2020 – 2nd Quarter Report

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

EPA Contract No. EP-W-18-005

Prepared for:

U. S. Environmental Protection Agency

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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
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
SCDHEC	South Carolina Department of Health and Environmental Control
SOP	standard operating procedure
TDEP	Total Deposition
TEI	Thermo Environmental Instruments
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USNO	United States Naval Observatory
VDC	volts direct current
WDEQ	Wyoming Department of Environmental Quality
WDNR	Wisconsin Department of Natural Resources
WRR	World Radiation Reference
WSLH	Wisconsin State Laboratory of Hygiene

1.0 CASTNET Quarterly Report

1.1 Introduction

The Clean Air Status and Trends Network (CASTNET) is a national air monitoring program established in 1988 by the US EPA. Nearly all CASTNET sites measures weekly concentrations of acidic gases and particles to provide accountability for EPA's emission reduction programs. Most sites measure ground-level ozone as well as supplemental measurements such as meteorology and/or other trace gas concentrations.

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

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

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

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

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

As of June 2020, the network is comprised of 97 active rural sampling sites across the United States and Canada, cooperatively operated by the Environmental Protection Agency (EPA), the National Park Service (NPS), Bureau of Land Management – Wyoming State Office (BLM-WSO) and several independent partners. Wood Environment and Infrastructure Solutions (Wood) is responsible for operating the EPA sponsored sites, and Air Resource Specialists, Inc. (ARS) is responsible for operating the NPS and BLM-WSO sponsored sites

1.2 Project Objectives

The objectives of this project are to establish an independent and unbiased program of performance and systems audits for all CASTNET sampling sites. Ongoing Quality Assurance (QA) programs are an essential part of any long-term monitoring network.

Performance audits verify that all reported variables are consistent with the accuracy goals as defined in the CASTNET Quality Assurance Project Plan (QAPP). The parameter specific accuracy goals are presented in Table 1.

Table 1. Performance Audit Challenge and Acceptance Criteria

Sensor	Parameter	Audit Challenge	Acceptance Criteria
Precipitation	Response	10 manual tips	1 DAS count per tip
Precipitation	Accuracy	2 introductions of known amounts of water	≤ ±10.0% of input amount
Relative Humidity	Accuracy	Compared to reference instrument or standard solution	≤ ±10.0% RH
Solar Radiation	Accuracy	Compared to WRR traceable standard	≤ ±10.0% of daytime average
Surface Wetness	Response	Distilled water spray mist	Positive response
Surface Wetness	Sensitivity	1% decade resistance	N/A
Temperature	Accuracy	Comparison to 3 NIST measured baths (~ 0° C, ambient, ~ full-scale)	≤ ± 0.5° C
Temperature Difference	Accuracy	Comparison to station temperature sensor	≤ ± 0.50° C

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

Performance audits are conducted using standards that are traceable to the National Institute of Standards and Technology (NIST), or another authoritative organization, at least annually.

Field site systems audits (FSA) 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 Second Quarter 2020

This report consists of the systems and performance, and other audit results from the CASTNET sites visited during the second quarter (April through June) of 2020. The site locations, sponsor, visit dates, and parameters audited are included in Table 2. The number of sites visited during this period were fewer than scheduled due to the impact of the COVID-19 pandemic.

Table 2. CASTNET Site Audit Visits

Site ID	Sponsor	Date	FSA	O3 PE	NOy	FLOW
ROM206	EPA	5/20/2020			**1**	
IRL141	EPA	5/22/2020	**1**	**1**		**1**
COW137	EPA	5/30/2020	**1**	**1**		**1**
SND152	EPA	5/31/2020	**1**	**1**		**1**
GAS153	EPA	6/1/2020	**1**	**1**		**1**
BAS601	BLM-WSO	6/2/2020		**1**		
FOR605	BLM-WSO	6/3/2020	**1**			**1**
NEC602	BLM-WSO	6/4/2020		**1**		
SHN418	NPS	6/16/2020		**1**		
LRL117	EPA	6/17/2020		**1**		
PRK134	EPA	6/23/2020		**1**		
GRB411	NPS	6/24/2020	**1**	**1**		**1**

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: https://java.epa.gov/castnet/reportPage.do

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 networks of the NADP are sponsored by several federal, state, and local agencies as well as private organizations.

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 Second Quarter 2020

This report presents the NADP sites surveyed during the second quarter (April through June) of 2020. The station locations, sponsors, network. and dates of the surveys are presented in Table 3.

The number of sites visited during this period were fewer than scheduled due to the impact of the COVID-19 pandemic.

Table 3. NADP Site Survey Visits

Site ID	Sponsor	Date	NTN	MDN	AMON
FL03	EPA	5/19/2020	**1**		
CO88	NPS	5/20/2020			**1**
FL19	EPA	5/22/2020			**1**
FL41	USGS	5/26/2020	**1**		
NC25	EPA	5/30/2020			**1**
AL99	EPA	5/31/2020			**1**
GA41	EPA	6/1/2020			**1**
WY26	WDEQ	6/1/2020		**1**	
WY93	ARS	6/2/2020			**1**
GA09	USFWS	6/3/2020	**1**	**1**	
GA20	EPA	6/9/2020	**1**		
SC19	SCDHEC	6/16/2020		**1**	
PA97	EPA	6/17/2020			**1**
CA50	USGS	6/22/2020	**1**		
SC05	USFWS	6/22/2020	**1**	**1**	
WI06	WSLH	6/22/2020	**1**	**1**	**1**
WI35	EPA	6/23/2020			**1**
WI36	WDNR	6/24/2020	**1**	**1**	
WI08	WDNR	6/25/2020	**1**	**1**	
MI99	USFS	6/26/2020	**1**		
CO93	USFS	6/30/2020	**1**		

2.4 Survey Results

Site survey results are entered into a relational database. The database in turn generates Site Spot Reports which are distributed among the interested parties as soon as all the site data has been entered. Database tables with all the data collected and reviewed are then sent to the NADP Program Office and to the U.S. EPA Project Officers.

Other items gathered during the surveys (i.e., photographs, Belfort charts, etc.) are uploaded to the EPA Box account where the NADP PO and the U.S. EPA POs can access them and download them as needed.

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

APPENDIX A

CASTNET Audit Report Forms

Site Inventory by Site Visit

Site Visit Date		*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
IRL141-Eric Hebert-05/22/2020						
1	5/22/2020	Computer	Dell	007024	Inspiron 15	8W2MC12
2	5/22/2020	DAS	Campbell	000340	CR3000	2119
3	5/22/2020	Elevation	Elevation	None	1	None
4	5/22/2020	Filter pack flow pump	Thomas	02759	107CAB18	1192001899
5	5/22/2020	Flow Rate	Apex	000648	AXMC105LPMDPCV	54777
6	5/22/2020	Infrastructure	Infrastructure	none	none	none
7	5/22/2020	Modem	Digi	07124	LR54	unknown
8	5/22/2020	Ozone	ThermoElectron Inc	000609	49i A1NAA	1009241782
9	5/22/2020	Ozone Standard	ThermoElectron Inc	000446	49i A3NAA	CM08200022
10	5/22/2020	Sample Tower	Aluma Tower	000020	B	AT-61152-A-H8-F
11	5/22/2020	Shelter Temperature	Campbell	none	107-L	none
12	5/22/2020	Siting Criteria	Siting Criteria	None	1	None
13	5/22/2020	Temperature	RM Young	illegible	41342VC	14804
14	5/22/2020	Zero air pump	Werther International	06902	PC70/4	000829157

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	54777	IRL141	Eric Hebert	05/22/2020	Flow Rate	000648

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	131818	**Tfer Desc.**	BIOS 220-H
Tfer ID	01417		
Slope	1.00032	**Intercept**	-0.02240
Cert Date	2/17/2020	**CorrCoff**	0.99997

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	-0.01
1.96%	1.96%			**Cal Factor Full Scale**	0.98
				Rotometer Reading:	1.45

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	-0.01	l/m	l/m	
primary	test pt 1	1.510	1.530	1.53	0.000	1.50	l/m	l/m	-1.96%
primary	test pt 2	1.511	1.530	1.53	0.000	1.50	l/m	l/m	-1.96%
primary	test pt 3	1.511	1.530	1.52	0.000	1.50	l/m	l/m	-1.96%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	6.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	90 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241782	IRL141	Eric Hebert	05/22/2020	Ozone	000609

Slope:	0.99475	**Slope:**	0.00000
Intercept	0.20607	**Intercept**	0.00000
CorrCoff:	0.99996	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180030022	**Tfer Desc.**	Ozone primary stan
Tfer ID	01114		
Slope	0.99950	**Intercept**	0.29010
Cert Date	1/14/2020	**CorrCoff**	0.99999

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.44	0.14	0.67	ppb		0.53
primary	2	15.94	15.65	15.37	ppb		-0.28
primary	3	36.55	36.27	36.58	ppb	0.85	
primary	4	66.88	66.62	66.04	ppb	-0.87	
primary	5	111.90	111.66	111.50	ppb	-0.14	

Sensor Component	Condition	Status
Audit Pressure	763.3 mmHg	pass
Sample Train	Good	pass
Minimum distance from road met	True	pass
Inlet Filter Condition	Clean	pass
26.6 degree unobstructed rule	True	pass
Tree dewline >10m or below inlet	True	pass
Offset	-0.60	pass
Span	1.013	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	89.9 kHz	pass
Cell A Noise	0.9 ppb	pass
Cell A Flow	0.74 lpm	pass
Cell A Pressure	726.5 mmHg	pass
Cell A Tmp.	32.5 C	pass
Cell B Freq.	95.9 kHz	pass
Cell B Noise	0.4 ppb	pass
Cell B Flow	0.74 lpm	pass
Cell B Pressure	725.6 mmHg	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	14804	IRL141	Eric Hebert	05/22/2020	Temperature	illegible

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00797	**Intercept**	0.12950
Cert Date	2/14/2020	**CorrCoff**	1.00000

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.30	0.17	0.000	0.6	C	0.42
primary	Temp Mid Range	24.50	24.18	0.000	24.0	C	-0.19
primary	Temp High Range	48.08	47.57	0.000	47.3	C	-0.27

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	IRL141	Eric Hebert	05/22/2020	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.16	0.30		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00797	Intercept	0.12950
Cert Date	2/14/2020	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	26.44	26.10	0.000	26.1	C	0.02
primary	Temp Mid Range	25.91	25.58	0.000	25.9	C	0.3

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	IRL141	Technician	Eric Hebert	Site Visit Date	05/22/2020

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

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

Manual z/s/p performed following ozone inlet filter changes. Leak checks are no longer performed.

2 **Parameter:** ShelterCleanNotes

The shelter is clean and well organized. The shelter floor and bottom of the walls are severely rotting with extensive mold growth. It has deteriorated since the previous audit.

3 **Parameter:** MetOpMaintCom

Only the temperature sensor was audited during this visit. The other meteorological sensors were not included. The temperature sensor signal cable shows signs of wear.

Siting Criteria Form

Sensor Component		Condition		Status	
Sensor Component	Large point source of So2 or Nox	Condition		Status	pass
Sensor Component	City > 50,000	Condition	30 km	Status	Fail
Sensor Component	City 1,000 to 10,000	Condition		Status	pass
Sensor Component	City 10,000 to 50,000	Condition	7 km	Status	Fail
Sensor Component	Feedlot operations	Condition		Status	pass
Sensor Component	Large parking lot	Condition	100 m	Status	Fail
Sensor Component	Limited agriculture operations	Condition		Status	pass
Sensor Component	Major industrial source	Condition		Status	pass
Sensor Component	Secondary road < or = 100 per da	Condition		Status	pass
Sensor Component	Secondary road >100 vehicles/da	Condition		Status	pass
Sensor Component	Small parking lot	Condition	20 m	Status	Fail
Sensor Component	System Memo	Condition		Status	pass
Sensor Component	Major highway, airport, or rail yard	Condition		Status	pass
Sensor Component	Intensive agriculture operations	Condition		Status	pass

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	IRL141	**Technician**	Eric Hebert	**Site Visit Date**	05/22/2020

Site Sponsor (agency)	EPA/SJRWMD	**USGS Map**	Sebastian
Operating Group	IRC Health Dept	**Map Scale**	
AQS #	12-061-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	
Deposition Measurement	dry	**QAPP Longitude**	
Land Use	coastal	**QAPP Elevation Meters**	
Terrain	flat	**QAPP Declination**	
Conforms to MLM	Yes	**QAPP Declination Date**	
Site Telephone	(772) 538-2365	**Audit Latitude**	27.849215
Site Address 1	Sebastian Inlet State Park	**Audit Longitude**	-80.455595
Site Address 2	9700 South A1A	**Audit Elevation**	2
County	Indian River	**Audit Declination**	-5.8
City, State	Melbourne Beach, FL		
Zip Code	32951	**Fire Extinguisher** ☑	inspected May 2020
Time Zone	Eastern	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☑	
Primary Op. Phone #		**Safety Hard Hat** ☑	
Primary Op. E-mail		**Climbing Belt** ☑	
Backup Operator		**Security Fence** ☑	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Present

Shelter Working Room ☐	**Make**	Ekto	**Model**	8810	**Shelter Size**	640 cuft
Shelter Clean ☑	**Notes**	The shelter is clean and well organized. The shelter floor and bottom of the walls are severely rotting with extensive mold growth. It has deteriorated since the previous audit.				
Site OK ☐	**Notes**					

Driving Directions From I-95 take exit 180, east on 192 to AIA. Turn right (south) and proceed approximately 18 miles over the Sebastian Inlet bridge. Once over the bridge, turn right at the entrance to the park and check in at the guard station. The site is at the west end of the road past the boat launch ramp.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	IRL141	Technician	Eric Hebert	Site Visit Date	05/22/2020

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	IRL141	Technician	Eric Hebert	Site Visit Date	05/22/2020

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

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

Only the temperature sensor was audited during this visit. The other meteorological sensors were not included. The temperature sensor signal cable shows signs of wear.

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID IRL141 **Technician** Eric Hebert **Site Visit Date** 05/22/2020

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID IRL141 **Technician** Eric Hebert **Site Visit Date** 05/22/2020

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	IRL141	Technician	Eric Hebert	Site Visit Date	05/22/2020

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	IRL141	Technician	Eric Hebert	Site Visit Date	05/22/2020

Site operation procedures

1	Has the site operator attended a formal CASTNET training course? If yes, when and who instructed?	☑	on-site 7/9/2001 by MACTEC employee
2	Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed?	☐	
3	Is the site visited regularly on the required Tuesday schedule?	☑	
4	Are the standard CASTNET operational procedures being flollowed by the site operator?	☑	
5	Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation)	☑	

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

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

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

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

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

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

Manual z/s/p performed following ozone inlet filter changes. Leak checks are no longer performed.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	IRL141	Technician	Eric Hebert	Site Visit Date	05/22/2020

Site operation procedures

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

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

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

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

Site ID IRL141 **Technician** Eric Hebert **Site Visit Date** 05/22/2020

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	8W2MC12	007024
DAS	Campbell	CR3000	2119	000340
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	1192001899	02759
Flow Rate	Apex	AXMC105LPMDPC	54777	000648
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	unknown	07124
Ozone	ThermoElectron Inc	49i A1NAA	1009241782	000609
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200022	000446
Sample Tower	Aluma Tower	B	AT-61152-A-H8-F	000020
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	14804	illegible
Zero air pump	Werther International	PC70/4	000829157	06902

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
COW137-Sandy Grenville-05/30/2020						
1	5/30/2020	Computer	Dell	07049	Inspiron 15	1K2MC12
2	5/30/2020	DAS	Campbell	000401	CR3000	2529
3	5/30/2020	elevation	Elevation	none	1	None
4	5/30/2020	Filter pack flow pump	Thomas	02758	107CAB18	001871
5	5/30/2020	Flow Rate	Apex	000555	AXMC105LPMDPCV	illegible
6	5/30/2020	Infrastructure	Infrastructure	none	none	none
7	5/30/2020	Modem	Digi	07164	LR54	unknown
8	5/30/2020	Ozone	ThermoElectron Inc	000689	49i A1NAA	1030244797
9	5/30/2020	Ozone Standard	ThermoElectron Inc	000441	49i A3NAA	CM08200017
10	5/30/2020	Sample Tower	Aluma Tower	03499	A	none
11	5/30/2020	Shelter Temperature	Campbell	none	107-L	none
12	5/30/2020	Siting Criteria	Siting Criteria	None	1	None
13	5/30/2020	Temperature	RM Young	02934	41342	none
14	5/30/2020	UPS	APC	none	650	unknown
15	5/30/2020	Zero air pump	Werther International	06940	C 70/4	000821897

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2529	COW137	Sandy Grenville	05/30/2020	DAS	Primary

Das Date: 5 /30/2020
Das Time: 14:11:30
Das Day: 151

Audit Date 5 /30/2020
Audit Time 14:11:30
Audit Day 151

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

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

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740135	**Tfer Desc.**	DVM
Tfer ID	01311		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/28/2020	**CorrCoff**	1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0000	0.0001	V	V	0.0001
7	0.1000	0.0999	0.0999	V	V	0.0000
7	0.3000	0.2997	0.2997	V	V	0.0000
7	0.5000	0.4995	0.4995	V	V	0.0000
7	0.7000	0.6995	0.6994	V	V	-0.0001
7	0.9000	0.8993	0.8992	V	V	-0.0001
7	1.0000	0.9992	0.9990	V	V	-0.0002

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	COW137	Sandy Grenville	05/30/2020	Flow Rate	000555

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	131818	**Tfer Desc.**	BIOS 220-H
Tfer ID	01417		
Slope	1.00032	**Intercept**	-0.02240
Cert Date	2/17/2020	**CorrCoff**	0.99997

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0
				Cal Factor Full Scale	0.98
2.60%	2.60%			**Rotometer Reading:**	1.6

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	0.00	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.01	l/m	l/m	
primary	test pt 1	1.523	1.540	1.54	0.000	1.50	l/m	l/m	-2.60%
primary	test pt 2	1.523	1.540	1.54	0.000	1.50	l/m	l/m	-2.60%
primary	test pt 3	1.523	1.540	1.54	0.000	1.50	l/m	l/m	-2.60%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Poor	**Status**	Fail
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	-0.5 cm	**Status**	Fail
Sensor Component	Filter Azimuth	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244797	COW137	Sandy Grenville	05/30/2020	Ozone	000689

Slope:	0.98820	**Slope:**	0.00000
Intercept	-1.43148	**Intercept**	0.00000
CorrCoff:	0.99999	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180030022	**Tfer Desc.**	Ozone primary stan
Tfer ID	01114		
Slope	0.99950	**Intercept**	0.29010
Cert Date	1/14/2020	**CorrCoff**	0.99999

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.44	0.14	-1.42	ppb		-1.56
primary	2	15.89	15.60	14.14	ppb		-1.46
primary	3	36.19	35.91	33.91	ppb	-5.73	
primary	4	68.51	68.25	66.25	ppb	-2.97	
primary	5	111.10	110.86	108.00	ppb	-2.61	

Sensor Component	Condition	Status
Audit Pressure	704 mmHg	pass
Sample Train	Good	pass
Minimum distance from road met	True	pass
Inlet Filter Condition	Clean	pass
26.6 degree unobstructed rule	True	pass
Tree dewline >10m or below inlet	True	pass
Offset	1.20	pass
Span	1.007	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	87.4 kHz	pass
Cell A Noise	0.6 ppb	pass
Cell A Flow	0.66 lpm	pass
Cell A Pressure	682.9 mmHg	pass
Cell A Tmp.	38.9 C	pass
Cell B Freq.	93.4 kHz	pass
Cell B Noise	0.5 ppb	pass
Cell B Flow	0.65 lpm	pass
Cell B Pressure	682.6 mmHg	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	none	COW137	Sandy Grenville	05/30/2020	Temperature	02934

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00797	**Intercept**	0.12950
Cert Date	2/14/2020	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.19	0.32		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.84	0.70	0.000	0.9	C	0.19
primary	Temp Mid Range	24.97	24.64	0.000	24.6	C	-0.07
primary	Temp High Range	49.20	48.68	0.000	48.4	C	-0.32

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	COW137	Sandy Grenville	05/30/2020	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.66	1.31		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00797	Intercept	0.12950
Cert Date	2/14/2020	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	30.53	30.16	0.000	30.0	C	-0.21
primary	Temp Mid Range	26.33	25.99	0.000	27.3	C	1.31
primary	Temp Mid Range	30.68	30.31	0.000	29.9	C	-0.46

Sensor Component	System Memo	Condition		Status	pass

Siting Criteria Form

Sensor Component		Condition		Status	
Sensor Component	Large point source of So2 or Nox	Condition		Status	pass
Sensor Component	City > 50,000	Condition		Status	pass
Sensor Component	City 1,000 to 10,000	Condition		Status	pass
Sensor Component	City 10,000 to 50,000	Condition		Status	pass
Sensor Component	Feedlot operations	Condition		Status	pass
Sensor Component	Large parking lot	Condition		Status	pass
Sensor Component	Limited agriculture operations	Condition		Status	pass
Sensor Component	Major industrial source	Condition		Status	pass
Sensor Component	Secondary road < or = 100 per da	Condition		Status	pass
Sensor Component	Secondary road >100 vehicles/da	Condition		Status	pass
Sensor Component	Small parking lot	Condition	60 m	Status	Fail
Sensor Component	System Memo	Condition		Status	pass
Sensor Component	Major highway, airport, or rail yard	Condition		Status	pass
Sensor Component	Intensive agriculture operations	Condition		Status	pass

Infrastructure Data For

Site ID	COW137	Technician	Sandy Grenville	Site Visit Date	05/30/2020

Shelter Make	Shelter Model	Shelter Size

Sensor Component		Condition		Status	
Sensor Component	Sample Tower Type	Condition	Type B	Status	pass
Sensor Component	Conduit	Condition	N/A	Status	pass
Sensor Component	Met Tower	Condition	N/A	Status	pass
Sensor Component	Moisture Trap	Condition	Installed	Status	pass
Sensor Component	Power Cables	Condition	Good	Status	pass
Sensor Component	Shelter Temp Control	Condition	Functioning	Status	pass
Sensor Component	Rotometer	Condition	Installed	Status	pass
Sensor Component	Sample Tower	Condition	Good	Status	pass
Sensor Component	Shelter Condition	Condition	Fair	Status	pass
Sensor Component	Shelter Door	Condition	Fair	Status	pass
Sensor Component	Shelter Roof	Condition	Good	Status	pass
Sensor Component	Shelter Floor	Condition	Fair	Status	pass
Sensor Component	Shelter walls	Condition	Fair	Status	pass
Sensor Component	Excessive mold present	Condition	Poor	Status	Fail
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	COW137	Sandy Grenville	05/30/2020	Filter Depth	Apex	3980	☐	☐

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:** ShelterCleanNotes

There are some wet spots from an apparent leak near the north and south walls.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	COW137	**Technician**	Sandy Grenville	**Site Visit Date**	05/30/2020

Site Sponsor (agency)	EPA/USFS	**USGS Map**	Prentiss
Operating Group	USFS	**Map Scale**	
AQS #	37-113-9991	**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	
Deposition Measurement	dry, wet	**QAPP Longitude**	
Land Use	Woodland - mixed	**QAPP Elevation Meters**	
Terrain	complex	**QAPP Declination**	
Conforms to MLM	No	**QAPP Declination Date**	
Site Telephone	8283697919	**Audit Latitude**	35.060527
Site Address 1	Southeastern Forest Experiment Statio	**Audit Longitude**	-83.43034
Site Address 2	3160 Coweeta Lab Road	**Audit Elevation**	683
County	Macon	**Audit Declination**	-5.1
City, State	, NC		
Zip Code	28763	**Fire Extinguisher** ☑	Inspected 2019
Time Zone	Eastern	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☐	
Primary Op. Phone #		**Safety Hard Hat** ☑	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Present

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	There are some wet spots from an apparent leak near the north and south walls.				
Site OK	☑	**Notes**					

Driving Directions

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	COW137	Technician	Sandy Grenville	Site Visit Date	05/30/2020

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	COW137	Technician	Sandy Grenville	Site Visit Date	05/30/2020

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	COW137	Technician	Sandy Grenville	Site Visit Date	05/30/2020

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID COW137 **Technician** Sandy Grenville **Site Visit Date** 05/30/2020

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	COW137	Technician	Sandy Grenville	Site Visit Date	05/30/2020

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	COW137	Technician	Sandy Grenville	Site Visit Date	05/30/2020

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	COW137	Technician	Sandy Grenville	Site Visit Date	05/30/2020

Site operation procedures

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

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

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

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

Site ID COW137 **Technician** Sandy Grenville **Site Visit Date** 05/30/2020

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	1K2MC12	07049
DAS	Campbell	CR3000	2135	000357
DAS	Campbell	CR3000	2529	000401
elevation	Elevation	1	None	none
Filter pack flow pump	Thomas	107CAB18	001871	02758
Flow Rate	Apex	AXMC105LPMDPC	illegible	000555
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	unknown	07164
Ozone	ThermoElectron Inc	49i A1NAA	1030244797	000689
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200017	000441
Sample Tower	Aluma Tower	A	none	03499
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	none	02934
UPS	APC	650	unknown	none
Zero air pump	Werther International	C 70/4	000821897	06940

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
SND152-Sandy Grenville-05/31/2020						
1	5/31/2020	Computer	Dell	07047	Inspiron 15	BY3MC12
2	5/31/2020	DAS	Campbell	000357	CR3000	2135
3	5/31/2020	Elevation	Elevation	None	1	None
4	5/31/2020	Filter pack flow pump	Thomas	06028	107CAB18	Illegible
5	5/31/2020	Flow Rate	Apex	000861	AXMC105LPMDPCV	illegible
6	5/31/2020	Infrastructure	Infrastructure	none	none	none
7	5/31/2020	Modem	Digi	07187	LR54	unknown
8	5/31/2020	Ozone	ThermoElectron Inc	000743	49i A1NAA	1105347321
9	5/31/2020	Ozone Standard	ThermoElectron Inc	000704	49i A3NAA	1030244816
10	5/31/2020	Sample Tower	Aluma Tower	000148	B	none
11	5/31/2020	Shelter Temperature	Campbell	none	107-L	none
12	5/31/2020	Siting Criteria	Siting Criteria	None	1	None
13	5/31/2020	Temperature	RM Young	06956	41342	024083
14	5/31/2020	Zero air pump	Werther International	06900	PC70/4	000821894

DAS Data Form

DAS Time Max Error: 0.02

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2135	SND152	Sandy Grenville	05/31/2020	DAS	Primary

Das Date: 5 /31/2020
Das Time: 13:48:36
Das Day: 152

Audit Date 5 /31/2020
Audit Time 13:48:37
Audit Day 152

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

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

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740135	**Tfer Desc.**	DVM
Tfer ID	01311		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/28/2020	**CorrCoff**	1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0000	0.0001	V	V	0.0001
7	0.1000	0.0999	0.0999	V	V	0.0000
7	0.3000	0.2997	0.2997	V	V	0.0000
7	0.5000	0.4996	0.4996	V	V	0.0000
7	0.7000	0.6995	0.6995	V	V	0.0000
7	0.9000	0.8993	0.8993	V	V	0.0000
7	1.0000	0.9992	0.9992	V	V	0.0000

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	SND152	Sandy Grenville	05/31/2020	Flow Rate	000861

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	131818	**Tfer Desc.**	BIOS 220-H
Tfer ID	01417		
Slope	1.00032	**Intercept**	-0.02240
Cert Date	2/17/2020	**CorrCoff**	0.99997

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	-0.018
1.32%	1.32%			**Cal Factor Full Scale**	0.984
				Rotometer Reading:	1.6

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	-0.04	l/m	l/m	
primary	test pt 1	1.500	1.520	1.52	0.000	1.50	l/m	l/m	-1.32%
primary	test pt 2	1.500	1.520	1.51	0.000	1.50	l/m	l/m	-1.32%
primary	test pt 3	1.500	1.520	1.52	0.000	1.50	l/m	l/m	-1.32%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	See comments	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.4 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	270 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347321	SND152	Sandy Grenville	05/31/2020	Ozone	000743

Slope:	0.99969	**Slope:**	0.00000
Intercept	0.42217	**Intercept**	0.00000
CorrCoff:	0.99999	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180030022	**Tfer Desc.**	Ozone primary stan
Tfer ID	01114		
Slope	0.99950	**Intercept**	0.29010
Cert Date	1/14/2020	**CorrCoff**	0.99999

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.52	0.23	0.57	ppb		0.34
primary	2	15.21	14.92	15.21	ppb		0.29
primary	3	36.01	35.73	36.54	ppb	2.24	
primary	4	68.07	67.81	68.01	ppb	0.29	
primary	5	110.24	110.00	110.40	ppb	0.36	

Sensor Component	Condition	Status
Audit Pressure	734.0 mmHg	pass
Sample Train	Good	pass
Minimum distance from road met	True	Pass
Inlet Filter Condition	Clean	pass
26.6 degree unobstructed rule	True	pass
Tree dewline >10m or below inlet	True	pass
Offset	-0.50	pass
Span	1.013	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	94.0 kHz	pass
Cell A Noise	0.4 ppb	pass
Cell A Flow	0.60 lpm	pass
Cell A Pressure	703.7 mmHg	pass
Cell A Tmp.	38.1 C	pass
Cell B Freq.	86.6 kHz	pass
Cell B Noise	0.6 ppb	pass
Cell B Flow	0.61 lpm	pass
Cell B Pressure	704.3 mmHg	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	024083	SND152	Sandy Grenville	05/31/2020	Temperature	06956

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00797	**Intercept**	0.12950
Cert Date	2/14/2020	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.40	0.53		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.33	0.20	0.000	0.7	C	0.53
primary	Temp Mid Range	25.33	25.00	0.000	24.9	C	-0.13
primary	Temp High Range	48.67	48.16	0.000	47.6	C	-0.53

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	SND152	Sandy Grenville	05/31/2020	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.23	0.30		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00797	Intercept	0.12950
Cert Date	2/14/2020	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	28.68	28.32	0.000	28.2	C	-0.09
primary	Temp Mid Range	26.37	26.03	0.000	26.3	C	0.3
primary	Temp Mid Range	25.93	25.60	0.000	25.9	C	0.29

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	SND152	Technician	Sandy Grenville	Site Visit Date	05/31/2020

Shelter Make	Shelter Model	Shelter Size
Ekto	8810	640 cuft

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	SND152	Sandy Grenville	05/31/2020	Moisture Present	Apex	4387	☐	☐

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

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

Unable to meet with operator due to COVID policy.

2 **Parameter:** DasComments

The meteorological tower has been removed and the temperature sensor is mounted in a naturally aspirated shield on the sample tower.

3 **Parameter:** SiteOpsProcedures

Ozone sample line leak checks are no longer performed. A manual zero/span test is performed every two weeks following the inlet filter change.

4 **Parameter:** SitingCriteriaCom

The site is located on an active research farm with cattle and poultry. Cattle are fed within 100 meters of the site. A new building has been constructed 32 meters south of the sample tower. A Climate Reference Network site is located on the farm on the south side of Hwy 68 which is a better location for the CASTNET site.

5 **Parameter:** ShelterCleanNotes

The shelter is kept clean, neat, and very well organized. The shelter floor continues to deteriorated with areas of extreme rot just inside the door and along the north wall.

6 **Parameter:** MetSensorComme

The temperature sensor is mounted to the sample tower and is oriented to the west.

Siting Criteria Form

Sensor Component		Condition		Status	
Sensor Component	Large point source of So2 or Nox	Condition		Status	pass
Sensor Component	City > 50,000	Condition		Status	pass
Sensor Component	City 1,000 to 10,000	Condition		Status	pass
Sensor Component	City 10,000 to 50,000	Condition		Status	pass
Sensor Component	Feedlot operations	Condition	100 m	Status	Fail
Sensor Component	Large parking lot	Condition		Status	pass
Sensor Component	Limited agriculture operations	Condition		Status	pass
Sensor Component	Major industrial source	Condition		Status	pass
Sensor Component	Secondary road < or = 100 per da	Condition		Status	pass
Sensor Component	Secondary road >100 vehicles/da	Condition		Status	pass
Sensor Component	Small parking lot	Condition	20 m	Status	Fail
Sensor Component	System Memo	Condition		Status	pass
Sensor Component	Major highway, airport, or rail yard	Condition		Status	pass
Sensor Component	Intensive agriculture operations	Condition		Status	pass

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	SND152	**Technician**	Sandy Grenville	**Site Visit Date**	05/31/2020

Site Sponsor (agency)	EPA	**USGS Map**	Crossville
Operating Group	Auburn Univ./private	**Map Scale**	
AQS #	01-049-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone, PM10	**QAPP Latitude**	
Deposition Measurement	dry, wet,	**QAPP Longitude**	
Land Use	Agriculture, Dairy	**QAPP Elevation Meters**	
Terrain	plateau, gently rolling	**QAPP Declination**	
Conforms to MLM	Marginally	**QAPP Declination Date**	
Site Telephone	(256) 528-7175	**Audit Latitude**	34.289001
Site Address 1	Sand Mountain Research & Extension	**Audit Longitude**	-85.970065
Site Address 2	13112 Hwy 68	**Audit Elevation**	349
County	DeKalb	**Audit Declination**	-3
City, State	Crossville, AL		
Zip Code	35962		
Time Zone	Eastern		
Primary Operator			
Primary Op. Phone #			
Primary Op. E-mail			
Backup Operator			
Backup Op. Phone #			
Backup Op. E-mail			

	Present	
Fire Extinguisher	☑	New in 2015
First Aid Kit	☑	
Safety Glasses	☑	
Safety Hard Hat	☑	
Climbing Belt	☐	
Security Fence	☑	
Secure Shelter	☑	
Stable Entry Steps	☑	

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The shelter is kept clean, neat, and very well organized. The shelter floor continues to deteriorated with areas of extreme rot just inside the door and along the north wall.				
Site OK	☑	**Notes**					

Driving Directions From I-59 take exit 205, Highway 68, west toward Crossville. The site is on the right at the Sand Mountain Research and Extension Station just at the east edge of Crossville. The combination to the gate lock is 22-32-10.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	SND152	Technician	Sandy Grenville	Site Visit Date	05/31/2020

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

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

The temperature sensor is mounted to the sample tower and is oriented to the west.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	SND152	Technician	Sandy Grenville	Site Visit Date	05/31/2020

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?	☑	N/A

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	SND152	Technician	Sandy Grenville	Site Visit Date	05/31/2020

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID SND152 **Technician** Sandy Grenville **Site Visit Date** 05/31/2020

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

The meteorological tower has been removed and the temperature sensor is mounted in a naturally aspirated shield on the sample tower.

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	SND152	Technician	Sandy Grenville	Site Visit Date	05/31/2020

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	SND152	Technician	Sandy Grenville	Site Visit Date	05/31/2020

Site operation procedures

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

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

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

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

QC Check Performed		Frequency	Compliant
Multi-point Calibrations	☑	Semiannually	☑
Automatic Zero/Span Tests	☑	Daily	☑
Manual Zero/Span Tests	☑	Every 2 weeks	☑
Automatic Precision Level Tests	☑	Daily	☑
Manual Precision Level Test	☐		☑
Analyzer Diagnostics Tests	☐	Not performed	☑
In-line Filter Replacement (at inlet)	☑	Every 2 weeks	☑
In-line Filter Replacement (at analyze	☑	N/A	☑
Sample Line Check for Dirt/Water	☑	Weekly	☑
Zero Air Desiccant Check	☑	Weekly	☑

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

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

Ozone sample line leak checks are no longer performed. A manual zero/span test is performed every two weeks following the inlet filter change.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	SND152	Technician	Sandy Grenville	Site Visit Date	05/31/2020

Site operation procedures

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

QC Check Performed		Frequency	Compliant
Multi-point MFC Calibrations	☑	Semiannually	☑
Flow System Leak Checks	☑	Weekly	☑
Filter Pack Inspection	☐		☐
Flow Rate Setting Checks	☑	Weekly	☑
Visual Check of Flow Rate Rotometer	☑	Weekly	☑
In-line Filter Inspection/Replacement	☑	Semiannually	☑
Sample Line Check for Dirt/Water	☑	Every 2 weeks	☑

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

Unable to meet with operator due to COVID policy.

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

Site ID SND152 **Technician** Sandy Grenville **Site Visit Date** 05/31/2020

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	BY3MC12	07047
DAS	Campbell	CR3000	2135	000357
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	Illegible	06028
Flow Rate	Apex	AXMC105LPMDPC	illegible	000861
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	unknown	07187
Ozone	ThermoElectron Inc	49i A1NAA	1105347321	000743
Ozone Standard	ThermoElectron Inc	49i A3NAA	1030244816	000704
Sample Tower	Aluma Tower	B	none	000148
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	024083	06956
Zero air pump	Werther International	PC70/4	000821894	06900

Site Inventory by Site Visit

Site Visit Date		*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
GAS153-Sandy Grenville-06/01/2020						
1	6/1/2020	Computer	Dell	07070	Inspiron 15	OF3WC8
2	6/1/2020	DAS	Campbell	000635	CR3000	4934
3	6/1/2020	Elevation	Elevation	None	1	None
4	6/1/2020	Filter pack flow pump	Thomas	04858	107CAB18	608102A
5	6/1/2020	Flow Rate	Apex	000643	AXMC105LPMDPCV	illegible
6	6/1/2020	Infrastructure	Infrastructure	none	none	none
7	6/1/2020	Modem	Digi	07185	LR54	unknown
8	6/1/2020	Ozone	ThermoElectron Inc	000737	49i A1NAA	1105347312
9	6/1/2020	Ozone Standard	ThermoElectron Inc	000434	49i A3NAA	CM08200010
10	6/1/2020	Sample Tower	Aluma Tower	000138	B	none
11	6/1/2020	Shelter Temperature	Campbell	none	107-L	none
12	6/1/2020	Siting Criteria	Siting Criteria	None	1	None
13	6/1/2020	Temperature	RM Young	04319	41342	4038
14	6/1/2020	UPS	APC	missing	BP6505	NB0009260535
15	6/1/2020	Zero air pump	Werther International	06865	C 70/4	000814277

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	4934	GAS153	Sandy Grenville	06/01/2020	DAS	Primary

Das Date: 6 /1 /2020
Das Time: 12:13:00
Das Day: 153

Audit Date 6 /1 /2020
Audit Time 12:13:00
Audit Day 153

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

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

Mfg Fluke
Parameter DAS
Serial Number 95740135
Tfer Desc. DVM
Tfer ID 01311
Slope 1.00000
Intercept 0.00000
Cert Date 1/28/2020
CorrCoff 1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	-0.0001	-0.0001	V	V	0.0000
7	0.1000	0.0998	0.0998	V	V	0.0000
7	0.3000	0.2996	0.2996	V	V	0.0000
7	0.5000	0.4996	0.4996	V	V	0.0000
7	0.7000	0.6995	0.6994	V	V	-0.0001
7	0.9000	0.8995	0.8994	V	V	-0.0001
7	1.0000	0.9993	0.9993	V	V	0.0000

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	GAS153	Sandy Grenville	06/01/2020	Flow Rate	000643

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	131818	**Tfer Desc.**	BIOS 220-H
Tfer ID	01417		
Slope	1.00032	**Intercept**	-0.02240
Cert Date	2/17/2020	**CorrCoff**	0.99997

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	-0.01
0.88%	1.32%			**Cal Factor Full Scale**	0.99
				Rotometer Reading:	1.6

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.02	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	-0.01	l/m	l/m	
primary	test pt 1	1.484	1.510	1.51	0.000	1.50	l/m	l/m	-0.66%
primary	test pt 2	1.484	1.510	1.51	0.000	1.50	l/m	l/m	-0.66%
primary	test pt 3	1.494	1.520	1.51	0.000	1.50	l/m	l/m	-1.32%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	See comments	**Status**	pass
Sensor Component	Filter Distance	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	90 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347312	GAS153	Sandy Grenville	06/01/2020	Ozone	000737

Slope:	0.96464	**Slope:**	0.00000
Intercept	-0.73163	**Intercept**	0.00000
CorrCoff:	0.99997	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180030022	**Tfer Desc.**	Ozone primary stan
Tfer ID	01114		
Slope	0.99950	**Intercept**	0.29010
Cert Date	1/14/2020	**CorrCoff**	0.99999

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.37	0.07	-0.23	ppb		-0.3
primary	2	15.20	14.91	13.57	ppb		-1.34
primary	3	35.50	35.22	32.77	ppb	-7.21	
primary	4	68.50	68.24	64.98	ppb	-4.89	
primary	5	109.50	109.26	104.90	ppb	-4.07	

Sensor Component	Condition	Status
Audit Pressure	743.5 mmHg	pass
Sample Train	Good	pass
Minimum distance from road met	True	pass
Inlet Filter Condition	Clean	pass
26.6 degree unobstructed rule	True	pass
Tree dewline >10m or below inlet	True	pass
Offset	0.000	pass
Span	1.004	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	85.4 kHz	pass
Cell A Noise	0.9 ppb	pass
Cell A Flow	0.66 lpm	pass
Cell A Pressure	701.4 mmHg	pass
Cell A Tmp.	36.0 C	pass
Cell B Freq.	97.9 kHz	pass
Cell B Noise	1.1 ppb	pass
Cell B Flow	0.71 lpm	pass
Cell B Pressure	702.3 mmHg	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	4038	GAS153	Sandy Grenville	06/01/2020	Temperature	04319

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232734	**Tfer Desc.**	RTD
Tfer ID	01227		
Slope	1.00797	**Intercept**	0.12950
Cert Date	2/14/2020	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.25	0.40		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.31	0.18	0.000	0.5	C	0.28
primary	Temp Mid Range	25.12	24.79	0.000	24.9	C	0.08
primary	Temp High Range	48.95	48.43	0.000	48.0	C	-0.4

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	GAS153	Sandy Grenville	06/01/2020	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.67	0.85		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232734	Tfer Desc.	RTD
Tfer ID	01227		
Slope	1.00797	Intercept	0.12950
Cert Date	2/14/2020	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	28.56	28.21	0.000	27.6	C	-0.66
primary	Temp Mid Range	24.60	24.28	0.000	25.1	C	0.85
primary	Temp Mid Range	27.72	27.37	0.000	26.9	C	-0.5

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	GAS153	Technician	Sandy Grenville	Site Visit Date	06/01/2020

Shelter Make	Shelter Model	Shelter Size
Ekto	8810	640 cuft

Sensor Component		Condition		Status	
Sensor Component	Sample Tower Type	Condition	Type B	Status	pass
Sensor Component	Conduit	Condition	N/A	Status	pass
Sensor Component	Met Tower	Condition	N/A	Status	pass
Sensor Component	Moisture Trap	Condition	Installed	Status	pass
Sensor Component	Power Cables	Condition	Good	Status	pass
Sensor Component	Shelter Temp Control	Condition	Functioning	Status	pass
Sensor Component	Rotometer	Condition	Installed	Status	pass
Sensor Component	Sample Tower	Condition	Good	Status	pass
Sensor Component	Shelter Condition	Condition	Good	Status	pass
Sensor Component	Shelter Door	Condition	Good	Status	pass
Sensor Component	Shelter Roof	Condition	Good	Status	pass
Sensor Component	Shelter Floor	Condition	Good	Status	pass
Sensor Component	Shelter walls	Condition	Fair	Status	pass
Sensor Component	Excessive mold present	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

Siting Criteria Form

Sensor Component		Condition		Status	
Sensor Component	Large point source of So2 or Nox	Condition		Status	pass
Sensor Component	City > 50,000	Condition		Status	pass
Sensor Component	City 1,000 to 10,000	Condition		Status	pass
Sensor Component	City 10,000 to 50,000	Condition		Status	pass
Sensor Component	Feedlot operations	Condition		Status	pass
Sensor Component	Large parking lot	Condition		Status	pass
Sensor Component	Limited agriculture operations	Condition		Status	pass
Sensor Component	Major industrial source	Condition		Status	pass
Sensor Component	Secondary road < or = 100 per da	Condition		Status	pass
Sensor Component	Secondary road >100 vehicles/da	Condition		Status	pass
Sensor Component	Small parking lot	Condition		Status	pass
Sensor Component	System Memo	Condition		Status	pass
Sensor Component	Major highway, airport, or rail yard	Condition		Status	pass
Sensor Component	Intensive agriculture operations	Condition		Status	pass

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	GAS153	**Technician**	Sandy Grenville	**Site Visit Date**	06/01/2020

Site Sponsor (agency)	EPA	**USGS Map**	Hollonville
Operating Group	UGA	**Map Scale**	
AQS #	13-231-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	
Deposition Measurement	dry, wet	**QAPP Longitude**	
Land Use	agriculture, woodland - mixed	**QAPP Elevation Meters**	
Terrain	gently rolling	**QAPP Declination**	
Conforms to MLM	Yes	**QAPP Declination Date**	
Site Telephone	(770) 229-8542	**Audit Latitude**	33.181173
Site Address 1	Bledsoe Farm, GA Experiment Station	**Audit Longitude**	-84.410054
Site Address 2	1913 Jackson road	**Audit Elevation**	265
County	Pike	**Audit Declination**	-4
City, State	Williamson, GA		
Zip Code	30292	**Fire Extinguisher** (Present ☑)	New in 2015
Time Zone	Eastern	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☐	
Primary Op. Phone #		**Safety Hard Hat** ☑	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☐	Not locked
Backup Op. E-mail		**Stable Entry Steps** ☑	

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

Shelter Clean ☑ **Notes**

Site OK ☑ **Notes**

Driving Directions

From I-75 take exit 205 (Rt 16) west to Griffin. Continue west through Griffin to 19/41 south. Turn south on 19/41 and take the next exit (Rt 362) west toward Williamson. Continue 7.2 miles on 362 through Williamson. Bear right on the dirt road marked Blanton Mill Road, approximately 0.9 miles to the gated Bledsoe Farm on the right. The site is past the farm office and sheds on the north side of the farm.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	GAS153	Technician	Sandy Grenville	Site Visit Date	06/01/2020

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	GAS153	Technician	Sandy Grenville	Site Visit Date	06/01/2020

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	GAS153	Technician	Sandy Grenville	Site Visit Date	06/01/2020

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID GAS153 **Technician** Sandy Grenville **Site Visit Date** 06/01/2020

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID GAS153 **Technician** Sandy Grenville **Site Visit Date** 06/01/2020

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	GAS153	Technician	Sandy Grenville	Site Visit Date	06/01/2020

Site operation procedures

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

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

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

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

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

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

It was reported that the ozone inlet filter is replaced every two weeks, and a manual zero test is performed every week.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	GAS153	Technician	Sandy Grenville	Site Visit Date	06/01/2020

Site operation procedures

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

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

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

Unable to meet with operator due to COVID policy.

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

Site ID GAS153 **Technician** Sandy Grenville **Site Visit Date** 06/01/2020

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	OF3WC8	07070
DAS	Campbell	CR3000	4934	000635
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	608102A	04858
Flow Rate	Apex	AXMC105LPMDPC	illegible	000643
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	unknown	07185
Ozone	ThermoElectron Inc	49i A1NAA	1105347312	000737
Ozone Standard	ThermoElectron Inc	49i A3NAA	CM08200010	000434
Sample Tower	Aluma Tower	B	none	000138
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	4038	04319
UPS	APC	BP6505	NB0009260535	missing
Zero air pump	Werther International	C 70/4	000814277	06865

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
FOR605-Martin Valvur-06/03/2020						
1	6/3/2020	DAS	Campbell	49922	CR1000	illegible
2	6/3/2020	elevation	Elevation	none	none	none
3	6/3/2020	Flow Rate	Omega	none	FMA6518ST-RS232	394013-3
4	6/3/2020	Infrastructure	Infrastructure	none	none	none
5	6/3/2020	Precipitation	Handar	none	444A	2998
6	6/3/2020	siting criteria	Siting Criteria	none	none	None
7	6/3/2020	Wind Direction	Met One	illegible	024	J5213
8	6/3/2020	Wind Speed	Met One	none	014	K2278

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Omega	394013-3	FOR605	Martin Valvur	06/03/2020	Flow Rate	none

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	122974	**Tfer Desc.**	BIOS 220-H
Tfer ID	01416		
Slope	1.00000	**Intercept**	0.00000
Cert Date	5/6/2020	**CorrCoff**	1.00000

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0.18
				Cal Factor Full Scale	1.002
1.46%	1.69%			**Rotometer Reading:**	0

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	0.18	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.18	l/m	l/m	
primary	test pt 1	2.951	2.950	2.98	0.000	3.00	l/m	l/m	1.69%
primary	test pt 2	2.957	2.960	2.97	0.000	3.00	l/m	l/m	1.35%
primary	test pt 3	2.957	2.960	2.96	0.000	3.00	l/m	l/m	1.35%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	N/A	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	3.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	90 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	124	FOR605	Martin Valvur	06/03/2020	Temperature2meter	none

Mfg	Fluke	Parameter	Temperature
Serial Number	3275143	Tfer Desc.	RTD
Tfer ID	01229		
Slope	1.00026	Intercept	-0.01710
Cert Date	1/29/2020	CorrCoff	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.1	0.18		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	0.19	0.21	0.000	0.13	C	-0.08
primary	Temp Mid Range	25.43	25.44	0.000	25.39	C	-0.05
primary	Temp High Rang	49.05	49.05	0.000	49.23	C	0.18

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

Siting Criteria Form

Sensor Component		Condition		Status	
Sensor Component	Large point source of So2 or Nox	Condition		Status	pass
Sensor Component	City > 50,000	Condition		Status	pass
Sensor Component	City 1,000 to 10,000	Condition		Status	pass
Sensor Component	City 10,000 to 50,000	Condition		Status	pass
Sensor Component	Feedlot operations	Condition		Status	pass
Sensor Component	Large parking lot	Condition		Status	pass
Sensor Component	Limited agriculture operations	Condition		Status	pass
Sensor Component	Major industrial source	Condition		Status	pass
Sensor Component	Secondary road < or = 100 per da	Condition		Status	pass
Sensor Component	Secondary road >100 vehicles/da	Condition		Status	pass
Sensor Component	Small parking lot	Condition		Status	pass
Sensor Component	System Memo	Condition		Status	pass
Sensor Component	Major highway, airport, or rail yard	Condition		Status	pass
Sensor Component	Intensive agriculture operations	Condition		Status	pass

Infrastructure Data For

Site ID	FOR605	Technician	Martin Valvur	Site Visit Date	06/03/2020

Shelter Make	Shelter Model	Shelter Size

Sensor Component		Condition		Status	
Sensor Component	Sample Tower Type	Condition	Pole type	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	N/A	Status	pass
Sensor Component	Rotometer	Condition	Not installed	Status	Fail
Sensor Component	Sample Tower	Condition	Good	Status	pass
Sensor Component	Shelter Condition	Condition	Good	Status	pass
Sensor Component	Shelter Door	Condition	Good	Status	pass
Sensor Component	Shelter Roof	Condition	N/A	Status	pass
Sensor Component	Shelter Floor	Condition	N/A	Status	pass
Sensor Component	Shelter walls	Condition	N/A	Status	pass
Sensor Component	Excessive mold present	Condition	N/A	Status	pass
Sensor Component	Signal Cable	Condition	Good	Status	pass
Sensor Component	Tubing Type	Condition	3/8 teflon	Status	pass
Sensor Component	Sample Train	Condition	Good	Status	pass

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The dry deposition sample height is approximately 6 meters and not 10 meters. The observation section of the SSRF is not used.

2 **Parameter:** DocumentationCo

There is no documentation available at the site since there is no place to store documents. The site does not have a computer or shelter other than the small enclosure. The site operator completes a site checklist which remains in his vehicle. Information from the checklist is later filed at his office. Per instruction from ARS the COC portion of the SSRF is not being used.

3 **Parameter:** SitingCriteriaCom

The site is located in a wellfield with oil and gas operations nearby.

4 **Parameter:** ShelterCleanNotes

This is a small footprint site with instruments mounted in enclosure on tripod tower.

5 **Parameter:** PollAnalyzerCom

The enclosure protecting the dry deposition filter pack is much smaller in diameter than the normal filter pack enclosure. The geometry of the enclosure may effect particulate collection making data not directly comparable to other CASTNET sites.

6 **Parameter:** MetOpMaintCom

The temperature sensor is now separate from the humidity sensor. The relative humidity measurement is 8 meters above the ground, and the temperature measurement is 2.2 meters above ground.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	FOR605	**Technician**	Martin Valvur	**Site Visit Date**	06/03/2020

Site Sponsor (agency)	EPA	**USGS Map**	
Operating Group	BLM	**Map Scale**	
AQS #		**Map Date**	
Meteorological Type	Met One		
Air Pollutant Analyzer		**QAPP Latitude**	
Deposition Measurement	dry	**QAPP Longitude**	
Land Use	Range	**QAPP Elevation Meters**	
Terrain	Rolling	**QAPP Declination**	
Conforms to MLM	Marginally	**QAPP Declination Date**	
Site Telephone		**Audit Latitude**	44.33927
Site Address 1		**Audit Longitude**	-105.920275
Site Address 2		**Audit Elevation**	1402
County	Campbell	**Audit Declination**	9.3
City, State	Gillette, WY		
Zip Code	82716	**Fire Extinguisher** ☐	
Time Zone	Mountain	**First Aid Kit** ☐	
Primary Operator		**Safety Glasses** ☐	
Primary Op. Phone #		**Safety Hard Hat** ☐	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Present

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

Shelter Clean ☐ **Notes** This is a small footprint site with instruments mounted in enclosure on tripod tower.

Site OK ☐ **Notes**

Driving Directions

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	FOR605	Technician	Martin Valvur	Site Visit Date	06/03/2020

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	FOR605	Technician	Martin Valvur	Site Visit Date	06/03/2020

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

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

The temperature sensor is now separate from the humidity sensor. The relative humidity measurement is 8 meters above the ground, and the temperature measurement is 2.2 meters above ground.

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	FOR605	Technician	Martin Valvur	Site Visit Date	06/03/2020

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

Provide any additional 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 enclosure protecting the dry deposition filter pack is much smaller in diameter than the normal filter pack enclosure. The geometry of the enclosure may effect particulate collection making data not directly comparable to other CASTNET sites.

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID FOR605 **Technician** Martin Valvur **Site Visit Date** 06/03/2020

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID FOR605 **Technician** Martin Valvur **Site Visit Date** 06/03/2020

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

There is no documentation available at the site since there is no place to store documents. The site does not have a computer or shelter other than the small enclosure. The site operator completes a site checklist which remains in his vehicle. Information from the checklist is later filed at his office. Per instruction from ARS the COC portion of the SSRF is not being used.

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID FOR605 **Technician** Martin Valvur **Site Visit Date** 06/03/2020

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID FOR605 **Technician** Martin Valvur **Site Visit Date** 06/03/2020

Site operation procedures

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

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

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

The dry deposition sample height is approximately 6 meters and not 10 meters. The observation section of the SSRF is not used.

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

Site ID FOR605 **Technician** Martin Valvur **Site Visit Date** 06/03/2020

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Campbell	CR1000	illegible	49922
elevation	Elevation	none	none	none
Flow Rate	Omega	FMA6518ST-RS232	394013-3	none
Infrastructure	Infrastructure	none	none	none
siting criteria	Siting Criteria	none	None	none
Temperature2meter	Campbell	10755	124	none

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
GRB411-Martin Valvur-06/24/2020						
1	6/24/2020	Computer	Hewlett Packard	none	ProBook	5CB22906VO
2	6/24/2020	DAS	Environmental Sys Corp	90635	8816	2507
3	6/24/2020	Elevation	Elevation	None	1	None
4	6/24/2020	Filter pack flow pump	Thomas	none	107CAB18	081700057767
5	6/24/2020	flow rate	Tylan	03387	FC280AV	AW9403026
6	6/24/2020	Infrastructure	Infrastructure	none	none	none
7	6/24/2020	Met tower	Climatronics	01358	18 inch taper	none
8	6/24/2020	MFC power supply	Tylan	03681	RO-32	FP9404004
9	6/24/2020	Ozone	ThermoElectron Inc	none	49iQ-ABBN	1183030014
10	6/24/2020	Ozone	ThermoElectron Inc	90565	49C	49C-59285-322
11	6/24/2020	Ozone Standard	ThermoElectron Inc	none	49C	0330302753
12	6/24/2020	Sample Tower	Aluma Tower	none	B	AT-5381-F9-2
13	6/24/2020	Shelter Temperature	ARS	none	none	80
14	6/24/2020	Siting Criteria	Siting Criteria	None	1	None
15	6/24/2020	Temperature2meter	RM Young	none	41342	018532
16	6/24/2020	Zero air pump	Werther International	90722	TT70/4E	507782

DAS Data Form

DAS Time Max Error: 1.38

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	2507	GRB411	Martin Valvur	06/24/2020	DAS	Primary

Das Date: 6 /24/2020
Das Time: 08:43:37
Das Day: 176

Audit Date 6 /24/2020
Audit Time 08:45:00
Audit Day 176

Low Channel:

Avg Diff:	Max Diff:
0.0002	0.0005

High Channel:

Avg Diff:	Max Diff:
0.0002	0.0005

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

Mfg	Fluke	**Parameter**	DAS
Serial Number	95740243	**Tfer Desc.**	DVM
Tfer ID	01312		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/28/2020	**CorrCoff**	1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
13	0.0000	-0.0007	-0.0009	V	V	-0.0002
13	0.1000	0.0992	0.0991	V	V	-0.0001
13	0.3000	0.2993	0.2992	V	V	-0.0001
13	0.5000	0.4995	0.4995	V	V	0.0000
13	0.7000	0.6995	0.6990	V	V	-0.0005
13	0.9000	0.8997	0.8998	V	V	0.0001
13	1.0000	0.9996	0.9993	V	V	-0.0003

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Tylan	AW9403026	GRB411	Martin Valvur	06/24/2020	flow rate	03387

Mfg	Tylan	
SN/Owner ID	FP9404004	03681
Parameter:	MFC power supply	

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number	122974	**Tfer Desc.**	BIOS 220-H
Tfer ID	01416		
Slope	1.00000	**Intercept**	0.00000
Cert Date	5/6/2020	**CorrCoff**	1.00000

DAS 1:		DAS 2:		
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	
0.59%	0.60%			

Cal Factor Zero	0.343
Cal Factor Full Scale	5.975
Rotometer Reading:	3.4

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	-0.30	0.0000	0.05	l/m	l/m	
primary	leak check	0.000	0.000	-0.29	0.0000	0.06	l/m	l/m	
primary	test pt 1	3.000	3.000	2.39	0.0000	3.02	l/m	l/m	0.60%
primary	test pt 2	3.005	3.000	2.39	0.0000	3.02	l/m	l/m	0.57%
primary	test pt 3	3.000	3.000	2.39	0.0000	3.02	l/m	l/m	0.60%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Poor	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	7.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	-1.5 cm	**Status**	Fail
Sensor Component	Filter Azimuth	**Condition**	270 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1183030014	GRB411	Martin Valvur	06/24/2020	Ozone	none

Slope:	0.97888	**Slope:**	0.00000
Intercept	-0.67707	**Intercept**	0.00000
CorrCoff:	0.99986	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00260	**Intercept**	0.03590
Cert Date	1/14/2020	**CorrCoff**	0.99999

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.12	0.08	0.10	ppb		0.02
primary	2	17.78	17.69	16.59	ppb		-1.1
primary	3	37.71	37.57	35.68	ppb	-5.16	
primary	4	67.71	67.49	64.44	ppb	-4.62	
primary	5	112.56	112.23	109.90	ppb	-2.1	

Sensor Component	Condition	Status
Audit Pressure	600.0 mmHg	pass
Sample Train	Good	pass
Minimum distance from road met	True	pass
Inlet Filter Condition	Clean	pass
26.6 degree unobstructed rule	True	pass
Tree dewline >10m or below inlet	True	pass
Offset	0.000	pass
Span	1.015	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	78.6 kHz	pass
Cell A Noise	0.8 ppb	pass
Cell A Flow	1.22 lpm	pass
Cell A Pressure	582.9 mmHg	pass
Cell A Tmp.	27.3 C	pass
Cell B Freq.	78.8 kHz	pass
Cell B Noise	0.7 ppb	pass
Cell B Flow	N/A	pass
Cell B Pressure	582.9 mmHg	pass
Line Loss	Not tested	pass
System Memo		pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	018532	GRB411	Martin Valvur	06/24/2020	Temperature2meter	none

Mfg	Fluke	Parameter	Temperature
Serial Number	3275143	Tfer Desc.	RTD
Tfer ID	01229		
Slope	1.00026	Intercept	-0.01710
Cert Date	1/29/2020	CorrCoff	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.13	0.17		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	0.29	0.31	0.0000	0.20	C	-0.11
primary	Temp Mid Range	22.99	23.00	0.0000	23.17	C	0.17
primary	Temp High Rang	49.15	49.15	0.0000	49.25	C	0.1

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	80	GRB411	Martin Valvur	06/24/2020	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.57	0.87		

Mfg	Fluke	Parameter	Shelter Temperature
Serial Number	3275143	Tfer Desc.	RTD
Tfer ID	01229		
Slope	1.00026	Intercept	-0.01710
Cert Date	1/29/2020	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	23.17	23.18	0.000	23.6	C	0.42
primary	Temp Mid Range	23.15	23.16	0.000	23.6	C	0.43
primary	Temp Mid Range	22.55	22.56	0.000	23.4	C	0.87

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	GRB411	Technician	Martin Valvur	Site Visit Date	06/24/2020

Shelter Make	Shelter Model	Shelter Size
Ekto	8810 (s/n 2652-1)	640 cuft

Sensor Component		Condition		Status	
Sensor Component	Sample Tower Type	Condition	Type B	Status	pass
Sensor Component	Conduit	Condition	Good	Status	pass
Sensor Component	Met Tower	Condition	Good	Status	pass
Sensor Component	Moisture Trap	Condition	Installed	Status	pass
Sensor Component	Power Cables	Condition	Good	Status	pass
Sensor Component	Shelter Temp Control	Condition	Functioning	Status	pass
Sensor Component	Rotometer	Condition	Installed	Status	pass
Sensor Component	Sample Tower	Condition	Good	Status	pass
Sensor Component	Shelter Condition	Condition	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	Shelter walls	Condition	Good	Status	pass
Sensor Component	Excessive mold present	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:** DocumentationCo

The station logbook system (Dataview) and the station maintenance reports are not current.

2 **Parameter:** ShelterCleanNotes

The shelter is in fair condition, The shelter floor has missing and crumbled tiles.

Siting Criteria Form

Sensor Component	Condition	Status
Large point source of So2 or Nox		pass
City > 50,000		pass
City 1,000 to 10,000		pass
City 10,000 to 50,000		pass
Feedlot operations		pass
Large parking lot		pass
Limited agriculture operations		pass
Major industrial source	mines to the west	Fail
Secondary road < or = 100 per da		pass
Secondary road >100 vehicles/da		pass
Small parking lot		pass
System Memo		pass
Major highway, airport, or rail yard		pass
Intensive agriculture operations		pass

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	GRB411	**Technician**	Martin Valvur	**Site Visit Date**	06/24/2020

Site Sponsor (agency)	NPS	**USGS Map**	Lehman Caves
Operating Group	NPS	**Map Scale**	
AQS #	32-033-0101	**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone, IMPROVE	**QAPP Latitude**	39.0053
Deposition Measurement	dry, wet	**QAPP Longitude**	-114.2158
Land Use	woodland - evergreen	**QAPP Elevation Meters**	2060
Terrain	complex (dessert basin and mountain)	**QAPP Declination**	
Conforms to MLM	No	**QAPP Declination Date**	
Site Telephone	(775) 234-7104	**Audit Latitude**	39.005121
Site Address 1	Great Basin Nat. Park	**Audit Longitude**	-114.215932
Site Address 2	Hwy 488	**Audit Elevation**	2058
County	White Pine	**Audit Declination**	12.5
City, State	Baker, NV		
Zip Code	89311	**Fire Extinguisher**	☑
Time Zone	Pacific	**First Aid Kit**	☑
Primary Operator		**Safety Glasses**	☐
Primary Op. Phone #		**Safety Hard Hat**	☐
Primary Op. E-mail		**Climbing Belt**	☐
Backup Operator		**Security Fence**	☐
Backup Op. Phone #		**Secure Shelter**	☑
Backup Op. E-mail		**Stable Entry Steps**	☑

Present

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810 (s/n 2652-1)	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The shelter is in fair condition, The shelter floor has missing and crumbled tiles.				
Site OK	☑	**Notes**					

Driving Directions From Las Vegas travel north on Interstate 15 to exit 109 in Beaver, Utah. Travel west on 21 to Garrison, Nevada and turn left on route 487 and continue to Baker. Turn left on 488 in Baker and follow the signs to Great Basin National Park. The site is on the left of the road to the residential and office area.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	GRB411	Technician	Martin Valvur	Site Visit Date	06/24/2020

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	GRB411	Technician	Martin Valvur	Site Visit Date	06/24/2020

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	GRB411	Technician	Martin Valvur	Site Visit Date	06/24/2020

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID GRB411 **Technician** Martin Valvur **Site Visit Date** 06/24/2020

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	GRB411	Technician	Martin Valvur	Site Visit Date	06/24/2020

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

The station logbook system (Dataview) and the station maintenance reports are not current.

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	GRB411	Technician	Martin Valvur	Site Visit Date	06/24/2020

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	GRB411	Technician	Martin Valvur	Site Visit Date	06/24/2020

Site operation procedures

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

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

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

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

Site ID GRB411 **Technician** Martin Valvur **Site Visit Date** 06/24/2020

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	ProBook	5CB22906VO	none
DAS	Environmental Sys Corp	8816	2507	90635
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	081700057767	none
flow rate	Tylan	FC280AV	AW9403026	03387
Infrastructure	Infrastructure	none	none	none
Met tower	Climatronics	18 inch taper	none	01358
MFC power supply	Tylan	RO-32	FP9404004	03681
Ozone	ThermoElectron Inc	49iQ-ABBN	1183030014	none
Ozone Standard	ThermoElectron Inc	49C	0330302753	none
Sample Tower	Aluma Tower	B	AT-5381-F9-2	none
Shelter Temperature	ARS	none	80	none
Siting Criteria	Siting Criteria	1	None	None
Temperature2meter	RM Young	41342	018532	none
Zero air pump	Werther International	TT70/4E	507782	90722

APPENDIX B

CASTNET Site Spot Report Forms

EEMS Spot Report

Data Compiled: 8/15/2020 13:27:38

SiteVisitDate	Site	Technician
05/30/2020	COW137	Sandy Grenville

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	15	0.19	c	**P**
2	Temperature max error	P	4	0.5	15	0.32	c	**P**
3	Ozone Slope	P	0	1.1	4	0.98820	unitless	**P**
4	Ozone Slope	P	0	1.1	4	0.98820	unitless	**P**
5	Ozone Intercept	P	0	5	4	-1.43148	ppb	**P**
6	Ozone Intercept	P	0	5	4	-1.43148	ppb	**P**
7	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
8	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
9	Ozone % difference avg	P	7	10	4	5.1	%	**P**
10	Ozone Absolute Difference g1	P	7	3	1	-1.56	ppb	**P**
11	Ozone Absolute Difference g2	P	7	1.5	1	-1.46	ppb	**P**
12	Flow Rate average % difference	P	10	5	4	2.6	%	**P**
13	Flow Rate max % difference	P	10	5	4	2.6	%	**P**
14	DAS Voltage average error	P	7	0.003	77	0.0001	V	**P**
15	Shelter Temperature average error	P	5	2	18	0.66	c	**P**
16	Shelter Temperature max error	P	5	2	18	1.31	c	**P**

SiteVisitDate	Site	Technician
05/30/2020	COW137	Sandy Grenville

Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** Filter Depth **CommentCode:** 71

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

Field Systems Comments

1 **Parameter:** ShelterCleanNotes

There are some wet spots from an apparent leak near the north and south walls.

EEMS Spot Report

Data Compiled: 8/11/2020 11:25:58

SiteVisitDate	Site	Technician
05/22/2020	IRL141	Eric Hebert

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	12	0.29	c	**P**
2	Temperature max error	P	4	0.5	12	0.42	c	**P**
3	Ozone Slope	P	0	1.1	4	0.99475	unitless	**P**
4	Ozone Intercept	P	0	5	4	0.20607	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99996	unitless	**P**
6	Ozone % difference avg	P	7	10	4	0.9	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	0.53	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.28	ppb	**P**
9	Flow Rate average % difference	P	10	5	6	1.96	%	**P**
10	Flow Rate max % difference	P	10	5	6	1.96	%	**P**
11	Shelter Temperature average error	P	5	2	12	0.16	c	**P**
12	Shelter Temperature max error	P	5	2	12	0.30	c	**P**

SiteVisitDate	Site	Technician
05/22/2020	IRL141	Eric Hebert

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

Manual z/s/p performed following ozone inlet filter changes. Leak checks are no longer performed.

2 **Parameter:** ShelterCleanNotes

The shelter is clean and well organized. The shelter floor and bottom of the walls are severely rotting with extensive mold growth. It has deteriorated since the previous audit.

3 **Parameter:** MetOpMaintCom

Only the temperature sensor was audited during this visit. The other meteorological sensors were not included. The temperature sensor signal cable shows signs of wear.

EEMS Spot Report

Data Compiled: 8/15/2020 13:56:51

SiteVisitDate	Site	Technician
05/31/2020	SND152	Sandy Grenville

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	3	0.40	c	**P**
2	Temperature max error	P	4	0.5	3	0.53	c	**Fail**
3	Ozone Slope	P	0	1.1	4	0.99969	unitless	**P**
4	Ozone Intercept	P	0	5	4	0.42217	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
6	Ozone % difference avg	P	7	10	4	1.2	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	0.34	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	0.29	ppb	**P**
9	Flow Rate average % difference	P	10	5	4	1.32	%	**P**
10	Flow Rate max % difference	P	10	5	4	1.32	%	**P**
11	DAS Voltage average error	P	7	0.003	84	0.0000	V	**P**
12	Shelter Temperature average error	P	5	2	18	0.23	c	**P**
13	Shelter Temperature max error	P	5	2	18	0.30	c	**P**

SiteVisitDate	Site	Technician
05/31/2020	SND152	Sandy Grenville

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

Unable to meet with operator due to COVID policy.

2 **Parameter:** DasComments

The meteorological tower has been removed and the temperature sensor is mounted in a naturally aspirated shield on the sample tower.

3 **Parameter:** SiteOpsProcedures

Ozone sample line leak checks are no longer performed. A manual zero/span test is performed every two weeks following the inlet filter change.

4 **Parameter:** SitingCriteriaCom

The site is located on an active research farm with cattle and poultry. Cattle are fed within 100 meters of the site. A new building has been constructed 32 meters south of the sample tower. A Climate Reference Network site is located on the farm on the south side of Hwy 68 which is a better location for the CASTNET site.

5 **Parameter:** ShelterCleanNotes

The shelter is kept clean, neat, and very well organized. The shelter floor continues to deteriorated with areas of extreme rot just inside the door and along the north wall.

6 **Parameter:** MetSensorComme

The temperature sensor is mounted to the sample tower and is oriented to the west.

EEMS Spot Report

Data Compiled: 8/11/2020 17:12:49

SiteVisitDate	Site	Technician
06/02/2020	BAS601	Martin Valvur

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.00369	unitless	**P**
2	Ozone Intercept	P	0	5	4	-0.20488	ppb	**P**
3	Ozone correlation	P	0	0.995	4	0.99998	unitless	**P**
4	Ozone % difference avg	P	7	10	4	0.7	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	0.10	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.16	ppb	**P**

EEMS Spot Report

Data Compiled: 8/15/2020 16:25:13

SiteVisitDate	Site	Technician
06/03/2020	FOR605	Martin Valvur

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.10	c	**P**
2	Temperature2meter max error	P	5	0.5	3	0.18	c	**P**
3	Flow Rate average % difference	P	10	5	3	1.47	%	**P**
4	Flow Rate max % difference	P	10	5	3	1.69	%	**P**

SiteVisitDate	Site	Technician
06/03/2020	FOR605	Martin Valvur

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The dry deposition sample height is approximately 6 meters and not 10 meters. The observation section of the SSRF is not used.

2 **Parameter:** DocumentationCo

There is no documentation available at the site since there is no place to store documents. The site does not have a computer or shelter other than the small enclosure. The site operator completes a site checklist which remains in his vehicle. Information from the checklist is later filed at his office. Per instruction from ARS the COC portion of the SSRF is not being used.

3 **Parameter:** SitingCriteriaCom

The site is located in a wellfield with oil and gas operations nearby.

4 **Parameter:** ShelterCleanNotes

This is a small footprint site with instruments mounted in enclosure on tripod tower.

5 **Parameter:** PollAnalyzerCom

The enclosure protecting the dry deposition filter pack is much smaller in diameter than the normal filter pack enclosure. The geometry of the enclosure may effect particulate collection making data not directly comparable to other CASTNET sites.

6 **Parameter:** MetOpMaintCom

The temperature sensor is now separate from the humidity sensor. The relative humidity measurement is 8 meters above the ground, and the temperature measurement is 2.2 meters above ground.

EEMS Spot Report

Data Compiled: 8/15/2020 14:21:24

SiteVisitDate	Site	Technician
06/01/2020	GAS153	Sandy Grenville

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	21	0.25	c	**P**
2	Temperature max error	P	4	0.5	21	0.40	c	**P**
3	Ozone Slope	P	0	1.1	4	0.96464	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.73163	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99997	unitless	**P**
6	Ozone % difference avg	P	7	10	4	6.2	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-0.3	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-1.34	ppb	**P**
9	Flow Rate average % difference	P	10	5	4	0.88	%	**P**
10	Flow Rate max % difference	P	10	5	4	1.32	%	**P**
11	DAS Voltage average error	P	7	0.003	63	0.0000	V	**P**
12	Shelter Temperature average error	P	5	2	18	0.67	c	**P**
13	Shelter Temperature max error	P	5	2	18	0.85	c	**P**

SiteVisitDate	Site	Technician
06/01/2020	GAS153	Sandy Grenville

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

Unable to meet with operator due to COVID policy.

2 **Parameter:** SiteOpsProcedures

It was reported that the ozone inlet filter is replaced every two weeks, and a manual zero test is performed every week.

EEMS Spot Report

Data Compiled: 8/15/2020 16:46:08

SiteVisitDate	Site	Technician
06/24/2020	GRB411	Martin Valvur

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature2meter average error	P	5	0.5	3	0.13	c	**P**
2	Temperature2meter max error	P	5	0.5	3	0.17	c	**P**
3	Ozone Slope	P	0	1.1	4	0.97888	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.67707	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99986	unitless	**P**
6	Ozone % difference avg	P	7	10	4	4.5	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	0.02	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-1.1	ppb	**P**
9	Flow Rate average % difference	P	10	5	12	0.59	%	**P**
10	Flow Rate max % difference	P	10	5	12	0.60	%	**P**
11	DAS Voltage average error	P	13	0.003	84	0.0002	V	**P**
12	Shelter Temperature average error	P	5	2	21	0.57	c	**P**
13	Shelter Temperature max error	P	5	2	21	0.87	c	**P**

SiteVisitDate	Site	Technician
06/24/2020	GRB411	Martin Valvur

Field Systems Comments

1 **Parameter:** DocumentationCo

The station logbook system (Dataview) and the station maintenance reports are not current.

2 **Parameter:** ShelterCleanNotes

The shelter is in fair condition, The shelter floor has missing and crumbled tiles.

EEMS Spot Report

Data Compiled: 8/11/2020 17:33:25

SiteVisitDate	Site	Technician
06/17/2020	LRL117	Korey Devins

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.98615	unitless	**P**
2	Ozone Intercept	P	0	5	4	-0.35395	ppb	**P**
3	Ozone correlation	P	0	0.995	4	1.00000	unitless	**P**
4	Ozone % difference avg	P	7	10	4	2.5	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	-0.27	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.56	ppb	**P**

EEMS Spot Report

Data Compiled: 8/11/2020 17:20:55

SiteVisitDate	Site	Technician
06/03/2020	NEC602	Martin Valvur

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.98551	unitless	**P**
2	Ozone Intercept	P	0	5	4	-0.60777	ppb	**P**
3	Ozone correlation	P	0	0.995	4	0.99989	unitless	**P**
4	Ozone % difference avg	P	7	10	4	4.3	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	0.30	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-1.39	ppb	**P**

EEMS Spot Report

Data Compiled: 8/11/2020 17:39:22

SiteVisitDate	Site	Technician
06/23/2020	PRK134	Korey Devins

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.96157	unitless	**P**
2	Ozone Intercept	P	0	5	4	-1.39677	ppb	**P**
3	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
4	Ozone % difference avg	P	7	10	4	8.4	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	-1.26	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-2.00	ppb	**Fail**

EEMS Spot Report

Data Compiled: 8/11/2020 17:27:20

SiteVisitDate	Site	Technician
06/16/2020	SHN418	Korey Devins

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.96769	unitless	**P**
2	Ozone Intercept	P	0	5	4	-0.13372	ppb	**P**
3	Ozone correlation	P	0	0.995	4	1.00000	unitless	**P**
4	Ozone % difference avg	P	7	10	4	3.7	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	-0.04	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.66	ppb	**P**

APPENDIX C

CASTNET Ozone Performance Evaluation Forms

Site Inventory by Site Visit

Site Visit Date		*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
BAS601-Martin Valvur-06/02/2020						
1	6/2/2020	DAS	Campbell	none	CR1000	41006
2	6/2/2020	Ozone	ThermoElectron Inc	L0534684	49i A1NAA	1214552973
3	6/2/2020	Ozone Standard	ThermoElectron Inc	none	49i E3CAA	1214552971
4	6/2/2020	Zero air pump	Thomas	none	107CAB18	100800033636

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1214552973	BAS601	Martin Valvur	06/02/2020	Ozone	L0534684

Slope:	1.00369	**Slope:**	0.00000
Intercept	-0.20488	**Intercept**	0.00000
CorrCoff:	0.99998	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00260	**Intercept**	0.03590
Cert Date	1/14/2020	**CorrCoff**	0.99999

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.11	0.07	0.17	ppb		0.1
primary	2	15.07	14.99	14.83	ppb		-0.16
primary	3	35.91	35.78	35.55	ppb	-0.64	
primary	4	65.11	64.90	64.51	ppb	-0.6	
primary	5	116.23	115.89	116.40	ppb	0.44	

Sensor Component	Condition	Status
Audit Pressure	663.5 mmHg	pass
Sample Train	Good	pass
Minimum distance from road met	True	pass
Inlet Filter Condition	Moderately clean	pass
26.6 degree unobstructed rule	True	pass
Tree dewline >10m or below inlet	True	pass
Offset	0.1	pass
Span	1.009	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	106.2 kHz	pass
Cell A Noise	0.8 ppb	pass
Cell A Flow	0.66 lpm	pass
Cell A Pressure	649.8 mmHg	pass
Cell A Tmp.	31.0 C	pass
Cell B Freq.	71.6 kHz	pass
Cell B Noise	1.0 ppb	pass
Cell B Flow	0.69 lpm	pass
Cell B Pressure	649.2 mmHg	pass
Line Loss	Not tested	pass
System Memo		pass

Site Inventory by Site Visit

Site Visit Date		*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
NEC602-Martin Valvur-06/03/2020						
1	6/3/2020	DAS	Campbell	none	CR1000	41007
2	6/3/2020	Ozone	ThermoElectron Inc	none	49i A1NAA	1214552974
3	6/3/2020	Ozone Standard	ThermoElectron Inc	L0534683	49i E3CAA	1214552972
4	6/3/2020	Zero air pump	Thomas	none	107CAB18	051400047325

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1214552974	NEC602	Martin Valvur	06/03/2020	Ozone	none

Slope:	0.98551	**Slope:**	0.00000
Intercept	-0.60777	**Intercept**	0.00000
CorrCoff:	0.99989	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00260	**Intercept**	0.03590
Cert Date	1/14/2020	**CorrCoff**	0.99999

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.13	0.09	0.39	ppb		0.3
primary	2	16.67	16.59	15.20	ppb		-1.39
primary	3	37.45	37.31	35.84	ppb	-4.02	
primary	4	64.86	64.65	62.59	ppb	-3.24	
primary	5	115.75	115.41	113.60	ppb	-1.58	

Sensor Component	Condition	Status
Audit Pressure	640.0 mmHg	pass
Sample Train	Good	pass
Minimum distance from road met	True	pass
Inlet Filter Condition	Clean	pass
26.6 degree unobstructed rule	True	pass
Tree dewline >10m or below inlet	True	pass
Offset	0.1	pass
Span	1.005	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	96.2 kHz	pass
Cell A Noise	0.9 ppb	pass
Cell A Flow	0.66 lpm	pass
Cell A Pressure	627.4 mmHg	pass
Cell A Tmp.	30.5 C	pass
Cell B Freq.	84.5 kHz	pass
Cell B Noise	1.0 ppb	pass
Cell B Flow	0.68 lpm	pass
Cell B Pressure	627.1 mmHg	pass
Line Loss	Not tested	pass
System Memo		pass

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
SHN418-Korey Devins-06/16/2020						
1	6/16/2020	DAS	Environmental Sys Corp	90658	8816	2643
2	6/16/2020	Ozone	ThermoElectron Inc	none	49i A3NAA	0903334535
3	6/16/2020	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	1030745083
4	6/16/2020	Zero air pump	Werther International	none	C 70/4	000855578

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	0903334535	SHN418	Korey Devins	06/16/2020	Ozone	none

Slope:	0.96769	**Slope:**	0.00000
Intercept	-0.13372	**Intercept**	0.00000
CorrCoff:	1.00000	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180030022	**Tfer Desc.**	Ozone primary stan
Tfer ID	01114		
Slope	0.99950	**Intercept**	0.29010
Cert Date	1/14/2020	**CorrCoff**	0.99999

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.51	0.22	0.18	ppb		-0.04
primary	2	15.78	15.49	14.83	ppb		-0.66
primary	3	35.13	34.85	33.52	ppb	-3.89	
primary	4	66.55	66.29	63.94	ppb	-3.61	
primary	5	111.83	111.59	107.92	ppb	-3.34	

Sensor Component	Condition	Status
Audit Pressure	677.5 mmHg	pass
Sample Train	Good	pass
Minimum distance from road met	True	pass
Inlet Filter Condition	Clean	pass
26.6 degree unobstructed rule	True	pass
Tree dewline >10m or below inlet	True	pass
Offset	-0.2	pass
Span	0.981	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	73.8 kHz	pass
Cell A Noise	1.6 ppb	pass
Cell A Flow	0.72 lpm	pass
Cell A Pressure	667.8 mmHg	pass
Cell A Tmp.	34.2 C	pass
Cell B Freq.	111.4 kHz	pass
Cell B Noise	1.8 ppb	pass
Cell B Flow	0.71 lpm	pass
Cell B Pressure	668.1 mmHg	pass
Line Loss	Not tested	pass
System Memo		pass

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
LRL117-Korey Devins-06/17/2020						
1	6/17/2020	DAS	Campbell	000344	CR300	2123
2	6/17/2020	Ozone	ThermoElectron Inc	000701	49i A1NAA	1030244808
3	6/17/2020	Ozone Standard	ThermoElectron Inc	000444	49i A3NAA	CM08200020
4	6/17/2020	Zero air pump	Werther International	06904	C 70/4	000821901

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244808	LRL117	Korey Devins	06/17/2020	Ozone	000701

Slope:	0.98615	**Slope:**	0.00000
Intercept	-0.35395	**Intercept**	0.00000
CorrCoff:	1.00000	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180030022	**Tfer Desc.**	Ozone primary stan
Tfer ID	01114		
Slope	0.99950	**Intercept**	0.29010
Cert Date	1/14/2020	**CorrCoff**	0.99999

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.45	0.15	-0.12	ppb		-0.27
primary	2	15.38	15.09	14.53	ppb		-0.56
primary	3	34.17	33.89	33.05	ppb	-2.51	
primary	4	67.48	67.22	65.74	ppb	-2.23	
primary	5	111.31	111.07	109.30	ppb	-1.61	

Sensor Component	Condition	Status
Audit Pressure	714.4 mmHg	pass
Sample Train	Good	pass
Minimum distance from road met	True	pass
Inlet Filter Condition	Clean	pass
26.6 degree unobstructed rule	True	pass
Tree dewline >10m or below inlet	True	pass
Offset	-0.1	pass
Span	1.011	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	131.0 kHz	pass
Cell A Noise	0.9 ppb	pass
Cell A Flow	0.64 lpm	pass
Cell A Pressure	698.5 mmHg	pass
Cell A Tmp.	34.4 C	pass
Cell B Freq.	90.6 kHz	pass
Cell B Noise	0.9 ppb	pass
Cell B Flow	0.68 lpm	pass
Cell B Pressure	699.4 mmHg	pass
Line Loss	Not tested	pass
System Memo		pass

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
PRK134-Korey Devins-06/23/2020						
1	6/23/2020	DAS	Campbell	000411	CR3000	2509
2	6/23/2020	Ozone	ThermoElectron Inc	000693	49i A1NAA	1030244806
3	6/23/2020	Ozone Standard	ThermoElectron Inc	000440	49i A3NAA	CM08200016
4	6/23/2020	Zero air pump	Werther International	06905	C 70/4	000821907

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244806	PRK134	Korey Devins	06/23/2020	Ozone	000693

Slope:	0.96157	**Slope:**	0.00000
Intercept	-1.39677	**Intercept**	0.00000
CorrCoff:	0.99999	**CorrCoff:**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180030022	**Tfer Desc.**	Ozone primary stan
Tfer ID	01114		
Slope	0.99950	**Intercept**	0.29010
Cert Date	1/14/2020	**CorrCoff**	0.99999

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.36	0.06	-1.20	ppb		-1.26
primary	2	14.01	13.72	11.72	ppb		-2
primary	3	34.40	34.12	31.44	ppb	-8.18	
primary	4	67.55	67.29	63.07	ppb	-6.47	
primary	5	109.80	109.56	104.10	ppb	-5.11	

Sensor Component	Condition	Status
Audit Pressure	716.5 mmHg	pass
Sample Train	Good	pass
Minimum distance from road met	True	pass
Inlet Filter Condition	Moderately clean	pass
26.6 degree unobstructed rule	True	pass
Tree dewline >10m or below inlet	True	pass
Offset	0.000	pass
Span	1.008	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	94.7 kHz	pass
Cell A Noise	0.8 ppb	pass
Cell A Flow	0.70 lpm	pass
Cell A Pressure	697.2 mmHg	pass
Cell A Tmp.	36.5 C	pass
Cell B Freq.	95.9 kHz	pass
Cell B Noise	0.8 ppb	pass
Cell B Flow	0.61 lpm	pass
Cell B Pressure	698.1 mmHg	pass
Line Loss	Not tested	pass
System Memo		pass