2019 – 4th Quarter Report

Support for Conducting Systems & Performance Audits of Clean Air Status and Trends Network (CASTNET) Sites and National Atmospheric Deposition Program (NADP) Monitoring Stations - II

EPA Contract No. EP-W-18-005

Prepared for:

U. S. Environmental Protection Agency

Prepared by:

environmental engineering
& measurement services, inc.

4577E NW 6th St Ext.
Gainesville, FL 32609

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List of Acronyms and Abbreviations

% diff	percent difference
A/D	analog to digital converter
ARS	Air Resource Specialists, Inc.
ASTM	American Society for Testing and Materials
BLM-WSO	Bureau of Land Management – Wyoming State Office
CASTNET	Clean Air Status and Trends Network
CMAQ	Community Multiscale Air Quality
DAS	data acquisition system
DC	direct current
deg	degree
DVM	digital voltmeter
ECCC	Environment and Climate Change Canada
EEMS	Environmental, Engineering & Measurement Services, Inc.
EPA	U.S. Environmental Protection Agency
ESC	Environmental Systems Corporation
FSA	Field Systems Audit
FSAD	Field Site Audit Database
GPS	geographical positioning system
lpm	liters per minute
MLM	Multilayer Model
m/s	meters per second
mv	millivolt
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
PE	Performance Evaluation
QAPP	Quality Assurance Project Plan
SOP	standard operating procedure
TDEP	Total Deposition
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 established in 1988 by the US EPA. Nearly all CASTNET sites measures weekly concentrations of acidic gases and particles to provide accountability for EPA's emission reduction programs. Most sites measure ground-level ozone as well as supplemental measurements such as meteorology and/or other trace gas concentrations.

Ambient concentrations 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 critical loads research.

Historically, CASTNET pollutant flux measurements have been reported as the aggregate product of weekly measured concentrations and model-estimated deposition velocities. The Multi-layer Model (MLM) was used to derive deposition velocity estimates from on-site meteorological parameters, land use types, and site characteristics. In 2011, EPA discontinued meteorological measurements at most EPA-sponsored CASTNET sites.

Currently, CASTNET pollutant flux estimates are calculated as the aggregate product of weekly measured chemical concentrations and gridded model-estimated deposition velocities. Total deposition is assessed using the NADP's Total Deposition Hybrid Method (TDEP; EPA, 2015c; Schwede and Lear, 2014), which combines data from established ambient monitoring networks and chemical-transport models. To estimate dry deposition, ambient measurement data from CASTNET and other networks were merged with dry deposition rates and flux output from the Community Multiscale Air Quality (CMAQ) modeling system.

Since 2011 nearly all CASTNET ozone monitors have adhered to the requirements for State or Local Air Monitoring Stations (SLAMS) as specified by the EPA in 40 CFR Part 58. As such, the ozone data collected must meet the requirements in 40 CFR Part 58 Appendix A, which defines the quality assurance (QA) requirements for gaseous pollutant ambient air monitoring. The audits performed by EEMS under this contract fulfilled the requirement for annual performance evaluation audits of pollutant monitors in the network. The QA requirements can be found at:
https://www.epa.gov/amtic/regulations-guidance-and-monitoring-plans

Currently 84 sites at 82 distinct locations measure ground-level ozone concentrations. Annual performance evaluation (PE), ozone audit data are submitted to the Air Quality System (AQS) database.

As of September 2019, the network is comprised of 97 active rural sampling sites across the United States and Canada, cooperatively operated by the Environmental Protection Agency (EPA), the National Park Service (NPS), Bureau of Land Management – Wyoming State Office (BLM-WSO) and several independent partners. Wood Environment and Infrastructure Solutions (Wood) is responsible for operating the EPA sponsored sites, and Air Resource Specialists, Inc. (ARS) is responsible for operating the NPS and BLM-WSO 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 reported 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.

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

Sensor	Parameter	Audit Challenge	Acceptance Criteria
Shelter Temperature	Accuracy	Comparison to station temperature sensor	≤ ± 2.0° C
Wind Direction	Orientation Accuracy	Parallel to alignment rod/crossarm, or sighted to distant point	≤ ±5° from degrees true
Wind Direction	Linearity	Eight cardinal points on test fixture	≤ ±5° mean absolute error
Wind Direction	Response Threshold	Starting torque tested with torque gauge	< 10 g-cm Climatronics; < 20 g-cm R.M. Young
Wind Speed	Accuracy	Shaft rotational speed generated and measured with certified synchronous motor	≤ ±0.5 mps below 5.0 mps input; ≤ ±5.0% of input at or above 5.0 mps
Wind Speed	Starting Threshold	Starting torque tested with torque gauge	< 0.5 g-cm
Mass Flow Controller	Flow Rate	Comparison with Primary Standard	≤ ± 5.0% of designated rate
Ozone	Slope	Linear regression of multi-point test gas concentration as measured with a certified transfer standard	0.9000 ≤ m ≤ 1.1000
Ozone	Intercept		-5.0 ppb ≤ b ≤ 5.0 ppb
Ozone	Correlation Coefficient		0.9950 ≤ r
Ozone	Percent Difference	Comparison with Level 2 standard concentration	≤ ±15.1% of test gas concentration and ≤ ± 0.003 ppm actual difference
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, at least annually.

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 Fourth Quarter 2019

This report consists of the systems and performance, and other audit results from the CASTNET sites visited during the fourth quarter (October through December) of 2019. The site locations, visit dates, and parameters audited are included in Table 2.

Table 2. Site Audit Visits

Side ID	Audit Type	Sponsor	Site Visit Date	Station Name
GRS420	Flow	NPS	10/7/2019	Great Smoky Mountains NP
GRS420	FSA	NPS	10/7/2019	Great Smoky Mountains NP
GRS420	O_3 PE	NPS	10/7/2019	Great Smoky Mountains NP
MAC426	Flow	NPS	10/17/2019	Mammoth Cave NP
MAC426	FSA	NPS	10/17/2019	Mammoth Cave NP
MAC426	O_3 PE	NPS	10/17/2019	Mammoth Cave NP
KNZ184	Flow	EPA	10/22/2019	Konza Prairie
SHN418	Flow	NPS	10/22/2019	Shenandoah NP - Big Meadows
KNZ184	FSA	EPA	10/22/2019	Konza Prairie
SHN418	FSA	NPS	10/22/2019	Shenandoah NP - Big Meadows
SHN418	O_3 PE	NPS	10/22/2019	Shenandoah NP - Big Meadows

Side ID	Audit Type	Sponsor	Site Visit Date	Station Name
KIC003	Flow	EPA	10/23/2019	Kickapoo Tribe
KIC003	FSA	EPA	10/23/2019	Kickapoo Tribe
DCP114	Flow	EPA	10/24/2019	Deer Creek State Park
DCP114	FSA	EPA	10/24/2019	Deer Creek State Park
DCP114	O_3 PE	EPA	10/24/2019	Deer Creek State Park
OXF122	Flow	EPA	10/25/2019	Oxford
SAN189	Flow	EPA	10/25/2019	Santee Sioux
OXF122	FSA	EPA	10/25/2019	Oxford
SAN189	FSA	EPA	10/25/2019	Santee Sioux
OXF122	O_3 PE	EPA	10/25/2019	Oxford
SAN189	O_3 PE	EPA	10/25/2019	Santee Sioux
MCK131	Flow	EPA	11/5/2019	Mackville
MCK231	Flow	EPA	11/5/2019	Mackville
STK138	Flow	EPA	11/5/2019	Stockton
MCK131	FSA	EPA	11/5/2019	Mackville
MCK231	FSA	EPA	11/5/2019	Mackville
STK138	FSA	EPA	11/5/2019	Stockton
MCK131	O_3 PE	EPA	11/5/2019	Mackville
MCK231	O_3 PE	EPA	11/5/2019	Mackville
STK138	O_3 PE	EPA	11/5/2019	Stockton
VIN140	Flow	EPA	11/7/2019	Vincennes
VIN140	FSA	EPA	11/7/2019	Vincennes

Side ID	Audit Type	Sponsor	Site Visit Date	Station Name
VIN140	O_3 PE	EPA	11/7/2019	Vincennes
BVL130	Flow	EPA	11/8/2019	Bondville
BVL130	FSA	EPA	11/8/2019	Bondville
BVL130	Met	EPA	11/8/2019	Bondville
BVL130	O_3 PE	EPA	11/8/2019	Bondville
QAK172	Flow	EPA	11/10/2019	Quaker City
QAK172	FSA	EPA	11/10/2019	Quaker City
QAK172	O_3 PE	EPA	11/10/2019	Quaker City
CKT136	Flow	EPA	11/11/2019	Crockett
CKT136	FSA	EPA	11/11/2019	Crockett
CKT136	O_3 PE	EPA	11/11/2019	Crockett
CDR119	Flow	EPA	11/12/2019	Cedar Creek St. Park
EGB181	Flow	EPA	11/12/2019	Egbert, Ontario
CDR119	FSA	EPA	11/12/2019	Cedar Creek St. Park
EGB181	FSA	EPA	11/12/2019	Egbert, Ontario
CDR119	O_3 PE	EPA	11/12/2019	Cedar Creek St. Park
BWR139	Flow	EPA	11/19/2019	Blackwater NWR
BWR139	FSA	EPA	11/19/2019	Blackwater NWR
BWR139	O_3 PE	EPA	11/19/2019	Blackwater NWR
ALH157	Flow	EPA	12/16/2019	Alhambra
ALH157	FSA	EPA	12/16/2019	Alhambra
ALH157	O_3 PE	EPA	12/16/2019	Alhambra

Side ID	Audit Type	Sponsor	Site Visit Date	Station Name
BFT142	Flow	EPA	12/17/2019	Beaufort
CDZ171	Flow	EPA	12/17/2019	Cadiz
BFT142	FSA	EPA	12/17/2019	Beaufort
CDZ171	FSA	EPA	12/17/2019	Cadiz
BFT142	O_3 PE	EPA	12/17/2019	Beaufort
CDZ171	O_3 PE	EPA	12/17/2019	Cadiz

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) Performance Evaluations of gaseous pollutant monitors as indicated in the table.

Table 3. TTP Pollutant PE Visits

Side ID	PE Audit Type	Sponsor	Site Visit Date	Station Name
PNF126	O_3 and NO_y	EPA	10/5/2019	Cranberry
GRS420	NOy	NPS	10/7/2019	Great Smoky Mountains NP
SPD111	O_3	EPA	11/6/2019	Speedwell
BVL130	SO_2 CO NO_y	EPA	11/8/2019	Bondville
BEL116	O_3	EPA	11/18/2019	Beltsville

1.4 Audit Results

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

Results of the PE audits of the gaseous pollutant monitors other than ozone were submitted immediately following the PE and are not included in this report. All TTP PE results of gaseous pollutant monitors are uploaded to AQS and are available there. All audit data and reports are available from the EPA CASTNET website.

2.0 NADP Quarterly Report

2.1 Introduction

The National Atmospheric Deposition Program (NADP) operates two precipitation chemistry networks and two atmospheric concentration networks. The National Trends Network (NTN) has been measuring acidic precipitation since 1978. The network currently has more than 250 sites. The precipitation event-based Atmospheric Integrated Research Monitoring Network (AIRMoN) began operation in 1992, and as of July 2019 is no longer in operation. The Mercury Deposition Network (MDN) measures total mercury in precipitation samples from approximately 90 stations. The MDN began operation in 1996 and includes sites throughout the US and Canada. The Atmospheric Mercury Network (AMNet) and the Ammonia Monitoring Network (AMoN) measure ambient concentrations of mercury and ammonia, respectively.

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

The NADP Program Office (PO) operates and administers the two precipitation chemistry networks (NTN and MDN), two atmospheric concentration networks (AMNet and AMoN), and two analytical laboratories located at the Wisconsin State Lab of Hygiene (WSLH) at the University of Wisconsin in Madison. The Mercury Analytical Laboratory (HAL) and the network equipment depot (NED) have been relocated to the WSLH.

2.2 Project Objectives

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

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

2.3 NADP Sites Visited Fourth Quarter 2019

This report presents the NADP sites surveyed during the fourth quarter (October through December) of 2019. The station names and dates of the surveys are presented in Table 4.

Table 4. Sites Surveyed – Fourth Quarter 2019

Side ID	Network	Visit Date	Station Name
KS97	NTN/AMoN	9/24/2015	Kickapoo Tribe
NY92	NTN	9/29/2015	Amherst
NY28	NTN	10/21/2015	Piseco Lake
NC02	AMoN	10/06/2019	Cranberry
TN01	AMoN	10/07/2019	Great Smoky Mountains NP - Look Rock
TN11	MDN/NTN	10/08/2019	Great Smoky Mountains National Park-Elkmont
KS31	AMoN	10/22/2019	Konza Prairie
OH54	AMoN	10/24/2019	Deer Creek State Park
NE98	AMoN	10/25/2019	Santee
OH09	AMoN	10/25/2019	Oxford
IL78	NTN	11/4/2019	Monmouth
IL37	AMoN	11/5/2019	Stockton
KY03	AMoN	11/5/2019	Mackville
TN04	AMoN	11/6/2019	Speedwell
IN34	NTN	11/6/2019	Indiana Dunes National Lakeshore
IN22	MDN/AMoN	11/7/2019	Southwest Purdue Agriculture Center
IL11	MDN/NTN/AMoN	11/8/2019	Bondville
OH99	AMoN	11/10/2019	Quaker City
KY29	AMoN	11/11/2019	Crockett
WV05	NTN/AMoN	11/13/2019	Cedar Creek St. Park
MD99	AMoN	11/18/2019	Beltsville
MD06	AMoN	11/19/2019	Blackwater NWR
MD13	NTN	11/19/2019	UM Wye Center

Side ID	Network	Visit Date	Station Name
IL46	AMoN	12/16/2019	Alhambra
KY98	AMoN	12/17/2019	Cadiz
NC06	AMoN	12/17/2019	Beaufort

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 the EPA Box account where the NADP PO and the U.S. EPA POs can access them and download them as needed.

Given the volume of data generated, and the fact that data is distributed and/or is available via the internet, no survey results are included in this report.

APPENDIX A

CASTNET Audit Report Forms

Site Inventory by Site Visit

Site Visit Date		*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
GRS420-Eric Hebert-10/07/2019						
1	10/7/2019	Computer	Hewlett Packard	none	6730b	USH01700BY
2	10/7/2019	DAS	Environmental Sys Corp	none	8832	A4115K
3	10/7/2019	Elevation	Elevation	None	1	None
4	10/7/2019	Filter pack flow pump	Thomas	none	107CAB18	100800033669
5	10/7/2019	Flow Rate	Mykrolis	none	FC280SAV-4S	AW9510056
6	10/7/2019	Infrastructure	Infrastructure	none	none	none
7	10/7/2019	Met tower	Rohn	none	unknown	none
8	10/7/2019	MFC power supply	Mykrolis	none	RO-32	FP9510004
9	10/7/2019	Modem	US Robotics	none	V.92	unknown
10	10/7/2019	Ozone	ThermoElectron Inc	none	49i A3NAA	1023943903
11	10/7/2019	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	1130450193
12	10/7/2019	Sample Tower	Aluma Tower	90945	B	none
13	10/7/2019	Shelter Temperature	ARS	none	none	none
14	10/7/2019	Siting Criteria	Siting Criteria	None	1	None
15	10/7/2019	Temperature2meter	RM Young	none	41342	7297
16	10/7/2019	Zero air pump	Werther International	none	PC70/4	531385

DAS Data Form

DAS Time Max Error: 0.13

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	A4115K	GRS420	Eric Hebert	10/07/2019	DAS	Primary

Das Date: 10/7 /2019 **Audit Date** 10/7 /2019
Das Time: 11:57:00 **Audit Time** 11:57:08
Das Day: 280 **Audit Day** 280

Low Channel:		High Channel:	
Avg Diff:	**Max Diff:**	**Avg Diff:**	**Max Diff:**
0.0001	0.0002	0.0001	0.0002

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740135	**Tfer Desc.**	DVM
Tfer ID	01311		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
2	0.0000	0.0000	0.0000	V	V	0.0000
2	0.1000	0.0999	0.0998	V	V	-0.0001
2	0.3000	0.2998	0.2996	V	V	-0.0002
2	0.5000	0.4996	0.4995	V	V	-0.0001
2	0.7000	0.6995	0.6995	V	V	0.0000
2	0.9000	0.8994	0.8993	V	V	-0.0001
2	1.0000	0.9992	0.9992	V	V	0.0000

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Mykrolis	AW9510056	GRS420	Eric Hebert	10/07/2019	Flow Rate	none

Mfg	Mykrolis	
SN/Owner ID	FP9510004	none
Parameter:	MFC power supply	

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	148613	**Tfer Desc.**	BIOS 220-H
Tfer ID	01421		
Slope	1.00000	**Intercept**	0.00000
Cert Date	3/4/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	-0.062
2.64%	2.77%			**Cal Factor Full Scale**	5.081
				Rotometer Reading:	3.05

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.05	0.0000	-0.09	l/m	l/m	
primary	leak check	0.000	0.000	0.58	0.0000	0.20	l/m	l/m	
primary	test pt 1	2.919	2.920	3.00	0.0000	3.00	l/m	l/m	2.74%
primary	test pt 2	2.922	2.920	2.99	0.0000	3.00	l/m	l/m	2.77%
primary	test pt 3	2.930	2.930	2.99	0.0000	3.00	l/m	l/m	2.42%

Sensor Component	Leak Test	**Condition**		**Status**	Fail
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Fair	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	0.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	315 deg	**Status**	pass
Sensor Component	System Memo	**Condition**	See comments	**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1023943903	GRS420	Eric Hebert	10/07/2019	Ozone	none

Slope:	0.99738	**Slope:**	0.00000
Intercept	-0.61972	**Intercept**	0.00000
CorrCoff:	1.00000	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180030022	**Tfer Desc.**	Ozone primary stan
Tfer ID	01114		
Slope	0.99840	**Intercept**	0.27090
Cert Date	6/11/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.22	-0.05	-0.55	ppb		-0.5
primary	2	15.06	14.81	14.03	ppb		-0.78
primary	3	36.70	36.48	35.74	ppb	-2.05	
primary	4	67.96	67.79	67.00	ppb	-1.17	
primary	5	114.49	114.40	113.50	ppb	-0.79	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.000	pass
Span	0.999	pass
Zero Voltage	-0.0002	pass
Fullscale Voltage	0.9996	pass
Cell A Freq.	75.7 kHz	pass
Cell A Noise	0.9 ppb	pass
Cell A Flow	0.65 lpm	pass
Cell A Pressure	685.2 mmHg	pass
Cell A Tmp.	31.7 C	pass
Cell B Freq.	81.1 kHz	pass
Cell B Noise	0.9 ppb	pass
Cell B Flow	0.69 lpm	pass
Cell B Pressure	685.8 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	7297	GRS420	Eric Hebert	10/07/2019	Temperature2meter	none

Mfg	Extech	Parameter	Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.18	0.29		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	0.33	0.18	0.0000	0.47	C	0.29
primary	Temp Mid Range	21.39	21.09	0.0000	21.00	C	-0.09
primary	Temp High Rang	46.97	46.48	0.0000	46.31	C	-0.17

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	GRS420	Eric Hebert	10/07/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.30	0.35		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	22.09	21.79	0.000	22.1	C	0.35
primary	Temp Mid Range	21.82	21.52	0.000	21.8	C	0.26

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	GRS420	Technician	Eric Hebert	Site Visit Date	10/07/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810 (s/n 2961-1)	640 cuft

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	GRS420	Eric Hebert	10/07/2019	Leak Test	Mykrolis	3559	☐	☐

The flow rate leak test performed at the flow rate standard indicates that the filter pack quick-disconnect fitting is not properly sealing and leaking when a filter is installed.

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The ozone sample train is leak-tested each week after the inlet filter is changed.

2 **Parameter:** SitingCriteriaCom

The site is located on a ridge top with the sampling height at the tops of the trees on the ridge. The site is within 40 km of Knoxville and other major sources.

3 **Parameter:** ShelterCleanNotes

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

4 **Parameter:** MetSensorComme

The temperature sensor has been relocated from 10 meters to approximately 3.9 meters above the ground.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	GRS420	**Technician**	Eric Hebert	**Site Visit Date**	10/07/2019

Site Sponsor (agency)	NPS	**USGS Map**	Blockhouse
Operating Group	NPS	**Map Scale**	
AQS #	47-009-0101	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone, Hg, SO2, NOx, PM2.5, PM10,	**QAPP Latitude**	35.6331
Deposition Measurement	dry	**QAPP Longitude**	-83.9422
Land Use	woodland - mixed	**QAPP Elevation Meters**	793
Terrain	complex (ridge-top)	**QAPP Declination**	
Conforms to MLM	No	**QAPP Declination Date**	
Site Telephone		**Audit Latitude**	35.633482
Site Address 1	Look Rock	**Audit Longitude**	-83.941606
Site Address 2	Foothills Parkway	**Audit Elevation**	801
County	Blount	**Audit Declination**	5.5
City, State	Maryville, TN		**Present**
Zip Code	37803	**Fire Extinguisher**	☑ inspected Sept 2019
Time Zone	Eastern	**First Aid Kit**	☑
Primary Operator		**Safety Glasses**	☑
Primary Op. Phone #		**Safety Hard Hat**	☑
Primary Op. E-mail		**Climbing Belt**	☑
Backup Operator		**Security Fence**	☑
Backup Op. Phone #		**Secure Shelter**	☑
Backup Op. E-mail		**Stable Entry Steps**	☑

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810 (s/n 2961-1)	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The shelter is in good condition, clean, neat, and well organized.				
Site OK	☑	**Notes**					

Driving Directions From Maryville proceed east on 321 and turn right (south) onto the Foothills Parkway. Continue approximately 11 miles. Just before reaching the Look Rock parking area and trail, turn right on a gravel road through a locked NPS gate. The site is approximately 200 meters up the trail on the right.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID GRS420 **Technician** Eric Hebert **Site Visit Date** 10/07/2019

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	35 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	20 m	☐
Obstacles to wind	10 times obstacle height		☑

Siting Distances OK ☐

Siting Criteria Comment

The site is located on a ridge top with the sampling height at the tops of the trees on the ridge. The site is within 40 km of Knoxville and other major sources.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	GRS420	Technician	Eric Hebert	Site Visit Date	10/07/2019

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

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

The temperature sensor has been relocated from 10 meters to approximately 3.9 meters above the ground.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	GRS420	Technician	Eric Hebert	Site Visit Date	10/07/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	GRS420	Technician	Eric Hebert	Site Visit Date	10/07/2019

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?	☑	

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID GRS420 **Technician** Eric Hebert **Site Visit Date** 10/07/2019

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?	Sample tower grounded to shelter, and slightly bent at hinge.	

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID GRS420 **Technician** Eric Hebert **Site Visit Date** 10/07/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑	Dataview	☑
SSRF	☑		☑
Site Ops Manual	☑		☑
HASP	☑		☑
Field Ops Manual	☑		☑
Calibration Reports	☑	10/30/2016	☐
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedule	☐		☐

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	GRS420	Technician	Eric Hebert	Site Visit Date	10/07/2019

Site operation procedures

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

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

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

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

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

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

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

The ozone sample train is leak-tested each week after the inlet filter is changed.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID GRS420 **Technician** Eric Hebert **Site Visit Date** 10/07/2019

Site operation procedures

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

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

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

Field Systems Data Form F-02058-1500-S10-rev002

Site ID GRS420 **Technician** Eric Hebert **Site Visit Date** 10/07/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	6730b	USH01700BY	none
DAS	Environmental Sys Corp	8832	A4115K	none
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	100800033669	none
Flow Rate	Mykrolis	FC280SAV-4S	AW9510056	none
Infrastructure	Infrastructure	none	none	none
Met tower	Rohn	unknown	none	none
MFC power supply	Mykrolis	RO-32	FP9510004	none
Modem	US Robotics	V.92	unknown	none
Ozone	ThermoElectron Inc	49i A3NAA	1023943903	none
Ozone Standard	ThermoElectron Inc	49i A1NAA	1130450193	none
Sample Tower	Aluma Tower	B	none	90945
Shelter Temperature	ARS	none	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature2meter	RM Young	41342	7297	none
Zero air pump	Werther International	PC70/4	531385	none

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
MAC426-Eric Hebert-10/17/2019						
1	10/17/2019	Computer	Hewlett Packard	none	6560 b	5CB1520H70
2	10/17/2019	DAS	Environmental Sys Corp	none	8832	unknown4
3	10/17/2019	Elevation	Elevation	None	1	None
4	10/17/2019	Filter pack flow pump	Thomas	none	107CAB18B	070000012920
5	10/17/2019	Flow Rate	Tylan	none	FC280	AW02213005
6	10/17/2019	Infrastructure	Infrastructure	none	none	none
7	10/17/2019	Met tower	Climatronics	none	illegible	illegible
8	10/17/2019	MFC power supply	Tylan	03677	RO-32	illegible
9	10/17/2019	Ozone	ThermoElectron Inc	none	49i A3NAA	1030745085
10	10/17/2019	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	1015543061
11	10/17/2019	Sample Tower	Aluma Tower	none	B	none
12	10/17/2019	Shelter Temperature	ARS	60	none	none
13	10/17/2019	Siting Criteria	Siting Criteria	None	1	None
14	10/17/2019	Temperature2meter	RM Young	none	41342	15104
15	10/17/2019	Zero air pump	Werther International	none	PC70/4	606489

DAS Data Form

DAS Time Max Error: 0.73

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	unknown4	MAC426	Eric Hebert	10/17/2019	DAS	Primary

Das Date: 10/17/2019
Das Time: 10:45:16
Das Day: 290

Audit Date 10/17/2019
Audit Time 10:46:00
Audit Day 290

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

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740135	**Tfer Desc.**	DVM
Tfer ID	01311		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
1	0.0000	0.0000	0.0000	V	V	0.0000
1	0.1000	0.0998	0.0999	V	V	0.0001
1	0.3000	0.2997	0.2997	V	V	0.0000
1	0.5000	0.4996	0.4996	V	V	0.0000
1	0.7000	0.6995	0.6995	V	V	0.0000
1	0.9000	0.8994	0.8993	V	V	-0.0001
1	1.0000	0.9992	0.9992	V	V	0.0000

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Tylan	AW02213005	MAC426	Eric Hebert	10/17/2019	Flow Rate	none

Mfg	Tylan		
SN/Owner ID	illegible	03677	
Parameter:	MFC power supply		

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	148613	**Tfer Desc.**	BIOS 220-H
Tfer ID	01421		
Slope	1.00000	**Intercept**	0.00000
Cert Date	3/4/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:		
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	
5.03%	5.03%			

Cal Factor Zero	0.032
Cal Factor Full Scale	10.98
Rotometer Reading:	1.65

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalE	PctDifference
primary	pump off	0.000	0.000	-0.13	0.0000	-0.08	l/m	l/m	
primary	leak check	0.000	0.000	-0.03	0.0000	0.03	l/m	l/m	
primary	test pt 1	1.594	1.590	1.34	0.0000	1.51	l/m	l/m	-5.03%
primary	test pt 2	1.594	1.590	1.34	0.0000	1.51	l/m	l/m	-5.03%
primary	test pt 3	1.593	1.590	1.34	0.0000	1.51	l/m	l/m	-5.03%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Poor	**Status**	Fail
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	See comments	**Status**	pass
Sensor Component	Filter Distance	**Condition**	7.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	-2.0 cm	**Status**	Fail
Sensor Component	Filter Azimuth	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030745085	MAC426	Eric Hebert	10/17/2019	Ozone	none

Slope:	0.98781	**Slope:**	0.00000
Intercept	2.24646	**Intercept**	0.00000
CorrCoff:	0.99999	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180030022	**Tfer Desc.**	Ozone primary stan
Tfer ID	01114		
Slope	0.99840	**Intercept**	0.27090
Cert Date	6/11/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.40	0.12	2.50	ppb		2.38
primary	2	14.16	13.91	15.77	ppb		1.86
primary	3	31.86	31.63	33.47	ppb	5.65	
primary	4	68.28	68.11	69.70	ppb	2.31	
primary	5	115.42	115.33	116.10	ppb	0.67	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Moderately clean	pass
Battery Backup	N/A	pass
Offset	-3.1	pass
Span	1.005	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	122.4 kHz	pass
Cell A Noise	0.9 ppb	pass
Cell A Flow	0.78 lpm	pass
Cell A Pressure	731.2 mmHg	pass
Cell A Tmp.	34.0 C	pass
Cell B Freq.	99.3 kHz	pass
Cell B Noise	0.6 ppb	pass
Cell B Flow	0.78 lpm	pass
Cell B Pressure	730.6 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	< 1 %	pass
System Memo		pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	15104	MAC426	Eric Hebert	10/17/2019	Temperature2meter	none

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00733	**Intercept**	0.14497
Cert Date	2/12/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.22	0.57		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	0.20	0.05	0.0000	0.62	C	0.57
primary	Temp Mid Range	27.28	26.94	0.0000	26.87	C	-0.07
primary	Temp High Rang	48.29	47.79	0.0000	47.82	C	0.03

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	MAC426	Eric Hebert	10/17/2019	Shelter Temperature	60

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.32	0.53		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	26.18	25.85	0.000	25.7	C	-0.11
primary	Temp Mid Range	25.31	24.98	0.000	25.5	C	0.53

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	MAC426	Technician	Eric Hebert	Site Visit Date	10/17/2019

Shelter Make	Shelter Model	Shelter Size
custom	N/A	1536 cuft

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	MAC426	Eric Hebert	10/17/2019	Moisture Present	Tylan	4410	☐	☐

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

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator is very knowledgeable with air quality monitoring. He is doing a very good job with site activities and filter handling.

2 **Parameter:** SitingCriteriaCom

Bowling Green is within 40 km of the site. The site is in a hay field which is harvested twice per year. The area to the west and south is comprised of livestock farms including cattle and poultry.

3 **Parameter:** ShelterCleanNotes

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

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	MAC426	**Technician**	Eric Hebert	**Site Visit Date**	10/17/2019

Site Sponsor (agency)	NPS	**USGS Map**	Rhoda
Operating Group	NPS	**Map Scale**	
AQS #	21-061-0501	**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone, SO2, NOy, Hg, IMPROVE, PM	**QAPP Latitude**	37.2806
Deposition Measurement	dry, wet, Hg	**QAPP Longitude**	-86.2639
Land Use	agriculture, woodland - mixed	**QAPP Elevation Meters**	236
Terrain	rolling	**QAPP Declination**	3
Conforms to MLM	Marginally	**QAPP Declination Date**	12/27/2004
Site Telephone	(270) 758-2136	**Audit Latitude**	37.131794
Site Address 1	Alfred Cook Road	**Audit Longitude**	-86.142953
Site Address 2		**Audit Elevation**	230
County	Edmonson	**Audit Declination**	-4.0
City, State	Smiths Grove, KY		
Zip Code	42171	**Fire Extinguisher** ☑	inspected March 2011
Time Zone	Eastern	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☐	
Primary Op. Phone #		**Safety Hard Hat** ☐	
Primary Op. E-mail		**Climbing Belt** ☑	
Backup Operator		**Security Fence** ☑	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Present

Shelter Working Room ☑	**Make**	custom	**Model**	N/A	**Shelter Size**	1536 cuft
Shelter Clean ☑	**Notes**	The shelter is well maintained, clean, neat, and well organized.				
Site OK ☑	**Notes**					

Driving Directions

From Bowling Green go east on 31W. Turn left (north) on 442 toward Pig. At the stop sign in Pig, turn right on route 259, or Brownsville Road. Continue approximately 1 mile, just past two churches (one on each side of the road). Take the 2nd left past the church on the left onto Chaumount Road. Then take the first left onto Doyle Road. Continue straight onto Alfred Cook Road. The site will be on the left approximately 0.6 miles.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID MAC426 **Technician** Eric Hebert **Site Visit Date** 10/17/2019

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	35 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	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

Bowling Green is within 40 km of the site. The site is in a hay field which is harvested twice per year. The area to the west and south is comprised of livestock farms including cattle and poultry.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	MAC426	Technician	Eric Hebert	Site Visit Date	10/17/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	MAC426	Technician	Eric Hebert	Site Visit Date	10/17/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	MAC426	Technician	Eric Hebert	Site Visit Date	10/17/2019

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 12 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID MAC426 **Technician** Eric Hebert **Site Visit Date** 10/17/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID MAC426 **Technician** Eric Hebert **Site Visit Date** 10/17/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑	DataView2	☑
SSRF	☑		☑
Site Ops Manual	☑		☑
HASP	☐		☐
Field Ops Manual	☐		☐
Calibration Reports	☑		☑
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedule	☐		☐

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID MAC426 **Technician** Eric Hebert **Site Visit Date** 10/17/2019

Site operation procedures

1	Has the site operator attended a formal CASTNET training course? If yes, when and who instructed?	☑	Receives training every 6 months during calibration visits
2	Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed?	☑	Receives training every 6 months during calibration visits
3	Is the site visited regularly on the required Tuesday schedule?	☑	
4	Are the standard CASTNET operational procedures being flollowed by the site operator?	☑	
5	Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation)	☑	

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID MAC426 **Technician** Eric Hebert **Site Visit Date** 10/17/2019

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
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 and as needed	☑
Sample Line Check for Dirt/Water	☑	Weekly	☑

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

The site operator is very knowledgeable with air quality monitoring. He is doing a very good job with site activities and filter handling.

Field Systems Data Form F-02058-1500-S10-rev002

Site ID MAC426 **Technician** Eric Hebert **Site Visit Date** 10/17/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	6560 b	5CB1520H70	none
DAS	Environmental Sys Corp	8832	unknown4	none
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18B	070000012920	none
Flow Rate	Tylan	FC280	AW02213005	none
Infrastructure	Infrastructure	none	none	none
Met tower	Climatronics	illegible	illegible	none
MFC power supply	Tylan	RO-32	illegible	03677
Ozone	ThermoElectron Inc	49i A3NAA	1030745085	none
Ozone Standard	ThermoElectron Inc	49i A1NAA	1015543061	none
Sample Tower	Aluma Tower	B	none	none
Shelter Temperature	ARS	none	none	60
Siting Criteria	Siting Criteria	1	None	None
Temperature2meter	RM Young	41342	15104	none
Zero air pump	Werther International	PC70/4	606489	none

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
KNZ184-Martin Valvur-10/22/2019						
1	10/22/2019	Computer	Dell	07014	Inspiron 15	313MC12
2	10/22/2019	DAS	Campbell	000361	CR3000	2139
3	10/22/2019	Elevation	Elevation	None	1	None
4	10/22/2019	Filter pack flow pump	Thomas	04921	107CAB18	060300019983
5	10/22/2019	Flow Rate	Apex	000849	AXMC105LPMDPCV	illegible
6	10/22/2019	Infrastructure	Infrastructure	none	none	none
7	10/22/2019	Modem	Digi	07182	LR54	Illegible
8	10/22/2019	Sample Tower	Aluma Tower	missing	B	none
9	10/22/2019	Shelter Temperature	Campbell	none	107-L	none
10	10/22/2019	Siting Criteria	Siting Criteria	None	1	None
11	10/22/2019	Temperature	RM Young	06541	41432VC	14082

DAS Data Form

DAS Time Max Error: 0.08

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2139	KNZ184	Martin Valvur	10/22/2019	DAS	Primary

Das Date: 10/22/2019 **Audit Date** 10/22/2019
Das Time: 07:26:00 **Audit Time** 07:26:05
Das Day: 295 **Audit Day** 295

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

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740243	**Tfer Desc.**	DVM
Tfer ID	01312		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	-0.0003	-0.0002	V	V	0.0001
7	0.1000	0.0992	0.0993	V	V	0.0001
7	0.3000	0.2994	0.2997	V	V	0.0003
7	0.5000	0.4994	0.4994	V	V	0.0000
7	0.7000	0.6994	0.6992	V	V	-0.0002
7	0.9000	0.8997	0.8995	V	V	-0.0002
7	1.0000	0.9992	0.9992	V	V	0.0000

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	KNZ184	Martin Valvur	10/22/2019	Flow Rate	000849

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	122974	**Tfer Desc.**	BIOS 220-H
Tfer ID	01416		
Slope	1.00178	**Intercept**	0.00161
Cert Date	7/13/2018	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	-0.05
				Cal Factor Full Scale	0.95
0.11%	0.33%			**Rotometer Reading:**	3.05

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalE	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	0.09	0.000	-0.06	l/m	l/m	
primary	test pt 1	3.000	2.990	3.05	0.000	2.99	l/m	l/m	0.00%
primary	test pt 2	3.000	2.990	3.05	0.000	2.99	l/m	l/m	0.00%
primary	test pt 3	3.010	3.000	3.05	0.000	2.99	l/m	l/m	-0.33%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	360 deg	**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	14082	KNZ184	Martin Valvur	10/22/2019	Temperature	06541

Mfg	Fluke	**Parameter**	Temperature
Serial Number	3275143	**Tfer Desc.**	RTD
Tfer ID	01229		
Slope	0.99989	**Intercept**	-0.00649
Cert Date	1/23/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.13	0.19		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.13	0.14	0.000	-0.1	C	-0.19
primary	Temp Mid Range	25.32	25.33	0.000	25.2	C	-0.09
primary	Temp High Range	47.76	47.77	0.000	47.7	C	-0.11

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	KNZ184	Martin Valvur	10/22/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.72	1.23		

Mfg	Fluke	Parameter	Shelter Temperature
Serial Number	3275143	Tfer Desc.	RTD
Tfer ID	01229		
Slope	0.99989	Intercept	-0.00649
Cert Date	1/23/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	24.22	24.23	0.000	25.5	C	1.23
primary	Temp Mid Range	25.93	25.94	0.000	25.3	C	-0.62
primary	Temp Mid Range	26.41	26.42	0.000	26.1	C	-0.31

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	KNZ184	Technician	Martin Valvur	Site Visit Date	10/22/2019

Shelter Make	Shelter Model	Shelter Size
Wells Cargo	EW1211 (s/n 1WC200E1623048028)	640 cuft

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

Field Systems Comments

1 **Parameter:** SitingCriteriaCom

The site is located at a Long Term Ecological Research site operated by KSU.

2 **Parameter:** ShelterCleanNotes

The shelter is very clean, neat, well organized and well maintained. The shelter floor has deteriorated and is poor condition.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	KNZ184	**Technician**	Martin Valvur	**Site Visit Date**	10/22/2019

Site Sponsor (agency)	EPA	**USGS Map**	Swede Creek
Operating Group	Kansas State University	**Map Scale**	
AQS #	20-161-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	39.1021
Deposition Measurement	dry, wet	**QAPP Longitude**	-96.6096
Land Use	range	**QAPP Elevation Meters**	348
Terrain	gently rolling	**QAPP Declination**	4.5
Conforms to MLM	Yes	**QAPP Declination Date**	01/07/2005
Site Telephone	(785) 770-8426	**Audit Latitude**	39.10216
Site Address 1	Konza Prairie Lane	**Audit Longitude**	-96.609583
Site Address 2	CR 901	**Audit Elevation**	346
County	Riley	**Audit Declination**	4.2
City, State	Manhattan, KZ		
Zip Code	66502	**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 Steps** ☑	

Present

Shelter Working Room	☑	**Make**	Wells Cargo	**Model**	EW1211 (s/n 1WC20	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The shelter is very clean, neat, well organized and well maintained. The shelter floor has deteriorated and is poor condition.				
Site OK	☑	**Notes**					

Driving Directions

From Manhattan take route 177 south. At the east edge of town, immediately after crossing the Kansas river, turn right onto CR901 (McDowell Creek Road). Continue approximately 6.2 miles and turn left into the Konza Prairie Biological Station. The site is through the gate and up the hill past the three-story stone farm house.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID KNZ184 **Technician** Martin Valvur **Site Visit Date** 10/22/2019

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 at a Long Term Ecological Research site operated by KSU.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	KNZ184	Technician	Martin Valvur	Site Visit Date	10/22/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	KNZ184	Technician	Martin Valvur	Site Visit Date	10/22/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	KNZ184	Technician	Martin Valvur	Site Visit Date	10/22/2019

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 12 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?	☑	
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID KNZ184 **Technician** Martin Valvur **Site Visit Date** 10/22/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

11	Tower comments?	

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	KNZ184	Technician	Martin Valvur	Site Visit Date	10/22/2019

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

1	Is the station log properly completed during every site visit?	☑	
2	Are the Site Status Report Forms being completed and current?	☑	
3	Are the chain-of-custody forms properly used to document sample transfer to and from lab?	☑	
4	Are ozone z/s/p control charts properly completed and current?	☑	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-rev002

Site ID KNZ184 **Technician** Martin Valvur **Site Visit Date** 10/22/2019

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?	☐	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	☑	N/A	☑
Confirm Reasonableness of Current Values	☑	Weekly	☑
Test Surface Wetness Response	☑	N/A	☑

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	KNZ184	Technician	Martin Valvur	Site Visit Date	10/22/2019

Site operation procedures

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

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

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

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID KNZ184 **Technician** Martin Valvur **Site Visit Date** 10/22/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	313MC12	07014
DAS	Campbell	CR3000	2139	000361
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	060300019983	04921
Flow Rate	Apex	AXMC105LPMDPC	illegible	000849
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	Illegible	07182
Sample Tower	Aluma Tower	B	none	missing
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41432VC	14082	06541

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
SHN418-Korey Devins-10/22/2019						
1	10/22/2019	Computer	Hewlett Packard	none	8460p	CNU13607B3
2	10/22/2019	DAS	Environmental Sys Corp	90658	8816	2643
3	10/22/2019	Elevation	Elevation	None	1	None
4	10/22/2019	Filter pack flow pump	Thomas	00443	107CA110	0288714888
5	10/22/2019	flow rate	Tylan	03942	FC280	AW9605202
6	10/22/2019	Infrastructure	Infrastructure	none	none	none
7	10/22/2019	MFC power supply	Tylan	03485	RO-32	FP9404009
8	10/22/2019	Ozone	ThermoElectron Inc	none	49i A3NAA	0903334535
9	10/22/2019	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	1030745083
10	10/22/2019	Sample Tower	Aluma Tower	923307	B	none
11	10/22/2019	Shelter Temperature	ARS	none	none	none
12	10/22/2019	Siting Criteria	Siting Criteria	None	1	None
13	10/22/2019	Temperature2meter	RM Young	none	41342VC	14265
14	10/22/2019	Zero air pump	Werther International	none	C 70/4	000855578

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Tylan	AW9605202	SHN418	Korey Devins	10/22/2019	flow rate	03942

Mfg	Tylan	
SN/Owner ID	FP9404009	03485
Parameter:	MFC power supply	

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	148613	**Tfer Desc.**	BIOS 220-H
Tfer ID	01421		
Slope	1.00000	**Intercept**	0.00000
Cert Date	3/4/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:		
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	
1.53%	2.03%			

Cal Factor Zero	0
Cal Factor Full Scale	0
Rotometer Reading:	1.7

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.28	0.0000	0.00	l/m	l/m	
primary	leak check	0.000	0.000	0.29	0.0000	0.01	l/m	l/m	
primary	test pt 1	1.523	1.520	1.74	0.0000	1.50	l/m	l/m	-1.32%
primary	test pt 2	1.528	1.530	1.74	0.0000	1.50	l/m	l/m	-2.03%
primary	test pt 3	1.522	1.520	1.74	0.0000	1.50	l/m	l/m	-1.25%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	See comments	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	200 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	0903334535	SHN418	Korey Devins	10/22/2019	Ozone	none

Slope:	0.98595	**Slope:**	0.00000
Intercept	-0.29970	**Intercept**	0.00000
CorrCoff:	0.99999	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180930075	**Tfer Desc.**	Ozone primary stan
Tfer ID	01115		
Slope	1.00800	**Intercept**	-0.40210
Cert Date	3/26/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.09	0.48	0.32	ppb		-0.16
primary	2	17.80	18.05	17.45	ppb		-0.6
primary	3	38.62	38.71	37.81	ppb	-2.35	
primary	4	66.73	66.59	65.18	ppb	-2.14	
primary	5	111.62	111.13	109.40	ppb	-1.57	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	-0.70	pass
Span	1.005	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	82.9 kHz	pass
Cell A Noise	1.0 ppb	pass
Cell A Flow	0.71 lpm	pass
Cell A Pressure	658.0 mmHg	pass
Cell A Tmp.	33.4 C	pass
Cell B Freq.	123.8 kHz	pass
Cell B Noise	1.2 ppb	pass
Cell B Flow	0.70 lpm	pass
Cell B Pressure	658.9 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	14265	SHN418	Korey Devins	10/22/2019	Temperature2meter	none

Mfg	Extech	Parameter	Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.11	0.13		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	-0.05	-0.19	0.0000	-0.06	C	0.13
primary	Temp Mid Range	26.32	25.98	0.0000	26.05	C	0.07
primary	Temp High Rang	47.47	46.98	0.0000	47.11	C	0.13

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	SHN418	Korey Devins	10/22/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.04	0.06		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	24.91	24.58	0.000	24.6	C	-0.02
primary	Temp Mid Range	24.88	24.56	0.000	24.5	C	-0.06
primary	Temp Mid Range	24.84	24.52	0.000	24.5	C	-0.04

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	SHN418	Technician	Korey Devins	Site Visit Date	10/22/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8814	896 cuft

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

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The ozone inlet filter is replaced and the sample train is leak-tested every two weeks.

2 **Parameter:** ShelterCleanNotes

The shelter is in good condition, clean and well organized

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	SHN418	**Technician**	Korey Devins	**Site Visit Date**	10/22/2019

Site Sponsor (agency)	NPS/EPA	**USGS Map**	Big Meadows
Operating Group	NPS	**Map Scale**	
AQS #	51-113-003	**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone, PM2.5	**QAPP Latitude**	
Deposition Measurement	dry, wet, Hg, IMPROVE	**QAPP Longitude**	
Land Use	woodland - mixed	**QAPP Elevation Meters**	
Terrain	complex	**QAPP Declination**	
Conforms to MLM	No	**QAPP Declination Date**	
Site Telephone		**Audit Latitude**	38.5231
Site Address 1	Shenandoah National Park	**Audit Longitude**	-78.43471
Site Address 2	3655 US Hwy 211 East	**Audit Elevation**	1068
County	Madison	**Audit Declination**	-9.9
City, State	Luray, VA		
Zip Code	22835	**Fire Extinguisher** ☑	Inspected Oct 2017
Time Zone	Eastern	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☐	
Primary Op. Phone #		**Safety Hard Hat** ☐	
Primary Op. E-mail		**Climbing Belt** ☑	
Backup Operator		**Security Fence** ☑	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Present

Shelter Working Room ☑	**Make**	Ekto	**Model**	8814	**Shelter Size**	896 cuft
Shelter Clean ☑	**Notes**	The shelter is in good condition, clean and well organized				
Site OK ☑	**Notes**					

Driving Directions Note: arrange for a "EB submaster" key 4 days in advance to be left at Big Meadows Visitor Center. From DC take 460 west to 29N to 33W to Skyline Drive North. Exit into Big Meadows Visitors Center. Go toward lodge and take the first right. Take the gravel road from the parking lot on the left to the site.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID SHN418 **Technician** Korey Devins **Site Visit Date** 10/22/2019

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	10 - 30 m	☐
Obstacles to wind	10 times obstacle height		☑

Siting Distances OK ☑

Siting Criteria Comment

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	SHN418	Technician	Korey Devins	Site Visit Date	10/22/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	SHN418	Technician	Korey Devins	Site Visit Date	10/22/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	SHN418	Technician	Korey Devins	Site Visit Date	10/22/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 15 meters
4	Describe dry dep sample tube.		3/8 teflon by 12 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☐	
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID	SHN418	Technician	Korey Devins	Site Visit Date	10/22/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	SHN418	Technician	Korey Devins	Site Visit Date	10/22/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑	Dataview	☑
SSRF	☑		☑
Site Ops Manual	☑		☑
HASP	☑		☐
Field Ops Manual	☑		☐
Calibration Reports	☑	9/16/2015	☑
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedule	☐		☐

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?	☑	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-S8-rev002

Site ID	SHN418	Technician	Korey Devins	Site Visit Date	10/22/2019

Site operation procedures

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

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

QC Check Performed		Frequency	Compliant
Multipoint Calibrations	☑	Semiannually	☑
Visual Inspections	☑	Weekly	☑
Translator Zero/Span Tests (climatronics)	☐	N/A	☑
Manual Rain Gauge Test	☑	N/A	☑
Confirm Reasonableness of Current Values	☑	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	☑	Every 2 weeks	☑
Automatic Precision Level Tests	☑	Daily	☑
Manual Precision Level Test	☑	Every 2 weeks	☑
Analyzer Diagnostics Tests	☑	Weekly	☑
In-line Filter Replacement (at inlet)	☑	Every 2 weeks	☑
In-line Filter Replacement (at analyze	☐	N/A	☑
Sample Line Check for Dirt/Water	☑	Weekly	☑
Zero Air Desiccant Check	☑	Semiannually	☑

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

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

The ozone inlet filter is replaced and the sample train is leak-tested every two weeks.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	SHN418	Technician	Korey Devins	Site Visit Date	10/22/2019

Site operation procedures

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

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

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

Field Systems Data Form F-02058-1500-S10-rev002

Site ID SHN418 **Technician** Korey Devins **Site Visit Date** 10/22/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	8460p	CNU13607B3	none
DAS	Environmental Sys Corp	8816	2643	90658
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA110	0288714888	00443
flow rate	Tylan	FC280	AW9605202	03942
Infrastructure	Infrastructure	none	none	none
MFC power supply	Tylan	RO-32	FP9404009	03485
Ozone	ThermoElectron Inc	49i A3NAA	0903334535	none
Ozone Standard	ThermoElectron Inc	49i A1NAA	1030745083	none
Sample Tower	Aluma Tower	B	none	923307
Shelter Temperature	ARS	none	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature2meter	RM Young	41342VC	14265	none
Zero air pump	Werther International	C 70/4	000855578	none

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
KIC003-Martin Valvur-10/23/2019						
1	10/23/2019	DAS	Campbell	000816	CR850	28382
2	10/23/2019	Filter pack flow pump	Permotec	none	BL30EB	unknown
3	10/23/2019	Flow Rate	Apex	000668	AXMC105LPMDPCV	illegible
4	10/23/2019	Modem	Sierra wireless	06996	unknown	unknown
5	10/23/2019	Sample Tower	Aluma Tower	000814	B	none
6	10/23/2019	Temperature	RM Young	06112	41342	10176

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	KIC003	Martin Valvur	10/23/2019	Flow Rate	000668

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	122974	**Tfer Desc.**	BIOS 220-H
Tfer ID	01416		
Slope	1.00178	**Intercept**	0.00161
Cert Date	7/13/2018	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Di**	**A Avg %Diff**	**A Max % Di**	**Cal Factor Zero**	-0.012
0.45%	0.67%			**Cal Factor Full Scale**	0.992
				Rotometer Reading:	2.9

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	-0.01	l/m	l/m	
primary	test pt 1	2.990	2.980	2.99	0.000	2.99	l/m	l/m	0.34%
primary	test pt 2	2.980	2.970	2.99	0.000	2.99	l/m	l/m	0.67%
primary	test pt 3	2.990	2.980	2.99	0.000	2.99	l/m	l/m	0.34%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	270 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	10176	KIC003	Martin Valvur	10/23/2019	Temperature	06112

Mfg	Fluke	**Parameter**	Temperature
Serial Number	3275143	**Tfer Desc.**	RTD
Tfer ID	01229		
Slope	0.99989	**Intercept**	-0.00649
Cert Date	1/23/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.08	0.17		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.10	0.11	0.000	0.1	C	0.02
primary	Temp Mid Range	25.47	25.48	0.000	25.5	C	0.04
primary	Temp High Range	46.34	46.35	0.000	46.5	C	0.17

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

Field Systems Comments

1 **Parameter:** DocumentationCo

The site operator currently maintains records in a logbook provided by Wood.

2 **Parameter:** SitingCriteriaCom

The site is located across the street from the community school in the town of Powhattan.

3 **Parameter:** ShelterCleanNotes

Small footprint site with no shelter.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	KIC003	**Technician**	Martin Valvur	**Site Visit Date**	10/23/2019

Site Sponsor (agency)	EPA	**USGS Map**	
Operating Group	Kickapoo Tribe	**Map Scale**	
AQS #		**Map Date**	
Meteorological Type	R.M. Young		
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**	39.76102
Site Address 1		**Audit Longitude**	-95.63599
Site Address 2		**Audit Elevation**	367
County	Brown	**Audit Declination**	
City, State	Powhattan, KS		
Zip Code	66527		
Time Zone	Central		
Primary Operator			
Primary Op. Phone #			
Primary Op. E-mail			
Backup Operator			
Backup Op. Phone #			
Backup Op. E-mail			

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

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

Shelter Clean ☐ **Notes** Small footprint site with no shelter.

Site OK ☑ **Notes**

Driving Directions

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID KIC003 **Technician** Martin Valvur **Site Visit Date** 10/23/2019

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

Siting Distances OK ☑

Siting Criteria Comment

The site is located across the street from the community school in the town of Powhattan.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	KIC003	Technician	Martin Valvur	Site Visit Date	10/23/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	KIC003	Technician	Martin Valvur	Site Visit Date	10/23/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	KIC003	Technician	Martin Valvur	Site Visit Date	10/23/2019

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID KIC003 **Technician** Martin Valvur **Site Visit Date** 10/23/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	KIC003	Technician	Martin Valvur	Site Visit Date	10/23/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

1	Is the station log properly completed during every site visit?	☑	
2	Are the Site Status Report Forms being completed and current?	☑	
3	Are the chain-of-custody forms properly used to document sample transfer to and from lab?	☑	
4	Are ozone z/s/p control charts properly completed and current?	☑	N/A

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

The site operator currently maintains records in a logbook provided by Wood.

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	KIC003	Technician	Martin Valvur	Site Visit Date	10/23/2019

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	KIC003	Technician	Martin Valvur	Site Visit Date	10/23/2019

Site operation procedures

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

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

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

Field Systems Data Form F-02058-1500-S10-rev002

Site ID KIC003 **Technician** Martin Valvur **Site Visit Date** 10/23/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR850	28382	000816
Filter pack flow pump	Permotec	BL30EB	unknown	none
Flow Rate	Apex	AXMC105LPMDPC	illegible	000668
Modem	Sierra wireless	unknown	unknown	06996
Sample Tower	Aluma Tower	B	none	000814
Temperature	RM Young	41342	10176	06112

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
DCP114-Korey Devins-10/24/2019						
1	10/24/2019	Computer	Dell	07031	Inspiron 15	4L2MC12
2	10/24/2019	DAS	Campbell	000345	CR3000	2124
3	10/24/2019	Elevation	Elevation	None	1	None
4	10/24/2019	Filter pack flow pump	Thomas	00390	107CA18	00001630787
5	10/24/2019	Flow Rate	Apex	000659	AXMC105LPMDPCV	54748
6	10/24/2019	Infrastructure	Infrastructure	none	none	none
7	10/24/2019	Modem	Digi	07199	LR54	unknown
8	10/24/2019	Ozone	ThermoElectron Inc	000702	49i A1NAA	1030244799
9	10/24/2019	Ozone Standard	ThermoElectron Inc	000515	49i A3NAA	0922236891
10	10/24/2019	Sample Tower	Aluma Tower	000030	B	AT-81056-J-4
11	10/24/2019	Shelter Temperature	Campbell	none	107-L	none
12	10/24/2019	Siting Criteria	Siting Criteria	None	1	None
13	10/24/2019	Temperature	RM Young	06390	41342VC	13993
14	10/24/2019	Zero air pump	Werther International	06939	PC70/4	000829175

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2124	DCP114	Korey Devins	10/24/2019	DAS	Primary

Das Date: 10/24/2019 **Audit Date** 10/24/2019
Das Time: 11:47:00 **Audit Time** 11:47:00
Das Day: 297 **Audit Day** 297

Low Channel:

Avg Diff:	Max Diff:
0.0000	0.0001

High Channel:

Avg Diff:	Max Diff:
0.0000	0.0001

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740135	**Tfer Desc.**	DVM
Tfer ID	01311		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0000	0.0000	V	V	0.0000
7	0.1000	0.1004	0.1004	V	V	0.0000
7	0.3000	0.3004	0.3003	V	V	-0.0001
7	0.5000	0.5008	0.5008	V	V	0.0000
7	0.7000	0.7009	0.7010	V	V	0.0001
7	0.9000	0.9005	0.9005	V	V	0.0000
7	1.0000	1.0005	1.0004	V	V	-0.0001

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	54748	DCP114	Korey Devins	10/24/2019	Flow Rate	000659

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	148613	**Tfer Desc.**	BIOS 220-H
Tfer ID	01421		
Slope	1.00000	**Intercept**	0.00000
Cert Date	3/4/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0
2.17%	2.60%			**Cal Factor Full Scale**	0
				Rotometer Reading:	1.4

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.01	l/m	l/m	
primary	test pt 1	1.528	1.530	1.51	0.000	1.50	l/m	l/m	-1.96%
primary	test pt 2	1.538	1.540	1.52	0.000	1.50	l/m	l/m	-2.60%
primary	test pt 3	1.527	1.530	1.51	0.000	1.50	l/m	l/m	-1.96%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	See comments	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	345 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244799	DCP114	Korey Devins	10/24/2019	Ozone	000702

Slope:	0.96442	**Slope:**	0.00000
Intercept	-0.53192	**Intercept**	0.00000
CorrCoff:	0.99999	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180930075	**Tfer Desc.**	Ozone primary stan
Tfer ID	01115		
Slope	1.00800	**Intercept**	-0.40210
Cert Date	3/26/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.01	0.40	0.03	ppb		-0.37
primary	2	14.97	15.25	13.95	ppb		-1.3
primary	3	37.17	37.27	35.48	ppb	-4.92	
primary	4	69.13	68.98	65.93	ppb	-4.52	
primary	5	116.96	116.43	111.80	ppb	-4.06	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	-0.40	pass
Span	1.013	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	96.8 kHz	pass
Cell A Noise	0.4 ppb	pass
Cell A Flow	0.81 lpm	pass
Cell A Pressure	719.2 mmHg	pass
Cell A Tmp.	36.3 C	pass
Cell B Freq.	101.3 kHz	pass
Cell B Noise	0.6 ppb	pass
Cell B Flow	0.66 lpm	pass
Cell B Pressure	719.8 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	13993	DCP114	Korey Devins	10/24/2019	Temperature	06390

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00733	**Intercept**	0.14497
Cert Date	2/12/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.22	0.31		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.12	-0.02	0.000	0.3	C	0.31
primary	Temp Mid Range	25.31	24.98	0.000	25.1	C	0.13
primary	Temp High Range	47.12	46.63	0.000	46.4	C	-0.23

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	DCP114	Korey Devins	10/24/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
1.32	1.42		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	26.03	25.70	0.000	26.9	C	1.18
primary	Temp Mid Range	25.78	25.45	0.000	26.8	C	1.35
primary	Temp Mid Range	25.14	24.81	0.000	26.2	C	1.42

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	DCP114	Technician	Korey Devins	Site Visit Date	10/24/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810 (s/n 2149-13)	640 cuft

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	DCP114	Korey Devins	10/24/2019	Moisture Present	Apex	3744	☐	☐

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

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator is following procedures and doing a very good job with filter handling.

2 **Parameter:** DasComments

Met tower removed.

3 **Parameter:** SiteOpsProcedures

The ozone inlet filter is replaced and the sample line is leak-tested every two weeks.

4 **Parameter:** SitingCriteriaCom

The site is located in a wooded thicket within a state park. The area surrounding the park is almost completely intensive agriculture. The site may not be regionally representative.

5 **Parameter:** ShelterCleanNotes

The shelter is currently in fair condition. There are loose floor tiles.

6 **Parameter:** MetOpMaintCom

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

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	DCP114	**Technician**	Korey Devins	**Site Visit Date**	10/24/2019

Site Sponsor (agency)	EPA	**USGS Map**	Mount Sterling
Operating Group	private / state	**Map Scale**	
AQS #	39-047-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	39.6358
Deposition Measurement	dry, wet	**QAPP Longitude**	-83.2600
Land Use	agriculture, woodland - mixed	**QAPP Elevation Meters**	267
Terrain	flat	**QAPP Declination**	6.25
Conforms to MLM	Marginally	**QAPP Declination Date**	2/23/2006
Site Telephone	(740) 869-4722	**Audit Latitude**	39.635888
Site Address 1	Waterloo Road	**Audit Longitude**	-83.260563
Site Address 2	Deer Creek State Park	**Audit Elevation**	264
County	Fayette	**Audit Declination**	-6.3
City, State	Mount Sterling, OH		
Zip Code	43143	**Fire Extinguisher** ☑	New in 2015
Time Zone	Eastern	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☑	
Primary Op. Phone #		**Safety Hard Hat** ☑	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator	none	**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Present

Shelter Working Room ☑	**Make**	Ekto	**Model**	8810 (s/n 2149-13)	**Shelter Size**	640 cuft
Shelter Clean ☑	**Notes**	The shelter is currently in fair condition. There are loose floor tiles.				
Site OK ☑	**Notes**					

Driving Directions

From Circleville take 22/56 west. Stay on 22 through Williamsport. Turn right (north) onto route 207 and follow the signs for the park office and lodge. After crossing the river, turn right at the sign for the park office, golf course, and lodge. Continue approximately 1.5 miles and turn right again into the park. Go past the office and golf course and take the next right onto a stone road. Continue to the end and turn left. The site is on the left before the gas pipeline.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID DCP114 **Technician** Korey Devins **Site Visit Date** 10/24/2019

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

Siting Distances OK ☑

Siting Criteria Comment

The site is located in a wooded thicket within a state park. The area surrounding the park is almost completely intensive agriculture. The site may not be regionally representative.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	DCP114	Technician	Korey Devins	Site Visit Date	10/24/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	DCP114	Technician	Korey Devins	Site Visit Date	10/24/2019

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

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	DCP114	Technician	Korey Devins	Site Visit Date	10/24/2019

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?	☐	Small trees within 10 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 12 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	Flow line only
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID DCP114 **Technician** Korey Devins **Site Visit Date** 10/24/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

		Stable	Grounded
9	Is the met tower stable and grounded?	☐	☐
10	Is the sample tower stable and grounded?	☑	☐
11	Tower comments?	Tower not grounded	

Provide any additional 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.

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	DCP114	Technician	Korey Devins	Site Visit Date	10/24/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑		☑
SSRF	☑		☑
Site Ops Manual	☐		☐
HASP	☑	May 2019	☑
Field Ops Manual	☑	May 2019	☑
Calibration Reports	☑		☑
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedule	☐		☐

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	DCP114	Technician	Korey Devins	Site Visit Date	10/24/2019

Site operation procedures

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

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

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

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

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

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

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

The ozone inlet filter is replaced and the sample line is leak-tested every two weeks.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	DCP114	Technician	Korey Devins	Site Visit Date	10/24/2019

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:

The site operator is following procedures and doing a very good job with filter handling.

Field Systems Data Form F-02058-1500-S10-rev002

Site ID DCP114 **Technician** Korey Devins **Site Visit Date** 10/24/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	4L2MC12	07031
DAS	Campbell	CR3000	2124	000345
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	00001630787	00390
Flow Rate	Apex	AXMC105LPMDPC	54748	000659
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	unknown	07199
Ozone	ThermoElectron Inc	49i A1NAA	1030244799	000702
Ozone Standard	ThermoElectron Inc	49i A3NAA	0922236891	000515
Sample Tower	Aluma Tower	B	AT-81056-J-4	000030
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	13993	06390
Zero air pump	Werther International	PC70/4	000829175	06939

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
OXF122-Korey Devins-10/25/2019						
1	10/25/2019	Computer	Dell	07008	Inspiron 15	694MC12
2	10/25/2019	DAS	Campbell	000425	CR3000	2528
3	10/25/2019	Elevation	Elevation	None	1	None
4	10/25/2019	Filter pack flow pump	Thomas	04924	107CAB18	100300020817
5	10/25/2019	Flow Rate	Apex	000556	AXMC105LPMDPCV	illegible
6	10/25/2019	Infrastructure	Infrastructure	none	none	none
7	10/25/2019	Modem	Digi	07163	LR54	unknown
8	10/25/2019	Ozone	ThermoElectron Inc	000610	49i A1NAA	1009241778
9	10/25/2019	Ozone Standard	ThermoElectron Inc	000545	49i A3NAA	0929938241
10	10/25/2019	Sample Tower	Aluma Tower	000018	B	AT-61152-A-H8-E
11	10/25/2019	Shelter Temperature	Campbell	none	107-L	10755-148
12	10/25/2019	Siting Criteria	Siting Criteria	None	1	None
13	10/25/2019	Temperature	RM Young	02823	41342	illegible
14	10/25/2019	Zero air pump	Werther International	06908	C 70/4	000821900

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2528	OXF122	Korey Devins	10/25/2019	DAS	Primary

Das Date: 10/25/2019 **Audit Date** 10/25/2019
Das Time: 10:45:00 **Audit Time** 10:45:00
Das Day: 298 **Audit Day** 298

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

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740135	**Tfer Desc.**	DVM
Tfer ID	01311		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0000	-0.0001	V	V	-0.0001
7	0.1000	0.1000	0.1000	V	V	0.0000
7	0.3000	0.3002	0.3001	V	V	-0.0001
7	0.5000	0.5004	0.5003	V	V	-0.0001
7	0.7000	0.7008	0.7007	V	V	-0.0001
7	0.9000	0.9005	0.9005	V	V	0.0000
7	1.0000	1.0006	1.0005	V	V	-0.0001

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	OXF122	Korey Devins	10/25/2019	Flow Rate	000556

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	148613	**Tfer Desc.**	BIOS 220-H
Tfer ID	01421		
Slope	1.00000	**Intercept**	0.00000
Cert Date	3/4/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0
				Cal Factor Full Scale	0
0.88%	1.32%			**Rotometer Reading:**	1.5

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.00	l/m	l/m	
primary	test pt 1	1.516	1.520	1.52	0.000	1.50	l/m	l/m	-1.32%
primary	test pt 2	1.514	1.510	1.52	0.000	1.50	l/m	l/m	-0.66%
primary	test pt 3	1.510	1.510	1.52	0.000	1.50	l/m	l/m	-0.66%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	See comments	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	350 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241778	OXF122	Korey Devins	10/25/2019	Ozone	000610

Slope:	0.99496	**Slope:**	0.00000
Intercept	-1.07432	**Intercept**	0.00000
CorrCoff:	1.00000	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180930075	**Tfer Desc.**	Ozone primary stan
Tfer ID	01115		
Slope	1.00800	**Intercept**	-0.40210
Cert Date	3/26/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.05	0.44	-0.62	ppb		-1.06
primary	2	17.25	17.51	16.30	ppb		-1.21
primary	3	35.24	35.35	34.18	ppb	-3.37	
primary	4	66.90	66.76	65.27	ppb	-2.26	
primary	5	116.26	115.73	114.10	ppb	-1.42	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.10	pass
Span	1.030	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	124.9 kHz	pass
Cell A Noise	1.0 ppb	pass
Cell A Flow	1.03 lpm	pass
Cell A Pressure	705.9 mmHg	pass
Cell A Tmp.	33.5 C	pass
Cell B Freq.	99.7 kHz	pass
Cell B Noise	0.9 ppb	pass
Cell B Flow	0.71 lpm	pass
Cell B Pressure	706.8 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	illegible	OXF122	Korey Devins	10/25/2019	Temperature	02823

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00733	**Intercept**	0.14497
Cert Date	2/12/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.33	0.47		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.11	-0.03	0.000	0.0	C	0.07
primary	Temp Mid Range	25.52	25.19	0.000	25.7	C	0.47
primary	Temp High Range	45.87	45.39	0.000	45.8	C	0.44

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	10755-148	OXF122	Korey Devins	10/25/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.20	0.43		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	24.66	24.34	0.000	24.8	C	0.43
primary	Temp Mid Range	25.48	25.15	0.000	25.1	C	-0.03
primary	Temp Mid Range	26.53	26.19	0.000	26.1	C	-0.13

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	OXF122	Technician	Korey Devins	Site Visit Date	10/25/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810 (s/n 2107-4)	640 cuft

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	OXF122	Korey Devins	10/25/2019	Moisture Present	Apex	4326	☐	☐

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

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The operator uses procedures written by the previous site operator.

2 **Parameter:** DasComments

The met tower is operated by the university and the temperature sensor has been moved to the sample tower in a naturally aspirated shield.

3 **Parameter:** SitingCriteriaCom

The site is located in university agriculture research facility.

4 **Parameter:** ShelterCleanNotes

The shelter roof has been repaired.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	OXF122	**Technician**	Korey Devins	**Site Visit Date**	10/25/2019

Site Sponsor (agency)	EPA	**USGS Map**	Oxford
Operating Group	Miami University	**Map Scale**	
AQS #	39-017-9991	**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	39.5314
Deposition Measurement	dry, wet	**QAPP Longitude**	-84.7231
Land Use	agriculture, woodland - mixed	**QAPP Elevation Meters**	284
Terrain	gently rolling	**QAPP Declination**	5.2
Conforms to MLM	Yes	**QAPP Declination Date**	2/23/2007
Site Telephone	(513) 523-6912	**Audit Latitude**	39.531115
Site Address 1	Ecological Research Center	**Audit Longitude**	-84.723547
Site Address 2	Somerville Rd.	**Audit Elevation**	284
County	Butler	**Audit Declination**	-5.6
City, State	Oxford, OH		
Zip Code	45056	**Fire Extinguisher** (Present ☑)	New in 2015
Time Zone	Eastern	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☑	
Primary Op. Phone #		**Safety Hard Hat** ☑	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810 (s/n 2107-4)	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The shelter roof has been repaired.				
Site OK	☑	**Notes**					

Driving Directions

From Oxford proceed north on route 732. Just outside of town bear right onto Somerville Road. Continue approximately 1/2 mile and turn right at the sign for the Ecological Research Center. Stay on the dirt road past the buildings. The road will turn to the right along the tree line. The site is in the field on the right.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID OXF122 **Technician** Korey Devins **Site Visit Date** 10/25/2019

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	25 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 university agriculture research facility.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	OXF122	Technician	Korey Devins	Site Visit Date	10/25/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	OXF122	Technician	Korey Devins	Site Visit Date	10/25/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	OXF122	Technician	Korey Devins	Site Visit Date	10/25/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 15 meters
4	Describe dry dep sample tube.		3/8 teflon by 15 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	Flow line only
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID	OXF122	Technician	Korey Devins	Site Visit Date	10/25/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

11	Tower comments?	

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

The met tower is operated by the university and the temperature sensor has been moved to the sample tower in a naturally aspirated shield.

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	OXF122	Technician	Korey Devins	Site Visit Date	10/25/2019

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	☑	March 2015	☐
HASP	☑	March 2015	☐
Field Ops Manual	☑	March 2015	☐
Calibration Reports	☑		☑
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedule	☐		☐

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	OXF122	Technician	Korey Devins	Site Visit Date	10/25/2019

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	OXF122	Technician	Korey Devins	Site Visit Date	10/25/2019

Site operation procedures

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

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

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

The operator uses procedures written by the previous site operator.

Field Systems Data Form F-02058-1500-S10-rev002

Site ID OXF122 **Technician** Korey Devins **Site Visit Date** 10/25/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	694MC12	07008
DAS	Campbell	CR3000	2528	000425
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	100300020817	04924
Flow Rate	Apex	AXMC105LPMDPC	illegible	000556
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	unknown	07163
Ozone	ThermoElectron Inc	49i A1NAA	1009241778	000610
Ozone Standard	ThermoElectron Inc	49i A3NAA	0929938241	000545
Sample Tower	Aluma Tower	B	AT-61152-A-H8-E	000018
Shelter Temperature	Campbell	107-L	10755-148	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	illegible	02823
Zero air pump	Werther International	C 70/4	000821900	06908

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
SAN189-Martin Valvur-10/25/2019						
1	10/25/2019	Computer	Dell	07016	Inspiron 15	DK2MC12
2	10/25/2019	DAS	Campbell	000360	CR3000	2138
3	10/25/2019	Elevation	Elevation	None	1	None
4	10/25/2019	Filter pack flow pump	Thomas	06019	107CAB18	050400022576
5	10/25/2019	Flow Rate	Apex	000861	AXMC105LPMDPCV	illegible
6	10/25/2019	Infrastructure	Infrastructure	none	none	none
7	10/25/2019	Modem	Digi	07133	LR54	unknown
8	10/25/2019	Ozone	ThermoElectron Inc	000729	49i A1NAA	1105347323
9	10/25/2019	Ozone Standard	ThermoElectron Inc	000367	49i A3NAA	0726124683
10	10/25/2019	Sample Tower	Aluma Tower	000207	B	none
11	10/25/2019	Shelter Temperature	Campbell	none	107-L	223461
12	10/25/2019	Siting Criteria	Siting Criteria	None	1	None
13	10/25/2019	Temperature	RM Young	06537	41342VC	14798
14	10/25/2019	Zero air pump	Werther International	06875	C 70/4	000814272

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2138	SAN189	Martin Valvur	10/25/2019	DAS	Primary

Das Date: 10/25/2019
Das Time: 08:01:00
Das Day: 298

Audit Date 10/25/2019
Audit Time 08:01:00
Audit Day 298

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

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740243	**Tfer Desc.**	DVM
Tfer ID	01312		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	-0.0002	-0.0002	V	V	0.0000
7	0.1000	0.0997	0.0996	V	V	-0.0001
7	0.3000	0.3019	0.3020	V	V	0.0001
7	0.5000	0.4993	0.4993	V	V	0.0000
7	0.7000	0.6990	0.6992	V	V	0.0002
7	0.9000	0.8989	0.8989	V	V	0.0000
7	1.0000	0.9995	0.9998	V	V	0.0003

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	SAN189	Martin Valvur	10/25/2019	Flow Rate	000861

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	122974	**Tfer Desc.**	BIOS 220-H
Tfer ID	01416		
Slope	1.00178	**Intercept**	0.00161
Cert Date	7/13/2018	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	-0.01
				Cal Factor Full Scale	1.01
0.78%	1.01%			**Rotometer Reading:**	3.2

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	-0.01	0.000	0.00	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	-0.01	l/m	l/m	
primary	test pt 1	2.980	2.970	2.94	0.000	3.00	l/m	l/m	1.01%
primary	test pt 2	2.990	2.980	2.95	0.000	3.00	l/m	l/m	0.67%
primary	test pt 3	2.990	2.980	2.94	0.000	3.00	l/m	l/m	0.67%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	3.3 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	270 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347323	SAN189	Martin Valvur	10/25/2019	Ozone	000729

Slope:	0.98555	**Slope:**	0.00000
Intercept	-1.28329	**Intercept**	0.00000
CorrCoff:	0.99999	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00151	**Intercept**	0.00666
Cert Date	10/30/2018	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.06	0.05	-1.09	ppb		-1.14
primary	2	15.75	15.71	14.26	ppb		-1.45
primary	3	35.40	35.33	33.41	ppb	-5.59	
primary	4	68.36	68.25	65.71	ppb	-3.79	
primary	5	114.32	114.14	111.40	ppb	-2.43	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.10	pass
Span	1.029	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	98.0 kHz	pass
Cell A Noise	0.6 ppb	pass
Cell A Flow	0.61 lpm	pass
Cell A Pressure	702.1 mmHg	pass
Cell A Tmp.	32.3 C	pass
Cell B Freq.	87.5 kHz	pass
Cell B Noise	0.6 ppb	pass
Cell B Flow	0.65 lpm	pass
Cell B Pressure	702.1 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	14798	SAN189	Martin Valvur	10/25/2019	Temperature	06537

Mfg	Fluke	**Parameter**	Temperature
Serial Number	3275143	**Tfer Desc.**	RTD
Tfer ID	01229		
Slope	0.99989	**Intercept**	-0.00649
Cert Date	1/23/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.09	0.19		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.04	0.05	0.000	0.1	C	0.05
primary	Temp Mid Range	24.17	24.18	0.000	24.2	C	-0.03
primary	Temp High Range	47.80	47.81	0.000	47.6	C	-0.19

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	223461	SAN189	Martin Valvur	10/25/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.29	0.42		

Mfg	Fluke	Parameter	Shelter Temperature
Serial Number	3275143	Tfer Desc.	RTD
Tfer ID	01229		
Slope	0.99989	Intercept	-0.00649
Cert Date	1/23/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	22.96	22.97	0.000	22.6	C	-0.42
primary	Temp Mid Range	22.26	22.27	0.000	22.7	C	0.39
primary	Temp Mid Range	21.86	21.87	0.000	21.8	C	-0.07

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	SAN189	Technician	Martin Valvur	Site Visit Date	10/25/2019

Shelter Make	Shelter Model	Shelter Size
Shelter One	E8109-26012	720 cuft

Sensor Component		Condition		Status	
Sensor Component	Sample Tower Type	Condition	Type B	Status	pass
Sensor Component	Conduit	Condition	Good	Status	pass
Sensor Component	Met Tower	Condition	N/A	Status	pass
Sensor Component	Moisture Trap	Condition	Installed	Status	pass
Sensor Component	Power Cables	Condition	Good	Status	pass
Sensor Component	Shelter Temp Control	Condition	Functioning	Status	pass
Sensor Component	Rotometer	Condition	Installed	Status	pass
Sensor Component	Sample Tower	Condition	Good	Status	pass
Sensor Component	Shelter Condition	Condition	Good	Status	pass
Sensor Component	Shelter Door	Condition	Good	Status	pass
Sensor Component	Shelter Roof	Condition	Good	Status	pass
Sensor Component	Shelter Floor	Condition	Good	Status	pass
Sensor Component	Signal Cable	Condition	Good	Status	pass
Sensor Component	Tubing Type	Condition	1/4 teflon	Status	pass
Sensor Component	Sample Train	Condition	Good	Status	pass

Field Systems Comments

1 **Parameter:** ShelterCleanNotes

The shelter is in very good condition, however somewhat cluttered.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	SAN189	**Technician**	Martin Valvur	**Site Visit Date**	10/25/2019

Site Sponsor (agency)	EPA	**USGS Map**	Santee
Operating Group	Santee Sioux Nation	**Map Scale**	
AQS #	31-107-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone, SO2, NOx, CO	**QAPP Latitude**	
Deposition Measurement	dry	**QAPP Longitude**	
Land Use	range	**QAPP Elevation Meters**	429
Terrain	rolling	**QAPP Declination**	
Conforms to MLM	Yes	**QAPP Declination Date**	6/21/2006
Site Telephone	(402) 857-2546	**Audit Latitude**	42.829154
Site Address 1	SR S54D	**Audit Longitude**	-97.854128
Site Address 2	Santee Sioux Indian Reservation	**Audit Elevation**	434
County	Knox	**Audit Declination**	5.0
City, State	Niobrara, NE		
Zip Code	68760	**Fire Extinguisher** ☑ Present	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 Steps** ☑	

Shelter Working Room	☑	**Make**	Shelter One	**Model**	E8109-26012	**Shelter Size**	720 cuft
Shelter Clean	☑	**Notes**	The shelter is in very good condition, however somewhat cluttered.				
Site OK	☑	**Notes**					

Driving Directions

From Yankton, South Dakota go south on route 81. Turn right (south) at the intersection of route 12 and continue approximately 26 miles. Just past the casino and gas station, turn right (north) onto SR 54 toward Santee. Continue approximately 6.5 miles. The site will be visible through the farm gate on the left at the top of a hill just before reaching Santee.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID SAN189 **Technician** Martin Valvur **Site Visit Date** 10/25/2019

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

Siting Distances OK ☑

Siting Criteria Comment

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	SAN189	Technician	Martin Valvur	Site Visit Date	10/25/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	SAN189	Technician	Martin Valvur	Site Visit Date	10/25/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	SAN189	Technician	Martin Valvur	Site Visit Date	10/25/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 16 meters
4	Describe dry dep sample tube.		1/4 teflon by 16 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID SAN189 **Technician** Martin Valvur **Site Visit Date** 10/25/2019

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?	☐	Temperature only
4	Are the signal connections protected from the weather and well maintained?	☑	
5	Are the signal leads connected to the correct DAS channel?	☑	
6	Are the DAS, sensor translators, and shelter properly grounded?	☑	
7	Does the instrument shelter have a stable power source?	☑	
8	Is the instrument shelter temperature controlled?	☑	

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	SAN189	Technician	Martin Valvur	Site Visit Date	10/25/2019

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	☑	2014	☐
HASP	☑	2014	☐
Field Ops Manual	☐		☐
Calibration Reports	☑		☑
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedule	☐		☐

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID SAN189 **Technician** Martin Valvur **Site Visit Date** 10/25/2019

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	SAN189	Technician	Martin Valvur	Site Visit Date	10/25/2019

Site operation procedures

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

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

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

Field Systems Data Form F-02058-1500-S10-rev002

Site ID SAN189 **Technician** Martin Valvur **Site Visit Date** 10/25/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	DK2MC12	07016
DAS	Campbell	CR3000	2138	000360
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	050400022576	06019
Flow Rate	Apex	AXMC105LPMDPC	illegible	000861
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	unknown	07133
Ozone	ThermoElectron Inc	49i A1NAA	1105347323	000729
Ozone Standard	ThermoElectron Inc	49i A3NAA	0726124683	000367
Sample Tower	Aluma Tower	B	none	000207
Shelter Temperature	Campbell	107-L	223461	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	14798	06537
Zero air pump	Werther International	C 70/4	000814272	06875

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
MCK131-Sandy Grenville-11/05/2019						
1	11/5/2019	Computer	Dell	07039	Inspiron 15	7M2MC12
2	11/5/2019	DAS	Campbell	000429	CR3000	2535
3	11/5/2019	Elevation	Elevation	None	1	None
4	11/5/2019	Filter pack flow pump	Thomas	00497	107CA18	118700000596
5	11/5/2019	Flow Rate	Apex	000528	AXMC105LPMDPCV	48097
6	11/5/2019	Flow Rate	Apex	000600	AXMC105LPMDPCV	illegible
7	11/5/2019	Infrastructure	Infrastructure	none	none	none
8	11/5/2019	Modem	Raven	06477	H4222-C	0808311292
9	11/5/2019	Modem	Digi	07177	LR54	unknown
10	11/5/2019	Ozone	ThermoElectron Inc	000723	49i A1NAA	1105347327
11	11/5/2019	Ozone Standard	ThermoElectron Inc	000366	49i A3NAA	0726124695
12	11/5/2019	Sample Tower	Aluma Tower	03514	A	none
13	11/5/2019	Shelter Temperature	Campbell	none	107-L	none
14	11/5/2019	Siting Criteria	Siting Criteria	None	1	None
15	11/5/2019	Temperature	RM Young	07002	41342	023293
16	11/5/2019	Zero air pump	Werther International	06912	PC70/4	000829177

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2535	MCK131	Sandy Grenville	11/05/2019	DAS	Primary

Das Date: 11/5 /2019
Das Time: 14:53:22
Das Day: 309

Audit Date 11/5 /2019
Audit Time 14:53:22
Audit Day 309

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

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740135	**Tfer Desc.**	DVM
Tfer ID	01311		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

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	0.3001	0.3001	V	V	0.0000
7	0.5000	0.5008	0.5008	V	V	0.0000
7	0.7000	0.7008	0.7008	V	V	0.0000
7	0.9000	0.9005	0.9005	V	V	0.0000
7	1.0000	1.0006	1.0006	V	V	0.0000

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	MCK131	Sandy Grenville	11/05/2019	Flow Rate	000600

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	148613	**Tfer Desc.**	BIOS 220-H
Tfer ID	01421		
Slope	1.00000	**Intercept**	0.00000
Cert Date	3/4/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	-0.04
3.01%	3.23%			**Cal Factor Full Scale**	0.96
				Rotometer Reading:	1.4

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalE	PctDifference
primary	pump off	0.000	0.000	0.01	0.000	0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.000	-0.03	l/m	l/m	
primary	test pt 1	1.558	1.560	1.55	0.000	1.51	l/m	l/m	-3.21%
primary	test pt 2	1.547	1.550	1.55	0.000	1.51	l/m	l/m	-2.58%
primary	test pt 3	1.550	1.550	1.55	0.000	1.50	l/m	l/m	-3.23%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	0.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	270 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347327	MCK131	Sandy Grenville	11/05/2019	Ozone	000723

Slope:	0.99511	**Slope:**	0.00000
Intercept	-1.37691	**Intercept**	0.00000
CorrCoff:	0.99993	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180930075	**Tfer Desc.**	Ozone primary stan
Tfer ID	01115		
Slope	1.00800	**Intercept**	-0.40210
Cert Date	3/26/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.07	0.46	-1.28	ppb		-1.74
primary	2	14.71	14.99	13.59	ppb		-1.4
primary	3	35.02	35.14	33.61	ppb	-4.45	
primary	4	68.17	68.02	67.11	ppb	-1.35	
primary	5	110.10	109.62	107.20	ppb	-2.23	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.000	pass
Span	1.005	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	88.7 kHz	pass
Cell A Noise	0.6 ppb	pass
Cell A Flow	0.70 lpm	pass
Cell A Pressure	729.2 mmHg	pass
Cell A Tmp.	27.2 C	pass
Cell B Freq.	92.7 kHz	pass
Cell B Noise	0.7 ppb	pass
Cell B Flow	0.71 lpm	pass
Cell B Pressure	729.8 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	023293	MCK131	Sandy Grenville	11/05/2019	Temperature	07002

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00733	**Intercept**	0.14497
Cert Date	2/12/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.29	0.39		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	-0.13	-0.27	0.000	0.1	C	0.39
primary	Temp Mid Range	26.16	25.83	0.000	25.9	C	0.1
primary	Temp High Range	49.73	49.22	0.000	48.8	C	-0.38

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	MCK131	Sandy Grenville	11/05/2019	Shelter Temperature	none

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

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	21.07	20.77	0.000	21.1	C	0.3
primary	Temp Mid Range	22.50	22.19	0.000	22.0	C	-0.19
primary	Temp Mid Range	23.61	23.29	0.000	23.2	C	-0.1

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	MCK131	Technician	Sandy Grenville	Site Visit Date	11/05/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810	640 cuft

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

Field Systems Comments

1 **Parameter:** DocumentationCo

HASP and Field Operations Manual are not onsite.

2 **Parameter:** ShelterCleanNotes

The shelter is neat and well organized.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	MCK131	**Technician**	Sandy Grenville	**Site Visit Date**	11/05/2019

Site Sponsor (agency)	EPA	**USGS Map**	Mackville
Operating Group	Private	**Map Scale**	
AQS #	21-229-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	37.7044
Deposition Measurement	dry, wet	**QAPP Longitude**	-85.0483
Land Use	agriculture, woodland - mixed	**QAPP Elevation Meters**	353
Terrain	rolling	**QAPP Declination**	4.25
Conforms to MLM	Marginally	**QAPP Declination Date**	12/28/2004
Site Telephone	(859) 262-5181	**Audit Latitude**	37.704678
Site Address 1	Westley Miller Road	**Audit Longitude**	-85.048706
Site Address 2		**Audit Elevation**	293
County	Washington	**Audit Declination**	-4.5
City, State	Harrodsburg, KY		
Zip Code	40330	**Fire Extinguisher** ☑	New in 2015
Time Zone	Eastern	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☑	
Primary Op. Phone #		**Safety Hard Hat** ☑	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Present

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The shelter is neat and well organized.				
Site OK	☑	**Notes**					

Driving Directions From Danville go west on 150 toward Perryville. In Perryville turn right (north) on 1920 or Battlefield Road. Continue approximately 7.3 miles to Wesley Miller Road. Turn left onto Wesley Miller Road and continue approximately 1 mile. The site is on the left through a farm gate.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID MCK131 **Technician** Sandy Grenville **Site Visit Date** 11/05/2019

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

Siting Distances OK ☑

Siting Criteria Comment

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	MCK131	Technician	Sandy Grenville	Site Visit Date	11/05/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	MCK131	Technician	Sandy Grenville	Site Visit Date	11/05/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID MCK131 **Technician** Sandy Grenville **Site Visit Date** 11/05/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 15 meters
4	Describe dry dep sample tube.		3/8 teflon by 12 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	Flow line only
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID MCK131 **Technician** Sandy Grenville **Site Visit Date** 11/05/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID MCK131 **Technician** Sandy Grenville **Site Visit Date** 11/05/2019

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 2014	☐
HASP	☑	Oct 2014	☑
Field Ops Manual	☐		☐
Calibration Reports	☑	Electronic copy	☑
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedule	☐		☐

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

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

HASP and Field Operations Manual are not onsite.

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	MCK131	Technician	Sandy Grenville	Site Visit Date	11/05/2019

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID MCK131 **Technician** Sandy Grenville **Site Visit Date** 11/05/2019

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	☑	As needed	☑
Sample Line Check for Dirt/Water	☑	Weekly	☑

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

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID MCK131 **Technician** Sandy Grenville **Site Visit Date** 11/05/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	7M2MC12	07039
DAS	Campbell	CR3000	2535	000429
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	118700000596	00497
Flow Rate	Apex	AXMC105LPMDPC	illegible	000600
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	unknown	07177
Modem	Raven	H4222-C	0808311292	06477
Ozone	ThermoElectron Inc	49i A1NAA	1105347327	000723
Ozone Standard	ThermoElectron Inc	49i A3NAA	0726124695	000366
Sample Tower	Aluma Tower	A	none	03514
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	023293	07002
Zero air pump	Werther International	PC70/4	000829177	06912

Site Inventory by Site Visit

Site Visit Date		*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
MCK231-Sandy Grenville-11/05/2019						
1	11/5/2019	Computer	Dell	07035	Inspiron 15	3C3MC12
2	11/5/2019	DAS	Campbell	000359	CR3000	2137
3	11/5/2019	Elevation	Elevation	None	1	None
4	11/5/2019	Filter pack flow pump	Thomas	04513	107CAB18B	110000014171
5	11/5/2019	Flow Rate	Apex	000597	AXMC105LPMDPCV	illegible
6	11/5/2019	Infrastructure	Infrastructure	none	none	none
7	11/5/2019	Modem	Digi	07176	LR54	unknown
8	11/5/2019	Ozone	ThermoElectron Inc	000682	49i A1NAA	1030244796
9	11/5/2019	Ozone Standard	ThermoElectron Inc	000369	49i A3NAA	0726124690
10	11/5/2019	Shelter Temperature	Campbell	none	107-L	none
11	11/5/2019	Siting Criteria	Siting Criteria	None	1	None
12	11/5/2019	Temperature	RM Young	07003	41342	025496
13	11/5/2019	Zero air pump	Werther International	06924	C 70/4	000836205

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2137	MCK231	Sandy Grenville	11/05/2019	DAS	Primary

Das Date: 11/5 /2019
Das Time: 14:44:28
Das Day: 309

Audit Date 11/5 /2019
Audit Time 14:44:28
Audit Day 309

Low Channel:

Avg Diff:	Max Diff:
0.0000	0.0000

High Channel:

Avg Diff:	Max Diff:
0.0000	0.0000

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740135	**Tfer Desc.**	DVM
Tfer ID	01311		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0000	0.0000	V	V	0.0000
7	0.1000	0.1001	0.1001	V	V	0.0000
7	0.3000	0.3004	0.3004	V	V	0.0000
7	0.5000	0.5003	0.5003	V	V	0.0000
7	0.7000	0.7002	0.7002	V	V	0.0000
7	0.9000	0.9004	0.9004	V	V	0.0000
7	1.0000	1.0001	1.0001	V	V	0.0000

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	MCK231	Sandy Grenville	11/05/2019	Flow Rate	000597

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	148613	**Tfer Desc.**	BIOS 220-H
Tfer ID	01421		
Slope	1.00000	**Intercept**	0.00000
Cert Date	3/4/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	-0.02
2.16%	3.21%			**Cal Factor Full Scale**	0.99
				Rotometer Reading:	1.5

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.02	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	-0.01	l/m	l/m	
primary	test pt 1	1.559	1.560	1.52	0.000	1.51	l/m	l/m	-3.21%
primary	test pt 2	1.529	1.530	1.52	0.000	1.50	l/m	l/m	-1.96%
primary	test pt 3	1.534	1.530	1.52	0.000	1.51	l/m	l/m	-1.31%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Fair	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	0.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	180 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244796	MCK231	Sandy Grenville	11/05/2019	Ozone	000682

Slope:	1.00181	**Slope:**	0.00000
Intercept	-1.68192	**Intercept**	0.00000
CorrCoff:	0.99994	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180930075	**Tfer Desc.**	Ozone primary stan
Tfer ID	01115		
Slope	1.00800	**Intercept**	-0.40210
Cert Date	3/26/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.20	0.59	-1.52	ppb		-2.11
primary	2	14.88	15.16	13.65	ppb		-1.51
primary	3	35.04	35.16	34.27	ppb	-2.56	
primary	4	69.80	69.64	67.56	ppb	-3.03	
primary	5	111.70	111.21	109.81	ppb	-1.27	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.000	pass
Span	1.017	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	88.7 kHz	pass
Cell A Noise	0.4 ppb	pass
Cell A Flow	0.69 lpm	pass
Cell A Pressure	716.7 mmHg	pass
Cell A Tmp.	32.5 C	pass
Cell B Freq.	90.2 kHz	pass
Cell B Noise	0.6 ppb	pass
Cell B Flow	0.73 lpm	pass
Cell B Pressure	716.1 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	025496	MCK231	Sandy Grenville	11/05/2019	Temperature	07003

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00733	**Intercept**	0.14497
Cert Date	2/12/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.50	0.88		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	-0.13	-0.27	0.000	0.2	C	0.45
primary	Temp Mid Range	26.16	25.83	0.000	25.7	C	-0.17
primary	Temp High Range	49.75	49.24	0.000	48.4	C	-0.88

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	MCK231	Sandy Grenville	11/05/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.56	0.98		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	20.65	20.36	0.000	21.3	C	0.98
primary	Temp Mid Range	23.61	23.29	0.000	23.8	C	0.54
primary	Temp Mid Range	22.05	21.75	0.000	21.9	C	0.15

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	MCK231	Technician	Sandy Grenville	Site Visit Date	11/05/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810	640 cuft

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

Field Systems Comments

1 **Parameter:** ShelterCleanNotes

The site instruments are located in the MCK131 shelter. The same site operator is servicing both sites.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	MCK231	**Technician**	Sandy Grenville	**Site Visit Date**	11/05/2019

Site Sponsor (agency)	EPA	**USGS Map**	Mackville
Operating Group	Private	**Map Scale**	
AQS #	21-229-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	37.7044
Deposition Measurement	dry, wet	**QAPP Longitude**	-85.0483
Land Use	agriculture, woodland - mixed	**QAPP Elevation Meters**	353
Terrain	rolling	**QAPP Declination**	4.25
Conforms to MLM	Marginally	**QAPP Declination Date**	12/28/2004
Site Telephone	(859) 262-5181	**Audit Latitude**	37.704678
Site Address 1	Wesley Miller Road	**Audit Longitude**	-85.048706
Site Address 2		**Audit Elevation**	293
County	Washington	**Audit Declination**	-4.5
City, State	Harrodsburg, KY		
Zip Code	40330	**Fire Extinguisher** ☑	New in 2015
Time Zone	Eastern	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☑	
Primary Op. Phone #		**Safety Hard Hat** ☑	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Present

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The site instruments are located in the MCK131 shelter. The same site operator is servicing both sites.				
Site OK	☑	**Notes**					

Driving Directions From Danville go west on 150 toward Perryville. In Perryville turn right (north) on 1920 or Battlefield Road. Continue approximately 7.3 miles to Wesley Miller Road. Turn left onto Wesley Miller Road and continue approximately 1 mile. The site is on the left through a farm gate.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID MCK231 **Technician** Sandy Grenville **Site Visit Date** 11/05/2019

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

Siting Distances OK ☑

Siting Criteria Comment

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	MCK231	Technician	Sandy Grenville	Site Visit Date	11/05/2019

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?	☐	Temperature facing south
5	Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)	☑	
6	Is the solar radiation sensor plumb?	☑	N/A
7	Is it sited to avoid shading, or any artificial or reflected light?	☑	N/A
8	Is the rain gauge plumb?	☑	N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	☑	N/A
10	Is the surface wetness sensor sited with the grid surface facing north?	☑	N/A
11	Is it inclined approximately 30 degrees?	☑	N/A

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	MCK231	Technician	Sandy Grenville	Site Visit Date	11/05/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	MCK231	Technician	Sandy Grenville	Site Visit Date	11/05/2019

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 13 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	Flow line only
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID MCK231 **Technician** Sandy Grenville **Site Visit Date** 11/05/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	MCK231	Technician	Sandy Grenville	Site Visit Date	11/05/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	MCK231	Technician	Sandy Grenville	Site Visit Date	11/05/2019

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	MCK231	Technician	Sandy Grenville	Site Visit Date	11/05/2019

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	☑	As needed	☑
Sample Line Check for Dirt/Water	☑	Weekly	☑

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

Field Systems Data Form F-02058-1500-S10-rev002

Site ID MCK231 **Technician** Sandy Grenville **Site Visit Date** 11/05/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	3C3MC12	07035
DAS	Campbell	CR3000	2137	000359
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18B	110000014171	04513
Flow Rate	Apex	AXMC105LPMDPC	illegible	000597
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	unknown	07176
Ozone	ThermoElectron Inc	49i A1NAA	1030244796	000682
Ozone Standard	ThermoElectron Inc	49i A3NAA	0726124690	000369
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	025496	07003
Zero air pump	Werther International	C 70/4	000836205	06924

Site Inventory by Site Visit

Site Visit Date		*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
STK138-Korey Devins-11/05/2019						
1	11/5/2019	Computer	Dell	07065	Inspiron 15	1Y3MC12
2	11/5/2019	DAS	Campbell	000349	CR3000	2128
3	11/5/2019	Elevation	Elevation	None	1	None
4	11/5/2019	Filter pack flow pump	Thomas	04923	107CAB18	060300019959
5	11/5/2019	Flow Rate	Apex	000661	AXMC105LPMDPCV	illegible
6	11/5/2019	Infrastructure	Infrastructure	none	none	none
7	11/5/2019	Modem	Digi	07179	LR54	unknown
8	11/5/2019	Ozone	ThermoElectron Inc	000625	49i A1NAA	1009241797
9	11/5/2019	Ozone Standard	ThermoElectron Inc	000688	49i A3NAA	1030244817
10	11/5/2019	Sample Tower	Aluma Tower	03554	A	none
11	11/5/2019	Shelter Temperature	Campbell	none	107-L	unknown
12	11/5/2019	Siting Criteria	Siting Criteria	None	1	None
13	11/5/2019	Temperature	RM Young	06407	41342VC	14040
14	11/5/2019	Zero air pump	Werther International	06915	C 70/4	000829162

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2128	STK138	Korey Devins	11/05/2019	DAS	Primary

Das Date: 11/5 /2019
Das Time: 11:16:00
Das Day: 309

Audit Date 11/5 /2019
Audit Time 11:16:00
Audit Day 309

Low Channel:		High Channel:	
Avg Diff:	**Max Diff:**	**Avg Diff:**	**Max Diff:**
0.0001	0.0002	0.0001	0.0002

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740135	**Tfer Desc.**	DVM
Tfer ID	01311		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	-0.0001	-0.0001	V	V	0.0000
7	0.1000	0.0997	0.0998	V	V	0.0001
7	0.3000	0.2996	0.2997	V	V	0.0001
7	0.5000	0.4994	0.4995	V	V	0.0001
7	0.7000	0.6993	0.6995	V	V	0.0002
7	0.9000	0.8992	0.8993	V	V	0.0001
7	1.0000	0.9990	0.9992	V	V	0.0002

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	STK138	Korey Devins	11/05/2019	Flow Rate	000661

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	148613	**Tfer Desc.**	BIOS 220-H
Tfer ID	01421		
Slope	1.00000	**Intercept**	0.00000
Cert Date	3/4/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0
				Cal Factor Full Scale	0
4.66%	4.90%			**Rotometer Reading:**	1.45

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.04	0.000	0.03	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.000	0.01	l/m	l/m	
primary	test pt 1	1.434	1.430	1.49	0.000	1.50	l/m	l/m	4.90%
primary	test pt 2	1.433	1.430	1.49	0.000	1.50	l/m	l/m	4.90%
primary	test pt 3	1.444	1.440	1.50	0.000	1.50	l/m	l/m	4.17%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	See comments	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	275 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241797	STK138	Korey Devins	11/05/2019	Ozone	000625

Slope:	0.97775	**Slope:**	0.00000
Intercept	-0.12925	**Intercept**	0.00000
CorrCoff:	0.99999	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180030022	**Tfer Desc.**	Ozone primary stan
Tfer ID	01114		
Slope	0.98600	**Intercept**	0.41627
Cert Date	10/29/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.51	0.09	-0.17	ppb		-0.26
primary	2	15.33	15.12	14.59	ppb		-0.53
primary	3	35.82	35.90	35.25	ppb	-1.83	
primary	4	67.92	68.46	66.79	ppb	-2.47	
primary	5	113.97	115.16	112.40	ppb	-2.43	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.10	pass
Span	1.003	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	112.3 kHz	pass
Cell A Noise	1.8 ppb	pass
Cell A Flow	0.69 lpm	pass
Cell A Pressure	703.4 mmHg	pass
Cell A Tmp.	33.9 C	pass
Cell B Freq.	101.0 khz	pass
Cell B Noise	1.2 ppb	pass
Cell B Flow	0.63 lpm	pass
Cell B Pressure	704.0 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	14040	STK138	Korey Devins	11/05/2019	Temperature	06407

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00733	**Intercept**	0.14497
Cert Date	2/12/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.03	0.04		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.17	0.02	0.000	0.0	C	-0.04
primary	Temp Mid Range	26.32	25.98	0.000	26.0	C	-0.02
primary	Temp High Range	46.73	46.25	0.000	46.3	C	0.02

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	unknown	STK138	Korey Devins	11/05/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.70	0.80		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	25.60	25.27	0.000	24.7	C	-0.62
primary	Temp Mid Range	24.93	24.60	0.000	23.8	C	-0.8
primary	Temp Mid Range	25.87	25.54	0.000	24.9	C	-0.69

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	STK138	Technician	Korey Devins	Site Visit Date	11/05/2019

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

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	STK138	Korey Devins	11/05/2019	Moisture Present	Apex	4104	☐	☐

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

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 corn field on a cattle farm. Corn is planted within 10 meters.

3 **Parameter:** ShelterCleanNotes

The shelter is somewhat dirty and cluttered. There are signs of leaks on the walls and floor rot.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	STK138	**Technician**	Korey Devins	**Site Visit Date**	11/05/2019

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		
Zip Code	61085	**Fire Extinguisher** ☑	new in 2015
Time Zone	Central	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☐	
Primary Op. Phone #		**Safety Hard Hat** ☑	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☐	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Present

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810 (s/n 2149-21)	**Shelter Size**	640 cuft
Shelter Clean	☐	**Notes**	The shelter is somewhat dirty and cluttered. There are signs of leaks on the walls and floor rot.				
Site OK	☑	**Notes**					

Driving Directions

From Stockton go south on 78 (Main Street) for approximately 2.5 miles. As the road turns sharply to the right, continue straight onto a dirt road. There will be a stop sign at another dirt road intersection within 100 yards. Continue through that intersection, the site will be visible in the distance on a hill-side to the left. Continue another 1.5 miles bearing to the left on dirt roads to the Evans farm. The site is past both houses in the hay field.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID STK138 **Technician** Korey Devins **Site Visit Date** 11/05/2019

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 corn field on a cattle farm. Corn is planted within 10 meters.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	STK138	Technician	Korey Devins	Site Visit Date	11/05/2019

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?	☑	Mounted to sample tower
5	Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)	☑	
6	Is the solar radiation sensor plumb?	☑	N/A
7	Is it sited to avoid shading, or any artificial or reflected light?	☑	N/A
8	Is the rain gauge plumb?	☑	N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	☑	N/A
10	Is the surface wetness sensor sited with the grid surface facing north?	☑	N/A
11	Is it inclined approximately 30 degrees?	☑	N/A

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	STK138	Technician	Korey Devins	Site Visit Date	11/05/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	STK138	Technician	Korey Devins	Site Visit Date	11/05/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID STK138 **Technician** Korey Devins **Site Visit Date** 11/05/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	STK138	Technician	Korey Devins	Site Visit Date	11/05/2019

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	☑	May 2019	☑
HASP	☑	May 2019	☑
Field Ops Manual	☑	May 2019	☑
Calibration Reports	☑		☑
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedule	☐		☐

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	STK138	Technician	Korey Devins	Site Visit Date	11/05/2019

Site operation procedures

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

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

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

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

QC Check Performed		Frequency	Compliant
Multi-point Calibrations	☑	Semiannually	☑
Automatic Zero/Span Tests	☑	Daily	☑
Manual Zero/Span Tests	☑	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?	☑	Call-in only

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

The ozone sample train is leak tested every 2 weeks.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	STK138	Technician	Korey Devins	Site Visit Date	11/05/2019

Site operation procedures

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

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

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

Field Systems Data Form F-02058-1500-S10-rev002

Site ID STK138 **Technician** Korey Devins **Site Visit Date** 11/05/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	1Y3MC12	07065
DAS	Campbell	CR3000	2128	000349
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	060300019959	04923
Flow Rate	Apex	AXMC105LPMDPC	illegible	000661
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	unknown	07179
Ozone	ThermoElectron Inc	49i A1NAA	1009241797	000625
Ozone Standard	ThermoElectron Inc	49i A3NAA	1030244817	000688
Sample Tower	Aluma Tower	A	none	03554
Shelter Temperature	Campbell	107-L	unknown	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	14040	06407
Zero air pump	Werther International	C 70/4	000829162	06915

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
BVL130-Korey Devins-11/07/2019						
1	11/7/2019	CO	Teledyne	000760	T300U	87
2	11/7/2019	Computer	Dell	07073	Inspiron 15	B94MC12
3	11/7/2019	DAS	Campbell	000332	CR3000	2111
4	11/7/2019	Elevation	Elevation	None	1	None
5	11/7/2019	Filter pack flow pump	Thomas	04860	107CAB18	060300019995
6	11/7/2019	Flow Rate	Apex	000595	AXMC105LPMDPCV	illegible
7	11/7/2019	Infrastructure	Infrastructure	none	none	none
8	11/7/2019	Met tower	Climatronics	02738	14 inch taper	none
9	11/7/2019	Modem	Digi	missing	LR54	Illegible
10	11/7/2019	Noy	Teledyne	000805	T200U	110
11	11/7/2019	Ozone	ThermoElectron Inc	000739	49i A1NAA	1105347318
12	11/7/2019	Ozone Standard	ThermoElectron Inc	000512	49i A3NAA	0922236890
13	11/7/2019	Precipitation	Climatronics	02704	100508-2	illegible
14	11/7/2019	Relative Humidity	Vaisala	06007	HMP500A	A2410006
15	11/7/2019	Sample Tower	Aluma Tower	000182	B	unknown
16	11/7/2019	Shelter Temperature	Campbell	none	107-L	unknown
17	11/7/2019	Shield (10 meter)	RM Young	06206	Aspirated 43408	none
18	11/7/2019	Shield (2 meter)	RM Young	06635	Aspirated 43408	none
19	11/7/2019	Siting Criteria	Siting Criteria	None	1	None
20	11/7/2019	SO2	Teledyne	000787	T100U	94
21	11/7/2019	Solar Radiation	Licor	04566	LI-200	PY10653
22	11/7/2019	Solar Radiation Translator	RM Young	04340	70101-X	none
23	11/7/2019	Temperature	RM Young	04690	41342	6704
24	11/7/2019	Temperature2meter	RM Young	06404	41342	14037
25	11/7/2019	Wind Direction	RM Young	06108	AQ05305-5	72230wdr
26	11/7/2019	Wind Speed	RM Young	06108	AQ05305-5	72230wsp
27	11/7/2019	Zero air pump	Werther International	06926	PC70/4	000836218
28	11/7/2019	Zero air pump	Teledyne	000759	701H	576

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2111	BVL130	Korey Devins	11/07/2019	DAS	Primary

Das Date: 11/7 /2019
Das Time: 15:03:00
Das Day: 311

Audit Date 11/7 /2019
Audit Time 15:03:00
Audit Day 311

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

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740135	**Tfer Desc.**	DVM
Tfer ID	01311		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0000	0.0000	V	V	0.0000
7	0.1000	0.0998	0.0999	V	V	0.0001
7	0.3000	0.2996	0.2998	V	V	0.0002
7	0.5000	0.4995	0.4997	V	V	0.0002
7	0.7000	0.6994	0.6996	V	V	0.0002
7	0.9000	0.8992	0.8995	V	V	0.0003
7	1.0000	0.9991	0.9994	V	V	0.0003

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	BVL130	Korey Devins	11/07/2019	Flow Rate	000595

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	148613	**Tfer Desc.**	BIOS 220-H
Tfer ID	01421		
Slope	1.00000	**Intercept**	0.00000
Cert Date	3/4/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0
				Cal Factor Full Scale	0
0.88%	1.32%			**Rotometer Reading:**	1.45

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.39	0.000	0.36	l/m	l/m	
primary	test pt 1	1.519	1.520	1.59	0.000	1.50	l/m	l/m	-1.32%
primary	test pt 2	1.520	1.520	1.59	0.000	1.50	l/m	l/m	-1.32%
primary	test pt 3	1.498	1.500	1.59	0.000	1.50	l/m	l/m	0.00%

Sensor Component	Leak Test	**Condition**	See comments	**Status**	Fail
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	See comments	**Status**	pass
Sensor Component	Filter Distance	**Condition**	1.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	190 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347318	BVL130	Korey Devins	11/07/2019	Ozone	000739

Slope:	0.97565	**Slope:**	0.00000
Intercept	-0.11353	**Intercept**	0.00000
CorrCoff:	1.00000	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180030022	**Tfer Desc.**	Ozone primary stan
Tfer ID	01114		
Slope	0.98600	**Intercept**	0.41627
Cert Date	10/29/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.35	-0.06	0.00	ppb		0.06
primary	2	15.36	15.15	14.48	ppb		-0.67
primary	3	35.58	35.66	34.63	ppb	-2.93	
primary	4	68.28	68.82	67.09	ppb	-2.55	
primary	5	113.42	114.60	111.70	ppb	-2.56	

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.000	**Status**	pass
Sensor Component	Span	**Condition**	1.000	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	98.7 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.9 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.70 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	731.8 lpm	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	33.9 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	100.7 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.3 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.73 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	732.4 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**	N/A	**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Wind Speed Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	72230wsp	BVL130	Korey Devins	11/07/2019	Wind Speed	06108

Mfg	RM Young	**Parameter**	wind speed
Serial Number	CA04013	**Tfer Desc.**	wind speed motor (h
Tfer ID	01253		
Slope	1.00000	**Intercept**	0.00000
Cert Date	7/11/2018	**CorrCoff**	1.00000

Prop or Cups SN	68622		
Prop or Cups Torque	0.3	**to**	0.5
Prop Correction Facto	0.0512		

	DAS 1:		DAS 2:	
	Low Range	**High Range:**	**Low Range**	**High Range:**
Abs Avg Err	0.03			
Abs Max Err	0.20			

UseDescription:	Input Device	Input RPM	Input m/s	Out V	DAS m/s	Diff/ %Diff	Diff	WsM
primary	none	0	0.20	0.0	0.0		-0.20	
primary	01253	1	0.00	0.0	0.0		0.00	
primary	01253	2	0.00	0.0	0.0		0.00	
primary	01253	3	0.00	0.0	0.0		0.00	
primary	01253	4	0.00	0.0	0.0		0.00	
primary	01253	5	0.00	0.0	0.0		0.00	
primary	01253	200	1.02	0.0	1.0		0.00	
primary	01253	400	2.05	0.0	2.1		0.00	

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

Wind Direction Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	72230wdr	BVL130	Korey Devins	11/07/2019	Wind Direction	06108

Mfg	RM Young	**Parameter**	wind direction
Serial Number	None	**Tfer Desc.**	wind direction wheel
Tfer ID	01458		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/1/2017	**CorrCoff**	1.00000

Mfg	Ushikata	**Parameter**	wind direction
Serial Number	191832	**Tfer Desc.**	transit
Tfer ID	01272		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/23/2019	**CorrCoff**	1.00000

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

VaneTorque 10 **to** 18 358

	DAS 1: Orientation	DAS 1: Linearity:	DAS 2: Orientation	DAS 2: Linearity:
Abs Avg Err	1.8	1.0		
Abs Max Err	2	2		

UseDescription	TferID	Input Raw	Linearity	Output V	Output Deg.	Difference	Change	Error
primary	01458	0	☑	0.000	0	0	45	0
primary	01458	45	☑	0.000	43	2	43	-2
primary	01458	90	☑	0.000	86	4	43	-2
primary	01458	135	☑	0.000	131	4	45	0
primary	01458	180	☑	0.000	177	3	46	1
primary	01458	225	☑	0.000	223	2	46	1
primary	01458	270	☑	0.000	270	0	47	2
primary	01458	315	☑	0.000	315	0	45	0
primary	01272	88	☐	0.000	86	2		2
primary	01272	178	☐	0.000	177	1		1
primary	01272	268	☐	0.000	270	2		2
primary	01272	358	☐	0.000	0	2		2

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

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	6704	BVL130	Korey Devins	11/07/2019	Temperature	04690

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00733	**Intercept**	0.14497
Cert Date	2/12/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.18	0.32		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.05	-0.09	0.000	0.05	C	0.14
primary	Temp Mid Range	17.71	17.44	0.000	17.37	C	-0.07
primary	Temp High Range	45.91	45.43	0.000	45.11	C	-0.32

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

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	14037	BVL130	Korey Devins	11/07/2019	Temperature2meter	06404

Mfg	Extech	Parameter	Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.07	0.15		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	0.05	-0.09	0.000	0.06	C	0.15
primary	Temp Mid Range	17.71	17.44	0.000	17.45	C	0.01
primary	Temp High Rang	45.91	45.43	0.000	45.37	C	-0.06

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

Humidity Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Vaisala	A2410006	BVL130	Korey Devins	11/07/2019	Relative Humidity	06007

Mfg	AZ Instruments	**Parameter**	Relative Humidity
Serial Number	10325189	**Tfer Desc.**	Psychrometer
Tfer ID	01223		
Slope	1.01540	**Intercept**	-1.34560
Cert Date	2/6/2019	**CorrCoff**	0.99994

	DAS 1:		DAS 2:	
	Low Range:	**High Range:**	**Low Range:**	**High Range:**
Abs Avg Err	1.7	1.3		
Abs Max Err	3.1	1.3		

UseDesc.	Test type	Device	Input RH	GTL Raw	RH Corr.	DAS Volts	DAS %RH	Difference
primary	RH Low Range	Psychrometer		40.7	40.7	0.000	43.8	3.1
primary	RH Low Range	Psychrometer		50.4	50.4	0.000	50.2	-0.2
primary	RH High Range	Psychrometer		99.9	99.9	0.000	98.6	-1.3

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

Solar Radiation Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Licor	PY10653	BVL130	Korey Devins	11/07/2019	Solar Radiation	04566

Mfg	RM Young
SN/Owner ID	none 04340
Parameter:	Solar Radiation Translator

Mfg	Eppley	**Parameter**	solar radiation
Serial Number	10765	**Tfer Desc.**	SR transfer translato
Tfer ID	01246		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/22/2019	**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	1/22/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
% Diff of Avg	**%Diff of Max**	**%Diff of Avg:**	**%Diff of Max**
7.4%	8.7%	0.0%	0.0%

UseDescription	Measure Date	MeasureTime	Tfer Raw	Tfer Corr	DAS w/m2	PctDifference
primary	11/8/2019	12:00	481	481	523	8.7%
primary	11/8/2019	13:00	463	463	489	5.5%
primary	11/8/2019	14:00	387	387	413	6.6%
primary	11/8/2019	15:00	322	322	351	9.1%

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

Precipitation Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Climatronics	illegible	BVL130	Korey Devins	11/07/2019	Precipitation	02704

DAS 1:		DAS 2:	
A Avg % Diff:	A Max % Dif	A Avg %Diff	A Max % Dif
19.0%	34.0%		

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

UseDesc.	Test type	TferVolume	Iteration	TimePerTip	Eq.Ht	DAS eng	Eq.HtUnit	OSE Unit	TferUnits	PctDifference
primary	test 1	231.5	1	8 - 10 sec	0.50	0.33	in	in	ml	-34.0%
primary	test 2	231.5	2	8 - 10 sec	0.50	0.56	in	in	ml	12.0%
primary	test 3	231.5	3	8 - 10 sec	0.50	0.57	in	in	ml	14.0%
primary	test 4	231.5	4	8 - 10 sec	0.50	0.58	in	in	ml	16.0%

Sensor Component	Properly Sited	Condition	45 degree rule	Status	pass
Sensor Component	Gauge Drain Screen	Condition	Installed	Status	pass
Sensor Component	Funnel Clean	Condition	Clean	Status	pass
Sensor Component	Condition	Condition	Good	Status	pass
Sensor Component	Gauge Screen	Condition	Not installed	Status	pass
Sensor Component	Gauge Clean	Condition	Clean	Status	pass
Sensor Component	Level	Condition	Level	Status	pass
Sensor Component	Sensor Heater	Condition	Functioning	Status	pass
Sensor Component	System Memo	Condition	See comments	Status	pass

Surface Wetness Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	none	BVL130	Korey Devins	11/07/2019	Surface Wetness	06151

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

☑ **Manual Test Pass**

UseDescription	Test Type	Tfer kOhms	OutputSignal	DAS eng	OutputSignalEngUnit	TferUnits	OutputSignalUnit
primary	wet	N/A	0.000	1.00	V	N/A	V
primary	dry	N/A	0.000	0.00	V	N/A	V

Sensor Component	Properly Sited	**Condition**	Properly sited	**Status**	pass
Sensor Component	Grid Clean	**Condition**	Clean	**Status**	pass
Sensor Component	Grid Angle	**Condition**	About 30 deg	**Status**	pass
Sensor Component	Grid Orientation	**Condition**	South	**Status**	pass
Sensor Component	Grid Condition	**Condition**	Good	**Status**	pass
Sensor Component	Grid Type	**Condition**	Grid without holes	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	unknown	BVL130	Korey Devins	11/07/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.11	0.28		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	24.60	24.28	0.000	24.6	C	0.28
primary	Temp Mid Range	24.81	24.49	0.000	24.5	C	-0.04
primary	Temp Mid Range	24.56	24.24	0.000	24.2	C	-0.01

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	BVL130	Technician	Korey Devins	Site Visit Date	11/07/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810 (s/n 2140-1)	640 cuft

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	BVL130	Korey Devins	11/07/2019	Moisture Present	Apex	4086	☐	☐
The filter sample tubing has drops of moisture in low sections outside the shelter.								
Flow Rate	BVL130	Korey Devins	11/07/2019	Leak Check	Apex	4086	☐	☐
The flow rate leak test performed at the flow rate standard indicates that the filter pack quick-disconnect fitting is not properly sealing and leaking when a filter is installed.								
Precipitation	BVL130	Korey Devins	11/07/2019	System Memo	Climatronics	2081	☐	☐
Additional details can be found in the hardcopy of the site audit report.								
Precipitation	BVL130	Korey Devins	11/07/2019	System Memo	Climatronics	2081	☐	☐
The tipping bucket rain gauge heater wires were found to be interfering with the operation of the tipping mechanism. The condition was corrected prior to the performance audit.								
Wind Speed	BVL130	Korey Devins	11/07/2019	System Memo	RM Young	4520	☐	☐
Additional details can be found in the hardcopy of the site audit report.								

Field Systems Comments

1 **Parameter:** DasComments

Only the low test points for the wind speed sensor were challenged due to a wind speed standard failure.

2 **Parameter:** SiteOpsProcedures

Ozone and NCORE sample line filters are replaced, and the sample lines are leaked tested, 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 still smells like rodent excrement.

5 **Parameter:** MetSensorComme

The tipping bucket rain gage is mounted near the meteorological tower and in violation of the 45 degree rule. The tipping bucket heater wires were interfering with the operation of the tipping bucket as indicated by the first audit challenge of the tipping bucket which was approximately 35% low. The wires were moved resulting in audit challenges approximately 14% high. Wetness sensor grid is facing south.

6 **Parameter:** MetOpMaintCom

The signal cables are showing signs of wear and previous repair.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	BVL130	**Technician**	Korey Devins	**Site Visit Date**	11/07/2019

Site Sponsor (agency)	EPA	**USGS Map**	Bondville
Operating Group	ISWS	**Map Scale**	
AQS #	17-019-1001	**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone, IMPROVE	**QAPP Latitude**	40.0520
Deposition Measurement	dry, wet, Hg	**QAPP Longitude**	-88.3725
Land Use	agricultural	**QAPP Elevation Meters**	212
Terrain	flat	**QAPP Declination**	-2.1
Conforms to MLM	Yes	**QAPP Declination Date**	9/16/2005
Site Telephone	(217) 863-2602	**Audit Latitude**	40.052021
Site Address 1	Bondville Road Research Station	**Audit Longitude**	-88.372481
Site Address 2		**Audit Elevation**	213
County	Champaign	**Audit Declination**	-2.9
City, State	Seymour, IL		
Zip Code	61875		**Present**
Time Zone	Central	**Fire Extinguisher**	☑ New in 2015
Primary Operator		**First Aid Kit**	☑
Primary Op. Phone #		**Safety Glasses**	☐
Primary Op. E-mail		**Safety Hard Hat**	☑
Backup Operator		**Climbing Belt**	☑
Backup Op. Phone #		**Security Fence**	☐
Backup Op. E-mail		**Secure Shelter**	☑
		Stable Entry Steps	☑

Shelter Working Room ☑ **Make** Ekto **Model** 8810 (s/n 2140-1) **Shelter Size** 640 cuft

Shelter Clean ☑ **Notes** The shelter still smells like rodent excrement.

Site OK ☑ **Notes**

Driving Directions From Champaign take I-57 south to exit 229, route CR 18. Go west on CR 18 approximately 2.5 miles and turn right (north) on CR 500E. Continue approximately 1.7 miles to the Bondville Road Research Center on the left. The site is visible in the field on the right.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID BVL130 **Technician** Korey Devins **Site Visit Date** 11/07/2019

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

Siting Distances OK ☑

Siting Criteria Comment

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

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	BVL130	Technician	Korey Devins	Site Visit Date	11/07/2019

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?	☐	facing south
11	Is it inclined approximately 30 degrees?	☑	

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

The tipping bucket rain gage is mounted near the meteorological tower and in violation of the 45 degree rule. The tipping bucket heater wires were interfering with the operation of the tipping bucket as indicated by the first audit challenge of the tipping bucket which was approximately 35% low. The wires were moved resulting in audit challenges approximately 14% high. Wetness sensor grid is facing south.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	BVL130	Technician	Korey Devins	Site Visit Date	11/07/2019

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?	☐	Signs of wear
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	☑	

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

The signal cables are showing signs of wear and previous repair.

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	BVL130	Technician	Korey Devins	Site Visit Date	11/07/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 12 meters
4	Describe dry dep sample tube.		3/8 teflon by 12 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	flow, SO2, and CO line only
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID BVL130 **Technician** Korey Devins **Site Visit Date** 11/07/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

11	Tower comments?	

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

Only the low test points for the wind speed sensor were challenged due to a wind speed standard failure.

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	BVL130	Technician	Korey Devins	Site Visit Date	11/07/2019

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	☑	March 2015	☐
HASP	☑	March 2015	☐
Field Ops Manual	☑		☐
Calibration Reports	☑		☑
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedule	☐		☐

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	BVL130	Technician	Korey Devins	Site Visit Date	11/07/2019

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	☑	Daily	☑
Translator Zero/Span Tests (climatronics)	☐	N/A	☑
Manual Rain Gauge Test	☑	Weekly	☑
Confirm Reasonableness of Current Values	☑	Weekly	☑
Test Surface Wetness Response	☑	Weekly	☑

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

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

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

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

Ozone and NCORE sample line filters are replaced, and the sample lines are leaked tested, every 2 weeks.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	BVL130	Technician	Korey Devins	Site Visit Date	11/07/2019

Site operation procedures

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

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

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

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID BVL130 **Technician** Korey Devins **Site Visit Date** 11/07/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
CO	Teledyne	T300U	87	000760
Computer	Dell	Inspiron 15	B94MC12	07073
DAS	Campbell	CR3000	2111	000332
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	060300019995	04860
Flow Rate	Apex	AXMC105LPMDPC	illegible	000595
Infrastructure	Infrastructure	none	none	none
Met tower	Climatronics	14 inch taper	none	02738
Modem	Digi	LR54	Illegible	missing
Noy	Teledyne	T200U	110	000805
Ozone	ThermoElectron Inc	49i A1NAA	1105347318	000739
Ozone Standard	ThermoElectron Inc	49i A3NAA	0922236890	000512
Precipitation	Climatronics	100508-2	illegible	02704
Relative Humidity	Vaisala	HMP500A	A2410006	06007
Sample Tower	Aluma Tower	B	unknown	000182
Shelter Temperature	Campbell	107-L	unknown	none
Shield (10 meter)	RM Young	Aspirated 43408	none	06206
Shield (2 meter)	RM Young	Aspirated 43408	none	06635
Siting Criteria	Siting Criteria	1	None	None
SO2	Teledyne	T100U	94	000787
Solar Radiation	Licor	LI-200	PY10653	04566
Solar Radiation Translator	RM Young	70101-X	none	04340
Surface Wetness	RM Young	58101	none	06151
Temperature	RM Young	41342	6704	04690
Temperature2meter	RM Young	41342	14037	06404
Wind Direction	RM Young	AQ05305-5	72230wdr	06108
Wind Speed	RM Young	AQ05305-5	72230wsp	06108
Zero air pump	Teledyne	701H	576	000759
Zero air pump	Werther International	PC70/4	000836218	06926

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
VIN140-Sandy Grenville-11/07/2019						
1	11/7/2019	Computer	Dell	07040	Inspiron 15	6K2MC12
2	11/7/2019	DAS	Campbell	000358	CR3000	2136
3	11/7/2019	Elevation	Elevation	None	1	None
4	11/7/2019	Filter pack flow pump	Thomas	04920	107CAB18	060300019956
5	11/7/2019	Flow Rate	Apex	000465	AXMC105LPMDPCV	43974
6	11/7/2019	Infrastructure	Infrastructure	none	none	none
7	11/7/2019	Modem	Raven	06461	V4221-V	0808338875
8	11/7/2019	Ozone	ThermoElectron Inc	000740	49i A1NAA	1105347311
9	11/7/2019	Ozone Standard	ThermoElectron Inc	000437	49i A3NAA	CM08200013
10	11/7/2019	Sample Tower	Aluma Tower	000137	B	none
11	11/7/2019	Shelter Temperature	Campbell	none	107-L	none
12	11/7/2019	Siting Criteria	Siting Criteria	None	1	None
13	11/7/2019	Temperature	RM Young	04685	41342VC	6699
14	11/7/2019	Zero air pump	Werther International	08928	C 70/4	000822222

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2136	VIN140	Sandy Grenville	11/07/2019	DAS	Primary

Das Date: 11/7 /2019
Das Time: 16:54:00
Das Day: 311

Audit Date 11/7 /2019
Audit Time 16:54:00
Audit Day 311

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

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740135	**Tfer Desc.**	DVM
Tfer ID	01311		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0000	0.0000	V	V	0.0000
7	0.1000	0.1000	0.0999	V	V	-0.0001
7	0.3000	0.3000	0.3000	V	V	0.0000
7	0.5000	0.5001	0.5002	V	V	0.0001
7	0.7000	0.7001	0.7002	V	V	0.0001
7	0.9000	0.9002	0.9003	V	V	0.0001
7	1.0000	1.0002	1.0003	V	V	0.0001

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	43974	VIN140	Sandy Grenville	11/07/2019	Flow Rate	000465

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	148613	**Tfer Desc.**	BIOS 220-H
Tfer ID	01421		
Slope	1.00000	**Intercept**	0.00000
Cert Date	3/4/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	-0.011
				Cal Factor Full Scale	0.992
1.96%	1.96%			**Rotometer Reading:**	1.45

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.02	l/m	l/m	
primary	test pt 1	1.529	1.530	1.51	0.000	1.50	l/m	l/m	-1.96%
primary	test pt 2	1.529	1.530	1.51	0.000	1.50	l/m	l/m	-1.96%
primary	test pt 3	1.528	1.530	1.51	0.000	1.50	l/m	l/m	-1.96%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	.
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.2 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	340 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347311	VIN140	Sandy Grenville	11/07/2019	Ozone	000740

Slope:	0.99069	**Slope:**	0.00000
Intercept	-0.37885	**Intercept**	0.00000
CorrCoff:	0.99997	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180930075	**Tfer Desc.**	Ozone primary stan
Tfer ID	01115		
Slope	1.00800	**Intercept**	-0.40210
Cert Date	3/26/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	-0.16	0.24	0.28	ppb		0.04
primary	2	15.01	15.28	14.27	ppb		-1.01
primary	3	35.14	35.26	34.59	ppb	-1.92	
primary	4	65.83	65.70	64.65	ppb	-1.61	
primary	5	111.21	110.72	109.40	ppb	-1.2	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	-0.20	pass
Span	1.015	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	107.6 kHz	pass
Cell A Noise	0.7 ppb	pass
Cell A Flow	0.70 lpm	pass
Cell A Pressure	718.1 mmHg	pass
Cell A Tmp.	30.2 C	pass
Cell B Freq.	97.7 kHz	pass
Cell B Noise	0.7 ppb	pass
Cell B Flow	0.70 lpm	pass
Cell B Pressure	718.4 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	6699	VIN140	Sandy Grenville	11/07/2019	Temperature	04685

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00733	**Intercept**	0.14497
Cert Date	2/12/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.15	0.30		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	-0.13	-0.27	0.000	0.0	C	0.3
primary	Temp Mid Range	25.65	25.32	0.000	25.3	C	-0.02
primary	Temp High Range	48.63	48.13	0.000	48.0	C	-0.12

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	VIN140	Sandy Grenville	11/07/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.53	0.98		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	10.21	9.99	0.000	10.5	C	0.54
primary	Temp Mid Range	12.33	12.10	0.000	12.0	C	-0.08
primary	Temp Mid Range	15.52	15.26	0.000	14.3	C	-0.98

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	VIN140	Technician	Sandy Grenville	Site Visit Date	11/07/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810 (s/n 2116-1)	640 cuft

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

Field Systems Comments

1 **Parameter:** DasComments

The sample tower ground wire is broken.

2 **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.

3 **Parameter:** ShelterCleanNotes

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

4 **Parameter:** MetSensorComme

The temperature sensor is mounted on the sample tower.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	VIN140	**Technician**	Sandy Grenville	**Site Visit Date**	11/07/2019

Site Sponsor (agency)	EPA	**USGS Map**	Fritchton
Operating Group	Purdue University	**Map Scale**	
AQS #	18-083-9991	**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	38.7406
Deposition Measurement	dry, wet	**QAPP Longitude**	-87.4844
Land Use	agriculture	**QAPP Elevation Meters**	134
Terrain	flat	**QAPP Declination**	4.25
Conforms to MLM	Yes	**QAPP Declination Date**	2/23/2006
Site Telephone		**Audit Latitude**	38.740792
Site Address 1	Southwest Purdue Agricultural Center	**Audit Longitude**	-87.484923
Site Address 2	4669 North Purdue Road	**Audit Elevation**	136
County	Knox	**Audit Declination**	-2.7
City, State	Vincennes, IN		**Present**
Zip Code	47591	**Fire Extinguisher**	☑ New in 2015
Time Zone	Central	**First Aid Kit**	☑
Primary Operator		**Safety Glasses**	☑
Primary Op. Phone #		**Safety Hard Hat**	☑
Primary Op. E-mail		**Climbing Belt**	☑
Backup Operator		**Security Fence**	☐
Backup Op. Phone #		**Secure Shelter**	☑
Backup Op. E-mail		**Stable Entry Steps**	☑

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810 (s/n 2116-1)	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The shelter is in good condition and well maintained, however rot is beginning to form at the bottom of the walls.				
Site OK	☑	**Notes**					

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

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 11/07/2019

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

Siting Distances OK ☑

Siting Criteria Comment

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

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	VIN140	Technician	Sandy Grenville	Site Visit Date	11/07/2019

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

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

The temperature sensor is mounted on the sample tower.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	VIN140	Technician	Sandy Grenville	Site Visit Date	11/07/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	VIN140	Technician	Sandy Grenville	Site Visit Date	11/07/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 11/07/2019

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?	☑	Temperature 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?	ground wire broken	

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

The sample tower ground wire is broken.

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	VIN140	Technician	Sandy Grenville	Site Visit Date	11/07/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	VIN140	Technician	Sandy Grenville	Site Visit Date	11/07/2019

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?	☑	Logbook, call-in

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	VIN140	Technician	Sandy Grenville	Site Visit Date	11/07/2019

Site operation procedures

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

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

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

Field Systems Data Form F-02058-1500-S10-rev002

Site ID VIN140 **Technician** Sandy Grenville **Site Visit Date** 11/07/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	6K2MC12	07040
DAS	Campbell	CR3000	2136	000358
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	060300019956	04920
Flow Rate	Apex	AXMC105LPMDPC	43974	000465
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V4221-V	0808338875	06461
Ozone	ThermoElectron Inc	49i A1NAA	1105347311	000740
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200013	000437
Sample Tower	Aluma Tower	B	none	000137
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	6699	04685
Zero air pump	Werther International	C 70/4	000822222	08928

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
QAK172-Eric Hebert-11/10/2019						
1	11/10/2019	Computer	Dell	07066	Inspiron 15	Unknown
2	11/10/2019	DAS	Campbell	000418	CR3000	2518
3	11/10/2019	Elevation	Elevation	None	1	None
4	11/10/2019	Filter pack flow pump	Thomas	02357	107CAB18	1089005314
5	11/10/2019	Flow Rate	Apex	000530	AXMC105LPMDPCV	illegible
6	11/10/2019	Infrastructure	Infrastructure	none	none	none
7	11/10/2019	Modem	Digi	07165	LR54	unknown
8	11/10/2019	Ozone	ThermoElectron Inc	000683	49i A1NAA	1030244798
9	11/10/2019	Ozone Standard	ThermoElectron Inc	000513	49i A3NAA	0922236889
10	11/10/2019	Sample Tower	Aluma Tower	666368	B	AT-5107-E-4-8
11	11/10/2019	Shelter Temperature	Campbell	none	107-L	none
12	11/10/2019	Siting Criteria	Siting Criteria	None	1	None
13	11/10/2019	Temperature	RM Young	06540	41342	14801
14	11/10/2019	Zero air pump	Werther International	06870	PC70/4	000814278

DAS Data Form

DAS Time Max Error: 0.03

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2518	QAK172	Eric Hebert	11/10/2019	DAS	Primary

Das Date: 11/10/2019 **Audit Date** 11/10/2019
Das Time: 08:30:02 **Audit Time** 08:30:00
Das Day: 314 **Audit Day** 314

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

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740135	**Tfer Desc.**	DVM
Tfer ID	01311		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0000	-0.0001	V	V	-0.0001
7	0.1000	0.1000	0.1000	V	V	0.0000
7	0.3000	0.3001	0.3001	V	V	0.0000
7	0.5000	0.5002	0.5002	V	V	0.0000
7	0.7000	0.7002	0.7003	V	V	0.0001
7	0.9000	0.9003	0.9004	V	V	0.0001
7	1.0000	1.0004	1.0005	V	V	0.0001

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	QAK172	Eric Hebert	11/10/2019	Flow Rate	000530

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	148613	**Tfer Desc.**	BIOS 220-H
Tfer ID	01421		
Slope	1.00000	**Intercept**	0.00000
Cert Date	3/4/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:		
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	
0.67%	0.67%			

Cal Factor Zero	0
Cal Factor Full Scale	1
Rotometer Reading:	1.5

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.01	0.000	0.00	l/m	l/m	
primary	leak check	0.000	0.000	0.44	0.000	0.44	l/m	l/m	
primary	test pt 1	1.487	1.490	1.50	0.000	1.50	l/m	l/m	0.67%
primary	test pt 2	1.486	1.490	1.50	0.000	1.50	l/m	l/m	0.67%
primary	test pt 3	1.488	1.490	1.50	0.000	1.50	l/m	l/m	0.67%

Sensor Component	Leak Test	**Condition**	See comments	**Status**	Fail
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	90 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244798	QAK172	Eric Hebert	11/10/2019	Ozone	000683

Slope:	1.00619	**Slope:**	0.00000
Intercept	-1.01653	**Intercept**	0.00000
CorrCoff:	0.99999	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180930075	**Tfer Desc.**	Ozone primary stan
Tfer ID	01115		
Slope	1.00800	**Intercept**	-0.40210
Cert Date	3/26/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.25	0.64	-0.18	ppb		-0.82
primary	2	13.67	13.96	13.03	ppb		-0.93
primary	3	32.61	32.75	31.70	ppb	-3.26	
primary	4	69.10	68.95	68.30	ppb	-0.95	
primary	5	114.22	113.71	113.50	ppb	-0.18	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Dirty	Fail
Battery Backup	N/A	pass
Offset	-0.90	pass
Span	1.011	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	99.8 kHz	pass
Cell A Noise	1.3 ppb	pass
Cell A Flow	0.70 lpm	pass
Cell A Pressure	693.7 mmHg	pass
Cell A Tmp.	27.1 C	pass
Cell B Freq.	99.0 kHz	pass
Cell B Noise	0.9 ppb	pass
Cell B Flow	0.70 lpm	pass
Cell B Pressure	694.3 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	14801	QAK172	Eric Hebert	11/10/2019	Temperature	06540

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00733	**Intercept**	0.14497
Cert Date	2/12/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.19	0.36		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	-0.16	-0.30	0.000	0.1	C	0.36
primary	Temp Mid Range	20.00	19.71	0.000	19.9	C	0.17
primary	Temp High Range	48.60	48.10	0.000	48.1	C	-0.03

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	QAK172	Eric Hebert	11/10/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.59	0.80		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	21.15	20.85	0.000	21.7	C	0.8
primary	Temp Mid Range	14.90	14.65	0.000	15.2	C	0.58
primary	Temp Mid Range	16.26	16.00	0.000	16.4	C	0.38

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	QAK172	Technician	Eric Hebert	Site Visit Date	11/10/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810 (s/n 2625-2)	640 cuft

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	QAK172	Eric Hebert	11/10/2019	Leak Test	Apex	4166	☐	☐

The flow rate leak test performed at the flow rate standard indicates that the filter pack quick-disconnect fitting is not properly sealing and leaking when a filter is installed.

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator is doing an excellent job maintaining the site.

2 **Parameter:** ShelterCleanNotes

The shelter is in fair condition with some loose floor tiles.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	QAK172	**Technician**	Eric Hebert	**Site Visit Date**	11/10/2019

Site Sponsor (agency)	EPA	**USGS Map**	Quaker City
Operating Group	Private	**Map Scale**	
AQS #	39-121-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone, IMPROVE	**QAPP Latitude**	39.9431
Deposition Measurement	dry	**QAPP Longitude**	-81.3378
Land Use	woodland - mixed, agriculture	**QAPP Elevation Meters**	372
Terrain	rolling	**QAPP Declination**	7.9
Conforms to MLM	Yes	**QAPP Declination Date**	2/22/2006
Site Telephone	(740) 679-3345	**Audit Latitude**	39.942714
Site Address 1	58163 St. Johns Road	**Audit Longitude**	-81.337914
Site Address 2		**Audit Elevation**	371
County	Noble	**Audit Declination**	-8.2
City, State	Quaker City, OH		
Zip Code	43773	**Fire Extinguisher** ☑	New in 2015
Time Zone	Eastern	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☑	
Primary Op. Phone #		**Safety Hard Hat** ☑	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Present

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810 (s/n 2625-2)	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The shelter is in fair condition with some loose floor tiles.				
Site OK	☑	**Notes**					

Driving Directions

From I-70 take exit 193, route 513 south to Quaker City. At the 4-way stop turn right and continue approximately 0.8 miles and turn left onto CR943. Continue approximately 2 miles and turn right onto Noble County Rd 34 (also St. Johns Road). Continue approximately 1.5 miles and turn left onto a dirt road which is the driveway up a steep hill to the site.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID QAK172 **Technician** Eric Hebert **Site Visit Date** 11/10/2019

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

Siting Distances OK ☑

Siting Criteria Comment

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	QAK172	Technician	Eric Hebert	Site Visit Date	11/10/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	QAK172	Technician	Eric Hebert	Site Visit Date	11/10/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	QAK172	Technician	Eric Hebert	Site Visit Date	11/10/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 15 meters
4	Describe dry dep sample tube.		3/8 teflon by 12 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	Flow line only
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID	QAK172	Technician	Eric Hebert	Site Visit Date	11/10/2019

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?	☑	Temperature only
4	Are the signal connections protected from the weather and well maintained?	☑	
5	Are the signal leads connected to the correct DAS channel?	☑	
6	Are the DAS, sensor translators, and shelter properly grounded?	☑	
7	Does the instrument shelter have a stable power source?	☑	
8	Is the instrument shelter temperature controlled?	☑	

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	QAK172	Technician	Eric Hebert	Site Visit Date	11/10/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	QAK172	Technician	Eric Hebert	Site Visit Date	11/10/2019

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	QAK172	Technician	Eric Hebert	Site Visit Date	11/10/2019

Site operation procedures

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

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

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

The site operator is doing an excellent job maintaining the site.

Field Systems Data Form F-02058-1500-S10-rev002

Site ID QAK172 **Technician** Eric Hebert **Site Visit Date** 11/10/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07066
DAS	Campbell	CR3000	2518	000418
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	1089005314	02357
Flow Rate	Apex	AXMC105LPMDPC	illegible	000530
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	unknown	07165
Ozone	ThermoElectron Inc	49i A1NAA	1030244798	000683
Ozone Standard	ThermoElectron Inc	49i A3NAA	0922236889	000513
Sample Tower	Aluma Tower	B	AT-5107-E-4-8	666368
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	14801	06540
Zero air pump	Werther International	PC70/4	000814278	06870

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2115	CKT136	Eric Hebert	11/11/2019	DAS	Primary

Das Date: 11/11/2019 **Audit Date** 11/11/2019
Das Time: 11:15:00 **Audit Time** 11:15:00
Das Day: 315 **Audit Day** 315

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

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740135	**Tfer Desc.**	DVM
Tfer ID	01311		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0000	-0.0001	V	V	-0.0001
7	0.1000	0.1000	0.0999	V	V	-0.0001
7	0.3000	0.3000	0.2999	V	V	-0.0001
7	0.5000	0.5000	0.4999	V	V	-0.0001
7	0.7000	0.7000	0.7000	V	V	0.0000
7	0.9000	0.9001	0.9000	V	V	-0.0001
7	1.0000	1.0001	1.0000	V	V	-0.0001

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
CKT136-Eric Hebert-11/11/2019						
1	11/11/2019	Computer	Dell	07050	Inspiron 15	Unknown
2	11/11/2019	DAS	Campbell	000336	CR3000	2115
3	11/11/2019	Elevation	Elevation	None	1	None
4	11/11/2019	Filter pack flow pump	Thomas	02361	107CA18	0290006116
5	11/11/2019	Flow Rate	Apex	000468	AXMC105LPMDPCV	illegible
6	11/11/2019	Infrastructure	Infrastructure	none	none	none
7	11/11/2019	Modem	Digi	07190	LR54	unknown
8	11/11/2019	Ozone	ThermoElectron Inc	000744	49i A1NAA	1105347324
9	11/11/2019	Ozone Standard	ThermoElectron Inc	000200	49i A3NAA	0607315738
10	11/11/2019	Sample Tower	Aluma Tower	000822	B	none
11	11/11/2019	Shelter Temperature	Campbell	none	107-L	none
12	11/11/2019	Siting Criteria	Siting Criteria	None	1	None
13	11/11/2019	Temperature	RM Young	04689	41342VO	6703
14	11/11/2019	Zero air pump	Werther International	06878	C 70/4	000815254

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	CKT136	Eric Hebert	11/11/2019	Flow Rate	000468

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	148613	**Tfer Desc.**	BIOS 220-H
Tfer ID	01421		
Slope	1.00000	**Intercept**	0.00000
Cert Date	3/4/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0
0.22%	0.66%			**Cal Factor Full Scale**	1
				Rotometer Reading:	1.5

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	-0.01	0.000	-0.02	l/m	l/m	
primary	leak check	0.000	0.000	0.04	0.000	0.04	l/m	l/m	
primary	test pt 1	1.507	1.510	1.51	0.000	1.50	l/m	l/m	-0.66%
primary	test pt 2	1.502	1.500	1.51	0.000	1.50	l/m	l/m	0.00%
primary	test pt 3	1.503	1.500	1.51	0.000	1.50	l/m	l/m	0.00%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	0.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	225 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347324	CKT136	Eric Hebert	11/11/2019	Ozone	000744

Slope:	0.92747	**Slope:**	0.00000
Intercept	-0.93752	**Intercept**	0.00000
CorrCoff:	0.99999	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180930075	**Tfer Desc.**	Ozone primary stan
Tfer ID	01115		
Slope	1.00800	**Intercept**	-0.40210
Cert Date	3/26/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.24	0.63	-0.59	ppb		-1.22
primary	2	16.15	16.42	14.32	ppb		-2.1
primary	3	32.61	32.75	29.73	ppb	-9.67	
primary	4	71.55	71.38	65.29	ppb	-8.91	
primary	5	107.36	106.90	98.10	ppb	-8.59	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Moderately clean	pass
Battery Backup	N/A	pass
Offset	-0.10	pass
Span	1.008	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	90.6 kHz	pass
Cell A Noise	0.8 ppb	pass
Cell A Flow	0.75 lpm	pass
Cell A Pressure	701.7 mmHg	pass
Cell A Tmp.	34.3 C	pass
Cell B Freq.	94.1 kHz	pass
Cell B Noise	1.1 ppb	pass
Cell B Flow	0.71 lpm	pass
Cell B Pressure	701.0 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	~ 4%	Fail
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	6703	CKT136	Eric Hebert	11/11/2019	Temperature	04689

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00733	**Intercept**	0.14497
Cert Date	2/12/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.28	0.37		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	-0.12	-0.26	0.000	0.1	C	0.37
primary	Temp Mid Range	23.31	23.00	0.000	23.2	C	0.23
primary	Temp High Range	46.06	45.58	0.000	45.8	C	0.24

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	CKT136	Eric Hebert	11/11/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
1.07	1.12		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	22.92	22.61	0.000	23.7	C	1.1
primary	Temp Mid Range	23.00	22.69	0.000	23.7	C	1
primary	Temp Mid Range	22.75	22.44	0.000	23.6	C	1.12

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	CKT136	Technician	Eric Hebert	Site Visit Date	11/11/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810 (s/n 2116-2)	640 cuft

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

Field Systems Comments

1 **Parameter:** ShelterCleanNotes

The shelter is in poor condition. The shelter walls adjacent to the air conditioner and rear corner are moldy, rotting, and buckled.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	CKT136	**Technician**	Eric Hebert	**Site Visit Date**	11/11/2019

Site Sponsor (agency)	EPA	**USGS Map**	Dingus
Operating Group	private	**Map Scale**	
AQS #	21-175-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	37.9211
Deposition Measurement	dry	**QAPP Longitude**	-83.0658
Land Use	woodland - mixed	**QAPP Elevation Meters**	455
Terrain	rolling	**QAPP Declination**	5.9
Conforms to MLM	Yes	**QAPP Declination Date**	2/22/2006
Site Telephone	(606) 522-3560	**Audit Latitude**	37.92146
Site Address 1	7687 Highway 437	**Audit Longitude**	-83.066295
Site Address 2		**Audit Elevation**	376
County	Morgan	**Audit Declination**	-6.1
City, State	West Liberty, KY		
Zip Code	41472	**Fire Extinguisher** ☑ Present	New in 2015
Time Zone	Eastern	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☑	
Primary Op. Phone #		**Safety Hard Hat** ☑	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☑	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Shelter Working Room ☑ **Make** Ekto **Model** 8810 (s/n 2116-2) **Shelter Size** 640 cuft

Shelter Clean ☐ **Notes** The shelter is in poor condition. The shelter walls adjacent to the air conditioner and rear corner are moldy, rotting, and buckled.

Site OK ☑ **Notes**

Driving Directions From I-64 in Morehead go south on route 519 to West Liberty. At the first traffic light in West Liberty, turn left (east) onto route 460. Continue approximately 1 mile and turn left onto route 172. continue approximately 8 miles and then turn right onto route 437. Continue approximately 8 miles staying on 437. The road will climb a hill, turn left onto a dirt road at the top of the hill before the closed gas station). There is a sign for "KY Ridgerunners". The site is approximately 1/2 mile on the left.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID CKT136 **Technician** Eric Hebert **Site Visit Date** 11/11/2019

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	15m	☐
Obstacles to wind	10 times obstacle height		☑

Siting Distances OK ☑

Siting Criteria Comment

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	CKT136	Technician	Eric Hebert	Site Visit Date	11/11/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	CKT136	Technician	Eric Hebert	Site Visit Date	11/11/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	CKT136	Technician	Eric Hebert	Site Visit Date	11/11/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 15 meters
4	Describe dry dep sample tube.		3/8 teflon by 12 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	Flow line only
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID CKT136 **Technician** Eric Hebert **Site Visit Date** 11/11/2019

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?	☑	Temperature only
4	Are the signal connections protected from the weather and well maintained?	☑	
5	Are the signal leads connected to the correct DAS channel?	☑	
6	Are the DAS, sensor translators, and shelter properly grounded?	☑	
7	Does the instrument shelter have a stable power source?	☑	
8	Is the instrument shelter temperature controlled?	☑	

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	CKT136	Technician	Eric Hebert	Site Visit Date	11/11/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑		☑
SSRF	☑		☑
Site Ops Manual	☐		☐
HASP	☑	Nov 2001	☐
Field Ops Manual	☑	Oct 2001	☐
Calibration Reports	☑	Electronic copy	☑
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedule	☐		☐

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	CKT136	Technician	Eric Hebert	Site Visit Date	11/11/2019

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	CKT136	Technician	Eric Hebert	Site Visit Date	11/11/2019

Site operation procedures

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

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

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

Field Systems Data Form F-02058-1500-S10-rev002

Site ID CKT136 **Technician** Eric Hebert **Site Visit Date** 11/11/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07050
DAS	Campbell	CR3000	2115	000336
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	0290006116	02361
Flow Rate	Apex	AXMC105LPMDPC	illegible	000468
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	unknown	07190
Ozone	ThermoElectron Inc	49i A1NAA	1105347324	000744
Ozone Standard	ThermoElectron Inc	49i A3NAA	0607315738	000200
Sample Tower	Aluma Tower	B	none	000822
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VO	6703	04689
Zero air pump	Werther International	C 70/4	000815254	06878

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
CDR119-Eric Hebert-11/12/2019						
1	11/12/2019	Computer	Dell	07071	Inspiron 15	Unknown
2	11/12/2019	DAS	Campbell	None	CR3000	4935
3	11/12/2019	Elevation	Elevation	None	1	None
4	11/12/2019	Filter pack flow pump	Thomas	06027	107CAB18	060400022672
5	11/12/2019	Flow Rate	Apex	000660	AXMC105LPMDPCV	54747
6	11/12/2019	Infrastructure	Infrastructure	none	none	none
7	11/12/2019	Modem	Digi	07191	LR54	unknown
8	11/12/2019	Ozone	ThermoElectron Inc	000623	49i A1NAA	1009241790
9	11/12/2019	Ozone Standard	ThermoElectron Inc	000365	49i A3NAA	0726124688
10	11/12/2019	Sample Tower	Aluma Tower	928376	B	AT-51060-56
11	11/12/2019	Shelter Temperature	Campbell	none	107-L	none
12	11/12/2019	Siting Criteria	Siting Criteria	None	1	None
13	11/12/2019	Temperature	RM Young	04448	41342	4546
14	11/12/2019	Zero air pump	Werther International	06903	C 70/4	000899159

DAS Data Form

DAS Time Max Error: 0.02

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	4935	CDR119	Eric Hebert	11/12/2019	DAS	Primary

Das Date: 11/12/2019 **Audit Date** 11/12/2019
Das Time: 12:15:00 **Audit Time** 12:15:01
Das Day: 316 **Audit Day** 316

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

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740135	**Tfer Desc.**	DVM
Tfer ID	01311		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
6	0.0000	0.0000	-0.0001	V	V	-0.0001
6	0.1000	0.1000	0.1000	V	V	0.0000
6	0.3000	0.3001	0.3001	V	V	0.0000
6	0.5000	0.5002	0.5002	V	V	0.0000
6	0.7000	0.7003	0.7003	V	V	0.0000
6	0.9000	0.9004	0.9004	V	V	0.0000
6	1.0000	1.0004	1.0005	V	V	0.0001

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	54747	CDR119	Eric Hebert	11/12/2019	Flow Rate	000660

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	148613	**Tfer Desc.**	BIOS 220-H
Tfer ID	01421		
Slope	1.00000	**Intercept**	0.00000
Cert Date	3/4/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0
0.66%	0.66%			**Cal Factor Full Scale**	0
				Rotometer Reading:	1.45

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.01	0.000	-0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.40	0.000	0.39	l/m	l/m	
primary	test pt 1	1.510	1.510	1.52	0.000	1.50	l/m	l/m	-0.66%
primary	test pt 2	1.510	1.510	1.52	0.000	1.50	l/m	l/m	-0.66%
primary	test pt 3	1.510	1.510	1.52	0.000	1.50	l/m	l/m	-0.66%

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

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241790	CDR119	Eric Hebert	11/12/2019	Ozone	000623

Slope:	1.01370	**Slope:**	0.00000
Intercept	-0.62450	**Intercept**	0.00000
CorrCoff:	0.99999	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180930075	**Tfer Desc.**	Ozone primary stan
Tfer ID	01115		
Slope	1.00800	**Intercept**	-0.40210
Cert Date	3/26/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.01	0.40	-0.22	ppb		-0.62
primary	2	16.46	16.72	16.22	ppb		-0.5
primary	3	34.44	34.56	34.35	ppb	-0.61	
primary	4	68.52	68.37	69.05	ppb	0.99	
primary	5	105.43	104.99	105.60	ppb	0.58	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		Fail
Inlet Filter Condition	Moderately clean	pass
Battery Backup	N/A	pass
Offset	-0.20	pass
Span	1.036	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	90.5 kHz	pass
Cell A Noise	0.8 ppb	pass
Cell A Flow	0.75 lpm	pass
Cell A Pressure	713.0 mmHg	pass
Cell A Tmp.	34.3 C	pass
Cell B Freq.	92.5 kHz	pass
Cell B Noise	0.6 ppb	pass
Cell B Flow	0.54 lpm	pass
Cell B Pressure	713.6 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	4546	CDR119	Eric Hebert	11/12/2019	Temperature	04448

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00733	**Intercept**	0.14497
Cert Date	2/12/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.13	0.27		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	-0.08	-0.22	0.000	0.1	C	0.27
primary	Temp Mid Range	25.20	24.87	0.000	24.9	C	0.03
primary	Temp High Range	47.29	46.80	0.000	46.7	C	-0.09

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	CDR119	Eric Hebert	11/12/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.71	0.90		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	24.82	24.50	0.000	25.4	C	0.9
primary	Temp Mid Range	25.63	25.30	0.000	25.8	C	0.52
primary	Temp Mid Range	24.88	24.56	0.000	25.3	C	0.7

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	CDR119	Technician	Eric Hebert	Site Visit Date	11/12/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810	640 cuft

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

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	CDR119	**Technician**	Eric Hebert	**Site Visit Date**	11/12/2019

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

Present

Shelter Working Room ☑	**Make**	Ekto	**Model**	8810	**Shelter Size**	640 cuft
Shelter Clean ☑	**Notes**	The shelter is in fair condition with some rot on the walls below the air conditioner.				
Site OK ☑	**Notes**					

Driving Directions

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID CDR119 **Technician** Eric Hebert **Site Visit Date** 11/12/2019

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

Siting Distances OK ☐

Siting Criteria Comment

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

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	CDR119	Technician	Eric Hebert	Site Visit Date	11/12/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	CDR119	Technician	Eric Hebert	Site Visit Date	11/12/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	CDR119	Technician	Eric Hebert	Site Visit Date	11/12/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID CDR119 **Technician** Eric Hebert **Site Visit Date** 11/12/2019

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?	☑	Temperature only
4	Are the signal connections protected from the weather and well maintained?	☑	
5	Are the signal leads connected to the correct DAS channel?	☑	
6	Are the DAS, sensor translators, and shelter properly grounded?	☑	
7	Does the instrument shelter have a stable power source?	☑	
8	Is the instrument shelter temperature controlled?	☑	

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	CDR119	Technician	Eric Hebert	Site Visit Date	11/12/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID CDR119 **Technician** Eric Hebert **Site Visit Date** 11/12/2019

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	CDR119	Technician	Eric Hebert	Site Visit Date	11/12/2019

Site operation procedures

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

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

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

Field Systems Data Form F-02058-1500-S10-rev002

Site ID CDR119 **Technician** Eric Hebert **Site Visit Date** 11/12/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07071
DAS	Campbell	CR3000	4935	None
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	060400022672	06027
Flow Rate	Apex	AXMC105LPMDPC	54747	000660
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	unknown	07191
Ozone	ThermoElectron Inc	49i A1NAA	1009241790	000623
Ozone Standard	ThermoElectron Inc	49i A3NAA	0726124688	000365
Sample Tower	Aluma Tower	B	AT-51060-56	928376
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	4546	04448
Zero air pump	Werther International	C 70/4	000899159	06903

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
EGB181-Korey Devins-11/12/2019						
1	11/12/2019	Computer	Dell	07018	Inspiron 15	Unknown
2	11/12/2019	DAS	Campbell	000408	CR3000	2538
3	11/12/2019	Elevation	Elevation	None	1	None
4	11/12/2019	Filter pack flow pump	Thomas	04285	107CAB18B	129800010108
5	11/12/2019	Flow Rate	Apex	000469	AXMC105LPMDPCV	illegible
6	11/12/2019	Infrastructure	Infrastructure	none	none	none
7	11/12/2019	Modem	Raven	06584	H4223-C	0844381230
8	11/12/2019	Sample Tower	Aluma Tower	missing	B	unknown
9	11/12/2019	Shelter Temperature	Campbell	none	107-L	none
10	11/12/2019	Siting Criteria	Siting Criteria	None	1	None
11	11/12/2019	Temperature	RM Young	05044	41342VO	9640

DAS Data Form

DAS Time Max Error: 5.75

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2538	EGB181	Korey Devins	11/12/2019	DAS	Primary

Das Date: 11/12/2019 **Audit Date** 11/12/2019
Das Time: 10:00:00 **Audit Time** 09:54:15
Das Day: 316 **Audit Day** 316

Low Channel:		High Channel:	
Avg Diff:	**Max Diff:**	**Avg Diff:**	**Max Diff:**
0.0001	0.0002	0.0001	0.0002

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740135	**Tfer Desc.**	DVM
Tfer ID	01311		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0000	0.0000	V	V	0.0000
7	0.1000	0.0999	0.0999	V	V	0.0000
7	0.3000	0.2998	0.2997	V	V	-0.0001
7	0.5000	0.4996	0.4995	V	V	-0.0001
7	0.7000	0.6995	0.6994	V	V	-0.0001
7	0.9000	0.8994	0.8992	V	V	-0.0002
7	1.0000	0.9993	0.9991	V	V	-0.0002

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	EGB181	Korey Devins	11/12/2019	Flow Rate	000469

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	148613	**Tfer Desc.**	BIOS 220-H
Tfer ID	01421		
Slope	1.00000	**Intercept**	0.00000
Cert Date	3/4/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0
				Cal Factor Full Scale	0
1.36%	1.36%			**Rotometer Reading:**	1.45

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalE	PctDifference
primary	pump off	0.000	0.000	-0.02	0.000	-0.05	l/m	l/m	
primary	leak check	0.000	0.000	0.05	0.000	0.03	l/m	l/m	
primary	test pt 1	1.475	1.470	1.46	0.000	1.49	l/m	l/m	1.36%
primary	test pt 2	1.473	1.470	1.46	0.000	1.49	l/m	l/m	1.36%
primary	test pt 3	1.471	1.470	1.46	0.000	1.49	l/m	l/m	1.36%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Poor	**Status**	Fail
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	-2.0 cm	**Status**	Fail
Sensor Component	Filter Azimuth	**Condition**	150 deg	**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	9640	EGB181	Korey Devins	11/12/2019	Temperature	05044

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00733	**Intercept**	0.14497
Cert Date	2/12/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.13	0.20		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.17	0.02	0.000	-0.1	C	-0.14
primary	Temp Mid Range	25.14	24.81	0.000	24.6	C	-0.2
primary	Temp High Range	45.23	44.76	0.000	44.8	C	0.04

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	EGB181	Korey Devins	11/12/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.55	0.56		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	22.48	22.17	0.000	21.6	C	-0.54
primary	Temp Mid Range	22.52	22.21	0.000	21.7	C	-0.56
primary	Temp Mid Range	22.55	22.24	0.000	21.7	C	-0.54

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	EGB181	Technician	Korey Devins	Site Visit Date	11/12/2019

Shelter Make	Shelter Model	Shelter Size
custom	N/A	7200 cuft

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	EGB181	Korey Devins	11/12/2019	Filter Position	Apex	4527	☐	☐

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

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

Filters are sent 4 at a time and stored in a refrigerator before and after sampling prior to shipment to the lab.

2 **Parameter:** DocumentationCo

The site operator uses the station logbook only occasionally and does not send copies to Wood.

3 **Parameter:** ShelterCleanNotes

The shelter is provided by the Center for Atmospheric Research and is clean, organized, and spacious. The roof is leaking but plans are underway for repairs.

4 **Parameter:** PollAnalyzerCom

Ozone concentration is not measured at EGB181 as part of CASTNET.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	EGB181	**Technician**	Korey Devins	**Site Visit Date**	11/12/2019

Site Sponsor (agency)	EPA/Envir Canada	**USGS Map**	
Operating Group	Envir Canada	**Map Scale**	
AQS #		**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	SO2, NOx, NOy, More	**QAPP Latitude**	44.2317
Deposition Measurement	dry, wet, CAPMon	**QAPP Longitude**	-79.7840
Land Use	Agriculture	**QAPP Elevation Meters**	251
Terrain	gentley rolling	**QAPP Declination**	10.75
Conforms to MLM	Yes	**QAPP Declination Date**	9/16/2005
Site Telephone	(705) 458-3309	**Audit Latitude**	44.231071
Site Address 1	Center for Atmospheric Research	**Audit Longitude**	-79.783115
Site Address 2	6248 Eighth Line	**Audit Elevation**	227
County		**Audit Declination**	-10.4
City, State	Egbert, Ontario		
Zip Code	CAN L0L 1N0	**Fire Extinguisher** (Present) ☑	inspected Oct 2019
Time Zone	Eastern	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☐	
Primary Op. Phone #		**Safety Hard Hat** ☐	
Primary Op. E-mail		**Climbing Belt** ☑	
Backup Operator		**Security Fence** ☑	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Shelter Working Room	☑	**Make**	custom	**Model**	N/A	**Shelter Size**	7200 cuft
Shelter Clean	☑	**Notes**	The shelter is provided by the Center for Atmospheric Research and is clean, organized, and spacious. The roof is leaking but plans are underway for repairs.				
Site OK	☑	**Notes**					

Driving Directions

From Toronto take the 403 to the 401 and then go north on the 400 toward Barrie. Go west on Hwy 89 at the Cookstown exit. Turn right (north) on Hwy 27. Continue approximately 3 miles and turn left (west) on Side Road 10 at the sign for Egbert. Continue approximately 3.2 miles and turn right (north) on the dirt road at the Environment Canada, Center for Atmospheric Research. The site is through the locked gate on the left into the complex.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID EGB181 **Technician** Korey Devins **Site Visit Date** 11/12/2019

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

Siting Distances OK ☑

Siting Criteria Comment

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	EGB181	Technician	Korey Devins	Site Visit Date	11/12/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	EGB181	Technician	Korey Devins	Site Visit Date	11/12/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	EGB181	Technician	Korey Devins	Site Visit Date	11/12/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		N/A
4	Describe dry dep sample tube.		3/8 teflon by 20 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?	☑	
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

Ozone concentration is not measured at EGB181 as part of CASTNET.

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID EGB181 **Technician** Korey Devins **Site Visit Date** 11/12/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	EGB181	Technician	Korey Devins	Site Visit Date	11/12/2019

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	☑	March 2015	☐
Field Ops Manual	☑	March 2015	☐
Calibration Reports	☑		☑
Ozone z/s/p Control Charts	☐	N/A	☐
Preventive maintenance schedule	☐		☐

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

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

The site operator uses the station logbook only occasionally and does not send copies to Wood.

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	EGB181	Technician	Korey Devins	Site Visit Date	11/12/2019

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	EGB181	Technician	Korey Devins	Site Visit Date	11/12/2019

Site operation procedures

1	Is the filter pack being changed every Tuesday as scheduled?	☑	Filter changed mornings
2	Are the Site Status Report Forms being completed and filed correctly?	☑	
3	Are data downloads and backups being performed as scheduled?	☐	No longer required
4	Are general observations being made and recorded? How?	☑	SSRF
5	Are site supplies on-hand and replenished in a timely fashion?	☑	
6	Are sample flow rates recorded? How?	☑	SSRF, 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	☑	Daily	☑
Visual Check of Flow Rate Rotometer	☑	Weekly	☑
In-line Filter Inspection/Replacement	☑	Semiannually	☑
Sample Line Check for Dirt/Water	☐		☐

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

Filters are sent 4 at a time and stored in a refrigerator before and after sampling prior to shipment to the lab.

Field Systems Data Form F-02058-1500-S10-rev002

Site ID EGB181 **Technician** Korey Devins **Site Visit Date** 11/12/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07018
DAS	Campbell	CR3000	2538	000408
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18B	129800010108	04285
Flow Rate	Apex	AXMC105LPMDPC	illegible	000469
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4223-C	0844381230	06584
Sample Tower	Aluma Tower	B	unknown	missing
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VO	9640	05044

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
BWR139-Korey Devins-11/19/2019						
1	11/19/2019	Computer	Dell	07009	Inspiron 15	Unknown
2	11/19/2019	DAS	Campbell	000431	CR3000	2536
3	11/19/2019	Elevation	Elevation	None	1	None
4	11/19/2019	Filter pack flow pump	Thomas	06031	107CAB18	608102A
5	11/19/2019	Flow Rate	Apex	000670	AXMC105LPMDPCV	54758
6	11/19/2019	Infrastructure	Infrastructure	none	none	none
7	11/19/2019	Modem	Digi	07186	LR54	Illegible
8	11/19/2019	Ozone	ThermoElectron Inc	000618	49i A1NAA	1009241789
9	11/19/2019	Ozone Standard	ThermoElectron Inc	000697	49i A3NAA	1030244814
10	11/19/2019	Sample Tower	Aluma Tower	missing	B	none
11	11/19/2019	Shelter Temperature	Campbell	none	107-L	none
12	11/19/2019	Siting Criteria	Siting Criteria	None	1	None
13	11/19/2019	Temperature	RM Young	04315	41342	4012
14	11/19/2019	Zero air pump	Werther International	06877	C 70/4	000815258

DAS Data Form

DAS Time Max Error: 1

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2536	BWR139	Korey Devins	11/19/2019	DAS	Primary

Das Date: 11/19/2019 **Audit Date** 11/19/2019
Das Time: 11:16:00 **Audit Time** 11:17:00
Das Day: 323 **Audit Day** 323

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

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740135	**Tfer Desc.**	DVM
Tfer ID	01311		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	-0.0001	0.0000	V	V	0.0001
7	0.1000	0.0998	0.0998	V	V	0.0000
7	0.3000	0.2996	0.2996	V	V	0.0000
7	0.5000	0.4995	0.4995	V	V	0.0000
7	0.7000	0.6994	0.6994	V	V	0.0000
7	0.9000	0.8993	0.8992	V	V	-0.0001
7	1.0000	0.9992	0.9991	V	V	-0.0001

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	54758	BWR139	Korey Devins	11/19/2019	Flow Rate	000670

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	148613	**Tfer Desc.**	BIOS 220-H
Tfer ID	01421		
Slope	1.00000	**Intercept**	0.00000
Cert Date	3/4/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0
2.39%	2.60%			**Cal Factor Full Scale**	0
				Rotometer Reading:	1.6

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.01	0.000	-0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.000	-0.01	l/m	l/m	
primary	test pt 1	1.538	1.540	1.51	0.000	1.50	l/m	l/m	-2.60%
primary	test pt 2	1.534	1.530	1.51	0.000	1.50	l/m	l/m	-1.96%
primary	test pt 3	1.535	1.540	1.51	0.000	1.50	l/m	l/m	-2.60%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	See comments	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	30 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241789	BWR139	Korey Devins	11/19/2019	Ozone	000618

Slope:	0.97304	**Slope:**	0.00000
Intercept	-1.01079	**Intercept**	0.00000
CorrCoff:	0.99999	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180030022	**Tfer Desc.**	Ozone primary stan
Tfer ID	01114		
Slope	0.98600	**Intercept**	0.41627
Cert Date	10/29/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.49	0.07	-1.07	ppb		-1.14
primary	2	14.96	14.75	13.36	ppb		-1.39
primary	3	35.05	35.12	33.39	ppb	-5.05	
primary	4	67.50	68.03	65.07	ppb	-4.45	
primary	5	113.62	114.81	110.70	ppb	-3.65	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Moderately clean	pass
Battery Backup	N/A	pass
Offset	-0.30	pass
Span	1.023	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	90.2 kHz	pass
Cell A Noise	0.9 ppb	pass
Cell A Flow	0.73 lpm	pass
Cell A Pressure	728.5 mmHg	pass
Cell A Tmp.	31.7 C	pass
Cell B Freq.	101.7 kHz	pass
Cell B Noise	0.9 ppb	pass
Cell B Flow	0.73 lpm	pass
Cell B Pressure	729.7 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	4012	BWR139	Korey Devins	11/19/2019	Temperature	04315

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00733	**Intercept**	0.14497
Cert Date	2/12/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.10	0.18		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.44	0.29	0.000	0.5	C	0.18
primary	Temp Mid Range	25.84	25.51	0.000	25.5	C	0.01
primary	Temp High Range	47.08	46.59	0.000	46.7	C	0.11

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	BWR139	Korey Devins	11/19/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.49	0.61		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	25.47	25.14	0.000	25.6	C	0.41
primary	Temp Mid Range	24.81	24.49	0.000	25.0	C	0.46
primary	Temp Mid Range	24.06	23.74	0.000	24.4	C	0.61

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	BWR139	Technician	Korey Devins	Site Visit Date	11/19/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810	640 cuft

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	BWR139	Korey Devins	11/19/2019	Moisture Present	Apex	3906	☐	☐

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

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The ozone sample train is leak checked every two weeks following the inlet filter change.

2 **Parameter:** SitingCriteriaCom

Very light agriculture activities near site, not harvested, just to provide food for wildlife.

3 **Parameter:** ShelterCleanNotes

The shelter is showing signs of deterioration with leaks and rot at bottom of walls.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	BWR139	**Technician**	Korey Devins	**Site Visit Date**	11/19/2019

Site Sponsor (agency)	EPA	**USGS Map**	
Operating Group	BNWR/private	**Map Scale**	
AQS #	24-019-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	
Deposition Measurement	dry	**QAPP Longitude**	
Land Use	woodlands - mixed, wetlands	**QAPP Elevation Meters**	
Terrain	flat	**QAPP Declination**	
Conforms to MLM	Yes	**QAPP Declination Date**	
Site Telephone		**Audit Latitude**	38.444971
Site Address 1	Blackwater Nat Wildlife Refuge	**Audit Longitude**	-76.111274
Site Address 2	2145 Key Wallace Dr.	**Audit Elevation**	1
County	Dorchester	**Audit Declination**	-11.2
City, State	Cambridge, MD		
Zip Code	21613	**Fire Extinguisher** ☑	dated 2015
Time Zone	Eastern	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☑	
Primary Op. Phone #		**Safety Hard Hat** ☑	
Primary Op. E-mail		**Climbing Belt** ☑	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The shelter is showing signs of deterioration with leaks and rot at bottom of walls.				
Site OK	☑	**Notes**					

Driving Directions

From I95 take route 50 east to Cambridge, MD. At mile marker 81 turn right on Woods Rd. Continue approximately 1 mile to the stop sign, turn right onto SR 16 west. Continue approximately 1.7 miles, past the school, and turn left onto Egypt Road. Continue approximately 7.1 miles to the stop sign. Turn right onto Key Wallace Drive towards the visitors center. Continue approximately 0.8 mile to the gate on the left. The site will be visible.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID BWR139 **Technician** Korey Devins **Site Visit Date** 11/19/2019

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	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

Very light agriculture activities near site, not harvested, just to provide food for wildlife.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	BWR139	Technician	Korey Devins	Site Visit Date	11/19/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	BWR139	Technician	Korey Devins	Site Visit Date	11/19/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	BWR139	Technician	Korey Devins	Site Visit Date	11/19/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID BWR139 **Technician** Korey Devins **Site Visit Date** 11/19/2019

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?	☑	Temperature only
4	Are the signal connections protected from the weather and well maintained?	☑	
5	Are the signal leads connected to the correct DAS channel?	☑	
6	Are the DAS, sensor translators, and shelter properly grounded?	☑	
7	Does the instrument shelter have a stable power source?	☑	
8	Is the instrument shelter temperature controlled?	☑	

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	BWR139	Technician	Korey Devins	Site Visit Date	11/19/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑		☑
SSRF	☑		☑
Site Ops Manual	☑		☑
HASP	☑	March 2015	☐
Field Ops Manual	☑	March 2015	☐
Calibration Reports	☑		☑
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedule	☐		☐

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	BWR139	Technician	Korey Devins	Site Visit Date	11/19/2019

Site operation procedures

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

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

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

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

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

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

The ozone sample train is leak checked every two weeks following the inlet filter change.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID BWR139 **Technician** Korey Devins **Site Visit Date** 11/19/2019

Site operation procedures

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

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

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

Field Systems Data Form F-02058-1500-S10-rev002

Site ID BWR139 **Technician** Korey Devins **Site Visit Date** 11/19/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07009
DAS	Campbell	CR3000	2536	000431
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	608102A	06031
Flow Rate	Apex	AXMC105LPMDPC	54758	000670
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	Illegible	07186
Ozone	ThermoElectron Inc	49i A1NAA	1009241789	000618
Ozone Standard	ThermoElectron Inc	49i A3NAA	1030244814	000697
Sample Tower	Aluma Tower	B	none	missing
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	4012	04315
Zero air pump	Werther International	C 70/4	000815258	06877

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
ALH157-Martin Valvur-12/16/2019						
1	12/16/2019	Computer	Dell	07052	Inspiron 15	DB3MC12
2	12/16/2019	DAS	Campbell	000428	CR3000	2534
3	12/16/2019	Elevation	Elevation	None	1	None
4	12/16/2019	Filter pack flow pump	Thomas	06285	107CA18	0990007057
5	12/16/2019	Flow Rate	Apex	000858	AXMC105LPMDPCV	illegible
6	12/16/2019	Infrastructure	Infrastructure	none	none	none
7	12/16/2019	Modem	Digi	07205	LR54	Illegible
8	12/16/2019	Ozone	ThermoElectron Inc	000615	49i A1NAA	1009241787
9	12/16/2019	Ozone Standard	ThermoElectron Inc	000329	49i A3NAA	0622717853
10	12/16/2019	Sample Tower	Aluma Tower	illegible	B	none
11	12/16/2019	Shelter Temperature	Campbell	none	107-L	none
12	12/16/2019	Siting Criteria	Siting Criteria	None	1	None
13	12/16/2019	Temperature	RM Young	04945	41342VC	8897
14	12/16/2019	Zero air pump	Werther International	06925	C 70/4	000836220

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2534	ALH157	Martin Valvur	12/16/2019	DAS	Primary

Das Date: 12/16/2019
Das Time: 09:26:00
Das Day: 350

Audit Date 12/16/2019
Audit Time 09:26:00
Audit Day 350

Low Channel:

Avg Diff:	Max Diff:
0.0001	0.0002

High Channel:

Avg Diff:	Max Diff:
0.0001	0.0002

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740243	**Tfer Desc.**	DVM
Tfer ID	01312		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	-0.0001	0.0001	V	V	0.0002
7	0.1000	0.0997	0.0998	V	V	0.0001
7	0.3000	0.2996	0.2996	V	V	0.0000
7	0.5000	0.4993	0.4992	V	V	-0.0001
7	0.7000	0.6995	0.6993	V	V	-0.0002
7	0.9000	0.8994	0.8994	V	V	0.0000
7	1.0000	0.9994	0.9995	V	V	0.0001

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	ALH157	Martin Valvur	12/16/2019	Flow Rate	000858

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	122974	**Tfer Desc.**	BIOS 220-H
Tfer ID	01416		
Slope	1.00178	**Intercept**	0.00161
Cert Date	7/13/2018	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0
1.08%	1.08%			**Cal Factor Full Scale**	0.99
				Rotometer Reading:	1.5

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.01	0.000	0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.000	-0.03	l/m	l/m	
primary	test pt 1	1.480	1.480	1.51	0.000	1.50	l/m	l/m	1.08%
primary	test pt 2	1.480	1.480	1.51	0.000	1.50	l/m	l/m	1.08%
primary	test pt 3	1.483	1.480	1.51	0.000	1.50	l/m	l/m	1.08%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	3.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	360 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241787	ALH157	Martin Valvur	12/16/2019	Ozone	000615

Slope:	0.99500	**Slope:**	0.00000
Intercept	0.11306	**Intercept**	0.00000
CorrCoff:	0.99999	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00331	**Intercept**	-0.06936
Cert Date	10/28/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.08	0.14	0.11	ppb		-0.03
primary	2	12.94	12.96	13.15	ppb		0.19
primary	3	37.98	37.92	38.04	ppb	0.32	
primary	4	67.77	67.61	67.10	ppb	-0.76	
primary	5	112.67	112.36	112.00	ppb	-0.32	

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.10	**Status**	pass
Sensor Component	Span	**Condition**	1.007	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	98.5 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.8 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.69 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	727.7 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	26.7 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	95.2 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.6 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.70 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	727.4 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**	N/A	**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	8897	ALH157	Martin Valvur	12/16/2019	Temperature	04945

Mfg	Fluke	**Parameter**	Temperature
Serial Number	3275143	**Tfer Desc.**	RTD
Tfer ID	01229		
Slope	0.99989	**Intercept**	-0.00649
Cert Date	1/23/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.05	0.08		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.12	0.13	0.000	0.1	C	-0.08
primary	Temp Mid Range	23.77	23.78	0.000	23.8	C	0.03
primary	Temp High Range	48.48	48.49	0.000	48.4	C	-0.05

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	ALH157	Martin Valvur	12/16/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.41	0.67		

Mfg	Fluke	Parameter	Shelter Temperature
Serial Number	3275143	Tfer Desc.	RTD
Tfer ID	01229		
Slope	0.99989	Intercept	-0.00649
Cert Date	1/23/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	20.62	20.63	0.000	20.5	C	-0.14
primary	Temp Mid Range	20.38	20.39	0.000	20.0	C	-0.42
primary	Temp Mid Range	20.51	20.52	0.000	19.9	C	-0.67

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	Technician	Site Visit Date
ALH157	Martin Valvur	12/16/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810 (2149-7)	640 cuft

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

Field Systems Comments

1 **Parameter:** SitingCriteriaCom

The site is located on a privately operated farm which rotates corn and soy bean crops.

2 **Parameter:** ShelterCleanNotes

The shelter floor has been repaird recently. Walls have signs of leaks.

3 **Parameter:** MetSensorComme

Temperature mounted in naturally aspirated shield on sample tower.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	ALH157	**Technician**	Martin Valvur	**Site Visit Date**	12/16/2019

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		
Zip Code	62275	**Fire Extinguisher** ☑	new in 2015
Time Zone	Central	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☑	
Primary Op. Phone #		**Safety Hard Hat** ☑	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Present

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810 (2149-7)	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The shelter floor has been repaird recently. Walls have signs of leaks.				
Site OK	☑	**Notes**					

Driving Directions

From I-70 take exit 36 (Pokey Road) north to the intersection of route 140. Turn left (west) on route 140 and continue approximately 1.5 miles. Turn left (south) onto CR 5. At the first intersection turn right (west) onto Meffert road. After the road turns left 90 degrees, turn at the first farm on the left. The site is approximately 1/2 mile on the dirt road under the power lines.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID ALH157 **Technician** Martin Valvur **Site Visit Date** 12/16/2019

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 on a privately operated farm which rotates corn and soy bean crops.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	ALH157	Technician	Martin Valvur	Site Visit Date	12/16/2019

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:

Temperature mounted in naturally aspirated shield on sample tower.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	ALH157	Technician	Martin Valvur	Site Visit Date	12/16/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	ALH157	Technician	Martin Valvur	Site Visit Date	12/16/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 15 meters
4	Describe dry dep sample tube.		3/8 teflon by 12 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	Flow line only
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID	ALH157	Technician	Martin Valvur	Site Visit Date	12/16/2019

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?	☑	Temperature only
4	Are the signal connections protected from the weather and well maintained?	☑	
5	Are the signal leads connected to the correct DAS channel?	☑	
6	Are the DAS, sensor translators, and shelter properly grounded?	☑	
7	Does the instrument shelter have a stable power source?	☑	
8	Is the instrument shelter temperature controlled?	☑	

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	ALH157	Technician	Martin Valvur	Site Visit Date	12/16/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	ALH157	Technician	Martin Valvur	Site Visit Date	12/16/2019

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?	☐	Trained by current operator
3	Is the site visited regularly on the required Tuesday schedule?	☑	
4	Are the standard CASTNET operational procedures being flollowed by the site operator?	☑	
5	Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation)	☑	

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	ALH157	Technician	Martin Valvur	Site Visit Date	12/16/2019

Site operation procedures

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

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

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

Field Systems Data Form F-02058-1500-S10-rev002

Site ID ALH157 **Technician** Martin Valvur **Site Visit Date** 12/16/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	DB3MC12	07052
DAS	Campbell	CR3000	2534	000428
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	0990007057	06285
Flow Rate	Apex	AXMC105LPMDPC	illegible	000858
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	Illegible	07205
Ozone	ThermoElectron Inc	49i A1NAA	1009241787	000615
Ozone Standard	ThermoElectron Inc	49i A3NAA	0622717853	000329
Sample Tower	Aluma Tower	B	none	illegible
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	8897	04945
Zero air pump	Werther International	C 70/4	000836220	06925

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
BFT142-Korey Devins-12/17/2019						
1	12/17/2019	Computer	Dell	07007	Inspiron 15	Unknown
2	12/17/2019	DAS	Campbell	000498	CR3000	3815
3	12/17/2019	Elevation	Elevation	None	1	None
4	12/17/2019	Filter pack flow pump	Thomas	00808	107CA18	00002460587
5	12/17/2019	Flow Rate	Apex	000593	AXMC105LPMDPCV	illegible
6	12/17/2019	Infrastructure	Infrastructure	none	none	none
7	12/17/2019	Modem	Digi	07129	LR54	Illegible
8	12/17/2019	Ozone	ThermoElectron Inc	000746	49i A1NAA	1105347315
9	12/17/2019	Ozone Standard	ThermoElectron Inc	000330	49i A3NAA	0622717854
10	12/17/2019	Sample Tower	Aluma Tower	000863	B	unknown
11	12/17/2019	Shelter Temperature	Campbell	none	107-L	none
12	12/17/2019	Siting Criteria	Siting Criteria	None	1	None
13	12/17/2019	Temperature	RM Young	04444	41342VO	4542
14	12/17/2019	Zero air pump	Werther International	06898	C 70/4	000821905

DAS Data Form

DAS Time Max Error: 0.05

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	3815	BFT142	Korey Devins	12/17/2019	DAS	Primary

Das Date: 12/17/2019 **Audit Date** 12/17/2019
Das Time: 08:41:40 **Audit Time** 08:41:43
Das Day: 351 **Audit Day** 351

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

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740135	**Tfer Desc.**	DVM
Tfer ID	01311		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0000	0.0000	V	V	0.0000
7	0.1000	0.0998	0.0999	V	V	0.0001
7	0.3000	0.2997	0.2997	V	V	0.0000
7	0.5000	0.4995	0.4996	V	V	0.0001
7	0.7000	0.6995	0.6995	V	V	0.0000
7	0.9000	0.8993	0.8993	V	V	0.0000
7	1.0000	0.9992	0.9992	V	V	0.0000

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	BFT142	Korey Devins	12/17/2019	Flow Rate	000593

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	148613	**Tfer Desc.**	BIOS 220-H
Tfer ID	01421		
Slope	1.00000	**Intercept**	0.00000
Cert Date	3/4/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0
0.22%	0.67%			**Cal Factor Full Scale**	0
				Rotometer Reading:	1.5

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.01	0.000	0.02	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	-0.02	l/m	l/m	
primary	test pt 1	1.491	1.490	1.49	0.000	1.50	l/m	l/m	0.67%
primary	test pt 2	1.491	1.490	1.48	0.000	1.49	l/m	l/m	0.00%
primary	test pt 3	1.491	1.490	1.48	0.000	1.49	l/m	l/m	0.00%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	3.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	205 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347315	BFT142	Korey Devins	12/17/2019	Ozone	000746

Slope:	0.96728	**Slope:**	0.00000
Intercept	-0.58271	**Intercept**	0.00000
CorrCoff:	1.00000	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180030022	**Tfer Desc.**	Ozone primary stan
Tfer ID	01114		
Slope	0.98600	**Intercept**	0.41627
Cert Date	10/29/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.30	-0.11	-0.61	ppb		-0.5
primary	2	15.43	15.22	14.01	ppb		-1.21
primary	3	33.61	33.66	31.94	ppb	-5.24	
primary	4	67.39	67.92	65.26	ppb	-3.99	
primary	5	112.18	113.35	109.00	ppb	-3.91	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.10	pass
Span	1.000	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	89.3 kHz	pass
Cell A Noise	0.6 ppb	pass
Cell A Flow	0.63 lpm	pass
Cell A Pressure	729.5 mmHg	pass
Cell A Tmp.	31.8 C	pass
Cell B Freq.	91.0 kHz	pass
Cell B Noise	0.6 ppb	pass
Cell B Flow	0.65 lpm	pass
Cell B Pressure	730.4 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	4542	BFT142	Korey Devins	12/17/2019	Temperature	04444

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00733	**Intercept**	0.14497
Cert Date	2/12/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.12	0.16		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.36	0.21	0.000	0.4	C	0.16
primary	Temp Mid Range	23.55	23.23	0.000	23.2	C	-0.06
primary	Temp High Range	45.42	44.95	0.000	45.1	C	0.14

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	BFT142	Korey Devins	12/17/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.09	0.20		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00733	Intercept	0.14497
Cert Date	2/12/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	21.56	21.26	0.000	21.5	C	0.2
primary	Temp Mid Range	21.82	21.52	0.000	21.6	C	0.07
primary	Temp Mid Range	22.25	21.94	0.000	21.9	C	0

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	BFT142	Technician	Korey Devins	Site Visit Date	12/17/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810	640 cuft

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

Field Systems Comments

1 **Parameter:** DasComments

The new sample tower is not attached to the shelter. The sample tower is not grounded.

2 **Parameter:** SitingCriteriaCom

The site is surrounded by a corn/soy bean field, within a large-scale commercial agriculture operation.

3 **Parameter:** ShelterCleanNotes

The shelter lights are not functioning properly.

4 **Parameter:** MetOpMaintCom

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

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	BFT142	**Technician**	Korey Devins	**Site Visit Date**	12/17/2019

Site Sponsor (agency)	EPA	**USGS Map**	Williston
Operating Group	UNC-IMS	**Map Scale**	
AQS #	37-031-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	
Deposition Measurement	dry, wet	**QAPP Longitude**	
Land Use	agriculture	**QAPP Elevation Meters**	
Terrain	flat	**QAPP Declination**	
Conforms to MLM	Yes	**QAPP Declination Date**	
Site Telephone		**Audit Latitude**	34.884668
Site Address 1	Open Grounds Farm	**Audit Longitude**	-76.620666
Site Address 2	100 Nelson Bay Rd.	**Audit Elevation**	5.3
County	Carteret	**Audit Declination**	-9.9
City, State	Beaufort, NC		
Zip Code	28516	**Fire Extinguisher** ☑	New in 2015
Time Zone	Eastern	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☑	
Primary Op. Phone #		**Safety Hard Hat** ☑	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☐	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Present

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The shelter lights are not functioning properly.				
Site OK	☑	**Notes**					

Driving Directions

From I-95 take highway 70 east through Morehead City and over the bridge. Continue through Beaufort staying on route 70 east. At East Carteret High School, route 70 turns to the right at a traffic light. Continue straight through the light on Merrimon Rd. (SR 1300), do not follow 70 to the right. Open Grounds Farm will be on the right approximately 6 miles on Merrimon Rd. Sign in at the guard house. Continue on the dirt road into the farm. Turn left at the first dirt road. The site will be visible in the corner of the field. Follow the dirt road around the field to the site.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID BFT142 **Technician** Korey Devins **Site Visit Date** 12/17/2019

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 surrounded by a corn/soy bean field, within a large-scale commercial agriculture operation.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	BFT142	Technician	Korey Devins	Site Visit Date	12/17/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	BFT142	Technician	Korey Devins	Site Visit Date	12/17/2019

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

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	BFT142	Technician	Korey Devins	Site Visit Date	12/17/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 10 meters
4	Describe dry dep sample tube.		3/8 teflon by 10 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	Flow line only
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID BFT142 **Technician** Korey Devins **Site Visit Date** 12/17/2019

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?	☑	Temperature only
4	Are the signal connections protected from the weather and well maintained?	☑	
5	Are the signal leads connected to the correct DAS channel?	☑	
6	Are the DAS, sensor translators, and shelter properly grounded?	☑	
7	Does the instrument shelter have a stable power source?	☑	
8	Is the instrument shelter temperature controlled?	☑	

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

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

The new sample tower is not attached to the shelter. The sample tower is not grounded.

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	BFT142	Technician	Korey Devins	Site Visit Date	12/17/2019

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	☑	2019	☑
HASP	☑	2019	☑
Field Ops Manual	☑	2019	☑
Calibration Reports	☑		☐
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedule	☐		☐

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	BFT142	Technician	Korey Devins	Site Visit Date	12/17/2019

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	BFT142	Technician	Korey Devins	Site Visit Date	12/17/2019

Site operation procedures

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

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

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

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID BFT142 **Technician** Korey Devins **Site Visit Date** 12/17/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07007
DAS	Campbell	CR3000	3815	000498
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	00002460587	00808
Flow Rate	Apex	AXMC105LPMDPC	illegible	000593
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	Illegible	07129
Ozone	ThermoElectron Inc	49i A1NAA	1105347315	000746
Ozone Standard	ThermoElectron Inc	49i A3NAA	0622717854	000330
Sample Tower	Aluma Tower	B	unknown	000863
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VO	4542	04444
Zero air pump	Werther International	C 70/4	000821905	06898

DAS Data Form

DAS Time Max Error: 0.03

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2133	CDZ171	Martin Valvur	12/17/2019	DAS	Primary

Das Date: 12/17/2019 **Audit Date** 12/17/2019
Das Time: 14:20:33 **Audit Time** 14:20:35
Das Day: 351 **Audit Day** 351

Low Channel:		High Channel:	
Avg Diff:	**Max Diff:**	**Avg Diff:**	**Max Diff:**
0.0001	0.0002	0.0001	0.0002

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740243	**Tfer Desc.**	DVM
Tfer ID	01312		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/25/2019	**CorrCoff**	1.00000

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	-0.0005	-0.0006	V	V	-0.0001
7	0.1000	0.0992	0.0993	V	V	0.0001
7	0.3000	0.2995	0.2997	V	V	0.0002
7	0.5000	0.4994	0.4994	V	V	0.0000
7	0.7000	0.6995	0.6995	V	V	0.0000
7	0.9000	0.8992	0.8993	V	V	0.0001
7	1.0000	0.9994	0.9995	V	V	0.0001

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
CDZ171-Martin Valvur-12/17/2019						
1	12/17/2019	Computer	Dell	07063	Inspiron 15	HX4MC12
2	12/17/2019	DAS	Campbell	000355	CR3000	2133
3	12/17/2019	Elevation	Elevation	None	1	None
4	12/17/2019	Filter pack flow pump	Thomas	06020	107CAB18D	060400022646
5	12/17/2019	Flow Rate	Apex	000669	AXMC105LPMDPCV	54766
6	12/17/2019	Infrastructure	Infrastructure	none	none	none
7	12/17/2019	Modem	Digi	07118	LR54	Illegible
8	12/17/2019	Ozone	ThermoElectron Inc	000727	49i A1NAA	1105347320
9	12/17/2019	Ozone Standard	ThermoElectron Inc	000220	49i A3NAA	0622717868
10	12/17/2019	Sample Tower	Aluma Tower	000125	B	none
11	12/17/2019	Shelter Temperature	Campbell	none	107-L	none
12	12/17/2019	Siting Criteria	Siting Criteria	None	1	None
13	12/17/2019	Temperature	RM Young	06403	41342VC	14036
14	12/17/2019	Zero air pump	Werther International	06879	C 70/4	000814275

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	54766	CDZ171	Martin Valvur	12/17/2019	Flow Rate	000669

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	122974	**Tfer Desc.**	BIOS 220-H
Tfer ID	01416		
Slope	1.00178	**Intercept**	0.00161
Cert Date	7/13/2018	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	-0.014
2.39%	2.60%			**Cal Factor Full Scale**	0.967
				Rotometer Reading:	1.45

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.01	0.000	-0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.02	0.000	-0.02	l/m	l/m	
primary	test pt 1	1.541	1.540	1.54	0.000	1.50	l/m	l/m	-2.60%
primary	test pt 2	1.541	1.540	1.54	0.000	1.50	l/m	l/m	-2.60%
primary	test pt 3	1.539	1.530	1.53	0.000	1.50	l/m	l/m	-1.96%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	3.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	4.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	90 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347320	CDZ171	Martin Valvur	12/17/2019	Ozone	000727

Slope:	1.01071	**Slope:**	0.00000
Intercept	-1.10155	**Intercept**	0.00000
CorrCoff:	0.99997	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00331	**Intercept**	-0.06936
Cert Date	10/28/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	-0.01	0.05	-0.73	ppb		-0.78
primary	2	14.38	14.40	13.55	ppb		-0.85
primary	3	37.05	36.99	35.68	ppb	-3.61	
primary	4	66.98	66.82	66.44	ppb	-0.57	
primary	5	114.41	114.10	114.40	ppb	0.26	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.50	pass
Span	1.019	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	88.8 kHz	pass
Cell A Noise	0.9 ppb	pass
Cell A Flow	0.76 lpm	pass
Cell A Pressure	707.9 mmHg	pass
Cell A Tmp.	30.5 C	pass
Cell B Freq.	92.9 kHz	pass
Cell B Noise	0.9 ppb	pass
Cell B Flow	0.82 lpm	pass
Cell B Pressure	707.3 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	14036	CDZ171	Martin Valvur	12/17/2019	Temperature	06403

Mfg	Fluke	**Parameter**	Temperature
Serial Number	3275143	**Tfer Desc.**	RTD
Tfer ID	01229		
Slope	0.99989	**Intercept**	-0.00649
Cert Date	1/23/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.08	0.13		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.00	0.01	0.000	0.0	C	-0.02
primary	Temp Mid Range	25.64	25.65	0.000	25.5	C	-0.13
primary	Temp High Range	49.49	49.50	0.000	49.4	C	-0.08

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	CDZ171	Martin Valvur	12/17/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.67	1.04		

Mfg	Fluke	Parameter	Shelter Temperature
Serial Number	3275143	Tfer Desc.	RTD
Tfer ID	01229		
Slope	0.99989	Intercept	-0.00649
Cert Date	1/23/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	23.88	23.89	0.000	22.9	C	-1.04
primary	Temp Mid Range	21.17	21.18	0.000	21.5	C	0.3
primary	Temp Mid Range	19.46	19.47	0.000	20.1	C	0.67

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	CDZ171	Technician	Martin Valvur	Site Visit Date	12/17/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810	640 cuft

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

Field Systems Comments

1 **Parameter:** SitingCriteriaCom

The site is in a corn field with limited agricultural operations within 15 meters.

2 **Parameter:** ShelterCleanNotes

The shelter floor has been repaired. There are signs of leaks from the roof on the walls.

3 **Parameter:** MetSensorComme

The temperature sensor has been installed in a naturally aspirated shield on the southeast leg of the sample tower.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	CDZ171	**Technician**	Martin Valvur	**Site Visit Date**	12/17/2019

Site Sponsor (agency)	EPA	**USGS Map**	Cadiz
Operating Group	private, TVA	**Map Scale**	
AQS #	21-221-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone, SO2, NOy, PM2.5, IMPROVE	**QAPP Latitude**	36.7841
Deposition Measurement	dry	**QAPP Longitude**	-87.8500
Land Use	agriculture, woodland - mixed	**QAPP Elevation Meters**	189
Terrain	gently rolling	**QAPP Declination**	-2.01
Conforms to MLM	Yes	**QAPP Declination Date**	2/23/2006
Site Telephone	(270) 522-9373	**Audit Latitude**	36.784053
Site Address 1	4560 Old Dover Road	**Audit Longitude**	-87.85015
Site Address 2	route 1175	**Audit Elevation**	190
County	Trigg	**Audit Declination**	-2.7
City, State	Cadiz, KY		
Zip Code	42211	**Fire Extinguisher** ☑	New in 2015
Time Zone	Central	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☐	
Primary Op. Phone #		**Safety Hard Hat** ☑	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Present

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The shelter floor has been repaired. There are signs of leaks from the roof on the walls.				
Site OK	☑	**Notes**					

Driving Directions From route 68 in Cadiz turn south on 1175 and continue approximately 4.7 miles. The site will be visible in the field on the right. Turn onto the gravel road just past the site operator's house at 4560 Old Dover Road, which is on the left.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID CDZ171 **Technician** Martin Valvur **Site Visit Date** 12/17/2019

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	15 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 a corn field with limited agricultural operations within 15 meters.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	CDZ171	Technician	Martin Valvur	Site Visit Date	12/17/2019

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?	☐	southest
5	Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided)	☑	
6	Is the solar radiation sensor plumb?	☑	N/A
7	Is it sited to avoid shading, or any artificial or reflected light?	☑	N/A
8	Is the rain gauge plumb?	☑	N/A
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	☑	N/A
10	Is the surface wetness sensor sited with the grid surface facing north?	☑	N/A
11	Is it inclined approximately 30 degrees?	☑	N/A

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

The temperature sensor has been installed in a naturally aspirated shield on the southeast leg of the sample tower.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	CDZ171	Technician	Martin Valvur	Site Visit Date	12/17/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	CDZ171	Technician	Martin Valvur	Site Visit Date	12/17/2019

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 15 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	Flow line only
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID CDZ171 **Technician** Martin Valvur **Site Visit Date** 12/17/2019

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?	☑	Temperature only
4	Are the signal connections protected from the weather and well maintained?	☑	
5	Are the signal leads connected to the correct DAS channel?	☑	
6	Are the DAS, sensor translators, and shelter properly grounded?	☑	
7	Does the instrument shelter have a stable power source?	☑	
8	Is the instrument shelter temperature controlled?	☑	

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID CDZ171 **Technician** Martin Valvur **Site Visit Date** 12/17/2019

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 2014	☐
HASP	☑	2016	☐
Field Ops Manual	☑	Oct 2014	☐
Calibration Reports	☐		☐
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedule	☐		☐

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	CDZ171	Technician	Martin Valvur	Site Visit Date	12/17/2019

Site operation procedures

1	Has the site operator attended a formal CASTNET training course? If yes, when and who instructed?	☐	Trained by previous opertor
2	Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed?	☐	no backup 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	☑	N/A	☑
Confirm Reasonableness of Current Values	☑	Weekly	☑
Test Surface Wetness Response	☑	N/A	☑

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID CDZ171 **Technician** Martin Valvur **Site Visit Date** 12/17/2019

Site operation procedures

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

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

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

Field Systems Data Form F-02058-1500-S10-rev002

Site ID CDZ171 **Technician** Martin Valvur **Site Visit Date** 12/17/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	HX4MC12	07063
DAS	Campbell	CR3000	2133	000355
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18D	060400022646	06020
Flow Rate	Apex	AXMC105LPMDPC	54766	000669
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	Illegible	07118
Ozone	ThermoElectron Inc	49i A1NAA	1105347320	000727
Ozone Standard	ThermoElectron Inc	49i A3NAA	0622717868	000220
Sample Tower	Aluma Tower	B	none	000125
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	14036	06403
Zero air pump	Werther International	C 70/4	000814275	06879

APPENDIX B

CASTNET Site Spot Report Forms

EEMS Spot Report

Data Compiled: 3/11/2020 12:13:08

SiteVisitDate	Site	Technician
12/16/2019	ALH157	Martin Valvur

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.05	c	**P**
2	Temperature max error	P	4	0.5	6	0.08	c	**P**
3	Ozone Slope	P	0	1.1	4	0.99500	unitless	**P**
4	Ozone Intercept	P	0	5	4	0.11306	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
6	Ozone % difference avg	P	7	10	4	0.7	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-0.03	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	0.19	ppb	**P**
9	Flow Rate average % difference	P	10	5	3	1.08	%	**P**
10	Flow Rate max % difference	P	10	5	3	1.08	%	**P**
11	DAS Voltage average error	P	7	0.003	35	0.0001	V	**P**
12	Shelter Temperature average error	P	5	2	18	0.41	c	**P**
13	Shelter Temperature max error	P	5	2	18	0.67	c	**P**

SiteVisitDate	Site	Technician
12/16/2019	ALH157	Martin Valvur

Field Systems Comments

1 **Parameter:** SitingCriteriaCom

The site is located on a privately operated farm which rotates corn and soy bean crops.

2 **Parameter:** ShelterCleanNotes

The shelter floor has been repaird recently. Walls have signs of leaks.

3 **Parameter:** MetSensorComme

Temperature mounted in naturally aspirated shield on sample tower.

EEMS Spot Report

Data Compiled: 3/11/2020 12:55:12

SiteVisitDate	Site	Technician
11/18/2019	BEL116	Korey Devins

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.99282	unitless	**P**
2	Ozone Intercept	P	0	5	4	-0.54196	ppb	**P**
3	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
4	Ozone % difference avg	P	7	10	4	2.4	%	**P**
5	Ozone Absolute Difference g2	P	7	1.5	1	-0.73	ppb	**P**

EEMS Spot Report

Data Compiled: 3/11/2020 12:50:50

SiteVisitDate	Site	Technician
12/17/2019	BFT142	Korey Devins

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	12	0.12	c	**P**
2	Temperature max error	P	4	0.5	12	0.16	c	**P**
3	Ozone Slope	P	0	1.1	4	0.96728	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.58271	ppb	**P**
5	Ozone correlation	P	0	0.995	4	1.00000	unitless	**P**
6	Ozone % difference avg	P	7	10	4	5.2	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-0.5	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-1.21	ppb	**P**
9	Flow Rate average % difference	P	10	5	4	0.22	%	**P**
10	Flow Rate max % difference	P	10	5	4	0.67	%	**P**
11	DAS Voltage average error	P	7	0.003	63	0.0000	V	**P**
12	Shelter Temperature average error	P	5	2	18	0.09	c	**P**
13	Shelter Temperature max error	P	5	2	18	0.20	c	**P**

SiteVisitDate	Site	Technician
12/17/2019	BFT142	Korey Devins

Field Systems Comments

1 **Parameter:** DasComments

The new sample tower is not attached to the shelter. The sample tower is not grounded.

2 **Parameter:** SitingCriteriaCom

The site is surrounded by a corn/soy bean field, within a large-scale commercial agriculture operation.

3 **Parameter:** ShelterCleanNotes

The shelter lights are not functioning properly.

4 **Parameter:** MetOpMaintCom

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

EEMS Spot Report

Data Compiled: 3/10/2020 20:40:27

SiteVisitDate	Site	Technician
11/07/2019	BVL130	Korey Devins

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.07	c	**P**
2	Temperature2meter max error	P	5	0.5	3	0.15	c	**P**
3	Surface Wetness Wetness Sensor		0		1	0		
4	Wind Speed average error below 5m/s in m/s	P	3	0.5	8	0.02	m/s	**P**
5	Wind Speed max error below 5m/s in m/s	P	3	0.5	8	0.20	m/s	**P**
6	Wind Speed Torque average error	P	3	0.5	1	0.40	g-cm	**P**
7	Wind Speed Torque max error	P	3	0.5	1	0.5	g-cm	**Fail**
8	Wind Direction Input Deg True average error (de	P	2	5	4	1.8	degrees	**P**
9	Wind Direction Input Deg True max error (deg)	P	2	5	4	2	degrees	**P**
10	Wind Direction Linearity average error (deg)	P	2	5	8	1.0	degrees	**P**
11	Wind Direction Linearity max error (deg)	P	2	5	8	2	degrees	**P**
12	Wind Direction Torque average error	P	2	30	1	14	g-cm	**P**
13	Wind Direction Torque max error	P	2	30	1	18	g-cm	**P**
14	Temperature average error	P	4	0.5	9	0.18	c	**P**
15	Temperature max error	P	4	0.5	9	0.32	c	**P**
16	Relative Humidity average above 85%	P	6	10	1	1.3	%	**P**
17	Relative Humidity max above 85%	P	6	10	1	1.3	%	**P**
18	Relative Humidity average below 85%	P	6	10	2	1.6	%	**P**
19	Relative Humidity max below 85%	P	6	10	2	3.1	%	**P**
20	Solar Radiation % diff of avg	P	9	10	24	7.4	%	**P**
21	Solar Radiation % diff of max STD value	P	9	10	24	8.7	%	**P**
22	Precipitation average % difference	P	1	10	4	19.0	%	**Fail**
23	Precipitation max % difference	P	1	10	4	34.0	%	**Fail**
24	Ozone Slope	P	0	1.1	4	0.97565	unitless	**P**
25	Ozone Intercept	P	0	5	4	-0.11353	ppb	**P**
26	Ozone correlation	P	0	0.995	4	1.00000	unitless	**P**
27	Ozone % difference avg	P	7	10	4	3.1	%	**P**
28	Ozone Absolute Difference g1	P	7	3	1	0.06	ppb	**P**
29	Ozone Absolute Difference g2	P	7	1.5	1	-0.67	ppb	**P**
30	Flow Rate average % difference	P	10	5	4	0.88	%	**P**
31	Flow Rate max % difference	P	10	5	4	1.32	%	**P**
32	DAS Voltage average error	P	7	0.003	42	0.0002	V	**P**
33	Surface Wetness Response	P	12	0.5	1	1.00		**P**

SiteVisitDate	Site	Technician
11/07/2019	BVL130	Korey Devins

34	Shelter Temperature average error	P	5	2	18	0.11	c	**P**
35	Shelter Temperature max error	P	5	2	18	0.28	c	**P**

SiteVisitDate	Site	Technician
11/07/2019	BVL130	Korey Devins

Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** Moisture Present **CommentCode:** 72

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

2 **Parameter:** Flow Rate **SensorComponent:** Leak Check **CommentCode:** 206

The flow rate leak test performed at the flow rate standard indicates that the filter pack quick-disconnect fitting is not properly sealing and leaking when a filter is installed.

3 **Parameter:** Precipitation **SensorComponent:** System Memo **CommentCode:** 174

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

4 **Parameter:** Precipitation **SensorComponent:** System Memo **CommentCode:** 108

The tipping bucket rain gauge heater wires were found to be interfering with the operation of the tipping mechanism. The condition was corrected prior to the performance audit.

5 **Parameter:** Wind Speed **SensorComponent:** System Memo **CommentCode:** 174

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

Field Systems Comments

1 **Parameter:** DasComments

Only the low test points for the wind speed sensor were challenged due to a wind speed standard failure.

2 **Parameter:** SiteOpsProcedures

Ozone and NCORE sample line filters are replaced, and the sample lines are leaked tested, 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 still smells like rodent excrement.

5 **Parameter:** MetSensorComme

The tipping bucket rain gage is mounted near the meteorological tower and in violation of the 45 degree rule. The tipping bucket heater wires were interfering with the operation of the tipping bucket as indicated by the first audit challenge of the tipping bucket which was approximately 35% low. The wires were moved resulting in audit challenges approximately 14% high. Wetness sensor grid is facing south.

6 **Parameter:** MetOpMaintCom

The signal cables are showing signs of wear and previous repair.

EEMS Spot Report

Data Compiled: 3/11/2020 11:53:53

SiteVisitDate	Site	Technician
11/19/2019	BWR139	Korey Devins

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	15	0.10	c	**P**
2	Temperature max error	P	4	0.5	15	0.18	c	**P**
3	Ozone Slope	P	0	1.1	4	0.97304	unitless	**P**
4	Ozone Intercept	P	0	5	4	-1.01079	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
6	Ozone % difference avg	P	7	10	4	5.6	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-1.14	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-1.39	ppb	**P**
9	Flow Rate average % difference	P	10	5	6	2.39	%	**P**
10	Flow Rate max % difference	P	10	5	6	2.6	%	**P**
11	DAS Voltage average error	P	7	0.003	70	0.0000	V	**P**
12	Shelter Temperature average error	P	5	2	18	0.49	c	**P**
13	Shelter Temperature max error	P	5	2	18	0.61	c	**P**

SiteVisitDate	Site	Technician
11/19/2019	BWR139	Korey Devins

Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** Moisture Present **CommentCode:** 72

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

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The ozone sample train is leak checked every two weeks following the inlet filter change.

2 **Parameter:** SitingCriteriaCom

Very light agriculture activities near site, not harvested, just to provide food for wildlife.

3 **Parameter:** ShelterCleanNotes

The shelter is showing signs of deterioration with leaks and rot at bottom of walls.

EEMS Spot Report

Data Compiled: 3/12/2020 09:36:23

SiteVisitDate	Site	Technician
11/12/2019	CDR119	Eric Hebert

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	21	0.13	c	**P**
2	Temperature max error	P	4	0.5	21	0.27	c	**P**
3	Ozone Slope	P	0	1.1	4	1.0137	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.6245	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
6	Ozone % difference avg	P	7	10	4	1.3	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-0.62	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.5	ppb	**P**
9	Flow Rate average % difference	P	10	5	6	0.66	%	**P**
10	Flow Rate max % difference	P	10	5	6	0.66	%	**P**
11	DAS Voltage average error	P	6	0.003	21	0.0000	V	**P**
12	Shelter Temperature average error	P	5	2	18	0.71	c	**P**
13	Shelter Temperature max error	P	5	2	18	0.90	c	**P**

SiteVisitDate	Site	Technician
11/12/2019	CDR119	Eric Hebert

Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** Leak Check **CommentCode:** 206

The flow rate leak test performed at the flow rate standard indicates that the filter pack quick-disconnect fitting is not properly sealing and leaking when a filter is installed.

Field Systems Comments

1 **Parameter:** SitingCriteriaCom

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

2 **Parameter:** ShelterCleanNotes

The shelter is in fair condition with some rot on the walls below the air conditioner.

EEMS Spot Report

Data Compiled: 3/11/2020 12:33:29

SiteVisitDate	Site	Technician
12/17/2019	CDZ171	Martin Valvur

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	15	0.08	c	**P**
2	Temperature max error	P	4	0.5	15	0.13	c	**P**
3	Ozone Slope	P	0	1.1	4	1.01071	unitless	**P**
4	Ozone Intercept	P	0	5	4	-1.10155	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99997	unitless	**P**
6	Ozone % difference avg	P	7	10	4	2.6	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-0.78	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.85	ppb	**P**
9	Flow Rate average % difference	P	10	5	3	2.39	%	**P**
10	Flow Rate max % difference	P	10	5	3	2.6	%	**P**
11	DAS Voltage average error	P	7	0.003	7	0.0001	V	**P**
12	Shelter Temperature average error	P	5	2	12	0.67	c	**P**
13	Shelter Temperature max error	P	5	2	12	1.04	c	**P**

SiteVisitDate	Site	Technician
12/17/2019	CDZ171	Martin Valvur

Field Systems Comments

1 **Parameter:** SitingCriteriaCom

The site is in a corn field with limited agricultural operations within 15 meters.

2 **Parameter:** ShelterCleanNotes

The shelter floor has been repaired. There are signs of leaks from the roof on the walls.

3 **Parameter:** MetSensorComme

The temperature sensor has been installed in a naturally aspirated shield on the southeast leg of the sample tower.

EEMS Spot Report

Data Compiled: 3/11/2020 10:20:06

SiteVisitDate	Site	Technician
11/11/2019	CKT136	Eric Hebert

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	12	0.28	c	**P**
2	Temperature max error	P	4	0.5	12	0.37	c	**P**
3	Ozone Slope	P	0	1.1	4	0.92747	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.93752	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
6	Ozone % difference avg	P	7	10	4	9.7	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-1.22	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-2.1	ppb	**Fail**
9	Flow Rate average % difference	P	10	5	6	0.22	%	**P**
10	Flow Rate max % difference	P	10	5	6	0.66	%	**P**
11	DAS Voltage average error	P	7	0.003	14	0.0001	V	**P**
12	Shelter Temperature average error	P	5	2	18	1.07	c	**P**
13	Shelter Temperature max error	P	5	2	18	1.12	c	**P**

SiteVisitDate	Site	Technician
11/11/2019	CKT136	Eric Hebert

Field Systems Comments

1 **Parameter:** ShelterCleanNotes

The shelter is in poor condition. The shelter walls adjacent to the air conditioner and rear corner are moldy, rotting, and buckled.

EEMS Spot Report

Data Compiled: 3/10/2020 15:57:14

SiteVisitDate	Site	Technician
10/24/2019	DCP114	Korey Devins

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	9	0.22	c	**P**
2	Temperature max error	P	4	0.5	9	0.31	c	**P**
3	Ozone Slope	P	0	1.1	4	0.96442	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.53192	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
6	Ozone % difference avg	P	7	10	4	5.4	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-0.37	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-1.3	ppb	**P**
9	Flow Rate average % difference	P	10	5	6	2.17	%	**P**
10	Flow Rate max % difference	P	10	5	6	2.6	%	**P**
11	DAS Voltage average error	P	7	0.003	70	0.0000	V	**P**
12	Shelter Temperature average error	P	5	2	18	1.32	c	**P**
13	Shelter Temperature max error	P	5	2	18	1.42	c	**P**

SiteVisitDate	Site	Technician
10/24/2019	DCP114	Korey Devins

Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** Moisture Present **CommentCode:** 72

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

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator is following procedures and doing a very good job with filter handling.

2 **Parameter:** DasComments

Met tower removed.

3 **Parameter:** SiteOpsProcedures

The ozone inlet filter is replaced and the sample line is leak-tested every two weeks.

4 **Parameter:** SitingCriteriaCom

The site is located in a wooded thicket within a state park. The area surrounding the park is almost completely intensive agriculture. The site may not be regionally representative.

5 **Parameter:** ShelterCleanNotes

The shelter is currently in fair condition. There are loose floor tiles.

6 **Parameter:** MetOpMaintCom

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

EEMS Spot Report

Data Compiled: 3/11/2020 11:25:02

SiteVisitDate	Site	Technician
11/12/2019	EGB181	Korey Devins

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.13	c	**P**
2	Temperature max error	P	4	0.5	6	0.20	c	**P**
3	Flow Rate average % difference	P	10	5	2	1.36	%	**P**
4	Flow Rate max % difference	P	10	5	2	1.36	%	**P**
5	DAS Voltage average error	P	7	0.003	35	0.0001	V	**P**
6	Shelter Temperature average error	P	5	2	15	0.55	c	**P**
7	Shelter Temperature max error	P	5	2	15	0.56	c	**P**

SiteVisitDate	Site	Technician
11/12/2019	EGB181	Korey Devins

Field Performance Comments

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

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

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

Filters are sent 4 at a time and stored in a refrigerator before and after sampling prior to shipment to the lab.

2 **Parameter:** DocumentationCo

The site operator uses the station logbook only occasionally and does not send copies to Wood.

3 **Parameter:** ShelterCleanNotes

The shelter is provided by the Center for Atmospheric Research and is clean, organized, and spacious. The roof is leaking but plans are underway for repairs.

4 **Parameter:** PollAnalyzerCom

Ozone concentration is not measured at EGB181 as part of CASTNET.

EEMS Spot Report

Data Compiled: 3/9/2020 20:08:28

SiteVisitDate	Site	Technician
10/07/2019	GRS420	Eric Hebert

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.18	c	**P**
2	Temperature2meter max error	P	5	0.5	3	0.29	c	**P**
3	Ozone Slope	P	0	1.1	4	0.99738	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.61972	ppb	**P**
5	Ozone correlation	P	0	0.995	4	1.00000	unitless	**P**
6	Ozone % difference avg	P	7	10	4	2.3	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-0.5	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.78	ppb	**P**
9	Flow Rate average % difference	P	10	5	6	2.65	%	**P**
10	Flow Rate max % difference	P	10	5	6	2.77	%	**P**
11	DAS Voltage average error	P	2	0.003	49	0.0001	V	**P**
12	Shelter Temperature average error	P	5	2	14	0.31	c	**P**
13	Shelter Temperature max error	P	5	2	14	0.35	c	**P**

SiteVisitDate	Site	Technician
10/07/2019	GRS420	Eric Hebert

Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** Leak Test **CommentCode:** 206

The flow rate leak test performed at the flow rate standard indicates that the filter pack quick-disconnect fitting is not properly sealing and leaking when a filter is installed.

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The ozone sample train is leak-tested each week after the inlet filter is changed.

2 **Parameter:** SitingCriteriaCom

The site is located on a ridge top with the sampling height at the tops of the trees on the ridge. The site is within 40 km of Knoxville and other major sources.

3 **Parameter:** ShelterCleanNotes

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

4 **Parameter:** MetSensorComme

The temperature sensor has been relocated from 10 meters to approximately 3.9 meters above the ground.

EEMS Spot Report

Data Compiled: 2/11/2020 14:20:40

SiteVisitDate	Site	Technician
10/23/2019	KIC003	Martin Valvur

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	9	0.08	c	**P**
2	Temperature max error	P	4	0.5	9	0.17	c	**P**
3	Flow Rate average % difference	P	10	5	4	0.45	%	**P**
4	Flow Rate max % difference	P	10	5	4	0.67	%	**P**

SiteVisitDate	Site	Technician
10/23/2019	KIC003	Martin Valvur

Field Systems Comments

1 **Parameter:** DocumentationCo

The site operator currently maintains records in a logbook provided by Wood.

2 **Parameter:** SitingCriteriaCom

The site is located across the street from the community school in the town of Powhattan.

3 **Parameter:** ShelterCleanNotes

Small footprint site with no shelter.

EEMS Spot Report

Data Compiled: 3/9/2020 20:48:52

SiteVisitDate	Site	Technician
10/22/2019	KNZ184	Martin Valvur

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	3	0.13	c	**P**
2	Temperature max error	P	4	0.5	3	0.19	c	**P**
3	Flow Rate average % difference	P	10	5	3	0.11	%	**P**
4	Flow Rate max % difference	P	10	5	3	0.33	%	**P**
5	DAS Voltage average error	P	7	0.003	49	0.0001	V	**P**
6	Shelter Temperature average error	P	5	2	18	0.72	c	**P**
7	Shelter Temperature max error	P	5	2	18	1.23	c	**P**

Field Systems Comments

1 **Parameter:** SitingCriteriaCom

The site is located at a Long Term Ecological Research site operated by KSU.

2 **Parameter:** ShelterCleanNotes

The shelter is very clean, neat, well organized and well maintained. The shelter floor has deteriorated and is poor condition.

EEMS Spot Report

Data Compiled: 3/9/2020 20:28:19

SiteVisitDate	Site	Technician
10/17/2019	MAC426	Eric Hebert

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.22	c	**P**
2	Temperature2meter max error	P	5	0.5	3	0.57	c	**Fail**
3	Ozone Slope	P	0	1.1	4	0.98781	unitless	**P**
4	Ozone Intercept	P	0	5	4	2.24646	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
6	Ozone % difference avg	P	7	10	4	5.5	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	2.38	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	1.86	ppb	**Fail**
9	Flow Rate average % difference	P	10	5	3	5.03	%	**Fail**
10	Flow Rate max % difference	P	10	5	3	5.03	%	**Fail**
11	DAS Voltage average error	P	1	0.003	28	0.0000	V	**P**
12	Shelter Temperature average error	P	5	2	10	0.32	c	**P**
13	Shelter Temperature max error	P	5	2	10	0.53	c	**P**

SiteVisitDate	Site	Technician
10/17/2019	MAC426	Eric Hebert

Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** Moisture Present **CommentCode:** 72

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

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator is very knowledgeable with air quality monitoring. He is doing a very good job with site activities and filter handling.

2 **Parameter:** SitingCriteriaCom

Bowling Green is within 40 km of the site. The site is in a hay field which is harvested twice per year. The area to the west and south is comprised of livestock farms including cattle and poultry.

3 **Parameter:** ShelterCleanNotes

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

EEMS Spot Report

Data Compiled: 3/10/2020 18:01:11

SiteVisitDate	Site	Technician
11/05/2019	MCK131	Sandy Grenville

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.29	c	**P**
2	Temperature max error	P	4	0.5	6	0.39	c	**P**
3	Ozone Slope	P	0	1.1	4	0.99511	unitless	**P**
4	Ozone Intercept	P	0	5	4	-1.37691	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99993	unitless	**P**
6	Ozone % difference avg	P	7	10	4	4.3	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-1.74	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-1.4	ppb	**P**
9	Flow Rate average % difference	P	10	5	6	3.00	%	**P**
10	Flow Rate max % difference	P	10	5	6	3.23	%	**P**
11	DAS Voltage average error	P	7	0.003	49	0.0000	V	**P**
12	Shelter Temperature average error	P	5	2	12	0.20	c	**P**
13	Shelter Temperature max error	P	5	2	12	0.30	c	**P**

SiteVisitDate	Site	Technician
11/05/2019	MCK131	Sandy Grenville

Field Systems Comments

1 **Parameter:** DocumentationCo

HASP and Field Operations Manual are not onsite.

2 **Parameter:** ShelterCleanNotes

The shelter is neat and well organized.

EEMS Spot Report

Data Compiled: 3/10/2020 18:26:05

SiteVisitDate	Site	Technician
11/05/2019	MCK231	Sandy Grenville

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.50	c	**Fail**
2	Temperature max error	P	4	0.5	6	0.88	c	**Fail**
3	Ozone Slope	P	0	1.1	4	1.00181	unitless	**P**
4	Ozone Intercept	P	0	5	4	-1.68192	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99994	unitless	**P**
6	Ozone % difference avg	P	7	10	4	4.2	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-2.11	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-1.51	ppb	**Fail**
9	Flow Rate average % difference	P	10	5	4	2.16	%	**P**
10	Flow Rate max % difference	P	10	5	4	3.21	%	**P**
11	DAS Voltage average error	P	7	0.003	77	0.0000	V	**P**
12	Shelter Temperature average error	P	5	2	12	0.56	c	**P**
13	Shelter Temperature max error	P	5	2	12	0.98	c	**P**

SiteVisitDate	Site	Technician
11/05/2019	MCK231	Sandy Grenville

Field Systems Comments

1 **Parameter:** ShelterCleanNotes

The site instruments are located in the MCK131 shelter. The same site operator is servicing both sites.

EEMS Spot Report

Data Compiled: 3/10/2020 16:15:52

SiteVisitDate	Site	Technician
10/25/2019	OXF122	Korey Devins

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	15	0.33	c	**P**
2	Temperature max error	P	4	0.5	15	0.47	c	**P**
3	Ozone Slope	P	0	1.1	4	0.99496	unitless	**P**
4	Ozone Intercept	P	0	5	4	-1.07432	ppb	**P**
5	Ozone correlation	P	0	0.995	4	1.00000	unitless	**P**
6	Ozone % difference avg	P	7	10	4	3.5	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-1.06	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-1.21	ppb	**P**
9	Flow Rate average % difference	P	10	5	3	0.88	%	**P**
10	Flow Rate max % difference	P	10	5	3	1.32	%	**P**
11	DAS Voltage average error	P	7	0.003	70	0.0001	V	**P**
12	Shelter Temperature average error	P	5	2	18	0.20	c	**P**
13	Shelter Temperature max error	P	5	2	18	0.43	c	**P**

SiteVisitDate	Site	Technician
10/25/2019	OXF122	Korey Devins

Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** Moisture Present **CommentCode:** 72

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

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The operator uses procedures written by the previous site operator.

2 **Parameter:** DasComments

The met tower is operated by the university and the temperature sensor has been moved to the sample tower in a naturally aspirated shield.

3 **Parameter:** SitingCriteriaCom

The site is located in university agriculture research facility.

4 **Parameter:** ShelterCleanNotes

The shelter roof has been repaired.

EEMS Spot Report

Data Compiled: 2/1/2020 15:47:42

SiteVisitDate	Site	Technician
10/05/2019	PNF126	Eric Hebert

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.00778	unitless	**P**
2	Ozone Intercept	P	0	5	4	-1.06583	ppb	**P**
3	Ozone correlation	P	0	0.995	4	1.00000	unitless	**P**
4	Ozone % difference avg	P	7	10	4	2.8	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	-1.06	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-1.05	ppb	**P**

EEMS Spot Report

Data Compiled: 3/11/2020 09:57:31

SiteVisitDate	Site	Technician
11/10/2019	QAK172	Eric Hebert

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	9	0.19	c	**P**
2	Temperature max error	P	4	0.5	9	0.36	c	**P**
3	Ozone Slope	P	0	1.1	4	1.00619	unitless	**P**
4	Ozone Intercept	P	0	5	4	-1.01653	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
6	Ozone % difference avg	P	7	10	4	2.7	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-0.82	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.93	ppb	**P**
9	Flow Rate average % difference	P	10	5	4	0.67	%	**P**
10	Flow Rate max % difference	P	10	5	4	0.67	%	**P**
11	DAS Voltage average error	P	7	0.003	70	0.0001	V	**P**
12	Shelter Temperature average error	P	5	2	3	0.59	c	**P**
13	Shelter Temperature max error	P	5	2	3	0.80	c	**P**

SiteVisitDate	Site	Technician
11/10/2019	QAK172	Eric Hebert

Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** Leak Test **CommentCode:** 206

The flow rate leak test performed at the flow rate standard indicates that the filter pack quick-disconnect fitting is not properly sealing and leaking when a filter is installed.

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site operator is doing an excellent job maintaining the site.

2 **Parameter:** ShelterCleanNotes

The shelter is in fair condition with some loose floor tiles.

EEMS Spot Report

Data Compiled: 3/10/2020 16:43:53

SiteVisitDate	Site	Technician
10/25/2019	SAN189	Martin Valvur

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	15	0.09	c	**P**
2	Temperature max error	P	4	0.5	15	0.19	c	**P**
3	Ozone Slope	P	0	1.1	4	0.98555	unitless	**P**
4	Ozone Intercept	P	0	5	4	-1.28329	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
6	Ozone % difference avg	P	7	10	4	5.2	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-1.14	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-1.45	ppb	**P**
9	Flow Rate average % difference	P	10	5	3	0.78	%	**P**
10	Flow Rate max % difference	P	10	5	3	1.01	%	**P**
11	DAS Voltage average error	P	7	0.003	63	0.0001	V	**P**
12	Shelter Temperature average error	P	5	2	18	0.29	c	**P**
13	Shelter Temperature max error	P	5	2	18	0.42	c	**P**

SiteVisitDate	Site	Technician
10/25/2019	SAN189	Martin Valvur

Field Systems Comments

1 **Parameter:** ShelterCleanNotes

The shelter is in very good condition, however somewhat cluttered.

EEMS Spot Report

Data Compiled: 3/9/2020 21:04:08

SiteVisitDate	Site	Technician
10/22/2019	SHN418	Korey Devins

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.11	c	**P**
2	Temperature2meter max error	P	5	0.5	3	0.13	c	**P**
3	Ozone Slope	P	0	1.1	4	0.98595	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.2997	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
6	Ozone % difference avg	P	7	10	4	2.3	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-0.16	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.6	ppb	**P**
9	Flow Rate average % difference	P	10	5	12	1.53	%	**P**
10	Flow Rate max % difference	P	10	5	12	2.03	%	**P**
11	Shelter Temperature average error	P	5	2	21	0.04	c	**P**
12	Shelter Temperature max error	P	5	2	21	0.06	c	**P**

SiteVisitDate	Site	Technician
10/22/2019	SHN418	Korey Devins

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The ozone inlet filter is replaced and the sample train is leak-tested every two weeks.

2 **Parameter:** ShelterCleanNotes

The shelter is in good condition, clean and well organized

EEMS Spot Report

Data Compiled: 3/11/2020 12:56:11

SiteVisitDate	Site	Technician
11/06/2019	SPD111	Sandy Grenville

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.99213	unitless	**P**
2	Ozone Intercept	P	0	5	4	-1.02793	ppb	**P**
3	Ozone correlation	P	0	0.995	4	0.99988	unitless	**P**
4	Ozone % difference avg	P	7	10	4	3.6	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	-1.39	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-1.24	ppb	**P**

EEMS Spot Report

Data Compiled: 3/10/2020 17:13:20

SiteVisitDate	Site	Technician
11/05/2019	STK138	Korey Devins

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	15	0.03	c	**P**
2	Temperature max error	P	4	0.5	15	0.04	c	**P**
3	Ozone Slope	P	0	1.1	4	0.97775	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.12925	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
6	Ozone % difference avg	P	7	10	4	2.5	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-0.26	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.53	ppb	**P**
9	Flow Rate average % difference	P	10	5	4	4.65	%	**P**
10	Flow Rate max % difference	P	10	5	4	4.9	%	**P**
11	DAS Voltage average error	P	7	0.003	70	0.0001	V	**P**
12	Shelter Temperature average error	P	5	2	18	0.70	c	**P**
13	Shelter Temperature max error	P	5	2	18	0.80	c	**P**

SiteVisitDate	Site	Technician
11/05/2019	STK138	Korey Devins

Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** Moisture Present **CommentCode:** 72

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

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The ozone sample train is leak tested every 2 weeks.

2 **Parameter:** SitingCriteriaCom

The site is located in a corn field on a cattle farm. Corn is planted within 10 meters.

3 **Parameter:** ShelterCleanNotes

The shelter is somewhat dirty and cluttered. There are signs of leaks on the walls and floor rot.

EEMS Spot Report

Data Compiled: 3/10/2020 18:52:45

SiteVisitDate	Site	Technician
11/07/2019	VIN140	Sandy Grenville

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	3	0.15	c	**P**
2	Temperature max error	P	4	0.5	3	0.30	c	**P**
3	Ozone Slope	P	0	1.1	4	0.99069	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.37885	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99997	unitless	**P**
6	Ozone % difference avg	P	7	10	4	2.8	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	0.04	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-1.01	ppb	**P**
9	Flow Rate average % difference	P	10	5	8	1.96	%	**P**
10	Flow Rate max % difference	P	10	5	8	1.96	%	**P**
11	DAS Voltage average error	P	7	0.003	70	0.0001	V	**P**
12	Shelter Temperature average error	P	5	2	18	0.53	c	**P**
13	Shelter Temperature max error	P	5	2	18	0.98	c	**P**

SiteVisitDate	Site	Technician
11/07/2019	VIN140	Sandy Grenville

Field Systems Comments

1 **Parameter:** DasComments

The sample tower ground wire is broken.

2 **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.

3 **Parameter:** ShelterCleanNotes

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

4 **Parameter:** MetSensorComme

The temperature sensor is mounted on the sample tower.

APPENDIX C

CASTNET Ozone Performance Evaluation Forms

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
PNF126-Eric Hebert-10/05/2019						
1	10/5/2019	DAS	Campbell	illegible	CR3000	3817
2	10/5/2019	Ozone	ThermoElectron Inc	000741	49i A1NAA	1105347316
3	10/5/2019	Ozone Standard	ThermoElectron Inc	000363	49i A3NAA	0726124691
4	10/5/2019	Zero air pump	Werther International	06885	C 70/4	000814270
5	10/5/2019	Zero air pump	Teledyne	000774	701H	610

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347316	PNF126	Eric Hebert	10/05/2019	Ozone	000741

Slope:	1.00778	**Slope:**	0.00000
Intercept	-1.06583	**Intercept**	0.00000
CorrCoff:	1.00000	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180030022	**Tfer Desc.**	Ozone primary stan
Tfer ID	01114		
Slope	0.99840	**Intercept**	0.27090
Cert Date	6/11/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.37	0.09	-0.97	ppb		-1.06
primary	2	13.09	12.83	11.78	ppb		-1.05
primary	3	35.48	35.26	34.46	ppb	-2.29	
primary	4	67.99	67.82	67.46	ppb	-0.53	
primary	5	117.93	117.84	117.60	ppb	-0.2	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	-0.40	pass
Span	1.003	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	88.9 kHz	pass
Cell A Noise	0.6 ppb	pass
Cell A Flow	0.63 lpm	pass
Cell A Pressure	628.4 mmHg	pass
Cell A Tmp.	36.4 C	pass
Cell B Freq.	117.0 kHz	pass
Cell B Noise	0.9 ppb	pass
Cell B Flow	0.68 lpm	pass
Cell B Pressure	627.4 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
SPD111-Sandy Grenville-11/06/2019						
1	11/6/2019	DAS	Campbell	000342	CR3000	2121
2	11/6/2019	Ozone	ThermoElectron Inc	000742	49i A1NAA	1105347313
3	11/6/2019	Ozone Standard	ThermoElectron Inc	000437	49i A3NAA	CM08200013
4	11/6/2019	Zero air pump	Werther International	06928	C 70/4	000822222

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347313	SPD111	Sandy Grenville	11/06/2019	Ozone	000742

Slope:	0.99213	**Slope:**	0.00000
Intercept	-1.02793	**Intercept**	0.00000
CorrCoff:	0.99988	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180930075	**Tfer Desc.**	Ozone primary stan
Tfer ID	01115		
Slope	1.00800	**Intercept**	-0.40210
Cert Date	3/26/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.22	0.61	-0.78	ppb		-1.39
primary	2	15.29	15.56	14.32	ppb		-1.24
primary	3	36.50	36.60	35.30	ppb	-3.62	
primary	4	66.30	66.17	65.70	ppb	-0.71	
primary	5	109.10	108.63	106.10	ppb	-2.36	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.000	pass
Span	1.005	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	96.8 kHz	pass
Cell A Noise	0.9 ppb	pass
Cell A Flow	0.68 lpm	pass
Cell A Pressure	684.1 mmHg	pass
Cell A Tmp.	31.5 C	pass
Cell B Freq.	110.7 kHz	pass
Cell B Noise	0.6 ppb	pass
Cell B Flow	0.67 lpm	pass
Cell B Pressure	685.3 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
BEL116-Korey Devins-11/18/2019						
1	11/18/2019	DAS	Campbell	000341	CR3000	2120
2	11/18/2019	Ozone	ThermoElectron Inc	000684	49i A1NAA	1030244795
3	11/18/2019	Ozone Standard	ThermoElectron Inc	000373	49i A3NAA	0726124685
4	11/18/2019	Zero air pump	Werther International	06913	C 70/4	000829178

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244795	BEL116	Korey Devins	11/18/2019	Ozone	000684

Slope:	0.99282	**Slope:**	0.00000
Intercept	-0.54196	**Intercept**	0.00000
CorrCoff:	0.99999	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180030022	**Tfer Desc.**	Ozone primary stan
Tfer ID	01114		
Slope	0.98600	**Intercept**	0.41627
Cert Date	10/29/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.42	0.00	-0.55	ppb		-0.55
primary	2	15.06	14.85	14.12	ppb		-0.73
primary	3	35.61	35.69	35.11	ppb	-1.64	
primary	4	66.84	67.36	66.16	ppb	-1.8	
primary	5	112.15	113.31	112.00	ppb	-1.16	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	-0.60	pass
Span	1.017	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	98.6 kHz	pass
Cell A Noise	0.4 ppb	pass
Cell A Flow	0.61 lpm	pass
Cell A Pressure	708.5 mmHg	pass
Cell A Tmp.	35.6 C	pass
Cell B Freq.	90.3 kHz	pass
Cell B Noise	0.6 ppb	pass
Cell B Flow	0.56 lpm	pass
Cell B Pressure	709.1 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass