tfer ID	01416		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/8/2013	**CorrCoff**	1.00000

DAS 1: **DAS 2:**

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
2.78%	2.82%		

Cal Factor Zero	0.01
Cal Factor Full Scale	1.02
Rotometer Reading:	1.45

UseDescription:	Test type:	Input l/m:	Input STP:	MfcDisp.:	OutputSignal:	Output S E:	InputUnit:	OutputSignalI	PctDifference:
primary	pump off	0.000	0.000	0.00	0.028	0.04	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.038	0.05	l/m	l/m	
primary	test pt 1	0.000	1.553	1.48	1.490	1.51	l/m	l/m	-2.74%
primary	test pt 2	0.000	1.553	1.48	1.490	1.51	l/m	l/m	-2.78%
primary	test pt 3	0.000	1.554	1.48	1.490	1.51	l/m	l/m	-2.82%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	200 deg	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.5 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**	2.5 cm	**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241797	BVL130	Eric Hebert	07/31/2013	Ozone	000625

Slope:	0.95159	**Slope:**	0.00000
Intercept	0.75261	**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
3.4%	4.2%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	517112175	**Tfer Desc.**	Ozone primary stan
Tfer ID	01111		
Slope	0.99720	**Intercept**	0.18428
Cert Date	1/2/2013	**CorrCoff**	1.00000

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	-0.22	-0.40	0.39	ppb	
primary	2	28.39	28.28	27.70	ppb	-2.05%
primary	3	52.48	52.44	50.71	ppb	-3.30%
primary	4	75.47	75.49	72.34	ppb	-4.17%
primary	5	107.30	107.41	103.10	ppb	-4.01%

Sensor Component	Cell B Noise	**Condition**	Not tested	**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**	-0.40	**Status**	pass
Sensor Component	Span	**Condition**	1.012	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	74.7 kHz	**Status**	Fail
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**	0.73 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	33.7 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	713 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	Not tested	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	77.4 kHz	**Status**	Fail
Sensor Component	Cell A Flow	**Condition**	0.74 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
Climatronics	illegible	BVL130	Eric Hebert	07/31/2013	Wind Speed	01029

Mfg RM Young **Parameter** wind speed

Serial Number **Tfer Desc.** wind speed motor (l

Tfer ID 01261

Slope 1.00000 **Intercept** 0.00000

Cert Date 1/13/2010 **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 1/13/2010 **CorrCoff** 1.00000

Prop or Cups SN 1434

Prop or Cups Torque 0.3 **to** 0.4

Prop Correction Fact N/A

	DAS 1:		DAS 2:	
	Low Range	High Range	Low Range	High Range
Abs Avg Err	0.02	0.00%		
Abs Max Er	0.05	0.00%		

UseDescription:	InputDevice:	Input RPM:	Input m/s:	Output V:	DAS m/s:	Diff/ %Diff:	Difference:
primary	none	0	0.20	0.000	0.2		0.02
primary	01261	50	1.40	0.000	1.4		0.00
primary	01261	100	2.57	0.000	2.6		0.05
primary	01261	170	4.22	0.000	4.2		0.00
primary	01261	250	6.10	0.000	6.1	0.00%	
primary	01262	500	11.97	0.000	12.0	0.00%	
primary	01262	800	19.02	0.000	19.0	0.00%	
primary	01262	2000	47.22	0.000	47.2	0.00%	

Sensor Component	Condition	**Condition**	Fair	**Status**	pass
Sensor Component	Sensor Plumb	**Condition**	Plumb	**Status**	pass
Sensor Component	Torque	**Condition**	Good	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	Not functioning	**Status**	Fail
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
Climatronics	3217	BVL130	Eric Hebert	07/31/2013	Wind Direction	03709

Mfg Ushikata **Parameter** wind direction
Serial Number 190037 **Tfer Desc.** transit
Tfer ID 01265
Slope 1.00000 **Intercept** 0.00000
Cert Date 1/4/2011 **CorrCoff** 1.00000

Mfg RM Young **Parameter** wind direction
Serial Number **Tfer Desc.** wind direction wheel
Tfer ID 01266

Vane SN: 558 **C. A. Align. deg. true:** 358
VaneTorque 8 **to** 10

	DAS 1: Orientation	DAS 1: Linearity:	DAS 2: Orientation	DAS 2: Linearity:
Abs Avg Err	2.3	1.8		
Abs Max Er	4	7		

UseDescription:	TferID:	Input Raw:	Linearity	Output V:	Output Deg.:	Difference:	Change:	Error:
primary	01266	0	☑	0.000	1	1	47	2
primary	01266	45	☑	0.000	39	6	38	-7
primary	01266	90	☑	0.000	84	6	45	0
primary	01266	135	☑	0.000	129	6	45	0
primary	01266	180	☑	0.000	176	4	47	2
primary	01266	225	☑	0.000	222	3	46	1
primary	01266	270	☑	0.000	268	2	46	1
primary	01266	315	☑	0.000	314	1	46	1
primary	01265	88	☐	0.000	84	4		4
primary	01265	178	☐	0.000	176	2		2
primary	01265	268	☐	0.000	268	0		0
primary	01265	358	☐	0.000	1	3		3

Sensor Component		Condition		Status	
Sensor Component	Mast	**Condition**	Good	**Status**	pass
Sensor Component	Condition	**Condition**	Poor	**Status**	Fail
Sensor Component	Sensor Heater	**Condition**	Not functioning	**Status**	Fail
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 Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Climatronics	none	BVL130	Eric Hebert	07/31/2013	Temperature	06690

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00732	**Intercept**	-0.12380
Cert Date	1/12/2013	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.14	0.25		

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Low Range	0.17	0.29	0.000	0.54	C	0.25
primary	Temp Mid Range	24.59	24.53	0.000	24.65	C	0.12
primary	Temp High Range	46.06	45.85	0.000	45.79	C	-0.06

Sensor Component	Shield	**Condition**	Moderately 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**		**Status**	pass

2 Meter Temperature Data For

Calc. Difference

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Climatronics	none	BVL130	Eric Hebert	07/31/2013	Temperature2meter	06689

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00732	**Intercept**	-0.12380
Cert Date	1/12/2013	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.31	0.47		

UseDescription:	Test type:	InputTmpRaw	InputTmpCorrected:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Low Rang	0.05	0.17	0.000	0.49	C	0.32
primary	Temp Mid Rang	24.59	24.53	0.000	24.66	C	0.13
primary	Temp High Ran	45.98	45.77	0.000	45.30	C	-0.47

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**	Moderately clean	**Status**	pass

Humidity Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	A2410001	BVL130	Eric Hebert	07/31/2013	Relative Humidity	06008

Mfg	Rotronic	**Parameter**	Relative Humidity
Serial Number	124432	**Tfer Desc.**	Hygroclip
Tfer ID	01225		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/29/2013	**CorrCoff**	1.00000

	DAS 1:		**DAS 2:**	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	1.9	0.8		
Abs Max Er	2.0	0.8		

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	0.308	30.8	-2.0
primary	RH Low Range	Hygroclip	52.9	0.0	52.9	0.512	51.2	-1.7
primary	RH High Range	Hygroclip	93.6	0.0	93.6	0.928	92.8	-0.8

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

Precipitation Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Climatronics	illegible	BVL130	Eric Hebert	07/31/2013	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:

A Avg % Diff:	A Max % Di
4.0%	4.0%

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	10 sec	0.50	0.48	in	in	ml	-4.0%
primary	test 2	231.5	2	10 sec	0.50	0.48	in	in	ml	-4.0%

Sensor Component	System Memo	**Condition**	See comments	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	Functioning	**Status**	pass
Sensor Component	Properly Sited	**Condition**	See comments	**Status**	pass
Sensor Component	Gauge Drain Screen	**Condition**	Not installed	**Status**	Fail
Sensor Component	Level	**Condition**	Level	**Status**	pass
Sensor Component	Gauge Clean	**Condition**	Moderately clean	**Status**	pass
Sensor Component	Funnel Clean	**Condition**	Moderately clean	**Status**	pass
Sensor Component	Condition	**Condition**	Fair	**Status**	pass
Sensor Component	Gauge Screen	**Condition**	Installed	**Status**	pass

Infrastructure Data For

Site ID BVL130 **Technician** Eric Hebert **Site Visit Date** 07/31/2013

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8810 (s/n 2140-1)	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**	Fair	**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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	unknown	BVL130	Eric Hebert	07/31/2013	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.36	0.47

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232679

Tfer Desc. RTD

Tfer ID 01228

Slope 1.00732

Intercept -0.12380

Cert Date 1/12/2013

CorrCoff 1.00000

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Mid Range	23.20	23.15	0.000	23.6	C	0.43
primary	Temp Mid Range	23.90	23.85	0.000	24.3	C	0.47
primary	Temp Mid Range	24.72	24.66	0.000	24.5	C	-0.17

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Precipitation	BVL130	Eric Hebert	07/31/2013	Properly Sited	Climatronics	3422	☐	☑
Objects violate the 45 degree rule for the tipping bucket rain gage.								
Wind Direction	BVL130	Eric Hebert	07/31/2013	Condition	Climatronics	3062	☐	☐
The upper and lower sections of the wind sensor body are loose. This condition will cause premature failure of the sensor and can affect data accuracy.								

Field Systems Comments

1 **Parameter:** DasComments

The tower pin which prevents the tower from tilting is missing from the leg of the tower.

2 **Parameter:** SiteOpsProcedures

Ozone sample line leak-checks are performed every 2 weeks.

3 **Parameter:** SitingCriteriaCom

The site is located in an agricultural and atmospheric research center. There are crops within 50 meters.

4 **Parameter:** ShelterCleanNotes

The shelter is clean and well organized.

5 **Parameter:** MetSensorComme

The tipping bucket rain gage is mounted near the towers and in violation of the 45 degree rule.

6 **Parameter:** MetOpMaintCom

The wind sensor crossarm signal cable is showing signs of wear. The wind sensor heaters are not functioning.

Field Systems Data Form

F-02058-1500-S1-rev001

Site ID BVL130 **Technician** Eric Hebert **Site Visit Date** 07/31/2013

Site Sponsor (agency) EPA

Operating Group ISWS

AQS # 17-019-1001

Meteorological Type Climatronics

Air Pollutant Analyzer Ozone, IMPROVE

Deposition Measurement dry, wet, Hg

Land Use agricultural

Terrain flat

Conforms to MLM Yes

Site Telephone (217) 863-2602

Site Address 1 Bondville Road Research Station

Site Address 2

County Champaign

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

USGS Map Bondville

Map Scale

Map Date

QAPP Latitude 40.0520

QAPP Longitude -88.3725

QAPP Elevation Meters 212

QAPP Declination -2.1

QAPP Declination Date 9/16/2005

Audit Latitude 40.052021

Audit Longitude -88.372481

Audit Elevation 213

Audit Declination -2.9

	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 clean and well organized.

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-rev001

Site ID BVL130 **Technician** Eric Hebert **Site Visit Date** 07/31/2013

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-rev001

Site ID BVL130 **Technician** Eric Hebert **Site Visit Date** 07/31/2013

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?**	☐	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 towers and in violation of the 45 degree rule.

Field Systems Data Form

F-02058-1500-S4-rev001

Site ID BVL130

Technician Eric Hebert

Site Visit Date 07/31/2013

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?	☐	Wind crossarm heater and signal wire
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	☑	

Parameter	Manufacturer	Model	S/N	Client ID
Met tower	Climatronics	14 inch taper	none	02738
Shield (10 meter)	Climatronics	100325	1494	02042
Shield (2 meter)	Climatronics	100325	missing	05015
Temperature	Climatronics	100093	none	06690
Temperature2meter	Climatronics	100093	none	06689
Wind Direction	Climatronics	100076	3217	03709
Precipitation	Climatronics	100508-2	illegible	810899
Solar Radiation	Licor	LI-200	PY10653	04566
Relative Humidity	Vaisala	HMP50UA	A2410001	06008
Wind Speed	Climatronics	100075	illegible	01029

Provide any additional 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 wind sensor crossarm signal cable is showing signs of wear. The wind sensor heaters are not functioning.

Field Systems Data Form

F-02058-1500-S5-rev001

Site ID BVL130 **Technician** Eric Hebert **Site Visit Date** 07/31/2013

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

Parameter	Manufacturer	Model	S/N	Client ID
Ozone	ThermoElectron Inc	49i A1NAA	1009241797	000625
Filter pack flow pump	Thomas	107CAB18	050400022576	06019
Sample Tower	Aluma Tower	B	unknown	000182
Zero air pump	Teledyne	701H	576	000759

Provide any additional 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-rev001

Site ID BVL130 **Technician** Eric Hebert **Site Visit Date** 07/31/2013

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?**

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	D520	8SFNHB1	000297
DAS	Campbell	CR3000	2539	000424
Modem	Raven	H4223-C	0844355827	06610
Solar Radiation Translator	RM Young	70101-X	none	04340

Provide any additional 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 pin which prevents the tower from tilting is missing from the leg of the tower.

Field Systems Data Form

F-02058-1500-S7-rev001

Site ID BVL130 **Technician** Eric Hebert **Site Visit Date** 07/31/2013

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 2011	☑
HASP	☑	Oct 2011	☑
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-rev001

Site ID BVL130 **Technician** Eric Hebert **Site Visit Date** 07/31/2013

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 sample line leak-checks are performed every 2 weeks.

Field Systems Data Form

F-02058-1500-S9-rev001

Site ID BVL130 **Technician** Eric Hebert **Site Visit Date** 07/31/2013

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:

Site Inventory by Site Visit

VIN140-Sandy Grenville-08/23/2013

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
1	8/23/2013	Computer	Dell	000246	D520	unknown
2	8/23/2013	DAS	Campbell	000358	CR3000	2136
3	8/23/2013	Elevation	Elevation	None	1	None
4	8/23/2013	Filter pack flow pump	Thomas	04920	107CAB18	060300019956
5	8/23/2013	Flow Rate	Apex	000657	AXMC105LPMDPCV	54772
6	8/23/2013	Infrastructure	Infrastructure	none	none	none
7	8/23/2013	Modem	Raven	06461	V4221-V	0808338875
8	8/23/2013	Ozone	ThermoElectron Inc	000630	49i A1NAA	1009241798
9	8/23/2013	Ozone Standard	ThermoElectron Inc	000435	49i A3NAA	CM08200011
10	8/23/2013	Sample Tower	Aluma Tower	000137	B	none
11	8/23/2013	Shelter Temperature	Campbell	none	107-L	none
12	8/23/2013	Siting Criteria	Siting Criteria	None	1	None
13	8/23/2013	Temperature	Climatronics	06686	100093	none
14	8/23/2013	Zero air pump	Werther International	06906	C 70/4	000821908

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2136	VIN140	Sandy Grenville	08/23/2013	DAS	Primary

Das Date: 8 /23/2013
Das Time: 13:24:04
Das Day: 235

Audit Date 8 /23/2013
Audit Time 13:24:04
Audit Day 235

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

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

Mfg Fluke
Parameter DAS
Serial Number 95740135
Tfer Desc. DVM
Tfer ID 01311
Slope 1.00000
Intercept 0.00000
Cert Date 1/26/2013
CorrCoff 1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
4	0.0000	-0.0002	-0.0002	V	V	0.0000
4	0.1000	0.0997	0.0998	V	V	0.0001
4	0.3000	0.2996	0.2996	V	V	0.0000
4	0.5000	0.4995	0.4996	V	V	0.0001
4	0.7000	0.6994	0.6995	V	V	0.0001
4	0.9000	0.8993	0.8994	V	V	0.0001
4	1.0000	0.9992	0.9993	V	V	0.0001

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	54772	VIN140	Sandy Grenville	08/23/2013	Flow Rate	000657

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	103471	**Tfer Desc.**	nexus
Tfer ID	01420		
Slope	1.00000	**Intercept**	0.00000
Cert Date	6/13/2012	**CorrCoff**	1.00000
Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	103424	**Tfer Desc.**	BIOS cell
Tfer ID	01410		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/27/2012	**CorrCoff**	1.00000

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

Cal Factor Zero -0.04

Cal Factor Full Scale 0.96

Rotometer Reading: 1.5

UseDescription:	Test type:	Input l/m:	Input STP:	MfcDisp.:	OutputSignal:	Output S E:	InputUnit:	OutputSignal	PctDifference:
primary	pump off	0.000	0.000	0.03	0.026	-0.02	l/m	l/m	
primary	leak check	0.000	0.000	0.05	0.052	0.01	l/m	l/m	
primary	test pt 1	1.538	1.515	1.54	1.537	1.50	l/m	l/m	-0.99%
primary	test pt 2	1.540	1.515	1.54	1.535	1.50	l/m	l/m	-0.99%
primary	test pt 3	1.539	1.515	1.54	1.537	1.50	l/m	l/m	-0.99%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	105 deg	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.8 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	1009241798	VIN140	Sandy Grenville	08/23/2013	Ozone	000630

Slope:	1.04434	**Slope:**	0.00000
Intercept	0.07624	**Intercept**	0.00000
CorrCoff	0.99967	**CorrCoff**	0.00000

DAS 1: **DAS 2:**

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
4.6%	6.1%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49C-73104-373	**Tfer Desc.**	Ozone transfer
Tfer ID	01100		
Slope	1.00308	**Intercept**	-0.17961
Cert Date	4/2/2013	**CorrCoff**	1.00000

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	0.05	0.22	0.39	ppb	
primary	2	31.25	31.33	32.68	ppb	4.31%
primary	3	50.30	50.32	53.37	ppb	6.06%
primary	4	80.48	80.41	82.30	ppb	2.35%
primary	5	103.06	102.92	108.60	ppb	5.52%

Sensor Component	Cell B Noise	**Condition**	0.7 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**	About 3%	**Status**	pass
Sensor Component	Offset	**Condition**	0.4	**Status**	pass
Sensor Component	Span	**Condition**	1.066	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	88.2 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**	0.68 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	36.3 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	723.8 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	1.0 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	83.9 kHz	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.68 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 Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Climatronics	none	VIN140	Sandy Grenville	08/23/2013	Temperature	06686

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00435	**Intercept**	-0.08480
Cert Date	1/12/2013	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.21	0.37		

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary		0.80	0.88	0.000	1.3	C	0.37
primary		23.47	23.45	0.000	23.5	C	0.02
primary		49.70	49.57	0.000	49.8	C	0.24

Sensor Component	Shield	**Condition**	Moderately clean	**Status**	pass
Sensor Component	Blower Status Switch	**Condition**	N/A	**Status**	pass
Sensor Component	Blower	**Condition**	Not functioning	**Status**	Fail
Sensor Component	System Memo	**Condition**		**Status**	pass

Infrastructure Data For

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 08/23/2013

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8810 (s/n 2116-1)	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**	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**	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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	VIN140	Sandy Grenville	08/23/2013	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.17	0.17		

Mfg	Extech	**Parameter**	Shelter Temperatur
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00435	**Intercept**	-0.08480
Cert Date	1/12/2013	**CorrCoff**	1.00000

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Mid Range	25.62	25.59	0.000	25.4	C	-0.17

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Temperature	VIN140	Sandy Grenville	08/23/2013	Blower	Climatronics	2914	☐	☑

The forced-air blower for the shield is not functioning.

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:** MetOpMaintCom

The temperature sensor blower is not functioning.

Field Systems Data Form

F-02058-1500-S1-rev001

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 08/23/2013

Site Sponsor (agency)	EPA	**USGS Map**		Fritchton
Operating Group	Purdue University	**Map Scale**		
AQS #		**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**	☑	No inspection date
Time Zone	Central	**First Aid Kit**	☑	
Primary Operator		**Safety Glasses**	☑	
Primary Op. Phone #		**Safety Hard Hat**	☑	
Primary Op. E-mail		**Climbing Belt**	☑	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

Shelter Working Room ☑ **Make** 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-rev001

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 08/23/2013

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-rev001

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 08/23/2013

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-rev001

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 08/23/2013

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?	☑	N/A
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	☑	N/A

Parameter	Manufacturer	Model	S/N	Client ID
Temperature	Climatronics	100093	none	06686

Provide any additional 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 blower is not functioning.

Field Systems Data Form

F-02058-1500-S5-rev001

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 08/23/2013

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?**	☑	
9	**Is there a rotometer in the dry deposition filter line, and is it clean?**	☑	Clean and dry

Parameter	Manufacturer	Model	S/N	Client ID
Sample Tower	Aluma Tower	B	none	000137
Ozone	ThermoElectron Inc	49i A1NAA	1009241798	000630
Filter pack flow pump	Thomas	107CAB18	060300019956	04920
Zero air pump	Werther International	C 70/4	000821908	06906

Provide any additional 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-rev001

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 08/23/2013

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?

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	D520	unknown	000246
DAS	Campbell	CR3000	2136	000358
Modem	Raven	V4221-V	0808338875	06461

Provide any additional 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-rev001

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 08/23/2013

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	☑	Oct 2011	☑
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-rev001

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 08/23/2013

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, 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-rev001

Site ID VIN140
Technician Sandy Grenville
Site Visit Date 08/23/2013

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:

Site Inventory by Site Visit

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
ALH157-Sandy Grenville-08/24/2013						
1	8/24/2013	Computer	Dell	000299	D520	unknown
2	8/24/2013	DAS	Campbell	000405	CR3000	2522
3	8/24/2013	Elevation	Elevation	None	1	None
4	8/24/2013	Filter pack flow pump	Thomas	06285	107CA18	0990007057
5	8/24/2013	Flow Rate	Apex	000647	AXMC105LPMDPCV	54749
6	8/24/2013	Infrastructure	Infrastructure	none	none	none
7	8/24/2013	Modem	Raven	06605	H4222-C	0844355805
8	8/24/2013	Ozone	ThermoElectron Inc	000703	49i A1NAA	1030244805
9	8/24/2013	Ozone Standard	ThermoElectron Inc	000449	49i A3NAA	CM08200025
10	8/24/2013	Sample Tower	Aluma Tower	illegible	B	none
11	8/24/2013	Shelter Temperature	Campbell	none	107-L	none
12	8/24/2013	Siting Criteria	Siting Criteria	None	1	None
13	8/24/2013	Temperature	RM Young	02489	41342	none
14	8/24/2013	Zero air pump	Werther International	06910	C 70/4	000829160

DAS Data Form

DAS Time Max Error: 0.07

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2522	ALH157	Sandy Grenville	08/24/2013	DAS	Primary

Das Date: 8 /24/2013
Audit Date 8 /24/2013

Das Time: 17:08:04
Audit Time 17:08:00

Das Day: 236
Audit Day 236

Low Channel:

Avg Diff: 0.0001
Max Diff: 0.0002

High Channel:

Avg Diff: 0.0001
Max Diff: 0.0002

Mfg Datel
Parameter DAS

Serial Number 15510194
Tfer Desc. Source generator (D

Tfer ID 01320

Slope 1.00000
Intercept 0.00000

Cert Date 2/13/2012
CorrCoff 1.00000

Mfg Fluke
Parameter DAS

Serial Number 95740135
Tfer Desc. DVM

Tfer ID 01311

Slope 1.00000
Intercept 0.00000

Cert Date 1/26/2013
CorrCoff 1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0001	0.0001	V	V	0.0000
7	0.1000	0.1000	0.1000	V	V	0.0000
7	0.3000	0.2999	0.2998	V	V	-0.0001
7	0.5000	0.4997	0.4996	V	V	-0.0001
7	0.7000	0.6997	0.6996	V	V	-0.0001
7	0.9000	0.8996	0.8994	V	V	-0.0002
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	54749	ALH157	Sandy Grenville	08/24/2013	Flow Rate	000647

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	103471	**Tfer Desc.**	nexus
Tfer ID	01420		
Slope	1.00000	**Intercept**	0.00000
Cert Date	6/13/2012	**CorrCoff**	1.00000
Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	103424	**Tfer Desc.**	BIOS cell
Tfer ID	01410		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/27/2012	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
2.39%	2.47%		

Cal Factor Zero -0.03

Cal Factor Full Scale 0.97

Rotometer Reading: 1.5

UseDescription:	Test type:	Input l/m:	Input STP:	MfcDisp.:	OutputSignal:	Output S E:	InputUnit:	OutputSignalI	PctDifference:
primary	pump off	0.000	0.000	0.01	0.012	-0.02	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.029	-0.01	l/m	l/m	
primary	test pt 1	1.564	1.534	1.53	1.524	1.50	l/m	l/m	-2.22%
primary	test pt 2	1.567	1.538	1.53	1.533	1.50	l/m	l/m	-2.47%
primary	test pt 3	1.568	1.538	1.53	1.526	1.50	l/m	l/m	-2.47%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	360 deg	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.4 cm	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Moisture Present	**Condition**	See comments	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Distance	**Condition**	1.7 cm	**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244805	ALH157	Sandy Grenville	08/24/2013	Ozone	000703

Slope:	1.01760	**Slope:**	0.00000
Intercept	-0.38879	**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
0.9%	1.6%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49C-73104-373	**Tfer Desc.**	Ozone transfer
Tfer ID	01100		
Slope	1.00308	**Intercept**	-0.17961
Cert Date	4/2/2013	**CorrCoff**	1.00000

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	0.31	0.48	0.35	ppb	
primary	2	31.08	31.16	31.31	ppb	0.48%
primary	3	49.33	49.35	49.34	ppb	-0.02%
primary	4	81.31	81.23	82.30	ppb	1.32%
primary	5	100.04	99.91	101.50	ppb	1.59%

Sensor Component	Cell B Noise	**Condition**	0.8 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**	< 1 %	**Status**	pass
Sensor Component	Offset	**Condition**	0.50	**Status**	pass
Sensor Component	Span	**Condition**	1.031	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	91.0 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**	0.72 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	36.0 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	732.3 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	1.1 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	83.2 kHz	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.68 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 Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	none	ALH157	Sandy Grenville	08/24/2013	Temperature	02489

Mfg Extech
Parameter Temperature
Serial Number H232734
Tfer Desc. RTD
Tfer ID 01227
Slope 1.00435
Intercept -0.08480
Cert Date 1/12/2013
CorrCoff 1.00000

DAS 1:

DAS 2:

DAS 1: Abs Avg Err	DAS 1: Abs Max Er	DAS 2: Abs Avg Err	DAS 2: Abs Max Er
0.08	0.11		

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Low Range	-0.01	0.07	0.000	0.1	C	0.03
primary	Temp High Range	48.98	48.85	0.000	48.9	C	0.09
primary	Temp Mid Range	26.01	25.98	0.000	26.1	C	0.11

Sensor Component		Condition		Status	
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

Infrastructure Data For

Site ID ALH157 **Technician** Sandy Grenville **Site Visit Date** 08/24/2013

Shelter Make	Shelter Model	Shelter Size
Ekto	8810 (2149-7)	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	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**	Good	**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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	ALH157	Sandy Grenville	08/24/2013	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.23	0.41		

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232734

Tfer Desc. RTD

Tfer ID 01227

Slope 1.00435

Intercept -0.08480

Cert Date 1/12/2013

CorrCoff 1.00000

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Mid Range	25.85	25.82	0.000	25.9	C	0.11
primary	Temp Mid Range	25.71	25.68	0.000	25.9	C	0.17
primary	Temp Mid Range	25.19	25.17	0.000	25.6	C	0.41

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	ALH157	Sandy Grenville	08/24/2013	System Memo	Apex	3864	☐	☐

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

Field Systems Comments

1 **Parameter:** DasComments

The shelter heat and air conditioner run simultaneously.

2 **Parameter:** SitingCriteriaCom

The site is located in a corn field on a privately operated farm.

3 **Parameter:** MetSensorComme

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

Field Systems Data Form

F-02058-1500-S1-rev001

Site ID ALH157 **Technician** Sandy Grenville **Site Visit Date** 08/24/2013

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

City, State	Pocahontas, IL		**Present**	
Zip Code	62275	**Fire Extinguisher**	☑	No inspection date
Time Zone	Central	**First Aid Kit**	☑	
Primary Operator		**Safety Glasses**	☑	
Primary Op. Phone #		**Safety Hard Hat**	☑	
Primary Op. E-mail		**Climbing Belt**	☑	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

Shelter Working Room ☑ **Make** 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-rev001

Site ID ALH157 **Technician** Sandy Grenville **Site Visit Date** 08/24/2013

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-rev001

Site ID ALH157 **Technician** Sandy Grenville **Site Visit Date** 08/24/2013

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-rev001

Site ID ALH157 **Technician** Sandy Grenville **Site Visit Date** 08/24/2013

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

Parameter	Manufacturer	Model	S/N	Client ID
Temperature	RM Young	41342	none	02489

Provide any additional 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-rev001

Site ID ALH157 **Technician** Sandy Grenville **Site Visit Date** 08/24/2013

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?	☑	

Parameter	Manufacturer	Model	S/N	Client ID
Sample Tower	Aluma Tower	B	none	illegible
Ozone	ThermoElectron Inc	49i A1NAA	1030244805	000703
Filter pack flow pump	Thomas	107CA18	0990007057	06285
Zero air pump	Werther International	C 70/4	000829160	06910

Provide any additional 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-rev001

Site ID ALH157 **Technician** Sandy Grenville **Site Visit Date** 08/24/2013

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?

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	D520	unknown	000299
DAS	Campbell	CR3000	2522	000405
Modem	Raven	H4222-C	0844355805	06605

Provide any additional 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 shelter heat and air conditioner run simultaneously.

Field Systems Data Form

F-02058-1500-S7-rev001

Site ID ALH157 **Technician** Sandy Grenville **Site Visit Date** 08/24/2013

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 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-rev001

Site ID ALH157 **Technician** Sandy Grenville **Site Visit Date** 08/24/2013

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-rev001

Site ID ALH157

Technician Sandy Grenville

Site Visit Date 08/24/2013

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:

Site Inventory by Site Visit

PRK134-Eric Hebert-09/04/2013

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
1	9/4/2013	Computer	Dell	000275	D520	unknown
2	9/4/2013	DAS	Campbell	000411	CR3000	2509
3	9/4/2013	Elevation	Elevation	None	1	None
4	9/4/2013	Filter pack flow pump	Thomas	03633	107CAB18	049400004507
5	9/4/2013	Flow Rate	Mykrolis	000175	FC2805	AW04423007
6	9/4/2013	Infrastructure	Infrastructure	none	none	none
7	9/4/2013	MFC power supply	MACTEC	06265	none	none
8	9/4/2013	Modem	Raven	06609	H4223-C	0844356221
9	9/4/2013	Ozone	ThermoElectron Inc	000690	49i A1NAA	1030244800
10	9/4/2013	Ozone Standard	ThermoElectron Inc	000446	49i A3NAA	CM08200022
11	9/4/2013	Sample Tower	Aluma Tower	03518	A	none
12	9/4/2013	Shelter Temperature	Campbell	none	107-L	unknown
13	9/4/2013	Siting Criteria	Siting Criteria	None	1	None
14	9/4/2013	Temperature	RM Young	06306	41342VC	12545
15	9/4/2013	UPS	APC	none	RS800	OB 0332131201
16	9/4/2013	Zero air pump	Werther International	06905	C 70/4	000821907

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Mykrolis	AW04423007	PRK134	Eric Hebert	09/04/2013	Flow Rate	000175

Mfg MACTEC

SN/Owner ID none 06265

Parameter MFC power supply

Mfg BIOS

Parameter Flow Rate

Serial Number 122974

Tfer Desc. BIOS 220-H

Tfer ID 01416

Slope 1.00000

Intercept 0.00000

Cert Date 1/8/2013

CorrCoff 1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
1.55%	1.64%		

Cal Factor Zero 0.02

Cal Factor Full Scale 0.97

Rotometer Reading: 1.6

UseDescription:	Test type:	Input l/m:	Input STP:	MfcDisp.:	OutputSignal:	Output S E:	InputUnit:	OutputSignalI	PctDifference:
primary	pump off	0.000	0.000	-0.03	-0.020	0.00	l/m	l/m	
primary	leak check	0.000	0.000	-0.02	-0.018	0.00	l/m	l/m	
primary	test pt 1	0.000	1.522	1.55	1.552	1.50	l/m	l/m	-1.46%
primary	test pt 2	0.000	1.524	1.55	1.552	1.50	l/m	l/m	-1.56%
primary	test pt 3	0.000	1.525	1.55	1.552	1.50	l/m	l/m	-1.64%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	235 deg	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.5 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**	6.0 cm	**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244800	PRK134	Eric Hebert	09/04/2013	Ozone	000690

Slope:	0.96421	**Slope:**	0.00000
Intercept	1.00502	**Intercept**	0.00000
CorrCoff	0.99996	**CorrCoff**	0.00000

DAS 1: **DAS 2:**

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
1.7%	3.1%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	517112175	**Tfer Desc.**	Ozone primary stan
Tfer ID	01111		
Slope	0.99720	**Intercept**	0.18428
Cert Date	1/2/2013	**CorrCoff**	1.00000

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	0.01	-0.17	0.62	ppb	
primary	2	27.84	27.73	27.80	ppb	0.25%
primary	3	57.13	57.10	56.26	ppb	-1.47%
primary	4	84.51	84.56	83.00	ppb	-1.84%
primary	5	104.64	104.74	101.50	ppb	-3.09%

Sensor Component	Cell B Noise	**Condition**	0.8 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**	Not tested	**Status**	pass
Sensor Component	Span	**Condition**	Not tested	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	87.3 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**	0.73 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	35.0 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	700.6 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.6 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	92.9 kHz	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.73 lpm	**Status**	pass
Sensor Component	Battery Backup	**Condition**	Not functioning	**Status**	Fail
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	12545	PRK134	Eric Hebert	09/04/2013	Temperature	06306

Mfg Extech

Parameter Temperature

Serial Number H232679

Tfer Desc. RTD

Tfer ID 01228

Slope 1.00732

Intercept -0.12380

Cert Date 1/12/2013

CorrCoff 1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.10	0.15		

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Low Range	-0.05	0.07	0.000	0.0	C	-0.11
primary	Temp Mid Range	20.14	20.12	0.000	20.1	C	-0.05
primary	Temp High Range	44.77	44.57	0.000	44.7	C	0.15

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

Infrastructure Data For

Site ID PRK134 **Technician** Eric Hebert **Site Visit Date** 09/04/2013

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

Sensor Component	Shelter Roof	**Condition**	Good	**Status**	pass
Sensor Component	Sample Tower Type	**Condition**	Type A	**Status**	pass
Sensor Component	Met Tower	**Condition**	Fair	**Status**	pass
Sensor Component	Moisture Trap	**Condition**	Installed	**Status**	pass
Sensor Component	Power Cables	**Condition**	Fair	**Status**	pass
Sensor Component	Rotometer	**Condition**	Installed	**Status**	pass
Sensor Component	Conduit	**Condition**	N/A	**Status**	pass
Sensor Component	Sample Tower	**Condition**	Poor	**Status**	Fail
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**	Fair	**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass

Shelter Temperature Data For

Mfg	**Serial Number Tag**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
Campbell	unknown	PRK134	Eric Hebert	09/04/2013	Shelter Temperature	none

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.34	0.57		

Mfg	Extech	**Parameter**	Shelter Temperatur
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00732	**Intercept**	-0.12380
Cert Date	1/12/2013	**CorrCoff**	1.00000

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Mid Range	24.57	24.51	0.000	24.4	C	-0.14
primary	Temp Mid Range	23.83	23.78	0.000	24.1	C	0.32
primary	Temp Mid Range	23.15	23.10	0.000	23.7	C	0.57

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Temperature	PRK134	Eric Hebert	09/04/2013	System Memo	RM Young	3850	☐	☑

The temperature probe is a short style and it is mounted in a housing with an extension designed for a long style probe.

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 during the previous audit visit.

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 and corners of the wall are beginning to rot.

Field Systems Data Form

F-02058-1500-S1-rev001

Site ID PRK134 **Technician** Eric Hebert **Site Visit Date** 09/04/2013

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**	☑	No inspection date
Time Zone	Central	**First Aid Kit**	☑	
Primary Operator		**Safety Glasses**	☐	
Primary Op. Phone #		**Safety Hard Hat**	☑	
Primary Op. E-mail		**Climbing Belt**	☑	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☑	
Backup Op. E-mail		**Stable Entry Step**	☑	

Shelter Working Room ☑ **Make** 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 and corners of the wall are beginning to rot.

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-rev001

Site ID PRK134 **Technician** Eric Hebert **Site Visit Date** 09/04/2013

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-rev001

Site ID PRK134 **Technician** Eric Hebert **Site Visit Date** 09/04/2013

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-rev001

Site ID PRK134 **Technician** Eric Hebert **Site Visit Date** 09/04/2013

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?	☑	N/A
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	☑	N/A

Parameter	Manufacturer	Model	S/N	Client ID
Temperature	RM Young	41342VC	12545	06306

Provide any additional 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-rev001

Site ID PRK134 **Technician** Eric Hebert **Site Visit Date** 09/04/2013

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?	☑	
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

Parameter	Manufacturer	Model	S/N	Client ID
Sample Tower	Aluma Tower	A	none	03518
MFC power supply	MACTEC	none	none	06265
Ozone	ThermoElectron Inc	49i A1NAA	1030244800	000690
Filter pack flow pump	Thomas	107CAB18	049400004507	03633
Zero air pump	Werther International	C 70/4	000821907	06905

Provide any additional 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-rev001

Site ID PRK134

Technician Eric Hebert

Site Visit Date 09/04/2013

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?

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	D520	unknown	000275
DAS	Campbell	CR3000	2509	000411
Modem	Raven	H4223-C	0844356221	06609
UPS	APC	RS800	OB 0332131201	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:

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 during the previous audit visit.

Field Systems Data Form

F-02058-1500-S7-rev001

Site ID PRK134 **Technician** Eric Hebert **Site Visit Date** 09/04/2013

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 2001	☐
HASP	☑	Oct 2011	☐
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-rev001

Site ID PRK134 **Technician** Eric Hebert **Site Visit Date** 09/04/2013

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-rev001

Site ID PRK134 **Technician** Eric Hebert **Site Visit Date** 09/04/2013

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:

Site Inventory by Site Visit

Site Visit	Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
VOY413-Eric Hebert-09/05/2013						
1	9/5/2013	DAS	Environmental Sys Corp	none	8816	4059
2	9/5/2013	Elevation	Elevation	None	1	None
3	9/5/2013	F460 translator	Climatronics	none	100163	211
4	9/5/2013	Filter pack flow pump	Thomas	none	107CAB18	120000014367
5	9/5/2013	flow rate	Tylan	none	FC280SAV	AW9806012
6	9/5/2013	Infrastructure	Infrastructure	none	none	none
7	9/5/2013	MFC power supply	Tylan	none	RO-32	FP9806001
8	9/5/2013	Ozone	ThermoElectron Inc	90730	49C	49C-70522-366
9	9/5/2013	Ozone Standard	ThermoElectron Inc	90717	49C	49C-66823-354
10	9/5/2013	Precipitation	Climatronics	02140	100508-2	illegible
11	9/5/2013	Printer	Hewlett Packard	none	842C	unknown
12	9/5/2013	Relative Humidity	Rotronic	none	MP 601A	56080
13	9/5/2013	Sample Tower	Aluma Tower	none	B	AT-51159-11-G
14	9/5/2013	Shelter Temperature	ARS	none	none	none
15	9/5/2013	Siting Criteria	Siting Criteria	None	1	None
16	9/5/2013	Solar Radiation	Licor	none	LI-200	PY28976
17	9/5/2013	Solar Radiation Translator	Climatronics	none	100144	347
18	9/5/2013	Temperature	Climatronics	none	100093	7967
19	9/5/2013	Temperature Translator	Climatronics	00593	100088-2	258
20	9/5/2013	Wind Direction	Climatronics	90838	100076	1832
21	9/5/2013	Wind Speed	Climatronics	90940	100075	1489
22	9/5/2013	Zero air pump	Twin Tower Engineering	90719	TT70/E4	526294

DAS Data Form

DAS Time Max Error: 1.77

Mfg	**Serial Number**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Use Desc.**
Environmental Sys	4059	VOY413	Eric Hebert	09/05/2013	DAS	Primary

Das Date: 9 /6 /2013
Das Time: 10:07:14
Das Day: 249

Audit Date 9 /6 /2013
Audit Time 10:09:00
Audit Day 249

Low Channel:		**High Channel:**	
Avg Diff:	**Max Diff:**	**Avg Diff:**	**Max Diff:**
0.0000	0.0001	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 2/13/2012
CorrCoff 1.00000

Mfg Fluke
Parameter DAS
Serial Number 86590148
Tfer Desc. DVM
Tfer ID 01310
Slope 1.00000
Intercept 0.00000
Cert Date 1/27/2013
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	0.8999	V	V	-0.0001
2	1.0000	1.0001	1.0000	V	V	-0.0001
16	0.0000	0.0000	0.0000	V	V	0.0000
16	0.1000	0.1000	0.1000	V	V	0.0000
16	0.3000	0.3000	0.3000	V	V	0.0000
16	0.5000	0.5000	0.5000	V	V	0.0000
16	0.7000	0.7000	0.7000	V	V	0.0000
16	0.9000	0.9000	0.9000	V	V	0.0000
16	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	AW9806012	VOY413	Eric Hebert	09/05/2013	flow rate	none

Mfg Tylan

SN/Owner ID FP9806001 none

Parameter MFC power supply

Mfg BIOS

Parameter Flow Rate

Serial Number 122974

Tfer Desc. BIOS 220-H

Tfer ID 01416

Slope 1.00000

Intercept 0.00000

Cert Date 1/8/2013

CorrCoff 1.00000

DAS 1:

DAS 2:

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
1.29%	1.68%		

Cal Factor Zero 0.12

Cal Factor Full Scale 5.52

Rotometer Reading: 3.3

UseDescription:	Test type:	Input l/m:	Input STP:	MfcDisp.:	OutputSignal:	Output S E:	InputUnit:	OutputSignalI	PctDifference:
primary	pump off	0.000	0.000	-0.14	-0.1015	0.01	l/m	l/m	
primary	leak check	0.000	0.000	-0.14	-0.1015	0.01	l/m	l/m	
primary	test pt 1	0.000	3.015	2.66	2.6633	2.99	l/m	l/m	-0.81%
primary	test pt 2	0.000	3.021	2.66	2.6633	2.99	l/m	l/m	-1.03%
primary	test pt 3	0.000	3.041	2.66	2.6633	2.99	l/m	l/m	-1.68%
primary	test pt 4	0.000	3.040	2.66	2.6633	2.99	l/m	l/m	-1.64%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	Not tested	**Status**	pass
Sensor Component	Filter Depth	**Condition**	-1.0 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**	Clean and dry	**Status**	pass
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.5 cm	**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	09/05/2013	Ozone	90730

Slope: 0.98970 **Slope:** 0.00000

Intercept 0.73068 **Intercept** 0.00000

CorrCoff 0.99998 **CorrCoff** 0.00000

DAS 1:

A Avg % Diff:	A Max % Di
0.6%	1.8%

DAS 2:

A Avg %Dif	A Max % Di

Mfg ThermoElectron Inc **Parameter** ozone

Serial Number 517112175 **Tfer Desc.** Ozone primary stan

Tfer ID 01111

Slope 0.99720 **Intercept** 0.18428

Cert Date 1/2/2013 **CorrCoff** 1.00000

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	0.41	0.22	1.05	ppb	
primary	2	30.24	30.14	30.67	ppb	1.76%
primary	3	49.77	49.72	49.78	ppb	0.12%
primary	4	79.80	79.83	79.40	ppb	-0.54%
primary	5	110.30	110.42	110.30	ppb	-0.11%

Sensor Component	Cell B Noise	**Condition**	Not tested	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	Not tested	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	Offset	**Condition**	Not tested	**Status**	pass
Sensor Component	Span	**Condition**	Not tested	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	Not tested	**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**	Not tested	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	Not tested	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	Not tested	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	Not tested	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	Not tested	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	Not tested	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	Not tested	**Status**	pass

Wind Speed Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Climatronics	1489	VOY413	Eric Hebert	09/05/2013	Wind Speed	90940

Mfg	Climatronics	
SN/Owner ID	211	none
Parameter	F460 translator	

Prop or Cups SN	2339		
Prop or Cups Torque	0.4	**to**	0.5
Prop Correction Fact	N/A		

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	1/13/2010	**CorrCoff**	1.00000

Mfg	RM Young	**Parameter**	wind speed
Serial Number		**Tfer Desc.**	wind speed motor (l
Tfer ID	01261		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/13/2010	**CorrCoff**	1.00000

	DAS 1:		DAS 2:	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	0.01	1.00%		
Abs Max Er	0.02	1.06%		

UseDescription:	InputDevice:	Input RPM:	Input m/s:	Output V:	DAS m/s:	Diff/ %Diff:	Difference:
primary	none	0	0.20	0.0000	0.2		0.02
primary	01261	50	1.40	0.0000	1.4		0.00
primary	01261	100	2.57	0.0000	2.6		0.02
primary	01261	170	4.22	0.0000	4.2		0.01
primary	01261	250	6.10	0.0000	6.2	0.98%	
primary	01262	500	11.97	0.0000	12.1	0.92%	
primary	01262	800	19.02	0.0000	19.2	1.05%	
primary	01262	2000	47.22	0.0000	47.7	1.06%	

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**		**Status**	pass

Wind Direction Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Climatronics	1832	VOY413	Eric Hebert	09/05/2013	Wind Direction	90838

Mfg Climatronics

SN/Owner ID 211 none

Parameter F460 translator

Vane SN: 3499

C. A. Align. deg. true: 2

VaneTorque 8 **to** 10

Mfg Ushikata **Parameter** wind direction

Serial Number 190037 **Tfer Desc.** transit

Tfer ID 01265

Slope 1.00000 **Intercept** 0.00000

Cert Date 1/4/2011 **CorrCoff** 1.00000

Mfg RM Young **Parameter** wind direction

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

Tfer ID 01266

	DAS 1: Orientation	DAS 1: Linearity:	DAS 2: Orientation	DAS 2: Linearity:
Abs Avg Err	1.8	2.0		
Abs Max Er	4	7		

UseDescription:	TferID:	Input Raw:	Linearity	Output V:	Output Deg.:	Difference:	Change:	Error:
primary	01266	0	☑	0.0000	358	2	45	0
primary	01266	45	☑	0.0000	40	5	42	-3
primary	01266	90	☑	0.0000	84	6	44	-1
primary	01266	135	☑	0.0000	136	1	52	7
primary	01266	180	☑	0.0000	179	1	43	-2
primary	01266	225	☑	0.0000	222	3	43	-2
primary	01266	270	☑	0.0000	268	2	46	1
primary	01266	315	☑	0.0000	313	2	45	0
primary	01265	88	☐	0.0000	84	4		4
primary	01265	90	☐	0.0000	86	4		4
primary	01265	178	☐	0.0000	179	1		1
primary	01265	268	☐	0.0000	268	0		0
primary	01265	358	☐	0.0000	358	0		0

Sensor Component	Mast	**Condition**	Good	**Status**	pass
Sensor Component	Condition	**Condition**	Poor	**Status**	Fail
Sensor Component	Sensor Heater	**Condition**	N/A	**Status**	pass
Sensor Component	Sensor Plumb	**Condition**	Plumb	**Status**	pass
Sensor Component	Torque	**Condition**		**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 Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Climatronics	7967	VOY413	Eric Hebert	09/05/2013	Temperature	none

Mfg Climatronics

SN/Owner ID 258 00593

Parameter Temperature Translator

Mfg Extech

Parameter Temperature

Serial Number H232679

Tfer Desc. RTD

Tfer ID 01228

Slope 1.00732

Intercept -0.12380

Cert Date 1/12/2013

CorrCoff 1.00000

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.11	0.18		

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Low Range	-0.06	0.06	0.0000	0.2	C	0.18
primary	Temp Mid Range	21.65	21.62	0.0000	21.6	C	0.02
primary	Temp High Range	46.79	46.57	0.0000	46.7	C	0.13

Sensor Component	Shield	**Condition**	Moderately 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**		**Status**	pass

Humidity Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Rotronic	56080	VOY413	Eric Hebert	09/05/2013	Relative Humidity	none

Mfg	Rotronic	**Parameter**	Relative Humidity
Serial Number	124432	**Tfer Desc.**	Hygroclip
Tfer ID	01225		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/29/2013	**CorrCoff**	1.00000

	DAS 1:		DAS 2:	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	2.0	1.9		
Abs Max Er	2.0	1.9		

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	0.0000	30.8	-2.0
primary	RH Low Range	Hygroclip	52.9	0.0	52.9	0.0000	51.0	-1.9
primary	RH High Range	Hygroclip	93.6	0.0	93.6	0.0000	91.7	-1.9

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**	Clean	**Status**	pass

Solar Radiation Data Form

Mfg	**Serial Number Tag**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
Licor	PY28976	VOY413	Eric Hebert	09/05/2013	Solar Radiation	none

Mfg Climatronics

SN/Owner ID 347 none

Parameter Solar Radiation Translator

Mfg Eppley **Parameter** solar radiation

Serial Number 10765 **Tfer Desc.** SR transfer translat

Tfer ID 01246

Slope 1.00000 **Intercept** 0.00000

Cert Date 1/6/2010 **CorrCoff** 1.00000

Mfg Eppley **Parameter** solar radiation

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

Tfer ID 01245

Slope 1.00000 **Intercept** 0.00000

Cert Date 12/16/2010 **CorrCoff** 1.00000

DAS 1:		**DAS 2:**	
% Diff of Avg	**%Diff of Max**	**%Diff of Avg**	**%Diff of Max**
1.9%	0.1%	0.0%	0.0%

UseDescription:	Measure Date	MeasureTime	Tfer Corr:	DAS w/m2:	PctDifference:
primary	9/6/2013	7:00	136	135	-0.7%
primary	9/6/2013	8:00	197	193	-2.4%
primary	9/6/2013	9:00	467	453	-2.9%
primary	9/6/2013	10:00	623	592	-4.9%
primary	9/6/2013	11:00	657	634	-3.5%
primary	9/6/2013	12:00	684	684	0.1%
primary	9/6/2013	13:00	530	526	-0.6%
primary	9/6/2013	14:00	417	422	1.1%

Sensor Component	Sensor Level	**Condition**	Level	**Status**	pass
Sensor Component	Sensor Clean	**Condition**	Clean	**Status**	pass
Sensor Component	Properly Sited	**Condition**	Partially shaded	**Status**	Fail
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass

Precipitation Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
Climatronics	illegible	VOY413	Eric Hebert	09/05/2013	Precipitation	02140

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**
2.0%	2.0%		

UseDesc.	Test type:	TferVolume:	Iteration:	TimePerTip:	Eq.Ht:	DAS eng:	Eq.HtUnit:	OSE Unit:	TferUnits:	PctDifference
primary	tip check	10 manual	1	2 sec	1.00	1.00	mm	mm	ml	
primary	test 1	231.5	1	8 sec	5.00	4.90	mm	mm	ml	-2.0%
primary	test 2	231.5	2	10 sec	5.00	4.90	mm	mm	ml	-2.0%

Sensor Component	System Memo	**Condition**		**Status**	pass
Sensor Component	Sensor Heater	**Condition**	Functioning	**Status**	pass
Sensor Component	Properly Sited	**Condition**	See comments	**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

Infrastructure Data For

Site ID VOY413 **Technician** Eric Hebert **Site Visit Date** 09/05/2013

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8810 (s/n 2880-2)	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**	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**	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**	Good	**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	VOY413	Eric Hebert	09/05/2013	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
1.84	2.79		

Mfg	Extech	**Parameter**	Shelter Temperatur
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00732	**Intercept**	-0.12380
Cert Date	1/12/2013	**CorrCoff**	1.00000

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Mid Range	20.45	20.42	0.000	20.8	C	0.33
primary	Temp Mid Range	27.10	27.03	0.000	24.2	C	-2.79
primary	Temp Mid Range	23.24	23.19	0.000	20.8	C	-2.4

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	VOY413	Eric Hebert	09/05/2013	Filter Position	Tylan	1838	☐	☑

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

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Precipitation	VOY413	Eric Hebert	09/05/2013	Properly Sited	Climatronics	1832	☐	☑

Objects violate the 45 degree rule for the tipping bucket rain gage.

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Solar Radiation	VOY413	Eric Hebert	09/05/2013	Properly Sited	Licor	1831	☐	☑

The solar radiation sensor is shaded at times during the day, and not properly sited.

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Wind Direction	VOY413	Eric Hebert	09/05/2013	Condition	Climatronics	1851	☐	☑

The upper and lower sections of the wind sensor body are loose. This condition will cause premature failure of the sensor and can affect data accuracy.

Field Systems Comments

1 **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.

2 **Parameter:** ShelterCleanNotes

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

3 **Parameter:** MetSensorComme

Objects violate the 45 degree rule for the tipping bucket rain gage. The solar radiation sensor is shaded during part of the day.

Field Systems Data Form

F-02058-1500-S1-rev001

Site ID VOY413 **Technician** Eric Hebert **Site Visit Date** 09/05/2013

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-rev001

Site ID VOY413 **Technician** Eric Hebert **Site Visit Date** 09/05/2013

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-rev001

Site ID VOY413 **Technician** Eric Hebert **Site Visit Date** 09/05/2013

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?	☑	Partially shaded
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:

Objects violate the 45 degree rule for the tipping bucket rain gage. The solar radiation sensor is shaded during part of the day.

Field Systems Data Form

F-02058-1500-S4-rev001

Site ID VOY413 **Technician** Eric Hebert **Site Visit Date** 09/05/2013

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

Parameter	Manufacturer	Model	S/N	Client ID
Precipitation	Climatronics	100508-2	illegible	02140
Wind Direction	Climatronics	100076	1832	90838
Temperature	Climatronics	100093	7967	none
Solar Radiation	Licor	LI-200	PY28976	none
Wind Speed	Climatronics	100075	1489	90940
Relative Humidity	Rotronic	MP 601A	56080	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-rev001

Site ID VOY413 **Technician** Eric Hebert **Site Visit Date** 09/05/2013

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

Parameter	Manufacturer	Model	S/N	Client ID
Sample Tower	Aluma Tower	B	AT-51159-11-G	none
Ozone	ThermoElectron Inc	49C	49C-70522-366	90730
Filter pack flow pump	Thomas	107CAB18	120000014367	none
Zero air pump	Twin Tower Engineering	TT70/E4	526294	90719
MFC power supply	Tylan	RO-32	FP9806001	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-S6-rev001

Site ID VOY413 **Technician** Eric Hebert **Site Visit Date** 09/05/2013

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?

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Environmental Sys Corp	8816	4059	none
F460 translator	Climatronics	100163	211	none
Printer	Hewlett Packard	842C	unknown	none
Solar Radiation Translator	Climatronics	100144	347	none
Temperature Translator	Climatronics	100088-2	258	00593

Provide any additional 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-rev001

Site ID VOY413 **Technician** Eric Hebert **Site Visit Date** 09/05/2013

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:

Field Systems Data Form

F-02058-1500-S8-rev001

Site ID VOY413 **Technician** Eric Hebert **Site Visit Date** 09/05/2013

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	☑	Semiannually	☑
Visual Inspections	☑	Weekly	☑
Translator Zero/Span Tests (climatronics)	☐		☐
Manual Rain Gauge Test	☑	Monthly	☑
Confirm Reasonableness of Current Values	☐		☐
Test Surface Wetness Response	☐		☐

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	☐		☐
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?	☑	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-rev001

Site ID VOY413 **Technician** Eric Hebert **Site Visit Date** 09/05/2013

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?	☑	Flow section only
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	☑	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:

Site Inventory by Site Visit

THR422-Eric Hebert-09/09/2013

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
1	9/9/2013	Computer	Hewlett Packard	none	65606	5CB1520H68
2	9/9/2013	DAS	Environmental Sys Corp	90656	8816	2600
3	9/9/2013	Elevation	Elevation	None	1	None
4	9/9/2013	F460 translator	Climatronics	none	100163	684
5	9/9/2013	Filter pack flow pump	Thomas	03634	107CAB18	049400004441
6	9/9/2013	flow rate	Tylan	none	FC280SAV	AW02213004
7	9/9/2013	Infrastructure	Infrastructure	none	none	none
8	9/9/2013	Mainframe	Climatronics	none	100081	1911
9	9/9/2013	Mainframe power supply	Climatronics	none	101074	unknown
10	9/9/2013	Met tower	Rohn	none	unknown	none
11	9/9/2013	MFC power supply	Tylan	00042	RO-32	FP902022
12	9/9/2013	Modem	US Robotics	none	14.4 fax modem	9244894
13	9/9/2013	Ozone	ThermoElectron Inc	none	49i A3NAA	0632119500
14	9/9/2013	Precipitation	Climatronics	01328	100508-2	illegible
15	9/9/2013	Relative Humidity	Rotronic	none	MP 601A	32736
16	9/9/2013	Sample Tower	Aluma Tower	none	B	AT-81077-J5
17	9/9/2013	Shelter Temperature	ARS	none	none	none
18	9/9/2013	Shield (10 meter)	Climatronics	none	100325	2589
19	9/9/2013	Siting Criteria	Siting Criteria	None	1	None
20	9/9/2013	Solar Radiation	Licor	none	LI-200	PY33503
21	9/9/2013	Solar Radiation Translator	Climatronics	none	100144	662
22	9/9/2013	Temperature	Climatronics	none	100093	7974
23	9/9/2013	Temperature Translator	Climatronics	01545	100088-2	217
24	9/9/2013	Wind Direction	Climatronics	90886	100076	1725
25	9/9/2013	Wind Speed	Climatronics	90925	100075	1489
26	9/9/2013	Zero air pump	Thomas	none	607CA22C	039500000348

DAS Data Form

DAS Time Max Error: 0.27

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	2600	THR422	Eric Hebert	09/09/2013	DAS	Primary

Das Date: 9 /10/2013
Das Time: 9:54:16
Das Day: 253

Audit Date 9 /10/2013
Audit Time 9:54:00
Audit Day 253

Low Channel:		**High Channel:**	
Avg Diff:	**Max Diff:**	**Avg Diff:**	**Max Diff:**
0.0001	0.0003	0.0001	0.0003

Mfg Datel
Parameter DAS
Serial Number 4000392
Tfer Desc. Source generator (D
Tfer ID 01321
Slope 1.00000
Intercept 0.00000
Cert Date 2/13/2012
CorrCoff 1.00000

Mfg Fluke
Parameter DAS
Serial Number 86590148
Tfer Desc. DVM
Tfer ID 01310
Slope 1.00000
Intercept 0.00000
Cert Date 1/27/2013
CorrCoff 1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
1	0.0000	0.0000	0.0000	V	V	0.0000
1	0.1000	0.1000	0.1000	V	V	0.0000
1	0.3000	0.3000	0.3001	V	V	0.0001
1	0.5000	0.5000	0.5001	V	V	0.0001
1	0.7000	0.7001	0.7002	V	V	0.0001
1	0.9000	0.9001	0.9003	V	V	0.0002
1	1.0000	1.0001	1.0004	V	V	0.0003
15	0.0000	0.0000	0.0000	V	V	0.0000
15	0.1000	0.1000	0.1000	V	V	0.0000
15	0.3000	0.3000	0.3001	V	V	0.0001
15	0.5000	0.5000	0.5001	V	V	0.0001
15	0.7000	0.7001	0.7002	V	V	0.0001
15	0.9000	0.9001	0.9003	V	V	0.0002
15	1.0000	1.0001	1.0004	V	V	0.0003

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Tylan	AW02213004	THR422	Eric Hebert	09/09/2013	flow rate	none

Mfg Tylan

SN/Owner ID FP902022 00042

Parameter MFC power supply

Mfg BIOS

Parameter Flow Rate

Serial Number 122974

Tfer Desc. BIOS 220-H

Tfer ID 01416

Slope 1.00000

Intercept 0.00000

Cert Date 1/8/2013

CorrCoff 1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
2.03%	2.29%		

Cal Factor Zero 0.16

Cal Factor Full Scale 10.74

Rotometer Reading: 3.25

UseDescription:	Test type:	Input l/m:	Input STP:	MfcDisp.:	OutputSignal:	Output S E:	InputUnit:	OutputSignal	PctDifference:
primary	pump off	0.000	0.000	-0.22	-0.0890	-0.03	l/m	l/m	
primary	leak check	0.000	0.000	-0.20	-0.0840	-0.01	l/m	l/m	
primary	test pt 1	0.000	3.059	2.67	1.3440	3.00	l/m	l/m	-1.94%
primary	test pt 2	0.000	3.070	2.67	1.3440	3.00	l/m	l/m	-2.29%
primary	test pt 3	0.000	3.057	2.67	1.3440	3.00	l/m	l/m	-1.86%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	Not tested	**Status**	pass
Sensor Component	Filter Depth	**Condition**	-1.0 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**	Clean and dry	**Status**	pass
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.5 cm	**Status**	pass

Ozone Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
ThermoElectron Inc	0632119500	THR422	Eric Hebert	09/09/2013	Ozone	none

Slope:	1.03488	**Slope:**	0.00000
Intercept	-0.57521	**Intercept**	0.00000
CorrCoff	0.99998	**CorrCoff**	0.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
2.3%	3.3%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	517112175	**Tfer Desc.**	Ozone primary stan
Tfer ID	01111		
Slope	0.99720	**Intercept**	0.18428
Cert Date	1/2/2013	**CorrCoff**	1.00000

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	-0.07	-0.25	-0.59	ppb	
primary	2	29.54	29.43	29.79	ppb	1.22%
primary	3	54.76	54.72	55.98	ppb	2.30%
primary	4	85.52	85.57	87.50	ppb	2.26%
primary	5	119.26	119.41	123.40	ppb	3.34%

Sensor Component	Cell B Noise	**Condition**	1.9 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**		**Status**	pass
Sensor Component	Offset	**Condition**	Not tested	**Status**	pass
Sensor Component	Span	**Condition**	Not tested	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	58.6 kHz	**Status**	Fail
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**	0.67 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	30.1 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	665 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	1.9 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	87.7 kHz	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.64 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
Climatronics	1489	THR422	Eric Hebert	09/09/2013	Wind Speed	90925

Mfg Climatronics
SN/Owner ID 684 none
Parameter F460 translator

Prop or Cups SN 1984
Prop or Cups Torque 0.3 **to** 0.4
Prop Correction Fact N/A

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 1/13/2010 **CorrCoff** 1.00000

Mfg RM Young **Parameter** wind speed
Serial Number **Tfer Desc.** wind speed motor (l
Tfer ID 01261
Slope 1.00000 **Intercept** 0.00000
Cert Date 1/13/2010 **CorrCoff** 1.00000

	DAS 1:		DAS 2:	
	Low Range	High Range	Low Range	High Range
Abs Avg Err	0.00	0.19%		
Abs Max Er	0.01	0.23%		

UseDescription:	InputDevice:	Input RPM:	Input m/s:	Output V:	DAS m/s:	Diff/ %Diff:	Difference:
primary	none	0	0.20	0.0000	0.2		0.01
primary	01261	50	1.40	0.0000	1.4		0.00
primary	01261	100	2.57	0.0000	2.6		0.00
primary	01261	170	4.22	0.0000	4.2		0.00
primary	01261	250	6.10	0.0000	6.1	0.16%	
primary	01262	500	11.97	0.0000	12.0	0.17%	
primary	01262	800	19.02	0.0000	19.1	0.21%	
primary	01262	2000	47.22	0.0000	47.3	0.23%	

Sensor Component		Condition		Status	
Sensor Component	System Memo	Condition		Status	pass
Sensor Component	Sensor Plumb	Condition	Plumb	Status	pass
Sensor Component	Sensor Heater	Condition	Functioning	Status	pass
Sensor Component	Prop or Cups Condition	Condition	Good	Status	pass
Sensor Component	Condition	Condition	Good	Status	pass
Sensor Component	Torque	Condition		Status	pass

Wind Direction Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Climatronics	1725	THR422	Eric Hebert	09/09/2013	Wind Direction	90886

Mfg Climatronics

SN/Owner ID 684 none

Parameter F460 translator

Vane SN: 4495

C. A. Align. deg. true: 358

VaneTorque 8 **to** 10

Mfg Ushikata **Parameter** wind direction

Serial Number 190037 **Tfer Desc.** transit

Tfer ID 01265

Slope 1.00000 **Intercept** 0.00000

Cert Date 1/4/2011 **CorrCoff** 1.00000

Mfg RM Young **Parameter** wind direction

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

Tfer ID 01266

	DAS 1:		DAS 2:	
	Orientation	Linearity:	Orientation	Linearity:
Abs Avg Err	1.5	1.5		
Abs Max Er	3	5		

UseDescription:	TferID:	Input Raw:	Linearity	Output V:	Output Deg.:	Difference:	Change:	Error:
primary	01266	0	☑	0.0000	359	1	46	1
primary	01266	45	☑	0.0000	40	5	41	-4
primary	01266	90	☑	0.0000	85	5	45	0
primary	01266	135	☑	0.0000	130	5	45	0
primary	01266	180	☑	0.0000	180	0	50	5
primary	01266	225	☑	0.0000	224	1	44	-1
primary	01266	270	☑	0.0000	268	2	44	-1
primary	01266	315	☑	0.0000	313	2	45	0
primary	01265	88	☐	0.0000	85	3		3
primary	01265	178	☐	0.0000	180	2		2
primary	01265	268	☐	0.0000	268	0		0
primary	01265	358	☐	0.0000	359	1		1

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

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

Sensor Component Sensor Heater **Condition** Functioning **Status** pass

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

Sensor Component Torque **Condition** **Status** pass

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

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

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Climatronics	7974	THR422	Eric Hebert	09/09/2013	Temperature	none

Mfg Climatronics

SN/Owner ID 217 01545

Parameter Temperature Translator

Mfg Extech **Parameter** Temperature

Serial Number H232679 **Tfer Desc.** RTD

Tfer ID 01228

Slope 1.00732 **Intercept** -0.12380

Cert Date 1/12/2013 **CorrCoff** 1.00000

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

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Low Range	0.18	0.30	0.0000	0.3	C	0.03
primary	Temp Mid Range	24.02	23.97	0.0000	23.9	C	-0.04
primary	Temp High Range	46.64	46.42	0.0000	46.5	C	0.04

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

Humidity Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Rotronic	32736	THR422	Eric Hebert	09/09/2013	Relative Humidity	none

Mfg	Rotronic	**Parameter**	Relative Humidity
Serial Number	124432	**Tfer Desc.**	Hygroclip
Tfer ID	01225		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/29/2013	**CorrCoff**	1.00000

	DAS 1:		DAS 2:	
	Low Range	**High Range**	**Low Range**	**High Range**
Abs Avg Err	1.7	1.6		
Abs Max Er	2.7	1.6		

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	0.0000	35.5	2.7
primary	RH Low Range	Hygroclip	52.9	0.0	52.9	0.0000	53.6	0.7
primary	RH High Range	Hygroclip	93.6	0.0	93.6	0.0000	92.0	-1.6

Sensor Component	System Memo	**Condition**		**Status**	pass
Sensor Component	Blower	**Condition**	Functioning	**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 Tag**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
Licor	PY33503	THR422	Eric Hebert	09/09/2013	Solar Radiation	none

Mfg Climatronics

SN/Owner ID 662 none

Parameter Solar Radiation Translator

Mfg Eppley **Parameter** solar radiation

Serial Number 10765 **Tfer Desc.** SR transfer translat

Tfer ID 01246

Slope 1.00000 **Intercept** 0.00000

Cert Date 1/6/2010 **CorrCoff** 1.00000

Mfg Eppley **Parameter** solar radiation

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

Tfer ID 01245

Slope 1.00000 **Intercept** 0.00000

Cert Date 12/16/2010 **CorrCoff** 1.00000

DAS 1: % Diff of Avg	**DAS 1:** %Diff of Max	**DAS 2:** %Diff of Avg	**DAS 2:** %Diff of Max
6.0%	6.5%	0.0%	0.0%

UseDescription:	Measure Date	MeasureTime	Tfer Corr:	DAS w/m2:	PctDifference:
primary	9/9/2013	11:00	757	708	-6.5%
primary	9/9/2013	12:00	714	665	-6.9%
primary	9/9/2013	13:00	703	656	-6.7%
primary	9/9/2013	14:00	480	449	-6.5%
primary	9/9/2013	15:00	272	259	-4.8%
primary	9/9/2013	16:00	81	80	-1.2%
primary	9/9/2013	17:00	79	84	6.3%

Sensor Component		**Condition**		**Status**	
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
Climatronics	illegible	THR422	Eric Hebert	09/09/2013	Precipitation	01328

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
2.0%	2.0%		

UseDesc.	Test type:	TferVolume:	Iteration:	TimePerTip:	Eq.Ht:	DAS eng:	Eq.HtUnit:	OSE Unit:	TferUnits:	PctDifference
primary	tip check	10 manual	1	2 sec	1.00	1.00	mm	mm	ml	
primary	test 1	231.5	1	10 sec	5.00	4.90	mm	mm	ml	-2.0%

Sensor Component	System Memo	**Condition**	See comments	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	Functioning	**Status**	pass
Sensor Component	Properly Sited	**Condition**	See comments	**Status**	pass
Sensor Component	Gauge Drain Screen	**Condition**	Not installed	**Status**	Fail
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**	Not installed	**Status**	Fail

Infrastructure Data For

Site ID THR422 **Technician** Eric Hebert **Site Visit Date** 09/09/2013

Shelter Make	Shelter Model	Shelter Size
Ekto	8814 (s/n 3028-1)	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**	Installed	**Status**	pass
Sensor Component	Power Cables	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer	**Condition**	Installed	**Status**	pass
Sensor Component	Conduit	**Condition**	Fair	**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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	THR422	Eric Hebert	09/09/2013	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.54	0.83

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232679

Tfer Desc. RTD

Tfer ID 01228

Slope 1.00732

Intercept -0.12380

Cert Date 1/12/2013

CorrCoff 1.00000

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Mid Range	22.78	22.74	0.000	23.0	C	0.26
primary	Temp Mid Range	21.75	21.71	0.000	22.5	C	0.83

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	THR422	Eric Hebert	09/09/2013	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.

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Precipitation	THR422	Eric Hebert	09/09/2013	Properly Sited	Climatronics	3854	☐	☑

Objects violate the 45 degree rule for the tipping bucket rain gage.

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 temperature shield is pointing south into the prevailing wind. Objects violate the 45 degree rule for the tipping bucket rain gage.

6 **Parameter:** MetOpMaintCom

The blower for the RH sensor is not functioning.

Field Systems Data Form

F-02058-1500-S1-rev001

Site ID THR422 **Technician** Eric Hebert **Site Visit Date** 09/09/2013

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-rev001

Site ID THR422

Technician Eric Hebert

Site Visit Date 09/09/2013

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-rev001

Site ID THR422 **Technician** Eric Hebert **Site Visit Date** 09/09/2013

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 shield is pointing south into the prevailing wind. Objects violate the 45 degree rule for the tipping bucket rain gage.

Field Systems Data Form

F-02058-1500-S4-rev001

Site ID THR422 **Technician** Eric Hebert **Site Visit Date** 09/09/2013

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?	☑	

Parameter	Manufacturer	Model	S/N	Client ID
Temperature	Climatronics	100093	7974	none
Shield (10 meter)	Climatronics	100325	2589	none
Wind Speed	Climatronics	100075	1489	90925
Wind Direction	Climatronics	100076	1725	90886
Solar Radiation	Licor	LI-200	PY33503	none
Relative Humidity	Rotronic	MP 601A	32736	none
Precipitation	Climatronics	100508-2	illegible	01328
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:

The blower for the RH sensor is not functioning.

Field Systems Data Form

F-02058-1500-S5-rev001

Site ID THR422 **Technician** Eric Hebert **Site Visit Date** 09/09/2013

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?	☑	Flow line only
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

Parameter	Manufacturer	Model	S/N	Client ID
Sample Tower	Aluma Tower	B	AT-81077-J5	none
Ozone	ThermoElectron Inc	49i A3NAA	0632119500	none
Filter pack flow pump	Thomas	107CAB18	049400004441	03634
Zero air pump	Thomas	607CA22C	039500000348	none
MFC power supply	Tylan	RO-32	FP902022	00042

Provide any additional 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-rev001

Site ID THR422 **Technician** Eric Hebert **Site Visit Date** 09/09/2013

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?

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	65606	5CB1520H68	none
DAS	Environmental Sys Corp	8816	2600	90656
F460 translator	Climatronics	100163	684	none
Mainframe	Climatronics	100081	1911	none
Mainframe power supply	Climatronics	101074	unknown	none
Modem	US Robotics	14.4 fax modem	9244894	none
Solar Radiation Translator	Climatronics	100144	662	none
Temperature Translator	Climatronics	100088-2	217	01545

Provide any additional 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-rev001

Site ID THR422 **Technician** Eric Hebert **Site Visit Date** 09/09/2013

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:

Field Systems Data Form

F-02058-1500-S8-rev001

Site ID THR422 **Technician** Eric Hebert **Site Visit Date** 09/09/2013

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)	☑	Weekly	☑
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	☐	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-rev001

Site ID THR422 **Technician** Eric Hebert **Site Visit Date** 09/09/2013

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?	☑	Clean gloves on and off
9	Are the site conditions reported regularly to the field operations manager or staff?	☐	

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

Provide any additional 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 Inventory by Site Visit

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

WNC429-Eric Hebert-09/11/2013

Site Visit Date		*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
1	9/11/2013	Computer	Hewlett Packard	none	6560 b	5CB1520H5J
2	9/11/2013	DAS	Environmental Sys Corp	missing	8816	4159
3	9/11/2013	Elevation	Elevation	None	1	None
4	9/11/2013	flow rate	Mykrolis	none	FC280SAV-4S	AW902153
5	9/11/2013	Infrastructure	Infrastructure	none	none	none
6	9/11/2013	Met tower	unknown	none	unknown	none
7	9/11/2013	MFC power supply	Tylan	none	RO-32	FP9706002
8	9/11/2013	Modem	US Robotics	none	56k fax modem	unknown
9	9/11/2013	Ozone	ThermoElectron Inc	none	49i A3NAA	0615817056
10	9/11/2013	Ozone Standard	ThermoElectron Inc	none	49i PSA2AB	0807328333
11	9/11/2013	Precipitation	Climatronics	91050	100508-2	illegible
12	9/11/2013	Relative Humidity	Rotronic	none	MP 601	52067
13	9/11/2013	Sample Tower	Aluma Tower	none	B	none
14	9/11/2013	Shelter Temperature	ARS	none	none	none
15	9/11/2013	Shield (10 meter)	RM Young	none	43502	None
16	9/11/2013	Siting Criteria	Siting Criteria	None	1	None
17	9/11/2013	Solar Radiation	Licor	none	LI-200	PY79874
18	9/11/2013	Solar Radiation Translator	RM Young	none	70101-X	none
19	9/11/2013	Temperature	RM Young	none	41342	14264
20	9/11/2013	Wind Direction	RM Young	90853	AQ05103-5	39243wdr
21	9/11/2013	Wind Speed	RM Young	90853	AQ05103-5	39243wsp
22	9/11/2013	Zero air pump	ThermoElectron Inc	none	111	111-78387-388

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Mykrolis	AW902153	WNC429	Eric Hebert	09/11/2013	flow rate	none

Mfg Tylan

SN/Owner ID FP9706002 none

Parameter MFC power supply

Mfg BIOS

Parameter Flow Rate

Serial Number 122974

Tfer Desc. BIOS 220-H

Tfer ID 01416

Slope 1.00000

Intercept 0.00000

Cert Date 1/8/2013

CorrCoff 1.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
0.98%	1.16%		

Cal Factor Zero 0.158

Cal Factor Full Scale 9.645

Rotometer Reading: 3.45

UseDescription:	Test type:	Input l/m:	Input STP:	MfcDisp.:	OutputSignal:	Output S E:	InputUnit:	OutputSignalI	PctDifference:
primary	pump off	0.000	0.000	-0.12	-0.0790	0.01	l/m	l/m	
primary	leak check	0.000	0.000	-0.11	-0.0740	0.01	l/m	l/m	
primary	test pt 1	0.000	3.029	1.50	1.4986	3.00	l/m	l/m	-0.94%
primary	test pt 2	0.000	3.025	1.50	1.4986	3.00	l/m	l/m	-0.84%
primary	test pt 3	0.000	3.035	1.50	1.4986	3.00	l/m	l/m	-1.16%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	90 deg	**Status**	pass
Sensor Component	Filter Depth	**Condition**	-4.0 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**	Clean and dry	**Status**	pass
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.5 cm	**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	0615817056	WNC429	Eric Hebert	09/11/2013	Ozone	none

Slope:	0.95048	**Slope:**	0.00000
Intercept	0.71139	**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**
3.4%	4.4%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	517112175	**Tfer Desc.**	Ozone primary stan
Tfer ID	01111		
Slope	0.99720	**Intercept**	0.18428
Cert Date	1/2/2013	**CorrCoff**	1.00000

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	0.09	-0.09	0.39	ppb	
primary	2	30.42	30.32	29.79	ppb	-1.75%
primary	3	51.23	51.18	49.54	ppb	-3.20%
primary	4	85.14	85.19	81.46	ppb	-4.38%
primary	5	111.27	111.39	106.60	ppb	-4.30%

Sensor Component	Cell B Noise	**Condition**	1.3 ppb	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**		**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	9.9986	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	N/A	**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	Offset	**Condition**	0.000	**Status**	pass
Sensor Component	Span	**Condition**	1.303	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	62.0 kHz	**Status**	Fail
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**	0.8 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	34.4 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**	55.4 kHz	**Status**	Fail
Sensor Component	Cell A Flow	**Condition**	0.64 lpm	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	0.0087	**Status**	pass

Wind Speed Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
RM Young	39243wsp	WNC429	Eric Hebert	09/11/2013	Wind Speed	90853

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	1/13/2010	**CorrCoff**	1.00000
Mfg	RM Young	**Parameter**	wind speed
Serial Number		**Tfer Desc.**	wind speed motor (l
Tfer ID	01261		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/13/2010	**CorrCoff**	1.00000

Prop or Cups SN	64425		
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	0.27	1.67%		
Abs Max Er	0.35	5.86%		

UseDescription:	InputDevice:	Input RPM:	Input m/s:	Output V:	DAS m/s:	Diff/ %Diff:	Difference:
primary	none	0	0.20	0.0000	0.0		-0.20
primary	01262	200	1.02	0.0000	1.2		0.21
primary	01262	400	2.05	0.0000	2.4		0.35
primary	01262	800	4.10	0.0000	4.4		0.30
primary	01262	1200	6.14	0.0000	6.5	5.86%	
primary	01262	2400	12.29	0.0000	12.4	0.81%	
primary	01262	4000	20.48	0.0000	20.5	0.00%	
primary	01262	9400	48.13	0.0000	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**		**Status**	pass

Wind Direction Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	39243wdr	WNC429	Eric Hebert	09/11/2013	Wind Direction	90853

Mfg Ushikata **Parameter** wind direction

Serial Number 190037 **Tfer Desc.** transit

Tfer ID 01265

Slope 1.00000 **Intercept** 0.00000

Cert Date 1/4/2011 **CorrCoff** 1.00000

Mfg RM Young **Parameter** wind direction

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

Tfer ID 01266

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

VaneTorque 10 **to** 15 360

	DAS 1:		DAS 2:	
	Orientation	Linearity:	Orientation	Linearity:
Abs Avg Err	1.0	1.5		
Abs Max Er	2	3		

UseDescription:	TferID:	Input Raw:	Linearity	Output V:	Output Deg.:	Difference:	Change:	Error:
primary	01266	0	☑	0.0000	358	2	42	-3
primary	01266	45	☑	0.0000	46	1	48	3
primary	01266	90	☑	0.0000	89	1	43	-2
primary	01266	135	☑	0.0000	135	0	46	1
primary	01266	180	☑	0.0000	180	0	45	0
primary	01266	225	☑	0.0000	225	0	45	0
primary	01266	270	☑	0.0000	269	1	44	-1
primary	01266	315	☑	0.0000	316	1	47	2
primary	01265	90	☐	0.0000	89	1		1
primary	01265	180	☐	0.0000	180	0		0
primary	01265	270	☐	0.0000	269	1		1
primary	01265	360	☐	0.0000	358	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 Torque **Condition** **Status** pass

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

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

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	14264	WNC429	Eric Hebert	09/11/2013	Temperature	none

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00732	**Intercept**	-0.12380
Cert Date	1/12/2013	**CorrCoff**	1.00000

DAS 1:		**DAS 2:**	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.08	0.21		

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Low Range	-0.07	0.05	0.0000	0.3	C	0.21
primary	Temp Mid Range	23.99	23.94	0.0000	23.9	C	-0.02
primary	Temp High Range	44.45	44.25	0.0000	44.2	C	-0.01

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**		**Status**	pass

Humidity Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Rotronic	52067	WNC429	Eric Hebert	09/11/2013	Relative Humidity	none

Mfg Rotronic **Parameter** Relative Humidity

Serial Number 124432 **Tfer Desc.** Hygroclip

Tfer ID 01225

Slope 1.00000 **Intercept** 0.00000

Cert Date 1/29/2013 **CorrCoff** 1.00000

	DAS 1:		DAS 2:	
	Low Range	High Range	Low Range	High Range
Abs Avg Err	0.9	3.9		
Abs Max Er	1.1	3.9		

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	0.0000	33.4	0.6
primary	RH Low Range	Hygroclip	52.9	0.0	52.9	0.0000	51.8	-1.1
primary	RH High Range	Hygroclip	93.6	0.0	93.6	0.0000	89.7	-3.9

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

Sensor Component Blower **Condition** Functioning **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 Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Licor	PY79874	WNC429	Eric Hebert	09/11/2013	Solar Radiation	none

Mfg RM Young

SN/Owner ID none none

Parameter Solar Radiation Translator

Mfg Eppley **Parameter** solar radiation

Serial Number 10765 **Tfer Desc.** SR transfer translat

Tfer ID 01246

Slope 1.00000 **Intercept** 0.00000

Cert Date 1/6/2010 **CorrCoff** 1.00000

Mfg Eppley **Parameter** solar radiation

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

Tfer ID 01245

Slope 1.00000 **Intercept** 0.00000

Cert Date 12/16/2010 **CorrCoff** 1.00000

DAS 1:		DAS 2:	
% Diff of Avg	%Diff of Max	%Diff of Avg	%Diff of Max
8.4%	6.8%	0.0%	0.0%

UseDescription:	Measure Date	MeasureTime	Tfer Corr:	DAS w/m2:	PctDifference:
primary	9/11/2013	14:00	376	350	-7.0%
primary	9/11/2013	15:00	231	187	-19.1%
primary	9/12/2013	10:00	518	475	-8.5%
primary	9/12/2013	11:00	732	681	-7.0%
primary	9/12/2013	12:00	765	707	-7.7%
primary	9/12/2013	13:00	769	717	-6.8%
primary	9/12/2013	14:00	317	290	-8.5%
primary	9/12/2013	15:00	328	294	-10.5%

Sensor Component		Condition		Status	
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
Climatronics	illegible	WNC429	Eric Hebert	09/11/2013	Precipitation	91050

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
100.0%	100.0%		

UseDesc.	Test type:	TferVolume:	Iteration:	TimePerTip:	Eq.Ht:	DAS eng:	Eq.HtUnit:	OSE Unit:	TferUnits:	PctDifference
primary	tip check	10 manual	1	2 sec	1.00	0.00	mm	mm	ml	
primary	test 1	231.5	1	10 sec	5.00	0.00	mm	mm	ml	-100.0%

Sensor Component	System Memo	**Condition**	See comments	**Status**	pass
Sensor Component	Sensor Heater	**Condition**	Functioning	**Status**	pass
Sensor Component	Properly Sited	**Condition**	Properly sited	**Status**	pass
Sensor Component	Gauge Drain Screen	**Condition**	Not installed	**Status**	fail
Sensor Component	Level	**Condition**	Level	**Status**	pass
Sensor Component	Gauge Clean	**Condition**	Moderately clean	**Status**	pass
Sensor Component	Funnel Clean	**Condition**	Clean	**Status**	pass
Sensor Component	Condition	**Condition**	Poor	**Status**	fail
Sensor Component	Gauge Screen	**Condition**	Installed	**Status**	pass

Infrastructure Data For

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 09/11/2013

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	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**	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**	Good	**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	WNC429	Eric Hebert	09/11/2013	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.90	1.46

DAS 2:

Abs Avg Err	Abs Max Er

Mfg Extech

Parameter Shelter Temperatur

Serial Number H232679

Tfer Desc. RTD

Tfer ID 01228

Slope 1.00732

Intercept -0.12380

Cert Date 1/12/2013

CorrCoff 1.00000

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Mid Range	21.02	20.99	0.000	22.2	C	1.18
primary	Temp Mid Range	19.84	19.82	0.000	21.3	C	1.46
primary	Temp Mid Range	22.45	22.41	0.000	22.4	C	-0.05

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>09/11/2013</td><td>Filter Position</td><td>Mykrolis</td><td>1887</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>09/11/2013</td><td>Cell B 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>Ozone</td><td>WNC429</td><td>Eric Hebert</td><td>09/11/2013</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>Precipitation</td><td>WNC429</td><td>Eric Hebert</td><td>09/11/2013</td><td>System Memo</td><td>Climatronics</td><td>2755</td><td>☐</td><td>☑</td></tr>
<tr><td colspan="9">This measurement system is damaged and not functioning.</td></tr>
<tr><td>Shelter Temperature</td><td>WNC429</td><td>Eric Hebert</td><td>09/11/2013</td><td>Accuracy Mid Ra</td><td>ARS</td><td>2285</td><td>☐</td><td>☑</td></tr>
<tr><td colspan="9">The shelter temperature is going outside CFR requirements for pollutant monitor operation.</td></tr>
</table>

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The purpose for completing the general observations section of the SSRF was discussed with the site operator.

2 **Parameter:** SiteOpsProcedures

The ozone analyzer is operated by the state of South Dakota. There is no means for introducing test gas at the sample inlet. 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.

6 **Parameter:** MetOpMaintCom

The tipping bucket rain gage is not functioning.

Field Systems Data Form

F-02058-1500-S1-rev001

Site ID WNC429

Technician Eric Hebert

Site Visit Date 09/11/2013

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-rev001

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 09/11/2013

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-rev001

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 09/11/2013

1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	☑	
2	Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind)	☑	
3	Are the tower and sensors plumb?	☑	
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?	☑	
5	Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)	☑	
6	Is the solar radiation sensor plumb?	☑	
7	Is it sited to avoid shading, or any artificial or reflected light?	☑	
8	Is the rain gauge plumb?	☑	
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	☑	
10	Is the surface wetness sensor sited with the grid surface facing north?	☑	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-rev001

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 09/11/2013

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

Parameter	Manufacturer	Model	S/N	Client ID
Precipitation	Climatronics	100508-2	illegible	91050
Wind Direction	RM Young	AQ05103-5	39243wdr	90853
Wind Speed	RM Young	AQ05103-5	39243wsp	90853
Relative Humidity	Rotronic	MP 601	52067	none
Solar Radiation	Licor	LI-200	PY79874	none
Temperature	RM Young	41342	14264	none
Shield (10 meter)	RM Young	43502	None	none
Met tower	unknown	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:

The tipping bucket rain gage is not functioning.

Field Systems Data Form

F-02058-1500-S5-rev001

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 09/11/2013

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

Parameter	Manufacturer	Model	S/N	Client ID
Sample Tower	Aluma Tower	B	none	none
Ozone	ThermoElectron Inc	49i A3NAA	0615817056	none
Zero air pump	ThermoElectron Inc	111	111-78387-388	none
MFC power supply	Tylan	RO-32	FP9706002	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:

The dry deposition filter is mounted low in the enclosure which changes the particle collection characteristics, and can allow precipitation to enter.

Field Systems Data Form

F-02058-1500-S6-rev001

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 09/11/2013

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?	☑	Both on

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

11 Tower comments?

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	6560 b	5CB1520H5J	none
DAS	Environmental Sys Corp	8816	4159	missing
Modem	US Robotics	56k fax modem	unknown	none
Solar Radiation Translator	RM Young	70101-X	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-S7-rev001

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 09/11/2013

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

	Present		Current
Station Log	☑	Dataview	☑
SSRF	☑		☑
Site Ops Manual	☑	Jan 2006	☑
HASP	☐		☐
Field Ops Manual	☐		☐
Calibration Reports	☑		☐
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedul	☐		☐

1	Is the station log properly completed during every site visit?	☑	Dataview
2	Are the Site Status Report Forms being completed and current?	☑	
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-rev001

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 09/11/2013

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	☑	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	☐		☐

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 test gas at the sample inlet. Audit test gas was introduced through the sample inlet flooding the glass manifold.

Field Systems Data Form

F-02058-1500-S9-rev001

Site ID WNC429 **Technician** Eric Hebert **Site Visit Date** 09/11/2013

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 purpose for completing the general observations section of the SSRF was discussed with the site operator.

Site Inventory by Site Visit

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
STK138-Eric Hebert-09/19/2013						
1	9/19/2013	Computer	Dell	000248	D520	unknown
2	9/19/2013	DAS	Campbell	000349	CR3000	2128
3	9/19/2013	Elevation	Elevation	None	1	None
4	9/19/2013	Filter pack flow pump	Thomas	04923	107CAB18	060300019959
5	9/19/2013	Flow Rate	Mykrolis	000238	FC280SAV	AW06273005
6	9/19/2013	Infrastructure	Infrastructure	none	none	none
7	9/19/2013	MFC power supply	MACTEC	04997	none	none
8	9/19/2013	Modem	Raven	06603	H4223-C	0844356279
9	9/19/2013	Ozone	ThermoElectron Inc	000610	49i A1NAA	1009241778
10	9/19/2013	Ozone Standard	ThermoElectron Inc	000450	49i A3NAA	CM08200026
11	9/19/2013	Sample Tower	Aluma Tower	03554	A	none
12	9/19/2013	Shelter Temperature	Campbell	none	107-L	unknown
13	9/19/2013	Siting Criteria	Siting Criteria	None	1	None
14	9/19/2013	Temperature	RM Young	06407	41342VC	14040
15	9/19/2013	Zero air pump	Werther International	06915	C 70/4	000829162

DAS Data Form

DAS Time Max Error: 0.03

Mfg	**Serial Number**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Use Desc.**
Campbell	2128	STK138	Eric Hebert	09/19/2013	DAS	Primary

Das Date: 9 /19/2013
Das Time: 15:45:58
Das Day: 262

Audit Date 9 /19/2013
Audit Time 15:46:00
Audit Day 262

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 4000392
Tfer Desc. Source generator (D
Tfer ID 01321
Slope 1.00000
Intercept 0.00000
Cert Date 2/13/2012
CorrCoff 1.00000

Mfg Fluke
Parameter DAS
Serial Number 86590148
Tfer Desc. DVM
Tfer ID 01310
Slope 1.00000
Intercept 0.00000
Cert Date 1/27/2013
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
Mykrolis	AW06273005	STK138	Eric Hebert	09/19/2013	Flow Rate	000238

Mfg MACTEC

SN/Owner ID none 04997

Parameter MFC power supply

Mfg BIOS

Parameter Flow Rate

Serial Number 122974

Tfer Desc. BIOS 220-H

Tfer ID 01416

Slope 1.00000

Intercept 0.00000

Cert Date 1/8/2013

CorrCoff 1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
1.69%	2.11%		

Cal Factor Zero -0.13

Cal Factor Full Scale 0.96

Rotometer Reading: 1.45

UseDescription:	Test type:	Input l/m:	Input STP:	MfcDisp.:	OutputSignal:	Output S E:	InputUnit:	OutputSignalI	PctDifference:
primary	pump off	0.000	0.000	0.11	0.111	-0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.12	0.126	0.00	l/m	l/m	
primary	test pt 1	0.000	1.520	1.49	1.498	1.50	l/m	l/m	-1.30%
primary	test pt 2	0.000	1.525	1.49	1.498	1.50	l/m	l/m	-1.67%
primary	test pt 3	0.000	1.532	1.49	1.498	1.50	l/m	l/m	-2.11%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	270 deg	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.0 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	1009241778	STK138	Eric Hebert	09/19/2013	Ozone	000610

Slope:	0.96544	**Slope:**	0.00000
Intercept	0.07959	**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
3.3%	3.6%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	517112175	**Tfer Desc.**	Ozone primary stan
Tfer ID	01111		
Slope	0.99720	**Intercept**	0.18428
Cert Date	1/2/2013	**CorrCoff**	1.00000

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	-0.16	-0.34	-0.23	ppb	
primary	2	23.41	23.29	22.61	ppb	-2.92%
primary	3	53.57	53.53	51.75	ppb	-3.33%
primary	4	77.07	77.10	74.34	ppb	-3.58%
primary	5	107.51	107.62	104.10	ppb	-3.27%

Sensor Component	Cell B Noise	**Condition**	0.8 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**	0.30	**Status**	pass
Sensor Component	Span	**Condition**	0.997	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	84.1 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**	0.70 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	30.4 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	702 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	1.0 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	93.4 kHz	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.71 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 Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	14040	STK138	Eric Hebert	09/19/2013	Temperature	06407

Mfg Extech

Parameter Temperature

Serial Number H232679

Tfer Desc. RTD

Tfer ID 01228

Slope 1.00732

Intercept -0.12380

Cert Date 1/12/2013

CorrCoff 1.00000

DAS 1: Abs Avg Err	DAS 1: Abs Max Er	DAS 2: Abs Avg Err	DAS 2: Abs Max Er
0.07	0.14		

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Low Range	0.20	0.32	0.000	0.4	C	0.03
primary	Temp Mid Range	22.26	22.22	0.000	22.3	C	0.04
primary	Temp High Range	46.23	46.02	0.000	46.2	C	0.14

Sensor Component		Condition		Status	
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

Infrastructure Data For

Site ID STK138 **Technician** Eric Hebert **Site Visit Date** 09/19/2013

Shelter Make	**Shelter Model**	**Shelter Size**
Ekto	8810 (s/n 2149-21)	640 cuft

Sensor Component	Shelter Roof	**Condition**	Good	**Status**	pass
Sensor Component	Sample Tower Type	**Condition**	Type 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**	Fair	**Status**	pass
Sensor Component	Rotometer	**Condition**	Installed	**Status**	pass
Sensor Component	Conduit	**Condition**	N/A	**Status**	pass
Sensor Component	Sample Tower	**Condition**	Fair	**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**	Good	**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	unknown	STK138	Eric Hebert	09/19/2013	Shelter Temperature	none

DAS 1:

Abs Avg Err	Abs Max Er
0.73	1.12

DAS 2:

Abs Avg Err	Abs Max Er

Mfg	Extech	**Parameter**	Shelter Temperatur
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00732	**Intercept**	-0.12380
Cert Date	1/12/2013	**CorrCoff**	1.00000

UseDesc.:	Test type:	InputTmpRaw	InputTmpCorr.:	OutputTmpSignal:	OutputSignalEng:	OSE Unit:	Difference:
primary	Temp Mid Range	26.18	26.11	0.000	26.3	C	0.22
primary	Temp Mid Range	24.25	24.20	0.000	25.3	C	1.12
primary	Temp Mid Range	26.07	26.00	0.000	25.1	C	-0.86

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:** MetOpMaintCom

The met tower is no longer in use. The temperature sensor is mounted in a naturally aspirated shield on the sample tower.

Field Systems Data Form F-02058-1500-S1-rev001

Site ID STK138 **Technician** Eric Hebert **Site Visit Date** 09/19/2013

Site Sponsor (agency)	EPA	**USGS Map**		Kent
Operating Group	Private	**Map Scale**		
AQS #	17-085-9991	**Map Date**		
Meteorological Type	R.M. Young			
Air Pollutant Analyzer	Ozone	**QAPP Latitude**		42.2872
Deposition Measurement	dry	**QAPP Longitude**		-89.9998
Land Use	agricultural	**QAPP Elevation Meters**		274
Terrain	rolling	**QAPP Declination**		1.3
Conforms to MLM	Yes	**QAPP Declination Date**		2/22/2006
Site Telephone		**Audit Latitude**		42.287216
Site Address 1	10939 E. Parker Road	**Audit Longitude**		-89.99995
Site Address 2		**Audit Elevation**		281
County	Jo Daviess	**Audit Declination**		-1.3
City, State	Stockton, IL		**Present**	
Zip Code	61085	**Fire Extinguisher**	☑	No inspection date
Time Zone	Central	**First Aid Kit**	☑	
Primary Operator		**Safety Glasses**	☐	
Primary Op. Phone #		**Safety Hard Hat**	☑	
Primary Op. E-mail		**Climbing Belt**	☐	
Backup Operator		**Security Fence**	☐	
Backup Op. Phone #		**Secure Shelter**	☐	
Backup Op. E-mail		**Stable Entry Step**	☑	

Shelter Working Room ☑ **Make** 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-rev001

Site ID STK138 **Technician** Eric Hebert **Site Visit Date** 09/19/2013

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-rev001

Site ID STK138

Technician Eric Hebert

Site Visit Date 09/19/2013

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-rev001

Site ID STK138 **Technician** Eric Hebert **Site Visit Date** 09/19/2013

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

Parameter	Manufacturer	Model	S/N	Client ID
Temperature	RM Young	41342VC	14040	06407

Provide any additional 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. The temperature sensor is mounted in a naturally aspirated shield on the sample tower.

Field Systems Data Form

F-02058-1500-S5-rev001

Site ID STK138 **Technician** Eric Hebert **Site Visit Date** 09/19/2013

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?	☑	
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

Parameter	Manufacturer	Model	S/N	Client ID
Sample Tower	Aluma Tower	A	none	03554
MFC power supply	MACTEC	none	none	04997
Ozone	ThermoElectron Inc	49i A1NAA	1009241778	000610
Filter pack flow pump	Thomas	107CAB18	060300019959	04923
Zero air pump	Werther International	C 70/4	000829162	06915

Provide any additional 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-rev001

Site ID STK138 **Technician** Eric Hebert **Site Visit Date** 09/19/2013

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?

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	D520	unknown	000248
DAS	Campbell	CR3000	2128	000349
Modem	Raven	H4223-C	0844356279	06603

Provide any additional 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-rev001

Site ID STK138 **Technician** Eric Hebert **Site Visit Date** 09/19/2013

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 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?	☑	
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-rev001

Site ID STK138 **Technician** Eric Hebert **Site Visit Date** 09/19/2013

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-rev001

Site ID STK138 **Technician** Eric Hebert **Site Visit Date** 09/19/2013

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:

APPENDIX B

CASTNET Site Spot Report Forms

EEMS Spot Report

Data Compiled: 1/29/2014 8:16:01 PM

SiteVisitDate	Site	Technician
06/26/2012	ALH157	Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.01474	unitless	**P**
2	Ozone Intercept	P	0	5	4	0.27292	ppb	**P**
3	Ozone correlation	P	0	0.995	4	1.00000	unitless	**P**
4	Ozone % difference avg	P	7	10	4	1.8	%	**P**
5	Ozone % difference max	P	7	10	4	2.1	%	**P**

EEMS Spot Report

Data Compiled: 3/14/2014 3:34:57 PM

SiteVisitDate	Site	Technician
07/22/2013	BAS601	Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	5	2.09	c	**Fail**
2	Temperature max error	P	4	0.5	5	6.41	c	**Fail**
3	Relative Humidity average above 85%	P	6	10	1	4.1	%	**P**
4	Relative Humidity max above 85%	P	6	10	1	4.1	%	**P**
5	Relative Humidity average below 85%	P	6	10	2	1.1	%	**P**
6	Relative Humidity max below 85%	P	6	10	2	1.2	%	**P**
7	Solar Radiation % diff of avg	P	9	10	4	0.95	%	**P**
8	Solar Radiation % diff of max STD value	P	9	10	4	0.10	%	**P**
9	Precipitation average % difference	P	1	10	1	0.0	%	**P**
10	Precipitation max % difference	P	1	10	1	0.0	%	**P**
11	Ozone Slope	P	0	1.1	4	0.97762	unitless	**P**
12	Ozone Intercept	P	0	5	4	0.89641	ppb	**P**
13	Ozone correlation	P	0	0.995	4	0.99997	unitless	**P**
14	Ozone % difference avg	P	7	10	4	0.9	%	**P**
15	Ozone % difference max	P	7	10	4	1.3	%	**P**
16	Flow Rate average % difference	P	10	5	2	0.93	%	**P**
17	Flow Rate max % difference	P	10	5	2	1.31	%	**P**
18	Shelter Temperature average error	P	5	1	3	1.57	c	**Fail**
19	Shelter Temperature max error	P	5	1	3	2.23	c	**Fail**

SiteVisitDate	Site	Technician
07/22/2013	BAS601	Eric Hebert

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The proper completion of the filter chain-of-custody form was discussed with the site operator. The proper observation of the site vegetation and completion of the SSRF was discussed with the site operator. There are no clean spare filter caps or Ziploc filter bags on site. The bag and caps for the received filter are being used to send the removed filter back to the lab.

2 **Parameter:** ShelterCleanNotes

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

3 **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.

4 **Parameter:** MetOpMaintCom

The site utilizes a Climatronics AIO all-in-one weather sensor for wind direction, wind speed, and temperature. The sensor was not audited. A separate sensor for humidity and temperature was audited.

EEMS Spot Report

Data Compiled: 1/29/2014 8:18:23 PM

SiteVisitDate	Site	Technician
07/31/2013	BVL130	Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.31	c	**P**
2	Temperature2meter max error	P	5	0.5	3	0.47	c	**P**
3	Wind Speed average error below 5m/s in m/s	P	3	0.5	4	0.02	m/s	**P**
4	Wind Speed max error below 5m/s in m/s	P	3	0.5	4	0.05	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	0.35	g-cm	**P**
8	Wind Speed Torque max error	P	3	0.5	1	0.4	g-cm	**P**
9	Wind Direction Input Deg True average error (de	P	2	5	8	2.2	degrees	**P**
10	Wind Direction Input Deg True max error (deg)	P	2	5	8	4	degrees	**P**
11	Wind Direction Linearity average error (deg)	P	2	5	16	1.8	degrees	**P**
12	Wind Direction Linearity max error (deg)	P	2	5	16	7	degrees	**Fail**
13	Wind Direction Torque average error	P	2	20	1	9	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	0.14	c	**P**
16	Temperature max error	P	4	0.5	9	0.25	c	**P**
17	Relative Humidity average above 85%	P	6	10	4	0.8	%	**P**
18	Relative Humidity max above 85%	P	6	10	4	0.8	%	**P**
19	Relative Humidity average below 85%	P	6	10	8	1.8	%	**P**
20	Relative Humidity max below 85%	P	6	10	8	2.0	%	**P**
21	Precipitation average % difference	P	1	10	2	4.0	%	**P**
22	Precipitation max % difference	P	1	10	2	4.0	%	**P**
23	Ozone Slope	P	0	1.1	4	0.95159	unitless	**P**
24	Ozone Intercept	P	0	5	4	0.75261	ppb	**P**
25	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
26	Ozone % difference avg	P	7	10	4	3.4	%	**P**
27	Ozone % difference max	P	7	10	4	4.2	%	**P**
28	Flow Rate average % difference	P	10	5	2	2.78	%	**P**
29	Flow Rate max % difference	P	10	5	2	2.82	%	**P**
30	DAS Time maximum error	P	0	5	1	0.02	min	**P**
31	DAS Voltage average error	P	7	0.003	28	0.0001	V	**P**
32	Shelter Temperature average error	P	5	1	9	0.36	c	**P**
33	Shelter Temperature max error	P	5	1	9	0.47	c	**P**

SiteVisitDate	**Site**	**Technician**
07/31/2013	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:** Wind Direction **SensorComponent:** Condition **CommentCode** 147

The upper and lower sections of the wind sensor body are loose. This condition will cause premature failure of the sensor and can affect data accuracy.

Field Systems Comments

1 **Parameter:** DasComments

The tower pin which prevents the tower from tilting is missing from the leg of the tower.

2 **Parameter:** SiteOpsProcedures

Ozone sample line leak-checks are performed every 2 weeks.

3 **Parameter:** SitingCriteriaCom

The site is located in an agricultural and atmospheric research center. There are crops within 50 meters.

4 **Parameter:** ShelterCleanNotes

The shelter is clean and well organized.

5 **Parameter:** MetSensorComme

The tipping bucket rain gage is mounted near the towers and in violation of the 45 degree rule.

6 **Parameter:** MetOpMaintCom

The wind sensor crossarm signal cable is showing signs of wear. The wind sensor heaters are not functioning.

EEMS Spot Report

Data Compiled: 1/29/2014 4:06:41 PM

SiteVisitDate	Site	Technician
07/18/2013	GLR468	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	0.05	m/s	**P**
2	Wind Speed max error below 5m/s in m/s	P	3	0.5	4	0.20	m/s	**P**
3	Wind Speed average % difference above 5 m/s	P	3	5	4	0.0	%	**P**
4	Wind Speed max % difference above 5 m/s	P	3	5	4	0.0	%	**P**
5	Wind Speed Torque average error	P	3	0.5	1	0.30	g-cm	**P**
6	Wind Speed Torque max error	P	3	0.5	1	0.3	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	Wind Direction Linearity average error (deg)	P	2	5	8	1.0	degrees	**P**
10	Wind Direction Linearity max error (deg)	P	2	5	8	2	degrees	**P**
11	Wind Direction Torque average error	P	2	20	1	12	g-cm	**P**
12	Wind Direction Torque max error	P	2	20	1	12	g-cm	**P**
13	Temperature average error	P	4	0.5	3	0.09	c	**P**
14	Temperature max error	P	4	0.5	3	0.13	c	**P**
15	Relative Humidity average above 85%	P	6	10	1	4.5	%	**P**
16	Relative Humidity max above 85%	P	6	10	1	4.5	%	**P**
17	Relative Humidity average below 85%	P	6	10	2	1.2	%	**P**
18	Relative Humidity max below 85%	P	6	10	2	2.2	%	**P**
19	Solar Radiation % diff of avg	P	9	10	6	2.83	%	**P**
20	Solar Radiation % diff of max STD value	P	9	10	6	0.10	%	**P**
21	Precipitation average % difference	P	1	10	2	3.0	%	**P**
22	Precipitation max % difference	P	1	10	2	4.0	%	**P**
23	Ozone Slope	P	0	1.1	4	1.02524	unitless	**P**
24	Ozone Intercept	P	0	5	4	0.15050	ppb	**P**
25	Ozone correlation	P	0	0.995	4	0.99993	unitless	**P**
26	Ozone % difference avg	P	7	10	4	2.5	%	**P**
27	Ozone % difference max	P	7	10	4	3.3	%	**P**
28	Flow Rate average % difference	P	10	5	2	1.13	%	**P**
29	Flow Rate max % difference	P	10	5	2	1.26	%	**P**
30	DAS Time maximum error	P	0	5	1	0.72	min	**P**
31	DAS Voltage average error	P	9	0.003	35	0.0002	V	**P**
32	DAS Voltage average error	P	2	0.003	35	0.0002	V	**P**
33	Shelter Temperature average error	P	5	1	9	1.91	c	**Fail**
34	Shelter Temperature max error	P	5	1	9	3.37	c	**Fail**

SiteVisitDate	**Site**	**Technician**
07/18/2013	GLR468	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:** Precipitation **SensorComponent:** Properly Sited **CommentCode** 193

Objects violate the 45 degree rule for the tipping bucket rain gage.

3 **Parameter:** Shelter Temperatur **SensorComponent:** Accuracy Mid Ran **CommentCode** 213

The shelter temperature is going outside CFR requirements for pollutant monitor operation.

4 **Parameter:** Temperature **SensorComponent:** System Memo **CommentCode** 141

The temperature sensor is mounted directly above the shelter roof.

Field Systems Comments

1 **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.

2 **Parameter:** ShelterCleanNotes

The shelter is in good condition, clean, neat, and well organized. Evidence of repairs to roof leaks attempted.

3 **Parameter:** PollAnalyzerCom

The tygon dry deposition filter flow tubing has been replaced with Teflon since the previous audit visit.

4 **Parameter:** MetSensorComme

The temperature and relative humidity sensors are mounted directly above the metal shelter roof.

5 **Parameter:** MetOpMaintCom

The signal cables are showing signs of wear.

EEMS Spot Report

Data Compiled: 1/29/2014 8:20:49 PM

SiteVisitDate	Site	Technician
07/29/2013	NEC602	Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	4	1.81	c	**Fail**
2	Temperature max error	P	4	0.5	4	5.00	c	**Fail**
3	Relative Humidity average above 85%	P	6	10	1	4.9	%	**P**
4	Relative Humidity max above 85%	P	6	10	1	4.9	%	**P**
5	Relative Humidity average below 85%	P	6	10	2	0.5	%	**P**
6	Relative Humidity max below 85%	P	6	10	2	0.9	%	**P**
7	Solar Radiation % diff of avg	P	9	10	6	9.47	%	**P**
8	Solar Radiation % diff of max STD value	P	9	10	6	10.5	%	**Fail**
9	Precipitation average % difference	P	1	10	2	5.0	%	**P**
10	Precipitation max % difference	P	1	10	2	6.7	%	**P**
11	Ozone Slope	P	0	1.1	4	0.95697	unitless	**P**
12	Ozone Intercept	P	0	5	4	0.97691	ppb	**P**
13	Ozone correlation	P	0	0.995	4	0.99991	unitless	**P**
14	Ozone % difference avg	P	7	10	4	2.0	%	**P**
15	Ozone % difference max	P	7	10	4	3.8	%	**P**
16	Flow Rate average % difference	P	10	5	0	1.86	%	**P**
17	Flow Rate max % difference	P	10	5	0	1.86	%	**P**
18	Shelter Temperature average error	P	5	1	3	0.20	c	**P**
19	Shelter Temperature max error	P	5	1	3	0.30	c	**P**

SiteVisitDate	Site	Technician
07/29/2013	NEC602	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.

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

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

2 **Parameter:** DocumentationCo

The purpose and procedure to complete the chain-of-custody and observations section of the SSRF was discussed with the operator during the audit.

3 **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.

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.

6 **Parameter:** MetOpMaintCom

The site utilizes a Climatronics AIO all-in-one weather sensor for wind direction, wind speed, and temperature. The sensor was not audited.
A separate sensor for humidity and temperature was audited.

EEMS Spot Report

Data Compiled: 1/29/2014 8:22:37 PM

SiteVisitDate	Site	Technician
09/04/2013	PRK134	Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	3	0.10	c	**P**
2	Temperature max error	P	4	0.5	3	0.15	c	**P**
3	Ozone Slope	P	0	1.1	4	0.96421	unitless	**P**
4	Ozone Intercept	P	0	5	4	1.00502	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99996	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	4	1.55	%	**P**
9	Flow Rate max % difference	P	10	5	4	1.64	%	**P**
10	Shelter Temperature average error	P	5	1	9	0.34	c	**P**
11	Shelter Temperature max error	P	5	1	9	0.57	c	**P**

Field Performance Comments

1 **Parameter:** Temperature **SensorComponent:** System Memo **CommentCode** 55

The temperature probe is a short style and it is mounted in a housing with an extension designed for a long style probe.

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 during the previous audit visit.

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 and corners of the wall are beginning to rot.

EEMS Spot Report

Data Compiled: 1/29/2014 8:24:44 PM

SiteVisitDate	Site	Technician
09/19/2013	STK138	Eric Hebert

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.07	c	**P**
2	Temperature max error	P	4	0.5	6	0.14	c	**P**
3	Ozone Slope	P	0	1.1	4	0.96544	unitless	**P**
4	Ozone Intercept	P	0	5	4	0.07959	ppb	**P**
5	Ozone correlation	P	0	0.995	4	1.00000	unitless	**P**
6	Ozone % difference avg	P	7	10	4	3.3	%	**P**
7	Ozone % difference max	P	7	10	4	3.6	%	**P**
8	Flow Rate average % difference	P	10	5	4	1.69	%	**P**
9	Flow Rate max % difference	P	10	5	4	2.11	%	**P**
10	DAS Time maximum error	P	0	5	1	0.03	min	**P**
11	DAS Voltage average error	P	7	0.003	28	0.0001	V	**P**
12	Shelter Temperature average error	P	5	1	9	0.73	c	**P**
13	Shelter Temperature max error	P	5	1	9	1.12	c	**Fail**

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:** MetOpMaintCom

The met tower is no longer in use. The temperature sensor is mounted in a naturally aspirated shield on the sample tower.

EEMS Spot Report

Data Compiled: 1/29/2014 8:26:17 PM

SiteVisitDate	Site	Technician
09/09/2013	THR422	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	0.00	m/s	**P**
2	Wind Speed max error below 5m/s in m/s	P	3	0.5	8	0.01	m/s	**P**
3	Wind Speed average % difference above 5 m/s	P	3	5	8	0.2	%	**P**
4	Wind Speed max % difference above 5 m/s	P	3	5	8	0.2	%	**P**
5	Wind Speed Torque average error	P	3	0.5	1	0.35	g-cm	**P**
6	Wind Speed Torque max error	P	3	0.5	1	0.4	g-cm	**P**
7	Wind Direction Input Deg True average error (de	P	2	5	8	1.5	degrees	**P**
8	Wind Direction Input Deg True max error (deg)	P	2	5	8	3	degrees	**P**
9	Wind Direction Linearity average error (deg)	P	2	5	16	1.5	degrees	**P**
10	Wind Direction Linearity max error (deg)	P	2	5	16	5	degrees	**P**
11	Wind Direction Torque average error	P	2	20	1	9	g-cm	**P**
12	Wind Direction Torque max error	P	2	20	1	10	g-cm	**P**
13	Temperature average error	P	4	0.5	9	0.04	c	**P**
14	Temperature max error	P	4	0.5	9	0.04	c	**P**
15	Relative Humidity average above 85%	P	6	10	2	1.6	%	**P**
16	Relative Humidity max above 85%	P	6	10	2	1.6	%	**P**
17	Relative Humidity average below 85%	P	6	10	4	1.7	%	**P**
18	Relative Humidity max below 85%	P	6	10	4	2.7	%	**P**
19	Solar Radiation % diff of avg	P	9	10	21	5.99	%	**P**
20	Solar Radiation % diff of max STD value	P	9	10	21	6.5	%	**P**
21	Precipitation average % difference	P	1	10	1	2.0	%	**P**
22	Precipitation max % difference	P	1	10	1	2.0	%	**P**
23	Ozone Slope	P	0	1.1	4	1.03488	unitless	**P**
24	Ozone Intercept	P	0	5	4	-0.57521	ppb	**P**
25	Ozone correlation	P	0	0.995	4	0.99998	unitless	**P**
26	Ozone % difference avg	P	7	10	4	2.3	%	**P**
27	Ozone % difference max	P	7	10	4	3.3	%	**P**
28	Flow Rate average % difference	P	10	5	6	2.03	%	**P**
29	Flow Rate max % difference	P	10	5	6	2.29	%	**P**
30	DAS Time maximum error	P	0	5	1	0.27	min	**P**
31	DAS Voltage average error	P	15	0.003	35	0.0001	V	**P**
32	DAS Voltage average error	P	1	0.003	35	0.0001	V	**P**
33	Shelter Temperature average error	P	5	1	8	0.54	c	**P**
34	Shelter Temperature max error	P	5	1	8	0.83	c	**P**

SiteVisitDate	**Site**	**Technician**
09/09/2013	THR422	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:** Precipitation **SensorComponent:** Properly Sited **CommentCode** 193

Objects violate the 45 degree rule for the tipping bucket rain gage.

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 temperature shield is pointing south into the prevailing wind. Objects violate the 45 degree rule for the tipping bucket rain gage.

6 **Parameter:** MetOpMaintCom

The blower for the RH sensor is not functioning.

EEMS Spot Report

Data Compiled: 1/29/2014 8:27:47 PM

SiteVisitDate	Site	Technician
08/23/2013	VIN140	Sandy Grenville

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.21	c	**P**
2	Temperature max error	P	4	0.5	6	0.37	c	**P**
3	Ozone Slope	P	0	1.1	4	1.04434	unitless	**P**
4	Ozone Intercept	P	0	5	4	0.07624	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99967	unitless	**P**
6	Ozone % difference avg	P	7	10	4	4.6	%	**P**
7	Ozone % difference max	P	7	10	4	6.1	%	**P**
8	Flow Rate average % difference	P	10	5	2	0.99	%	**P**
9	Flow Rate max % difference	P	10	5	2	0.99	%	**P**
10	DAS Time maximum error	P	0	5	1	0.00	min	**P**
11	DAS Voltage average error	P	4	0.003	28	0.0001	V	**P**
12	Shelter Temperature average error	P	5	1	3	0.17	c	**P**
13	Shelter Temperature max error	P	5	1	3	0.17	c	**P**

SiteVisitDate	**Site**	**Technician**
08/23/2013	VIN140	Sandy Grenville

Field Performance Comments

1 **Parameter:** Temperature **SensorComponent:** Blower **CommentCode** 26

The forced-air blower for the shield is not functioning.

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:** MetOpMaintCom

The temperature sensor blower is not functioning.

EEMS Spot Report

Data Compiled: 1/29/2014 8:29:21 PM

SiteVisitDate	Site	Technician
09/05/2013	VOY413	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	0.02	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	1.1	%	**P**
5	Wind Speed Torque average error	P	3	0.5	1	0.45	g-cm	**P**
6	Wind Speed Torque max error	P	3	0.5	1	0.5	g-cm	**Fail**
7	Wind Direction Input Deg True average error (de	P	2	5	10	1.8	degrees	**P**
8	Wind Direction Input Deg True max error (deg)	P	2	5	10	4	degrees	**P**
9	Wind Direction Linearity average error (deg)	P	2	5	16	2.0	degrees	**P**
10	Wind Direction Linearity max error (deg)	P	2	5	16	7	degrees	**Fail**
11	Wind Direction Torque average error	P	2	20	1	9	g-cm	**P**
12	Wind Direction Torque max error	P	2	20	1	10	g-cm	**P**
13	Temperature average error	P	5	0.5	6	0.11	c	**P**
14	Temperature max error	P	5	0.5	6	0.18	c	**P**
15	Relative Humidity average above 85%	P	6	10	1	1.9	%	**P**
16	Relative Humidity max above 85%	P	6	10	1	1.9	%	**P**
17	Relative Humidity average below 85%	P	6	10	2	1.9	%	**P**
18	Relative Humidity max below 85%	P	6	10	2	2.0	%	**P**
19	Solar Radiation % diff of avg	P	9	10	24	1.9	%	**P**
20	Solar Radiation % diff of max STD value	P	9	10	24	0.10	%	**P**
21	Precipitation average % difference	P	1	10	2	2.0	%	**P**
22	Precipitation max % difference	P	1	10	2	2.0	%	**P**
23	Ozone Slope	P	0	1.1	4	0.98970	unitless	**P**
24	Ozone Intercept	P	0	5	4	0.73068	ppb	**P**
25	Ozone correlation	P	0	0.995	4	0.99998	unitless	**P**
26	Ozone % difference avg	P	7	10	4	0.6	%	**P**
27	Ozone % difference max	P	7	10	4	1.8	%	**P**
28	Flow Rate average % difference	P	10	5	8	1.29	%	**P**
29	Flow Rate max % difference	P	10	5	8	1.68	%	**P**
30	DAS Time maximum error	P	0	5	1	1.77	min	**P**
31	DAS Voltage average error	P	16	0.003	21	0.0000	V	**P**
32	DAS Voltage average error	P	2	0.003	21	0.0000	V	**P**
33	Shelter Temperature average error	P	5	1	12	1.84	c	**Fail**
34	Shelter Temperature max error	P	5	1	12	2.79	c	**Fail**

SiteVisitDate	**Site**	**Technician**
09/05/2013	VOY413	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:** Precipitation **SensorComponent:** Properly Sited **CommentCode** 193

Objects violate the 45 degree rule for the tipping bucket rain gage.

3 **Parameter:** Solar Radiation **SensorComponent:** Properly Sited **CommentCode** 130

The solar radiation sensor is shaded at times during the day, and not properly sited.

4 **Parameter:** Wind Direction **SensorComponent:** Condition **CommentCode** 147

The upper and lower sections of the wind sensor body are loose. This condition will cause premature failure of the sensor and can affect data accuracy.

Field Systems Comments

1 **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.

2 **Parameter:** ShelterCleanNotes

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

3 **Parameter:** MetSensorComme

Objects violate the 45 degree rule for the tipping bucket rain gage. The solar radiation sensor is shaded during part of the day.

EEMS Spot Report

Data Compiled: 1/29/2014 8:30:35 PM

SiteVisitDate	Site	Technician
09/11/2013	WNC429	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	0.27	m/s	**P**
2	Wind Speed max error below 5m/s in m/s	P	3	0.5	8	0.35	m/s	**P**
3	Wind Speed average % difference above 5 m/s	P	3	5	8	1.7	%	**P**
4	Wind Speed max % difference above 5 m/s	P	3	5	8	5.9	%	**Fail**
5	Wind Speed Torque average error	P	3	0.5	1	0.45	g-cm	**P**
6	Wind Speed Torque max error	P	3	0.5	1	0.5	g-cm	**Fail**
7	Wind Direction Input Deg True average error (de	P	2	5	8	1.0	degrees	**P**
8	Wind Direction Input Deg True max error (deg)	P	2	5	8	2	degrees	**P**
9	Wind Direction Linearity average error (deg)	P	2	5	16	1.5	degrees	**P**
10	Wind Direction Linearity max error (deg)	P	2	5	16	3	degrees	**P**
11	Wind Direction Torque average error	P	2	20	1	12	g-cm	**P**
12	Wind Direction Torque max error	P	2	20	1	15	g-cm	**P**
13	Temperature average error	P	4	0.5	3	0.08	c	**P**
14	Temperature max error	P	4	0.5	3	0.21	c	**P**
15	Relative Humidity average above 85%	P	6	10	2	3.9	%	**P**
16	Relative Humidity max above 85%	P	6	10	2	3.9	%	**P**
17	Relative Humidity average below 85%	P	6	10	4	0.9	%	**P**
18	Relative Humidity max below 85%	P	6	10	4	1.1	%	**P**
19	Solar Radiation % diff of avg	P	9	10	8	8.37	%	**P**
20	Solar Radiation % diff of max STD value	P	9	10	8	6.8	%	**P**
21	Precipitation average % difference	P	1	10	1	100.0	%	**Fail**
22	Precipitation max % difference	P	1	10	1	100.0	%	**Fail**
23	Ozone Slope	P	0	1.1	4	0.95048	unitless	**P**
24	Ozone Intercept	P	0	5	4	0.71139	ppb	**P**
25	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
26	Ozone % difference avg	P	7	10	4	3.4	%	**P**
27	Ozone % difference max	P	7	10	4	4.4	%	**P**
28	Flow Rate average % difference	P	10	5	6	0.98	%	**P**
29	Flow Rate max % difference	P	10	5	6	1.16	%	**P**
30	Shelter Temperature average error	P	5	1	12	0.90	c	**P**
31	Shelter Temperature max error	P	5	1	12	1.46	c	**Fail**

SiteVisitDate	Site	Technician
09/11/2013	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:** Cell B Freq. **CommentCode** 99

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

3 **Parameter:** Ozone **SensorComponent:** Cell A Freq. **CommentCode** 99

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

4 **Parameter:** Precipitation **SensorComponent:** System Memo **CommentCode** 179

This measurement system is damaged and not functioning.

5 **Parameter:** Shelter Temperatur **SensorComponent:** Accuracy Mid Ran **CommentCode** 213

The shelter temperature is going outside CFR requirements for pollutant monitor operation.

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The purpose for completing the general observations section of the SSRF was discussed with the site operator.

2 **Parameter:** SiteOpsProcedures

The ozone analyzer is operated by the state of South Dakota. There is no means for introducing test gas at the sample inlet. 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.

6 **Parameter:** MetOpMaintCom

The tipping bucket rain gage is not functioning.

APPENDIX C

CASTNET Ozone Performance Evaluation Forms

Site Inventory by Site Visit

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
UVL124-Eric Hebert-08/30/2013						
1	8/30/2013	DAS	Campbell	000423	CR3000	2517
2	8/30/2013	Ozone	ThermoElectron Inc	000745	49i A1NAA	1105347310
3	8/30/2013	Ozone Standard	ThermoElectron Inc	000365	49i A3NAA	0726124688
4	8/30/2013	Zero air pump	Werther International	06936	C 70/4	000829169

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347310	UVL124	Eric Hebert	08/30/2013	Ozone	000745

Slope:	0.98832	**Slope:**	0.00000
Intercept	0.60271	**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**
0.9%	1.6%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	517112175	**Tfer Desc.**	Ozone primary stan
Tfer ID	01111		
Slope	0.99720	**Intercept**	0.18428
Cert Date	1/2/2013	**CorrCoff**	1.00000

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	-0.20	-0.38	0.34	ppb	
primary	2	22.38	22.25	22.61	ppb	1.62%
primary	3	59.62	59.60	58.95	ppb	-1.09%
primary	4	83.58	83.62	83.80	ppb	0.22%
primary	5	105.55	105.66	104.90	ppb	-0.72%

Sensor Component	Cell B Noise	**Condition**	1.1 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**	-0.10	**Status**	pass
Sensor Component	Span	**Condition**	1.049	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	74.4 kHz	**Status**	Fail
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**	0.69 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	34.8 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	717 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.8 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	70.3 kHz	**Status**	Fail
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**	N/A	**Status**	pass

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Ozone	UVL124	Eric Hebert	08/30/2013	Cell B Freq.	ThermoElectron	3427	☐	☑
Ozone	UVL124	Eric Hebert	08/30/2013	Cell A Freq.	ThermoElectron	3427	☐	☑

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-Eric Hebert-08/30/2013						
1	8/30/2013	DAS	Campbell	000426	CR3000	2533
2	8/30/2013	Ozone	ThermoElectron Inc	000614	49i A1NAA	1009241794
3	8/30/2013	Ozone Standard	ThermoElectron Inc	000432	49i A3NAA	CM08200008
4	8/30/2013	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	Eric Hebert	08/30/2013	Ozone	000614

Slope:	0.96463	**Slope:**	0.00000
Intercept	1.17379	**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
1.9%	2.7%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	517112175	**Tfer Desc.**	Ozone primary stan
Tfer ID	01111		
Slope	0.99720	**Intercept**	0.18428
Cert Date	1/2/2013	**CorrCoff**	1.00000

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	-0.05	-0.23	0.68	ppb	
primary	2	24.98	24.86	25.35	ppb	1.97%
primary	3	54.23	54.19	53.65	ppb	-1.00%
primary	4	83.91	83.96	82.20	ppb	-2.10%
primary	5	116.37	116.51	113.40	ppb	-2.67%

Sensor Component	Cell B Noise	**Condition**	Not tested	**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**	-0.50	**Status**	pass
Sensor Component	Span	**Condition**	1.022	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	82.8 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**	0.72 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	32.4 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	703 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	Not tested	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	76.7 kHz	**Status**	Fail
Sensor Component	Cell A Flow	**Condition**	0.72 lpm	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Ozone	HOX148	Eric Hebert	08/30/2013	Cell A Freq.	ThermoElectron	3373	☐	☑

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

Site Inventory by Site Visit

MKG113-Sandy Grenville-09/17/2013

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
1	9/17/2013	DAS	Campbell	000404	CR3000	2521
2	9/17/2013	Ozone	ThermoElectron Inc	000612	49i A1NAA	1009241776
3	9/17/2013	Ozone Standard	ThermoElectron Inc	000200	49i A3NAA	0607315738
4	9/17/2013	Zero air pump	Werther International	06937	C 70/4	000821896

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241776	MKG113	Sandy Grenville	09/17/2013	Ozone	000612

Slope:	0.98679	**Slope:**	0.00000
Intercept	-0.03352	**Intercept**	0.00000
CorrCoff	0.99989	**CorrCoff**	0.00000

DAS 1: **DAS 2:**

A Avg % Diff:	A Max % Di	A Avg %Dif	A Max % Di
1.0%	2.1%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49C-73104-373	**Tfer Desc.**	Ozone transfer
Tfer ID	01100		
Slope	1.00308	**Intercept**	-0.17961
Cert Date	4/2/2013	**CorrCoff**	1.00000

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	0.09	0.26	-0.22	ppb	
primary	2	31.00	31.08	30.80	ppb	-0.90%
primary	3	51.33	51.35	51.03	ppb	-0.62%
primary	4	81.33	81.25	80.80	ppb	-0.55%
primary	5	102.09	101.95	99.80	ppb	-2.11%

Sensor Component	Cell B Noise	**Condition**	1.0 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**	0.20	**Status**	pass
Sensor Component	Span	**Condition**	0.996	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	93.4 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**	0.71 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	31.0 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	706.2 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.5 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	84.6 kHz	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.71 lpm	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass

Site Inventory by Site Visit

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
ANA115-Sandy Grenville-09/17/2013						
1	9/17/2013	DAS	Campbell	000338	CR3000	2117
2	9/17/2013	Ozone	ThermoElectron Inc	000746	49i A1NAA	1105347315
3	9/17/2013	Ozone Standard	ThermoElectron Inc	000436	49i A3NAA	CM08200012
4	9/17/2013	Zero air pump	Werther International	06933	C 70/4	000836202

Ozone Data Form

Mfg	**Serial Number Ta**	**Site**	**Technician**	**Site Visit Date**	**Parameter**	**Owner ID**
ThermoElectron Inc	1105347315	ANA115	Sandy Grenville	09/17/2013	Ozone	000746

Slope:	0.97477	**Slope:**	0.00000
Intercept	0.18180	**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**
2.4%	2.8%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49C-73104-373	**Tfer Desc.**	Ozone transfer
Tfer ID	01100		
Slope	1.00308	**Intercept**	-0.17961
Cert Date	4/2/2013	**CorrCoff**	1.00000

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	0.05	0.22	0.59	ppb	
primary	2	30.28	30.36	29.57	ppb	-2.60%
primary	3	51.05	51.07	49.66	ppb	-2.76%
primary	4	79.80	79.73	78.38	ppb	-1.69%
primary	5	100.66	100.52	98.00	ppb	-2.51%

Sensor Component	Cell B Noise	**Condition**	0.4 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**	0.10	**Status**	pass
Sensor Component	Span	**Condition**	1.016	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	87.3 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**	0.66 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	30.6 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	715.1 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.6 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	87.6 kHz	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.73 lpm	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass

Site Inventory by Site Visit

Site Visit Date		Parameter	Mfg	Owner ID	Model Number	Serial Number
KEF112-Sandy Grenville-09/20/2013						
1	9/20/2013	DAS	Campbell	000414	CR3000	2537
2	9/20/2013	Ozone	ThermoElectron Inc	000700	49i A1NAA	1030244793
3	9/20/2013	Ozone Standard	ThermoElectron Inc	000438	49i A3NAA	CM08200014
4	9/20/2013	Zero air pump	Werther International	06922	C 70/4	000836217

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244793	KEF112	Sandy Grenville	09/20/2013	Ozone	000700

Slope:	1.01140	**Slope:**	0.00000
Intercept	-0.29229	**Intercept**	0.00000
CorrCoff	0.99999	**CorrCoff**	0.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
0.7%	1.1%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49C-73104-373	**Tfer Desc.**	Ozone transfer
Tfer ID	01100		
Slope	1.00308	**Intercept**	-0.17961
Cert Date	4/2/2013	**CorrCoff**	1.00000

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	0.04	0.21	0.16	ppb	
primary	2	30.64	30.72	30.52	ppb	-0.65%
primary	3	50.85	50.87	51.09	ppb	0.43%
primary	4	81.38	81.30	81.80	ppb	0.62%
primary	5	101.22	101.08	102.16	ppb	1.07%

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**	0.30	**Status**	pass
Sensor Component	Span	**Condition**	1.023	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	80.7 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**	35.6 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	685 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.9 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	81.9 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**	N/A	**Status**	pass

Site Inventory by Site Visit

	Site Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
PSU106-Sandy Grenville-09/24/2013						
1	9/24/2013	DAS	Campbell	000407	CR3000	2512
2	9/24/2013	Ozone	ThermoElectron Inc	000684	49i A1NAA	1030244795
3	9/24/2013	Ozone Standard	ThermoElectron Inc	000696	49i A3NAA	1030244812
4	9/24/2013	UPS	APC	06268	RS900	unknown
5	9/24/2013	Zero air pump	Werther International	06914	C 70/4	000829156

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244795	PSU106	Sandy Grenville	09/24/2013	Ozone	000684

Slope:	1.03118	**Slope:**	0.00000
Intercept	-0.22420	**Intercept**	0.00000
CorrCoff	0.99989	**CorrCoff**	0.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
2.3%	3.6%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49C-73104-373	**Tfer Desc.**	Ozone transfer
Tfer ID	01100		
Slope	1.00308	**Intercept**	-0.17961
Cert Date	4/2/2013	**CorrCoff**	1.00000

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	0.42	0.59	0.93	ppb	
primary	2	29.79	29.87	30.41	ppb	1.81%
primary	3	50.49	50.51	51.14	ppb	1.25%
primary	4	80.64	80.57	82.50	ppb	2.40%
primary	5	100.04	99.91	103.50	ppb	3.59%

Sensor Component	Cell B Noise	**Condition**	0.8 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**	0.000	**Status**	pass
Sensor Component	Span	**Condition**	1.023	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	109.3 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**	0.71 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	33.7 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	708.4 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	1.1 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	102.8 kHz	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.67 lpm	**Status**	pass
Sensor Component	Battery Backup	**Condition**	Functioning	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass

Site Inventory by Site Visit

Site Visit Date		*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
SAL133-Eric Hebert-09/28/2013						
1	9/28/2013	DAS	Campbell	000351	CR3000	2129
2	9/28/2013	Ozone	ThermoElectron Inc	000741	49i A1NAA	1105347316
3	9/28/2013	Ozone Standard	ThermoElectron Inc	000372	49i A3NAA	0726124684
4	9/28/2013	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	Eric Hebert	09/28/2013	Ozone	000741

Slope:	0.98728	**Slope:**	0.00000
Intercept	0.56200	**Intercept**	0.00000
CorrCoff	0.99999	**CorrCoff**	0.00000

DAS 1:		**DAS 2:**	
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**
0.6%	1.0%		

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	517112175	**Tfer Desc.**	Ozone primary stan
Tfer ID	01111		
Slope	0.99720	**Intercept**	0.18428
Cert Date	1/2/2013	**CorrCoff**	1.00000

UseDescription:	ConcGroup:	Tfer Raw:	Tfer Corr:	Site:	Site Unit:	PctDifference:
primary	1	-0.03	-0.21	0.20	ppb	
primary	2	24.98	24.86	25.06	ppb	0.80%
primary	3	53.48	53.44	53.64	ppb	0.37%
primary	4	76.66	76.69	76.37	ppb	-0.42%
primary	5	109.32	109.44	108.40	ppb	-0.95%

Sensor Component	Cell B Noise	**Condition**	0.8 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**	0.10	**Status**	pass
Sensor Component	Span	**Condition**	1.020	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	90.8 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**	0.56 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	33.9 C	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	728 mmHg	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.8 ppb	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	97.7 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