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

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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

File location 1 EEMS/transfer/clients/EPA

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	$\leq \pm 10.0\%$ 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	$\leq \pm 0.5$ mps below 5.0 mps input; $\leq \pm 5.0\%$ of input at or above 5.0 mps
Wind Speed	Starting Threshold	Starting torque tested with torque gauge	< 0.5 g-cm
Mass Flow Controller	Flow Rate	Comparison with Primary Standard	≤ ± 5.0% of designated rate
Ozone	Slope	Linear regression of multi-	$0.9000 \le m \le 1.1000$
Ozone	Intercept	point test gas concentration as	-5.0 ppb ≤ b ≤ 5.0 ppb
Ozone Correlation coefficient measured with a certified transfer standard		0.9950 ≤ r	
Ozone	Percent Difference	Comparison with Level 2 standard concentration	$\leq \pm 15.1\%$ of test gas concentration and $\leq \pm 0.003$ 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		de ID Audit Type Sponsor Site Vis		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	Side ID Audit Type		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	FSA EPA		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	Side ID PE Audit Type		Site Visit Date	Station Name
PNF126	PNF126 O ₃ and NO _y EP		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	<u>Network</u>	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
ОН09	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
ОН99	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

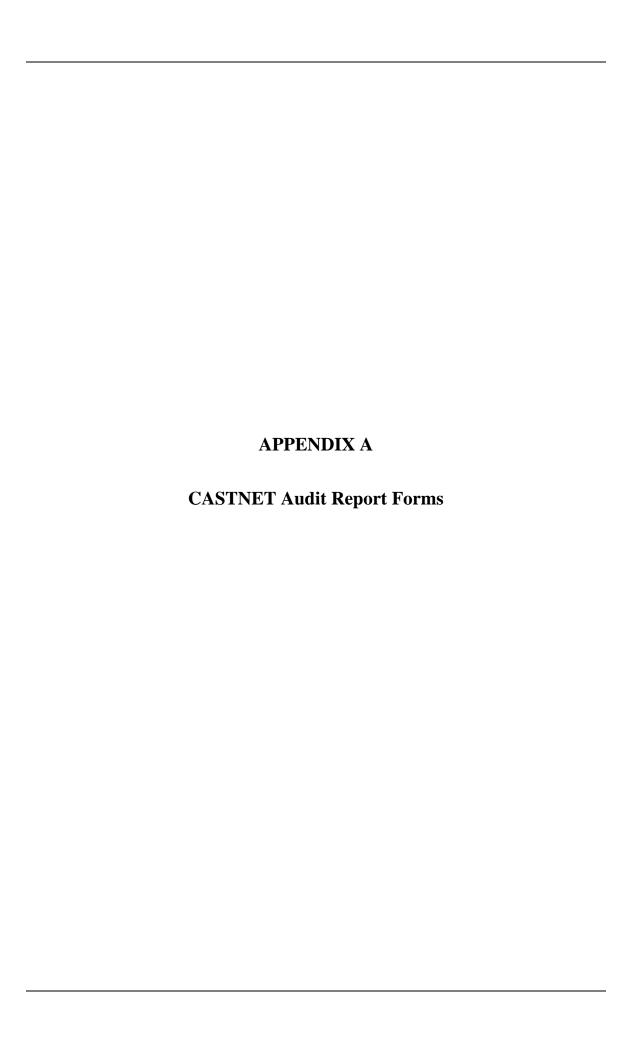
Side ID	Network	Visit Date	Station Name
IL46	AMoN	12/16/2019	Alhambra
KY98	AMoN	12/17/2019	Cadiz
NC06	AMoN	12/17/2019	Beaufort

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.



Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
GRS-	420-Eric H	lebert-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	В	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 0.13 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg **Environmental Sys** A4115K **GRS420** Eric Hebert 10/07/2019 DAS Primary Das Date: 10/7 /2019 **Audit Date** 10/7 /2019 Fluke **Parameter** DAS Mfg 11:57:08 **Das Time:** 11:57:00 **Audit Time** 95740135 Tfer Desc. DVM **Serial Number** Das Day: 280 **Audit Day** 280 Tfer ID 01311 **High Channel: Low Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0001 0.0002 0.0001 0.0002 1/25/2019 1.00000 **Cert Date** CorrCoff Datel Parameter DAS Mfg **Serial Number** 15510194 Tfer Desc. Source generator (D 01320 Tfer ID 1.00000 0.00000 Slope Intercept 2/13/2012 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 2 V 0.0000 0.0000 0.0000 0.00002 0.0999 0.0998 V V -0.0001 0.1000 2 0.3000 0.2998 0.2996 V V -0.0002 2 V V 0.5000 0.4996 0.4995 -0.0001 V V 2 0.7000 0.6995 0.6995 0.0000 2 V V 0.9000 0.8994 -0.0001 0.8993 2 1.0000 0.9992 0.9992 V V 0.0000

Flow Data Form

Mykrolis	AV	V951005	6	RS420	Eric	: Hebert	10/07/2019	Flow R	ate	none
Mfg	Mykroli	s			I	Mfg	Pa	arameter Flo	ow Rate	
SN/Owner ID	FP9510	0004	none		5	Serial Number	148613	T	fer Desc. Blo	OS 220-H
514/Owner ID							04.404			
Parameter: MFC power supply				Γfer ID	01421					
						Slope	1.	.00000 Inte	rcept	0.00000
					(Cert Date	3/4	4/2019 Cor	rCoff	1.00000
DAS 1:			DAS 2:		L	Cal Factor Z	ero	-0.06	52	
A Avg % Diff:	A Max	% Dif	A Avg %D	iff A Max	% Dif	Cal Factor F		5.08	31	
2.64%		2.77%				Rotometer R	eading:	3.0	05	
Desc.	Test	type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit (OutputSignal	I PctDifference
primary	pump o	off	0.000	0.000	0.05	0.0000	-0.09	1/m	1/m	
primary	leak ch	eck	0.000	0.000	0.58	0.0000	0.20	1/m	l/m	
primary	test pt 1	1	2.919	2.920	3.00	0.0000	3.00	1/m	l/m	2.74%
primary	test pt 2	2	2.922	2.920	2.99	0.0000	3.00	1/m	l/m	2.77%
primary	test pt 3	3	2.930	2.930	2.99	0.0000	3.00	1/m	l/m	2.42%
Sensor Comp	onent	eak Test	t		Condition	1		Status	Fail	
Sensor Comp	onent	ubing Co	ondition		Condition	Good		Status	pass	
Sensor Comp	onent F	Filter Position		Condition	n Fair		Status pass			
Sensor Comp	onent R	Rotometer Condition		Condition	n Clean and dry		Status pass			
Sensor Comp	onent N	Moisture Present		Condition	No moisture present		Status pass			
Sensor Comp	onent F	Filter Distance		Condition	n 5.5 cm		Status	Status pass		
Sensor Component Filter Depth		oth		Condition	Condition 0.0 cm		Status pass		pass	
Sensor Component Filter Azimuth		Condition	on 315 deg		Status	Status pass				
Sensor Component System Memo		Condition	ion See comments		Status pass					

Ozone Data Form

Mfg	Serial Numbe	r Tag Site	T	echnician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1023943903	GRS420) E	Eric Hebert	10/07/2019	Ozone	none
Intercept -0		rcept	0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180030022 01114		meter ozone Desc. Ozone primary stan
DAS 1:	D	AS 2:				40 -	0.07000
A Avg % Diff: A M			Max % Dif	Slope	0.9984	40 Interce	pt 0.27090
0.0%	0.0%			Cert Date	6/11/20	19 CorrCo	off 1.00000
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	
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		.17
primary	5	114.49	114.40	113.50	ppb		0.79
Sensor Componer	nt Sample Trai	n	Condi	tion Good		Status pa	SS
Sensor Componer	22.5 degree	rule	Condi	tion		Status pa	ss
Sensor Componer	Inlet Filter C	ondition	Condi	tion Clean		Status pa	SS
Sensor Componer	Battery Back	кир	Condi	tion N/A		Status pa	ss
Sensor Componer	offset Offset		Condi	0.000		Status pa	ss
Sensor Componer	Span		Condi	0.999		Status pa	ss
Sensor Componer	Zero Voltage	9	Condi	-0.0002		Status pa	ss
Sensor Componer	Fullscale Vo	ltage	Condi	0.9996		Status pa	ss
Sensor Componer	Cell A Freq.		Condi	tion 75.7 kHz		Status pa	ss
Sensor Componer	cell A Noise	!	Condi	tion 0.9 ppb		Status pa	ss
Sensor Componer	Cell A Flow		Condi	tion 0.65 lpm		Status pa	ss
Sensor Componer	cell A Press	ure	Condi	tion 685.2 mmHg		Status pa	ss
Sensor Componer	Cell A Tmp.		Condi	31.7 C		Status pa	SS
Sensor Componer	Cell B Freq.		Condi	tion 81.1 kHz		Status pa	ss
Sensor Componer	Cell B Noise		Condi	tion 0.9 ppb		Status pa	ss
Sensor Componer	Cell B Flow		Condi	tion 0.69 lpm		Status pa	ss
Sensor Componer	Cell B Press	sure	Condi	tion 685.8 mmHg		Status pa	ss
Sensor Componer	Cell B Tmp.			tion N/A		Status pa	SS
Sensor Componer	Line Loss		Condi	Not tested		Status pa	SS
Sensor Componer	System Men	no	Condi	tion		Status pa	ss

2 Meter Temperature Data Form Calc. Difference **Serial Number Tag Site Technician** Site Visit Date Parameter Mfg **Owner ID** GRS420 10/07/2019 RM Young 7297 Eric Hebert Temperature2meter none Mfg Extech Parameter Temperature Tfer Desc. RTD **Serial Number** H232734 01227 Tfer ID **Slope** 1.00733 **Intercept** 0.14497 **DAS 1: DAS 2:** 2/12/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.18 0.29 Difference InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit UseDescription Test type primary Temp Low Rang 0.33 0.18 0.0000 0.47 C 0.29 21.39 21.09 0.0000 21.00C -0.09 primary Temp Mid Range primary Temp High Rang 46.97 46.48 0.0000 46.31C -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 Status pass **Condition** N/A Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** 10/07/2019 ARS GRS420 Eric Hebert Shelter Temperature none none **DAS 1: DAS 2:** Mfg Extech **Parameter** Shelter Temperature **Abs Avg Err** Abs Max Err **Abs Avg Err Abs Max Err** Tfer Desc. RTD H232734 **Serial Number** 0.30 0.35 01227 Tfer ID 1.00733 0.14497 **Slope** Intercept 2/12/2019 1.00000 **Cert Date** CorrCoff UseDesc. Test type InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference primary Temp Mid Range 22.09 21.79 0.000 22.1 \mathbf{C} 0.35 21.82 C Temp Mid Range 21.52 0.000 21.8 0.26 primary Condition Sensor Component System Memo **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	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 P	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 Visit Date 10/07/2019 GRS420 Technician Eric Hebert Site ID Blockhouse **USGS Map NPS** Site Sponsor (agency) Map Scale **NPS Operating Group Map Date** 47-009-0101 AQS# R.M. Young **Meteorological Type** Air Pollutant Analyzer Ozone, Hg, SO2, NOx, PM2.5, PM10, **QAPP** Latitude 35.6331 -83.9422 **Deposition Measurement QAPP** Longitude 793 **Land Use** woodland - mixed **QAPP Elevation Meters** Terrain complex (ridge-top) **QAPP Declination** No Conforms to MLM **OAPP Declination Date** 35.633482 **Site Telephone Audit Latitude** Look Rock -83.941606 Site Address 1 **Audit Longitude** Site Address 2 Foothills Parkway **Audit Elevation** 801 Blount 5.5 **County Audit Declination** Maryville, TN City, State **Present** Fire Extinguisher 37803 inspected Sept 2019 Zip Code Eastern Time Zone **First Aid Kit ✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **V Climbing Belt** Primary Op. E-mail **V Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 (s/n 2961-1) Ekto **Shelter Size** 640 cuft **✓** Notes **Shelter Clean** The shelter is in good condition, clean, neat, and well organized. **✓** Notes Site OK

From Maryville proceed east on 321 and turn right (south) onto the Foothills Parkway. Continue approximately 11

gate. The site is approximately 200 meters up the trail on the right.

miles. Just before reaching the Look Rock parking area and trail, turn right on a gravel road through a locked NPS

Driving Directions

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 \Box

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.

Fi	eld Systems Data Form		F-02058-1500-S3-rev002			
Site	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?	V	N/A			
8	Is the rain gauge plumb?	✓	N/A			
9	Is it sited to avoid sheltering effects from buildings, trees, towers, etc?	V	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			
	ovide any additional explanation (photograph or sketch if neces ural or man-made, that may affect the monitoring parameters		y) regarding conditions listed above, or any other features,			

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

Fi	eld Systems Data Form		F-02058-1500-S4-rev002
Sit	e 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?	✓	
	vide any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:		regarding conditions listed above, or any other features,

Fi	eld Systems Data Form		F-02058-1500-S5-rev002
Site	GRS420 Technician Eric Hebert		Site Visit Date 10/07/2019
	Siting Criteria: Are the pollutant analyzers and deposition eq	uipı	nent 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	l ma	intenance
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?	✓	
Prov natu	ride any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	sary)	regarding conditions listed above, or any other features,

Field Systems Data Form F-02058-1500-S6-rev002 Site ID GRS420 Technician Eric Hebert Site Visit Date 10/07/2019 DAS, sensor translators, and peripheral equipment operations and maintenance Do the DAS instruments appear to be in good condition and well maintained? **✓** Are all the components of the DAS operational? (printers, modem, backup, etc) Met sensors only Do the analyzer and sensor signal leads pass through lightning protection circuitry? **✓** Are the signal connections protected from the weather and well maintained? **✓** Are the signal leads connected to the correct DAS channel? Are the DAS, sensor translators, and shelter properly **~** grounded? **✓** Does the instrument shelter have a stable power source? **~** Is the instrument shelter temperature controlled? Grounded **Stable** Is the met tower stable and grounded? **V V** Is the sample tower stable and grounded? **V V** Sample tower grounded to shelter, and slightly bent at hinge. 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 GRS420 Technician Eric Hebert Site Visit Date 10/07/2019 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No Yes N/A Yes No N/A **V V** Wind speed sensor **Data logger V** ✓ П Wind direction sensor Data logger **V** ✓ П **Temperature sensor** Strip chart recorder ~ П **V** Relative humidity sensor Computer **V V Solar radiation sensor** Modem **V ~ Printer Surface wetness sensor V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V ~ Humidity sensor translator Surge protector ✓** П \checkmark П **UPS Solar radiation translator** П **✓ V** Tipping bucket rain gauge Lightning protection device ~ **V Shelter heater** Ozone analyzer **V** \checkmark Filter pack flow controller Shelter air conditioner Filter pack MFC power supply ✓ Does the site have the required and most recent QC documents and report forms? **Present Current Station Log ✓ V** Dataview **SSRF V ✓ V V Site Ops Manual V V HASP V Field Ops Manual V 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 Flow & observation sections Are the Site Status Report Forms being completed and current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

Field Systems Data Form F-02058-1500-S8-rev002 GRS420 Technician Eric Hebert Site Visit Date 10/07/2019 Site ID Site operation procedures Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency** Compliant **✓ V** Semiannually **Multipoint Calibrations V V** Weekly **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** Monthly **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? Compliant **QC Check Performed** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** Weekly Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests V Manual Precision Level Test V V** Alarm values only **Analyzer Diagnostics Tests V** Weekly **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Sample Line Check for Dirt/Water Weekly **~ V** As needed **Zero Air Desiccant Check ✓** Do multi-point calibration gases go through the complete sample train including all filters? **✓** Do automatic and manual z/s/p gasses go through the complete sample train including all filters? ✓ Dataview Are the automatic and manual z/s/p checks monitored and reported? If yes, how? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

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

Field Systems Data Form					F-02058-1500-S9-rev002			
Site	e ID	GRS420 Te	chnician E	ric Hebert		Site Visit Date	10/07/2019	
	Site ope	ration procedures						
1	Is the fil	ter pack being changed even	y Tuesday	as scheduled?	✓	Filter changed mori summer	nings in winter, changed in afternoon in	
2	Are the correctly	Site Status Report Forms boy?	eing comple	ted and filed				
3	Are data	a downloads and backups beed?	eing perforr	med as		No longer required		
4	Are gen	eral observations being mad	e and recor	ded? How?	✓	SSRF		
5	Are site	supplies on-hand and reple	nished in a	timely	✓			
6	Are sam	ple flow rates recorded? Ho	ow?		✓	SSRF		
7	Are sam	ples sent to the lab on a reg	ular schedu	le in a timely	✓			
8		ers protected from contamin oping? How?	ation durin	g handling	✓	Clean gloves on an	d off	
9		site conditions reported reg ons manager or staff?	ularly to the	e field				
QC	Check Po	erformed	Freque	ency			Compliant	
N	Multi-poii	nt MFC Calibrations	✓ Semiar	nually			✓	
I	Flow Syste	em Leak Checks	✓ Weekly	1			\checkmark	
I	Filter Pac	k Inspection	✓ Weekly	1			\checkmark	
I	Flow Rate	Setting Checks	✓ Weekly	1			✓	
1	Visual Ch	eck of Flow Rate Rotometer	✓ Weekly	/			\checkmark	
I	In-line Fil	ter Inspection/Replacement	✓ As nee	ded			✓	
5	Sample Li	ne Check for Dirt/Water	✓ Weekly	/			\checkmark	
		dditional explanation (phot n-made, that may affect the			sary) regarding conditi	ions listed above, or any other features,	

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	В	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
MAC	C426-Eric I	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	В	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 0.73 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Eric Hebert **Environmental Sys** unknown4 MAC426 10/17/2019 DAS Primary Das Date: 10/17/2019 **Audit Date** 10/17/2019 Fluke **Parameter** DAS Mfg 10:46:00 Das Time: 10:45:16 **Audit Time** 95740135 Tfer Desc. DVM **Serial Number** Das Day: 290 **Audit Day** 290 Tfer ID 01311 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0000 0.0000 0.0001 0.0001 1/25/2019 1.00000 **Cert Date** CorrCoff Datel Parameter DAS Mfg **Serial Number** 15510194 Tfer Desc. Source generator (D 01320 Tfer ID 1.00000 0.00000 **Slope** Intercept 2/13/2012 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference V 1 0.0000 0.0000 0.0000 0.0000 1 0.1000 0.0998 0.0999 V V 0.0001 1 0.3000 0.2997 0.2997 V V 0.0000V V 1 0.5000 0.4996 0.4996 0.0000 V V 1 0.7000 0.6995 0.6995 0.0000 V V 1 0.9000 0.8994 -0.0001 0.8993 1 1.0000 0.9992 0.9992 V V 0.0000

Flow Data Form

ylan	A'	W022130	005	MAC426	Erio	c Hebert	10/17/2019	Flow R	ate	none
Mfg	Tylan					Mfg	BIOS	P	arameter Flo	ow Rate
SN/Owner ID	illegibl	e	03677			Serial Number	148613	T	fer Desc. Bl	OS 220-H
		ower sup			,	Tfer ID	01421			
Parameter:	IVII-C F	ower sup	ріу						Г	
						Slope	1.	00000 Inte	ercept	0.00000
						Cert Date	3/4	1/2019 Cor	rCoff	1.00000
OAS 1:			DAS 2:		L	Cal Factor Z	ero	0.03	32	
A Avg % Diff:	A Max	% Dif	A Avg %E	oiff A Max	% Dif	Cal Factor F	ull Scale	10.9	98	
5.03%		5.03%				Rotometer R	eading:	1.6	35	
Desc.	Tes	st type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSigna	II PctDifference
primary	pump		0.000	0.000	-0.13	0.0000	-0.08	l/m	1/m	
primary	leak c		0.000	0.000	-0.03	0.0000	0.03	l/m	1/m	
primary	test pt		1.594	1.590	1.34	0.0000	1.51	1/m	1/m	-5.03%
primary	test pt		1.594	1.590	1.34	0.0000	1.51	1/m	1/m	-5.03%
primary	test pt		1.593	1.590	1.34	0.0000	1.51	1/m	1/m	-5.03%
Sensor Comp	onent	Leak Tes	t		Condition	n		Status	pass	
Sensor Comp	onent	Tubing C	ondition		Condition	n Good		Status	pass	
Sensor Comp	onent	Filter Pos	ition		Condition	n Poor		Status	Fail	
Sensor Comp	onent	Rotomete	er Condition		Condition	n Clean and dry		Status	pass	
Sensor Comp	onent	Moisture	Present		Condition	n See comments	<u> </u>	Status	pass	
Sensor Comp	onent	Filter Dist	ance		Condition	7.0 cm		Status	pass	
Sensor Comp	onent	Filter Dep	oth		Condition	n -2.0 cm		Status	Fail	
Sensor Comp	onent	Filter Azir	muth		Condition	Not tested		Status	pass	
Sensor Comp	_				Condition	n		Status	pass	

Ozone Data Form

Mfg	Serial Numbe	r Tag Site	Т	echnician	Site Visit Date	Paramete	er Owner ID
ThermoElectron Inc	1030745085	MAC426	S	Eric Hebert	10/17/2019	Ozone	none
Intercept		rcept	0.00000 0.00000 0.00000	Mfg Serial Number	ThermoElectron		nameter ozone Desc. Ozone primary stan
				Tfer ID	01114		
DAS 1:		AS 2:	3.5 0/ D10	Slope	0.9984	40 Interc	ept 0.27090
A Avg % Diff: A M 0.0%	0.0% A	Avg %Diff A	Max % Dif	Cert Date	6/11/20	19 CorrC	1.00000
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerD	if 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 Componer	nt Sample Trai	n	Condi	tion Good		Status P	ass
Sensor Componer	nt 22.5 degree	rule	Condi	tion		Status p	ass
Sensor Compone	nt Inlet Filter C	ondition	Condi	tion Moderately cle	ean	Status p	ass
Sensor Compone	nt Battery Back	кир	Condi	tion N/A		Status p	ass
Sensor Componer	nt Offset		Condi	tion -3.1		Status p	ass
Sensor Componer	nt Span		Condi	1.005		Status p	ass
Sensor Compone	Zero Voltage	Э	Condi	tion N/A		Status p	ass
Sensor Compone	Fullscale Vo	ltage	Condi	tion N/A		Status p	ass
Sensor Compone	Cell A Freq.		Condi	tion 122.4 kHz		Status p	ass
Sensor Compone	Cell A Noise	•	Condi	tion 0.9 ppb		Status p	ass
Sensor Compone	Cell A Flow		Condi	tion 0.78 lpm		Status p	ass
Sensor Compone	Cell A Press	sure		tion 731.2 mmHg		Status p	ass
Sensor Compone	Cell A Tmp.			tion 34.0 C		Status p	
Sensor Componer	Cell B Freq.			tion 99.3 kHz		Status p	
Sensor Componer	Cell B Noise	,		tion 0.6 ppb		Status p	
Sensor Componer	Cell B Flow		Condi	tion 0.78 lpm		Status p	ass
Sensor Compone		sure		730.6 mmHg		Status p	
Sensor Compone				tion N/A		Status P	
Sensor Compone				tion < 1 %		Status P	
Sensor Compone	nt System Mer	no	Condi	tion		Status p	ass

2 Meter Temperature Data Form Calc. Difference **Serial Number Tag Site Technician** Site Visit Date Parameter Mfg **Owner ID** 10/17/2019 RM Young 15104 MAC426 Eric Hebert Temperature2meter none Mfg Extech Parameter Temperature Tfer Desc. RTD **Serial Number** H232734 01227 Tfer ID **Slope** 1.00733 **Intercept** 0.14497 **DAS 1: DAS 2:** 2/12/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err CorrCoff **Cert Date** 0.22 0.57 InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit Difference UseDescription Test type primary Temp Low Rang 0.20 0.05 0.0000 0.62 C 0.57 27.28 0.0000 26.87 C -0.07 primary Temp Mid Range 26.94 primary Temp High Rang 48.29 47.79 0.0000 47.82C 0.03 Sensor Component Properly Sited **Condition** Properly sited **Status** pass **Condition** Moderately clean Sensor Component Shield **Status** pass Sensor Component Blower **Condition** Functioning **Status** pass **Sensor Component** Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** 10/17/2019 ARS MAC426 Eric Hebert Shelter Temperature 60 none **DAS 1: DAS 2:** Mfg Extech **Parameter** Shelter Temperature **Abs Avg Err** Abs Max Err **Abs Avg Err Abs Max Err** Tfer Desc. RTD H232734 **Serial Number** 0.32 0.53 01227 Tfer ID 1.00733 0.14497 **Slope** Intercept 2/12/2019 1.00000 **Cert Date** CorrCoff UseDesc. Test type InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference primary Temp Mid Range 26.18 25.85 0.000 25.7 \mathbf{C} -0.11 C Temp Mid Range 25.31 24.98 0.000 25.5 0.53 primary Sensor Component System Memo Condition **Status** pass

Infrastructure Data For

Si	te ID	MAC426	Technician	Eric Hebert Site Visit Date 10/17/2019	
	Shelter M	ake	Shelter Model	Shelter Size	
	custom		N/A	1536 cuft	
	ATTACA BATTACA BASTA	MERCHANIA TANDAN	SAN DESPRESENTANTANTAN		

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	l Problem
Flow Rate	MAC426	Eric Hebert	10/17/2019	Moisture Present	Tylan	4410		
The filter sample tubing	has drops of mo	isture in low section	ns outside the sh	elter.				

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 Visit Date 10/17/2019 MAC426 Technician Eric Hebert Site ID Rhoda **USGS Map NPS** Site Sponsor (agency) Map Scale **NPS Operating Group Map Date** 21-061-0501 AQS# Climatronics **Meteorological Type** Air Pollutant Analyzer Ozone, SO2, NOy, Hg, IMPROVE, PM **QAPP** Latitude 37.2806 dry, wet, Hg -86.2639 **Deposition Measurement QAPP** Longitude 236 **Land Use** agriculture, woodland - mixed **QAPP Elevation Meters** 3 Terrain rolling **QAPP Declination** Marginally 12/27/2004 Conforms to MLM **OAPP Declination Date** (270) 758-2136 37.131794 **Site Telephone Audit Latitude** Alfred Cook Road -86.142953 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 230 Edmonson -4.0 **County Audit Declination** Smiths Grove, KY City, State **Present** Fire Extinguisher 42171 inspected March 2011 Zip Code **V** Eastern First Aid Kit Time Zone **Primary Operator Safety Glasses Safety Hard Hat** Primary Op. Phone # **V Climbing Belt** Primary Op. E-mail **V Security Fence Backup Operator V Secure Shelter** Backup Op. Phone # Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model N/A custom **Shelter Size** 1536 cuft **✓** Notes The shelter is well maintained, clean, neat, and well organized. **Shelter Clean ✓** Notes Site OK From Bowling Green go east on 31W. Turn left (north) on 442 toward Pig. At the stop sign in Pig, turn right on route **Driving Directions**

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.

Fi	eld Sy	stems Data Fo	orm				F-020	58-1	500-S3-	rev002
Site	e ID	MAC426	Technician	Eric Hebert		Site Visit Date	10/17/2019			
1		d speed and direction fluenced by obstruction		as to avoid	✓	N/A				
2	(i.e. win	d sensors mounted so d sensors should be m tally extended boom > to the prevailing wind	ounted atop the 2x the max diar	e tower or on a	✓	N/A				
3	Are the	tower and sensors plu	mb?		✓	N/A				
4		temperature shields p diated heat sources su		•	✓					
5	conditio surface	perature and RH sens ns? (i.e. ground below and not steeply sloped g water should be avoi	sensors should Ridges, hollov	be natural	✓					
6	Is the so	lar radiation sensor p	lumb?		✓	N/A				
7	Is it site	d to avoid shading, or	any artificial o	r reflected light?	✓	N/A				
8	Is the ra	in gauge plumb?			✓	N/A				
9	Is it site towers,	d to avoid sheltering e	ffects from buil	ldings, trees,	✓	N/A				
10	Is the su facing n	rface wetness sensor sorth?	sited with the gr	rid surface	✓	N/A				
11	Is it inc	lined approximately 3	0 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:

Fi	eld Systems Data Form	F-02058-1500-S4-rev002				
Site	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?					
	ide any additional explanation (photograph or sketch if necestral or man-made, that may affect the monitoring parameters	ssary) regarding conditions listed above, or any other features, :				

		F-02058-1500-85-rev002			
MAC426 Technician Eric Hebert		Site Visit Date 10/17/2019			
Siting Criteria: Are the pollutant analyzers and deposition eq	uipr	nent sited in accordance with 40 CFR 58, Appendix E			
	✓				
Are the sample inlets 3 - 15 meters above the ground?	✓				
	✓				
Pollutant analyzers and deposition equipment operations and	l mai	intenance			
	✓				
	✓				
Describe ozone sample tube.		1/4 teflon by 10 meters			
Describe dry dep sample tube.		3/8 teflon by 12 meters			
	✓	At inlet only			
	✓				
Is the zero air supply desiccant unsaturated?	✓				
Are there moisture traps in the sample lines?	✓				
ranga kanangan dan	✓	Clean and dry			
	Do the sample inlets have at least a 270 degree arc of unrestricted airflow? Are the sample inlets 3 - 15 meters above the ground? Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees?	Are the sample inlets 3 - 15 meters above the ground? Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and main analyzers and equipment appear to be in good condition and well maintained? Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. Describe dry dep sample tube. Are in-line filters used in the ozone sample line? (if yes indicate location) Are sample lines clean, free of kinks, moisture, and obstructions? Is the zero air supply desiccant unsaturated? Are there moisture traps in the sample lines? Is there a rotometer in the dry deposition filter line, and is it			

Field Systems Data Form F-02058-1500-S6-rev002 MAC426 Technician Eric Hebert Site Visit Date 10/17/2019 Site ID DAS, sensor translators, and peripheral equipment operations and maintenance Do the DAS instruments appear to be in good condition and well maintained? **V** Are all the components of the DAS operational? (printers, modem, backup, etc) Met sensors only Do the analyzer and sensor signal leads pass through lightning protection circuitry? **✓** Are the signal connections protected from the weather and well maintained? **✓** Are the signal leads connected to the correct DAS channel? Are the DAS, sensor translators, and shelter properly **~** grounded? **✓** Does the instrument shelter have a stable power source? **✓** Is the instrument shelter temperature controlled? Grounded Stable Is the met tower stable and grounded? **V ✓** Is the sample tower stable and grounded? **V V** 11 Tower comments?

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

Field Systems Data Form F-02058-1500-S7-rev002 MAC426 Technician Eric Hebert Site Visit Date 10/17/2019 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No Yes N/A Yes No N/A **V V** Wind speed sensor **Data logger V** ✓ П Wind direction sensor Data logger **V** ✓ П **Temperature sensor** Strip chart recorder **V** П **V** Relative humidity sensor Computer **V V Solar radiation sensor Modem** П **V** П **~ Printer Surface wetness sensor V** П **V** Wind sensor translator Zero air pump \checkmark **V** Filter flow pump **Temperature translator** П **V V Humidity sensor translator Surge protector V** П **V UPS Solar radiation translator V V** Tipping bucket rain gauge Lightning protection device ~ **V Shelter heater** Ozone analyzer **V ✓** Filter pack flow controller Shelter air conditioner Filter pack MFC power supply **✓** Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V** DataView2 **SSRF V ✓ V V Site Ops Manual HASP Field Ops Manual Calibration Reports V V** Ozone z/s/p Control Charts Preventive maintenance schedule 1 Is the station log properly completed during every site visit? ✓ DataView Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site I	MAC426	Technician	Eric Hebert		Site Visit Date 10/17/2	2019	
1	Site operation procedures Has the site operator attendourse? If yes, when and when the site of the sit		STNET trainir	ıg 🗸	Receives training every 6 n	nonths during ca	alibration visits
2	Has the backup operator at training course? If yes, whe	tended a forma		✓	Receives training every 6 n	nonths during ca	alibration visits
3 I	Is the site visited regularly oschedule?			✓			
	Are the standard CASTNET followed by the site operato		ocedures being	✓			
5 I	Is the site operator(s) knowle the required site activities? (edgeable of, and including docur	l able to performentation)	m 🗹			
<u> 4</u>	Are regular operational QA	QC checks per	formed on mete	<u>orolo</u>	gical instruments?		
QC (Check Performed		Frequenc	y		Compliant	
Mult	tipoint Calibrations	[Semiannu	ally		✓	
Visua	al Inspections]	Weekly			✓	
Tran	aslator Zero/Span Tests (clin	natronics)	N/A			\checkmark	
Man	ual Rain Gauge Test	[✓ Monthly			\checkmark	
Conf	firm Reasonableness of Cur	ent Values	Weekly			✓	
Test	Surface Wetness Response]	√ N/A			✓	
<u> 4</u>	Are regular operational QA	QC checks per	formed on the o	zone	analyzer?		
QC	Check Performed		Frequenc	y		Compliant	
Mult	ti-point Calibrations	[✓ Semiannu	ally		✓	
Auto	matic Zero/Span Tests	[✓ Daily			✓	
Man	ual Zero/Span Tests	[✓ Monthly			✓	
Auto	matic Precision Level Tests	[✓ Daily			✓	
Man	ual Precision Level Test	[N/A			✓	
Anal	yzer Diagnostics Tests	[✓ Alarm valu	es on	ly	\checkmark	
In-lir	ne Filter Replacement (at in	let)	✓ Monthly			✓	
In-lir	ne Filter Replacement (at ar	alyze	N/A			✓	
Samp	ple Line Check for Dirt/Wa	er [₩eekly			✓	
Zero	Air Desiccant Check	[Weekly			✓	
	Do multi-point calibration g sample train including all fil	0	the complete	✓			
2 I	Do automatic and manual z/complete sample train includ	s/p gasses go th	rough the	✓			
3 A	Are the automatic and manureported? If yes, how?		monitored and	✓	DataView		
	de any additional explanational or man-made, that may a				y) regarding conditions lis	ted above, or a	any other features,

Fi	eld Sy	stems Data For	m			F-02058-1500-S9-rev00			
Site	e ID	MAC426	Technici	an Eric Heb	ert	Site Visit Dat	10/17/2019		
	Site ope	ration procedures							
1	Is the fil	ter pack being changed	every Tu	esday as sche	eduled? 🗹	Filter changed var	rious times		
2	Are the correctly	Site Status Report Form	ns being co	ompleted and	d filed 🔽				
3	Are data	a downloads and backuped?	s being p	erformed as		No longer required	d		
4	Are gen	eral observations being	made and	recorded? H	How? ✓	SSRF, logbook			
5	Are site fashion?	supplies on-hand and re	eplenished	in a timely	✓				
6	Are sam	ple flow rates recorded?	? How?		✓	SSRF			
7	Are sam fashion?	ples sent to the lab on a	regular s	chedule in a	timely 🔽				
8		rs protected from contactions:	mination	during hand	lling 🔽	Clean gloves on a	nd off		
9		site conditions reported ons manager or staff?	regularly	to the field					
QC	Check Po	erformed	1	requency			Compliant		
N	Aulti-poir	nt MFC Calibrations	✓ (Semiannually			✓		
F	Flow Syste	em Leak Checks	✓ \	Veekly			✓		
F	ilter Pacl	k Inspection							
F	low Rate	Setting Checks	✓ [Veekly			✓		
1	isual Ch	eck of Flow Rate Rotom	eter 🔽 🛚	Veekly			✓		
I	n-line Fil	ter Inspection/Replacem		Semiannually	and as nee	ded	✓		
S	Sample Li	ne Check for Dirt/Wate	r 🗸 🛚	Veekly			\checkmark		
		dditional explanation (p				y) regarding condi	tions listed above, or a	ny 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

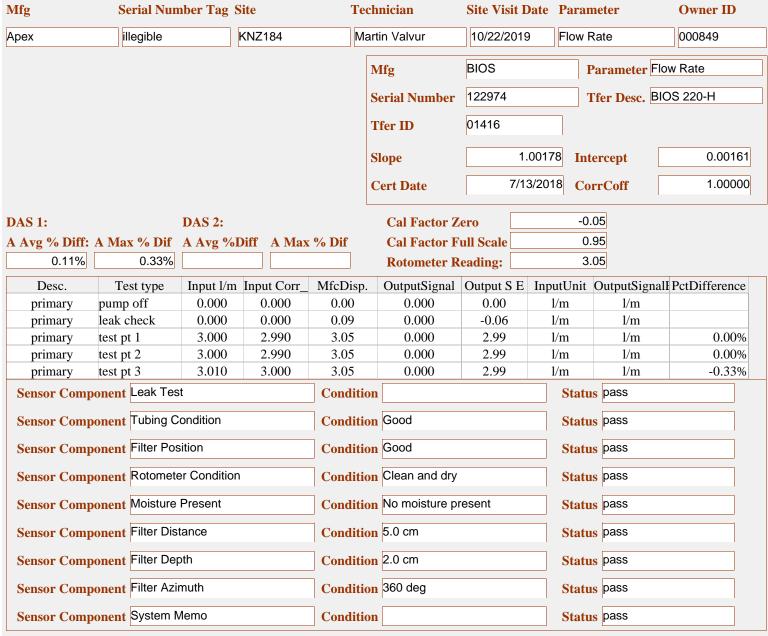
Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	6560 b	5CB1520H70	none
DAS	Environmental Sys Corp	8832	unknown4	none
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18B	070000012920	none
Flow Rate	Tylan	FC280	AW02213005	none
Infrastructure	Infrastructure	none	none	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	В	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
KNZ	Z184-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	В	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 0.08 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2139 KNZ184 Martin Valvur 10/22/2019 DAS Primary Das Date: 10/22/2019 **Audit Date** 10/22/2019 Fluke **Parameter** DAS Mfg 07:26:00 07:26:05 Das Time: **Audit Time** 95740243 Tfer Desc. DVM **Serial Number** Das Day: 295 **Audit Day** 295 Tfer ID 01312 **High Channel: Low Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0001 0.0003 0.0001 0.0003 1/25/2019 1.00000 **Cert Date** CorrCoff ΗY Parameter DAS Mfg **Serial Number** 12010039329 Tfer Desc. Source generator (D 01322 Tfer ID 1.00000 0.00000 **Slope** Intercept 6/15/2014 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 7 V 0.0000 -0.0003 -0.0002 0.0001 7 0.0992 0.0993 V V 0.0001 0.1000 7 0.3000 0.2994 0.2997 V V 0.0003 7 V V 0.5000 0.4994 0.4994 0.0000 V V 7 0.7000 0.6994 0.6992 -0.00027 V V 0.9000 0.8997 -0.0002 0.8995 7 1.0000 0.9992 0.9992 V V 0.0000

Flow Data Form Mfg Serial Number Tag Site Technician Site Visit Date Page



Temperature Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg Martin Valvur 14082 KNZ184 10/22/2019 Temperature 06541 RM Young Mfg Fluke Parameter Temperature Tfer Desc. RTD 3275143 **Serial Number** 01229 Tfer ID **Slope** 0.99989 **Intercept** -0.00649 **DAS 1: DAS 2: Cert Date** 1/23/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err CorrCoff 0.13 0.19 UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference Test type primary Temp Low Range 0.130.14 0.000 -0.1 \mathbf{C} -0.19 C Temp Mid Range 25.32 25.33 0.000 25.2 -0.09 primary 0.000 C primary Temp High Range 47.76 47.77 47.7 -0.11 Status pass **Sensor Component** Shield **Condition** Clean **Sensor Component** Blower Status pass **Condition** N/A Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** KNZ184 Martin Valvur 10/22/2019 Shelter Temperature Campbell none **DAS 1: DAS 2:** Mfg Fluke Parameter Shelter Temperature Abs Avg Err Abs Max Err Abs Avg Err **Abs Max Err** Tfer Desc. RTD 3275143 **Serial Number** 0.72 1.23 01229 **Tfer ID** 0.99989 -0.00649 **Slope** Intercept 1/23/2019 1.00000 **Cert Date** CorrCoff

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	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 Visit Date 10/22/2019 KNZ184 Technician Martin Valvur Site ID Swede Creek **USGS Map EPA** Site Sponsor (agency) Map Scale Kansas State University **Operating Group Map Date** 20-161-9991 AQS# R.M. Young **Meteorological Type** Air Pollutant Analyzer Ozone **QAPP** Latitude 39.1021 -96.6096 dry, wet **QAPP** Longitude **Deposition Measurement** 348 **Land Use** range **QAPP Elevation Meters** gently rolling 4.5 Terrain **QAPP Declination** Yes 01/07/2005 Conforms to MLM **OAPP Declination Date** (785) 770-8426 39.10216 **Site Telephone Audit Latitude** Konza Prairie Lane -96.609583 Site Address 1 **Audit Longitude** CR 901 Site Address 2 **Audit Elevation** 346 4.2 Riley **County Audit Declination** Manhattan, KZ City, State **Present** Fire Extinguisher 66502 No inspection date Zip Code **Time Zone** central First Aid Kit **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **Climbing Belt** Primary Op. E-mail **Backup Operator Security Fence Secure Shelter** Backup Op. Phone # Stable Entry Steps Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model EW1211 (s/n 1WC20 Wells Cargo **Shelter Size** 640 cuft **✓** Notes The shelter is very clean, neat, well organized and well maintained. The shelter floor has **Shelter Clean** deteriorated and is poor condition.

Driving Directions

Site OK

✓ Notes

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		V
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		\checkmark
Secondary road, heavily traveled	500 m		✓
Secondary road, lightly traveled	200 m		✓
Feedlot operations	500 m		✓
Intensive agricultural ops (including aerial spraying)	500 m		✓
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 $\ lacksquare$

Siting Criteria Comment

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

Fi	eld Systems Data Form		F-02058-1500-S3-rev002
Site	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?	V	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:

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? 2 Are all the meteorological sensors operational online, and reporting data? 3 Are the shields for the temperature and RH sensors clean? 4 Are the aspirated motors working? 5 Is the solar radiation sensor's lens clean and free of scratches? 6 Is the surface wetness sensor grid clean and undamaged? 7 Are the sensor signal and power cables intact, in good condition, and well maintained? 8 Are the sensor signal and power cable connections protected from the elements and well maintained? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:
condition, and well maintained? 2 Are all the meteorological sensors operational online, and reporting data? 3 Are the shields for the temperature and RH sensors clean? 4 Are the aspirated motors working? 5 Is the solar radiation sensor's lens clean and free of scratches? 6 Is the surface wetness sensor grid clean and undamaged? 7 Are the sensor signal and power cables intact, in good condition, and well maintained? 8 Are the sensor signal and power cable connections protected from the elements and well maintained? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,
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natural of man-made, that may affect the monitoring parameters.

Martin Valvur Technician Martin Valvur		Site Visit Date 10/22/2019
iting Criteria: Are the pollutant analyzers and deposition eq	uipı	nent sited in accordance with 40 CFR 58, Appendix E
	✓	
re the sample inlets 3 - 15 meters above the ground?	✓	
	✓	
ollutant analyzers and deposition equipment operations and	ma	intenance
	✓	N/A
	✓	N/A
escribe ozone sample tube.		N/A
escribe dry dep sample tube.		3/8 teflon by 12 meters
	✓	N/A
	✓	
the zero air supply desiccant unsaturated?	✓	N/A
re there moisture traps in the sample lines?	✓	
there a rotometer in the dry deposition filter line, and is it ean?	✓	Clean and dry
	to the sample inlets have at least a 270 degree arc of incestricted airflow? The the sample inlets 3 - 15 meters above the ground? The the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? The sample inlets > 1 meter from any major obstruction, and 20 meters from trees? The sample inlets > 1 meter from any major obstruction, and 20 meters from trees? The sample inlets > 1 meter from any major obstruction, and 20 meters from trees? The sample inlets and deposition equipment operations and so the analyzers and equipment appear to be in good on dition and well maintained? The sample in analyzers and monitors operational, on-line, and deporting data? The sample tube. The sample lines clean, free of kinks, moisture, and destructions? The sample lines clean, free of kinks, moisture, and destructions? The there moisture traps in the sample lines? The there moisture traps in the sample lines?	iting Criteria: Are the pollutant analyzers and deposition equipment of the sample inlets have at least a 270 degree arc of increstricted airflow? In the sample inlets 3 - 15 meters above the ground? In the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Collutant analyzers and deposition equipment operations and main to the analyzers and equipment appear to be in good condition and well maintained? In the analyzers and monitors operational, on-line, and exporting data? Collected are the analyzers and monitors operational, on-line, and exporting data? Collected are in-line filters used in the ozone sample line? (if yes necessarily describe dry dep sample tube. Collected are in-line filters used in the ozone sample line? (if yes necessarily described are analyzers and betructions? Collected are the analyzers and deposition filter line, and is it with the sample lines?

Field Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	KNZ184	Technician	Martin Valvur		Site Vis	it Date 10/22/2	2019	
	DAS, se	ensor translators, and	peripheral equi	pment operation	ıs and	l maintena	nce		
1				_	V				
1		DAS instruments appenintained?	ear to be in good	condition and					
2		the components of the , backup, etc)	DAS operation	al? (printers,	✓				
3		analyzer and sensor sig g protection circuitry		through	✓				
4		signal connections pro intained?	otected from the	e weather and	✓				
5	Are the	signal leads connected	l to the correct	DAS channel?	✓				
6	Are the ground	DAS, sensor translatoed?	ors, and shelter	properly	✓				
7	Does th	e instrument shelter h	ave a stable pov	ver source?	✓				
8	Is the in	nstrument shelter temp	oerature control	lled?	✓				
9	Is the n	net tower stable and gr	ounded?			Stable		Grounded	
10	Is the sa	ample tower stable and	l grounded?			✓		✓	
11	Tower	comments?							
Dre	vide ons	v additional explanatio	n (nhotograph d	or skatch if need	ccorr) regardin	g conditions li	sted ahove or o	ny other feetures
		nan-made, that may af				, regaruili	g continuits in	sicu above, of a	my omer reaures,

Field Systems Data Form F-02058-1500-S7-rev002 KNZ184 Technician | Martin Valvur Site Visit Date 10/22/2019 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No N/A Yes Yes No N/A **✓** Wind speed sensor **Data logger V V** Wind direction sensor Data logger ✓ **V Temperature sensor** Strip chart recorder **V V** Relative humidity sensor Computer **V** П **Solar radiation sensor V** Modem П **V V Printer Surface wetness sensor V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V** \checkmark **V Humidity sensor translator Surge protector** П **V V UPS Solar radiation translator ~ V** Tipping bucket rain gauge Lightning protection device ~ **V Shelter heater** Ozone analyzer **V** \checkmark Filter pack flow controller Shelter air conditioner **V** Filter pack MFC power supply □ Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF ✓ V V Site Ops Manual** Oct 2001 **HASP Field Ops Manual Calibration Reports V V** Ozone z/s/p Control Charts Preventive maintenance schedule 1 Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? **~** N/A Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

Field Systems Data Form F-02058-1500-S8-rev002 KNZ184 Site Visit Date 10/22/2019 Site ID Technician Martin Valvur Site operation procedures Has the site operator attended a formal CASTNET training ✓ Trained by previous operator course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET Trained by site operator training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency** Compliant **✓ V** Semiannually **Multipoint Calibrations V V** Weekly **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? Compliant **QC Check Performed Frequency Multi-point Calibrations V** N/A **V** N/A **Automatic Zero/Span Tests V** N/A Manual Zero/Span Tests **V** N/A **Automatic Precision Level Tests V** N/A **Manual Precision Level Test V** N/A **Analyzer Diagnostics Tests V** N/A **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V** N/A Sample Line Check for Dirt/Water **~** N/A **Zero Air Desiccant Check**

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?

✓	N/A
✓	N/A

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

N/A

Field Systems Data Form				F-02058-1500-S9-rev00			
Sit	e ID	KNZ184 Tec	hnician Martin Valvur		Site Visit Date	10/22/2019	
	Site ope	ration procedures					
1	Is the fi	ter pack being changed ever	y Tuesday as scheduled?	V	Filter changed mor	inings	
2	Are the correctl	Site Status Report Forms begy?	ing completed and filed	✓			
3	Are dat	a downloads and backups be ed?	ng performed as		No longer required		
4	Are gen	eral observations being made	e and recorded? How?	✓	SSRF, logbook		
5	Are site fashion	supplies on-hand and replen	ished in a timely	✓			
6	Are san	ple flow rates recorded? How	v?	✓	SSRF, call-in		
7	Are san	uples sent to the lab on a regu	lar schedule in a timely	✓			
8		ers protected from contamina pping? How?	tion during handling	✓	Clean gloves on an	nd off	
9		site conditions reported regu ons manager or staff?	larly to the field	✓			
QC	Check P	erformed	Frequency			Compliant	
]	Multi-poi	nt MFC Calibrations	✓ Semiannually			✓	
]	Flow Syst	em Leak Checks	✓ Weekly			✓	
]	Filter Pac	k Inspection					
]	Flow Rate	Setting Checks	Weekly			✓	
,	Visual Ch	eck of Flow Rate Rotometer	Weekly			\checkmark	
]	In-line Fil	ter Inspection/Replacement	Weekly			\checkmark	
,	Sample Li	ne Check for Dirt/Water	Weekly			✓	
		dditional explanation (photo n-made, that may affect the) regarding condit	ions listed above, or a	ny other features,

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	В	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
SHN	418-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	В	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 **Technician Owner ID** Mfg **Serial Number Tag Site** Site Visit Date Parameter Korey Devins 03942 Tylan AW9605202 SHN418 10/22/2019 flow rate Mfg BIOS Parameter Flow Rate Tylan Mfg 148613 Tfer Desc. BIOS 220-H **Serial Number** FP9404009 03485 **SN/Owner ID** 01421 Tfer ID MFC power supply **Parameter:** 0.00000 **Slope** 1.00000 **Intercept** 3/4/2019 1.00000 CorrCoff **Cert Date** 0 **DAS 1: DAS 2: Cal Factor Zero** 0 A Avg % Diff: A Max % Dif A Avg % Diff A Max % Dif **Cal Factor Full Scale** 1.53% 2.03% 1.7 **Rotometer Reading:** Test type Input l/m Input Corr OutputSignal Output S E InputUnit OutputSignall PctDifference Desc. MfcDisp. primary pump off 0.000 0.0000.28 0.00000.00 1/m1/m0.29 0.0000 0.01 1/mleak check 0.000 0.000 1/mprimary test pt 1 1.523 1.520 1.74 0.00001.50 1/m1/m -1.32% primary 1.74 0.00001.50 1/m-2.03% primary test pt 2 1.528 1.530 1/mtest pt 3 1.522 1.520 1.74 0.00001.50 1/m1/m -1.25% primary 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 Status pass Condition Clean and dry 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 Status pass **Sensor Component** Filter Azimuth Condition 200 deg

Condition

Status pass

Sensor Component System Memo

Ozone Data Form

Mfg	Serial Number	er Tag Site	Te	Γechnician Site Visit 1		Paramete	er Owner ID
ThermoElectron Inc	0903334535	SHN418	B K	Corey Devins	10/22/2019	Ozone	none
Slope:	0.98595 Slop	e: (0.0000	Mfg	ThermoElectron	Inc Para	ameter ozone
•		•	0.00000	Serial Number	1180930075	Tfor	Desc. Ozone primary stan
		•	0.00000	Seriai Number		I lei	Desc. Ozone primary starr
				Tfer ID	01115		
DAS 1:		AS 2:		Slope	1.0080	00 Interc	ept -0.40210
A Avg % Diff: A N		Avg %Diff A	Max % Dif	Cert Date	3/26/20	19 CorrC	Coff 1.00000
0.0%	0.0%				1		
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerD	oif 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 Compone	Sample Tra	in	Condit	ion Good		Status p	pass
Sensor Compone	22.5 degree	rule	Condit	ion		Status p	ass
Sensor Compone	nt Inlet Filter C	ondition	Condit	ion Clean		Status p	ass
Sensor Compone	ent Battery Bac	kup	Condit	ion N/A		Status P	ass
Sensor Compone	Offset		Condit	ion -0.70		Status p	ass
Sensor Compone	ent Span		Condit	ion 1.005		Status p	pass
Sensor Compone	zero Voltag	е	Condit	ion N/A		Status P	ass
Sensor Compone	Fullscale Vo	oltage	Condit	ion N/A		Status P	ass
Sensor Compone	ent Cell A Freq.		Condit	ion 82.9 kHz		Status p	ass
Sensor Compone	ent Cell A Noise)	Condit	ion 1.0 ppb		Status p	ass
Sensor Compone	cent Cell A Flow		Condit	ion 0.71 lpm		Status p	pass
Sensor Compone	ent Cell A Press	sure	Condit	ion 658.0 mmHg		Status p	ass
Sensor Compone	Cell A Tmp.		Condit	ion 33.4 C		Status p	ass
Sensor Compone	Cell B Freq.		Condit	ion 123.8 kHz		Status P	ass
Sensor Compone	Cell B Noise)	Condit	ion 1.2 ppb		Status P	ass
Sensor Compone	Cell B Flow		Condit	ion 0.70 lpm		Status P	pass
Sensor Compone	ent Cell B Press	sure		ion 658.9 mmHg		Status p	pass
Sensor Compone	Cell B Tmp.		Condit	ion N/A		Status P	ass
Sensor Compone	ent Line Loss		Condit	ion Not tested		Status p	ass
Sensor Compone	System Mer	no	Condit	ion		Status P	ass

2 Meter Temperature Data Form Calc. Difference **Serial Number Tag Site Technician** Site Visit Date Parameter Mfg **Owner ID** Korey Devins 10/22/2019 RM Young 14265 SHN418 Temperature2meter none Mfg Extech Parameter Temperature H232734 Tfer Desc. RTD **Serial Number** 01227 Tfer ID **Slope** 1.00733 **Intercept** 0.14497 **DAS 1: DAS 2:** 2/12/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.11 0.13 InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit Difference UseDescription Test type primary Temp Low Rang -0.05 -0.19 0.0000 -0.06 C 0.13 0.0000 26.05 C 0.07 primary Temp Mid Range 26.32 25.98 primary Temp High Rang 47.47 46.98 0.0000 47.11C 0.13 Sensor Component Properly Sited **Condition** Properly sited **Status** pass **Condition** Moderately clean Sensor Component | Shield **Status** pass Sensor Component Blower **Condition** Functioning **Status** pass **Sensor Component** Blower Status Switch **Condition** N/A Status pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** Korey Devins ARS SHN418 10/22/2019 Shelter Temperature none none **DAS 1: DAS 2:** Parameter Shelter Temperature Mfg Extech **Abs Avg Err** Abs Max Err **Abs Avg Err Abs Max Err** Tfer Desc. RTD H232734 **Serial Number** 0.04 0.06 01227 **Tfer ID** 1.00733 0.14497 **Slope** Intercept 2/12/2019 1.00000 **Cert Date** CorrCoff UseDesc. Test type InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference primary Temp Mid Range 24.91 24.58 0.00024.6 \mathbf{C} -0.02

0.000

0.000

24.56

24.52

Condition

Temp Mid Range

Temp Mid Range

Sensor Component System Memo

primary

primary

24.88

24.84

C

C

Status pass

-0.06

-0.04

24.5

24.5

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	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 Visit Date 10/22/2019 SHN418 Technician Korey Devins Site ID Big Meadows **USGS Map** NPS/EPA Site Sponsor (agency) Map Scale **NPS Operating Group Map Date** 51-113-003 AQS# Climatronics **Meteorological Type** Ozone, PM2.5 Air Pollutant Analyzer **QAPP** Latitude dry, wet, Hg, IMPROVE **Deposition Measurement QAPP** Longitude **Land Use** woodland - mixed **QAPP Elevation Meters** Terrain complex **QAPP Declination** No Conforms to MLM **OAPP Declination Date** 38.5231 **Site Telephone Audit Latitude** Shenandoah National Park -78.43471 Site Address 1 **Audit Longitude** 3655 US Hwy 211 East Site Address 2 **Audit Elevation** 1068 Madison -9.9 **County Audit Declination** Luray, VA City, State **Present** Fire Extinguisher 22835 Inspected Oct 2017 Zip Code **✓** Eastern First Aid Kit Time Zone **Primary Operator Safety Glasses Safety Hard Hat** Primary Op. Phone # **V Climbing Belt** Primary Op. E-mail **V Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8814 Ekto **Shelter Size** 896 cuft **✓** Notes The shelter is in good condition, clean and well organized **Shelter Clean ✓** Notes Site OK

Note: arrange for a "EB submaster" key 4 days in advance to be left at Big Meadows Visitor Center. From DC take

first right. Take the gravel road from the parking lot on the left to the site.

460 west to 29N to 33W to Skyline Drive North. Exit into Big Meadows Visitors Center. Go toward lodge and take the

Driving Directions

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 Comn	nent

Field Systems Data Form							F-02058-	-15	00-S3-	rev002
Site	e ID	SHN418	Technician	Korey Devins		Site Visit Date	10/22/2019			
1	Are wine	d speed and direction s	cancare sitad cancar	as to avoid	✓	N/A				
1		fluenced by obstruction		as to avoid						
2	(i.e. wine	d sensors mounted so a d sensors should be mo cally extended boom >2	ounted atop the	tower or on a	✓	N/A				
		to the prevailing wind)								
3	Are the	tower and sensors plur	nb?		✓	N/A				
4		temperature shields po diated heat sources suc			✓					
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)			be natural	✓						
6	Is the so	lar radiation sensor pl	umb?		✓	N/A				
7	Is it sited	d to avoid shading, or a	any artificial o	r reflected light?	~	N/A				
8	Is the ra	in gauge plumb?			✓	N/A				
9	Is it sited towers, o	d to avoid sheltering ef etc?	fects from buil	dings, trees,	✓	N/A				
10	Is the su facing n	rface wetness sensor si orth?	ited with the gr	rid surface	✓	N/A				
11	Is it inc	lined 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:

Fi	eld Systems Data Form		F-02058-1500-S4-rev002
Site	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?	✓	
	ride any additional explanation (photograph or sketch if neces ral or man-made, that may affect the monitoring parameters:		regarding conditions listed above, or any other features,

Fi	eld Systems Data Form		F-02058-1500-S5-rev002			
Site	SHN418 Technician Korey Devins		Site Visit Date 10/22/2019			
	Siting Criteria: Are the pollutant analyzers and deposition eq	<u>uipr</u>	nent 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	ma	intenance			
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			
	ride any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	ary)	regarding conditions listed above, or any other features,			

Field Systems Data Form F-02058-1500-S6-rev002 SHN418 Technician Korey Devins Site Visit Date 10/22/2019 Site ID DAS, sensor translators, and peripheral equipment operations and maintenance Do the DAS instruments appear to be in good condition and well maintained? **V** Are all the components of the DAS operational? (printers, modem, backup, etc) Met sensors only Do the analyzer and sensor signal leads pass through lightning protection circuitry? **✓** Are the signal connections protected from the weather and well maintained? **✓** Are the signal leads connected to the correct DAS channel? Are the DAS, sensor translators, and shelter properly **~** grounded? **✓** Does the instrument shelter have a stable power source? **✓** Is the instrument shelter temperature controlled? Grounded Stable Is the met tower stable and grounded? **V ✓** Is the sample tower stable and grounded? **V V** 11 Tower comments?

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

Field Systems Data Form F-02058-1500-S7-rev002 SHN418 Technician Korey Devins Site Visit Date 10/22/2019 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No Yes N/A Yes No N/A **V V** Wind speed sensor **Data logger V** ✓ П Wind direction sensor Data logger **V** ✓ П **Temperature sensor** Strip chart recorder **V** П **V** Relative humidity sensor Computer **✓ V Solar radiation sensor Modem V V Printer Surface wetness sensor V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V** \checkmark **~ Humidity sensor translator Surge protector ✓ ~ UPS Solar radiation translator ✓ V** Tipping bucket rain gauge **Lightning protection device V ✓ Shelter heater** Ozone analyzer **✓** \checkmark Filter pack flow controller Shelter air conditioner \checkmark Filter pack MFC power supply □ Does the site have the required and most recent QC documents and report forms? **Present Current Station Log ✓ V** Dataview **SSRF V ✓ V V Site Ops Manual V HASP V Field Ops Manual Calibration Reports V ✓** 9/16/2015 Ozone z/s/p Control Charts Preventive maintenance schedule 1 Is the station log properly completed during every site visit? ✓ Dataview **✓** Are the Site Status Report Forms being completed and current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? Dataview Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

Field Systems Data Form F-02058-1500-S8-rev002 SHN418 Technician Korey Devins Site Visit Date 10/22/2019 Site ID Site operation procedures Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency** Compliant **✓ V** Semiannually **Multipoint Calibrations V V** Weekly **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? Compliant **OC Check Performed** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** Every 2 weeks Manual Zero/Span Tests **V ~** Daily **Automatic Precision Level Tests V** Every 2 weeks **Manual Precision Level Test ✓ V Analyzer Diagnostics Tests** Weekly **V** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Sample Line Check for Dirt/Water Weekly **~ V** Semiannually **Zero Air Desiccant Check ✓** Do multi-point calibration gases go through the complete sample train including all filters? **✓** Do automatic and manual z/s/p gasses go through the complete sample train including all filters? ✓ Dataview Are the automatic and manual z/s/p checks monitored and reported? If yes, how?

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

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

Field Systems Data Form					F-02058-1500-S9-rev002				
Sit	e ID	SHN418 Te	chnician Korey	/ Devins		Site Visit Date	10/22/2019		
	Site ope	ration procedures							
1	Is the fi	lter pack being changed eve	ry Tuesday as s	cheduled?	V	Filter changed mori	nings 90%		
2	Are the correctl	Site Status Report Forms b y?	eing completed	and filed	✓				
3	Are dat	a downloads and backups beed?	eing performed	as		No longer required			
4	Are gen	eral observations being mad	le and recorded	l? How?	✓	SSRF			
5	Are site	supplies on-hand and reple?	nished in a time	ely	✓				
6	Are san	nple flow rates recorded? Ho	ow?		✓	SSRF			
7	Are san	nples sent to the lab on a reg	ular schedule i	n a timely	✓				
8		ers protected from contamin oping? How?	ation during h	andling	✓	Clean gloves on an	d off		
9		site conditions reported reg ons manager or staff?	ularly to the fie	eld					
QC	Check P	erformed	Frequency	y			Compliant		
I	Multi-poi	nt MFC Calibrations	✓ Semiannua	ally			✓		
]	Flow Syst	em Leak Checks	✓ Weekly				✓		
]	Filter Pac	k Inspection							
]	Flow Rate	Setting Checks	✓ Weekly				✓		
1	Visual Ch	eck of Flow Rate Rotometer	✓ Weekly				✓		
]	In-line Filter Inspection/Replacement As needed					✓			
5	Sample Li	ine Check for Dirt/Water	✓ Weekly						
		ndditional explanation (phot an-made, that may affect the			sary) regarding conditi	ons listed above,	or any other features,	

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	В	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
KIC	003-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	В	none
6	10/23/2019	Temperature	RM Young	06112	41342	10176

Flow Data Form

Ifg	Serial Nun	iber Ta S	Site		hnician	Site Visit I	Date Paran	neter	Owner ID
pex	illegible		KIC003	Ма	rtin Valvur	10/23/2019	Flow F	tate	000668
					Mfg	BIOS	P	arameter Flo	ow Rate
					Serial Number	122974	Т	fer Desc. Bl	OS 220-H
					Tfer ID	01416			
					Slope	1.	00178 Int	ercept	0.0016
					Cert Date	7/1:	3/2018 Co	rrCoff	1.0000
DAS 1:		DAS 2:		L	Cal Factor Z	ero	-0.0	12	
A Avg % Diff:	A Max % Di	A Avg %I	Diff A Max	% Di	Cal Factor F	ull Scale	0.99	92	
0.45%	0.67%				Rotometer R	eading:	2	9	
Desc.	Test type	Input 1/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignal	II PctDifferenc
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	0.349
primary	test pt 2	2.980	2.970	2.99	0.000	2.99	l/m	l/m	0.679
primary	test pt 3	2.990	2.980	2.99	0.000	2.99	l/m	l/m	0.349
Sensor Compo	onent Leak Tes	it		Condition	n		Status	pass	
Sensor Comp	onent Tubing C	ondition		Condition	n Good		Status	pass	
Sensor Compo	onent Filter Pos	sition		Condition	Good		Status	pass	
Sensor Compo	onent Rotomete	er Condition		Condition	Clean and dry		Status	pass	
Sensor Compo	onent Moisture	Moisture Present			No moisture p	resent	Status	pass	
Sensor Comp	onent Filter Dis	tance		Condition	n 5.0 cm	Status		s pass	
Sensor Comp	Sensor Component Filter Depth Condition 1.5 cm			Status	pass				
Sensor Comp	onent Filter Azi	muth		Condition	270 deg		Status	pass	
Concor Comp	onent System N	/lemo		Condition	n		Status	pass	

Temperature Data Form Serial Number Ta Site **Technician** Site Visit Date Parameter **Owner ID** Mfg RM Young 10176 KIC003 Martin Valvur 10/23/2019 Temperature 06112 Fluke Mfg **Parameter** Temperature Tfer Desc. RTD 3275143 **Serial Number** 01229 Tfer ID -0.00649 Slope 0.99989 **Intercept DAS 1: DAS 2:** 1/23/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.08 0.17 Test type OutputTmpSignal | OutputSignalEng | OSE Unit | Difference UseDesc. InputTmpRaw InputTmpCorr. primary Temp Low Range 0.10 0.11 0.000 0.1 C 0.02 C 0.04 Temp Mid Range 25.47 25.48 0.000 25.5 primary 0.000 C primary Temp High Range 46.34 46.35 46.5 0.17 Sensor Component | Shield Condition Clean Status pass Sensor Component Blower **Condition** N/A **Status** pass Sensor Component Blower Status Switch Status pass **Condition** N/A Sensor Component System Memo Status pass Condition

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.

F-02058-1500-S1-rev002 Field Systems Data Form Site Visit Date 10/23/2019 KIC003 Technician Martin Valvur Site ID **USGS Map EPA** Site Sponsor (agency) **Map Scale** Kickapoo Tribe **Operating Group Map Date** AQS# R.M. Young **Meteorological Type Air Pollutant Analyzer QAPP** Latitude **Deposition Measurement QAPP** Longitude **Land Use QAPP Elevation Meters Terrain QAPP Declination** Conforms to MLM **OAPP Declination Date** 39.76102 **Site Telephone Audit Latitude** -95.63599 Site Address 1 **Audit Longitude** 367 Site Address 2 **Audit Elevation** Brown **Audit Declination County** Powhattan, KS City, State **Present** Fire Extinguisher 66527 Zip Code **V** Central **First Aid Kit Time Zone ✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # Primary Op. E-mail **Climbing Belt ✓ Backup Operator Security Fence** Backup Op. Phone # **Secure Shelter** Stable Entry Step Backup Op. E-mail Shelter Working Room Model **Shelter Size** □ Notes Small footprint site with no shelter. **Shelter Clean ✓** Notes Site OK

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		ightharpoons
Large parking lot	200 m		ightharpoons
Small parking lot	100 m	40 m	
Tree line	50 m		✓
Obstacles to wind	10 times obstacle height		

Siting Criteria Comment

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

Fie	eld Systems Data Form		F-02058-1500-S3-rev002
Site	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:

11 Is it inclined approximately 30 degrees?

Fic	eld 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?	✓	
	ide any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	sary)	regarding conditions listed above, or any other features,

Field Systems Data Form F-02058-1500-S5-rev002 KIC003 Technician | Martin Valvur Site Visit Date 10/23/2019 Site ID Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E **~** Do the sample inlets have at least a 270 degree arc of unrestricted airflow? **~** Are the sample inlets 3 - 15 meters above the ground? **~** Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and maintenance **✓** N/A Do the analyzers and equipment appear to be in good condition and well maintained? **✓** N/A Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. N/A Describe dry dep sample tube. 3/8 teflon by 10 meters ✓ N/A Are in-line filters used in the ozone sample line? (if ves indicate location) **~** Are sample lines clean, free of kinks, moisture, and obstructions? ✓ N/A Is the zero air supply desiccant unsaturated? **~** Are there moisture traps in the sample lines? ✓ Clean and dry Is there a rotometer in the dry deposition filter line, and is it clean?

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site	ID	KIC003	Technician	Martin Valvur		Site Vis	it Date 10/23/201	9	
	DAC co	nsor translators, and	novinhovol ogvin	mont opoution	• • • • • •	d maintana			
	DAS, se	usor translators, and	peripheral equip	ment operation	<u>18 a1</u>	<u>iu mamiena</u>	<u>ince</u>		
1	Do the I well ma	OAS instruments appeintained?	ear to be in good	condition and	✓				
2		he components of the backup, etc)	DAS operationa	al? (printers,	✓				
3		nalyzer and sensor sig g protection circuitry		hrough	✓				
4		signal connections prointained?	otected from the	weather and	✓				
5	Are the	signal leads connected	l to the correct I	DAS channel?	✓				
6	Are the grounde	DAS, sensor translated?	ors, and shelter p	oroperly	✓				
7	Does the instrument shelter have a stable power source?				✓				
8	Is the in	strument shelter temp	perature control	led?	✓	N/A			
9	Is the m	et tower stable and gr	ounded?			Stable		Grounded	
10	Is the sa	mple tower stable and	d grounded?			✓		✓	
11	Tower o	omments?							
		additional explanatio nan-made, that may af				y) regardin	g conditions liste	d above, or a	any other features,

Field Systems Data Form KIC003 Site Visit Date 10/23/2019 Site ID Technician Martin Valvur **Documentation** Does the site have the required instrument and equipment manuals? Yes No N/A Yes No N/A **✓ ✓** Wind speed sensor **Data logger V V** Wind direction sensor **Data logger** ✓ **V** П **Temperature sensor** Strip chart recorder **V V** Relative humidity sensor Computer **V** П Solar radiation sensor **V Modem** П **V V Printer** Surface wetness sensor **V V** Wind sensor translator Zero air pump **V** Filter flow pump Temperature translator **V V ~ Humidity sensor translator Surge protector** П **V ~ UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device V V Shelter heater** Ozone analyzer \checkmark **V** Filter pack flow controller Shelter air conditioner **V** Filter pack MFC power supply Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF ✓ V ✓ V** Site Ops Manual Feb 2014 **V HASP V** Feb 2014 **Field Ops Manual Calibration Reports** Ozone z/s/p Control Charts Preventive maintenance schedule Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **✓** sample transfer to and from lab? N/A **✓** Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

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

F-02058-1500-S7-rev002

Field Systems Data Form F-02058-1500-S8-rev002 KIC003 Site Visit Date 10/23/2019 Site ID Technician | Martin Valvur Site operation procedures trained on site by Wood technician Has the site operator attended a formal CASTNET training ✓ course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **V** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed** Frequency **Compliant ✓ V** N/A **Multipoint Calibrations V V** Weekly **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **OC Check Performed Compliant** Frequency **Multi-point Calibrations V** N/A **V** N/A **Automatic Zero/Span Tests V** N/A Manual Zero/Span Tests **V** N/A **Automatic Precision Level Tests V** N/A **Manual Precision Level Test V** N/A **Analyzer Diagnostics Tests ~** N/A **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V** N/A Sample Line Check for Dirt/Water

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?

Zero Air Desiccant Check

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

✓	N/A
_	
✓	

~

N/A
N/A

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

N/A

Fi	Field Systems Data Form						F-02058-1500-S9-rev00			
Sit	e ID	KIC003	Гесhni	hnician Martin Valvur			Site Visit Date	10/23/2019		
	Site ope	ration procedures								
1	Is the fi	ter pack being changed e	very T	uesd	ay as scheduled	?	Filter changed morn	ings		
2 Are the Site Status Report Forms being completed and filed correctly?					pleted and filed	✓				
3	Are data	a downloads and backups	being	perf	ormed as		No longer required			
4	Are gen	eral observations being m	ade ar	d re	corded? How?	✓	SSRF, logbook, call-	-in		
5	5 Are site supplies on-hand and replenished in a timely fashion?					✓				
6	Are san	pple flow rates recorded?	How?			✓	SSRF, logbook, call-in			
7	Are sam	nples sent to the lab on a r	egular	sche	dule in a timely	✓				
8		ers protected from contant oping? How?	inatio	n du	ring handling	✓	Clean gloves on and	d off		
9		site conditions reported rons manager or staff?	egular	ly to	the field	✓				
QC	Check P	erformed		Fre	quency			Compliant		
I	Multi-poi	nt MFC Calibrations	✓	Sen	niannually			✓		
I	Flow System Leak Checks Weekly				✓					
1	Filter Pac	k Inspection								
I	Flow Rate Setting Checks Weekly				✓					
1	Visual Check of Flow Rate Rotometer Weekly				✓					
]	In-line Filter Inspection/Replacement As needed				✓					
5	Sample Li	ne Check for Dirt/Water	✓	Wee	ekly			✓		
		dditional explanation (ph n-made, that may affect t					regarding condition	ons listed above, or a	any other features,	

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	В	none	000814
Temperature	RM Young	41342	10176	06112

Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number						
DCI	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	В	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 0 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg 2124 Primary Campbell DCP114 Korey Devins 10/24/2019 DAS Das Date: 10/24/2019 **Audit Date** 10/24/2019 Fluke **Parameter** DAS Mfg 11:47:00 11:47:00 **Das Time: Audit Time** 95740135 Tfer Desc. DVM **Serial Number** Das Day: 297 **Audit Day** 297 Tfer ID 01311 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0000 0.0001 0.0000 0.0001 1/25/2019 1.00000 **Cert Date** CorrCoff Datel Parameter DAS Mfg **Serial Number** 15510194 Tfer Desc. Source generator (D 01320 Tfer ID 1.00000 0.00000 **Slope** Intercept 2/13/2012 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output **DAS** Output InputUnit OutputUnit Difference 7 V 0.0000 0.0000 0.0000 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 V V 0.5000 0.5008 0.5008 0.0000 V V 7 0.7000 0.7009 0.7010 0.0001 7 V V 0.9000 0.9005 0.00000.9005 7 1.0000 1.0004 V V -0.0001 1.0005

Flow Data Form **Technician Owner ID** Mfg **Serial Number Tag Site** Site Visit Date Parameter Korey Devins DCP114 10/24/2019 000659 Apex 54748 Flow Rate Mfg BIOS Parameter Flow Rate 148613 Tfer Desc. BIOS 220-H **Serial Number** 01421 Tfer ID 0.00000 **Slope** 1.00000 **Intercept** 3/4/2019 1.00000 CorrCoff **Cert Date** 0 **DAS 2: DAS 1: Cal Factor Zero** 0 A Avg % Diff: A Max % Dif A Avg % Diff A Max % Dif **Cal Factor Full Scale** 2.17% 2.60% 1.4 **Rotometer Reading:** Test type Input l/m Input Corr MfcDisp. OutputSignal Output S E InputUnit OutputSignall PctDifference Desc. primary pump off 0.000 0.0000.00 0.0000.01 1/m1/mleak check 0.00 0.000 0.01 1/m0.000 0.000 1/mprimary test pt 1 1.528 1.530 1.51 0.000 1.50 1/m1/m -1.96% primary 1.52 0.000 1.50 1/m-2.60% primary test pt 2 1.538 1.540 1/m test pt 3 1.527 1.530 1.51 0.000 1.50 1/m1/m -1.96% primary Sensor Component Leak Test Condition **Status** pass **Condition** Good **Status** pass **Sensor Component** Tubing Condition Sensor Component Filter Position **Condition** Good Status pass Sensor Component Rotometer Condition Status pass Condition Clean and dry Sensor Component Moisture Present **Condition** See comments Status pass Sensor Component Filter Distance Condition 4.0 cm Status pass Status pass Sensor Component Filter Depth Condition 2.0 cm

Condition 345 deg

Condition

Sensor Component Filter Azimuth

Sensor Component System Memo

Status pass

Status pass

Ozone Data Form

Mfg	Serial Numbe	er Tag Site	T	echnician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244799	DCP114	ŀ	Korey Devins	10/24/2019	Ozone	000702
CorrCoff:	0.99999 Cor ı	rcept C	0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180930075 01115		ozone Ozone primary stan
DAS 1: A Avg % Diff: A l		AS 2: Avg %Diff A	May % Dif	Slope	1.0080	00 Intercept	-0.40210
0.0%	0.0%	Avg /vDiii A	Wida 70 Dii	Cert Date	3/26/20	19 CorrCoff	1.00000
UseDescription primary	ConcGroup 1	Tfer Raw 0.01	Tfer Corr 0.40	Site 0.03	Site Unit	RelPerDif	AbsDif -0.37
primary primary	3	14.97 37.17	15.25 37.27	13.95 35.48	ppb ppb	-4.92	-1.3
primary	4	69.13	68.98	65.93	ppb	-4.52	
primary	5	116.96	116.43	111.80	ppb	-4.06	
Sensor Compone			Condi	tion Good		Status pass Status pass	
Sensor Compon	ent Inlet Filter C	ondition	Condi	tion Clean		Status pass	
Sensor Compon	ent Battery Back	кир	Condi	tion N/A		Status pass	
Sensor Compon	ent Offset		Condi	-0.40		Status pass	
Sensor Compone	ent Span		Condi	tion 1.013		Status pass	
Sensor Compon	ent Zero Voltage	Э	Condi	tion N/A		Status pass	
Sensor Compon	ent Fullscale Vo	ltage	Condi	tion N/A		Status pass	
Sensor Compone	ent Cell A Freq.		Condi	tion 96.8 kHz		Status pass	
Sensor Compone	ent Cell A Noise	;	Condi	tion 0.4 ppb		Status pass	
Sensor Compone	ent Cell A Flow		Condi	tion 0.81 lpm		Status pass	
Sensor Compone	ent Cell A Press	sure	Condi	tion 719.2 mmHg		Status pass	
Sensor Compone	ent Cell A Tmp.		Condi	36.3 C		Status pass	
Sensor Compone	ent Cell B Freq.		Condi	tion 101.3 kHz		Status pass	
Sensor Compone	ent Cell B Noise)	Condi	tion 0.6 ppb		Status pass	
Sensor Compone	ent Cell B Flow		Condi	tion 0.66 lpm		Status pass	
Sensor Compone	ent Cell B Press	sure	Condi	tion 719.8 mmHg		Status pass	
Sensor Compon	ent Cell B Tmp.		Condi	tion N/A		Status pass	
Sensor Compon	ent Line Loss		Condi	Not tested		Status pass	
Sensor Compon	ent System Men	no	Condi	tion		Status pass	

Temperature Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg DCP114 Korey Devins 10/24/2019 Temperature 06390 RM Young 13993 Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 Tfer ID **Slope** 1.00733 **Intercept** 0.14497 **DAS 1: DAS 2:** 2/12/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.22 0.31 UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference Test type primary Temp Low Range 0.12-0.02 0.000 0.3 \mathbf{C} 0.31 C Temp Mid Range 25.31 24.98 0.000 25.1 0.13 primary C -0.23 primary Temp High Range 47.12 46.63 0.000 46.4 Condition Moderately clean Status pass Sensor Component Shield Sensor Component Blower Status pass **Condition** N/A Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** DCP114 Korey Devins 10/24/2019 Shelter Temperature Campbell none none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperature Abs Avg Err Abs Max Err Abs Avg Err **Abs Max Err** Tfer Desc. RTD H232734 **Serial Number** 1.32 1.42 01227 **Tfer ID** 1.00733 0.14497 **Slope** Intercept 2/12/2019 ${\bf CorrCoff}$ 1.00000 **Cert Date**

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	Sample Tower Type	Condition	Туре В	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	l 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 Visit Date 10/24/2019 DCP114 Technician Korey Devins Site ID Mount Sterling **USGS Map EPA** Site Sponsor (agency) Map Scale private / state **Operating Group Map Date** 39-047-9991 AQS# R.M. Young **Meteorological Type** Air Pollutant Analyzer Ozone **QAPP** Latitude 39.6358 dry, wet -83.2600 **Deposition Measurement QAPP** Longitude 267 **Land Use** agriculture, woodland - mixed **QAPP Elevation Meters** flat 6.25 Terrain **QAPP Declination** Marginally 2/23/2006 Conforms to MLM **OAPP Declination Date** (740) 869-4722 39.635888 **Site Telephone Audit Latitude** Waterloo Road -83.260563 Site Address 1 **Audit Longitude** Deer Creek State Park Site Address 2 **Audit Elevation** 264 Fayette -6.3 **County Audit Declination** Mount Sterling, OH City, State **Present** Fire Extinguisher 43143 New in 2015 Zip Code Eastern First Aid Kit Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **Climbing Belt** Primary Op. E-mail none **Security Fence Backup Operator V Secure Shelter** Backup Op. Phone # Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 (s/n 2149-13) Ekto **Shelter Size** 640 cuft **✓** Notes The shelter is currently in fair condition. There are loose floor tiles. Shelter Clean **✓** Notes Site OK From Circleville take 22/56 west. Stay on 22 through Williamsport. Turn right (north) onto route 207 and follow the **Driving Directions** 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		<u> </u>
Major industrial complex	10 to 20 km		✓
City > 50,000 population	40 km		✓
City 10,000 to 50,000 population	10 km		✓
City 1,000 to 10,000 population	5 km		✓
Major highway, airport or rail yard	2 km		✓
Secondary road, heavily traveled	500 m		✓
Secondary road, lightly traveled	200 m		✓
Feedlot operations	500 m		✓
Intensive agricultural ops (including aerial spraying)	500 m		✓
Limited agricultural operations	200 m		✓
Large parking lot	200 m		✓
Small parking lot	100 m		✓
Tree line	50 m	15 m	
Obstacles to wind	10 times obstacle height		✓

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.

Fi	eld Systems Data Form	F-02058-1500-S3-rev002	
Site	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:

Fi	eld Systems Data Form		F-02058-1500-S4-rev002
Site	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?	✓	
	ide any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	sary)	regarding conditions listed above, or any other features,
The	emperature sensor is mounted in a naturally aspirated shield on the	e saı	mple tower.

Fi	eld Systems Data Form	F-02058-1500-S5-rev002	
Site	DCP114 Technician Korey Devins		Site Visit Date 10/24/2019
	Siting Criteria: Are the pollutant analyzers and deposition eq	uipı	nent 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	ma	intenance
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
	ide any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	ary)	regarding conditions listed above, or any other features,

Field Systems Data Form F-02058-1500-S6-rev002 DCP114 Technician Korey Devins Site Visit Date 10/24/2019 Site ID DAS, sensor translators, and peripheral equipment operations and maintenance Do the DAS instruments appear to be in good condition and well maintained? **✓** Are all the components of the DAS operational? (printers, modem, backup, etc) Met sensors only Do the analyzer and sensor signal leads pass through lightning protection circuitry? **✓** Are the signal connections protected from the weather and well maintained? **✓** Are the signal leads connected to the correct DAS channel? Are the DAS, sensor translators, and shelter properly **~** grounded? **✓** Does the instrument shelter have a stable power source? ~ Is the instrument shelter temperature controlled? Grounded **Stable** Is the met tower stable and grounded? Is the sample tower stable and grounded? **V** 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 F	orm				F-02	2058-	1500-S7-rev00
Site ID DCP114	Technic	an Korey Devin	s	Site Visit Date	10/24/2019)	
Documentation							
Does the site have the required	instrument	and equipment	manuals?				
Wind direction sensor Femperature sensor Relative humidity sensor Solar radiation sensor Surface wetness sensor Wind sensor translator			Shelter hea	r recorder imp pump ector protection device	Yes V C C C C C C C C C C C C		N/A V V V V V V V V V V V V V V V V V V
Does the site have the require	d and most 1	ecent QC docur	nents and	report forms?			
P	resent				Curre	ent	
tation Log	✓				✓		
SRF	✓				✓		
ite Ops Manual							
IASP	✓ Ma	/ 2019			✓		
ield Ops Manual	✓ May	/ 2019			✓		
Calibration Reports	✓				✓		
Ozone z/s/p Control Charts							
reventive maintenance schedule							
1 Is the station log properly co	mpleted dur	ng every site vis	sit?				
2 Are the Site Status Report Focurrent?	orms being c	ompleted and	V				
Are the chain-of-custody for sample transfer to and from		used to docume	nt 🗸				
Are ozone z/s/p control chart current?	s properly co	ompleted and	C	ontrol charts not u	sed		
rovide any additional explanatio atural or man-made, that may a				regarding condit	ions listed	above,	or any other features,

Field Systems Data Form F-02058-1500-S8-rev002 DCP114 Technician Korey Devins Site Visit Date 10/24/2019 Site ID Site operation procedures Trained during site installation by ESE employee DDK Has the site operator attended a formal CASTNET training ✓ course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency** Compliant **✓ V** N/A **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test ✓ V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **Compliant QC Check Performed** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V** Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests V Manual Precision Level Test V V** Weekly **Analyzer Diagnostics Tests V V** Every 2 weeks **In-line Filter Replacement (at inlet) V V** N/A In-line Filter Replacement (at analyze **V V** Sample Line Check for Dirt/Water Weekly **~ V Zero Air Desiccant Check** Weekly **V** Do multi-point calibration gases go through the complete sample train including all filters? \checkmark Do automatic and manual z/s/p gasses go through the

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

✓

SSRF, call-in

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

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

complete sample train including all filters?

reported? If yes, how?

Field Systems Data Form			F-02058-1500-S9-rev002					
Site ID DCP114 Tec	hnician Korey Devins		Site Visit Date	10/24/2019				
Site operation procedures								
1 Is the filter pack being changed every	y Tuesday as scheduled	? ✓	Filter changed morin	ings				
2 Are the Site Status Report Forms be correctly?	ing completed and filed	✓						
3 Are data downloads and backups be scheduled?	Are data downloads and backups being performed as scheduled?				No longer required			
4 Are general observations being made	Are general observations being made and recorded? How?				SSRF, logbook			
5 Are site supplies on-hand and replen fashion?	Are site supplies on-hand and replenished in a timely fashion?							
6 Are sample flow rates recorded? How	Are sample flow rates recorded? How?			SSRF, logbook, call-in				
7 Are samples sent to the lab on a regularishion?	Are samples sent to the lab on a regular schedule in a timely fashion?							
8 Are filters protected from contamina and shipping? How?	Are filters protected from contamination during handling and shipping? How?			off				
9 Are the site conditions reported regular operations manager or staff?	larly to the field	✓						
QC Check Performed	Frequency			Compliant				
Multi-point MFC Calibrations	✓ Semiannually			✓				
Flow System Leak Checks	✓ Weekly			✓				
Filter Pack Inspection								
Flow Rate Setting Checks	•			✓				
Visual Check of Flow Rate Rotometer				✓				
In-line Filter Inspection/Replacement	✓ Semiannually			✓				
Sample Line Check for Dirt/Water	✓ Weekly			✓				
Provide any additional explanation (photo natural or man-made, that may affect the			regarding condition	ons listed above, or a	ny other features,			

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	<u> </u> 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	В	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

Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
F122-Korey	Devins-10/25/2019				
10/25/2019	Computer	Dell	07008	Inspiron 15	694MC12
10/25/2019	DAS	Campbell	000425	CR3000	2528
10/25/2019	Elevation	Elevation	None	1	None
10/25/2019	Filter pack flow pump	Thomas	04924	107CAB18	100300020817
10/25/2019	Flow Rate	Apex	000556	AXMC105LPMDPCV	illegible
10/25/2019	Infrastructure	Infrastructure	none	none	none
10/25/2019	Modem	Digi	07163	LR54	unknown
10/25/2019	Ozone	ThermoElectron Inc	000610	49i A1NAA	1009241778
10/25/2019	Ozone Standard	ThermoElectron Inc	000545	49i A3NAA	0929938241
10/25/2019	Sample Tower	Aluma Tower	000018	В	AT-61152-A-H8-E
10/25/2019	Shelter Temperature	Campbell	none	107-L	10755-148
10/25/2019	Siting Criteria	Siting Criteria	None	1	None
10/25/2019	Temperature	RM Young	02823	41342	illegible
10/25/2019	Zero air pump	Werther International	06908	C 70/4	000821900
	10/25/2019 10/25/2019 10/25/2019 10/25/2019 10/25/2019 10/25/2019 10/25/2019 10/25/2019 10/25/2019 10/25/2019 10/25/2019 10/25/2019	10/25/2019 DAS 10/25/2019 Elevation 10/25/2019 Filter pack flow pump 10/25/2019 Flow Rate 10/25/2019 Infrastructure 10/25/2019 Modem 10/25/2019 Ozone 10/25/2019 Ozone Standard 10/25/2019 Sample Tower 10/25/2019 Shelter Temperature 10/25/2019 Siting Criteria 10/25/2019 Temperature	T122-Korey Devins-10/25/2019 10/25/2019 Computer Dell 10/25/2019 DAS Campbell 10/25/2019 Elevation Elevation 10/25/2019 Filter pack flow pump Thomas 10/25/2019 Flow Rate Apex 10/25/2019 Infrastructure Infrastructure 10/25/2019 Modem Digi 10/25/2019 Ozone ThermoElectron Inc 10/25/2019 Sample Tower Aluma Tower 10/25/2019 Shelter Temperature Campbell 10/25/2019 Siting Criteria Siting Criteria 10/25/2019 Temperature RM Young	### Tight	10/25/2019 Computer Dell 07008 Inspiron 15

DAS Data Form 0 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Primary Campbell 2528 OXF122 Korey Devins 10/25/2019 DAS Das Date: 10/25/2019 **Audit Date** 10/25/2019 Fluke **Parameter** DAS Mfg 10:45:00 10:45:00 **Das Time: Audit Time** 95740135 Tfer Desc. DVM **Serial Number** Das Day: 298 **Audit Day** 298 Tfer ID 01311 **High Channel: Low Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0001 0.0001 0.0001 0.0001 1/25/2019 1.00000 **Cert Date** CorrCoff Datel Parameter DAS Mfg **Serial Number** 15510194 Tfer Desc. Source generator (D 01320 Tfer ID 1.00000 0.00000 **Slope** Intercept 2/13/2012 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output **DAS** Output InputUnit OutputUnit Difference 7 V 0.0000 0.0000 -0.0001 -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 V V 0.5000 0.5004 0.5003 -0.0001 V V 7 0.7000 0.7008 0.7007 -0.0001 7 V V 0.9000 0.9005 0.9005 0.00007 1.0000 V V -0.0001 1.0006 1.0005

Flow Data Form **Technician Owner ID** Mfg **Serial Number Tag Site** Site Visit Date Parameter Korey Devins 10/25/2019 000556 Apex OXF122 Flow Rate illegible Mfg BIOS Parameter Flow Rate 148613 Tfer Desc. BIOS 220-H **Serial Number** 01421 Tfer ID 0.00000 **Slope** 1.00000 **Intercept** 3/4/2019 1.00000 CorrCoff **Cert Date** 0 **DAS 2: DAS 1: Cal Factor Zero** 0 A Avg % Diff: A Max % Dif A Avg % Diff A Max % Dif **Cal Factor Full Scale** 0.88% 1.32% 1.5 **Rotometer Reading:** Test type Input l/m Input Corr MfcDisp. OutputSignal Output S E InputUnit OutputSignall PctDifference Desc. primary pump off 0.000 0.0000.00 0.0000.01 1/m1/mleak check 0.00 0.000 0.00 1/m0.000 0.000 1/mprimary test pt 1 1.516 1.520 1.52 0.000 1.50 1/m1/m -1.32% primary 1.52 0.000 1.50 1/m-0.66% primary test pt 2 1.514 1.510 1/m -0.66% test pt 3 1.510 1.510 1.52 0.000 1.50 1/m1/m primary Sensor Component Leak Test Condition **Status** pass **Condition** Good **Status** pass **Sensor Component** Tubing Condition Sensor Component Filter Position **Condition** Good Status pass Sensor Component Rotometer Condition Status pass Condition Clean and dry Sensor Component Moisture Present **Condition** See comments Status pass Sensor Component Filter Distance Condition 5.0 cm Status pass Condition 2.0 cm Status pass Sensor Component Filter Depth Status pass **Sensor Component** Filter Azimuth Condition 350 deg

Condition

Status pass

Sensor Component System Memo

Ozone Data Form

Mfg	Serial Numbe	r Tag Site	Т	echnician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241778	OXF122	ŀ	Korey Devins	10/25/2019	Ozone	000610
Intercept -1		rcept	0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180930075 01115		eter ozone esc. Ozone primary stan
DAS 1:	D A	AS 2:		Slope	1.0080	00 Intercept	-0.40210
A Avg % Diff: A M	ax % Dif A	Avg %Diff A	Max % Dif		3/26/20		
0.0%	0.0%			Cert Date	3/20/20	19 CorrCoff	1.00000
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	-3.3	
primary	4	66.90	66.76	65.27	ppb	-2.2	
primary	5	116.26	115.73	114.10	ppb	-1.4	
Sensor Componer	Sample Trai	n	Condi	Good		Status pass	i
Sensor Componer	22.5 degree	rule	Condi	tion		Status pass	
Sensor Componer	Inlet Filter C	ondition	Condi	tion Clean		Status pass	i
Sensor Componer	Battery Back	кир	Condi	tion N/A		Status pass	i
Sensor Componer	Offset		Condi	tion 0.10		Status pass	
Sensor Componer	Span		Condi	tion 1.030		Status pass	i
Sensor Componer	zero Voltage	Э	Condi	tion N/A		Status pass	i
Sensor Componer	Fullscale Vo	ltage	Condi	tion N/A		Status pass	
Sensor Componer	Cell A Freq.		Condi	124.9 kHz		Status pass	
Sensor Componer	cell A Noise) !	Condi	tion 1.0 ppb		Status pass	
Sensor Componer	Cell A Flow		Condi	tion 1.03 lpm		Status pass	
Sensor Componer	Cell A Press	sure	Condi	705.9 mmHg		Status pass	
Sensor Componer	Cell A Tmp.			33.5 C		Status pass	
Sensor Componer	Cell B Freq.		Condi	tion 99.7 kHz		Status pass	
Sensor Componer	Cell B Noise			tion 0.9 ppb		Status pass	
Sensor Componer	Cell B Flow		Condi	tion 0.71 lpm		Status pass	
Sensor Componer	cell B Press	sure		tion 706.8 mmHg		Status pass	
Sensor Componer	Cell B Tmp.			N/A		Status pass	
Sensor Componer	Line Loss		Condi	tion Not tested		Status pass	
Sensor Componer	System Men	no	Condi	tion		Status pass	

Temperature Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg OXF122 Korey Devins 10/25/2019 Temperature 02823 RM Young illegible Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 Tfer ID **Slope** 1.00733 **Intercept** 0.14497 **DAS 1: DAS 2:** 2/12/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.33 0.47 UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference Test type primary Temp Low Range 0.11-0.03 0.000 0.0 \mathbf{C} 0.07 C Temp Mid Range 25.52 25.19 0.000 25.7 0.47 primary 0.000 C primary Temp High Range 45.87 45.39 45.8 0.44 **Status** pass Sensor Component Shield **Condition** Clean Sensor Component Blower Status pass **Condition** N/A Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg Serial Number Tag Site **Technician** Site Visit Date Parameter **Owner ID** 10755-148 OXF122 Korey Devins 10/25/2019 Shelter Temperature Campbell none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperature Abs Avg Err Abs Max Err Abs Avg Err **Abs Max Err** Tfer Desc. RTD H232734 **Serial Number** 0.20 0.43 01227 **Tfer ID** 1.00733 0.14497 **Slope** Intercept 2/12/2019 CorrCoff 1.00000 **Cert Date**

primary Temp Mid Rai primary Temp Mid Rai		24.34	0.000	24.8	С	0.43
primary Temp Mid Rai	25.49					0.13
primary romp with real	ige 25.46	25.15	0.000	25.1	С	-0.03
primary Temp Mid Rai	nge 26.53	26.19	0.000	26.1	С	-0.13
Sensor Component System	n 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 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 Visit Date 10/25/2019 OXF122 Technician Korey Devins Site ID Oxford **USGS Map EPA** Site Sponsor (agency) Map Scale Miami University **Operating Group Map Date** 39-017-9991 AQS# Climatronics **Meteorological Type** Air Pollutant Analyzer Ozone **QAPP** Latitude 39.5314 dry, wet **QAPP** Longitude -84.7231 **Deposition Measurement** 284 **Land Use** agriculture, woodland - mixed **QAPP Elevation Meters** 5.2 Terrain gently rolling **QAPP Declination** Yes 2/23/2007 Conforms to MLM **OAPP Declination Date** (513) 523-6912 39.531115 **Site Telephone Audit Latitude** Ecological Research Center -84.723547 Site Address 1 **Audit Longitude** Somerville Rd. Site Address 2 **Audit Elevation** 284 Butler -5.6 **County Audit Declination** Oxford, OH City, State **Present** Fire Extinguisher 45056 New in 2015 Zip Code Eastern First Aid Kit Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **Climbing Belt** Primary Op. E-mail **Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 (s/n 2107-4) Ekto **Shelter Size** 640 cuft **✓** Notes The shelter roof has been repaired. **Shelter Clean ✓** Notes Site OK From Oxford proceed north on route 732. Just outside of town bear right onto Somerville Road. Continue **Driving Directions**

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 $\ lacksquare$

Siting Criteria Comment

The site is located in university agriculture research facility.

Field Systems Data Form							F-020	58-15	00-S3-1	rev002
Site	ox OX	(F122	Technician	Korey Devins		Site Visit Date	10/25/2019			
1		peed and direction senced by obstruction		as to avoid	✓	N/A				
·				✓	N/A					
				✓	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 plu	ımb?		✓	N/A				
7	Is it sited to	avoid shading, or a	ny artificial o	r reflected light?	✓	N/A				
8	Is the rain g	gauge plumb?			✓	N/A				
9	Is it sited to towers, etc?	avoid sheltering eff	ects from buil	dings, trees,	✓	N/A				
10	Is the surfact facing north	ce wetness sensor sit 1?	ted with the gr	id surface	✓	N/A				
11	Is it inclined	d 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:

Fi	eld 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?	✓	
	ide any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:		regarding conditions listed above, or any other features,

Field Systems Data Form	F-02058-1500-S5-rev00
OXF122 Technician Korey Devins	Site Visit Date 10/25/2019
Siting Criteria: Are the pollutant analyzers and deposition e	equipment sited in accordance with 40 CFR 58, Appendix E
Do the sample inlets have at least a 270 degree arc of unrestricted airflow?	
Are the sample inlets 3 - 15 meters above the ground?	
Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees?	, v
Pollutant analyzers and deposition equipment operations and	nd maintenance
Do the analyzers and equipment appear to be in good condition and well maintained?	
Are the analyzers and monitors operational, on-line, and reporting data?	
Describe ozone sample tube.	1/4 teflon by 15 meters
Describe dry dep sample tube.	3/8 teflon by 15 meters
Are in-line filters used in the ozone sample line? (if yes indicate location)	At inlet only
Are sample lines clean, free of kinks, moisture, and obstructions?	
Is the zero air supply desiccant unsaturated?	
Are there moisture traps in the sample lines?	Flow line only
Is there a rotometer in the dry deposition filter line, and is it clean?	
ovide any additional explanation (photograph or sketch if neces tural or man-made, that may affect the monitoring parameters:	

Field Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	OXF122	Technician	Korey Devins		Site Visit I	Date [10/25/2019		
	DAS, se	nsor translators, and p	peripheral equi	pment operation	ıs ar	ıd maintenanc	<u>e</u>			
1		OAS instruments appeintained?	l condition and	✓						
2	Are all the components of the DAS operational? (printers, modem, backup, etc)				✓					
3		nalyzer and sensor sig g protection circuitry?		through	✓	Met sensors or	nly			
4	4 Are the signal connections protected from the weather and well maintained? ✓				✓					
5	5 Are the signal leads connected to the correct DAS channel? ✓									
6	Are the grounde	DAS, sensor translatoed?	rs, and shelter	properly	✓					
7	Does the	e instrument shelter ha	ave a stable pov	ver source?	✓					
8	Is the in	strument shelter temp	erature control	lled?	✓					
9	Is the m	et tower stable and gr	ounded?			Stable		(Grounded	
10	Is the sa	mple tower stable and	grounded?			V				
11	Tower c	omments?								

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

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

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

Field Systems Data Form OXF122 Technician Korey Devins Site Visit Date 10/25/2019 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No N/A Yes Yes No N/A П **✓ V** Wind speed sensor **Data logger V V** Wind direction sensor Data logger **V V** П **Temperature sensor** Strip chart recorder **✓ V** Relative humidity sensor Computer **V** П **Solar radiation sensor V Modem** П **V V Printer Surface wetness sensor V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V V Humidity sensor translator Surge protector** П **V V UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device** ~ **✓ Shelter heater** Ozone analyzer **✓ ✓** Filter pack flow controller Shelter air conditioner **V** Filter pack MFC power supply □ Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF ✓ V ✓ Site Ops Manual** March 2015 **V HASP** March 2015 **✓ Field Ops Manual** March 2015 **Calibration Reports V V** Ozone z/s/p Control Charts Preventive maintenance schedule 1 Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

F-02058-1500-S7-rev002

Field Systems Data Form F-02058-1500-S8-rev002 OXF122 Technician Korey Devins Site Visit Date 10/25/2019 Site ID Site operation procedures Trained onsite by previous site operator Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency** Compliant **✓ V** N/A **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **Compliant QC Check Performed** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests Manual Precision Level Test V V** Weekly **Analyzer Diagnostics Tests ~ V** Every 2 weeks **In-line Filter Replacement (at inlet) V V** N/A In-line Filter Replacement (at analyze **V** 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 OXF122 Technician Korey Devins Site Visit Date 10/25/2019 Site ID **Site operation procedures** Is the filter pack being changed every Tuesday as scheduled? Filter changed morinings or early afternoon Are the Site Status Report Forms being completed and filed correctly? No longer required Are data downloads and backups being performed as scheduled? SSRF, logbook Are general observations being made and recorded? How? **V** Are site supplies on-hand and replenished in a timely fashion? SSRF, logbook, call-in Are sample flow rates recorded? How? Are samples sent to the lab on a regular schedule in a timely fashion? **✓** Clean gloves on and off Are filters protected from contamination during handling and shipping? How? **~** Are the site conditions reported regularly to the field operations manager or staff? **QC Check Performed Compliant Frequency V** ✓ Semiannually **Multi-point MFC Calibrations** Weekly **V** Flow System Leak Checks **Filter Pack Inspection V ✓** Weekly **Flow Rate Setting Checks V ✓** Weekly **Visual Check of Flow Rate Rotometer** ✓ Semiannually **V In-line Filter Inspection/Replacement** Weekly Sample Line Check for Dirt/Water Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

The 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	В	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					
SAN	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	В	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 0 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2138 **SAN189** Martin Valvur 10/25/2019 DAS Primary Das Date: 10/25/2019 **Audit Date** 10/25/2019 Fluke **Parameter** DAS Mfg 08:01:00 08:01:00 Das Time: **Audit Time** 95740243 Tfer Desc. DVM **Serial Number** Das Day: 298 **Audit Day** 298 Tfer ID 01312 **High Channel: Low Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0001 0.0003 0.0001 0.0003 1/25/2019 1.00000 **Cert Date** CorrCoff ΗY Parameter DAS Mfg **Serial Number** 12010039329 Tfer Desc. Source generator (D 01322 Tfer ID 1.00000 0.00000 **Slope** Intercept 6/15/2014 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 7 V 0.0000 -0.0002 -0.0002 0.0000 7 0.0997 0.0996 V V -0.0001 0.1000 7 0.3000 0.3019 0.3020 V V 0.00017 V V 0.5000 0.4993 0.4993 0.0000 V V 7 0.7000 0.6990 0.6992 0.0002 7 V V 0.9000 0.8989 0.0000 0.8989 7 1.0000 0.9995 0.9998 V V 0.0003

Flow Data Form **Technician Owner ID** Mfg **Serial Number Tag Site** Site Visit Date Parameter SAN189 Martin Valvur 000861 Apex 10/25/2019 Flow Rate illegible Mfg BIOS Parameter Flow Rate 122974 Tfer Desc. BIOS 220-H **Serial Number** 01416 Tfer ID 0.00161 **Slope** 1.00178 **Intercept** 7/13/2018 1.00000 CorrCoff **Cert Date** -0.01 **DAS 1: DAS 2: Cal Factor Zero** 1.01 A Avg % Diff: A Max % Dif A Avg % Diff A Max % Dif **Cal Factor Full Scale** 0.78% 1.01% 3.2 **Rotometer Reading:** Test type Input l/m Input Corr OutputSignal Output S E InputUnit OutputSignall PctDifference Desc. MfcDisp. primary pump off 0.000 0.000-0.010.000 0.00 1/m1/mleak check 0.00 0.000 -0.01 1/m0.000 0.000 1/mprimary test pt 1 2.980 2.970 2.94 0.000 3.00 1/m1/m 1.01% primary 2.990 2.980 2.95 0.000 3.00 1/m0.67% primary test pt 2 1/m test pt 3 2.990 2.980 2.94 0.000 3.00 1/m1/m 0.67% primary Sensor Component Leak Test Condition **Status** pass Sensor Component Tubing Condition **Condition** Good **Status** pass

Condition Good

Condition 4.0 cm

Condition 3.3 cm

Condition 270 deg

Condition

Condition Clean and dry

Condition No moisture present

Status pass

Status pass

Status pass

Status pass

Status pass

Status pass

Status pass

Sensor Component Filter Position

Sensor Component Rotometer Condition

Sensor Component Moisture Present

Sensor Component Filter Distance

Sensor Component Filter Depth

Sensor Component Filter Azimuth

Sensor Component System Memo

Ozone Data Form

Mfg	Serial Number	r Tag Site	T	echnician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347323	SAN189		Martin Valvur	10/25/2019	Ozone	000729
Slope: Intercept CorrCoff: DAS 1: A Avg % Diff: A I	DA	Coff: C	0.00000 0.00000 0.00000 Max % Dif	Mfg Serial Number Tfer ID Slope	ThermoElectror 49CPS-70008-3 01110 1.001	Tfer Des	ozone Ozone primary stan 0.00666
0.0%	0.0%			Cert Date	10/30/20	18 CorrCoff	1.00000
UseDescription primary primary primary primary primary Sensor Component	ConcGroup 1 2 3 4 5	Tfer Raw 0.06 15.75 35.40 68.36 114.32	Tfer Corr 0.05 15.71 35.33 68.25 114.14	Site -1.09 14.26 33.41 65.71 111.40 tion Good	Site Unit ppb ppb ppb ppb ppb ppb	-5.59 -3.79 -2.43	
Sensor Compone	22.5 degree ent Inlet Filter Co	rule	Condi	tion Clean		Status pass Status pass Status pass	
Sensor Compone		sup		tion N/A tion 0.10		Status pass Status pass	
Sensor Compone				1.029		Status pass	
Sensor Compone				tion N/A tion N/A		Status pass Status pass	
Sensor Compone				tion 98.0 kHz		Status pass	
Sensor Compone	Cell A Noise		Condi	tion 0.6 ppb		Status pass	
Sensor Compone	Cell A Flow			tion 0.61 lpm		Status pass	
Sensor Compone		ure		702.1 mmHg tion 32.3 C		Status pass Status pass	
Sensor Compone				tion 87.5 kHz		Status pass	
Sensor Compone				tion 0.6 ppb		Status pass	
Sensor Compone	Cell B Flow			tion 0.65 lpm		Status pass	
Sensor Compone	Cell B Press	ure	Condi	tion 702.1 mmHg		Status pass	
Sensor Compone				tion N/A		Status pass	
Sensor Compone				tion Not tested		Status pass	
Sensor Compone	ent System Men	10	Condi	tion		Status pass	

Temperature Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg Martin Valvur 14798 SAN189 10/25/2019 Temperature 06537 RM Young Mfg Fluke Parameter Temperature Tfer Desc. RTD 3275143 **Serial Number** 01229 Tfer ID **Slope** 0.99989 **Intercept** -0.00649 **DAS 1: DAS 2:** 1/23/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.09 0.19 UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference Test type primary Temp Low Range 0.04 0.05 0.000 0.1 \mathbf{C} 0.05 C Temp Mid Range 24.17 24.18 0.000 24.2 -0.03 primary 47.80 0.000 C primary Temp High Range 47.81 47.6 -0.19Status pass Sensor Component Shield **Condition** Clean Sensor Component Blower Status pass **Condition** N/A Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** 223461 SAN189 Martin Valvur 10/25/2019 Shelter Temperature Campbell none **DAS 1: DAS 2:** Mfg Fluke Parameter Shelter Temperature Abs Avg Err Abs Max Err Abs Avg Err **Abs Max Err** Tfer Desc. RTD 3275143 **Serial Number** 0.29 0.42 01229 **Tfer ID** 0.99989 -0.00649 **Slope** Intercept 1/23/2019 1.00000 **Cert Date** CorrCoff

UseDesc.	UseDesc. Test type InputTmpRaw		InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference	
primary	primary Temp Mid Range 22.96		22.97	0.000	0.000 22.6		-0.42	
primary Temp Mid Range 22.26		22.26	22.27	0.000	22.7	С	0.39	
primary	primary Temp Mid Range 21.86		21.87	0.000	21.8	С	-0.07	
Sensor Con	nponent 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	Sample Tower Type	Condition	Туре В	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 SAN189 Site Visit Date 10/25/2019 Technician | Martin Valvur Site ID Santee **USGS Map EPA** Site Sponsor (agency) Map Scale Santee Sioux Nation **Operating Group Map Date** 31-107-9991 AQS# R.M. Young **Meteorological Type** Ozone, SO2, NOx, CO Air Pollutant Analyzer **QAPP** Latitude dry **Deposition Measurement QAPP** Longitude 429 **Land Use** range **QAPP Elevation Meters** Terrain rolling **QAPP Declination** Yes 6/21/2006 Conforms to MLM **OAPP Declination Date** (402) 857-2546 42.829154 **Site Telephone Audit Latitude** SR S54D -97.854128 Site Address 1 **Audit Longitude** Santee Sioux Indian Reservation Site Address 2 **Audit Elevation** 434 Knox 5.0 **County Audit Declination** Niobrara, NE City, State **Present** Fire Extinguisher 68760 No inspection date Zip Code Central First Aid Kit Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **Climbing Belt** Primary Op. E-mail **Security Fence Backup Operator V Secure Shelter** Backup Op. Phone # Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make Model** E8109-26012 Shelter One **Shelter Size** 720 cuft **✓** Notes The shelter is in very good condition, however somewhat cluttered. **Shelter Clean ✓** Notes

Driving Directions

Site OK

From Yankton, South Dakota go south on route 81. Turn right (south) at the intersection of route 12 and continue approximately 26 miles. Just past the casino and gas station, turn right (north) onto SR 54 toward Santee. Continue approximately 6.5 miles. The site will be visible through the farm gate on the left at the top of a hill just before 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		lacksquare
Feedlot operations	500 m		✓
Intensive agricultural ops (including aerial spraying)	500 m		✓
Limited agricultural operations	200 m		lacksquare
Large parking lot	200 m		lacksquare
Small parking lot	100 m		lacksquare
Tree line	50 m		lacksquare
Obstacles to wind	10 times obstacle height		✓

Siting	Distances OK	✓
Siting	Criteria Comn	nent

Fic	eld Systems Data Form	F-02058-1500-S3-rev002			
Site	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:

condition, and well maintained? Are all the meteorological sensors operational online, and reporting data? Are the shields for the temperature and RH sensors clean? Are the aspirated motors working? Is the solar radiation sensor's lens clean and free of scratches? Is the surface wetness sensor grid clean and undamaged? Are the sensor signal and power cables intact, in good condition, and well maintained?	Fi	eld Systems Data Form	F-02058-1500-S4-rev002			
condition, and well maintained? Are all the meteorological sensors operational online, and reporting data? Are the shields for the temperature and RH sensors clean? Are the aspirated motors working? Is the solar radiation sensor's lens clean and free of scratches? Is the surface wetness sensor grid clean and undamaged? Are the sensor signal and power cables intact, in good condition, and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained? Are the sensor signal and power cable connections protected growth the elements and well maintained? Are the sensor signal and power cable connections protected growth the elements and well maintained? N/A N/A N/A N/A N/A	Site	ID SAN189 Technician Martin Valvur		Site Visit Date 10/25/2019		
reporting data? Are the shields for the temperature and RH sensors clean? Are the aspirated motors working? Is the solar radiation sensor's lens clean and free of scratches? Is the surface wetness sensor grid clean and undamaged? Are the sensor signal and power cables intact, in good condition, and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained? N/A To Are the sensor signal and power cable connections protected from the elements and well maintained? N/A To Are the sensor signal and power cable connections protected with the elements and well maintained? N/A To Are the sensor signal and power cable connections protected with the elements and well maintained? N/A To Are the sensor signal and power cable connections protected with the elements and well maintained?	1		✓			
Are the aspirated motors working? N/A Is the solar radiation sensor's lens clean and free of scratches? Is the surface wetness sensor grid clean and undamaged? N/A Are the sensor signal and power cables intact, in good condition, and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained? N/A N/A N/A N/A N/A N/A N/A Povide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	2		✓			
Is the solar radiation sensor's lens clean and free of scratches? Is the surface wetness sensor grid clean and undamaged? Are the sensor signal and power cables intact, in good condition, and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained? N/A N/A N/A N/A N/A N/A rovide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	3	Are the shields for the temperature and RH sensors clean?	✓			
scratches? Is the surface wetness sensor grid clean and undamaged? Are the sensor signal and power cables intact, in good condition, and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained? N/A N/A N/A N/A rovide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	4	Are the aspirated motors working?	✓	N/A		
Are the sensor signal and power cables intact, in good condition, and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained? N/A N/A rovide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	5		✓	N/A		
condition, and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained? N/A rovide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	6	Is the surface wetness sensor grid clean and undamaged?	✓	N/A		
from the elements and well maintained? rovide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	7		✓	N/A		
	8		✓	N/A		
) regarding conditions listed above, or any other features,		

Fi	eld Systems Data Form	F-02058-1500-S5-rev002			
Site	SAN189 Technician Martin Valvur		Site Visit Date 10/25/2019		
	Siting Criteria: Are the pollutant analyzers and deposition eq	uipr	nent 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	mai	ntenance		
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?	✓			
	ride any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	ary)	regarding conditions listed above, or any other features,		

Field Systems Data Form F-02058-1500-S6-rev002 SAN189 Technician Martin Valvur Site Visit Date 10/25/2019 Site ID DAS, sensor translators, and peripheral equipment operations and maintenance Do the DAS instruments appear to be in good condition and well maintained? **V** Are all the components of the DAS operational? (printers, modem, backup, etc) Temperature only Do the analyzer and sensor signal leads pass through lightning protection circuitry? **V** Are the signal connections protected from the weather and well maintained? **V** Are the signal leads connected to the correct DAS channel? Are the DAS, sensor translators, and shelter properly **~** grounded? **✓** Does the instrument shelter have a stable power source? **✓** Is the instrument shelter temperature controlled? Grounded Stable Is the met tower stable and grounded? **V ✓** Is the sample tower stable and grounded? **V V** 11 Tower comments?

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

Field Systems Data Form F-02058-1500-S7-rev002 SAN189 Technician | Martin Valvur Site Visit Date 10/25/2019 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No N/A Yes Yes No N/A **✓** Wind speed sensor **Data logger** П **V V** Wind direction sensor Data logger ✓ **V Temperature sensor** Strip chart recorder **✓ V** Relative humidity sensor Computer **V Solar radiation sensor V** Modem П **V V Printer Surface wetness sensor ✓ V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V ~ Humidity sensor translator Surge protector** П П **V ~ UPS Solar radiation translator ~ V** Tipping bucket rain gauge Lightning protection device ~ **✓ Shelter heater** Ozone analyzer **V** ~ Filter pack flow controller Shelter air conditioner **~** Filter pack MFC power supply □ Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF ✓ V ✓ Site Ops Manual** 2014 **HASP ✓** 2014 **Field Ops Manual Calibration Reports V V** Ozone z/s/p Control Charts Preventive maintenance schedule 1 Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

Field Systems Data Form F-02058-1500-S8-rev002 SAN189 Technician Martin Valvur Site Visit Date 10/25/2019 Site ID Site operation procedures Trained by Wood Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency** Compliant **✓ V** N/A **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **QC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests Manual Precision Level Test ✓ V** Weekly **Analyzer Diagnostics Tests ~** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze Sample Line Check for Dirt/Water **~ ~** Weekly **Zero Air Desiccant Check** Unknown Do multi-point calibration gases go through the complete

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

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

reported? If yes, how?

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

✓

SSRF, logbook, call-in

Fi	Field Systems Data Form				F-02058-1500-S9-rev00			
Sit	e ID	SAN189 Te	chnician Martin Valvur	nician Martin Valvur		e 10/25/2019		
	Site ope	ration procedures						
1	Is the fil	ter pack being changed eve	ry Tuesday as scheduled	? 🗸	Filter changed mo	rinings		
2	Are the correctl	Site Status Report Forms b	eing completed and filed	✓				
3	3 Are data downloads and backups being performed as scheduled?				No longer required			
4	4 Are general observations being made and recorded? How?			✓	SSRF, logbook, call-in			
5	5 Are site supplies on-hand and replenished in a timely fashion?			✓				
6	6 Are sample flow rates recorded? How?			✓	SSRF, logbook, call-in			
7	7 Are samples sent to the lab on a regular schedule in a timely fashion?			✓				
8	8 Are filters protected from contamination during handling and shipping? How?			✓	Clean gloves on a	nd off		
9		site conditions reported reg ons manager or staff?	ularly to the field	✓				
QC	Check P	erformed	Frequency			Compliant		
I	Multi-poi	nt MFC Calibrations	✓ Semiannually			✓		
]	Flow System Leak Checks Weekly					✓		
]	Filter Pac	k Inspection						
]	Flow Rate	Setting Checks	✓ Weekly		✓			
1	Visual Ch	eck of Flow Rate Rotometer	✓ Weekly			✓		
]	In-line Fil	ter Inspection/Replacement	✓ Semiannually			\checkmark		
5	Sample Li	ne Check for Dirt/Water	✓ Weekly			✓		
		dditional explanation (phot n-made, that may affect the			y) regarding condi	tions listed above, or	any other features,	

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	В	none	000207
Shelter Temperature	Campbell	107-L	223461	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	14798	06537
Zero air pump	Werther International	C 70/4	000814272	06875

Site Inventory by Site Visit

11/5/2019 11/5/2019	Grenville-11/05/2019 Computer DAS	Dell	07039										
11/5/2019	•	Dell	07030	MCK131-Sandy Grenville-11/05/2019 1 11/5/2019 Computer Dell 07039 Inspiron 15 7M2MC12									
	DAS		07039	Inspiron 15	7M2MC12								
11/5/2019		Campbell	000429	CR3000	2535								
11/0/2010	Elevation	Elevation	None	1	None								
11/5/2019	Filter pack flow pump	Thomas	00497	107CA18	118700000596								
11/5/2019	Flow Rate	Apex	000528	AXMC105LPMDPCV	48097								
11/5/2019	Flow Rate	Apex	000600	AXMC105LPMDPCV	illegible								
11/5/2019	Infrastructure	Infrastructure	none	none	none								
11/5/2019	Modem	Raven	06477	H4222-C	0808311292								
11/5/2019	Modem	Digi	07177	LR54	unknown								
11/5/2019	Ozone	ThermoElectron Inc	000723	49i A1NAA	1105347327								
11/5/2019	Ozone Standard	ThermoElectron Inc	000366	49i A3NAA	0726124695								
11/5/2019	Sample Tower	Aluma Tower	03514	A	none								
11/5/2019	Shelter Temperature	Campbell	none	107-L	none								
11/5/2019	Siting Criteria	Siting Criteria	None	1	None								
11/5/2019	Temperature	RM Young	07002	41342	023293								
11/5/2019	Zero air pump	Werther International	06912	PC70/4	000829177								
	11/5/2019 11/5/2019 11/5/2019 11/5/2019 11/5/2019 11/5/2019 11/5/2019 11/5/2019 11/5/2019	11/5/2019 Filter pack flow pump 11/5/2019 Flow Rate 11/5/2019 Flow Rate 11/5/2019 Infrastructure 11/5/2019 Modem 11/5/2019 Ozone 11/5/2019 Ozone Standard 11/5/2019 Sample Tower 11/5/2019 Shelter Temperature 11/5/2019 Siting Criteria 11/5/2019 Temperature	11/5/2019 Filter pack flow pump Thomas 11/5/2019 Flow Rate Apex 11/5/2019 Flow Rate Apex 11/5/2019 Infrastructure Infrastructure 11/5/2019 Modem Raven 11/5/2019 Modem Digi 11/5/2019 Ozone ThermoElectron Inc 11/5/2019 Ozone Standard ThermoElectron Inc 11/5/2019 Sample Tower Aluma Tower 11/5/2019 Shelter Temperature Campbell 11/5/2019 Siting Criteria Siting Criteria 11/5/2019 Temperature RM Young	11/5/2019 Filter pack flow pump Thomas 00497 11/5/2019 Flow Rate Apex 000528 11/5/2019 Flow Rate Apex 000600 11/5/2019 Infrastructure none 11/5/2019 Modem Raven 06477 11/5/2019 Modem Digi 07177 11/5/2019 Ozone ThermoElectron Inc 000723 11/5/2019 Ozone Standard ThermoElectron Inc 000366 11/5/2019 Sample Tower Aluma Tower 03514 11/5/2019 Shelter Temperature Campbell none 11/5/2019 Siting Criteria Nine 11/5/2019 Temperature RM Young 07002	11/5/2019 Filter pack flow pump Thomas 00497 107CA18 11/5/2019 Flow Rate Apex 000528 AXMC105LPMDPCV 11/5/2019 Flow Rate Apex 000600 AXMC105LPMDPCV 11/5/2019 Infrastructure none none 11/5/2019 Modem Raven 06477 H4222-C 11/5/2019 Modem Digi 07177 LR54 11/5/2019 Ozone ThermoElectron Inc 000723 49i A1NAA 11/5/2019 Ozone Standard ThermoElectron Inc 000366 49i A3NAA 11/5/2019 Sample Tower Aluma Tower 03514 A 11/5/2019 Shelter Temperature Campbell none 107-L 11/5/2019 Siting Criteria None 1 11/5/2019 Temperature RM Young 07002 41342								

DAS Data Form 0 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2535 MCK131 Sandy Grenville 11/05/2019 DAS Primary Das Date: 11/5 /2019 **Audit Date** 11/5 /2019 Fluke **Parameter** DAS Mfg 14:53:22 **Das Time:** 14:53:22 **Audit Time** 95740135 Tfer Desc. DVM **Serial Number** Das Day: 309 **Audit Day** 309 Tfer ID 01311 **High Channel: Low Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0000 0.0000 0.0000 0.0000 1/25/2019 1.00000 **Cert Date** CorrCoff Datel Parameter DAS Mfg **Serial Number** 15510194 Tfer Desc. Source generator (D 01320 Tfer ID 1.00000 0.00000 **Slope** Intercept 2/13/2012 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output **DAS** Output InputUnit OutputUnit Difference 7 V 0.0000 0.0000 0.0000 0.0000 7 0.1000 0.1000 V V 0.0000 0.1000 7 0.3000 0.30010.3001 V V 0.00007 V V 0.5000 0.5008 0.5008 0.0000 V V 7 0.7000 0.7008 0.7008 0.0000 7 V V 0.9000 0.9005 0.9005 0.0000 7 1.0000 V V 0.00001.0006 1.0006

Flow Data Form **Technician Owner ID** Mfg **Serial Number Tag Site** Site Visit Date Parameter MCK131 Sandy Grenville 000600 Apex 11/05/2019 Flow Rate illegible Mfg BIOS Parameter Flow Rate 148613 Tfer Desc. BIOS 220-H **Serial Number** 01421 Tfer ID 0.00000 **Slope** 1.00000 **Intercept** 3/4/2019 1.00000 CorrCoff **Cert Date** -0.04 **DAS 2: DAS 1: Cal Factor Zero** 0.96 A Avg % Diff: A Max % Dif A Avg % Diff A Max % Dif **Cal Factor Full Scale** 3.01% 3.23% 1.4 **Rotometer Reading:** Test type Input l/m Input Corr MfcDisp. OutputSignal Output S E InputUnit OutputSignall PctDifference Desc. primary pump off 0.000 0.0000.01 0.000 0.01 1/m1/m leak check 0.01 0.000 -0.03 1/m0.000 0.000 1/mprimary test pt 1 1.558 1.560 1.55 0.000 1.51 1/m1/m -3.21% primary 1.55 0.000 1/m-2.58% primary test pt 2 1.547 1.550 1.51 1/m test pt 3 1.550 1.550 1.55 0.000 1.50 1/m1/m -3.23% primary Sensor Component Leak Test Condition **Status** pass **Condition** Good **Status** pass **Sensor Component** Tubing Condition Sensor Component Filter Position **Condition** Good Status pass Sensor Component Rotometer Condition Status pass Condition Clean and dry Sensor Component Moisture Present Condition No moisture present Status pass

Condition 5.0 cm

Condition 0.5 cm

Condition 270 deg

Condition

Status pass

Status pass

Status pass

Status pass

Sensor Component Filter Distance

Sensor Component Filter Depth

Sensor Component Filter Azimuth

Sensor Component System Memo

Ozone Data Form

Mfg	Serial Numbe	er Tag Site	Т	echnician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347327	MCK131		Sandy Grenville	11/05/2019	Ozone	000723
Slope: Intercept CorrCoff:		rcept	0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180930075 01115		ozone Ozone primary stan
DAS 1:		AS 2:	N.F. 0/ D10	Slope	1.008	00 Intercept	-0.40210
A Avg % Diff: A I	0.0% A	Avg %Diff A	Max % Dif	Cert Date	3/26/20	19 CorrCoff	1.00000
UseDescription	ConcGroup	Tfer Raw	Tfer Corr		Site Unit	RelPerDif	AbsDif
primary	1	0.07	0.46	-1.28	ppb		-1.74
primary primary	3	14.71 35.02	14.99 35.14	13.59 33.61	ppb ppb	-4.45	-1.4
primary	4	68.17	68.02	67.11	ppb	-1.35	
primary	5	110.10	109.62	107.20	ppb	-2.23	
Sensor Compone	ent Sample Trai	in	Condi	tion Good		Status pass	
Sensor Compone	ent 22.5 degree	rule	Condi	tion		Status pass	
Sensor Compone	ent Inlet Filter C	ondition	Condi	tion Clean		Status pass	
Sensor Compone	ent Battery Back	kup	Condi	tion N/A		Status pass	
Sensor Compone	ent Offset		Condi	tion 0.000		Status pass	
Sensor Compone	ent Span		Condi	tion 1.005		Status pass	
Sensor Compone	ent Zero Voltage	е	Condi	tion N/A		Status pass	
Sensor Compone	Fullscale Vo	ltage	Condi	tion N/A		Status pass	
Sensor Compone	ent Cell A Freq.		Condi	tion 88.7 kHz		Status pass	
Sensor Compone	ent Cell A Noise)	Condi	tion 0.6 ppb		Status pass	
Sensor Compone	ent Cell A Flow		Condi	tion 0.70 lpm		Status pass	
Sensor Compone	ent Cell A Press	sure	Condi	tion 729.2 mmHg		Status pass	
Sensor Compone	ent Cell A Tmp.		Condi	tion 27.2 C		Status pass	
Sensor Compone	ent Cell B Freq.		Condi	tion 92.7 kHz		Status pass	
Sensor Component Cell B Noise		Condi	tion 0.7 ppb		Status pass		
Sensor Compone	ent Cell B Flow		Condi	tion 0.71 lpm		Status pass	
Sensor Compone	ent Cell B Press	sure	Condi	tion 729.8 mmHg		Status pass	
Sensor Compone	ent Cell B Tmp.		Condi	tion N/A		Status pass	
Sensor Compone	ent Line Loss		Condi	tion Not tested		Status pass	
Sensor Compone	ent System Mer	no	Condi	tion		Status pass	

Temperature Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg 023293 MCK131 Sandy Grenville 11/05/2019 Temperature 07002 RM Young Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 Tfer ID **Slope** 1.00733 **Intercept** 0.14497 **DAS 1: DAS 2:** 2/12/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.29 0.39 UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference Test type primary Temp Low Range -0.13-0.27 0.000 0.1 \mathbf{C} 0.39 C Temp Mid Range 26.16 25.83 0.000 25.9 0.1 primary 49.73 0.000 C -0.38 primary Temp High Range 49.22 48.8 Status pass Sensor Component Shield **Condition** Clean Sensor Component Blower Status pass **Condition** N/A Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** MCK131 Sandy Grenville 11/05/2019 Shelter Temperature Campbell none none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperature Abs Avg Err Abs Max Err Abs Avg Err **Abs Max Err** Tfer Desc. RTD H232734 **Serial Number** 0.20 0.30 01227 **Tfer ID** 1.00733 0.14497 **Slope** Intercept 2/12/2019 CorrCoff 1.00000 **Cert Date**

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	21.07	20.77	0.000	21.1	С	0.3
primary	Temp Mid Range	22.50	22.19	0.000	22.0	С	-0.19
primary	Temp Mid Range	23.61	23.29	0.000	23.2	С	-0.1
Sensor Component System Memo			Condition		Status	pass	

Infrastructure Data For

MCK131	Technician	Sandy Grenville	Site Visit Date	11/05/2019
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Shelter Make	Shelter Model	Shelter Size	
Ekto	8810	640 cuft	

Sensor Component	Sample Tower Type	Condition	Type A	Status pass
Sensor Component	Conduit	Condition	N/A	Status pass
Sensor Component	Met Tower	Condition	N/A	Status pass
Sensor Component	Moisture Trap	Condition	Installed	Status pass
Sensor Component	Power Cables	Condition	Good	Status pass
Sensor Component	Shelter Temp Control	Condition	Functioning	Status pass
Sensor Component	Rotometer	Condition	Installed	Status pass
Sensor Component	Sample Tower	Condition	Fair	Status pass
Sensor Component	Shelter Condition	Condition	Fair	Status pass
Sensor Component	Shelter Door	Condition	Fair	Status pass
Sensor Component	Shelter Roof	Condition	Good	Status pass
Sensor Component	Shelter Floor	Condition	Fair	Status pass
Sensor Component	Signal Cable	Condition	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 Visit Date 11/05/2019 MCK131 Technician Sandy Grenville Site ID Mackville **USGS Map EPA** Site Sponsor (agency) Map Scale Private **Operating Group** 21-229-9991 **Map Date** AQS# R.M. Young **Meteorological Type** 37.7044 Air Pollutant Analyzer Ozone **QAPP** Latitude -85.0483 dry, wet **QAPP** Longitude **Deposition Measurement** 353 **Land Use** agriculture, woodland - mixed **QAPP Elevation Meters** 4.25 Terrain rolling **QAPP Declination** 12/28/2004 Marginally Conforms to MLM **OAPP Declination Date** (859) 262-5181 37.704678 **Site Telephone Audit Latitude** Westley Miller Road -85.048706 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 293 Washington -4.5 **County Audit Declination** Harrodsburg, KY City, State **Present** Fire Extinguisher 40330 New in 2015 Zip Code Eastern **First Aid Kit** Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **Climbing Belt** Primary Op. E-mail **Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 Ekto **Shelter Size** 640 cuft **✓** Notes **Shelter Clean** The shelter is neat and well organized. **✓** Notes

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.

Site OK

Driving Directions

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		V
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		\checkmark
Secondary road, heavily traveled	500 m		✓
Secondary road, lightly traveled	200 m		✓
Feedlot operations	500 m		✓
Intensive agricultural ops (including aerial spraying)	500 m		✓
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 Comn	nent

Fic	eld Systems Data Form		F-02058-1500-S3-rev002
Site	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:

Fi	eld Systems Data Form		F-02058-1500-S4-rev002
Site	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?	✓	
	ide any additional explanation (photograph or sketch if neces ral or man-made, that may affect the monitoring parameters:) regarding conditions listed above, or any other features,

Fi	eld Systems Data Form		F-02058-1500-S5-rev002
Site	MCK131 Technician Sandy Grenville		Site Visit Date 11/05/2019
	Siting Criteria: Are the pollutant analyzers and deposition eq	uipr	ment 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	mai	intenance
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
	ride any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	ary)	regarding conditions listed above, or any other features,

Field Systems Data Form

F-02058-1500-S6-rev002

Site	ID	MCK131	Technician S	andy Grenville		Site Vis	it Date	11/05/201	9	
	DAS, sei	nsor translators, and p	oeripheral equipn	nent operation	s an	nd maintena	<u>nce</u>			
1	Do the D	AS instruments appearation of the control of the co	ar to be in good c	ondition and	✓					
2		he components of the backup, etc)	DAS operational	? (printers,	✓					
3		nalyzer and sensor sig protection circuitry?		rough	✓	Met sensors	only			
4	Are the swell mai	signal connections pro ntained?	tected from the v	veather and	✓					
5	Are the	signal leads connected	to the correct DA	AS channel?	✓					
6	Are the l	DAS, sensor translatord?	rs, and shelter pr	operly	✓					
7	Does the	instrument shelter ha	ave a stable powe	r source?	✓					
8	Is the ins	strument shelter temp	erature controlle	d?	✓					
9	Is the mo	et tower stable and gro	ounded?			Stable			Grounded	
10	Is the sa	mple tower stable and	grounded?			<u> </u>			<u> </u>	
11	Tower co	omments?				Met tower re	emoved		_	
		additional explanation an-made, that may af				y) regardin	g condit	ions listed	d above, or a	any other features,

MCK131 Technician Sandy Grenville Site Visit Date 11/05/2019 Site ID **Documentation** Does the site have the required instrument and equipment manuals? N/A Yes No Yes No N/A **✓** Wind speed sensor **Data logger V V** Wind direction sensor Data logger ✓ **V** П **Temperature sensor** Strip chart recorder ✓ **V** Relative humidity sensor Computer **V** П **Solar radiation sensor V** Modem П **V V Printer Surface wetness sensor V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V** \checkmark **~ Humidity sensor translator Surge protector** П **V ~ UPS Solar radiation translator ~ V** Tipping bucket rain gauge Lightning protection device ~ **✓ Shelter heater** Ozone analyzer **V ✓** Filter pack flow controller Shelter air conditioner **~** Filter pack MFC power supply □ Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF ✓ V ✓ Site Ops Manual** Oct 2014 **V HASP ✓** Oct 2014 **Field Ops Manual Calibration Reports V ✓** Electronic copy Ozone z/s/p Control Charts Preventive maintenance schedule 1 Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

F-02058-1500-S7-rev002

Field Systems Data Form

HASP and Field Operations Manual are not onsite.

Field Systems Data Form F-02058-1500-S8-rev002 MCK131 Technician Sandy Grenville Site Visit Date 11/05/2019 Site ID Site operation procedures Has the site operator attended a formal CASTNET training ✓ Trained on-site by MACTEC technician course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency** Compliant **✓ V** Semiannually **Multipoint Calibrations V V** Weekly **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **Compliant QC Check Performed** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V** Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests V Manual Precision Level Test ✓ V Analyzer Diagnostics Tests** Weekly **~** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Sample Line Check for Dirt/Water Weekly **V V** Weekly **Zero Air Desiccant Check**

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

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

	Unknown
✓	
✓	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:

Fi	eld Sy	stems Data Form									F-02	058-1	15()0-S	9-rev	002
Site ID MCK131 Tech				nnician Sandy Grenville				Site Vi	sit Date	e 11/05/2019						
	Site ope	ration procedures														
1	Is the fi	ter pack being changed ever	y Tu	esda	y as scheduled	? ✓	Filte	er chan	ged moi	rinin	ngs					
2	Are the correctl	Site Status Report Forms be	eing c	omp	leted and filed	✓										
3 Are data downloads and backups being performed as scheduled?							No longer required									
4	4 Are general observations being made and recorded? How?					✓	SSI	SSRF, logbook								
5 Are site supplies on-hand and replenished in a timely fashion?					✓											
6	6 Are sample flow rates recorded? How?					✓	SSRF, logbook, call-in									
7	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?					✓	Cle	an glove	es on a	nd o	off						
9		site conditions reported regularisms manager or staff?	ılarly	y to tl	he field	✓										
QC	Check P	erformed		Freq	uency					C	ompliant					
]	Multi-poi	nt MFC Calibrations	✓	Semi	annually					V						
]	Flow Syst	em Leak Checks	✓	Week	dy					V						
]	Filter Pac	k Inspection														
Flow Rate Setting Checks ✓ Weekly						✓										
7	Visual Check of Flow Rate Rotometer ✓ Weekly									V						
]	In-line Filter Inspection/Replacement ✓ As needed					✓										
Sample Line Check for Dirt/Water								V								
		dditional explanation (photon-made, that may affect the					y) re	garding	g condi	tion	s listed at	oove, or	any	other	feature	s,

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
MCI	K231-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 0 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2137 MCK231 Sandy Grenville 11/05/2019 DAS Primary Das Date: 11/5 /2019 **Audit Date** 11/5 /2019 Fluke **Parameter** DAS Mfg 14:44:28 14:44:28 **Das Time: Audit Time** 95740135 Tfer Desc. DVM **Serial Number** Das Day: 309 **Audit Day** 309 Tfer ID 01311 **High Channel: Low Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0000 0.0000 0.0000 0.0000 1/25/2019 1.00000 **Cert Date** CorrCoff Datel Parameter DAS Mfg **Serial Number** 15510194 Tfer Desc. Source generator (D 01320 Tfer ID 1.00000 0.00000 **Slope** Intercept 2/13/2012 1.00000 CorrCoff **Cert Date** Channel Input **DVM** Output **DAS** Output InputUnit OutputUnit Difference 7 V 0.0000 0.0000 0.0000 0.0000 7 0.1001 0.1001 V V 0.0000 0.1000 7 0.3000 0.3004 0.3004 V V 0.00007 V V 0.5000 0.5003 0.5003 0.0000 V V 7 0.7000 0.7002 0.7002 0.0000 7 V V 0.9000 0.9004 0.9004 0.0000 7 1.0000 V V 0.00001.0001 1.0001

Flow Data Form **Technician Owner ID** Mfg **Serial Number Tag Site** Site Visit Date Parameter Sandy Grenville 000597 Apex MCK231 11/05/2019 Flow Rate illegible Mfg BIOS Parameter Flow Rate 148613 Tfer Desc. BIOS 220-H **Serial Number** 01421 Tfer ID 0.00000 **Slope** 1.00000 **Intercept** 3/4/2019 1.00000 CorrCoff **Cert Date** -0.02 **DAS 2: DAS 1: Cal Factor Zero** 0.99 A Avg % Diff: A Max % Dif A Avg % Diff A Max % Dif **Cal Factor Full Scale** 2.16% 3.21% 1.5 **Rotometer Reading:** Test type Input l/m Input Corr MfcDisp. OutputSignal Output S E InputUnit OutputSignall PctDifference Desc. primary pump off 0.000 0.0000.00 0.000 -0.021/m1/m leak check 0.00 0.000 -0.01 1/m0.000 0.000 1/mprimary test pt 1 1.559 1.560 1.52 0.000 1.51 1/m1/m -3.21% primary 1.52 0.000 1.50 1/m-1.96% primary test pt 2 1.529 1.530 1/m test pt 3 1.534 1.530 1.52 0.000 1.51 1/m1/m -1.31% primary Sensor Component Leak Test Condition **Status** pass

Condition Good

Condition Fair

Condition 4.5 cm

Condition 0.0 cm

Condition 180 deg

Condition

Condition Clean and dry

Condition No moisture present

Status pass

Status pass

Sensor Component Tubing Condition

Sensor Component Rotometer Condition

Sensor Component Moisture Present

Sensor Component Filter Distance

Sensor Component Filter Depth

Sensor Component Filter Azimuth

Sensor Component System Memo

Sensor Component Filter Position

Ozone Data Form

Mfg	Serial Numbe	r Tag Site	T	echnician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244796	MCK231		Sandy Grenville	11/05/2019	Ozone	000682
Intercept -1		rcept	0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180930075 01115		neter ozone Ozone primary stan
DAS 1:	D A	AS 2:		Slope	1.0080	00 Intercep	-0.40210
A Avg % Diff: A M		Avg %Diff A	Max % Dif	Cert Date	3/26/20		
0.0%	0.0%			CCIT Date	0/20/20	Correo	
	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	
primary	1	0.20	0.59	-1.52	ppb		-2.11
primary	2	14.88 35.04	15.16 35.16	13.65	ppb	-2.	-1.51
primary primary	3 4	69.80	69.64	34.27 67.56	ppb ppb	-2. -3.	
primary	5	111.70	111.21	109.81	ppb		27
Sensor Componer				tion Good	рро	Status pas	
Sensor Componer	22.5 degree	rule	Condi	tion		Status pas	SS
Sensor Componer	Inlet Filter C	ondition	Condi	tion Clean		Status pas	SS
Sensor Componer	attery Back	кир	Condi	tion N/A		Status pas	SS
Sensor Componer	offset Offset		Condi	tion 0.000		Status pas	ss
Sensor Componer	Span		Condi	1.017		Status pas	SS
Sensor Componer	zero Voltage	Э	Condi	tion N/A		Status pas	SS
Sensor Componer	Fullscale Vo	ltage	Condi	tion N/A		Status pas	SS
Sensor Component Cell A Freq.				tion 88.7 kHz		Status pas	SS
Sensor Component Cell A Noise				tion 0.4 ppb		Status pas	SS
Sensor Componer	Cell A Flow		Condi	tion 0.69 lpm		Status pas	ss
Sensor Componer	cell A Press	sure	Condi	tion 716.7 mmHg		Status pas	ss
Sensor Componer	Cell A Tmp.			tion 32.5 C		Status pas	
Sensor Componer	cell B Freq.		Condi	tion 90.2 kHz		Status pas	SS
Sensor Componer	cell B Noise			0.6 ppb		Status pas	SS
Sensor Component Cell B Flow				tion 0.73 lpm		Status pas	ss
Sensor Component Cell B Pressure				tion 716.1 mmHg		Status pas	
Sensor Component Cell B Tmp.				tion N/A		Status pas	SS
Sensor Component Line Loss				tion Not tested		Status pas	SS
Sensor Componer	System Men	no	Condi	tion		Status pas	SS

Temperature Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg 07003 025496 MCK231 Sandy Grenville 11/05/2019 Temperature RM Young Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 Tfer ID **Slope** 1.00733 **Intercept** 0.14497 **DAS 1: DAS 2:** 2/12/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.50 0.88 UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference Test type primary Temp Low Range -0.13-0.270.000 0.2 \mathbf{C} 0.45 C Temp Mid Range 26.16 25.83 0.000 25.7 -0.17 primary 0.000 C primary Temp High Range 49.75 49.24 48.4 -0.88 Status pass Sensor Component Shield **Condition** Clean Sensor Component Blower Status pass **Condition** N/A Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** MCK231 Sandy Grenville 11/05/2019 Shelter Temperature Campbell none none **DAS 1: DAS 2:** Extech Mfg Parameter Shelter Temperature Abs Avg Err Abs Max Err Abs Avg Err **Abs Max Err** Tfer Desc. RTD H232734 **Serial Number** 0.56 0.98 01227 **Tfer ID** 1.00733 0.14497 **Slope** Intercept 2/12/2019 1.00000 **Cert Date** CorrCoff

primary Te	3.61.1.75			OutputTmpSignal	OutputSignalEng	OSE OIII	Difference
	emp Mid Range	20.65	20.36	0.000	21.3	C	0.98
primary Te	emp Mid Range	23.61	23.29	0.000	23.8	C	0.54
primary Te	emp Mid Range	22.05	21.75	0.000	21.9	C	0.15
Sensor Compo	onent System Memo		Condition		Status	pass	

Infrastructure Data For

Site ID	MCK231	Technician	Sandy Grenville	Site Visit Date	11/05/2019
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Shelter Make	Shelter Model	Shelter Size
Ekto	8810	640 cuft

Sensor Component	Sample Tower Type	Condition	Type A	Status pass
Sensor Component	Conduit	Condition	N/A	Status pass
Sensor Component	Met Tower	Condition	N/A	Status pass
Sensor Component	Moisture Trap	Condition	Installed	Status pass
Sensor Component	Power Cables	Condition	Good	Status pass
Sensor Component	Shelter Temp Control	Condition	Functioning	Status pass
Sensor Component	Rotometer	Condition	Installed	Status pass
Sensor Component	Sample Tower	Condition	Fair	Status pass
Sensor Component	Shelter Condition	Condition	Fair	Status pass
Sensor Component	Shelter Door	Condition	Fair	Status pass
Sensor Component	Shelter Roof	Condition	Good	Status pass
Sensor Component	Shelter Floor	Condition	Fair	Status pass
Sensor Component	Signal Cable	Condition	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 Visit Date 11/05/2019 MCK231 Technician Sandy Grenville Site ID Mackville **USGS Map EPA** Site Sponsor (agency) Map Scale Private **Operating Group** 21-229-9991 **Map Date** AQS# R.M. Young **Meteorological Type** 37.7044 Air Pollutant Analyzer Ozone **QAPP** Latitude -85.0483 dry, wet **QAPP** Longitude **Deposition Measurement** 353 **Land Use** agriculture, woodland - mixed **QAPP Elevation Meters** 4.25 Terrain rolling **QAPP Declination** Marginally 12/28/2004 Conforms to MLM **OAPP Declination Date** (859) 262-5181 37.704678 **Site Telephone Audit Latitude** Wesley Miller Road -85.048706 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 293 Washington -4.5 **County Audit Declination** Harrodsburg, KY City, State **Present** Fire Extinguisher 40330 New in 2015 Zip Code **Time Zone** Eastern First Aid Kit **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **Climbing Belt** Primary Op. E-mail **Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 Ekto **Shelter Size** 640 cuft

Driving Directions

Shelter Clean

Site OK

✓ Notes

✓ Notes

sites.

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.

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

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		V
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		\checkmark
Secondary road, heavily traveled	500 m		\checkmark
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 Comn	ient

Field Systems Data Form F-02058-1500-S3-rev002 Site Visit Date 11/05/2019 Site ID MCK231 Technician Sandy Grenville ✓ N/A Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? ✓ N/A Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) ✓ N/A Are the tower and sensors plumb? Temperature facing south Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? **V** Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) ✓ N/A Is the solar radiation sensor plumb? Is it sited to avoid shading, or any artificial or reflected light? N/A Is the rain gauge plumb? ✓ N/A Is it sited to avoid sheltering effects from buildings, trees, towers, etc? N/A 10 Is the surface wetness sensor sited with the grid surface facing north? ✓ N/A 11 Is it inclined approximately 30 degrees?

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

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

Fie	eld Systems Data Form	F-02058-1500-S4-rev002					
Site	ID MCK231 Technician Sandy Grenville	Site Visit Date 11/05/2019					
	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	Temperature only					
	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	-				
	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					
	Are the sensor signal and power cables intact, in good condition, and well maintained?						
	Are the sensor signal and power cable connections protected from the elements and well maintained?						
	de any additional explanation (photograph or sketch if necesseal or man-made, that may affect the monitoring parameters:	ary) regarding conditions listed above, or any other features,					

Fi	eld Systems Data Form		F-02058-1500-S5-rev002
Site	MCK231 Technician Sandy Grenville		Site Visit Date 11/05/2019
	Siting Criteria: Are the pollutant analyzers and deposition eq	uipr	ment 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	ma	intenance
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
	ride any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	ary)	regarding conditions listed above, or any other features,

Field Systems Data Form

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			,-,,,,-		/\/

Site	ID	MCK231	Technician	Sandy Grenville		Site Visi	t Date 11/0	5/2019	
	DAS, sei	nsor translators, and p	peripheral equir	oment operation	ıs ar	nd maintena	nce		
1		AS instruments appe		-	✓				
2		he components of the backup, etc)	DAS operationa	al? (printers,					
3		nalyzer and sensor sig protection circuitry?		hrough	✓	Met sensors	only		
4	Are the swell mai	signal connections prontained?	tected from the	weather and	✓				
5	Are the	signal leads connected	to the correct I	OAS channel?	✓				
6	Are the l	DAS, sensor translatord?	rs, and shelter p	oroperly	✓				
7	Does the	instrument shelter ha	ive a stable pow	er source?	✓				
8	Is the in	strument shelter temp	erature control	led?	✓				
9	Is the mo	et tower stable and gr	ounded?			Stable		Grounded	
10	Is the sa	mple tower stable and	grounded?					<u> </u>	
11	Tower co	omments?				Met tower re	moved		
Duc	vida anv	additional avalanction	n (nhotograph c	r skatch if nece	CCOM	y) regarding	r conditions	listed above one	inv other feetures
		additional explanation an-made, that may af				y) regarding	g continons	nsteu above, or a	my other reatures,

Field Systems Data Form F-02058-1500-S7-rev002 MCK231 Technician Sandy Grenville Site Visit Date 11/05/2019 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No N/A Yes Yes No N/A П **✓** Wind speed sensor **Data logger** П **V V** Wind direction sensor Data logger ✓ **V Temperature sensor** Strip chart recorder **✓ V** Relative humidity sensor Computer **V Solar radiation sensor V** Modem П **V V Printer Surface wetness sensor V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V** ✓ **V Humidity sensor translator Surge protector** П **V V UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device** ~ **✓ Shelter heater** Ozone analyzer **V** \checkmark Filter pack flow controller Shelter air conditioner **~** Filter pack MFC power supply □ Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF ✓ V Site Ops Manual ✓ V HASP** Oct 2014 **✓ Field Ops Manual V** Oct 2014 **Calibration Reports ✓ V** Electronic copy Ozone z/s/p Control Charts Preventive maintenance schedule 1 Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

Field Systems Data Form F-02058-1500-S8-rev002 MCK231 Technician Sandy Grenville Site Visit Date 11/05/2019 Site ID Site operation procedures Has the site operator attended a formal CASTNET training ✓ Trained on-site by MACTEC technician course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? Compliant **QC Check Performed Frequency V ✓** Semiannually **Multipoint Calibrations ✓ V** Weekly **Visual Inspections V** Translator Zero/Span Tests (climatronics) N/A **✓ V** N/A **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values ✓ V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **Frequency** Compliant **QC Check Performed Multi-point Calibrations ✓ V** Semiannually **V** Daily Automotic Zono/Chan Tosts

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 wee	eks		✓	
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 throu	gh the	complete	✓			
sample train including all filters?			_			
2 Do automatic and manual z/s/p gasses go	through	gh the	✓			
complete sample train including all filters	,					
3 Are the automatic and manual z/s/p check		nitored and	✓	Logbook, call-in		
reported? If yes, how?		and the time		,		
reported. If yes, now.						

Provide any additional explanation (photograph or sketch if necessary) regarding 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				
Sit	e ID	MCK231 Ted	chnic	i <mark>an</mark> Sa	ndy Grenville		Site Visit Dat	e 11/05/20	19		
	Site ope	ration procedures									
1	Is the fil	ter pack being changed ever	y Tu	esday a	s scheduled?	V	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 gen	eral observations being mad	e and	l record	led? How?	✓	SSRF, logbook				
5	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 sam	aples sent to the lab on a reg	ular s	schedul	e in a timely	✓					
8		ers protected from contamination	ation	during	handling	✓	Clean gloves on a	nd off			
9		site conditions reported regularies manager or staff?	ılarly	y to the	field	✓					
QC	Check P	erformed		Freque	ncy			Complia	ınt		
]	Multi-poi	nt MFC Calibrations	✓	Semianr	nually			✓			
]	Flow Syst	em Leak Checks	✓	Weekly				✓			
]	Filter Pack Inspection										
]	Flow Rate Setting Checks Weekly					✓					
7	Visual Check of Flow Rate Rotometer ✓ Weekly					✓					
]	In-line Filter Inspection/Replacement As needed					V					
	Sample Li	ne Check for Dirt/Water	✓	Weekly				\checkmark			
		dditional explanation (photon-made, that may affect the) regarding condi	tions listed	l above, or	any other fo	eatures,

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 V	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number					
STK1	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	Α	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 0 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Primary Campbell 2128 STK138 Korey Devins 11/05/2019 DAS Das Date: 11/5 /2019 **Audit Date** 11/5 /2019 Fluke **Parameter** DAS Mfg 11:16:00 11:16:00 **Das Time: Audit Time** 95740135 Tfer Desc. DVM **Serial Number** 309 Das Day: 309 **Audit Day** Tfer ID 01311 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0001 0.0002 0.0001 0.0002 1/25/2019 1.00000 **Cert Date** CorrCoff Datel Parameter DAS Mfg **Serial Number** 15510194 Tfer Desc. Source generator (D 01320 Tfer ID 1.00000 0.00000 **Slope** Intercept 2/13/2012 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output **DAS** Output InputUnit OutputUnit Difference 7 V 0.0000 -0.0001 -0.0001 0.0000 7 0.1000 0.0997 0.0998 V V 0.0001 7 0.3000 0.2996 0.2997 V V 0.00017 V V 0.5000 0.4994 0.4995 0.0001 V V 7 0.7000 0.6993 0.6995 0.0002 7 V V 0.9000 0.8992 0.0001 0.8993 7 1.0000 0.9990 0.9992 V V 0.0002

Flow Data Form **Technician Owner ID** Mfg **Serial Number Tag Site** Site Visit Date Parameter Korey Devins 11/05/2019 000661 Apex STK138 Flow Rate illegible Mfg BIOS Parameter Flow Rate 148613 Tfer Desc. BIOS 220-H **Serial Number** 01421 Tfer ID 0.00000 **Slope** 1.00000 **Intercept** 3/4/2019 1.00000 CorrCoff **Cert Date** 0 **DAS 2: DAS 1: Cal Factor Zero** 0 A Avg % Diff: A Max % Dif A Avg % Diff A Max % Dif **Cal Factor Full Scale** 4.66% 4.90% 1.45 **Rotometer Reading:** Test type Input l/m Input Corr MfcDisp. OutputSignal Output S E InputUnit OutputSignal PctDifference Desc. primary pump off 0.000 0.0000.04 0.000 0.03 1/m1/m leak check 0.01 0.000 0.01 1/m0.000 0.000 1/mprimary 4.90% test pt 1 1.434 1.430 1.49 0.000 1.50 1/m1/m primary 1.430 1.49 0.000 1.50 1/m4.90% primary test pt 2 1.433 1/m test pt 3 1.444 1.440 1.50 0.000 1.50 1/m1/m 4.17% primary Sensor Component Leak Test Condition **Status** pass **Condition** Good **Status** pass **Sensor Component** Tubing Condition Sensor Component Filter Position **Condition** Good Status pass Sensor Component Rotometer Condition Status pass Condition Clean and dry Sensor Component Moisture Present **Condition** See comments Status pass Sensor Component Filter Distance Condition 4.0 cm Status pass Condition 2.0 cm Status pass Sensor Component Filter Depth

Condition 275 deg

Condition

Sensor Component Filter Azimuth

Sensor Component System Memo

Status pass

Status pass

Ozone Data Form

Mfg Se	eriai Numbe	r Tag Site	T	echnician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc 1	rmoElectron Inc 1009241797 ST		K	Corey Devins	11/05/2019	Ozone	000625
Intercept -0.1	97775 Slope 12925 Inter 99999 Corr	cept 0	.00000 .00000	Mfg Serial Number Tfer ID	ThermoElectron 1180030022 01114		er ozone c. Ozone primary stan
DAS 1:	DA	AS 2:		Slope	0.9860	0 Intercept	0.41627
A Avg % Diff: A Ma	x % Dif A	Avg %Diff A	Max % Dif				
0.0%	0.0%			Cert Date	10/29/201	9 CorrCoff	1.00000
UseDescription C	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	Sample Trai	n	Condit	ion Good		Status pass	
Sensor Component	22.5 degree	rule	Condit	ion		Status pass	
Sensor Component	Inlet Filter C	ondition	Condit	ion Clean		Status pass	
Sensor Component				ion N/A		Status pass	
Sensor Component		•		ion 0.10		Status pass	
_				ion 1.003		Status pass	
Sensor Component							
Sensor Component				ion N/A		Status pass	
Sensor Component	Fullscale Vo	ltage	Condit	ion N/A		Status pass	
Sensor Component	Cell A Freq.		Condit	ion 112.3 kHz		Status pass	
Sensor Component	Cell A Noise		Condit	ion 1.8 ppb		Status pass	
Sensor Component	Cell A Flow		Condit	ition 0.69 lpm		Status pass	
Sensor Component	Cell A Press	ure	Condit	ion 703.4 mmHg		Status pass	
Sensor Component	Cell A Tmp.		Condit	ion 33.9 C		Status pass	
Sensor Component	Cell B Freq.		Condit	ion 101.0 khz		Status pass	
Sensor Component	Cell B Noise		Condit	ion 1.2 ppb		Status pass	
Sensor Component	Cell B Flow		Condit	ion 0.63 lpm		Status pass	
Sensor Component	Sensor Component Cell B Pressure			ion 704.0 mmHg		Status pass	
Sensor Component	Cell B Tmp.			ion N/A		Status pass	
Sensor Component				ion Not tested		Status pass	
Sensor Component System Memo			Condit			Status pass	
School Component	-,	-	Condit			Status Paco	

Temperature Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg 14040 STK138 Korey Devins 11/05/2019 Temperature 06407 RM Young Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 Tfer ID **Slope** 1.00733 **Intercept** 0.14497 **DAS 1: DAS 2:** 2/12/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.03 0.04 UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference Test type primary Temp Low Range 0.17 0.02 0.000 0.0 \mathbf{C} -0.04 C Temp Mid Range 26.32 25.98 0.000 26.0 -0.02 primary C primary Temp High Range 46.73 46.25 0.000 46.3 0.02 Condition Moderately clean Status pass Sensor Component Shield Sensor Component Blower Status pass **Condition** N/A Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** STK138 Korey Devins 11/05/2019 Shelter Temperature Campbell none unknown **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperature Abs Avg Err Abs Max Err Abs Avg Err **Abs Max Err** Tfer Desc. RTD H232734 **Serial Number** 0.70 0.80 01227 **Tfer ID** 1.00733 0.14497 **Slope** Intercept 2/12/2019 CorrCoff 1.00000 **Cert Date**

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 Cor	nponent System Memo	<u> </u>	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	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 D	ata Form		F-02058-1500-S1-rev002	
Site ID STK138	Technician Korey Devins	Site Visit Date 11/0	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	42.28721	
Site Address 1	10939 E. Parker Road	Audit Longitude	-89.99999	
Site Address 2		Audit Elevation	281	
County	Jo Daviess	Audit Declination	-1.3	
City, State	Stockton, IL	Present		
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		
Shelter Working Room	Make Ekto M	odel 8810 (s/n 2149-21)	Shelter Size 640 cuft	
Shelter Clean	•	and cluttered. There are signs	of leaks on the walls and floor rot.	
	Notes			
cont Con	n Stockton go south on 78 (Main Street) fo inue straight onto a dirt road. There will be tinue through that intersection, the site will miles bearing to the left on dirt roads to the	e a stop sign at another dirt roa be visible in the distance on a	d intersection within 100 yards. hill-side to the left. Continue another	

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 $\ lacksquare$

Siting Criteria Comment

The site is located in a corn field on a cattle farm. Corn is planted within 10 meters.

F-02058-1500-S3-rev002 **Field Systems Data Form** Site Visit Date 11/05/2019 Site ID STK138 Technician Korey Devins ✓ N/A Are wind speed and direction sensors sited so as to avoid being influenced by obstructions? ✓ N/A Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind) ✓ N/A Are the tower and sensors plumb? Mounted to sample tower Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc? **V** Are temperature and RH sensors sited to avoid unnatural conditions? (i.e. ground below sensors should be natural surface and not steeply sloped. Ridges, hollows, and areas of standing water should be avoided) ✓ N/A Is the solar radiation sensor plumb? Is it sited to avoid shading, or any artificial or reflected light? N/A Is the rain gauge plumb? ✓ N/A Is it sited to avoid sheltering effects from buildings, trees, towers, etc? ✓ N/A 10 Is the surface wetness sensor sited with the grid surface

✓ N/A

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

facing north?

11 Is it inclined approximately 30 degrees?

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

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 neces natural or man-made, that may affect the monitoring parameters:	
 5 Is the solar radiation sensor's lens clean and free of scratches? 6 Is the surface wetness sensor grid clean and undamaged? 7 Are the sensor signal and power cables intact, in good condition, and well maintained? 8 Are the sensor signal and power cable connections protected from the elements and well maintained? Provide any additional explanation (photograph or sketch if neces 	 ✓ N/A ✓ N/A ✓ N/A ✓ N/A ✓ N/A sary) regarding conditions listed above, or any other features,

Fi	eld Systems Data Form		F-02058-1500-S5-rev002			
Sit	STK138 Technician Korey Devins		Site Visit Date 11/05/2019			
	Siting Criteria: Are the pollutant analyzers and deposition e	quipr	nent 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	d mai	intenance			
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			
'rov iatu	ide any additional explanation (photograph or sketch if neces ral or man-made, that may affect the monitoring parameters:	sary)	regarding conditions listed above, or any other features,			

Field Systems Data Form F-02058-1500-S6-rev002 STK138 Technician Korey Devins Site Visit Date 11/05/2019 Site ID DAS, sensor translators, and peripheral equipment operations and maintenance Do the DAS instruments appear to be in good condition and well maintained? **V** Are all the components of the DAS operational? (printers, modem, backup, etc) Met sensors only Do the analyzer and sensor signal leads pass through lightning protection circuitry? **✓** Are the signal connections protected from the weather and well maintained? **✓** Are the signal leads connected to the correct DAS channel? Are the DAS, sensor translators, and shelter properly **~** grounded? **✓** Does the instrument shelter have a stable power source? **✓** Is the instrument shelter temperature controlled? Grounded **Stable** Is the met tower stable and grounded?

Is the sample tower stable and grounded?

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

11 Tower comments?

V

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

V

Field Systems Data Form F-02058-1500-S7-rev002 STK138 Technician Korey Devins Site Visit Date 11/05/2019 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No N/A Yes Yes No N/A П **V V** Wind speed sensor **Data logger V V** Wind direction sensor Data logger **V V** П **Temperature sensor** Strip chart recorder **✓ V** Relative humidity sensor Computer **V** П **Solar radiation sensor V** Modem П **V V Printer Surface wetness sensor** ✓ **V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V V Humidity sensor translator Surge protector** П **V V UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device** ~ **✓ Shelter heater** Ozone analyzer **V ✓** Filter pack flow controller Shelter air conditioner **~** Filter pack MFC power supply □ Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF ✓ V ✓ V Site Ops Manual** May 2019 **✓ V HASP** May 2019 **✓ Field Ops Manual V** May 2019 **Calibration Reports V ✓** Ozone z/s/p Control Charts Preventive maintenance schedule 1 Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

Field Systems Data Form F-02058-1500-S8-rev002 STK138 Technician Korey Devins Site Visit Date 11/05/2019 Site ID Site operation procedures Trained by previous operator Has the site operator attended a formal CASTNET training ✓ course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency** Compliant **✓ V** N/A **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? Compliant **OC Check Performed** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** As needed Manual Zero/Span Tests **V ~** Daily **Automatic Precision Level Tests V Manual Precision Level Test** As needed **V V** Weekly **Analyzer Diagnostics Tests V** Monthly **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Sample Line Check for Dirt/Water Weekly **~ Zero Air Desiccant Check** Weekly Unknown Do multi-point calibration gases go through the complete sample train including all filters? **✓** Do automatic and manual z/s/p gasses go through the

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

✓

Call-in only

The ozone sample train is leak tested every 2 weeks.

complete sample train including all filters?

reported? If yes, how?

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

Field Systems Data Form					F-02058-1500-S9-rev002			
Sit	e ID	STK138 Te	chnician Korey Devins		Site Visit Date	11/05/2019		
	Site ope	ration procedures						
1	Is the fi	ter pack being changed ever	y Tuesday as scheduled	V	Filter changed morr	nings		
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 gen	eral observations being mad	e and recorded? How?	✓	SSRF, logbook			
5	Are site supplies on-hand and replenished in a timely fashion?			✓				
6	Are san	aple flow rates recorded? Ho	w?	✓	SSRF, call-in			
7	Are san	uples sent to the lab on a reg	ular schedule in a timely	✓				
8		ers protected from contamin oping? How?	ation during handling	✓	Clean gloves on and off			
9		site conditions reported reg ons manager or staff?	ularly to the field	✓				
QC	Check P	erformed	Frequency			Compliant		
I	Multi-poi	nt MFC Calibrations	✓ Semiannually			✓		
]	Flow System Leak Checks Weekly					✓		
]	Filter Pac	k Inspection						
]	Flow Rate Setting Checks Weekly				✓			
7	Visual Check of Flow Rate Rotometer ✓ Weekly			✓				
]	In-line Filter Inspection/Replacement ✓ Semiannually				V			
5	Sample Li	ne Check for Dirt/Water	✓ Weekly			✓		
		dditional explanation (photon-made, that may affect the) regarding conditi	ons listed above, or a	ny other features,	

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	<u> </u> 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
BVL	130-Korey	Devins-11/07/2019				
1	11/7/2019	со	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	В	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 0 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Primary Campbell 2111 BVL130 Korey Devins 11/07/2019 DAS Das Date: 11/7 /2019 **Audit Date** 11/7 /2019 Fluke **Parameter** DAS Mfg 15:03:00 15:03:00 **Das Time: Audit Time** 95740135 Tfer Desc. DVM **Serial Number** 311 Das Day: 311 **Audit Day** Tfer ID 01311 **High Channel: Low Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0002 0.0003 0.0002 0.0003 1/25/2019 1.00000 **Cert Date** CorrCoff Datel Parameter DAS Mfg **Serial Number** 15510194 Tfer Desc. Source generator (D 01320 Tfer ID 1.00000 0.00000 **Slope** Intercept 2/13/2012 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 7 V 0.0000 0.0000 0.0000 0.0000 7 0.1000 0.0998 0.0999 V V 0.0001 7 0.3000 0.2996 0.2998 V V 0.00027 V V 0.5000 0.4995 0.4997 0.0002 V V 7 0.7000 0.6994 0.6996 0.0002 7 V V 0.9000 0.8992 0.8995 0.0003 7 1.0000 0.9991 0.9994 V V 0.0003

Flow Data Form **Technician Owner ID** Mfg **Serial Number Tag Site** Site Visit Date Parameter Korey Devins 11/07/2019 000595 Apex BVL130 Flow Rate illegible Mfg BIOS Parameter Flow Rate 148613 Tfer Desc. BIOS 220-H **Serial Number** 01421 Tfer ID 0.00000 **Slope** 1.00000 **Intercept** 3/4/2019 1.00000 CorrCoff **Cert Date** 0 **DAS 2: DAS 1: Cal Factor Zero** 0 A Avg % Diff: A Max % Dif A Avg % Diff A Max % Dif **Cal Factor Full Scale** 0.88% 1.32% 1.45 **Rotometer Reading:** Test type Input l/m Input Corr MfcDisp. OutputSignal Output S E InputUnit OutputSignal PctDifference Desc. primary pump off 0.000 0.0000.00 0.000 -0.011/m1/m leak check 0.39 0.000 0.36 1/m0.000 0.000 1/mprimary test pt 1 1.519 1.520 1.59 0.000 1.50 1/m1/m -1.32% primary 1.59 0.000 1.50 1/m-1.32% primary test pt 2 1.520 1.520 1/m test pt 3 1.498 1.500 1.59 0.000 1.50 1/m1/m 0.00% primary Condition See comments Status Fail Sensor Component Leak Test **Status** pass **Sensor Component** Tubing Condition **Condition** Good Sensor Component Filter Position **Condition** Good Status pass Sensor Component Rotometer Condition Status pass Condition Clean and dry Sensor Component Moisture Present **Condition** See comments Status pass Sensor Component Filter Distance Condition 1.5 cm Status pass Condition 2.0 cm Status pass Sensor Component Filter Depth

Condition 190 deg

Condition

Sensor Component Filter Azimuth

Sensor Component System Memo

Status pass

Status pass

Ozone Data Form

		Tag Site	•	1 ecn	nician	Site Visit Date	Parame	eter	Owner II)
ThermoElectron Inc 1	105347318	BVL130		Kore	y Devins	11/07/2019	Ozone		000739	
Intercept -0.1 CorrCoff: 1.0	7565 Slope: 1353 Interce 0000 CorrCo	pt (0.00000 0.00000 0.00000	S	Ifg erial Number fer ID	ThermoElectron 1180030022 01114		rametei er Desc.	ozone Ozone primary	stan
DAS 1:	DAS		3.5 0/ D10	S	lope	0.9860	00 Inter	rcept	0.416	627
A Avg % Diff: A Max	0.0% A Av	g %Diff A	Max % Dif	C	ert Date	10/29/201	19 Corr	·Coff	1.000	000
0.076	0.076			L						
	oncGroup	Tfer Raw	Tfer Com	r	Site	Site Unit	RelPer	Dif	AbsDif	
primary	1	0.35	-0.06		0.00	ppb			0.06	
primary primary	3	15.36 35.58	15.15 35.66		14.48 34.63	ppb ppb		-2.93	-0.67	
primary	4	68.28	68.82		67.09	ppb		-2.55		
primary	5	113.42	114.60		111.70	ppb		-2.56		
Sensor Component		1101.12	<u>'</u>	ition	Good	PP	Status			1
Sensor Component		le	Cond				Status]
Sensor Component					Clean		Status]
Sensor Component			Cond				Status]
Sensor Component					0.000		Status]
Sensor Component					1.000		Status]
Sensor Component			Cond				Status]
Sensor Component		ge	Cond				Status			
Sensor Component					98.7 kHz		Status			
	nsor Component Cell A Noise				0.9 ppb		Status]
	Sensor Component Cell A Flow				0.70 lpm	Status				
Sensor Component		9			731.8 lpm		Status			
Sensor Component			Cond	ition	33.9 C		Status			
Sensor Component	Cell B Freq.				100.7 kHz		Status			
Sensor Component	Cell B Noise				0.3 ppb		Status	pass		
Sensor Component	Cell B Flow		Cond	ition	0.73 lpm		Status	pass		
Sensor Component	Cell B Pressure	9	Cond	ition	732.4 mmHg		Status	pass		
Sensor Component	nt Cell B Tmp.			ition	on N/A		Status	pass		
Sensor Component	nt Line Loss			ition	Not tested		Status	pass		
Sensor Component	System Memo		Cond	ition			Status	pass		

Wind Speed Data Form Mfg **Serial Number Tag Site** Technician Site Visit Date Parameter **Owner ID** 72230wsp BVL130 Wind Speed 06108 RM Young Korey Devins 11/07/2019 RM Young Parameter wind speed Mfg CA04013 Tfer Desc. wind speed motor (h **Serial Number** 01253 Tfer ID 1.00000 0.00000 **Slope Intercept** 68622 **Prop or Cups SN** 0.3 **to** 0.5 **Prop or Cups Torque Cert Date** 7/11/2018 CorrCoff 1.00000 **Prop Correction Facto** 0.0512 **DAS 1: DAS 2: High Range:** Low Range Low Range High Range: 0.03 Abs Avg Err 0.20 **Abs Max Err** Input RPM UseDescription: Input Device Input m/s Out V DAS m/s Diff/ % Diff Diff WsM primary 0 0.20 0.0 0.0 -0.20 none 0.00 0.0 0.0 0.00 primary 01253 01253 2 0.00 0.0 0.0 0.00 primary 3 0.00 0.0 0.0 0.00 01253 primary primary 01253 4 0.00 0.0 0.0 0.00 5 0.00 0.0 0.0 0.00 primary 01253 01253 200 1.02 0.0 1.0 0.00 primary 400 2.05 2.1 primary 01253 0.0 0.00 Sensor Component Condition **Condition** Good **Status** pass Sensor Component Prop or Cups Condition **Condition** Good **Status** pass Status pass Sensor Component Sensor Heater **Condition** N/A **Status** pass Sensor Component Torque **Condition Condition** Plumb Sensor Component | Sensor Plumb **Status** pass Status pass Sensor Component System Memo **Condition** See comments

Wind Direction Data Form

Mfg	Serial Number	Tag Site		Fechnician	Site Visi	Site Visit Date Parameter		r Owner ID		
RM Young	72230wdr	BVL130		Korey Devins	11/07/20	O19 Wind [Wind Direction 06108 Parameter wind direction Tfer Desc. wind direction w 00 Intercept 0.000			
Vane SN: N/A C. A. Align. deg. tru				Mfg Serial Num Tfer ID Slope Cert Date Mfg	Mfg RM Young Parameter Serial Number None Tfer Desc. Ifer ID 01458 Slope 1.00000 Intercept Cert Date 1/1/2017 CorrCoff Mfg Ushikata Parameter Serial Number 191832 Tfer Desc. Ifer ID 01272 Slope 1.00000 Intercept			wind direction wind direction wheel 0.00000 1.00000 wind direction		
DAS 1: DAS 2: Orientation Linearity: Orientation Linearity: Abs Avg Err 1.8 1.0 Abs Max Err 2 2 2										
			T	O 47 4 W	0.45.4 Dec	D:cc	Change	F		
UseDescription primary	TferID 01458	Input Raw 0	Linearity	Output V	ut VOutput Deg.DifferenceChar0.00000			Error 0		
primary	01458	45	V	0.000		43 2		-2		
primary	01458	90	V	0.000	86	4	43	-2		
primary	01458	135	V	0.000	131	4	45	0		
primary	01458	180	<u> </u>	0.000	177	3	46	1		
primary	01458	225	<u> </u>	0.000	223	2	46	1		
primary	01458	270	<u></u>	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 Compo	nent Condition		Cond	ition Good		Statu	pass			
Sensor Compo	nent Mast		Condi	ition Good		Statu	s pass			
Sensor Component Sensor Heater				ition N/A		Statu	pass			
Sensor Component Sensor Plumb				ition Plumb		Statu	s pass			
Sensor Compon	nent Torque		Cond			Statu	s pass			
	nent Vane Condition		Cond	ition Good		Statu	s pass			
Sensor Component System Memo				ition		Statu	Status pass Status pass Status pass Status pass			

Temperature Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg 6704 BVL130 Korey Devins 11/07/2019 Temperature 04690 RM Young Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 Tfer ID **Slope** 1.00733 **Intercept** 0.14497 **DAS 1: DAS 2:** 2/12/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.18 0.32 UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference Test type primary Temp Low Range 0.05 -0.09 0.000 0.05 \mathbf{C} 0.14 C Temp Mid Range 17.71 17.44 0.000 17.37 -0.07 primary 0.000 C primary Temp High Range 45.91 45.43 45.11 -0.32Status pass Sensor Component Shield **Condition** Clean **Condition** Functioning Sensor Component Blower Status pass Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

2 Meter Temperature Data Form Calc. Difference **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** Mfg BVL130 Korey Devins 11/07/2019 06404 RM Young 14037 Temperature2meter Mfg Extech Parameter Temperature Tfer Desc. RTD **Serial Number** H232734 01227 Tfer ID **Slope** 1.00733 **Intercept** 0.14497 **DAS 1: DAS 2:** 2/12/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.07 0.15 Difference InputTmpRaw InputTmpCorrected | OutputTmpSignal | OutputSignalEng | OSE Unit UseDescription Test type 0.05 -0.09 0.000 0.06Cprimary Temp Low Rang 0.15 17.44 0.000 17.45 C 0.01 primary Temp Mid Range 17.71 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 Status pass Condition

Humidity Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg A2410006 BVL130 Korey Devins 11/07/2019 Relative Humidity 06007 Vaisala Parameter Relative Humidity Mfg AZ Instruments Tfer Desc. Psychrometer 10325189 **Serial Number** 01223 Tfer ID **Slope** 1.01540 **Intercept** -1.34560 2/6/2019 0.99994 **Cert Date** CorrCoff **DAS 1: DAS 2:** Low Range: **High Range:** Low Range: **High Range:** 1.7 **Abs Avg Err** 1.3 3.1 1.3 **Abs Max Err** 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 3.1 43.8 RH Low Range Psychrometer 50.4 50.4 0.000 50.2 -0.2 primary Psychrometer 99.9 99.9 0.000 primary RH High Range 98.6 -1.3 Sensor Component RH Filter **Condition** Clean **Status** pass Sensor Component Shield **Condition** Clean Status pass Status pass Sensor Component Blower **Condition** N/A Sensor Component Blower Status Switch **Condition** N/A **Status** pass **Sensor Component** System Memo Condition **Status** pass

Solar Radiation Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg Korey Devins Solar Radiation PY10653 BVL130 11/07/2019 04566 Licor Mfg Eppley Parameter solar radiation RM Young Mfg 10765 Tfer Desc. SR transfer translato **Serial Number SN/Owner ID** none 04340 01246 Tfer ID **Parameter:** Solar Radiation Translator **Slope** 1.00000 **Intercept** 0.00000 **DAS 1: DAS 2:** 1/22/2019 1.00000 % Diff of Avg %Diff of Max %Diff of Avg: %Diff of Max **Cert Date** CorrCoff Parameter solar radiation Mfg Eppley Tfer Desc. SR transfer sensor **Serial Number** 34341F3 Tfer ID 01245 1.00000 0.00000 Slope Intercept **Cert Date** 1/22/2019 CorrCoff 1.00000 8.7% 0.0% 7.4% 0.0% MeasureTime Tfer Corr DAS w/m2 PctDifference UseDescription Measure Date Tfer Raw 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 primary 11/8/2019 15:00 322 322 351 9.1% Sensor Component | Sensor Clean **Condition** Clean **Status** pass Sensor Component Sensor Level **Status** pass **Condition** Level Sensor Component Properly Sited **Condition** Properly sited **Status** pass Sensor Component System Memo Status pass **Condition**

Precipitation Data Form

Mfg	Se	erial N	umber Tag	Site		Te	Technician		Site Visit Da	ite Pa	aramete	r	Owner ID	
Climatronics	ill	egible		BVL13	30	Ko	orey Devins		11/07/2019		Precipitation		02704	
				Mfg		PMP		Para	meter Pr	recipitation				
DAS 1: DAS 2:				Serial Nun	Serial Number EW-06134-50 Tfer Desc. 250ml graduate					50ml graduate				
A Avg % Diff 19.0%		34.0°		Diff [A Max	% Dif	Tfer ID		01250					
							Slope		1.0	0000	Interce	pt	0.00000	
							Cert Date		9/5/	2005	CorrCo	off	1.00000	
UseDesc.	Test ty	ype	TferVolume	Iteratio	on Tin	nePerTip	Eq.Ht	DAS	eng Eq.HtU	nit OS	SE Unit	TferUni	ts 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%	
1 ,	test 3		231.5	3		- 10 sec	0.50	0			in	ml	14.0%	
primary	test 4		231.5	4	8	- 10 sec	0.50	0	58 in		in	ml	16.0%	
Sensor Com	ponent	Prope	rly Sited			Condition	on 45 degre	n 45 degree rule Status pass						
Sensor Com	ponent	Gauge	Drain Scree	n		Condition	on Installed	Installed Status pass						
Sensor Com	ponent	Funne	l Clean			Condition	on Clean			St	tatus pa	SS		
Sensor Com	ponent	Condit	ion			Condition	on Good			St	tatus pa	SS		
Sensor Com	ponent	Gauge	Screen			Condition	on Not insta	lled		St	tatus pa	SS		
Sensor Component Gauge Clean			Condition	on Clean			St	tatus pa	SS					
Sensor Com	Sensor Component Level			Condition	on Level			St	tatus pa	SS				
Sensor Com	ponent	Senso	r Heater			Condition	on Function	ing		St	tatus pa	SS		
Sensor Com	ponent	Syster	m Memo			Condition	on See com	ments		St	tatus pa	SS		

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** Korey Devins Campbell BVL130 11/07/2019 Shelter Temperature unknown none **DAS 1: DAS 2:** Parameter Shelter Temperature Mfg Extech **Abs Avg Err** Abs Max Err **Abs Avg Err Abs Max Err** Tfer Desc. RTD H232734 **Serial Number** 0.11 0.28 01227 **Tfer ID** 1.00733 0.14497 **Slope** Intercept 2/12/2019 1.00000 **Cert Date** CorrCoff UseDesc. Test type InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference primary Temp Mid Range 24.60 24.28 0.00024.6 \mathbf{C} 0.28

0.000

0.000

24.49

24.24

Condition

Temp Mid Range

Temp Mid Range

Sensor Component System Memo

primary

primary

24.81

24.56

C

C

Status pass

-0.04

-0.01

24.5

24.2

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	Sample Tower Type	Condition	Туре В	Status pass
Sensor Component	Conduit	Condition	Good	Status pass
Sensor Component	Met Tower	Condition	Good	Status pass
Sensor Component	Moisture Trap	Condition	Installed	Status pass
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 car	n be found in the h	nardcopy of the site a	udit report.								
Precipitation	BVL130	Korey Devins	11/07/2019	System Memo	Climatronics	2081					
The tipping bucket rate to the performance au	~ ~	ires were found to be	e interfering with	h the operation of th	e tipping mechar	nism. The conditi	on was corr	rected prior			
Wind Speed	BVL130	Korey Devins	11/07/2019	System Memo	RM Young	4520					
Additional details car	n be found in the h	nardcopy of the site a	udit 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 Visit Date 11/07/2019 BVL130 Technician Korey Devins Site ID Bondville **USGS Map EPA** Site Sponsor (agency) Map Scale ISWS **Operating Group Map Date** 17-019-1001 AQS# Climatronics **Meteorological Type** Ozone, IMPROVE 40.0520 Air Pollutant Analyzer **QAPP** Latitude dry, wet, Hg **QAPP** Longitude -88.3725 **Deposition Measurement** 212 **Land Use** agricultural **QAPP Elevation Meters** flat -2.1 Terrain **QAPP Declination** Yes 9/16/2005 Conforms to MLM **OAPP Declination Date** (217) 863-2602 40.052021 **Site Telephone Audit Latitude** Bondville Road Research Station -88.372481 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 213 -2.9 Champaign **County Audit Declination** Seymour, IL City, State **Present** Fire Extinguisher 61875 New in 2015 Zip Code Central First Aid Kit Time Zone **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **~ Climbing Belt** Primary Op. E-mail **Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 (s/n 2140-1) Ekto **Shelter Size** 640 cuft **✓** Notes The shelter still smells like rodent excrement. **Shelter Clean ✓** Notes Site OK 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

Driving Directions

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		V
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		\checkmark
Secondary road, heavily traveled	500 m		\checkmark
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 $\ lacksquare$

Siting Criteria Comment

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

Fi	eld Systems Data Form		F-02058-1500-S3-rev002						
Sit	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:								
we	e tipping bucket rain gage is mounted near the meteorological tower re interfering with the operation of the tipping bucket as indicated by % low. The wires were moved resulting in audit challenges approxing	the	first audit challenge of the tipping bucket which was approximately						

Fic	eld Systems Data Form	F-02058-1500-S4-rev002
Site	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?	
	ide any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	sary) regarding conditions listed above, or any other features,
	signal cables are showing signs of wear and previous repair.	

Fi	eld Sy	stems Data Fo	orm				F-020	58-1 :	500-S5	-rev002	
Site	e ID	BVL130	Technician	Korey Devins		Site Visit Date	11/07/2019				
	Siting C	riteria: Are the pollut	ant analyzers aı	nd deposition eq	<u>uipr</u>	nent sited in accord	dance with 40) CFR 5	8, Append	lix E	
1		ample inlets have at le	east a 270 degre	e arc of	✓						
2	Are the	sample inlets 3 - 15 m	eters above the	ground?	✓						
3		sample inlets > 1 meteneters from trees?	er from any maj	or obstruction,	✓						
	Pollutan	t analyzers and depos	ition equipmen	t operations and	ma	<u>intenance</u>					
1		nalyzers and equipment and well maintained	✓								
2	Are the analyzers and monitors operational, on-line, and reporting data?										
3	Describe	e ozone sample tube.				1/4 teflon by 12 me	ters				
4	Describe	e dry dep sample tube				3/8 teflon by 12 meters					
5		ne filters used in the olocation)	ozone sample lin	e? (if yes	✓	At inlet only					
6	Are sam	ple lines clean, free of ions?	kinks, moisture	e, and	✓						
7	Is the ze	ro air supply desiccan	t unsaturated?		✓						
8	Are ther	re moisture traps in th	e sample lines?		✓	flow, SO2, and CO	line only				
9	Is there clean?	a rotometer in the dry	deposition filte	er line, and is it	✓	Clean and dry					

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	BVL130	Technician	Korey Devins		Site Visi	it Date 11/07/201	9	
	DAS, se	ensor translators, and p	peripheral equi	oment operation	ns ar	ıd maintena	nce		
1	Do the	DAS instruments appe		_	✓				
2		the components of the , backup, etc)	DAS operations	al? (printers,	✓				
3		analyzer and sensor signg protection circuitry		through	✓	Met sensors	only		
4		signal connections pro nintained?	otected from the	e weather and	✓				
5	Are the	signal leads connected	l to the correct	DAS channel?	✓				
6	Are the ground	DAS, sensor translate	ors, and shelter p	properly	✓				
7	Does th	e instrument shelter h	ave a stable pov	ver source?	✓				
8	Is the in	nstrument shelter temp	perature control	lled?	✓				
9	Is the n	net tower stable and gr	ounded?			Stable 🗸		Grounded	
10	Is the sa	ample tower stable and	l grounded?					<u> </u>	
11	Tower	comments?							
nat	Provide any additional 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 BVL130 Technician Korey Devins Site Visit Date 11/07/2019 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No Yes N/A Yes No N/A **V V** Wind speed sensor **Data logger V** ✓ П Wind direction sensor Data logger **V** ✓ П **Temperature sensor** Strip chart recorder **✓** П Relative humidity sensor Computer **V V Solar radiation sensor** Modem **~** П **~ Printer Surface wetness sensor ✓ V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V V Humidity sensor translator Surge protector** П \checkmark **V UPS Solar radiation translator** П **V V** Tipping bucket rain gauge Lightning protection device ~ **V Shelter heater** Ozone analyzer ~ **✓** Filter pack flow controller Shelter air conditioner **~** Filter pack MFC power supply □ Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V SSRF ✓ V ✓ Site Ops Manual** March 2015 **HASP ✓** March 2015 **V Field Ops Manual Calibration Reports V ✓** Ozone z/s/p Control Charts Preventive maintenance schedule 1 Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

Field Systems Data Form F-02058-1500-S8-rev002 BVL130 Technician Korey Devins Site Visit Date 11/07/2019 Site ID Site operation procedures Trained by previous operator Has the site operator attended a formal CASTNET training ✓ course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed** Frequency Compliant **✓ V** Semiannually **Multipoint Calibrations V V** Daily **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** Weekly **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values V V** Weekly **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? Compliant **OC Check Performed** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** As needed Manual Zero/Span Tests **V ~** Daily **Automatic Precision Level Tests V Manual Precision Level Test** As needed **V V** Weekly **Analyzer Diagnostics Tests V** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Sample Line Check for Dirt/Water Weekly **~ Zero Air Desiccant Check** Weekly Unknown Do multi-point calibration gases go through the complete sample train including all filters? **✓** Do automatic and manual z/s/p gasses go through the complete sample train including all filters?

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

✓

SSRF, call-in

Ozone and NCORE sample line filters are replaced, and the sample lines are leaked tested, every 2 weeks.

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

reported? If yes, how?

Fi	eld Sy	stems Data Form			F-02058-1500-S9-rev002			
Sit	te ID	BVL130 Tec	hnician Korey Devins		Site Visit Date	11/07/2019		
	Site ope	ration procedures						
1	Is the fi	ter pack being changed ever	y Tuesday as scheduled	? ✓	Filter changed mor	inings		
2	2 Are the Site Status Report Forms being completed and filed correctly?							
3	Are dat	a downloads and backups be ed?	ing performed as		No longer required			
4	Are gen	eral observations being made	e and recorded? How?	✓	SSRF			
5	5 Are site supplies on-hand and replenished in a timely fashion?			✓				
6	Are san	ple flow rates recorded? Ho	w?	✓	SSRF, call-in			
7	Are samples sent to the lab on a regular schedule in a timely fashion?			. 🗸				
8		ers protected from contamina pping? How?	ntion during handling	✓	Clean gloves on ar	nd off		
9		site conditions reported regu ons manager or staff?	llarly to the field	✓				
QC	Check P	erformed	Frequency			Compliant		
]	Multi-poi	nt MFC Calibrations	✓ Semiannually			✓		
]	Flow System Leak Checks Weekly					✓		
]	Filter Pack Inspection							
]	Flow Rate Setting Checks Weekly				✓			
,	Visual Ch	eck of Flow Rate Rotometer	✓ Weekly			✓		
]	In-line Fil	ter Inspection/Replacement	Semiannually			✓		
,	Sample Li	ne Check for Dirt/Water	✓ Weekly			✓		
		dditional explanation (photon-made, that may affect the			y) regarding condit	ions listed above, or any other features,		

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	В	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
VIN	140-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	В	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 0 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2136 VIN140 Sandy Grenville 11/07/2019 DAS Primary Das Date: 11/7 /2019 **Audit Date** 11/7 /2019 Fluke **Parameter** DAS Mfg 16:54:00 **Das Time:** 16:54:00 **Audit Time** 95740135 Tfer Desc. DVM **Serial Number** 311 Das Day: 311 **Audit Day** Tfer ID 01311 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 **Slope** Intercept 0.0001 0.0001 0.0001 0.0001 1/25/2019 1.00000 **Cert Date** CorrCoff Datel Parameter DAS Mfg **Serial Number** 15510194 Tfer Desc. Source generator (D 01320 Tfer ID 1.00000 0.00000 **Slope** Intercept 2/13/2012 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 7 V 0.0000 0.0000 0.0000 0.0000 7 0.1000 0.0999 V V -0.0001 0.1000 7 0.3000 0.3000 0.3000 V V 0.00007 V V 0.5000 0.5001 0.5002 0.0001 V V 7 0.7000 0.7001 0.7002 0.0001 7 V V 0.9000 0.9002 0.9003 0.0001 7 1.0000 V V 0.00011.0002 1.0003

Flow Data Form **Technician Owner ID** Mfg **Serial Number Tag Site** Site Visit Date Parameter Sandy Grenville 000465 Apex 43974 VIN140 11/07/2019 Flow Rate Mfg BIOS Parameter Flow Rate 148613 Tfer Desc. BIOS 220-H **Serial Number** 01421 Tfer ID 0.00000 **Slope** 1.00000 **Intercept** 3/4/2019 1.00000 CorrCoff **Cert Date** -0.011 **DAS 2: DAS 1: Cal Factor Zero** 0.992 A Avg % Diff: A Max % Dif A Avg % Diff A Max % Dif **Cal Factor Full Scale** 1.96% 1.96% 1.45 **Rotometer Reading:** Test type Input l/m Input Corr MfcDisp. OutputSignal Output S E InputUnit OutputSignal PctDifference Desc. primary pump off 0.000 0.0000.00 0.000 -0.011/m1/m leak check 0.00 0.000 0.02 1/m0.000 0.000 1/mprimary test pt 1 1.529 1.530 1.51 0.000 1.50 1/m1/m -1.96% primary 1.51 0.000 1.50 1/m-1.96% primary test pt 2 1.529 1.530 1/m test pt 3 1.528 1.530 1.51 0.000 1.50 1/m1/m -1.96% primary Sensor Component Leak Test Condition **Status** pass **Condition** Good **Status** pass **Sensor Component** Tubing Condition 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

Condition 4.2 cm

Condition 2.0 cm

Condition 340 deg

Condition

Status pass

Status pass

Status pass

Status pass

Sensor Component Filter Distance

Sensor Component Filter Depth

Sensor Component Filter Azimuth

Sensor Component System Memo

Ozone Data Form

Mfg	Serial Number	er Tag Site	Т	'echnician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347311	VIN140		Sandy Grenville	11/07/2019	Ozone	000740
Slope: Intercept CorrCoff:		rcept	0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180930075 01115		ozone Ozone primary stan
DAS 1:		AS 2:		Slope	1.0080	00 Intercept	-0.40210
A Avg % Diff: A 1	0.0% A	Avg %Diff A	Max % Dif	Cert Date	3/26/201	19 CorrCoff	1.00000
UseDescription	ConcGroup	Tfer Raw	Tfer Corr		Site Unit	RelPerDif	AbsDif
primary	1	-0.16	0.24	0.28	ppb		0.04
primary	3	15.01 35.14	15.28 35.26	14.27 34.59	ppb	-1.92	-1.01
primary primary	4	65.83	65.70	64.65	ppb ppb	-1.92	
primary	5	111.21	110.72	109.40	ppb	-1.2	
Sensor Compon	ent Sample Trai	'n	Condi	tion Good		Status pass	
Sensor Compon	ent 22.5 degree	rule	Condi	tion		Status pass	
Sensor Compon	ent Inlet Filter C	ondition	Condi	tion Clean		Status pass	
Sensor Compon	ent Battery Back	kup	Condi	tion N/A		Status pass	
Sensor Compon	ent Offset		Condi	tion -0.20		Status pass	
Sensor Compon	ent Span		Condi	tion 1.015		Status pass	
Sensor Compon	ent Zero Voltage	9	Condi	tion N/A		Status pass	
Sensor Compon	ent Fullscale Vo	ltage	Condi	tion N/A		Status pass	
Sensor Compon	ent Cell A Freq.		Condi	tion 107.6 kHz		Status pass	
Sensor Compon	ent Cell A Noise)	Condi	tion 0.7 ppb		Status pass	
Sensor Compon	ent Cell A Flow		Condi	tion 0.70 lpm		Status pass	
Sensor Compon	ent Cell A Press	sure	Condi	tion 718.1 mmHg		Status pass	
Sensor Compon	ent Cell A Tmp.		Condi	tion 30.2 C		Status pass	
Sensor Compon	ent Cell B Freq.			tion 97.7 kHz		Status pass	
Sensor Compon		•		tion 0.7 ppb		Status pass	
Sensor Compon				tion 0.70 lpm		Status pass	
Sensor Compon				tion 718.4 mmHg		Status pass	
Sensor Compon				tion N/A		Status pass	
Sensor Compon				tion Not tested		Status pass	
Sensor Compon	ent System Mer	no	Condi	tion		Status pass	

Temperature Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg 6699 VIN140 Sandy Grenville 11/07/2019 Temperature 04685 RM Young Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 Tfer ID **Slope** 1.00733 **Intercept** 0.14497 **DAS 1: DAS 2:** 2/12/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.15 0.30 UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference Test type primary Temp Low Range -0.13 -0.27 0.000 0.0 \mathbf{C} 0.3 C Temp Mid Range 25.65 25.32 0.000 25.3 -0.02 primary 0.000 C primary Temp High Range 48.63 48.13 48.0 -0.12Status pass Sensor Component Shield **Condition** Clean Sensor Component Blower Status pass **Condition** N/A Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** VIN140 Sandy Grenville 11/07/2019 Shelter Temperature Campbell none none **DAS 1: DAS 2:** Extech Mfg Parameter Shelter Temperature Abs Avg Err Abs Max Err Abs Avg Err **Abs Max Err** Tfer Desc. RTD H232734 **Serial Number** 0.53 0.98 01227 **Tfer ID** 1.00733 0.14497 **Slope** Intercept 2/12/2019 1.00000 **Cert Date** CorrCoff

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	10.21	9.99	0.000	10.5	С	0.54
primary	Temp Mid Range	12.33	12.10	0.000	12.0	С	-0.08
primary	Temp Mid Range	15.52	15.26	0.000	14.3	С	-0.98
Sensor Component System Memo			Condition		Status	pass	

Infrastructure Data For

Sit	te ID	VIN140	Technician	Sandy Grenville	Site Visit Date	11/07/2019	
	Shelter Ma	ake	Shelter Model	Sh	elter Size		
	Ekto		8810 (s/n 2116-	1) 64	0 cuft		

Sensor Component	Sample Tower Type	Condition	Type B	Status pass
Sensor Component	Conduit	Condition	N/A	Status pass
Sensor Component	Met Tower	Condition	N/A	Status pass
Sensor Component	Moisture Trap	Condition	Installed	Status pass
Sensor Component	Power Cables	Condition	Good	Status pass
Sensor Component	Shelter Temp Control	Condition	Functioning	Status pass
Sensor Component	Rotometer	Condition	Installed	Status pass
Sensor Component	Sample Tower	Condition	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 Visit Date 11/07/2019 VIN140 Technician Sandy Grenville Site ID Fritchton **USGS Map EPA** Site Sponsor (agency) Map Scale Purdue University **Operating Group Map Date** 18-083-9991 AQS# Climatronics **Meteorological Type** 38.7406 Air Pollutant Analyzer Ozone **QAPP** Latitude dry, wet **QAPP** Longitude -87.4844 **Deposition Measurement** 134 **Land Use** agriculture **QAPP Elevation Meters** flat 4.25 Terrain **QAPP Declination** Yes 2/23/2006 Conforms to MLM **OAPP Declination Date** 38.740792 **Site Telephone Audit Latitude** Southwest Purdue Agricultural Center -87.484923 Site Address 1 **Audit Longitude** 4669 North Purdue Road Site Address 2 **Audit Elevation** 136 Knox -2.7 **County Audit Declination** Vincennes, IN City, State **Present** Fire Extinguisher 47591 New in 2015 Zip Code Central **First Aid Kit** Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **V Climbing Belt** Primary Op. E-mail **Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 (s/n 2116-1) Ekto **Shelter Size** 640 cuft **✓** Notes The shelter is in good condition and well maintained, however rot is beginning to form at the bottom **Shelter Clean** of the walls.

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.

✓ Notes

Site OK

Driving Directions

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.

	eld Systems Data Form		F-02058-1500-S3-rev002
Site	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
	Is it inclined approximately 30 degrees?	✓	N/A

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

The temperature sensor is mounted on the sample tower.

Do all the meterological sensors appear to be intact, in good condition, and well maintained? Are all the meteorological sensors operational online, and reporting data? Are the shields for the temperature and RH sensors clean? Are the aspirated motors working? Is the solar radiation sensor's lens clean and free of scratches? Is the surface wetness sensor grid clean and undamaged? Are the sensor signal and power cables intact, in good condition, and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained? N/A N/A N/A N/A N/A N/A N/A PAre the sensor signal and power cable connections protected from the elements and well maintained? N/A PARE the sensor signal and power cable connections protected from the elements and well maintained? N/A PARE the sensor signal and power cable connections protected from the elements and well maintained? N/A PARE the sensor signal and power cable connections protected from the elements and well maintained? N/A PARE the sensor signal and power cable connections protected from the elements and well maintained? N/A	eld Systems Data Form		F-02058-1500-S4-rev002
condition, and well maintained? Are all the meteorological sensors operational online, and reporting data? Are the shields for the temperature and RH sensors clean? Are the aspirated motors working? Is the solar radiation sensor's lens clean and free of scratches? Is the surface wetness sensor grid clean and undamaged? Are the sensor signal and power cables intact, in good condition, and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained? Are the sensor signal and power cable connections protected or wide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	ID VIN140 Technician Sandy Grenville		Site Visit Date 11/07/2019
reporting data? Are the shields for the temperature and RH sensors clean? Are the aspirated motors working? Is the solar radiation sensor's lens clean and free of scratches? Is the surface wetness sensor grid clean and undamaged? Are the sensor signal and power cables intact, in good condition, and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained? Are the sensor signal and power cable connections protected working the sensor signal and power cable connections protected from the elements and well maintained? Are the sensor signal and power cable connections protected working the sensor signal and power cable connections protected from the elements and well maintained?		✓	
Are the aspirated motors working? N/A Is the solar radiation sensor's lens clean and free of scratches? Is the surface wetness sensor grid clean and undamaged? Are the sensor signal and power cables intact, in good condition, and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained? N/A N/A N/A N/A N/A Vovide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,		✓	
Is the solar radiation sensor's lens clean and free of scratches? Is the surface wetness sensor grid clean and undamaged? Are the sensor signal and power cables intact, in good condition, and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained? N/A N/A N/A N/A N/A Povide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	Are the shields for the temperature and RH sensors clean?	✓	
scratches? Is the surface wetness sensor grid clean and undamaged? Are the sensor signal and power cables intact, in good condition, and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained? N/A N/A N/A N/A vovide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	Are the aspirated motors working?	✓	N/A
Are the sensor signal and power cables intact, in good condition, and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained? N/A N/A rovide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,		✓	N/A
condition, and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained? N/A rovide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,	Is the surface wetness sensor grid clean and undamaged?	✓	N/A
from the elements and well maintained? rovide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,		✓	N/A
		✓	N/A
		sary)	regarding conditions listed above, or any other features,
	•	Do all the meterological sensors appear to be intact, in good condition, and well maintained? Are all the meteorological sensors operational online, and reporting data? Are the shields for the temperature and RH sensors clean? Are the aspirated motors working? Is the solar radiation sensor's lens clean and free of scratches? Is the surface wetness sensor grid clean and undamaged? Are the sensor signal and power cables intact, in good condition, and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained?	Do all the meterological sensors appear to be intact, in good condition, and well maintained? Are all the meteorological sensors operational online, and reporting data? Are the shields for the temperature and RH sensors clean? Are the aspirated motors working? Is the solar radiation sensor's lens clean and free of scratches? Is the surface wetness sensor grid clean and undamaged? Are the sensor signal and power cables intact, in good condition, and well maintained? Are the sensor signal and power cable connections protected from the elements and well maintained? ide any additional explanation (photograph or sketch if necessary)

field Systems Data Form	F-02058-1500-S5-rev00
VIN140 Technician Sandy Grenville	Site Visit Date 11/07/2019
Siting Criteria: Are the pollutant analyzers and deposition e	equipment sited in accordance with 40 CFR 58, Appendix E
Do the sample inlets have at least a 270 degree arc of unrestricted airflow?	
Are the sample inlets 3 - 15 meters above the ground?	
Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees?	, v
Pollutant analyzers and deposition equipment operations an	nd maintenance
Do the analyzers and equipment appear to be in good condition and well maintained?	
Are the analyzers and monitors operational, on-line, and reporting data?	
Describe ozone sample tube.	1/4 teflon by 18 meters
Describe dry dep sample tube.	3/8 teflon by 18 meters
Are in-line filters used in the ozone sample line? (if yes indicate location)	At inlet only
Are sample lines clean, free of kinks, moisture, and obstructions?	
Is the zero air supply desiccant unsaturated?	
Are there moisture traps in the sample lines?	Flow line only
Is there a rotometer in the dry deposition filter line, and is it clean?	t ✓ Clean and dry
rovide any additional explanation (photograph or sketch if neces tural or man-made, that may affect the monitoring parameters	

Field Systems Data Form F-02058-1500-S6-rev002 VIN140 Technician Sandy Grenville Site Visit Date 11/07/2019 Site ID DAS, sensor translators, and peripheral equipment operations and maintenance Do the DAS instruments appear to be in good condition and well maintained? **✓** Are all the components of the DAS operational? (printers, modem, backup, etc) Temperature only Do the analyzer and sensor signal leads pass through lightning protection circuitry? **✓** Are the signal connections protected from the weather and well maintained? **✓** Are the signal leads connected to the correct DAS channel? Are the DAS, sensor translators, and shelter properly **~** grounded? **✓** Does the instrument shelter have a stable power source? ~ Is the instrument shelter temperature controlled? Grounded **Stable** Is the met tower stable and grounded? Is the sample tower stable and grounded? **V** 11 Tower comments? around 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 F	orm			F-02	2058-	1500-S7-rev002
Site ID VIN140	Technician	Sandy Grenville	Site Visit Date	11/07/2019)	
Documentation						
Does the site have the required	instrument an	d equipment manuals	?			
Wind speed sensor Wind direction sensor Temperature sensor Relative humidity sensor Solar radiation sensor Surface wetness sensor Wind sensor translator Temperature translator Humidity sensor translator Solar radiation translator Tipping bucket rain gauge Ozone analyzer Filter pack flow controller Filter pack MFC power supply		Strip cha Compute Modem Printer Zero air Filter flo Surge pr UPS Lightnin Shelter h	ger art recorder er pump w pump otector g protection device	Yes		N/A
Does the site have the required	l and most rec	ent QC documents an	d report forms?			
Pı	esent			Curre	ent	
Station Log	✓			✓		
SSRF	✓			✓		
Site Ops Manual	✓ Feb 20	014				
HASP	✓ Feb 20					
Field Ops Manual	✓ Oct 20					
Calibration Reports						
Ozone z/s/p Control Charts						
Preventive maintenance schedule						
1 Is the station log properly cor	npleted during	g every site visit? 🗸				
2 Are the Site Status Report Focurrent?	rms being con	npleted and				
3 Are the chain-of-custody form sample transfer to and from l		ed to document				
4 Are ozone z/s/p control charts current?	s properly com	pleted and	Control charts not use	ed		
Provide any additional explanation			y) regarding condition	ons listed	above, o	or any other features,

Field Systems Data Form F-02058-1500-S8-rev002 VIN140 Technician Sandy Grenville Site Visit Date 11/07/2019 Site ID Site operation procedures Trained by the previous site operator Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency** Compliant **✓ V** Semiannually **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **Compliant QC Check Performed** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** As needed Manual Zero/Span Tests **V ~** Daily **Automatic Precision Level Tests V Manual Precision Level Test** As needed **V V Analyzer Diagnostics Tests** Weekly **~** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Sample Line Check for Dirt/Water Weekly **V Zero Air Desiccant Check** Weekly

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

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

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

	Unknown
✓	
✓	Logbook, call-in

Fi	Field Systems Data Form					F-02058-1500-S9-rev002				
Sit	e ID	VIN140 T	echni	cian	Sandy Grenville) 	Site Visit Date	e 11/07/2019		
	Site ope	ration procedures								
1	Is the fi	ter pack being changed ev	ery T	uesda	y as scheduled	? ~	Filter changed mo	rinings		
2	Are the correctl	Site Status Report Forms I y?	eing	comp	oleted and filed	✓				
3	Are data	a downloads and backups led?	eing	perfo	ormed as		No longer required	d		
4	Are gen	eral observations being ma	de an	ıd rec	orded? How?	✓	SSRF			
5	Are site	supplies on-hand and repl	enish	ed in	a timely	✓				
6	Are san	ple flow rates recorded? H	ow?			✓	SSRF, logbook, ca	all-in		
7	Are sam	pples sent to the lab on a re	gular	sched	dule in a timely	✓				
8		ers protected from contami oping? How?	natio	n dur	ing handling	✓	Clean gloves on a	nd off		
9		site conditions reported reons manager or staff?	gular!	ly to t	the field	✓				
QC	Check P	erformed		Freq	luency			Compliant		
]	Multi-poi	nt MFC Calibrations	✓	Sem	iannually			✓		
]	Flow Syst	em Leak Checks	✓	Wee	kly			✓		
]	Filter Pac	k Inspection								
]	Flow Rate	Setting Checks	✓	Wee	kly			✓		
7	Visual Ch	eck of Flow Rate Rotomete	r 🗸	Wee	kly			✓		
]	In-line Fil	ter Inspection/Replacemen	t 🗸	Sem	iannually			✓		
	Sample Li	ne Check for Dirt/Water	✓	Wee	kly			✓		
		dditional explanation (pho n-made, that may affect th) regarding condi	tions listed al	bove, or any	other features,

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	В	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
QAI	K172-Eric H	lebert-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	В	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 0.03 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2518 QAK172 Eric Hebert 11/10/2019 DAS Primary Das Date: 11/10/2019 **Audit Date** 11/10/2019 Fluke **Parameter** DAS Mfg 08:30:02 Das Time: **Audit Time** 08:30:00 95740135 Tfer Desc. DVM **Serial Number** 314 Das Day: 314 **Audit Day** Tfer ID 01311 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0001 0.0001 0.0001 0.0001 1/25/2019 1.00000 **Cert Date** CorrCoff Datel Parameter DAS Mfg **Serial Number** 15510194 Tfer Desc. Source generator (D 01320 Tfer ID 1.00000 0.00000 **Slope** Intercept 2/13/2012 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output **DAS** Output InputUnit OutputUnit Difference 7 V 0.0000 0.0000 -0.0001 -0.0001 7 0.1000 0.1000 V V 0.0000 0.1000 7 0.3000 0.30010.3001 V V 0.00007 V V 0.5000 0.5002 0.5002 0.0000 V V 7 0.7000 0.7002 0.7003 0.0001 7 V V 0.9000 0.9003 0.9004 0.0001 7 1.0000 1.0005 V V 0.0001 1.0004

Flow Data Form **Technician Owner ID** Mfg **Serial Number Tag Site** Site Visit Date Parameter 000530 Apex QAK172 Eric Hebert 11/10/2019 Flow Rate illegible Mfg BIOS Parameter Flow Rate 148613 Tfer Desc. BIOS 220-H **Serial Number** 01421 Tfer ID 0.00000 **Slope** 1.00000 **Intercept** 3/4/2019 1.00000 CorrCoff **Cert Date** 0 **DAS 1: DAS 2: Cal Factor Zero** 1 A Avg % Diff: A Max % Dif A Avg % Diff A Max % Dif **Cal Factor Full Scale** 0.67% 0.67% 1.5 **Rotometer Reading:** Test type Input l/m Input Corr MfcDisp. OutputSignal Output S E InputUnit OutputSignall PctDifference Desc. primary pump off 0.000 0.0000.01 0.0000.00 1/m1/m leak check 0.44 0.000 1/m0.000 0.000 0.44 1/mprimary test pt 1 1.487 1.490 1.50 0.000 1.50 1/m1/m 0.67% primary 1.490 1.50 0.000 1/m0.67% primary test pt 2 1.486 1.50 1/m test pt 3 1.488 1.490 1.50 0.000 1.50 1/m1/m 0.67% primary Condition See comments Sensor Component Leak Test **Status** Fail **Status** pass **Sensor Component** Tubing Condition **Condition** Good Sensor Component Filter Position **Condition** Good Status pass Sensor Component Rotometer Condition Status pass Condition Clean and dry Sensor Component Moisture Present Condition No moisture present Status pass Sensor Component Filter Distance Condition 5.0 cm Status pass Status pass Sensor Component Filter Depth Condition 5.0 cm Status pass **Sensor Component** Filter Azimuth Condition 90 deg

Condition

Status pass

Sensor Component System Memo

Ozone Data Form

Mfg	Serial Numbe	r Tag Site	ר	Гесhnician	Site Visit Date	Parame	eter	Owner ID
ThermoElectron Inc	1030244798	QAK172		Eric Hebert	11/10/2019	Ozone		000683
Intercept	1.00619 Slope 1.01653 Inter 0.99999 Corr	cept	.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180930075 01115			ozone Ozone primary stan
DAS 1:		AS 2:	N. 0/ D10	Slope	1.008	00 Inter	cept	-0.40210
A Avg % Diff: A M	0.0%	Avg %Diff A	Max % Dif	Cert Date	3/26/20)19 Corr	Coff	1.00000
		Tf D	Tf C	C:4-	Cita IIit	D -1D	D:c	Al-Dif
UseDescription primary	ConcGroup	Tfer Raw 0.25	Tfer Corr 0.64	Site -0.18	Site Unit	RelPer	DII	AbsDif -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 Componer	Sample Train	n	Cond	ition Good		Status	pass	
Sensor Componer	22.5 degree	rule	Cond	ition		Status	pass	
Sensor Componer	Inlet Filter Co	ondition	Cond	ition Dirty		Status	Fail	
Sensor Componer	Battery Back	кир	Cond	ition N/A		Status	pass	
Sensor Componer	Offset		Cond	-0.90		Status	pass	
Sensor Componer	Span		Cond	ition 1.011		Status	pass	
Sensor Componer	Zero Voltage)	Cond	ition N/A		Status	pass	
Sensor Componer	Fullscale Vo	ltage	Cond	ition N/A		Status	pass	
Sensor Componer	Cell A Freq.		Cond	99.8 kHz		Status	pass	
Sensor Componer	Cell A Noise		Cond	1.3 ppb		Status	pass	
Sensor Componer	Cell A Flow		Cond	ition 0.70 lpm		Status	pass	
Sensor Componer	Cell A Press	ure	Cond	ition 693.7 mmHg		Status	pass	
Sensor Componer	Cell A Tmp.		Cond	ition 27.1 C		Status	pass	
Sensor Componer	Cell B Freq.		Cond	ition 99.0 kHz		Status	pass	
Sensor Componer				o.9 ppb		Status	pass	
Sensor Componer				o.70 lpm		Status		
Sensor Componer		ure		ition 694.3 mmHg		Status		
Sensor Componer				ition N/A		Status		
Sensor Componer	·		Cond	Not tested		Status		
Sensor Componer	System Men	no	Cond	ition		Status	pass	

Temperature Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg 14801 QAK172 Eric Hebert 11/10/2019 Temperature 06540 RM Young Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 Tfer ID **Slope** 1.00733 **Intercept** 0.14497 **DAS 1: DAS 2:** 2/12/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.19 0.36 UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference Test type primary Temp Low Range -0.16-0.30 0.000 0.1 \mathbf{C} 0.36 C Temp Mid Range 20.00 19.71 0.000 19.9 0.17 primary C primary Temp High Range 48.60 48.10 0.000 48.1 -0.03 Condition Moderately clean Status pass Sensor Component Shield Sensor Component Blower Status pass **Condition** N/A Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** 11/10/2019 Shelter Temperature Campbell none QAK172 Eric Hebert none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperature Abs Avg Err Abs Max Err Abs Avg Err **Abs Max Err** Tfer Desc. RTD H232734 **Serial Number** 0.59 0.80 01227 **Tfer ID** 1.00733 0.14497 **Slope** Intercept 2/12/2019 ${\bf CorrCoff}$ 1.00000 **Cert Date**

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 Con	nponent System Memo	1	Condition		Status	pass	

Infrastructure Data For

QAK172	Technician Eric Hebert	Site Visit Date 11/10/2019	
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Shelter Make	Shelter Model	Shelter Size	
Ekto	8810 (s/n 2625-2)	640 cuft	

Sensor Component	Sample Tower Type	Condition	Type B	Status pass
Sensor Component	Conduit	Condition	N/A	Status pass
Sensor Component	Met Tower	Condition	N/A	Status pass
Sensor Component	Moisture Trap	Condition	Installed	Status pass
Sensor Component	Power Cables	Condition	Good	Status pass
Sensor Component	Shelter Temp Control	Condition	Functioning	Status pass
Sensor Component	Rotometer	Condition	Installed	Status pass
Sensor Component	Sample Tower	Condition	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	OAK172	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 Visit Date 11/10/2019 QAK172 Technician Eric Hebert Site ID Quaker City **USGS Map EPA** Site Sponsor (agency) Map Scale Private **Operating Group Map Date** 39-121-9991 AQS# R.M. Young **Meteorological Type** Ozone, IMPROVE Air Pollutant Analyzer **QAPP** Latitude 39.9431 dry **QAPP** Longitude -81.3378 **Deposition Measurement** 372 **Land Use** woodland - mixed, agriculture **QAPP Elevation Meters** 7.9 Terrain rolling **QAPP Declination** Yes 2/22/2006 Conforms to MLM **OAPP Declination Date** (740) 679-3345 39.942714 **Site Telephone Audit Latitude** 58163 St. Johns Road -81.337914 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 371 -8.2 Noble **County Audit Declination** Quaker City, OH City, State **Present** Fire Extinguisher 43773 New in 2015 Zip Code Eastern First Aid Kit Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **Climbing Belt** Primary Op. E-mail **Security Fence Backup Operator V Secure Shelter** Backup Op. Phone # Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 (s/n 2625-2) Ekto **Shelter Size** 640 cuft **✓** Notes The shelter is in fair condition with some loose floor tiles. **Shelter Clean ✓** Notes Site OK From I-70 take exit 193, route 513 south to Quaker City. At the 4-way stop turn right and continue approximately 0.8 **Driving Directions**

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		lacksquare
City > 50,000 population	40 km		lacksquare
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		lacksquare
Intensive agricultural ops (including aerial spraying)	500 m		ightharpoons
Limited agricultural operations	200 m		✓
Large parking lot	200 m		lacksquare
Small parking lot	100 m		lacksquare
Tree line	50 m		lacksquare
Obstacles to wind	10 times obstacle height		

Siting	Distances OK	✓
Siting	Criteria Comn	nent

Fi	eld Sy	stems Data Fo	orm			F-02058-1	500-S3-rev002
Site	e ID	QAK172	Technician Eric Hebert		Site Visit Date	11/10/2019	
1		d speed and direction fluenced by obstruction	sensors sited so as to avoid ons?	✓	N/A		
2	(i.e. win	d sensors should be m	as to minimize tower effects? ounted atop the tower or on a 2x the max diameter of the	✓	N/A		
3	Are the	tower and sensors plu	mb?	✓	N/A		
4			ointed north or positioned to ach as buildings, walls, etc?	✓			
5	conditio surface	ns? (i.e. ground below	ors sited to avoid unnatural sensors should be natural . Ridges, hollows, and areas of ded)	✓			
6	Is the so	lar radiation sensor p	lumb?	✓	N/A		
7	Is it site	d to avoid shading, or	any artificial or reflected light	V	N/A		
8	Is the ra	nin gauge plumb?		✓	N/A		
9	Is it site towers,		ffects from buildings, trees,	✓	N/A		
10	Is the su facing n		ited with the grid surface	✓	N/A		
11	Is it inc	lined approximately 3	0 degrees?	✓	N/A		

Field Systems Data Form						F-02058-1500-S4-rev002
Site	QAK1	72	Technician Eric H	Hebert		Site Visit Date 11/10/2019
1		rological sensor well maintained	s appear to be intact?	t, in good	✓	Temperature only
2	Are all the met		ors operational onli	ne, and	/	Temperature only
3	Are the shields	for the tempera	ture and RH sensor	es clean?	/	
4	Are the aspirat	ed motors work	ing?		/	N/A
5	Is the solar rad scratches?	iation sensor's l	ens clean and free of	f	/	N/A
6	Is the surface v	vetness sensor gi	id clean and undam	naged?	/	N/A
7		signal and powe well maintained	r cables intact, in go	ood	/	
8		signal and powe nts and well mai	r cable connections intained?	protected	✓	
			photograph or sketc et the monitoring pa		ry)	regarding conditions listed above, or any other features,

Fi	eld Systems Data Form	F-02058-1500-S5-rev002			
Site	QAK172 Technician Eric Hebert		Site Visit Date 11/10/2019		
	Siting Criteria: Are the pollutant analyzers and deposition eq	uipr	nent 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	l ma	intenance		
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		
	ride any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	sary)	regarding conditions listed above, or any other features,		

Field Systems Data Form F-02058-1500-S6-rev002 Site ID QAK172 Technician Eric Hebert Site Visit Date 11/10/2019 DAS, sensor translators, and peripheral equipment operations and maintenance Do the DAS instruments appear to be in good condition and well maintained? **V** Are all the components of the DAS operational? (printers, modem, backup, etc) Temperature only Do the analyzer and sensor signal leads pass through lightning protection circuitry? **✓** Are the signal connections protected from the weather and well maintained? **V** Are the signal leads connected to the correct DAS channel? Are the DAS, sensor translators, and shelter properly **~** grounded? **✓** Does the instrument shelter have a stable power source? **✓** Is the instrument shelter temperature controlled? Grounded **Stable** Is the met tower stable and grounded? Is the sample tower stable and grounded? **V V** 11 Tower comments?

Field	Systems Data	F-02	F-02058-1500-S7-rev002					
Site ID	QAK172		Technician	Eric Hebert	Site Visit Date	11/10/2019)	
Docu	ımentation							
	the site have the requ	ired ins	trument and	equinment manua	ls?			
Docs	the site have the requ	Yes	No N/A		13.6	Yes	No	N/A
Wind sp	peed sensor				gger		V	
Wind d	irection sensor			Data lo	gger			✓
Temper	rature sensor	✓		Strip cl	art recorder			✓
Relative	e humidity sensor			Compu	ter	✓		
Solar ra	adiation sensor			Modem	ı		✓	
Surface	wetness sensor			Printer				✓
Wind se	ensor translator			Zero ai	r pump		✓	
Temper	ature translator			Filter fl	ow pump		✓	
Humidi	ty sensor translator			Surge p	rotector			✓
Solar ra	ndiation translator			UPS			✓	
Tipping	bucket rain gauge			Lightni	ng protection device			\checkmark
Ozone a	nalyzer	✓		Shelter	heater		✓	
Filter p	ack flow controller	✓			air conditioner	✓		
Filter p	ack MFC power suppl	y						
Doe	es the site have the req	uired aı	nd most rece	nt QC documents a	and report forms?			
		Prese	ent			Curre	ent	
Station	Log					✓		
SSRF		,				✓		
Site Op	s Manual	,	Feb 20°	14				
HASP		N	Feb 20°					
Field O	ps Manual							
Calibra	tion Reports	N				✓		
Ozone z	z/s/p Control Charts							
Prevent	ive maintenance sched	lule						
1 Is	the station log properl	y compl	eted during	every site visit? 🗸	Minimal information			
	e the Site Status Reporrent?	rt Form	s being comp	pleted and				
	e the chain-of-custody nple transfer to and fr			d to document				
	e ozone z/s/p control c rrent?	harts pr	operly comp	pleted and	Control charts not u	sed		
	any additional explan				ry) regarding condit	ions listed	above, o	or any other features,

Field Systems Data Form F-02058-1500-S8-rev002 QAK172 Technician Eric Hebert Site Visit Date 11/10/2019 Site ID Site operation procedures Site operator refresher training July 2006 Has the site operator attended a formal CASTNET training ✓ course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency** Compliant **✓ V** N/A **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? Compliant **QC Check Performed** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V V** As needed Manual Zero/Span Tests **V ~** Daily **Automatic Precision Level Tests V Manual Precision Level Test** As needed **V V Analyzer Diagnostics Tests** Weekly **~** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Sample Line Check for Dirt/Water Weekly **~ V Zero Air Desiccant Check** Weekly

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

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

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

	Unknown
✓	
✓	Logbook, call-in

Field Systems Data Form			F-02058-1500-S9-rev002		
Site ID QAK172 Tec	hnician Eric Hebert	Site Visit	Date 11/10/2019		
Site operation procedures					
1 Is the filter pack being changed ever	y Tuesday as scheduled	? Filter change	d morinings 80% of the time		
2 Are the Site Status Report Forms be correctly?	ing completed and filed				
3 Are data downloads and backups be scheduled?	ing performed as	No longer rec	uired		
4 Are general observations being made	e and recorded? How?	✓ SSRF			
5 Are site supplies on-hand and replen fashion?	ished in a timely	V			
6 Are sample flow rates recorded? Ho	w?	SSRF, logboo	SSRF, logbook, call-in		
7 Are samples sent to the lab on a regularishion?	ılar schedule in a timely	7			
8 Are filters protected from contamina and shipping? How?	ation during handling	Clean gloves	on and off		
9 Are the site conditions reported regular operations manager or staff?	llarly to the field	✓			
QC Check Performed	Frequency		Compliant		
Multi-point MFC Calibrations	✓ Semiannually		V		
Flow System Leak Checks	✓ Weekly		✓		
Filter Pack Inspection					
Flow Rate Setting Checks	✓ Weekly		✓		
Visual Check of Flow Rate Rotometer	✓ Weekly		✓		
In-line Filter Inspection/Replacement		✓			
Sample Line Check for Dirt/Water	✓ Weekly		✓		
Provide any additional explanation (photo natural or man-made, that may affect the			onditions listed above, or a	any other features,	

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	В	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 0 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Primary Campbell 2115 CKT136 Eric Hebert 11/11/2019 DAS Das Date: 11/11/2019 **Audit Date** 11/11/2019 Fluke **Parameter** DAS Mfg 11:15:00 Das Time: 11:15:00 **Audit Time** 95740135 Tfer Desc. DVM **Serial Number** 315 315 Das Day: **Audit Day** Tfer ID 01311 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0001 0.0001 0.0001 0.0001 1/25/2019 1.00000 **Cert Date** CorrCoff Datel Parameter DAS Mfg **Serial Number** 15510194 Tfer Desc. Source generator (D 01320 Tfer ID 1.00000 0.00000 Slope Intercept 2/13/2012 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 7 V 0.0000 0.0000 -0.0001 -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 V V 0.5000 0.5000 0.4999 -0.0001 V V 7 0.7000 0.7000 0.7000 0.00007 V V 0.9000 0.9001 0.9000 -0.0001 7 1.0000 1.0000 V V -0.0001 1.0001

Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number					
CK	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	В	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 **Technician Owner ID** Mfg **Serial Number Tag Site** Site Visit Date Parameter 000468 Apex CKT136 Eric Hebert 11/11/2019 Flow Rate illegible Mfg BIOS Parameter Flow Rate 148613 Tfer Desc. BIOS 220-H **Serial Number** 01421 Tfer ID 0.00000 **Slope** 1.00000 **Intercept** 3/4/2019 1.00000 CorrCoff **Cert Date** 0 **DAS 2: DAS 1: Cal Factor Zero** 1 A Avg % Diff: A Max % Dif A Avg % Diff A Max % Dif **Cal Factor Full Scale** 0.22% 0.66% 1.5 **Rotometer Reading:** Test type Input l/m Input Corr OutputSignal Output S E InputUnit OutputSignall PctDifference Desc. MfcDisp. primary pump off 0.000 0.000-0.01 0.000-0.021/m1/m leak check 0.04 0.000 0.04 1/m0.000 0.000 1/mprimary test pt 1 1.507 1.510 1.51 0.000 1.50 1/m1/m -0.66% primary 1.500 1.51 0.000 1/m0.00% primary test pt 2 1.502 1.50 1/m 0.00% test pt 3 1.503 1.500 1.51 0.000 1.50 1/m1/m primary Sensor Component Leak Test Condition **Status** pass **Condition** Good **Status** pass **Sensor Component** Tubing Condition Sensor Component Filter Position **Condition** Good Status pass Sensor Component Rotometer Condition Status pass Condition Clean and dry Sensor Component Moisture Present Condition No moisture present Status pass Sensor Component Filter Distance Condition 5.5 cm Status pass Condition 0.5 cm Status pass Sensor Component Filter Depth Status pass **Sensor Component** Filter Azimuth Condition 225 deg

Condition

Status pass

Sensor Component System Memo

Ozone Data Form

Mfg	Serial Numbe	r Tag Site	T	echnician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347324	CKT136	E	Fric Hebert	11/11/2019	Ozone	000744
Intercept -C		rcept	0.00000 0.00000 0.00000	Mfg Serial Number	ThermoElectron		er ozone c. Ozone primary stan
	Con			Tfer ID	01115		
DAS 1:	D A	AS 2:		Slope	1.0080	0 Intercept	-0.40210
A Avg % Diff: A M		Avg %Diff A	Max % Dif	Cert Date	3/26/201		1.00000
0.0%	0.0%			Cert Date	0/20/201	Correon	1.00000
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 Componer	Sample Trai	n	Condi	tion Good		Status pass	
Sensor Componer	22.5 degree	rule	Condi	tion		Status pass	
Sensor Componer	Inlet Filter C	ondition	Condi	Moderately cle	ean	Status pass	
Sensor Componer	at Battery Back	кир	Condi	tion N/A		Status pass	
Sensor Componer				tion -0.10		Status pass	
Sensor Componer	span		Condi	tion 1.008		Status pass	
Sensor Componer	zero Voltage	Э		tion N/A		Status pass	
Sensor Componer				tion N/A		Status pass	
Sensor Componer	Cell A Freq.		Condi	tion 90.6 kHz		Status pass	
Sensor Componer	cell A Noise)	Condi	tion 0.8 ppb		Status pass	
Sensor Componer	Cell A Flow			tion 0.75 lpm		Status pass	
Sensor Componer	cell A Press	sure	Condi	tion 701.7 mmHg		Status pass	
Sensor Componer	Cell A Tmp.		Condi	34.3 C		Status pass	
Sensor Componer	cell B Freq.		Condi	ion 94.1 kHz		Status pass	
Sensor Componer	Cell B Noise)	Condi	tion 1.1 ppb		Status pass	
Sensor Componer	Cell B Flow		Condi	ion 0.71 lpm		Status pass	
Sensor Componer	cell B Press	sure	Condi	701.0 mmHg		Status pass	
Sensor Componer	Cell B Tmp.		Condi	tion N/A		Status pass	
Sensor Componer	Line Loss		Condi	tion ~ 4%		Status Fail	
Sensor Componer	System Mer	no	Condi	tion		Status pass	
•							

Temperature Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg 6703 CKT136 Eric Hebert 11/11/2019 Temperature 04689 RM Young Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 Tfer ID **Slope** 1.00733 **Intercept** 0.14497 **DAS 1: DAS 2:** 2/12/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.28 0.37 UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference Test type primary Temp Low Range -0.12-0.26 0.000 0.1 \mathbf{C} 0.37 C Temp Mid Range 23.31 23.00 0.000 23.2 0.23 primary 0.000 C primary Temp High Range 46.06 45.58 45.8 0.24 Status Fail Sensor Component Shield **Condition** Dirty Sensor Component Blower Status pass **Condition** N/A Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** 11/11/2019 Shelter Temperature Campbell none CKT136 Eric Hebert none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperature Abs Avg Err Abs Max Err Abs Avg Err **Abs Max Err** Tfer Desc. RTD H232734 **Serial Number** 1.07 1.12 01227 **Tfer ID** 1.00733 0.14497 **Slope** Intercept 2/12/2019 CorrCoff 1.00000 **Cert Date**

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 Cor	nponent System Memo)	Condition	Status pass			

Infrastructure Data For

Site ID CKT136 Eric Hebert Site Visit Date 11/11/2019

	Shelter Make	Shelter Model	Shelter Size	
ă	Ekto	8810 (s/n 2116-2)	640 cuft	

Sensor Component Sample Tower Type	Condition Type B	Status pass
Sensor Component Conduit	Condition N/A	Status pass
Sensor Component Met Tower	Condition N/A	Status pass
Sensor Component Moisture Trap	Condition Installed	Status pass
Sensor Component Power Cables	Condition Good	Status pass
Sensor Component Shelter Temp Control	Condition Functioning	Status pass
Sensor Component Rotometer	Condition Installed	Status pass
Sensor Component Sample Tower	Condition Good	Status pass
Sensor Component Shelter Condition	Condition 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 Visit Date 11/11/2019 CKT136 Technician Eric Hebert Site ID Dingus **USGS Map EPA** Site Sponsor (agency) Map Scale private **Operating Group Map Date** 21-175-9991 AQS# R.M. Young **Meteorological Type** Air Pollutant Analyzer Ozone **QAPP** Latitude 37.9211 dry **QAPP** Longitude -83.0658 **Deposition Measurement** 455 **Land Use** woodland - mixed **QAPP Elevation Meters** 5.9 rolling Terrain **QAPP Declination** Yes 2/22/2006 Conforms to MLM **OAPP Declination Date** (606) 522-3560 37.92146 **Site Telephone Audit Latitude** 7687 Highway 437 -83.066295 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 376 Morgan -6.1 **County Audit Declination** West Liberty, KY City, State **Present** Fire Extinguisher 41472 New in 2015 Zip Code Eastern First Aid Kit Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **Climbing Belt** Primary Op. E-mail **V Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 (s/n 2116-2) Ekto **Shelter Size** 640 cuft □ Notes The shelter is in poor condition. The shelter walls adjacent to the air conditioner and rear corner are **Shelter Clean** moldy, rotting, and buckled. **✓** Notes Site OK From I-64 in Morehead go south on route 519 to West Liberty. At the first traffic light in West Liberty, turn left (east) **Driving Directions** 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
Ditt 1D		1 centilician		Dite vibit Date	— • . •

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

Siting	Distances OK	V
Siting	Criteria Com	ment

Field Systems Data Form						F-020	58-15	500-S3	-rev002	
Site	e ID	CKT136	Technician Er	ric Hebert		Site Visit Date	11/11/2019			
1		d speed and direction : fluenced by obstructio		s to avoid	✓	N/A				
2	(i.e. wind horizont	d sensors mounted so a d sensors should be mo ally extended boom >2 to the prevailing wind	ounted atop the to 2x the max diame	ower or on a	✓	N/A				
3	Are the	tower and sensors plu	mb?	l	✓	N/A				
4		temperature shields po diated heat sources su		ositioned to	✓					
5	condition surface	perature and RH sens ns? (i.e. ground below and not steeply sloped gwater should be avoid	sensors should be Ridges, hollows,	e natural	✓					
6	Is the so	lar radiation sensor pl	umb?		✓	N/A				
7	Is it site	d to avoid shading, or	any artificial or r	eflected light?	✓	N/A				
8	Is the ra	in gauge plumb?		l	✓	N/A				
9	Is it sited towers, o	d to avoid sheltering efetc?	ffects from buildin	ngs, trees,	✓	N/A				
10	Is the su facing n	rface wetness sensor s orth?	ited with the grid	surface	✓	N/A				
11	Is it inc	lined approximately 3	0 degrees?		✓	N/A				

Fi	eld Systems Data Form		F-02058-1500-S4-rev002
Site	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?	✓	
	ide any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:		regarding conditions listed above, or any other features,

Field Systems Data Form			F-02058-1500-S5-rev002
Site ID CKT136 Technician Eric Hebert			Site Visit Date 11/11/2019
	Siting Criteria: Are the pollutant analyzers and deposition eq	uipr	nent 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	l mai	intenance
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
	vide any additional explanation (photograph or sketch if necess	sary)	regarding conditions listed above, or any other features,
natu	ral 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 Do the DAS instruments appear to be in good condition and well maintained? **V** Are all the components of the DAS operational? (printers, modem, backup, etc) Temperature only Do the analyzer and sensor signal leads pass through lightning protection circuitry? **✓** Are the signal connections protected from the weather and well maintained? **✓** Are the signal leads connected to the correct DAS channel? Are the DAS, sensor translators, and shelter properly **~** grounded? **✓** Does the instrument shelter have a stable power source? **~** Is the instrument shelter temperature controlled? Grounded **Stable** Is the met tower stable and grounded?

Is the sample tower stable and grounded?

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

11 Tower comments?

V

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

Met tower removed

Fiel	d Systems Data	Fori	n				F-02	2058-	1500-S7-rev002
Site II	D CKT136	7	Fechnicia	n Eric Hebert		Site Visit Dat	11/11/2019	9	
<u>Doc</u>	cumentation								
Doe	es the site have the require	<u>ed inst</u>	rument ar	id equipment	manuals?				
Wind Tempo Relati Solar i Surfac Wind Tempo Humic Solar i Tippin Ozone Filter	speed sensor direction sensor erature sensor ve humidity sensor radiation sensor se wetness sensor sensor translator erature translator dity sensor translator radiation translator radiation translator ag bucket rain gauge analyzer pack flow controller pack MFC power supply oes the site have the requi	Yes			Shelter hea Shelter air	r recorder imp pump ector protection devicater conditioner	Yes	No	
<u> </u>	_	Presei			1101115 4114	report forms.	Curre	ent	
Station		✓					✓		
SSRF		✓					✓		
Site O	ps Manual								
HASP		✓	Nov 2	2001					
Field (Ops Manual	✓							
Calibr	ration Reports	✓	Electi	onic copy			✓		
Ozone	z/s/p Control Charts			1,7					
Prever	ntive maintenance schedul	e							
2 A	s the station log properly o			•	isit? 🗸				
3 A	urrent? .re the chain-of-custody fo		roperly us	sed to docume	ent 🗸				
4 A	ample transfer to and from tre ozone z/s/p control cha urrent?		perly con	npleted and	C	ontrol charts not	used		
	le any additional explanat					regarding cond	litions listed	above, o	or any other features,

Field Systems Data Form F-02058-1500-S8-rev002 CKT136 Technician Eric Hebert Site Visit Date 11/11/2019 Site ID Site operation procedures Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency** Compliant **✓ V** Semiannually **Multipoint Calibrations V V** Weekly **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **QC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests Manual Precision Level Test ✓ V** Weekly **Analyzer Diagnostics Tests ~ V** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Weekly Sample Line Check for Dirt/Water **~ V Zero Air Desiccant Check** Weekly Unknown Do multi-point calibration gases go through the complete sample train including all filters? **✓** Do automatic and manual z/s/p gasses go through the complete sample train including all filters? **✓** Logbook and call-in Are the automatic and manual z/s/p checks monitored and

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

reported? If yes, how?

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

Fi	Field Systems Data Form					F-02058-1500-S9-rev002			
Sit	e ID	CKT136 T	echnici	Eric Hebert		Site Visit Date	e 11/11/2019		
	Site ope	ration procedures							
1	Is the fil	ter pack being changed ev	ery Tu	esday as scheduled?	V	Filter changed usu	ally about noon		
2	Are the correctly	Site Status Report Forms y?	being c	ompleted and filed	✓				
3	Are data	a downloads and backups led?	being p	erformed as		No longer required			
4	Are gen	eral observations being ma	ide and	recorded? How?	✓	SSRF, logbook			
5	5 Are site supplies on-hand and replenished in a timely fashion?			l in a timely	✓				
6	Are sam	ple flow rates recorded? H	Iow?		✓	SSRF, logbook, call-in			
7	Are sam	ples sent to the lab on a re	gular s	chedule in a timely	✓				
8		ers protected from contami	nation	during handling	✓	Clean gloves on ar	nd off		
9		site conditions reported re ons manager or staff?	gularly	to the field	✓				
QC	Check Po	erformed	1	Frequency			Compliant		
I	Multi-poii	nt MFC Calibrations	✓ (Semiannually			V		
]	Flow Syste	em Leak Checks	✓ \	Neekly			✓		
]	Filter Pac	k Inspection							
]	Flow Rate	Setting Checks	✓ \	Neekly			✓		
7	Visual Ch	eck of Flow Rate Rotometo	er 🗸	Neekly			\checkmark		
]	In-line Fil	ter Inspection/Replacemen	ıt 🗸 🤄	Semiannually			✓		
5	Sample Li	ne Check for Dirt/Water	✓ [Neekly			✓		
		dditional explanation (pho n-made, that may affect th) regarding condit	tions listed above, or any other fe	atures,	

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	В	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
CDI	R119-Eric H	lebert-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	В	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 0.02 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 4935 CDR119 Eric Hebert 11/12/2019 DAS Primary Das Date: 11/12/2019 **Audit Date** 11/12/2019 Fluke **Parameter** DAS Mfg 12:15:00 Das Time: **Audit Time** 12:15:01 95740135 Tfer Desc. DVM **Serial Number** 316 Das Day: 316 **Audit Day** Tfer ID 01311 **Low Channel: High Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0000 0.0001 0.0000 0.0001 1/25/2019 1.00000 **Cert Date** CorrCoff Datel Parameter DAS Mfg **Serial Number** 15510194 Tfer Desc. Source generator (D 01320 Tfer ID 1.00000 0.00000 **Slope** Intercept 2/13/2012 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output **DAS** Output InputUnit OutputUnit Difference V 6 0.0000 0.0000 -0.0001 -0.0001 6 0.1000 0.1000 0.1000 V V 0.0000 6 0.3000 0.30010.3001 V V 0.0000V V 6 0.5000 0.5002 0.5002 0.0000 V V 6 0.7000 0.7003 0.7003 0.0000 V V 6 0.9000 0.9004 0.9004 0.0000 6 1.0000 1.0005 V V 0.0001 1.0004

Flow Data Form **Technician Owner ID** Mfg **Serial Number Tag Site** Site Visit Date Parameter 000660 Apex 54747 CDR119 Eric Hebert 11/12/2019 Flow Rate Mfg BIOS Parameter Flow Rate 148613 Tfer Desc. BIOS 220-H **Serial Number** 01421 Tfer ID 0.00000 **Slope** 1.00000 **Intercept** 3/4/2019 1.00000 CorrCoff **Cert Date** 0 **DAS 1: DAS 2: Cal Factor Zero** 0 A Avg % Diff: A Max % Dif A Avg % Diff A Max % Dif **Cal Factor Full Scale** 0.66% 0.66% 1.45 **Rotometer Reading:** Test type Input l/m Input Corr MfcDisp. OutputSignal Output S E InputUnit OutputSignall PctDifference Desc. primary pump off 0.000 0.0000.01 0.000 -0.011/m1/mleak check 0.40 0.000 0.39 1/m0.000 0.000 1/mprimary test pt 1 1.510 1.510 1.52 0.000 1.50 1/m1/m -0.66% primary 0.000 1/m-0.66% primary test pt 2 1.510 1.510 1.52 1.50 1/m test pt 3 1.510 1.510 1.52 0.000 1.50 1/m1/m -0.66% primary Condition See comments Sensor Component Leak Test **Status** Fail Sensor Component Tubing Condition **Status** pass **Condition** Good Sensor Component Filter Position **Condition** Good Status pass Sensor Component Rotometer Condition Status pass Condition Clean and dry Sensor Component Moisture Present Condition No moisture present Status pass Sensor Component Filter Distance Condition 5.5 cm Status pass Status pass Sensor Component Filter Depth Condition 1.5 cm

Condition 180 deg

Condition

Sensor Component Filter Azimuth

Sensor Component System Memo

Status pass

Status pass

Ozone Data Form

Mfg	Serial Number	er Tag Site	Te	echnician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241790	CDR119) E	ric Hebert	11/12/2019	Ozone	000623
Slope:	1.01370 Slop	e: (0.00000	Mfg	ThermoElectron	Inc Parame	eter ozone
•			0.00000	Serial Number	1180930075	Tfor Do	esc. Ozone primary stan
_		-	0.00000	Serial Number			Ozono primary dan
				Tfer ID	01115		
DAS 1:		AS 2:		Slope	1.0080	00 Intercept	-0.40210
A Avg % Diff: A N		Avg %Diff A	Max % Dif	Cert Date	3/26/20	19 CorrCoff	1.00000
0.0%	0.0%			Corvibate	1		
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	-0.6	
primary	4	68.52	68.37	69.05	ppb	0.9	9
primary	5	105.43	104.99	105.60	ppb	0.5	8
Sensor Compone	Sample Tra	in	Condit	ion Good		Status pass	3
Sensor Compone	22.5 degree	rule	Condit	ion		Status Fail	
Sensor Compone	Inlet Filter C	ondition	Condit	ion Moderately cle	ean	Status pass	3
Sensor Compone	Battery Bac	kup	Condit	ion N/A		Status pass	3
Sensor Compone	Offset		Condit	ion -0.20		Status pass	;
Sensor Compone	ent Span		Condit	ion 1.036		Status pass	3
Sensor Compone	zero Voltag	е	Condit	ion N/A		Status pass	3
Sensor Compone	Fullscale Vo	oltage	Condit	ion N/A		Status pass	3
Sensor Compone	ent Cell A Freq.		Condit	ion 90.5 kHz		Status pass	3
Sensor Compone	ent Cell A Noise)	Condit	ion 0.8 ppb		Status pass	3
Sensor Compone	cent Cell A Flow		Condit	ion 0.75 lpm		Status pass	3
Sensor Compone	Cell A Press	sure	Condit	713.0 mmHg		Status pass	3
Sensor Compone	ent Cell A Tmp.		Condit	ion 34.3 C		Status pass	3
Sensor Compone	Cell B Freq.		Condit	92.5 kHz		Status pass	3
Sensor Compone	Cell B Noise)	Condit	ion 0.6 ppb		Status pass	3
Sensor Compone	Cell B Flow		Condit	ion 0.54 lpm		Status pass	3
Sensor Compone	Cell B Press	sure	Condit	713.6 mmHg		Status pass	3
Sensor Compone	Cell B Tmp.		Condit	ion N/A		Status pass	3
Sensor Compone	Line Loss		Condit	ion Not tested		Status pass	
Sensor Compone	System Mer	mo	Condit	ion		Status pass	3

Temperature Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg 4546 CDR119 Eric Hebert 11/12/2019 Temperature 04448 RM Young Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 Tfer ID **Slope** 1.00733 **Intercept** 0.14497 **DAS 1: DAS 2:** 2/12/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.13 0.27 UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference Test type primary Temp Low Range -0.08 -0.22 0.000 0.1 \mathbf{C} 0.27 C Temp Mid Range 25.20 24.87 0.000 24.9 0.03 primary 47.29 C primary Temp High Range 46.80 0.000 46.7 -0.09 Condition Moderately clean Status pass Sensor Component Shield Sensor Component Blower Status pass **Condition** N/A Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** CDR119 11/12/2019 Shelter Temperature Campbell none Eric Hebert none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperature Abs Avg Err Abs Max Err Abs Avg Err **Abs Max Err** Tfer Desc. RTD H232734 **Serial Number** 0.71 0.90 01227 **Tfer ID** 1.00733 0.14497 **Slope** Intercept 2/12/2019 1.00000 **Cert Date** CorrCoff

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 Con	nponent System Memo)	Condition		Status	pass	

Infrastructure Data For

CDR119	Technician Eric Hebert	Site Visit Date	11/12/2019
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Shelter Make	Shelter Model	Shelter Size	
Ekto	8810	640 cuft	

Sensor Component	Sample Tower Type	Condition	Type B	Status	pass
Sensor Component	Conduit	Condition	N/A	Status	pass
Sensor Component	Met Tower	Condition	N/A	Status	pass
Sensor Component	Moisture Trap	Condition	Installed	Status	pass
Sensor Component	Power Cables	Condition	Good	Status	pass
Sensor Component	Shelter Temp Control	Condition	Functioning	Status	pass
Sensor Component	Rotometer	Condition	Installed	Status	pass
Sensor Component	Sample Tower	Condition	Good	Status	pass
Sensor Component	Shelter Condition	Condition	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

F-02058-1500-S1-rev002 **Field Systems Data Form** CDR119 Site Visit Date 11/12/2019 Technician Eric Hebert Site ID Glenville **USGS Map EPA** Site Sponsor (agency) Map Scale private, WV parks dept **Operating Group Map Date** 54-021-9991 AQS# Climatronics **Meteorological Type Air Pollutant Analyzer** Ozone **QAPP** Latitude **Deposition Measurement** dry, wet **QAPP** Longitude woodland - mixed **Land Use QAPP Elevation Meters** complex **Terrain QAPP Declination** No Conforms to MLM **OAPP Declination Date** 38.879503 **Site Telephone Audit Latitude** Cedar Creek St. Park -80.847677 Site Address 1 **Audit Longitude** 240 Site Address 2 **Audit Elevation** Gilmer -8 **County Audit Declination** Glenville, WV City, State **Present** Fire Extinguisher 26351 Inspected Oct 2015 Zip Code Eastern First Aid Kit Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **✓** Primary Op. E-mail **Climbing Belt Backup Operator Security Fence ~** Backup Op. Phone # **Secure Shelter** Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 Ekto **Shelter Size** 640 cuft

The shelter is in fair condition with some rot on the walls below the air conditioner.

✓ Notes

✓ Notes

Shelter Clean

Driving Directions

Site OK

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID	CDR119	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		<u> </u>
Major industrial complex	10 to 20 km		✓
City > 50,000 population	40 km		✓
City 10,000 to 50,000 population	10 km		✓
City 1,000 to 10,000 population	5 km		✓
Major highway, airport or rail yard	2 km		✓
Secondary road, heavily traveled	500 m		✓
Secondary road, lightly traveled	200 m	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	Distances	UK	ш

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.

Fi	eld Sy	stems Data Fo	orm				F-020	58-15	500-S3	-rev002
Site	Site ID CDR119 Te		Technician	Eric Hebert		Site Visit Date	11/12/2019			
1		d speed and direction : fluenced by obstructio		as to avoid	✓	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 plu	mb?		✓	N/A				
4		temperature shields po diated heat sources su			✓					
5	condition surface a	perature and RH sens ns? (i.e. ground below and not steeply sloped water should be avoid	sensors should l . Ridges, hollows	be natural	✓					
6	Is the so	lar radiation sensor pl	lumb?		✓	N/A				
7	Is it sited	d to avoid shading, or	any artificial or	reflected light?	✓	N/A				
8	Is the ra	in gauge plumb?			✓	N/A				
9	Is it sited towers, o	d to avoid sheltering efetc?	ffects from build	lings, trees,	✓	N/A				
10	Is the su facing n	rface wetness sensor s orth?	ited with the gri	d surface	✓	N/A				
11	Is it inc	lined approximately 3	0 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:

Fi	eld Systems Data Form		F-02058-1500-S4-rev002
Site	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?	✓	
	ide any additional explanation (photograph or sketch if necestral or man-made, that may affect the monitoring parameters:	sary)	regarding conditions listed above, or any other features,

Fi	eld Systems Data Form		F-02058-1500-S5-rev002
Site	CDR119 Technician Eric Hebert		Site Visit Date 11/12/2019
	Siting Criteria: Are the pollutant analyzers and deposition eq	uipr	ment 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	ma	intenance
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
	ride any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	ary)	regarding conditions listed above, or any other features,

Field Systems Data Form F-02058-1500-S6-rev002 Site ID CDR119 Technician Eric Hebert Site Visit Date 11/12/2019 DAS, sensor translators, and peripheral equipment operations and maintenance Do the DAS instruments appear to be in good condition and well maintained? **✓** Are all the components of the DAS operational? (printers, modem, backup, etc) Temperature only Do the analyzer and sensor signal leads pass through lightning protection circuitry? **✓** Are the signal connections protected from the weather and well maintained? **✓** Are the signal leads connected to the correct DAS channel?

6	Are the DAS, sensor translators, and shelter properly grounded?	✓	
7	Does the instrument shelter have a stable power source?	✓	
8	Is the instrument shelter temperature controlled?	✓	

- 9 Is the met tower stable and grounded?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:

Stable

V

Met tower removed

Grounded

V

Field Systems Data Form F-02058-1500-S7-rev002 CDR119 Technician Eric Hebert Site Visit Date 11/12/2019 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No N/A Yes Yes No N/A **✓** Wind speed sensor **Data logger** П **V V** Wind direction sensor Data logger ✓ **V Temperature sensor** Strip chart recorder **✓ V** Relative humidity sensor Computer **V Solar radiation sensor V** Modem **Surface wetness sensor** П **V V Printer V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V ~ Humidity sensor translator Surge protector** П **V ~ UPS Solar radiation translator** Tipping bucket rain gauge **~ V Lightning protection device** ~ \checkmark **Shelter heater** Ozone analyzer **✓ ✓** Filter pack flow controller Shelter air conditioner **V** Filter pack MFC power supply □ Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF ✓ V V Site Ops Manual ✓ HASP** no longer on site **✓ Field Ops Manual Calibration Reports V** Ozone z/s/p Control Charts Preventive maintenance schedule 1 Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

Field Systems Data Form F-02058-1500-S8-rev002 CDR119 Technician Eric Hebert Site Visit Date 11/12/2019 Site ID Site operation procedures Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency** Compliant **✓ V** N/A **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test ✓ V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **QC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V** Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests V Manual Precision Level Test ✓ V** Weekly **Analyzer Diagnostics Tests ~ V** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Weekly Sample Line Check for Dirt/Water **~ V Zero Air Desiccant Check** Weekly Unknown Do multi-point calibration gases go through the complete sample train including all filters? **✓** Do automatic and manual z/s/p gasses go through the complete sample train including all filters? **✓** Logbook, call-in Are the automatic and manual z/s/p checks monitored and reported? If yes, how?

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

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

Fi	eld Sy	stems Data Forn	1				F-02058	-1500-S9-rev002			
Sit	e ID	CDR119 T	'echni	cian Eric Hebert		Site Visit Date	e 11/12/2019				
	Site ope	ration procedures									
1	Is the fi	ter pack being changed ev	ery T	uesday as scheduled	? ✓	Filter changed afternoons					
2	Are the Site Status Report Forms being completed and filed correctly?				V						
3	Are dat	a downloads and backups	being	performed as		No longer required					
4	Are gen	eral observations being ma	ide an	nd recorded? How?	✓	SSRF, logbook					
5	5 Are site supplies on-hand and replenished in a timely fashion?				✓						
6	Are san	ple flow rates recorded? I	Iow?		✓	SSRF, logbook, call-in					
7	Are san	uples sent to the lab on a re	gular	schedule in a timely	. 🗸						
8		ers protected from contami	natio	n during handling	✓	Clean gloves on a	nd off				
9		site conditions reported reons manager or staff?	gular	ly to the field	✓						
QC	Check P	erformed		Frequency			Compliant				
I	Multi-poi	nt MFC Calibrations	✓	Semiannually			✓				
]	Flow Syst	em Leak Checks	✓	Weekly		✓					
]	Filter Pac	k Inspection									
]	Flow Rate Setting Checks Weekly				✓						
7	Visual Check of Flow Rate Rotometer				✓						
]	In-line Filter Inspection/Replacement Semiannually				✓						
5	Sample Li	ne Check for Dirt/Water	✓	Weekly			✓				
		dditional explanation (pho n-made, that may affect tl				y) regarding condi	tions listed above, o	or any other features,			

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	В	AT-51060-56	928376
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	4546	04448
Zero air pump	Werther International	C 70/4	000899159	06903

Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number				
EGB	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	В	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 5.75 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2538 EGB181 Korey Devins 11/12/2019 DAS Primary Das Date: 11/12/2019 **Audit Date** 11/12/2019 Fluke **Parameter** DAS Mfg 10:00:00 09:54:15 **Das Time: Audit Time** 95740135 Tfer Desc. DVM **Serial Number** 316 316 Das Day: **Audit Day** Tfer ID 01311 **High Channel: Low Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0001 0.0002 0.0001 0.0002 1/25/2019 1.00000 **Cert Date** CorrCoff Datel Parameter DAS Mfg **Serial Number** 15510194 Tfer Desc. Source generator (D 01320 Tfer ID 1.00000 0.00000 **Slope** Intercept 2/13/2012 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 7 V 0.0000 0.0000 0.0000 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 V V 0.5000 0.4996 0.4995 -0.0001 V V 7 0.7000 0.6995 0.6994 -0.0001 7 V V 0.9000 0.8994 0.8992 -0.0002 7 1.0000 0.9993 0.9991 V V -0.0002

Flow Data Form **Technician Owner ID** Mfg **Serial Number Tag Site** Site Visit Date Parameter Korey Devins 11/12/2019 000469 Apex EGB181 Flow Rate illegible Mfg BIOS Parameter Flow Rate 148613 Tfer Desc. BIOS 220-H **Serial Number** 01421 Tfer ID 0.00000 **Slope** 1.00000 **Intercept** 3/4/2019 1.00000 CorrCoff **Cert Date** 0 **DAS 2: DAS 1: Cal Factor Zero** 0 A Avg % Diff: A Max % Dif A Avg % Diff A Max % Dif **Cal Factor Full Scale** 1.36% 1.36% 1.45 **Rotometer Reading:** Test type Input l/m Input Corr OutputSignal Output S E InputUnit OutputSignall PctDifference Desc. MfcDisp. primary pump off 0.000 0.000-0.020.000-0.051/m1/mleak check 0.05 0.000 0.03 1/m0.000 0.000 1/mprimary test pt 1 1.475 1.470 1.46 0.000 1.49 1/m1/m 1.36% primary 1.470 1.46 0.000 1.49 1/m1.36% primary test pt 2 1.473 1/m test pt 3 1.471 1.470 1.46 0.000 1.49 1/m1/m 1.36% primary Sensor Component Leak Test Condition **Status** pass **Condition** Good **Status** pass **Sensor Component** Tubing Condition Sensor Component Filter Position **Condition** Poor Status Fail Sensor Component Rotometer Condition Status pass Condition Clean and dry Sensor Component Moisture Present Condition No moisture present Status pass Sensor Component Filter Distance Condition 5.0 cm Status pass

Condition -2.0 cm

Condition 150 deg

Condition

Sensor Component Filter Depth

Sensor Component Filter Azimuth

Sensor Component System Memo

Status Fail

Status pass

Status pass

Temperature Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg 9640 EGB181 Korey Devins 11/12/2019 Temperature 05044 RM Young Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 Tfer ID **Slope** 1.00733 **Intercept** 0.14497 **DAS 1: DAS 2:** 2/12/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.13 0.20 UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference Test type primary Temp Low Range 0.17 0.02 0.000 -0.1 \mathbf{C} -0.14 C Temp Mid Range 25.14 24.81 0.000 24.6 -0.2 primary 0.000 C primary Temp High Range 45.23 44.76 44.8 0.04 Status pass **Sensor Component** Shield **Condition** Clean **Sensor Component** Blower Status pass **Condition** N/A Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** EGB181 Korey Devins 11/12/2019 Shelter Temperature Campbell none none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperature Abs Avg Err Abs Max Err Abs Avg Err **Abs Max Err** Tfer Desc. RTD H232734 **Serial Number** 0.55 0.56 01227 **Tfer ID** 1.00733 0.14497 **Slope** Intercept 2/12/2019 1.00000 **Cert Date** CorrCoff

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	
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Shelter Make	Shelter Model	Shelter Size
custom	N/A	7200 cuft
and the state of t		

Sensor Component	Sample Tower Type	Condition	Туре В	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 P	roblem
Flow Rate	EGB181	Korey Devins	11/12/2019	Filter Position	Apex	4527		
TI C1 1	1.4.1.	1 1 1 1	1	1 (*1, 1 *	1 1.1.		. 1 1	

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 Visit Date 11/12/2019 EGB181 Technician Korey Devins Site ID **USGS Map** EPA/Envir Canada Site Sponsor (agency) Map Scale Envir Canada **Operating Group Map Date** AQS# R.M. Young **Meteorological Type** Air Pollutant Analyzer SO2, NOx, NOy, More **QAPP** Latitude 44.2317 dry, wet, CAPMon **QAPP** Longitude -79.7840 **Deposition Measurement** 251 **Land Use** Agriculture **QAPP Elevation Meters** gentley rolling 10.75 Terrain **QAPP Declination** Yes 9/16/2005 Conforms to MLM **OAPP Declination Date** (705) 458-3309 44.231071 **Site Telephone Audit Latitude** Center for Atmospheric Research -79.783115 Site Address 1 **Audit Longitude** 6248 Eighth Line Site Address 2 **Audit Elevation** 227 -10.4 **County Audit Declination** Egbert, Ontario City, State **Present** Fire Extinguisher CAN LOL 1NO inspected Oct 2019 Zip Code **✓** Eastern First Aid Kit Time Zone **Primary Operator Safety Glasses Safety Hard Hat** Primary Op. Phone # **V Climbing Belt** Primary Op. E-mail **V Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make** custom Model N/A **Shelter Size** 7200 cuft **✓** Notes The shelter is provided by the Center for Atmospheric Research and is clean, organized, and Shelter Clean spacious. The roof is leaking but plans are underway for repairs. **✓** Notes Site OK

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		V
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		\checkmark
Secondary road, heavily traveled	500 m		✓
Secondary road, lightly traveled	200 m		✓
Feedlot operations	500 m		✓
Intensive agricultural ops (including aerial spraying)	500 m		✓
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 Comn	nen

Fic	eld Systems Data Form	F-02058-1500-S3-rev002				
Site	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:

Fi	eld Systems Data Form		F-02058-1500-S4-rev002
Site	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?	✓	
	ide any additional explanation (photograph or sketch if neces ral or man-made, that may affect the monitoring parameters:		regarding conditions listed above, or any other features,

Field Systems Data Form F-02058-1500-S5-rev002 EGB181 Technician Korey Devins Site Visit Date 11/12/2019 Site ID Siting Criteria: Are the pollutant analyzers and deposition equipment sited in accordance with 40 CFR 58, Appendix E **~** Do the sample inlets have at least a 270 degree arc of unrestricted airflow? **~** Are the sample inlets 3 - 15 meters above the ground? **~** Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees? Pollutant analyzers and deposition equipment operations and maintenance **~** Do the analyzers and equipment appear to be in good condition and well maintained? **~** Are the analyzers and monitors operational, on-line, and reporting data? Describe ozone sample tube. N/A Describe dry dep sample tube. 3/8 teflon by 20 meters N/A Are in-line filters used in the ozone sample line? (if ves indicate location) **~** Are sample lines clean, free of kinks, moisture, and obstructions? N/A Is the zero air supply desiccant unsaturated? **~** Are there moisture traps in the sample lines? ✓ Clean and dry Is there a rotometer in the dry deposition filter line, and is it clean? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,

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

Ozone concentration is not measured at EGB181 as part of CASTNET.

Field Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	EGB181	Technician	Korey Devins		Site Visit	t Date 11/12/	/2019	
	DAS, sensor translators, and peripheral equipment operations and maintenance								
1	Do the I	OAS instruments appeintained?		_	✓				
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		signal connections prointained?	tected from the	weather and	✓				
5	Are the	signal leads connected	to the correct D	AS channel?	✓				
6	Are the grounde	DAS, sensor translatoed?	rs, and shelter p	roperly	✓				
7	Does the	e instrument shelter ha	ave a stable powe	er source?	✓				
8	Is the in	strument shelter temp	erature controlle	ed?	✓				
9	Is the m	et tower stable and gr	ounded?			Stable		Grounded	
10	Is the sa	mple tower stable and	grounded?			✓		<u> </u>	
11	Tower c	omments?							
	Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:								

Field Systems Data Form EGB181 Technician Korey Devins Site Visit Date 11/12/2019 Site ID **Documentation** Does the site have the required instrument and equipment manuals? N/A Yes No Yes No N/A **V V** Wind speed sensor **Data logger V V** Wind direction sensor Data logger **V V** П **Temperature sensor** Strip chart recorder **✓** П **V** Relative humidity sensor Computer ✓ П П **Solar radiation sensor V** Modem П **V V Printer Surface wetness sensor V V** Wind sensor translator Zero air pump **V Temperature translator V** Filter flow pump **V Humidity sensor translator V Surge protector** П **V V UPS Solar radiation translator ~ V** Tipping bucket rain gauge Lightning protection device **V V Shelter heater** Ozone analyzer **✓ V** Shelter air conditioner Filter pack flow controller **~** Filter pack MFC power supply □ Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V SSRF ✓ V ✓ Site Ops Manual** Oct 2001 **HASP ✓** March 2015 **✓ Field Ops Manual** March 2015 **V 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 **✓** Are the Site Status Report Forms being completed and current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? N/A Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

The site operator uses the station logbook only occasionally and does not send copies to Wood.

F-02058-1500-S7-rev002

Field Systems Data Form F-02058-1500-S8-rev002 EGB181 Technician Korey Devins Site Visit Date 11/12/2019 Site ID Site operation procedures Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency** Compliant **✓ V** N/A **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **QC Check Performed** Compliant **Frequency Multi-point Calibrations V** N/A **V** N/A **Automatic Zero/Span Tests V** N/A Manual Zero/Span Tests **V** N/A **Automatic Precision Level Tests V** N/A **Manual Precision Level Test V** N/A **Analyzer Diagnostics Tests ~** N/A **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V** N/A Sample Line Check for Dirt/Water **~** N/A **Zero Air Desiccant Check** N/A Do multi-point calibration gases go through the complete sample train including all filters? Do automatic and manual z/s/p gasses go through the N/A complete sample train including all filters? N/A Are the automatic and manual z/s/p checks monitored and reported? If yes, how?

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

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

Field Systems Data Form			F-02058-1500-S9-rev002		
Site ID EGB181 Tec	hnician Korey Devins	Site Visit Da	te 11/12/2019		
Site operation procedures					
1 Is the filter pack being changed ever	y Tuesday as scheduled	? ✓ Filter changed m	ornings		
2 Are the Site Status Report Forms be correctly?	ing completed and filed	✓			
3 Are data downloads and backups be scheduled?	ing performed as	□ No longer require	ed		
4 Are general observations being made	e and recorded? How?	✓ SSRF			
5 Are site supplies on-hand and replen fashion?	ished in a timely	✓			
6 Are sample flow rates recorded? How	w?	SSRF, call-in	SSRF, call-in		
7 Are samples sent to the lab on a regularishion?	llar schedule in a timely				
8 Are filters protected from contamina and shipping? How?	tion during handling	Clean gloves on	and off		
9 Are the site conditions reported regular operations manager or staff?	larly to the field	✓			
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		<u> </u>		
Sample Line Check for Dirt/Water					
Provide any additional explanation (photo natural or man-made, that may affect the			litions listed above, or any other features,		

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	В	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
BWI	R139-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	В	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 1 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Primary Campbell 2536 BWR139 Korey Devins 11/19/2019 DAS Das Date: 11/19/2019 **Audit Date** 11/19/2019 Fluke **Parameter** DAS Mfg 11:16:00 11:17:00 **Das Time: Audit Time** 95740135 Tfer Desc. DVM **Serial Number** Das Day: 323 **Audit Day** 323 Tfer ID 01311 **High Channel: Low Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0000 0.0001 0.0000 0.0001 1/25/2019 1.00000 **Cert Date** CorrCoff Datel Parameter DAS Mfg **Serial Number** 15510194 Tfer Desc. Source generator (D 01320 Tfer ID 1.00000 0.00000 **Slope** Intercept 2/13/2012 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 7 V 0.0000 -0.0001 0.0000 0.0001 7 0.1000 0.0998 0.0998 V V 0.0000 7 0.3000 0.2996 0.2996 V V 0.00007 V V 0.5000 0.4995 0.4995 0.0000 V V 7 0.7000 0.6994 0.6994 0.0000 7 V V 0.9000 0.8993 0.8992 -0.0001 7 1.0000 0.9992 0.9991 V V -0.0001

Flow Data Form **Technician Owner ID** Mfg **Serial Number Tag Site** Site Visit Date Parameter Korey Devins 11/19/2019 000670 Apex 54758 BWR139 Flow Rate Mfg BIOS Parameter Flow Rate 148613 Tfer Desc. BIOS 220-H **Serial Number** 01421 Tfer ID 0.00000 **Slope** 1.00000 **Intercept** 3/4/2019 1.00000 CorrCoff **Cert Date** 0 **DAS 2: DAS 1: Cal Factor Zero** 0 A Avg % Diff: A Max % Dif A Avg % Diff A Max % Dif **Cal Factor Full Scale** 2.39% 2.60% 1.6 **Rotometer Reading:** Test type Input l/m Input Corr MfcDisp. OutputSignal Output S E InputUnit OutputSignal PctDifference Desc. primary pump off 0.000 0.0000.01 0.000 -0.011/m1/m leak check 0.01 0.000 -0.01 1/m0.000 0.000 1/mprimary test pt 1 1.538 1.540 1.51 0.000 1.50 1/m1/m -2.60% primary 1.51 0.000 1.50 1/m-1.96% primary test pt 2 1.534 1.530 1/m test pt 3 1.535 1.540 1.51 0.000 1.50 1/m1/m -2.60% primary Sensor Component Leak Test Condition **Status** pass **Condition** Good **Status** pass **Sensor Component** Tubing Condition Sensor Component Filter Position **Condition** Good Status pass Sensor Component Rotometer Condition Status pass Condition Clean and dry Sensor Component Moisture Present **Condition** See comments Status pass Sensor Component Filter Distance Condition 4.5 cm Status pass

Condition 2.5 cm

Condition 30 deg

Condition

Sensor Component Filter Depth

Sensor Component Filter Azimuth

Sensor Component System Memo

Status pass

Status pass

Status pass

Ozone Data Form

Mfg	Serial Numbe	r Tag Site	Т	'echnician	Site Visit Date Parameter		ter Owner ID	
ThermoElectron Inc	1009241789	BWR139)	Korey Devins	11/19/2019	Ozone	000618	
Intercept -1		rcept	0.00000 0.00000 0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180030022 01114		r Desc. Ozone primary stan	
DAS 1:	D A	AS 2:		Slope	0.986	00 Interd	cept 0.41627	
A Avg % Diff: A M		Avg %Diff A	Max % Dif	Cert Date	10/29/20			
0.0%	0.0%			Cert Date	10/20/20	Corre	1.0000	
	ConcGroup	Tfer Raw	Tfer Corr		Site Unit	RelPerD		
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 primary	5	67.50 113.62	68.03 114.81	65.07 110.70	ppb		-4.45 -3.65	
					ppb	_		
Sensor Componen	Sample Trai	n	Condi	tion Good		Status	Dass	
Sensor Componen	22.5 degree	rule	Condi	tion		Status	pass	
Sensor Componen	nt Inlet Filter C	ondition	Condi	tion Moderately cle	ean	Status	pass	
Sensor Componen	Battery Back	кир	Condi	tion N/A		Status	pass	
Sensor Componen	Offset		Condi	tion -0.30		Status	pass	
Sensor Componen	Span		Condi	tion 1.023		Status	pass	
Sensor Componen	Zero Voltage	9	Condi	tion N/A		Status	pass	
Sensor Componen	Fullscale Vo	ltage	Condi	tion N/A		Status	pass	
Sensor Componen	Cell A Freq.		Condi	tion 90.2 kHz		Status	pass	
Sensor Componen	Cell A Noise	!	Condi	tion 0.9 ppb		Status	pass	
Sensor Componen	Cell A Flow		Condi	tion 0.73 lpm		Status	pass	
Sensor Componen	Cell A Press	sure	Condi	tion 728.5 mmHg		Status	pass	
Sensor Componen	Cell A Tmp.			tion 31.7 C		Status		
Sensor Componen	Cell B Freq.		Condi	tion 101.7 kHz		Status		
Sensor Componen	Cell B Noise			tion 0.9 ppb		Status	pass	
Sensor Componen	Cell B Flow		Condi	tion 0.73 lpm		Status	pass	
Sensor Componen		sure		tion 729.7 mmHg		Status		
Sensor Componen				tion N/A		Status	pass	
_	Sensor Component Line Loss			tion Not tested		Status pass		
Sensor Componen	System Men	no	Condi	tion		Status	pass	

Temperature Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg 4012 BWR139 Korey Devins 11/19/2019 Temperature 04315 RM Young Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 Tfer ID **Slope** 1.00733 **Intercept** 0.14497 **DAS 1: DAS 2:** 2/12/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.10 0.18 UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference Test type primary Temp Low Range 0.44 0.29 0.000 0.5 \mathbf{C} 0.18 C Temp Mid Range 25.84 25.51 0.000 25.5 0.01 primary C primary Temp High Range 47.08 46.59 0.000 46.7 0.11 Condition Moderately clean Status pass Sensor Component Shield Sensor Component Blower Status pass **Condition** N/A Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** BWR139 Korey Devins 11/19/2019 Shelter Temperature Campbell none none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperature Abs Avg Err Abs Max Err Abs Avg Err **Abs Max Err** Tfer Desc. RTD H232734 **Serial Number** 0.49 0.61 01227 **Tfer ID** 1.00733 0.14497 **Slope** Intercept 2/12/2019 1.00000 **Cert Date** CorrCoff

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 Con	nponent 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	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 Prol	olem
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 Visit Date 11/19/2019 BWR139 Technician Korey Devins Site ID **USGS Map EPA** Site Sponsor (agency) Map Scale BNWR/private **Operating Group Map Date** 24-019-9991 AQS# R.M. Young **Meteorological Type** Air Pollutant Analyzer Ozone **QAPP** Latitude dry **Deposition Measurement QAPP** Longitude **Land Use** woodlands - mixed, wetlands **QAPP Elevation Meters** flat Terrain **QAPP Declination** Yes Conforms to MLM **OAPP Declination Date** 38.444971 **Site Telephone Audit Latitude** Blackwater Nat Wildlife Refuge -76.111274 Site Address 1 **Audit Longitude** 2145 Key Wallace Dr. Site Address 2 **Audit Elevation** Dorchester -11.2 **County Audit Declination** Cambridge, MD City, State **Present** Fire Extinguisher 21613 dated 2015 Zip Code Eastern First Aid Kit Time Zone **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **~ Climbing Belt** Primary Op. E-mail **Security Fence Backup Operator V Secure Shelter** Backup Op. Phone # Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 Ekto **Shelter Size** 640 cuft **✓** Notes The shelter is showing signs of deterioration with leaks and rot at bottom of walls. Shelter Clean **✓** Notes Site OK From I95 take route 50 east to Cambridge, MD. At mile marker 81 turn right on Woods Rd. Continue approximately **Driving Directions** 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 $\ lacksquare$

Siting Criteria Comment

Very light agriculture activities near site, not harvested, just to provide food for wildlife.

Fic	eld Sy	stems Data Fo	rm				F-020	58-15	500-S3-	rev002
Site	e ID	BWR139	Technician	Korey Devins		Site Visit Date	11/19/2019			
1		d speed and direction s fluenced by obstruction		as to avoid	✓	N/A				
2	(i.e. wind horizont	d sensors mounted so a d sensors should be mo ally extended boom >2 to the prevailing wind)	ounted atop the Ex the max diar	tower or on a	✓	N/A				
3	Are the	tower and sensors plur	nb?		✓	N/A				
4		temperature shields po diated heat sources su			✓					
5	condition surface	perature and RH sensons? (i.e. ground below and not steeply sloped. water should be avoid	sensors should Ridges, hollow	be natural	✓					
6	Is the so	lar radiation sensor pl	umb?		✓	N/A				
7	Is it site	d to avoid shading, or a	any artificial o	r reflected light?	V	N/A				
8	Is the ra	in gauge plumb?			✓	N/A				
9	Is it sited towers,	d to avoid sheltering ef	fects from buil	dings, trees,	✓	N/A				
10	Is the su facing n	rface wetness sensor si orth?	ted with the gr	rid surface	✓	N/A				
11	Is it inc	lined 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:

Fi	eld Systems Data Form		F-02058-1500-S4-rev002
Site	e ID BWR139 Technician Korey D	Devins	Site Visit Date 11/19/2019
1	Do all the meterological sensors appear to be intact, i condition, and well maintained?	in good 🔽	Temperature only
2	Are all the meteorological sensors operational online reporting data?	, and	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 undama	ged? ✓	N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	d 🗸	
8	Are the sensor signal and power cable connections prom the elements and well maintained?	rotected 🗹	
	vide any additional explanation (photograph or sketch ural or man-made, that may affect the monitoring para		regarding conditions listed above, or any other features,

Fi	eld Systems Data Form		F-02058-1500-S5-rev002				
Site	BWR139 Technician Korey Devins		Site Visit Date 11/19/2019				
	Siting Criteria: Are the pollutant analyzers and deposition eq	uipı	ment 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	ma	intenance				
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				
	rovide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, atural or man-made, that may affect the monitoring parameters:						

Field Systems Data Form

F-02058-1500-S6-rev002

Site	e ID	BWR139	Technician	Korey Devins		Site Visi	it Date 11/1	9/2019	
	DAS, se	nsor translators, and j	peripheral equi	pment operation	ıs ar	nd maintena	nce		
_				_	✓				
1		OAS instruments appe intained?	ar to be in good	l condition and	•				
2		he components of the backup, etc)	DAS operation	al? (printers,	✓				
3		nalyzer and sensor sig g protection circuitry?	-	through	✓	Temperature	only		
4		signal connections prointained?	otected from the	e weather and	✓				
5	Are the	signal leads connected	to the correct	DAS channel?	✓				
6	Are the grounde	DAS, sensor translatord?	rs, and shelter	properly	✓				
7	Does the	e instrument shelter h	ave a stable pov	ver source?	✓				
8	Is the in	strument shelter temp	oerature control	lled?	✓				
9	Is the m	et tower stable and gr	ounded?			Stable		Grounde	d
4.0									
10	Is the sa	mple tower stable and	l grounded?			✓		✓	
11	Tower c	omments?				Met tower re	moved		
D		1114		1 4 7 10			7040	11.4.1.3	41 6
		additional explanationan-made, that may af				y) regarding	g conditions	s usted above, or	any other features,

Field Systems Data Form BWR139 Technician Korey Devins Site Visit Date 11/19/2019 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No N/A Yes Yes No N/A **✓ V** Wind speed sensor **Data logger V V** Wind direction sensor Data logger **V V** П **Temperature sensor** Strip chart recorder **✓ V** Relative humidity sensor Computer **V** П **Solar radiation sensor V** Modem П **V V Printer Surface wetness sensor V V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V ~ Humidity sensor translator Surge protector** П **V ~ UPS Solar radiation translator ~ V** Tipping bucket rain gauge Lightning protection device ~ **✓ Shelter heater** Ozone analyzer **V ✓** Filter pack flow controller Shelter air conditioner **~** Filter pack MFC power supply □ Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF ✓ V V V Site Ops Manual V HASP** March 2015 **✓ Field Ops Manual** March 2015 **Calibration Reports V V** Ozone z/s/p Control Charts Preventive maintenance schedule 1 Is the station log properly completed during every site visit? ✓ Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

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Field Systems Data Form F-02058-1500-S8-rev002 BWR139 Technician Korey Devins Site Visit Date 11/19/2019 Site ID Site operation procedures Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency** Compliant **✓ V** N/A **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? Compliant **OC Check Performed** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V** Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests V Manual Precision Level Test V V** Weekly **Analyzer Diagnostics Tests V V** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V** Sample Line Check for Dirt/Water Weekly **~ Zero Air Desiccant Check** Weekly Unknown Do multi-point calibration gases go through the complete sample train including all filters? **✓** Do automatic and manual z/s/p gasses go through the complete sample train including all filters? ✓ SSRF, logbook, call-in Are the automatic and manual z/s/p checks monitored and reported? If yes, how? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features,

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

The ozone sample train is leak checked every two weeks following the inlet filter change.

Fi	eld Sy	stems Data Form				F-02058-1	500-S9-rev002
Sit	e ID	BWR139 Te	chnician Korey Devins		Site Visit Date	11/19/2019	
	Site ope	ration procedures					
1	1 Is the filter pack being changed every Tuesday as scheduled?				Filter changed afte	rnoons	
2	Are the correctl	Site Status Report Forms b	eing completed and filed	~			
3	Are data	a downloads and backups beed?	eing performed as		No longer required		
4	Are gen	eral observations being mad	le and recorded? How?	✓	SSRF, logbook		
5	Are site	supplies on-hand and reple	nished in a timely	✓			
6	Are san	ple flow rates recorded? Ho	ow?	✓	SSRF, logbook, call-in		
7	Are sam	pples sent to the lab on a reg	ular schedule in a timely	✓			
8		ers protected from contamin oping? How?	ation during handling	✓	Clean gloves on ar	nd off	
9		site conditions reported reg ons manager or staff?	ularly to the field	✓			
QC	Check P	erformed	Frequency			Compliant	
I	Multi-poi	nt MFC Calibrations	✓ Semiannually			✓	
]	Flow Syste	em Leak Checks	✓ Weekly			✓	
]	Filter Pack Inspection						
]	Flow Rate Setting Checks				✓		
7	Visual Ch	eck of Flow Rate Rotometer	w Rate Rotometer			✓	
]	In-line Fil	ter Inspection/Replacement	Semiannually			\checkmark	
5	Sample Li	ne Check for Dirt/Water	✓ Weekly			\checkmark	
		dditional explanation (phot n-made, that may affect the			y) regarding condit	tions listed above, or	any other features,

Field Systems Data Form

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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	В	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
ALH	1157-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	В	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 0 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 2534 ALH157 Martin Valvur 12/16/2019 DAS Primary Das Date: 12/16/2019 **Audit Date** 12/16/2019 Fluke **Parameter** DAS Mfg 09:26:00 09:26:00 Das Time: **Audit Time** 95740243 Tfer Desc. DVM **Serial Number** 350 350 Das Day: **Audit Day** Tfer ID 01312 **High Channel: Low Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0001 0.0002 0.0001 0.0002 1/25/2019 1.00000 **Cert Date** CorrCoff ΗY Parameter DAS Mfg **Serial Number** 12010039329 Tfer Desc. Source generator (D 01322 Tfer ID 1.00000 0.00000 **Slope** Intercept 6/15/2014 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 7 V 0.0000 -0.0001 0.0001 0.0002 7 0.0997 0.0998 V V 0.0001 0.1000 7 0.3000 0.2996 0.2996 V V 0.00007 V V 0.5000 0.4993 0.4992 -0.0001 V V 7 0.7000 0.6995 0.6993 -0.0002 7 V V 0.9000 0.8994 0.8994 0.00007 1.0000 0.9994 0.9995 V V 0.0001

Flow Data Form **Technician Owner ID** Mfg **Serial Number Tag Site** Site Visit Date Parameter Martin Valvur 000858 Apex ALH157 12/16/2019 Flow Rate illegible Mfg BIOS Parameter Flow Rate 122974 Tfer Desc. BIOS 220-H **Serial Number** 01416 Tfer ID 0.00161 **Slope** 1.00178 **Intercept** 7/13/2018 1.00000 CorrCoff **Cert Date** 0 **DAS 2: DAS 1: Cal Factor Zero** 0.99 A Avg % Diff: A Max % Dif A Avg % Diff A Max % Dif **Cal Factor Full Scale** 1.08% 1.08% 1.5 **Rotometer Reading:** Test type Input l/m Input Corr MfcDisp. OutputSignal Output S E InputUnit OutputSignal PctDifference Desc. primary pump off 0.000 0.0000.01 0.0000.01 1/m1/m leak check 0.01 0.000 -0.03 1/m0.000 0.000 1/mprimary 1.08% test pt 1 1.480 1.480 1.51 0.000 1.50 1/m1/m primary 1.480 1.51 0.000 1.50 1/m1.08% primary test pt 2 1.480 1/m test pt 3 1.483 1.480 1.51 0.000 1.50 1/m1/m 1.08% primary Sensor Component Leak Test Condition **Status** pass **Condition** Good **Status** pass **Sensor Component** Tubing Condition Sensor Component Filter Position **Condition** Good Status pass Sensor Component Rotometer Condition Status pass Condition Clean and dry Sensor Component Moisture Present Condition No moisture present Status pass Sensor Component Filter Distance Condition 2.0 cm Status pass

Condition 3.0 cm

Condition 360 deg

Condition

Sensor Component Filter Depth

Sensor Component Filter Azimuth

Sensor Component System Memo

Status pass

Status pass

Status pass

Ozone Data Form

Mfg	Serial Number	er Tag Site	Т	echnician	Site Visit Date	Parameter	Owner ID	
ThermoElectron Inc	1009241787	ALH157	N	Martin Valvur	12/16/2019	Ozone	000615	
•	0.99500 Slop		0.00000	Mfg	ThermoElectron	Inc Paramete	ozone	
•			0.00000	Serial Number	49CPS-70008-3	64 Tfer Desc	Ozone primary stan	
CorrCoff:	0.99999 Cor	rCoff:	0.0000	Tfer ID	01110			
DAS 1:		AS 2:	3.5 0/ D10	Slope	1.0033	Intercept	-0.06936	
A Avg % Diff: A M		Avg %Diff A	Max % Dif	Cert Date	10/28/201	19 CorrCoff	1.00000	
0.0%	0.0%			CCI v Butt				
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 Compone	ent Sample Tra	in	Condi	ion Good		Status pass		
Sensor Compone	ent 22.5 degree	rule	Condi	ion		Status pass		
Sensor Compone	ent Inlet Filter C	Condition	Condi	ion Clean		Status pass		
Sensor Compone	ent Battery Bac	kup	Condi	ion N/A		Status pass		
Sensor Compone	ent Offset		Condi	ion 0.10		Status pass		
Sensor Compone	ent Span		Condi	ion 1.007		Status pass		
Sensor Compone	ent Zero Voltag	е	Condi	ion N/A		Status pass		
Sensor Compone	ent Fullscale Vo	oltage	Condi	ion N/A		Status pass		
Sensor Compone	ent Cell A Freq.		Condi	ion 98.5 kHz		Status pass		
Sensor Compone	ent Cell A Noise	9	Condi	ion 0.8 ppb		Status pass		
Sensor Compone	ent Cell A Flow		Condi	ion 0.69 lpm		Status pass		
Sensor Compone	ent Cell A Press	sure	Condi	ion 727.7 mmHg		Status pass		
Sensor Compone	ent Cell A Tmp.		Condi	ion 26.7 C		Status pass		
Sensor Compone	Cell B Freq.		Condi	ion 95.2 kHz		Status pass		
Sensor Compone	ent Cell B Noise)		ion 0.6 ppb		Status pass		
Sensor Compone	Cell B Flow		Condi	ion 0.70 lpm		Status pass		
Sensor Compone	ent Cell B Press	sure		ion 727.4 mmHg		Status pass		
Sensor Compone	ent Cell B Tmp.			ion N/A		Status pass		
Sensor Component Line Loss			Condi	ion Not tested		Status pass		
Sensor Compone	ent System Mer	mo	Condi	ion		Status pass		

Temperature Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg Martin Valvur 8897 ALH157 12/16/2019 Temperature 04945 RM Young Mfg Fluke Parameter Temperature Tfer Desc. RTD 3275143 **Serial Number** 01229 Tfer ID **Slope** 0.99989 **Intercept** -0.00649 **DAS 1: DAS 2:** 1/23/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.05 0.08 UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference Test type primary Temp Low Range 0.12 0.13 0.000 0.1 \mathbf{C} -0.08 C Temp Mid Range 23.77 23.78 0.000 23.8 0.03 primary 0.000 C primary Temp High Range 48.48 48.49 48.4 -0.05 Status pass **Sensor Component** Shield **Condition** Clean Status pass **Sensor Component** Blower **Condition** N/A Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** Martin Valvur 12/16/2019 Shelter Temperature Campbell none ALH157 none **DAS 1: DAS 2:** Mfg Fluke Parameter Shelter Temperature Abs Avg Err Abs Max Err Abs Avg Err **Abs Max Err** Tfer Desc. RTD 3275143 **Serial Number** 0.41 0.67 01229 **Tfer ID** 0.99989 -0.00649 **Slope** Intercept 1/23/2019 1.00000 **Cert Date** CorrCoff

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 ALH157 Technician Martin Valvur Site Visit Date 12/16/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810 (2149-7)	640 cuft

Sensor Component	Sample Tower Type	Condition	Type B	Status pass
Sensor Component	Conduit	Condition	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	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 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 Visit Date 12/16/2019 ALH157 Technician Martin Valvur Site ID Pocahontas **USGS Map EPA** Site Sponsor (agency) Map Scale private **Operating Group Map Date** 17-119-9991 AQS# Climatronics **Meteorological Type** 38.8690 Air Pollutant Analyzer Ozone **QAPP** Latitude dry, wet **QAPP** Longitude -89.6229 **Deposition Measurement** 164 **Land Use** agricultural **QAPP Elevation Meters** flat 0.9 Terrain **QAPP Declination** Yes 1/28/2004 Conforms to MLM **OAPP Declination Date** 38.869001 **Site Telephone Audit Latitude** Fairview Road -89.622815 Site Address 1 **Audit Longitude** Site Address 2 **Audit Elevation** 164 -1.1 Madison **County Audit Declination** Pocahontas, IL City, State **Present** Fire Extinguisher 62275 new in 2015 Zip Code Central Time Zone First Aid Kit **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **Climbing Belt** Primary Op. E-mail **Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 (2149-7) Ekto **Shelter Size** 640 cuft **✓** Notes The shelter floor has been repaird recently. Walls have signs of leaks. **Shelter Clean ✓** Notes Site OK From I-70 take exit 36 (Pokey Road) north to the intersection of route 140. Turn left (west) on route 140 and continue **Driving Directions**

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		\checkmark
City > 50,000 population	40 km		\checkmark
City 10,000 to 50,000 population	10 km		\checkmark
City 1,000 to 10,000 population	5 km		\checkmark
Major highway, airport or rail yard	2 km		\checkmark
Secondary road, heavily traveled	500 m		$ lap{\checkmark}$
Secondary road, lightly traveled	200 m		$ lap{\checkmark}$
Feedlot operations	500 m		$ lap{\checkmark}$
Intensive agricultural ops (including aerial spraying)	500 m	20 m	
Limited agricultural operations	200 m		lacksquare
Large parking lot	200 m		lacksquare
Small parking lot	100 m		\checkmark
Tree line	50 m		lacksquare
Obstacles to wind	10 times obstacle height		✓

Siting Distances OK $\ \overline{\checkmark}$

Siting Criteria Comment

The site is located on a privately operated farm which rotates corn and soy bean crops.

Fi	eld Sy	stems Data Fo	orm				F-020	58-1	500-S3-rev002
Site	e ID	ALH157	Technician	Martin Valvur		Site Visit Date	12/16/2019		
1		d speed and direction fluenced by obstruction		as to avoid	✓	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 plu	mb?		✓	N/A			
4		temperature shields p diated heat sources su			✓				
5	condition surface	perature and RH sens ns? (i.e. ground below and not steeply sloped g water should be avoi	sensors should . Ridges, hollov	l be natural	✓				
6	Is the so	lar radiation sensor p	lumb?		✓	N/A			
7	Is it site	d to avoid shading, or	any artificial o	r reflected light?	✓	N/A			
8	Is the rain gauge plumb?				✓	N/A			
9	Is it site towers,	d to avoid sheltering e	ffects from buil	ldings, trees,	✓	N/A			
10	Is the su facing n	urface wetness sensor sorth?	sited with the gr	rid surface	✓	N/A			
11	Is it inc	lined approximately 3	0 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.

Fi	eld Systems Data Form	F-02058-1500-S4-rev002
Site	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?	
	ide any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	sary) regarding conditions listed above, or any other features,

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

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Site	e ID	ALH157	Technician	Martin Valvur		Site Visit Date	12/16/2019	
	DAS, se	ensor translators, and p	peripheral equip	ment operation	ıs ar	nd maintenance		
				_				
1		DAS instruments appe intained?	ear to be in good	condition and	✓			
2		the components of the , backup, etc)	DAS operationa	l? (printers,	✓			
3		analyzer and sensor sig g protection circuitry?		nrough	✓	Temperature only		
4		signal connections pro intained?	otected from the	weather and	✓			
5	Are the	signal leads connected	l to the correct D	AS channel?	✓			
6	Are the ground	DAS, sensor translato	ors, and shelter p	roperly	✓			
7	Does th	e instrument shelter h	ave a stable pow	er source?	✓			
8	Is the ir	nstrument shelter temp	oerature controll	ed?	✓			
9	Is the m	net tower stable and gr	ounded?			Stable	Ground	ed
10	Is the sa	ample tower stable and	l grounded?				✓	
11	Tower	comments?				Met tower removed		
		additional explanatio				y) regarding condi	tions listed above, o	r any other features,
	natural or man-made, that may affect the monitoring parameters:							

Field Systems Data F	orm			F-02	2058-	1500-S7-rev00
Site ID ALH157	Technicia	n Martin Valvur	Site Visit Date	12/16/2019)	
Documentation						
Does the site have the required	l instrument an	nd equipment manuals	<u>?</u>			
Wind speed sensor Wind direction sensor Temperature sensor Relative humidity sensor Solar radiation sensor Surface wetness sensor Wind sensor translator Temperature translator Humidity sensor translator Solar radiation translator Tipping bucket rain gauge Ozone analyzer Filter pack flow controller Filter pack MFC power supply		Compute Modem Printer Zero air j Filter flow Surge pro UPS Lightning Shelter h Shelter air	ger rt recorder r pump w pump otector g protection device eater ir conditioner	Yes	No V	
Does the site have the require		cent QC documents an	d report forms?	G		
Station Log SSRF Site Ops Manual HASP Field Ops Manual Calibration Reports Ozone z/s/p Control Charts Preventive maintenance schedule	Present V Oct 20 Feb 2 V July 1	2014		Curre	ent	
 Is the station log properly co Are the Site Status Report F current? Are the chain-of-custody for sample transfer to and from 	orms being con	npleted and				
4 Are ozone z/s/p control char current?	ts properly con		Control charts not us			
Provide any additional explanation natural or man-made, that may a) regarding condition	ons listed	above,	or any other features,

Field Systems Data Form F-02058-1500-S8-rev002 ALH157 Site Visit Date 12/16/2019 Site ID Technician Martin Valvur Site operation procedures Has the site operator attended a formal CASTNET training ✓ Trained by previous operator course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET Trained by current operator training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency** Compliant **✓ V** N/A **Multipoint Calibrations V V** N/A **Visual Inspections ✓ V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **Compliant QC Check Performed** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily **V** Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests V Manual Precision Level Test ✓ V Analyzer Diagnostics Tests** Weekly **~** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Sample Line Check for Dirt/Water Weekly **Zero Air Desiccant Check**

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

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

	Unknown
✓	
✓	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:

Fi	eld Sy	stems Data Form	l		F-02058-1500-S9-rev002					
Sit	e ID	ALH157 T 6	chnician Martin Valvur		Site Visit Date	12/16/2019				
	Site ope	ration procedures								
1	Is the fi	ter pack being changed eve	ry Tuesday as scheduled	? ✓	Filter changed morinings					
2	Are the correctl	Site Status Report Forms by?	eing completed and filed	✓						
3	Are data	a downloads and backups b	eing performed as		No longer required					
4	Are gen	eral observations being mad	de and recorded? How?	✓	SSRF, logbook					
5	Are site	supplies on-hand and reple	nished in a timely	✓						
6	Are sample flow rates recorded? How?				SSRF, logbook, call-in					
7	Are sam	uples sent to the lab on a reg	gular schedule in a timely	✓						
8		ers protected from contaminoping? How?	nation during handling	✓	Clean gloves on ar	nd off				
9		site conditions reported reg ons manager or staff?	ularly to the field	✓						
QC	Check P	erformed	Frequency			Compliant				
I	Multi-poi	nt MFC Calibrations	✓ Semiannually			✓				
]	Flow Syste	em Leak Checks	✓ Weekly		✓					
]	Filter Pac	k Inspection								
]	Flow Rate Setting Checks ✓ Weekly				✓					
7	Visual Check of Flow Rate Rotometer ✓ Weekly				✓					
]	In-line Filter Inspection/Replacement Semiannually					✓				
5	Sample Li	ne Check for Dirt/Water	✓ Weekly			✓				
		dditional explanation (photon-made, that may affect the			y) regarding condit	ions listed above, or a	any other features,			

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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	В	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

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 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 none 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 Sample Tower Aluma Tower 000863 B unknown 11 12/17/2019 Shelter Temperature Campbell none 107-L none 12/17/2019 Shelter Temperature	Site Visit	t Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
2 12/17/2019 DAS Campbell 000498 CR3000 3815 3 12/17/2019 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 none 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	BFT142-I	-Korey I	Devins-12/17/2019				
3 12/17/2019 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 none 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	1 12/17	17/2019	Computer	Dell	07007	Inspiron 15	Unknown
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 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	2 12/17	17/2019	DAS	Campbell	000498	CR3000	3815
5 12/17/2019 Flow Rate Apex 000593 AXMC105LPMDPCV illegible 6 12/17/2019 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	3 12/17	17/2019	Elevation	Elevation	None	1	None
6 12/17/2019 Infrastructure Infrastructure none 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	4 12/17	17/2019	Filter pack flow pump	Thomas	00808	107CA18	00002460587
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	5 12/17	17/2019	Flow Rate	Apex	000593	AXMC105LPMDPCV	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	6 12/17	17/2019	Infrastructure	Infrastructure	none	none	none
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	7 12/17	17/2019	Modem	Digi	07129	LR54	Illegible
10 12/17/2019 Sample Tower Aluma Tower 000863 B unknown 11 12/17/2019 Shelter Temperature Campbell none 107-L none	8 12/17	17/2019	Ozone	ThermoElectron Inc	000746	49i A1NAA	1105347315
11 12/17/2019 Shelter Temperature Campbell none 107-L none	9 12/17	17/2019	Ozone Standard	ThermoElectron Inc	000330	49i A3NAA	0622717854
	10 12/17	17/2019	Sample Tower	Aluma Tower	000863	В	unknown
12 12/17/2019 Siting Criteria Siting Criteria None 1 None	11 12/17	17/2019	Shelter Temperature	Campbell	none	107-L	none
	12 12/17	17/2019	Siting Criteria	Siting Criteria	None	1	None
13 12/17/2019 Temperature RM Young 04444 41342VO 4542	13 12/17	17/2019	Temperature	RM Young	04444	41342VO	4542
14 12/17/2019 Zero air pump Werther International 06898 C 70/4 000821905	14 12/17	17/2019	Zero air pump	Werther International	06898	C 70/4	000821905

DAS Data Form 0.05 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg Campbell 3815 BFT142 Korey Devins 12/17/2019 DAS Primary Das Date: 12/17/2019 **Audit Date** 12/17/2019 Fluke **Parameter** DAS Mfg 08:41:40 08:41:43 Das Time: **Audit Time** 95740135 Tfer Desc. DVM **Serial Number** 351 351 Das Day: **Audit Day** Tfer ID 01311 **High Channel: Low Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0000 0.0001 0.0000 0.0001 1/25/2019 1.00000 **Cert Date** CorrCoff Datel Parameter DAS Mfg **Serial Number** 15510194 Tfer Desc. Source generator (D 01320 Tfer ID 1.00000 0.00000 **Slope** Intercept 2/13/2012 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output DAS Output InputUnit OutputUnit Difference 7 V 0.0000 0.0000 0.0000 0.0000 7 0.1000 0.0998 0.0999 V V 0.0001 7 0.3000 0.2997 0.2997 V V 0.00007 V V 0.5000 0.4995 0.4996 0.0001 V V 7 0.7000 0.6995 0.6995 0.00007 V V 0.9000 0.8993 0.0000 0.8993 7 1.0000 0.9992 0.9992 V V 0.0000

Flow Data Form **Technician Owner ID** Mfg **Serial Number Tag Site** Site Visit Date Parameter Korey Devins 000593 Apex BFT142 12/17/2019 Flow Rate illegible Mfg BIOS Parameter Flow Rate 148613 Tfer Desc. BIOS 220-H **Serial Number** 01421 Tfer ID 0.00000 **Slope** 1.00000 **Intercept** 3/4/2019 1.00000 CorrCoff **Cert Date** 0 **DAS 2: DAS 1: Cal Factor Zero** 0 A Avg % Diff: A Max % Dif A Avg % Diff A Max % Dif **Cal Factor Full Scale** 0.22% 0.67% 1.5 **Rotometer Reading:** Test type Input l/m Input Corr MfcDisp. OutputSignal Output S E InputUnit OutputSignall PctDifference Desc. primary pump off 0.000 0.0000.01 0.0000.02 1/m1/mleak check 0.00 0.000 -0.02 1/m0.000 0.000 1/mprimary test pt 1 1.491 1.490 1.49 0.000 1.50 1/m1/m 0.67% primary 1.490 1.48 0.000 1.49 1/m0.00% primary test pt 2 1.491 1/m test pt 3 1.491 1.490 1.48 0.000 1.49 1/m1/m 0.00% primary Sensor Component Leak Test Condition **Status** pass **Condition** Good **Status** pass **Sensor Component** Tubing Condition Sensor Component Filter Position **Condition** Good Status pass Sensor Component Rotometer Condition Status pass Condition Clean and dry Sensor Component Moisture Present **Condition** No moisture present Status pass Sensor Component Filter Distance Condition 3.5 cm Status pass Condition 2.0 cm Status pass Sensor Component Filter Depth

Condition 205 deg

Condition

Sensor Component Filter Azimuth

Sensor Component System Memo

Status pass

Status pass

Ozone Data Form

Mfg Serial Number Tag Site			T	echnician	Site Visit Date	Paramete	eter Owner ID	
ThermoElectron Inc	1105347315	BFT142	ŀ	Korey Devins	12/17/2019	Ozone	000746	
Intercept -(rcept	0.00000	Mfg Serial Number Tfer ID	ThermoElectron 1180030022 01114		Desc. Ozone primary stan	
DAS 1:	D	AS 2:				20 -	0.44007	
A Avg % Diff: A M			Max % Dif	Slope	0.9860	00 Interce	ept 0.41627	
0.0%	0.0%			Cert Date	10/29/20	19 CorrC	off 1.00000	
UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerD	if 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 Componer	nt Sample Trai	n	Condi	Good		Status pa	ass	
Sensor Compone	nt 22.5 degree	rule	Condi	tion		Status pa	ass	
Sensor Compone	nt Inlet Filter C	ondition	Condi	tion Clean		Status pa	ass	
Sensor Compone	nt Battery Back	кир	Condi	tion N/A		Status pa	ass	
Sensor Compone	offset Offset		Condi	tion 0.10		Status pa	ass	
Sensor Compone	nt Span		Condi	1.000		Status pa	ass	
Sensor Compone	nt Zero Voltage	Э	Condi	tion N/A		Status pa	ass	
Sensor Compone	nt Fullscale Vo	ltage	Condi	Condition N/A			ass	
Sensor Compone	Cell A Freq.		Condi	Condition 89.3 kHz			ass	
Sensor Compone	cell A Noise		Condi	Condition 0.6 ppb			ass	
Sensor Compone	cell A Flow		Condi	Condition 0.63 lpm			ass	
Sensor Compone		sure	Condi	tion 729.5 mmHg		Status pa		
Sensor Componer	Cell A Tmp.			31.8 C		Status pa		
Sensor Compone	cell B Freq.			bion 91.0 kHz		Status pa		
Sensor Compone		•		tion 0.6 ppb		Status pa		
Sensor Compone				tion 0.65 lpm		Status pa		
Sensor Component Cell B Pressure				tion 730.4 mmHg		Status pa		
Sensor Compone				tion N/A		Status pa		
Sensor Component Line Loss				tion Not tested		Status pass		
Sensor Compone	nt System Mer	no	Condi	tion		Status pa	ass	

Temperature Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg 4542 BFT142 Korey Devins 12/17/2019 Temperature 04444 RM Young Mfg Extech Parameter Temperature Tfer Desc. RTD H232734 **Serial Number** 01227 Tfer ID **Slope** 1.00733 **Intercept** 0.14497 **DAS 1: DAS 2:** 2/12/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.12 0.16 UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference Test type primary Temp Low Range 0.36 0.21 0.000 0.4 \mathbf{C} 0.16 C Temp Mid Range 23.55 23.23 0.000 23.2 -0.06 primary C primary Temp High Range 45.42 44.95 0.000 45.1 0.14 Condition Moderately clean Status pass Sensor Component Shield Sensor Component Blower Status pass **Condition** N/A Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** Korey Devins 12/17/2019 Shelter Temperature Campbell none BFT142 none **DAS 1: DAS 2:** Mfg Extech Parameter Shelter Temperature Abs Avg Err Abs Max Err Abs Avg Err **Abs Max Err** Tfer Desc. RTD H232734 **Serial Number** 0.09 0.20 01227 **Tfer ID** 1.00733 0.14497 **Slope** Intercept 2/12/2019 CorrCoff 1.00000 **Cert Date**

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	Sample Tower Type	Condition	Туре В	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 Visit Date 12/17/2019 BFT142 Technician Korey Devins Site ID Williston **USGS Map EPA** Site Sponsor (agency) Map Scale **UNC-IMS Operating Group Map Date** 37-031-9991 AQS# R.M. Young **Meteorological Type** Air Pollutant Analyzer Ozone **QAPP** Latitude dry, wet **Deposition Measurement QAPP** Longitude **Land Use** agriculture **QAPP Elevation Meters** flat Terrain **QAPP Declination** Yes Conforms to MLM **OAPP Declination Date** 34.884668 **Site Telephone Audit Latitude** Open Grounds Farm -76.620666 Site Address 1 **Audit Longitude** 100 Nelson Bay Rd. Site Address 2 **Audit Elevation** 5.3 Carteret -9.9 **County Audit Declination** Beaufort, NC City, State **Present** Fire Extinguisher 28516 New in 2015 Zip Code First Aid Kit Time Zone Eastern **✓ Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **Climbing Belt** Primary Op. E-mail **Security Fence Backup Operator Secure Shelter** Backup Op. Phone # Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 Ekto **Shelter Size** 640 cuft **✓** Notes The shelter lights are not functioning properly. Shelter Clean **✓** Notes Site OK From I-95 take highway 70 east through Morehead City and over the bridge. Continue through Beaufort staying on **Driving Directions** 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.

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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		lacksquare
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		lacksquare
Tree line	50 m		lacksquare
Obstacles to wind	10 times obstacle height		✓

Siting Distances OK $\ \overline{\checkmark}$

Siting Criteria Comment

The site is surrounded by a corn/soy bean field, within a large-scale commercial agriculture operation.

Fi	eld Sy	stems Data Fo	orm				F-020)58-1	500-S3	8-rev002
Site	e ID	BFT142	Technician	Korey Devins		Site Visit Date	12/17/2019			
1		d speed and direction fluenced by obstruction		as to avoid	✓	N/A				
2	(i.e. win	d sensors mounted so d sensors should be m tally extended boom > to the prevailing wind	ounted atop the 2x the max diar	tower or on a	✓	N/A				
3	Are the	tower and sensors plu	mb?		✓	N/A				
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?									
5	conditio surface	perature and RH sens ns? (i.e. ground below and not steeply sloped g water should be avoi	sensors should . Ridges, hollow	be natural	✓					
6	Is the so	lar radiation sensor p	lumb?		✓	N/A				
7	Is it site	d to avoid shading, or	any artificial o	r reflected light?	✓	N/A				
8	Is the ra	in gauge plumb?			✓	N/A				
9	Is it site towers,	d to avoid sheltering e	ffects from buil	dings, trees,	✓	N/A				
10	Is the su facing n	rface wetness sensor sorth?	sited with the gr	rid surface	✓	N/A				
11	Is it inc	lined approximately 3	0 degrees?		✓	N/A				

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

Fie	eld Systems Data Form		F-02058-1500-S4-rev002
Site	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?	✓	
	ide any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	ary)	regarding conditions listed above, or any other features,
The r	neteorological tower has been removed and the temperature sensor	or is	installed in a naturally aspirated shield on the sample tower.

Fi	eld Systems Data Form		F-02058-1500-S5-rev002
Site	BFT142 Technician Korey Devins		Site Visit Date 12/17/2019
	Siting Criteria: Are the pollutant analyzers and deposition eq	<u>uipr</u>	nent 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	mai	ntenance
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
	ride any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:	ary)	regarding conditions listed above, or any other features,

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Site	e ID	BFT142	Technician	Korey Devins		Site Visit Date	12/17/2019	
	DAS, se	nsor translators, and j	peripheral equij	pment operation	ıs ar	nd maintenance		
1		DAS instruments appe intained?	ear to be in good	condition and	✓			
2		the components of the , backup, etc)	DAS operations	al? (printers,	✓			
3		analyzer and sensor sig g protection circuitry		through	✓	Temperature only		
4		signal connections prointained?	otected from the	e weather and	✓			
5	Are the	signal leads connected	l to the correct	DAS channel?	✓			
6	Are the ground	DAS, sensor translatored?	ors, and shelter p	properly	✓			
7	Does th	e instrument shelter h	ave a stable pow	ver source?	✓			
8	Is the in	strument shelter temp	oerature control	led?	✓			
9	Is the m	net tower stable and gr	ounded?			Stable	Grounded	
10	Is the sa	ample tower stable and	l grounded?					
11	Tower o	comments?				Met tower removed	i.	
	Provide any additional 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.							

Wind speed sensor Wind direction sensor Data logger Temperature sensor Strip chart recorder Computer Solar radiation sensor Modem V Printer Wind sensor translator Temperature translator Temperature translator Surface wetness sensor Wind sensor translator Surge protector Solar radiation translator Wind sensor translator	500-S7-rev0
Does the site have the required instrument and equipment manuals? Yes No N/A Yes No N/A Wind speed sensor	
Yes No N/A Yes	
Vind speed sensor Vind direction sensor Vemperature vemperature translator Vemperature tran	
Present Station Log SSRF Site Ops Manual HASP Field Ops Manual Calibration Reports Dzone z/s/p Control Charts Preventive maintenance schedule Current Current	
Itation Log SRF Ite Ops Manual ASP Iteld Ops Manual Iteld Ops	
SRF ite Ops Manual IASP iteld Ops Manual Calibration Reports Dzone z/s/p Control Charts Preventive maintenance schedule	
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IASP 2019	
Calibration Reports Dzone z/s/p Control Charts Preventive maintenance schedule	
Calibration Reports Dzone z/s/p Control Charts Preventive maintenance schedule	
Ozone z/s/p Control Charts Preventive maintenance schedule	
Preventive maintenance schedule	
Is the station log properly completed during every site visit? 🗸	
Are the Site Status Report Forms being completed and current?	
Are the chain-of-custody forms properly used to document sample transfer to and from lab?	
Are ozone z/s/p control charts properly completed and current?	

Field Systems Data Form F-02058-1500-S8-rev002 BFT142 Technician Korey Devins Site Visit Date 12/17/2019 Site ID Site operation procedures Has the site operator attended a formal CASTNET training ✓ course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency** Compliant **✓ V** N/A **Multipoint Calibrations V V** N/A **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** N/A **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **QC Check Performed Compliant** Frequency **Multi-point Calibrations V V** Semiannually **V Automatic Zero/Span Tests** Daily **V** As needed Manual Zero/Span Tests **V** Daily **Automatic Precision Level Tests V Manual Precision Level Test** As needed **V V** Weekly **Analyzer Diagnostics Tests V** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze **V V** Weekly Sample Line Check for Dirt/Water **~ V** As needed **Zero Air Desiccant Check** Unknown Do multi-point calibration gases go through the complete sample train including all filters? **✓** Do automatic and manual z/s/p gasses go through the complete sample train including all filters?

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

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

reported? If yes, how?

✓

SSRF, call-in

Fic	eld Systems Data Form			F-02058-1500-S9-rev002		
Site	e ID BFT142 Tecl	hnician 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 bei correctly?	ng completed and filed	✓			
3	Are data downloads and backups bei scheduled?	ng performed as		No longer required		
4	Are general observations being made	and recorded? How?	✓	SSRF		
5	5 Are site supplies on-hand and replenished in a timely fashion?					
6	Are sample flow rates recorded? How	v?	✓	SSRF, logbook, call-in		
7	Are samples sent to the lab on a regulation?	lar schedule in a timely	✓			
8	Are filters protected from contamina and shipping? How?	tion during handling	✓	Clean gloves on and off		
9	Are the site conditions reported regular operations manager or staff?	larly to the field	✓			
QC	Check Performed	Frequency		Compliant		
N	Multi-point MFC Calibrations	✓ Semiannually		✓		
Flow System Leak Checks Weekly		Weekly		✓		
Filter Pack Inspection						
Flow Rate Setting Checks ✓ Weekly			✓			
Visual Check of Flow Rate Rotometer ✓ Weekly			✓			
In-line Filter Inspection/Replacement Semiannually			✓			
S	ample Line Check for Dirt/Water	✓ Weekly		✓		
	ide any additional explanation (photograf)			regarding conditions listed above, or any other features,		

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	В	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 0.03 **DAS Time Max Error: Serial Number** Site **Technician** Site Visit Date Parameter Use Desc. Mfg 2133 Campbell CDZ171 Martin Valvur 12/17/2019 DAS Primary Das Date: 12/17/2019 **Audit Date** 12/17/2019 Fluke **Parameter** DAS Mfg 14:20:33 14:20:35 **Das Time: Audit Time** 95740243 Tfer Desc. DVM **Serial Number** Das Day: 351 **Audit Day** 351 Tfer ID 01312 **High Channel: Low Channel: Avg Diff: Max Diff: Avg Diff: Max Diff:** 1.00000 0.00000 Slope Intercept 0.0001 0.0002 0.0001 0.0002 1/25/2019 1.00000 **Cert Date** CorrCoff ΗY Parameter DAS Mfg **Serial Number** 12010039329 Tfer Desc. Source generator (D 01322 Tfer ID 1.00000 0.00000 **Slope** Intercept 6/15/2014 1.00000 **Cert Date** CorrCoff Channel Input **DVM** Output **DAS** Output InputUnit OutputUnit Difference 7 V 0.0000 -0.0005 -0.0006 -0.0001 7 0.0992 0.0993 V V 0.0001 0.1000 7 0.3000 0.2995 0.2997 V V 0.00027 V V 0.5000 0.4994 0.4994 0.0000 V V 7 0.7000 0.6995 0.6995 0.0000 7 V V 0.9000 0.8992 0.8993 0.0001 7 1.0000 0.9994 0.9995 V V 0.0001

Site Inventory by Site Visit

Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number				
CDZ171-Martin Valvur-12/17/2019									
12/17/2019	Computer	Dell	07063	Inspiron 15	HX4MC12				
12/17/2019	DAS	Campbell	000355	CR3000	2133				
12/17/2019	Elevation	Elevation	None	1	None				
12/17/2019	Filter pack flow pump	Thomas	06020	107CAB18D	060400022646				
12/17/2019	Flow Rate	Apex	000669	AXMC105LPMDPCV	54766				
12/17/2019	Infrastructure	Infrastructure	none	none	none				
12/17/2019	Modem	Digi	07118	LR54	Illegible				
12/17/2019	Ozone	ThermoElectron Inc	000727	49i A1NAA	1105347320				
12/17/2019	Ozone Standard	ThermoElectron Inc	000220	49i A3NAA	0622717868				
12/17/2019	Sample Tower	Aluma Tower	000125	В	none				
12/17/2019	Shelter Temperature	Campbell	none	107-L	none				
12/17/2019	Siting Criteria	Siting Criteria	None	1	None				
12/17/2019	Temperature	RM Young	06403	41342VC	14036				
12/17/2019	Zero air pump	Werther International	06879	C 70/4	000814275				
	12/17/2019 12/17/2019 12/17/2019 12/17/2019 12/17/2019 12/17/2019 12/17/2019 12/17/2019 12/17/2019 12/17/2019 12/17/2019 12/17/2019 12/17/2019 12/17/2019	12/17/2019 Computer 12/17/2019 DAS 12/17/2019 Elevation 12/17/2019 Filter pack flow pump 12/17/2019 Flow Rate 12/17/2019 Infrastructure 12/17/2019 Modem 12/17/2019 Ozone 12/17/2019 Ozone Standard 12/17/2019 Sample Tower 12/17/2019 Shelter Temperature 12/17/2019 Siting Criteria 12/17/2019 Temperature	Z171-Martin Valvur-12/17/2019 12/17/2019 Computer Dell 12/17/2019 DAS Campbell 12/17/2019 Elevation Elevation 12/17/2019 Filter pack flow pump Thomas 12/17/2019 Flow Rate Apex 12/17/2019 Infrastructure Infrastructure 12/17/2019 Modem Digi 12/17/2019 Ozone ThermoElectron Inc 12/17/2019 Ozone Standard ThermoElectron Inc 12/17/2019 Sample Tower Aluma Tower 12/17/2019 Shelter Temperature Campbell 12/17/2019 Siting Criteria Siting Criteria 12/17/2019 Temperature RM Young	Z171-Martin Valvur-12/17/2019 Dell 07063 12/17/2019 DAS Campbell 000355 12/17/2019 Elevation Elevation None 12/17/2019 Filter pack flow pump Thomas 06020 12/17/2019 Flow Rate Apex 000669 12/17/2019 Infrastructure Infrastructure none 12/17/2019 Modem Digi 07118 12/17/2019 Ozone ThermoElectron Inc 000727 12/17/2019 Ozone Standard ThermoElectron Inc 000220 12/17/2019 Sample Tower Aluma Tower 000125 12/17/2019 Shelter Temperature Campbell none 12/17/2019 Siting Criteria None 12/17/2019 Temperature RM Young 06403	Z171-Martin Valvur-12/17/2019 Dell 07063 Inspiron 15 12/17/2019 DAS Campbell 000355 CR3000 12/17/2019 Elevation None 1 12/17/2019 Filter pack flow pump Thomas 06020 107CAB18D 12/17/2019 Flow Rate Apex 000669 AXMC105LPMDPCV 12/17/2019 Infrastructure none none 12/17/2019 Modem Digi 07118 LR54 12/17/2019 Ozone ThermoElectron Inc 000727 49i A1NAA 12/17/2019 Ozone Standard ThermoElectron Inc 000220 49i A3NAA 12/17/2019 Sample Tower Aluma Tower 000125 B 12/17/2019 Shelter Temperature Campbell none 107-L 12/17/2019 Siting Criteria Siting Criteria None 1 12/17/2019 Temperature RM Young 06403 41342VC				

Flow Data Form **Technician Owner ID** Mfg **Serial Number Tag Site** Site Visit Date Parameter Martin Valvur 000669 Apex 54766 CDZ171 12/17/2019 Flow Rate Mfg BIOS Parameter Flow Rate 122974 Tfer Desc. BIOS 220-H **Serial Number** 01416 Tfer ID 0.00161 **Slope** 1.00178 **Intercept** 7/13/2018 1.00000 CorrCoff **Cert Date** -0.014 **DAS 1: DAS 2: Cal Factor Zero** 0.967 A Avg % Diff: A Max % Dif A Avg % Diff A Max % Dif **Cal Factor Full Scale** 2.39% 2.60% 1.45 **Rotometer Reading:** Test type Input l/m Input Corr MfcDisp. OutputSignal Output S E InputUnit OutputSignall PctDifference Desc. primary pump off 0.000 0.0000.01 0.000 -0.011/m1/mleak check 0.02 0.000 -0.02 1/m0.000 0.000 1/mprimary test pt 1 1.541 1.540 1.54 0.000 1.50 1/m1/m -2.60% primary 1.54 0.000 1.50 1/m-2.60% primary test pt 2 1.541 1.540 1/m test pt 3 1.539 1.530 1.53 0.000 1.50 1/m1/m -1.96% primary Sensor Component Leak Test Condition **Status** pass Sensor Component Tubing Condition **Condition** Good **Status** pass

Condition Good

Condition 3.0 cm

Condition 4.0 cm

Condition 90 deg

Condition

Condition Clean and dry

Condition No moisture present

Status pass

Status pass

Status pass

Status pass

Status pass

Status pass

Status pass

Sensor Component Filter Position

Sensor Component Rotometer Condition

Sensor Component Moisture Present

Sensor Component Filter Distance

Sensor Component Filter Depth

Sensor Component Filter Azimuth

Sensor Component System Memo

Ozone Data Form

Mfg	Serial Numbe	r Tag Site	T	echnician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347320	CDZ171	N	Martin Valvur	12/17/2019	Ozone	000727
Slope: Intercept CorrCoff: DAS 1: A Avg % Diff: A I	0.99997 Corr	rcept C CCoff: C AS 2:	.00000 .00000 .00000 Max % Dif	Mfg Serial Number Tfer ID Slope Cert Date	ThermoElectron 49CPS-70008-3 01110 1.0033 10/28/20	Tfer Des	ozone ozone primary stan -0.06936 1.00000
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 primary	3 4	37.05 66.98	36.99 66.82	35.68 66.44	ppb ppb	-3.61 -0.57	
primary	5	114.41	114.10	114.40	ppb	0.26	
Sensor Compone				tion Good	FF -	Status pass	
Sensor Compone			Condi			Status pass	
Sensor Compone				tion Clean		Status pass	
Sensor Compone				tion N/A		Status pass	
Sensor Compone				tion 0.50		Status pass	
Sensor Compone	ent Span		Condi	tion 1.019		Status pass	
Sensor Compone	ent Zero Voltage	9	Condi	tion N/A		Status pass	
Sensor Compone	ent Fullscale Vo	ltage	Condi	tion N/A		Status pass	
Sensor Compone	ent Cell A Freq.		Condi	tion 88.8 kHz		Status pass	
Sensor Compone	ent Cell A Noise)	Condi	tion 0.9 ppb		Status pass	
Sensor Compone	ent Cell A Flow		Condi	tion 0.76 lpm		Status pass	
Sensor Compone	ent Cell A Press	sure	Condi	tion 707.9 mmHg		Status pass	
Sensor Compone	ent Cell A Tmp.		Condi	30.5 C		Status pass	
Sensor Compone	ent Cell B Freq.		Condi	tion 92.9 kHz		Status pass	
Sensor Compone	ent Cell B Noise	,	Condi	0.9 ppb		Status pass	
Sensor Compone	ent Cell B Flow		Condi	0.82 lpm		Status pass	
Sensor Compone	ent Cell B Press	sure	Condi	tion 707.3 mmHg		Status pass	
Sensor Compone	ent Cell B Tmp.			tion N/A		Status pass	
Sensor Compone	ent Line Loss		Condi	Not tested		Status pass	
Sensor Compone	ent System Men	no	Condi	tion		Status pass	

Temperature Data Form Serial Number Tag Site Technician Site Visit Date Parameter **Owner ID** Mfg Martin Valvur 14036 CDZ171 12/17/2019 Temperature 06403 RM Young Mfg Fluke Parameter Temperature Tfer Desc. RTD 3275143 **Serial Number** 01229 Tfer ID **Slope** 0.99989 **Intercept** -0.00649 **DAS 1: DAS 2:** 1/23/2019 1.00000 Abs Avg Err Abs Max Err Abs Avg Err Abs Max Err **Cert Date** CorrCoff 0.08 0.13 UseDesc. InputTmpRaw InputTmpCorr. OutputTmpSignal OutputSignalEng OSE Unit Difference Test type primary Temp Low Range 0.00 0.01 0.000 0.0 \mathbf{C} -0.02 C Temp Mid Range 25.64 25.65 0.000 25.5 -0.13 primary 0.000 C primary Temp High Range 49.49 49.50 49.4 -0.08Status pass Sensor Component Shield **Condition** Clean Sensor Component Blower Status pass **Condition** N/A Sensor Component Blower Status Switch **Condition** N/A **Status** pass Sensor Component System Memo Status pass Condition

Shelter Temperature Data For Mfg **Serial Number Tag Site Technician** Site Visit Date Parameter **Owner ID** Martin Valvur 12/17/2019 Shelter Temperature Campbell none CDZ171 none **DAS 1: DAS 2:** Mfg Fluke Parameter Shelter Temperature Abs Avg Err Abs Max Err Abs Avg Err **Abs Max Err** Tfer Desc. RTD 3275143 **Serial Number** 0.67 1.04 01229 **Tfer ID** 0.99989 -0.00649 **Slope** Intercept 1/23/2019 1.00000 **Cert Date** CorrCoff

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 Con	nponent System Memo		Condition		Status	pass	

Infrastructure Data For

CDZ171	Technician	Martin Valvur	Site Visit Date	12/17/2019
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Shelter Make	Shelter Model	Shelter Size	
Ekto	8810	640 cuft	

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 Visit Date 12/17/2019 CDZ171 Technician | Martin Valvur Site ID Cadiz **USGS Map EPA** Site Sponsor (agency) Map Scale private, TVA **Operating Group Map Date** 21-221-9991 AQS# R.M. Young **Meteorological Type** Ozone, SO2, NOy, PM2.5, IMPROVE 36.7841 Air Pollutant Analyzer **QAPP** Latitude **QAPP** Longitude -87.8500 **Deposition Measurement** 189 **Land Use** agriculture, woodland - mixed **QAPP Elevation Meters** -2.01 Terrain gently rolling **QAPP Declination** Yes 2/23/2006 Conforms to MLM **OAPP Declination Date** (270) 522-9373 36.784053 **Site Telephone Audit Latitude** 4560 Old Dover Road -87.85015 Site Address 1 **Audit Longitude** route 1175 Site Address 2 **Audit Elevation** 190 -2.7 **County** Trigg **Audit Declination** Cadiz, KY City, State **Present** Fire Extinguisher 42211 New in 2015 Zip Code Central **First Aid Kit** Time Zone **Primary Operator Safety Glasses** Safety Hard Hat Primary Op. Phone # **Climbing Belt** Primary Op. E-mail **Backup Operator Security Fence V Secure Shelter** Backup Op. Phone # Stable Entry Steps ✓ Backup Op. E-mail **Shelter Working Room** ✓ **Make** Model 8810 Ekto **Shelter Size** 640 cuft **✓** Notes The shelter floor has been repaired. There are signs of leaks from the roof on the walls. **Shelter Clean ✓** Notes Site OK

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

Driving Directions

left.

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		\checkmark
Secondary road, heavily traveled	500 m		\checkmark
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		\checkmark
Tree line	50 m		\checkmark
Obstacles to wind	10 times obstacle height		✓

Siting Criteria Comment

The site is in a corn field with limited agricultural operations within 15 meters.

Fi	eld Sy	stems Data Fo	orm				F-0205	8-150	0-S3-rev002
Site	e ID	CDZ171	Technician	Martin Valvur		Site Visit Date	12/17/2019		
1		d speed and direction fluenced by obstruction		as to avoid	✓	N/A			
2	Are win (i.e. win horizon	d sensors mounted so d sensors should be m tally extended boom > nto the prevailing wind	as to minimize ounted atop the 2x the max diar	tower or on a	✓	N/A			
3		tower and sensors plu			✓	N/A			
4		temperature shields p idiated heat sources su				southest			
5	conditio surface	perature and RH sensons? (i.e. ground below and not steeply sloped g water should be avoi	sensors should. Ridges, hollow	be natural	✓				
6	Is the so	lar radiation sensor p	lumb?		✓	N/A			
7	Is it site	d to avoid shading, or	any artificial o	r reflected light?	✓	N/A			
8	Is the ra	nin gauge plumb?			✓	N/A			
9	Is it site towers,	d to avoid sheltering e etc?	ffects from buil	dings, trees,	✓	N/A			
10	Is the su facing n	urface wetness sensor s orth?	sited with the gr	rid surface	✓	N/A			
11	Is it inc	lined approximately 3	0 degrees?		✓	N/A			
		additional explanational explanation				y) regarding condit	tions listed abov	ve, or an	y other features,

The temperature sensor has been installed in a naturally aspirated shield on the southeast leg of the sample tower.

Fi	eld Systems Data Form		F-02058-1500-S4-rev002
Site	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?	✓	
	ride any additional explanation (photograph or sketch if necess ral or man-made, that may affect the monitoring parameters:) regarding conditions listed above, or any other features,

Fi	eld 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				
	vide any additional explanation (photograph or sketch if necess aral or man-made, that may affect the monitoring parameters:	ary)	regarding conditions listed above, or any other features,				

Field Systems Data Form F-02058-1500-S6-rev002 Site ID CDZ171 Technician Martin Valvur Site Visit Date 12/17/2019 DAS, sensor translators, and peripheral equipment operations and maintenance Do the DAS instruments appear to be in good condition and well maintained? **V** Are all the components of the DAS operational? (printers, modem, backup, etc) Temperature only Do the analyzer and sensor signal leads pass through lightning protection circuitry? **✓** Are the signal connections protected from the weather and well maintained? **✓** Are the signal leads connected to the correct DAS channel? Are the DAS, sensor translators, and shelter properly **~** grounded? **✓** Does the instrument shelter have a stable power source? **~** Is the instrument shelter temperature controlled? Grounded **Stable** Is the met tower stable and grounded? Is the sample tower stable and grounded? **V ✓**

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

Met tower removed

11 Tower comments?

Field Systems Data Form F-02058-1500-S7-rev002 CDZ171 Technician | Martin Valvur Site Visit Date 12/17/2019 Site ID **Documentation** Does the site have the required instrument and equipment manuals? No N/A Yes Yes No N/A **✓** Wind speed sensor **Data logger** П **V V** Wind direction sensor Data logger **V V** П **Temperature sensor** Strip chart recorder **✓ V** Relative humidity sensor Computer **V** П **Solar radiation sensor V Modem** П **V V Printer Surface wetness sensor** ✓ **V** Wind sensor translator Zero air pump **V** Filter flow pump **Temperature translator V V ~ Humidity sensor translator Surge protector** П **V ~ UPS Solar radiation translator ~ V** Tipping bucket rain gauge **Lightning protection device** ~ **✓ Shelter heater** Ozone analyzer **V** \checkmark Filter pack flow controller Shelter air conditioner **~** Filter pack MFC power supply □ Does the site have the required and most recent QC documents and report forms? **Present Current Station Log V V SSRF ✓ V ✓ Site Ops Manual** Oct 2014 **HASP V** 2016 **V 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 Are the Site Status Report Forms being completed and **V** current? Are the chain-of-custody forms properly used to document **V** sample transfer to and from lab? Control charts not used Are ozone z/s/p control charts properly completed and current? Provide any additional explanation (photograph or sketch if necessary) regarding conditions listed above, or any other features, natural or man-made, that may affect the monitoring parameters:

Field Systems Data Form F-02058-1500-S8-rev002 CDZ171 Technician | Martin Valvur Site Visit Date 12/17/2019 Site ID Site operation procedures Trained by previous opertor Has the site operator attended a formal CASTNET training course? If yes, when and who instructed? Has the backup operator attended a formal CASTNET no backup operator training course? If yes, when and who instructed? Is the site visited regularly on the required Tuesday **~** schedule? **✓** Are the standard CASTNET operational procedures being flollowed by the site operator? Is the site operator(s) knowledgeable of, and able to perform ✓ the required site activities? (including documentation) Are regular operational QA/QC checks performed on meteorological instruments? **QC Check Performed Frequency** Compliant **✓ V** Semiannually **Multipoint Calibrations V V** Weekly **Visual Inspections V** N/A **Translator Zero/Span Tests (climatronics) ✓ V** N/A **Manual Rain Gauge Test V V** Weekly **Confirm Reasonableness of Current Values V V** N/A **Test Surface Wetness Response** Are regular operational QA/QC checks performed on the ozone analyzer? **Compliant QC Check Performed** Frequency **Multi-point Calibrations V V** Semiannually **V V Automatic Zero/Span Tests** Daily Manual Zero/Span Tests **V V** Daily **Automatic Precision Level Tests Manual Precision Level Test ✓ V Analyzer Diagnostics Tests** Weekly **~** Every 2 weeks **In-line Filter Replacement (at inlet) V** N/A In-line Filter Replacement (at analyze Sample Line Check for Dirt/Water **V ~ 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:

Fi	eld Sy	stems Data Form	ı		F-02058-1500-S9-rev002				
Sit	te ID	CDZ171 T 6	chnician Martin Valvur		Site Visit Date	12/17/2019			
	Site ope	ration procedures							
1	Is the fil	ter pack being changed eve	ry Tuesday as scheduled	✓	Filter changed afte	rnoons (90% of the time))		
2	2 Are the Site Status Report Forms being completed and filed correctly?								
3	Are data	a downloads and backups b	eing performed as		No longer required				
4	Are gen	eral observations being mad	de and recorded? How?	✓	SSRF				
5	5 Are site supplies on-hand and replenished in a timely fashion?								
6	Are sam	pple flow rates recorded? H	ow?	✓	SSRF, call-in				
7	Are sam	uples sent to the lab on a reg	gular schedule in a timely	✓					
8		ers protected from contaminoping? How?	nation during handling	✓	Clean gloves on ar	nd off			
9		site conditions reported reg ons manager or staff?	ularly to the field	✓					
QC	Check P	erformed	Frequency			Compliant			
]	Multi-poi	nt MFC Calibrations	✓ Semiannually			✓			
]	Flow Syste	em Leak Checks	✓ Weekly			✓			
]	Filter Pac	k Inspection							
]	Flow Rate	Setting Checks	✓ Weekly			\checkmark			
,	Visual Ch	eck of Flow Rate Rotometer	r ✓ Weekly			✓			
]	In-line Filter Inspection/Replacement Semiannually					\checkmark			
	Sample Li	ne Check for Dirt/Water							
		dditional explanation (photon-made, that may affect the			y) regarding condit	tions listed above, or ar	y other features,		

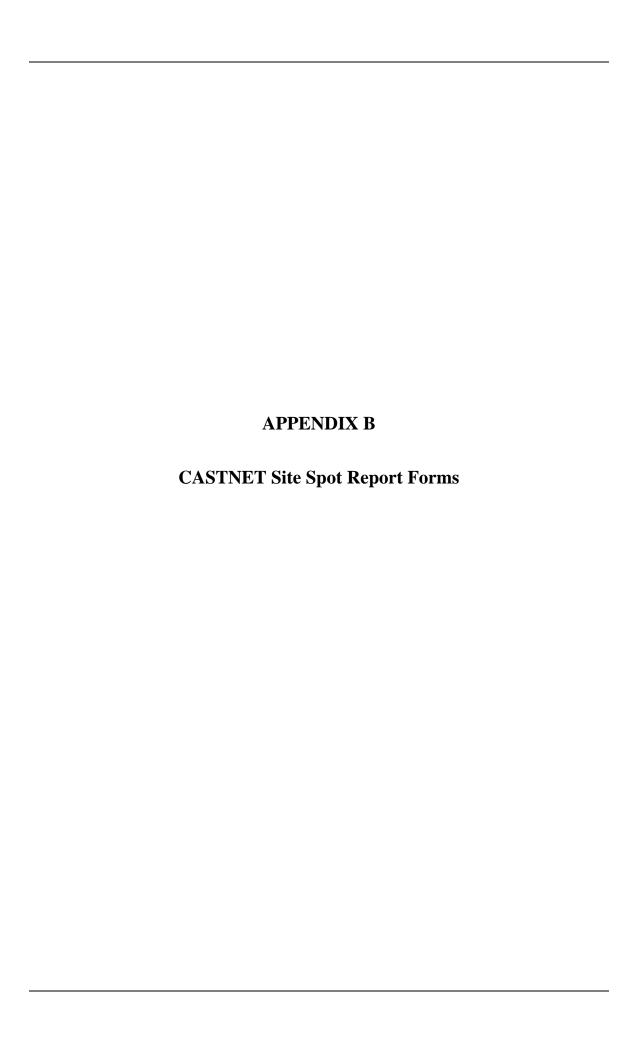
Field Systems Data Form

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	В	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



Data Compiled:

3/11/2020 12:13:08

SiteVisitDate Site Technician

12/16/2019 ALH157 Martin Valvur

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
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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.

Data Compiled:

3/11/2020 12:55:12

SiteVisitDateSiteTechnician11/18/2019BEL116Korey Devins

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	dqq	P

Data Compiled:

3/11/2020 12:50:50

SiteVisitDate Site Technician

12/17/2019 BFT142 Korey Devins

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.

Data Compiled:

3/10/2020 20:40:27

SiteVisitDate Site Technician

11/07/2019 BVL130 Korey Devins

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 ave	rage error P	5	2	18	0.11	c	
35 Shelter Temperature max	c error P	5	2	18	0.28	c	

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.

Data Compiled:

3/11/2020 11:53:53

SiteVisitDate Site Technician

11/19/2019 BWR139 Korey Devins

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
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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.

Data Compiled:

3/12/2020 09:36:23

SiteVisitDate Site Technician

11/12/2019 CDR119 Eric Hebert

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.

Data Compiled:

3/11/2020 12:33:29

SiteVisitDate Site Technician

12/17/2019 CDZ171 Martin Valvur

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.

Data Compiled:

3/11/2020 10:20:06

SiteVisitDate Site Technician

11/11/2019 CKT136 Eric Hebert

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.

Data Compiled:

3/10/2020 15:57:14

SiteVisitDate Site Technician

10/24/2019 DCP114 Korey Devins

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

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.

Data Compiled:

3/11/2020 11:25:02

SiteVisitDate Site Technician

11/12/2019 EGB181 Korey Devins

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.

Data Compiled:

3/9/2020 20:08:28

SiteVisitDate Site Technician

10/07/2019 GRS420 Eric Hebert

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.

Data Compiled:

2/11/2020 14:20:40

 SiteVisitDate
 Site
 Technician

 10/23/2019
 KIC003
 Martin Valvur

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.

Data Compiled: 3/9/

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.

Data Compiled:

3/9/2020 20:28:19

SiteVisitDate Site Technician

10/17/2019 MAC426 Eric Hebert

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

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.

Data Compiled:

3/10/2020 18:01:11

SiteVisitDate Site Technician

11/05/2019 MCK131 Sandy Grenville

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.

Data Compiled:

3/10/2020 18:26:05

SiteVisitDate Site Technician

11/05/2019 MCK231 Sandy Grenville

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.

Data Compiled:

3/10/2020 16:15:52

SiteVisitDate Site Technician

10/25/2019 OXF122 Korey Devins

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.

Data Compiled:

2/1/2020 15:47:42

SiteVisitDate Site Technician

10/05/2019 PNF126 Eric Hebert

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	dqq	P

Data Compiled:

3/11/2020 09:57:31

SiteVisitDate Site Technician

11/10/2019 QAK172 Eric Hebert

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 Sit	e Technician	
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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.

Data Compiled:

3/10/2020 16:43:53

SiteVisitDate Site Technician

10/25/2019 SAN189 Martin Valvur

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

Parameter: ShelterCleanNotes

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

Data Compiled:

3/9/2020 21:04:08

SiteVisitDate Site Technician

10/22/2019 SHN418 Korey Devins

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

Data Compiled:

3/11/2020 12:56:11

SiteVisitDate Site Technician

11/06/2019 SPD111 Sandy Grenville

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

Data Compiled:

3/10/2020 17:13:20

SiteVisitDate Site Technician

11/05/2019 STK138 Korey Devins

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
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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.

Data Compiled:

3/10/2020 18:52:45

SiteVisitDate Site Technician

11/07/2019 VIN140 Sandy Grenville

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

11/07/2019

VIN140

Sandy Grenville

Field Systems Comments

1 Parameter: DasComments

The sample tower ground wire is broken.

2 Parameter: SitingCriteriaCom

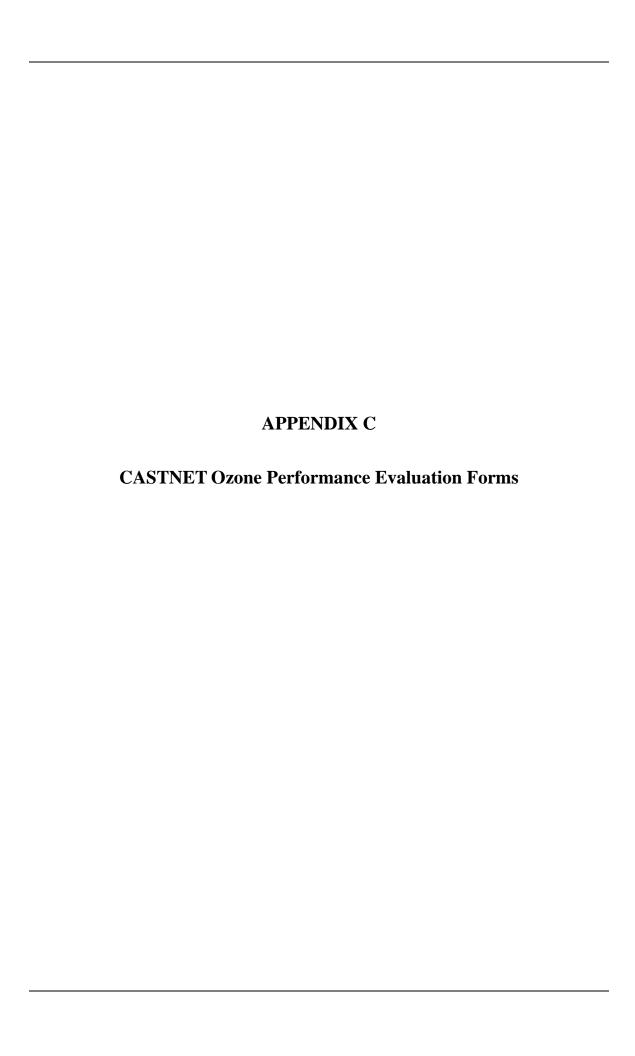
The site is in an agricultural research center with farm activities adjacent to the site. A train track is approximately 200 meters to the north.

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.



Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
PNF.	126-Eric H	lebert-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	er Tag Site	T	echnician	Site Visit Date	Paramet	ter	Owner ID
ThermoElectron Inc	1105347316	PNF126	E	Fric Hebert	10/05/2019	Ozone		000741
Slope: Intercept CorrCoff:		rcept	.00000	Mfg Serial Number	ThermoElectron 1180030022 01114		r Desc.	zone zone primary stan
D. C. 1		A G @		Tfer ID			ı	
DAS 1: A Avg % Diff: A		AS 2:	Mov 0/ Dif	Slope	0.9984	10 Interd	cept	0.27090
0.0%	0.0%	Avg %Dill A	Max % DII	Cert Date	6/11/20	Ocrr(Coff	1.00000
		TC D	TES C	g:	G'. II '.	D 1D F	2:6	41 D:C
UseDescription	ConcGroup	Tfer Raw 0.37	Tfer Corr 0.09	Site -0.97	Site Unit	RelPerD) 1†	AbsDif -1.06
primary primary	2	13.09	12.83	11.78	ppb ppb			-1.05
primary	3	35.48	35.26	34.46	ppb		-2.29	1.03
primary	4	67.99	67.82	67.46	ppb		-0.53	
primary	5	117.93	117.84	117.60	ppb		-0.2	
Sensor Compon	ent Sample Tra	in	Condit	tion Good		Status	oass	
Sensor Compon	ent 22.5 degree	rule	Condit	tion		Status	pass	
Sensor Compon	Inlet Filter C	Condition	Condit	tion Clean		Status	pass	
Sensor Compon	Battery Bac	kup	Condi	tion N/A		Status	pass	
Sensor Compon	Offset		Condit	-0.40		Status	pass	
Sensor Compon	Span Span		Condit	1.003		Status	pass	
Sensor Compon	Zero Voltag	е	Condi	tion N/A		Status	pass	
Sensor Compon	Fullscale Vo	oltage	Condi	tion N/A		Status	pass	
Sensor Compon	Cell A Freq.		Condit	tion 88.9 kHz		Status	pass	
Sensor Compon	Cell A Noise)	Condit	tion 0.6 ppb		Status	pass	
Sensor Compon	Cell A Flow		Condit	tion 0.63 lpm		Status	pass	
Sensor Compon	Cell A Press	sure	Condit	628.4 mmHg		Status	oass	
Sensor Component Cell A Tmp.			Condition 36.4 C		Status	pass		
Sensor Component Cell B Freq.			Condition 117.0 kHz		Status	pass		
Sensor Component Cell B Noise			Condition 0.9 ppb		Status	pass		
Sensor Compon	Sensor Component Cell B Flow			tion 0.68 lpm		Status	oass	
Sensor Compon				627.4 mmHg		Status		
Sensor Compon	<u> </u>			tion N/A		Status		
Sensor Compon	-			Not tested		Status		
Sensor Compon	ent System Mer	no	Condit	tion		Status	oass	

Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
SPD	111-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

A Avg % Diff: A Max % Dif	Mfg Serial Number Tag Site			Tec	chnician	Site Visit Date	Parame	eter	Owner ID
Status Pass Status Pass Pas	hermoElectron Inc 1	105347313	SPD111	Sa	ndy Grenville	11/06/2019	Ozone		000742
A Avg % Diff: A Max % Dif	ntercept -1.0	D2793 Intercept	0.00000		Serial Number	1180930075			
A Avg % Diff: A Max % Dif	DAS 1:	DAS 2:				1.0080	00 Inter	·cent	-0.40210
UseDescription ConcGroup Tfer Raw Tfer Corr Site Site Unit RelPerDif AbsDif	Avg % Diff: A Ma	x % Dif A Avg %	Diff A Max %	Dif	_			_	
primary 1 0.22 0.61 -0.78 ppb -1.39 primary 2 15.29 15.56 14.32 ppb -3.62 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 Sample Train Condition Good Status pass Sensor Component Inlet Filter Condition Condition Status pass Sensor Component Battery Backup Condition N/A Status pass Sensor Component Offset Condition 0.000 Status pass Sensor Component Span Condition N/A Status pass Sensor Component Fullscale Voltage Condition N/A Status pass Sensor Component Cell A Freq. Condition 0.9 ppb Status pass	0.0%	0.0%			Cert Date	3/26/201	9 Corr	·Coff	1.00000
primary 1 0.22 0.61 -0.78 ppb -1.39 primary 2 15.29 15.56 14.32 ppb -3.62 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 Sample Train Condition Good Status pass Sensor Component Inlet Filter Condition Condition Clean Status pass Sensor Component Offset Condition N/A Status pass Sensor Component Span Condition N/A Status pass Sensor Component Fullscale Voltage Condition N/A Status pass Sensor Component Cell A Freq. Condition N/A Status	UseDescription (ConcGroup Tfe	r Raw Tfer	Corr	Site	Site Unit	RelPer	Dif	AbsDif
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primary 4 66.30 66.17 65.70 ppb -0.71 primary 5 109.10 108.63 106.10 ppb -2.36 Sensor Component Sample Train Condition Good Status pass Sensor Component Inlet Filter 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 1.005 Status pass Sensor Component Zero Voltage Condition N/A Status pass Sensor Component Cell A Freq. Condition N/A Status pass Sensor Component Cell A Noise Condition 0.9 ppb Status pass		3 30	6.50 36	5.60	35.30	**		-3.62	
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Sensor Component Cell A Freq. Condition 96.8 kHz Status pass Sensor Component Cell A Noise Condition 0.9 ppb Status pass	_								
Sensor Component Cell A Noise Condition 0.9 ppb Status pass									
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Songer Component Cell A Flow Condition 0.68 lpm Status pass	Sensor Component Cell A Noise								
	Sensor Component Cell A Flow						Status pass		
Sensor Component Cell A Pressure Condition 684.1 mmHg Status pass	Sensor Component Cell A Pressure			Conditio	ndition 684.1 mmHg			pass	
Sensor Component Cell A Tmp. Condition 31.5 C Status pass	Sensor Component Cell A Tmp.			Conditio	31.5 C		Status	pass	
Sensor Component Cell B Freq. Condition 110.7 kHz Status pass	Sensor Component Cell B Freq.			Conditio	dition 110.7 kHz		Status	pass	
Sensor Component Cell B Noise Condition 0.6 ppb Status pass	Sensor Component Cell B Noise			Conditio	on 0.6 ppb		Status	pass	
Sensor Component Cell B Flow Condition 0.67 lpm Status pass	Sensor Component Cell B Flow			Conditio	0.67 lpm		Status	pass	
Sensor Component Cell B Pressure Condition 685.3 mmHg Status pass	Sensor Component Cell B Pressure			Conditio	685.3 mmHg		Status	pass	
Sensor Component Cell B Tmp. Condition N/A Status pass	Sensor Component	Cell B Tmp.	(Conditio	n N/A		Status	pass	
Sensor Component Line Loss Condition Not tested Status pass	Sensor Component	Line Loss	(Conditio	Not tested		Status	pass	
Sensor Component System Memo Condition Status pass	Sensor Component	System Memo	(Conditio	on		Status	pass	

Site Inventory by Site Visit

Site	Visit Date	Parameter	Mfg	Owner ID	Model Number	Serial Number
BEL	116-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

No. Condition	Mfg	Afg Serial Number Tag Site			echnician echnician	Site Visit Date	Parameter	Owner ID
DAS 1:	ThermoElectron Inc	1030244795	BEL116		Korey Devins	11/18/2019	Ozone	000684
A Ng % Diff: A Max % Dif	Intercept -0).54196 Inter	rcept	0.0000	Serial Number	1180030022		
UseDescription ConcGroup Tfer Raw Tfer Corr Site Site Unit RelPerDif AbsDif	DAS 1:	D A	AS 2:			0.9860	0 Intercept	0.41627
Primary			Avg %Diff A	Max % Dif	Cert Date	10/29/201	9 CorrCoff	1.00000
Primary 2 15.06 14.85 14.12 Ppb -0.73	UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
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 Sample Train Condition Good Status pass Sensor Component Status pass Status pass Sensor Component Inlet Filter Condition Condition Condition Condition Condition Condition Status pass Sensor Component Status pass Status pass Sensor Component Status pass Status pass Status pass Sensor Component Status pass Status pass Status pass Sensor Component Span Condition Condition Condition Condition Status pass Status pa	primary	1	0.42	0.00	-0.55	ppb		-0.55
primary 4 66.84 67.36 66.16 ppb -1.8 primary 5 112.15 113.31 112.00 ppb -1.16 Sensor Component Sample Train Condition Good Status pass Sensor Component 22.5 degree rule Condition Clean Status pass Sensor Component Inlet Filter Condition Condition Clean Status pass Sensor Component Battery Backup Condition N/A Status pass Sensor Component Offset Condition N/A Status pass Sensor Component Span Condition N/A Status pass Sensor Component Zero Voltage Condition N/A Status pass Sensor Component Fullscale Voltage Condition N/A Status pass Sensor Component Cell A Freq. Condition N/A Status pass Sensor Component Cell A Flow Condition N/A Status pass Sensor Component Cell A Flow Condition N/A Status pass Sensor Component Cell A Freq. Condition N/A Status pass Sensor Component Cell A Flow Condition N/A Status pass Sensor Component Cell A Freq. Condition N/A Status pass Sensor Component Cell B Freq. Condition N/A Status pass Sensor Component Cell B Freq. Condition N/A Status pass Sensor Component Cell B Freq. Condition N/A Status pass Sensor Component Cell B Freq. Condition N/A Status pass Sensor Component Cell B Pressure Condition N/A Status pass Sensor Component Cell B Pressure Condition N/A Status pass Sensor Component Cell B Pressure Condition N/A Status pass Sensor Component Cell B Pressure Condition N/A Status pass Sensor Component Cell B Pressure Condition N/A Status pass Sensor Component Cell B Pressure Condition N/A Status pass Sensor Component Cell B Pressure Condition N/A Status pass Sensor Component Cell B Pressure Condition N/A Status pass Sensor Component Cell B Pressure Condition N/A Status pass	primary	2	15.06	14.85	14.12	ppb		-0.73
Sensor Component Sample Train Condition Good Status pass	primary	3	35.61	35.69	35.11	ppb	-1.64	
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 Inlet Filter Condition Condition Clean Status pass Sensor Component Offset Condition Pu/A Status pass Sensor Component Span Condition Pu/A Status pass Sensor Component Zero Voltage Condition Pu/A Status pass Sensor Component Fullscale Voltage Condition Pu/A Status pass Sensor Component Cell A Freq. Condition Pu/A Status pass Sensor Component Cell A Flow Condition Pu/A Status pass Sensor Component Cell A Flow Condition Pu/A Status pass Sensor Component Cell A Flow Condition Pu/A Status pass Sensor Component Cell A Flow Condition Pu/A Status pass Sensor Component Cell A Flow Condition Pu/A Status pass Sensor Component Cell A Freq. Condition Pu/A Status pass Sensor Component Cell A Freq. Condition Pu/A Status pass Sensor Component Cell A Freq. Condition Pu/A Status pass Sensor Component Cell B Freq. Condition Pu/A Status pass Sensor Component Cell B Freq. Condition Pu/A Status pass Sensor Component Cell B Flow Condition Pu/A Status pass Sensor Component Cell B Flow Condition Pu/A Status pass Sensor Component Cell B Flow Condition Pu/A Status pass Sensor Component Cell B Tmp. Condition Pu/A Status pass Sensor Component Cell B Tmp. Condition Pu/A Status pass Sensor Component Cell B Tmp. Condition Pu/A Status pass	primary	4	66.84	67.36	66.16	ppb	-1.8	
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 0.600 Status pass Sensor Component Span Condition N/A Status pass Sensor Component Zero Voltage Condition N/A Status pass Sensor Component Fullscale Voltage Condition N/A Status pass Sensor Component Cell A Freq. Condition Pass Status pass Sensor Component Cell A Freq. Condition Pass Status pass Sensor Component Cell A Flow Condition D.4 ppb Status pass Sensor Component Cell A Flow Condition D.61 lpm Status pass Sensor Component Cell A Freq. Condition Pass Pass Sensor Component Cell B Flow Condition Pass Pass Sensor Component Cell B Flow Condition Pass Status Pass Sensor Component Cell B Flow Condition Pass Status Pass Sensor Component Cell B Flow Condition Pass Status Pass Sensor Component Cell B Freq. Condition Pass Status Pass Sensor Component Cell B Freq. Condition Pass Status Pass Sensor Component Cell B Freq. Condition Pass Status Pass Sensor Component Cell B Freq. Condition Pass Status Pass Sensor Component Cell B Freq. Condition Pass Status Pass Sensor Component Cell B Freq. Condition Pass Status Pass Sensor Component Cell B Freq. Condition Pass Status Pass Sensor Component Cell B Freq. Condition Pass Status Pass Sensor Component Cell B Freq. Condition Pass Status Pass Sensor Component Cell B Freq. Condition Pass Status Pass Sensor Component Cell B Freq. Condition Pass Status Pass Sensor Component Cell B Freq. Condition Pass Status Pass Sensor Component Cell B Freq. Condition Pass Status Pass Sensor Component Cell B Freq. Condition Pass Status Pass	primary	5	112.15	113.31	112.00	ppb	-1.16	
Sensor Component Inlet Filter Condition Condition Clean Status pass Sensor Component Battery Backup Condition N/A Status pass Sensor Component Offset Condition 1.017 Status pass Sensor Component Zero Voltage Condition N/A Status pass Sensor Component Fullscale Voltage Condition N/A Status pass Sensor Component Cell A Freq. Condition N/A Status pass Sensor Component Cell A Noise Condition 0.4 ppb Status pass Sensor Component Cell A Flow Condition 0.61 lpm Status pass Sensor Component Cell A Pressure Condition 708.5 mmHg Status pass Sensor Component Cell B Freq. Condition 35.6 C Status pass Sensor Component Cell B Freq. Condition 90.3 kHz Status pass Sensor Component Cell B Freq. Condition 0.6 ppb Status pass Sensor Component Cell B Flow Condition 0.6 ppb Status pass Sensor Component Cell B Flow Condition 0.56 lpm Status pass Sensor Component Cell B Flow Condition 0.56 lpm Status pass Sensor Component Cell B Flow Condition 70.9.1 mmHg Status pass Sensor Component Cell B Fressure Condition 70.9.1 mmHg Status pass Sensor Component Cell B Tmp. Condition Not tested Status pass	Sensor Componer	Sample Trai	n	Condi	tion Good		Status pass	
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Sensor Component Cell B Tmp. Condition N/A Status pass Sensor Component Line Loss Condition Not tested Status pass	Sensor Component Cell B Flow				dition 0.56 lpm		Status pass	
Sensor Component Line Loss Condition Not tested Status pass	Sensor Componer	t Cell B Press	sure					
	Sensor Componer	Cell B Tmp.					Status pass	
G G G G G G G G G G G G G G G G G G G	Sensor Componer	Line Loss		Condi	tion Not tested			
Sensor Component System Memo Condition Status pass	Sensor Componer	System Men	no	Condi	tion		Status pass	