2019 – 1st 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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April 2019

Table of Contents

List of Appendices

List of Tables

List of Acronyms and Abbreviations

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

1.0 CASTNET Quarterly Report

1.1 Introduction

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

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

CASTNET pollutant flux estimates are calculated as the aggregate product of weekly measured chemical concentrations and model-estimated deposition velocities. 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.

As of December 2018, the network is comprised of 95 active rural sampling sites across the United States and Canada, cooperatively operated by the Environmental Protection Agency (EPA), the National Park Service (NPS), Environment and Climate Change Canada (ECCC), Bureau of Land Management – Wyoming State Office (BLM-WSO) and several independent partners. Wood is responsible for operating the EPA and ECCC sponsored sites, and Air Resource Specialist, 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 evaluated variables are consistent with the accuracy goals as defined in the CASTNET Quality Assurance Project Plan (QAPP). The parameter specific accuracy goals are presented in Table 1. Two EPA sponsored sites that are operated by Wood continue to operate meteorological sensors. Those sites are BEL116 and BVL130. PND165 and four sites sponsored by BLM-WSO also operate meteorological sensors. The NPS operates meteorological sensors at many of their air quality monitoring sites. No meteorological sensors other than temperature were audited during this reporting period.

Some or all of the additional monitored variables, NOy, CO, and SO_2 have been added to the EPA sponsored sites BVL130, HWF187, PND165, PNF126, GRS420, MAC426, and ROM206. None of those variables were audited during this reporting period.

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
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

Sensor	Parameter	Audit Challenge	Acceptance Criteria
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
DAS	Accuracy	Comparison with certified standard	≤ ± 0.003 VDC

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

Site systems audits are intended to provide a qualitative appraisal of the total measurement system. Site planning, organization, and operation are evaluated to ensure that good Quality Assurance/Quality Control (QA/QC) practices are being applied. At a minimum the following audit issues were addressed at each site systems audit:

- Site locations and configurations match those provided in the CASTNET QAPP.
- Meteorological instruments are in good physical and operational condition and are sited to meet EPA ambient monitoring guidelines (EPA-600/4-82-060).
- Sites are accessible, orderly, and if applicable, compliant with OSHA safety standards.
- Sampling lines are free of leaks, kinks, visible contamination, weathering, and moisture.
- Site shelters provide adequate temperature control.
- All ambient air quality instruments are functional, being operated in the appropriate range, and the zero air supply desiccant is unsaturated.
- All instruments are in current calibration.
- Site documentation (maintenance schedules, on-site SOPs, etc.) is current and log book records are complete.
- All maintenance and on-site SOPs are performed on schedule.

- Corrective actions are documented and appropriate for required maintenance/repair activity.
- Site operators demonstrate an adequate knowledge and ability to perform required site activities, including documentation and maintenance activities.

1.3 CASTNET Sites Visited First Quarter 2019

This report consists of the systems and performance and other audit results from the CASTNET sites visited during the first quarter (January through March) of 2019. The locations and dates of the site visits for complete audits are presented in Table 2.

Table 2. Site Audit Visits

Side ID	Audit Type	Sponsor	Site Visit Date	Station Name
ALC188	FSA	EPA	2/25/2019	Alabama-Coushatta
ALC188	O_3 PE	EPA	2/25/2019	Alabama-Coushatta
ALC188	Flow	EPA	2/25/2019	Alabama-Coushatta
BBE401	FSA	NPS	2/27/2019	Big Bend National Park – K-Bar
BBE401	O_3 PE	NPS	2/27/2019	Big Bend National Park – K-Bar
BBE401	Flow	NPS	2/27/2019	Big Bend National Park – K-Bar
PAL190	FSA	EPA	3/1/2019	Palo Duro
PAL190	O_3 PE	EPA	3/1/2019	Palo Duro
PAL190	Flow	EPA	3/1/2019	Palo Duro
EVE419	FSA	NPS	3/19/2019	Everglades NP
EVE419	Flow	NPS	3/19/2019	Everglades NP

In addition to the sites listed in Table 2 that were visited for complete audits, the sites listed in Table 3 were visited to conduct Through-The-Probe (TTP) pollutant Performance Evaluations (PE).

Table 3. TTP Pollutant PE Visits

Side ID	PE Audit Type	Sponsor	Site Visit Date	Station Name
IRL141	O_3	EPA	3/19/2019	Indian River Lagoon
GAS153	O_3	EPA	3/26/2019	Georgia Station
SUM156	O_3	EPA	3/26/2019	Sumatra

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 systems report where necessary. Copies of the spot reports that were sent immediately 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.*

2.0 NADP Quarterly Report

2.1 Introduction

The National Atmospheric Deposition Program (NADP) operates three precipitation chemistry networks and two atmospheric concentration networks. The National Trends Network (NTN) has been measuring acidic precipitation since 1978. The network currently has more than 250 sites. The Atmospheric Integrated Research Monitoring Network (AIRMoN) began operation in 1992 and currently measures event based precipitation events at 3 sites. The Mercury Deposition Network (MDN) measures total mercury in precipitation samples from more than 120 stations. The MDN began operation in 1996 and includes sites throughout the US and Canada. The Atmospheric Mercury Network (AMNet) and the Ammonia Monitoring Network (AMoN) measure ambient concentrations of mercury and ammonia, respectively.

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

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

2.2 Project Objectives

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

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

2.3 NADP Sites Visited First Quarter 2019

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

Table 4. Sites Surveyed – First Quarter 2019

Side ID	Network	Visit Date	Station Name
TX41	AMoN	2/25/2019	Alabama-Coushatta
TX43	AMoN	3/1/2019	Canonceta
FL11	AMoN	3/19/2019	Everglades National Park – Research Center
FL19	AMoN	3/19/2019	Indian River
GA41	AMoN	3/26/2019	Georgia Station
FL23	AMoN	3/27/2019	Sumatra

2.4 Survey Results

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

Other items gathered during the surveys (i.e., photographs, Belfort charts, etc.) are uploaded to EEMS' server where the NADP PO and the U.S. EPA POs can access them and download them as needed by login into the server site.

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

APPENDIX A

CASTNET Audit Report Forms

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
ALC188-Martin Valvur-02/25/2019						
1	2/25/2019	Computer	Dell	07006	Inspiron 15	373MC12
2	2/25/2019	DAS	Campbell	000422	CR3000	2523
3	2/25/2019	Elevation	Elevation	None	1	None
4	2/25/2019	Filter pack flow pump	Thomas	02976	107CAB18	0493002475
5	2/25/2019	Flow Rate	Apex	000683	AXMC105LPMDPCV	illegible
6	2/25/2019	Infrastructure	Infrastructure	none	none	none
7	2/25/2019	Modem	Raven	06583	H4223-C	08443555843
8	2/25/2019	Ozone	ThermoElectron Inc	000745	49i A1NAA	1105347310
9	2/25/2019	Ozone Standard	ThermoElectron Inc	000694	49i A3NAA	1030244815
10	2/25/2019	Sample Tower	Aluma Tower	000136	B	none
11	2/25/2019	Shelter Temperature	Campbell	none	107-L	none
12	2/25/2019	Siting Criteria	Siting Criteria	None	1	None
13	2/25/2019	Temperature	RM Young	04942	41342	8894
14	2/25/2019	Zero air pump	Werther International	06878	C 70/4	000815254

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2523	ALC188	Martin Valvur	02/25/2019	DAS	Primary

Das Date: 2 /25/2019
Das Time: 8:46:00
Das Day: 56

Audit Date 2 /25/2019
Audit Time 8:46:00
Audit Day 56

Low Channel:

Avg Diff:	Max Diff:
0.0002	0.0004

High Channel:

Avg Diff:	Max Diff:
0.0002	0.0004

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	1/25/2019	**CorrCoff**	1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	-0.0002	-0.0003	V	V	-0.0001
7	0.1000	0.0997	0.0999	V	V	0.0002
7	0.3000	0.2997	0.2999	V	V	0.0002
7	0.5000	0.4996	0.5000	V	V	0.0004
7	0.7000	0.7002	0.7002	V	V	0.0000
7	0.9000	0.8996	0.8995	V	V	-0.0001
7	1.0000	1.0004	1.0002	V	V	-0.0002

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	ALC188	Martin Valvur	02/25/2019	Flow Rate	000683

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

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**	**Cal Factor Zero**	0
2.38%	2.60%			**Cal Factor Full Scale**	0
				Rotometer Reading:	1.55

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	0.01	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	1.541	1.540	1.55	0.000	1.51	l/m	l/m	-1.95%
primary	test pt 2	1.540	1.540	1.55	0.000	1.50	l/m	l/m	-2.60%
primary	test pt 3	1.542	1.540	1.55	0.000	1.50	l/m	l/m	-2.60%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	4.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	190 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347310	ALC188	Martin Valvur	02/25/2019	Ozone	000745

Slope:	0.96029	**Slope:**	0.00000
Intercept	0.55012	**Intercept**	0.00000
CorrCoff	0.99988	**CorrCoff**	0.00000

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

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.20	0.19	1.03	ppb		0.84
primary	2	14.94	14.91	14.57	ppb		-0.34
primary	3	32.56	32.50	31.15	ppb	-4.24	
primary	4	67.13	67.02	65.91	ppb	-1.67	
primary	5	109.98	109.80	105.60	ppb	-3.9	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	-0.7	pass
Span	1.034	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	105.8 kHz	pass
Cell A Noise	1.0 ppb	pass
Cell A Flow	0.57 lpm	pass
Cell A Pressure	727.0 mmHg	pass
Cell A Tmp.	32.9 C	pass
Cell B Freq.	93.9 kHz	pass
Cell B Noise	1.0 ppb	pass
Cell B Flow	0.67 lpm	pass
Cell B Pressure	726.4 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	8894	ALC188	Martin Valvur	02/25/2019	Temperature	04942

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

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.26	0.42		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.15	0.16	0.000	0.0	C	-0.15
primary	Temp Mid Range	23.23	23.24	0.000	23.0	C	-0.22
primary	Temp High Range	46.22	46.23	0.000	45.8	C	-0.42

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

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	ALC188	Martin Valvur	02/25/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.93	0.96		

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	23.53	23.54	0.000	22.6	C	-0.92
primary	Temp Mid Range	23.44	23.45	0.000	22.5	C	-0.92
primary	Temp Mid Range	23.74	23.75	0.000	22.8	C	-0.96

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	Technician	Site Visit Date
ALC188	Martin Valvur	02/25/2019

Shelter Make	Shelter Model	Shelter Size
Shelter One	8128-2311	1024 cuft

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

Field Systems Comments

1 **Parameter:** SitingCriteriaCom

The site is well located with respect to CASTNET siting criteria, however there is a small campground 0.5 km to the northwest which may be a source of smoke.

2 **Parameter:** ShelterCleanNotes

The site is clean and neat.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	ALC188	**Technician**	Martin Valvur	**Site Visit Date**	02/25/2019

Site Sponsor (agency)	EPA	**USGS Map**	Dallardsville
Operating Group	Alabama-Coushatta Environmental Gr	**Map Scale**	
AQS #	48-373-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	30.4210
Deposition Measurement	dry	**QAPP Longitude**	-94.4045
Land Use	woodland - mixed	**QAPP Elevation Meters**	101
Terrain	gently rolling	**QAPP Declination**	3.8
Conforms to MLM	Yes	**QAPP Declination Date**	9/16/2005
Site Telephone	(936) 563-2973	**Audit Latitude**	30.701577
Site Address 1	Poncho Rd.	**Audit Longitude**	-94.674011
Site Address 2	571 Park Rd. 56	**Audit Elevation**	105
County	Polk	**Audit Declination**	2.5
City, State	Livingston, TX		
Zip Code	77351	**Fire Extinguisher** ☑	New in 2015
Time Zone	Central	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☑	
Primary Op. Phone #		**Safety Hard Hat** ☑	
Primary Op. E-mail		**Climbing Belt** ☑	
Backup Operator		**Security Fence** ☑	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Step** ☑	

Shelter Working Room	☑	**Make**	Shelter One	**Model**	8128-2311	**Shelter Size**	1024 cuft
Shelter Clean	☑	**Notes**	The site is clean and neat.				
Site OK	☑	**Notes**					

Driving Directions

From Livingston proceed east on route 190 approximately 16 miles. Turn right (south) onto Park Road 56 at the sign for Alabama-Coushatta Tribe and the Indain Village. Continue past the facility and campground by the small lake on the left. Just past the campground entrance, turn left onto a dirt road. Continue approximately 0.6 miles bearing right at the first fork and left at the second. You will see the site in the clearing.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID ALC188 **Technician** Martin Valvur **Site Visit Date** 02/25/2019

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

Siting Distances OK ☑

Siting Criteria Comment

The site is well located with respect to CASTNET siting criteria, however there is a small campground 0.5 km to the northwest which may be a source of smoke.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	ALC188	Technician	Martin Valvur	Site Visit Date	02/25/2019

1	Are wind speed and direction sensors sited so as to avoid being influenced by obstructions?	☑	N/A
2	Are wind sensors mounted so as to minimize tower effects? (i.e. wind sensors should be mounted atop the tower or on a horizontally extended boom >2x the max diameter of the tower into the prevailing wind)	☑	N/A
3	Are the tower and sensors plumb?	☑	N/A
4	Are the temperature shields pointed north or positioned to avoid radiated heat sources such as buildings, walls, etc?	☐	Temperature sensor facing 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:

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	ALC188	Technician	Martin Valvur	Site Visit Date	02/25/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	ALC188	Technician	Martin Valvur	Site Visit Date	02/25/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 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
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 ALC188 **Technician** Martin Valvur **Site Visit Date** 02/25/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

		Stable	Grounded
9	Is the met tower stable and grounded?	☐	☐
10	Is the sample tower stable and grounded?	☑	☑
11	Tower comments?	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 ALC188 **Technician** Martin Valvur **Site Visit Date** 02/25/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑		☑
SSRF	☑		☑
Site Ops Manual	☑	Oct 2011	☑
HASP	☑	Oct 2014	☑
Field Ops Manual	☐		☐
Calibration Reports	☑		☑
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedul	☑		☐

1	Is the station log properly completed during every site visit?	☑	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 ALC188 **Technician** Martin Valvur **Site Visit Date** 02/25/2019

Site operation procedures

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID ALC188 **Technician** Martin Valvur **Site Visit Date** 02/25/2019

Site operation procedures

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

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

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

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

Site ID ALC188 **Technician** Martin Valvur **Site Visit Date** 02/25/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	373MC12	07006
DAS	Campbell	CR3000	2523	000422
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	0493002475	02976
Flow Rate	Apex	AXMC105LPMDPC	illegible	000683
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4223-C	08443555843	06583
Ozone	ThermoElectron Inc	49i A1NAA	1105347310	000745
Ozone Standard	ThermoElectron Inc	49i A3NAA	1030244815	000694
Sample Tower	Aluma Tower	B	none	000136
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	8894	04942
Zero air pump	Werther International	C 70/4	000815254	06878

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
BBE401-Martin Valvur-02/27/2019						
1	2/27/2019	Computer	Hewlett Packard	none	6730b	CNU9335N72
2	2/27/2019	DAS	Environmental Sys Corp	90767	8816	4592
3	2/27/2019	Elevation	Elevation	None	1	None
4	2/27/2019	Filter pack flow pump	Thomas	none	107CA18	0688001784
5	2/27/2019	Flow Rate	Alicat	none	Unknown	Unknown
6	2/27/2019	Infrastructure	Infrastructure	none	none	none
7	2/27/2019	Mainframe	Climatronics	01847	100081	1426
8	2/27/2019	Mainframe power supply	Climatronics	none	101074	unknown
9	2/27/2019	Modem	US Robotics	none	56k	22SBB9FA71K4
10	2/27/2019	Ozone	ThermoElectron Inc	90517	49C	49C-58468-318
11	2/27/2019	Ozone Standard	ThermoElectron Inc	90831	49C	0520012325
12	2/27/2019	Printer	Hewlett Packard	none	842C	unknown
13	2/27/2019	Sample Tower	Aluma Tower	none	B	AT-5381-F9-1
14	2/27/2019	Shelter Temperature	ARS	none	none	none
15	2/27/2019	Siting Criteria	Siting Criteria	None	1	None
16	2/27/2019	Temperature2meter	RM Young	none	41342VC	14961
17	2/27/2019	Zero air pump	Twin Tower Engineering	none	TT70/4E	526293

DAS Data Form

DAS Time Max Error: 1.85

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	4592	BBE401	Martin Valvur	02/27/2019	DAS	Primary

Das Date: 2 /27/2019 **Audit Date** 2 /27/2019
Das Time: 8:25:00 **Audit Time** 8:26:51
Das Day: 58 **Audit Day** 58

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

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
14	0.0000	-0.0003	-0.0003	V	V	0.0000
14	0.1000	0.0999	0.0997	V	V	-0.0002
14	0.3000	0.2998	0.2999	V	V	0.0001
14	0.5000	0.5001	0.4998	V	V	-0.0003
14	0.7000	0.7000	0.7002	V	V	0.0002
14	0.9000	0.8999	0.9000	V	V	0.0001
14	1.0000	1.0000	1.0001	V	V	0.0001

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Alicat	Unknown	BBE401	Martin Valvur	02/27/2019	Flow Rate	none

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

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**	**Cal Factor Zero**	0.016
0.69%	0.81%			**Cal Factor Full Scale**	5.017
				Rotometer Reading:	3.3

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	-0.03	0.0000	0.02	l/m	l/m	
primary	leak check	0.000	0.000	-0.01	0.0000	0.02	l/m	l/m	
primary	test pt 1	2.983	2.980	2.99	0.0000	3.00	l/m	l/m	0.81%
primary	test pt 2	2.984	2.980	2.99	0.0000	3.00	l/m	l/m	0.77%
primary	test pt 3	2.997	2.990	2.99	0.0000	3.01	l/m	l/m	0.50%

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

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	49C-58468-318	BBE401	Martin Valvur	02/27/2019	Ozone	90517

Slope:	0.99057	**Slope:**	0.00000
Intercept	0.23958	**Intercept**	0.00000
CorrCoff	0.99999	**CorrCoff**	0.00000

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

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.30	0.29	0.85	ppb		0.56
primary	2	16.31	16.27	16.05	ppb		-0.22
primary	3	35.71	35.64	35.43	ppb	-0.59	
primary	4	65.23	65.12	64.79	ppb	-0.51	
primary	5	116.90	116.71	115.90	ppb	-0.7	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.10	pass
Span	0.995	pass
Zero Voltage	0.0015	pass
Fullscale Voltage	1.0018	pass
Cell A Freq.	101.3 kHz	pass
Cell A Noise	0.5 ppb	pass
Cell A Flow	0.58 lpm	pass
Cell A Pressure	661.3 mmHg	pass
Cell A Tmp.	36.8 C	pass
Cell B Freq.	85.7 kHz	pass
Cell B Noise	0.4 ppb	pass
Cell B Flow	0.60 lpm	pass
Cell B Pressure	661.2 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	14961	BBE401	Martin Valvur	02/27/2019	Temperature2meter	none

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

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.26	0.29		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	0.09	0.10	0.0000	0.37	C	0.27
primary	Temp Mid Rang	25.08	25.09	0.0000	25.38	C	0.29
primary	Temp High Rang	47.35	47.36	0.0000	47.57	C	0.21

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

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	BBE401	Martin Valvur	02/27/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.66	1.08		

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	17.78	17.79	0.000	18.9	C	1.08
primary	Temp Mid Range	20.30	20.31	0.000	19.8	C	-0.54
primary	Temp Mid Range	21.68	21.69	0.000	22.0	C	0.35

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	BBE401	Technician	Martin Valvur	Site Visit Date	02/27/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8814	896 cuft

Sensor Component		Condition		Status	
Sensor Component	Sample Tower Type	Condition	Type B	Status	pass
Sensor Component	Conduit	Condition	Good	Status	pass
Sensor Component	Met Tower	Condition	Good	Status	pass
Sensor Component	Moisture Trap	Condition	Installed	Status	pass
Sensor Component	Power Cables	Condition	Good	Status	pass
Sensor Component	Shelter Temp Control	Condition	Functioning	Status	pass
Sensor Component	Rotometer	Condition	Installed	Status	pass
Sensor Component	Sample Tower	Condition	Good	Status	pass
Sensor Component	Shelter Condition	Condition	Good	Status	pass
Sensor Component	Shelter Door	Condition	Good	Status	pass
Sensor Component	Shelter Roof	Condition	Good	Status	pass
Sensor Component	Shelter Floor	Condition	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:** SiteOpsProcedures

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

2 **Parameter:** ShelterCleanNotes

The shelter is clean, neat, and well organized.

3 **Parameter:** MetSensorComme

The two meter temperature sensor has been moved from 1.6 to 2.0 meters above the ground.

4 **Parameter:** MetOpMaintCom

The signal cables have been replaced since the previous audit visit.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	BBE401	**Technician**	Martin Valvur	**Site Visit Date**	02/27/2019

Site Sponsor (agency)	NPS/EPA	**USGS Map**	Panther Junction
Operating Group	NPS	**Map Scale**	
AQS #	48-043-0101	**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone, IMPROVE, PM2.5	**QAPP Latitude**	29.3022
Deposition Measurement	dry, wet	**QAPP Longitude**	-103.1772
Land Use	desert	**QAPP Elevation Meters**	1052
Terrain	complex	**QAPP Declination**	
Conforms to MLM	Marginally	**QAPP Declination Date**	
Site Telephone	(432) 477-2258	**Audit Latitude**	29.302651
Site Address 1	K-Bar Ranch	**Audit Longitude**	-103.177813
Site Address 2	Big Bend National Park	**Audit Elevation**	1057
County	Brewster	**Audit Declination**	7.0
City, State	Big Bend National Park, TX		
Zip Code	79834	**Fire Extinguisher** ☑	Inspected April 2018
Time Zone	Central	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☐	
Primary Op. Phone #		**Safety Hard Hat** ☐	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Step** ☑	

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

Driving Directions

From interstate 10 in Fort Stockton, turn south on highway 385 and drive approximately 120 miles to Big Bend National Park. Continue on the park road past the entrance station 26 miles to the stop sign at Panther Junction near the visitor center. Turn left (east) and continue approximately 2.5 miles. Turn left on the dirt road marked K-Bar and continue approximately 0.5 miles. Turn right on the service road just past the Chihuahuan Desert Research Station (old house) on the right. The site is 400 meters at the end of the road.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID BBE401 **Technician** Martin Valvur **Site Visit Date** 02/27/2019

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

Siting Distances OK ☑

Siting Criteria Comment

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID BBE401 **Technician** Martin Valvur **Site Visit Date** 02/27/2019

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

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

The two meter temperature sensor has been moved from 1.6 to 2.0 meters above the ground.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID BBE401 **Technician** Martin Valvur **Site Visit Date** 02/27/2019

1	**Do all the meterological sensors appear to be intact, in good condition, and well maintained?**	☑	Temperature only
2	**Are all the meteorological sensors operational online, and reporting data?**	☑	Temperature only
3	**Are the shields for the temperature and RH sensors clean?**	☑	Temperature only
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:

The signal cables have been replaced since the previous audit visit.

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID BBE401 **Technician** Martin Valvur **Site Visit Date** 02/27/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID BBE401 **Technician** Martin Valvur **Site Visit Date** 02/27/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	BBE401	Technician	Martin Valvur	Site Visit Date	02/27/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID BBE401 **Technician** Martin Valvur **Site Visit Date** 02/27/2019

Site operation procedures

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

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

QC Check Performed		Frequency	Compliant
Multipoint Calibrations	☑	Semiannually	☑
Visual Inspections	☑	Weekly	☑
Translator Zero/Span Tests (climatronics)	☑	Weekly	☑
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	☑	Monthly	☑
Analyzer Diagnostics Tests	☐	Alarm values only	☑
In-line Filter Replacement (at inlet)	☑	Every 2 weeks	☑
In-line Filter Replacement (at analyze	☑	N/A	☑
Sample Line Check for Dirt/Water	☐		☐
Zero Air Desiccant Check	☐		☐

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID BBE401 **Technician** Martin Valvur **Site Visit Date** 02/27/2019

Site operation procedures

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

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

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

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

Site ID BBE401 **Technician** Martin Valvur **Site Visit Date** 02/27/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	6730b	CNU9335N72	none
DAS	Environmental Sys Corp	8816	4592	90767
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	0688001784	none
Flow Rate	Alicat	Unknown	Unknown	none
Infrastructure	Infrastructure	none	none	none
Mainframe	Climatronics	100081	1426	01847
Mainframe power supply	Climatronics	101074	unknown	none
Modem	US Robotics	56k	22SBB9FA71K4	none
Ozone	ThermoElectron Inc	49C	49C-58468-318	90517
Ozone Standard	ThermoElectron Inc	49C	0520012325	90831
Printer	Hewlett Packard	842C	unknown	none
Sample Tower	Aluma Tower	B	AT-5381-F9-1	none
Shelter Temperature	ARS	none	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature2meter	RM Young	41342VC	14961	none
Zero air pump	Twin Tower Engineering	TT70/4E	526293	none

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
PAL190-Martin Valvur-03/01/2019						
1	3/1/2019	Computer	Dell	07056	Inspiron 15	Unknown
2	3/1/2019	DAS	Campbell	000343	CR3000	2122
3	3/1/2019	Elevation	Elevation	None	1	None
4	3/1/2019	Filter pack flow pump	Thomas	02752	107CA110	11920011905
5	3/1/2019	Flow Rate	Apex	000654	AXMC105LPMDPCV	54774
6	3/1/2019	Infrastructure	Infrastructure	none	none	none
7	3/1/2019	Modem	Raven	06808	H4223-C	0934411667
8	3/1/2019	Ozone	ThermoElectron Inc	000613	49i A1NAA	1009241783
9	3/1/2019	Ozone Standard	ThermoElectron Inc	000735	49i A3NAA	0726124696
10	3/1/2019	Sample Tower	Aluma Tower	missing	B	AT-7200-582
11	3/1/2019	Shelter Temperature	Campbell	none	107-L	10755-148
12	3/1/2019	Siting Criteria	Siting Criteria	None	1	None
13	3/1/2019	Temperature	RM Young	06303	41342VO	12542
14	3/1/2019	Zero air pump	Werther International	06922	C 70/4	000836217

DAS Data Form

DAS Time Max Error: 1

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2122	PAL190	Martin Valvur	03/01/2019	DAS	Primary

Das Date: 3 /1 /2019
Das Time: 8:55:00
Das Day: 60

Audit Date 3 /1 /2019
Audit Time 8:56:00
Audit Day 60

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

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	1/25/2019	**CorrCoff**	1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0001	0.0002	V	V	0.0001
7	0.1000	0.0998	0.0998	V	V	0.0000
7	0.3000	0.2999	0.3001	V	V	0.0002
7	0.5000	0.4998	0.4999	V	V	0.0001
7	0.7000	0.6993	0.6995	V	V	0.0002
7	0.9000	0.8996	0.8995	V	V	-0.0001
7	1.0000	0.9993	0.9995	V	V	0.0002

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	54774	PAL190	Martin Valvur	03/01/2019	Flow Rate	000654

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

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**	**Cal Factor Zero**	0.05
0.55%	0.66%			**Cal Factor Full Scale**	1.04
				Rotometer Reading:	3.15

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	-0.03	0.000	0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.000	0.06	l/m	l/m	
primary	test pt 1	3.030	3.020	2.97	0.000	3.00	l/m	l/m	-0.66%
primary	test pt 2	3.020	3.010	2.98	0.000	3.00	l/m	l/m	-0.33%
primary	test pt 3	3.030	3.020	2.98	0.000	3.00	l/m	l/m	-0.66%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	0.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	200 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241783	PAL190	Martin Valvur	03/01/2019	Ozone	000613

Slope:	0.99603	**Slope:**	0.00000
Intercept	-0.33515	**Intercept**	0.00000
CorrCoff	0.99999	**CorrCoff**	0.00000

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

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.14	0.13	0.02	ppb		-0.11
primary	2	16.02	15.98	15.58	ppb		-0.4
primary	3	36.04	35.97	35.33	ppb	-1.8	
primary	4	65.10	64.99	64.14	ppb	-1.32	
primary	5	115.89	115.70	115.10	ppb	-0.52	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.40	pass
Span	1.009	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	88.4 kHz	pass
Cell A Noise	0.6 ppb	pass
Cell A Flow	0.60 lpm	pass
Cell A Pressure	651.8 mmHg	pass
Cell A Tmp.	29.8 C	pass
Cell B Freq.	83.6 kHz	pass
Cell B Noise	0.8 ppb	pass
Cell B Flow	0.62 lpm	pass
Cell B Pressure	651.3 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	12542	PAL190	Martin Valvur	03/01/2019	Temperature	06303

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

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.11	0.12	0.000	0.1	C	-0.04
primary	Temp Mid Range	23.39	23.40	0.000	23.4	C	-0.02
primary	Temp High Range	46.64	46.65	0.000	46.6	C	-0.04

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

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	10755-148	PAL190	Martin Valvur	03/01/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
1.66	1.99		

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	22.00	22.01	0.000	24.0	C	1.99
primary	Temp Mid Range	25.65	25.66	0.000	24.1	C	-1.55
primary	Temp Mid Range	25.35	25.36	0.000	23.9	C	-1.45

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	PAL190	Technician	Martin Valvur	Site Visit Date	03/01/2019

Shelter Make	Shelter Model	Shelter Size
Shelter One	E-8109-26012-2	720 cuft

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

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The ozone sample train is leak tested every two weeks.

2 **Parameter:** SitingCriteriaCom

The site is located 40 km southeast of Amarillo TX which has a population of approximately 178,000.

3 **Parameter:** ShelterCleanNotes

The shelter is in good condition.

4 **Parameter:** MetSensorComme

The meteorological tower and sensors have been removed.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	PAL190	**Technician**	Martin Valvur	**Site Visit Date**	03/01/2019

Site Sponsor (agency)	EPA	**USGS Map**	Fortress Cliff
Operating Group	TX A&M University	**Map Scale**	
AQS #	48-381-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	
Deposition Measurement	dry, wet	**QAPP Longitude**	
Land Use	agriculture	**QAPP Elevation Meters**	
Terrain	Complex	**QAPP Declination**	
Conforms to MLM	Marginally	**QAPP Declination Date**	
Site Telephone		**Audit Latitude**	34.88061
Site Address 1		**Audit Longitude**	-101.664703
Site Address 2		**Audit Elevation**	1053
County	Randall	**Audit Declination**	6.6
City, State	Canyon, TX		
Zip Code	79015	**Fire Extinguisher** ☑	No inspection date
Time Zone	Central	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☐	
Primary Op. Phone #		**Safety Hard Hat** ☑	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☑	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Step** ☑	

Shelter Working Room	☑	**Make**	Shelter One	**Model**	E-8109-26012-2	**Shelter Size**	720 cuft
Shelter Clean	☑	**Notes**	The shelter is in good condition.				
Site OK	☑	**Notes**					

Driving Directions

From I27 take exit 99 and go east on Hungate road to the first stop sign. Turn right (south) onto Eastern which is a dirt road. At the next intersection turn left (east) on Lawrence (also dirt). Continue and follow sharp left turn onto Pullman. Continue and follow sharp right turn onto game lands. Continue through two gates and past storage building. Site will be visible on the left.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID PAL190 **Technician** Martin Valvur **Site Visit Date** 03/01/2019

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

Siting Distances OK ☑

Siting Criteria Comment

The site is located 40 km southeast of Amarillo TX which has a population of approximately 178,000.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID PAL190 **Technician** Martin Valvur **Site Visit Date** 03/01/2019

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

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

The meteorological tower and sensors have been removed.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	PAL190	Technician	Martin Valvur	Site Visit Date	03/01/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	PAL190	Technician	Martin Valvur	Site Visit Date	03/01/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 15 meters
4	Describe dry dep sample tube.		3/8 teflon by 15 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	Flow line only
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	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 PAL190 **Technician** Martin Valvur **Site Visit Date** 03/01/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

		Stable	Grounded
9	Is the met tower stable and grounded?	☐	☐
10	Is the sample tower stable and grounded?	☑	☑
11	Tower comments?	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	PAL190	Technician	Martin Valvur	Site Visit Date	03/01/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID PAL190 **Technician** Martin Valvur **Site Visit Date** 03/01/2019

Site operation procedures

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

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

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

The ozone sample train is leak tested every two weeks.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID PAL190 **Technician** Martin Valvur **Site Visit Date** 03/01/2019

Site operation procedures

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

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

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

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

Site ID PAL190 **Technician** Martin Valvur **Site Visit Date** 03/01/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07056
DAS	Campbell	CR3000	2122	000343
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA110	11920011905	02752
Flow Rate	Apex	AXMC105LPMDPC	54774	000654
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4223-C	0934411667	06808
Ozone	ThermoElectron Inc	49i A1NAA	1009241783	000613
Ozone Standard	ThermoElectron Inc	49i A3NAA	0726124696	000735
Sample Tower	Aluma Tower	B	AT-7200-582	missing
Shelter Temperature	Campbell	107-L	10755-148	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VO	12542	06303
Zero air pump	Werther International	C 70/4	000836217	06922

Site Inventory by Site Visit

Site Visit Date		*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
EVE419-Sandy Grenville-03/19/2019						
1	3/19/2019	DAS	Environmental Sys Corp	90642	8816	2527
2	3/19/2019	Elevation	Elevation	None	1	None
3	3/19/2019	Filter pack flow pump	Thomas	none	107CAB18	081700057785
4	3/19/2019	Flow Rate	Alicat	none	MC-10SLPM-D-PCV	150339
5	3/19/2019	Infrastructure	Infrastructure	none	none	none
6	3/19/2019	Modem	US Robotics	none	56k	unknown
7	3/19/2019	Sample Tower	Aluma Tower	none	B	illegible
8	3/19/2019	Siting Criteria	Siting Criteria	None	1	None

DAS Data Form

DAS Time Max Error: 1.72

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	2527	EVE419	Sandy Grenville	03/19/2019	DAS	Primary

Das Date: 3 /19/2019
Das Time: 9:05:50
Das Day: 78

Audit Date 3 /19/2019
Audit Time 9:07:33
Audit Day 78

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	1/25/2019	**CorrCoff**	1.00000

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
8	0.0000	0.0000	0.0000	V	V	0.0000
8	0.1000	0.0999	0.0999	V	V	0.0000
8	0.3000	0.2997	0.2999	V	V	0.0002
8	0.5000	0.4996	0.4996	V	V	0.0000
8	0.7000	0.6995	0.6996	V	V	0.0001
8	0.9000	0.8994	0.8994	V	V	0.0000
8	1.0000	0.9993	0.9992	V	V	-0.0001

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Alicat	150339	EVE419	Sandy Grenville	03/19/2019	Flow Rate	none

Mfg	BIOS	**Parameter**	Flow Rate
Serial Number		**Tfer Desc.**	BIOS 530-H
Tfer ID	01414		
Slope	0.99332	**Intercept**	0.00935
Cert Date	2/8/2019	**CorrCoff**	0.99999

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Di**	**A Avg %Dif**	**A Max % Di**	**Cal Factor Zero**	-0.011
0.56%	0.79%			**Cal Factor Full Scale**	5.063
				Rotometer Reading:	3

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.00	0.0000	0.04	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.0000	0.03	l/m	l/m	
primary	test pt 1	3.006	3.020	2.98	0.0000	3.01	l/m	l/m	-0.46%
primary	test pt 2	3.008	3.020	2.98	0.0000	3.01	l/m	l/m	-0.43%
primary	test pt 3	3.015	3.030	2.98	0.0000	3.01	l/m	l/m	-0.79%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Poor	**Status**	Fail
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	See comments	**Status**	pass
Sensor Component	Filter Distance	**Condition**	6.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	-0.5 cm	**Status**	Fail
Sensor Component	Filter Azimuth	**Condition**	360 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Infrastructure Data For

Site ID	Technician	Site Visit Date
EVE419	Sandy Grenville	03/19/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810	640 cuft

Sensor Component	Condition	Status
Sample Tower Type	Type B	pass
Conduit	Good	pass
Met Tower	Fair	pass
Moisture Trap	Not 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	Fair	pass
Signal Cable	Good	pass
Tubing Type	3/8 teflon	pass
Sample Train	Good	pass

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	EVE419	**Technician**	Sandy Grenville	**Site Visit Date**	03/19/2019

Site Sponsor (agency)	NPS/EPA	**USGS Map**	Long Pine Key
Operating Group	NPS	**Map Scale**	
AQS #		**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer		**QAPP Latitude**	
Deposition Measurement	dry, wet, Hg, IMPROVE	**QAPP Longitude**	
Land Use	wetlands	**QAPP Elevation Meters**	
Terrain	flat	**QAPP Declination**	
Conforms to MLM	Yes	**QAPP Declination Date**	
Site Telephone	(305) 242-7838	**Audit Latitude**	25.391223
Site Address 1	Everglades National Park	**Audit Longitude**	-80.680819
Site Address 2	40001 State Road 9336	**Audit Elevation**	1
County	Dade	**Audit Declination**	-5.1
City, State	Homestead, FL		
Zip Code	33034	**Fire Extinguisher** ☑	Inspected July 2017
Time Zone	Eastern	**First Aid Kit** ☐	
Primary Operator		**Safety Glasses** ☐	
Primary Op. Phone #		**Safety Hard Hat** ☐	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Step** ☑	

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The shelter is very clean, neat and well organized. Repairs have been made since the previous audit.				
Site OK	☑	**Notes**					

Driving Directions

Take the Florida Turnpike (Rat 821) south to the end and junction with Rat 1. Continue south on Rat 1 about 1/4 mile to the intersection of East Palm Drive (Rat 9336). Turn right (west) on 9336 and continue to the park entrance. Check-in at the guard station. Take the Main Park Road to Long Pine Key Road. Turn left on Long Pine Key Rd. and continue to the research facility. The site is on the right at the fire station.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID EVE419 **Technician** Sandy Grenville **Site Visit Date** 03/19/2019

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

Siting Distances OK ☑

Siting Criteria Comment

Small parking lot for park employees and fire fighting equipment is within 100 meters of the site.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	EVE419	Technician	Sandy Grenville	Site Visit Date	03/19/2019

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

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

The 10 meter temperature sensor has been removed and temperature is now being measured using a combination RH/temperature sensor mounted in a naturally aspirated shield at approximately 2 meters above the ground. The temperature measurement system was not challenged with an audit standard.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID EVE419 **Technician** Sandy Grenville **Site Visit Date** 03/19/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	EVE419	Technician	Sandy Grenville	Site Visit Date	03/19/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		N/A
4	Describe dry dep sample tube.		3/8 teflon by 9 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☐	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?	☐	No moisture trap installed
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

The dry deposition flow controller was recently replaced by the site operator. It has not been calibrated onsite.

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID EVE419 **Technician** Sandy Grenville **Site Visit Date** 03/19/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

1	Do the DAS instruments appear to be in good condition and well maintained?	☑	
2	Are all the components of the DAS operational? (printers, modem, backup, etc)	☑	
3	Do the analyzer and sensor signal leads pass through lightning protection circuitry?	☑	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 EVE419 **Technician** Sandy Grenville **Site Visit Date** 03/19/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑	Dataview	☑
SSRF	☑		☑
Site Ops Manual	☑		☑
HASP	☐		☐
Field Ops Manual	☐		☐
Calibration Reports	☑	not current	☐
Ozone z/s/p Control Charts	☐	N/A	☑
Preventive maintenance schedul	☐		☐

1	Is the station log properly completed during every site visit?	☑	Dataview
2	Are the Site Status Report Forms being completed and current?	☑	Observations completed during filter off day
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:

Electronic checklists within Dataview for the dry deposition filter procedures are not completed during site visits.

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID EVE419 **Technician** Sandy Grenville **Site Visit Date** 03/19/2019

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID EVE419 **Technician** Sandy Grenville **Site Visit Date** 03/19/2019

Site operation procedures

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

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

Assistance was provided to the site operators regarding questions relating to the SSRF. The rationale and importance of properly recording the vegetation observations was discussed. Gloves were not used when changing the filter and the channels were not flagged as invalid when the tower was lowered.

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

Site ID EVE419 **Technician** Sandy Grenville **Site Visit Date** 03/19/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Environmental Sys Corp	8816	2527	90642
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	081700057785	none
Flow Rate	Alicat	MC-10SLPM-D-PC	150339	none
Infrastructure	Infrastructure	none	none	none
Modem	US Robotics	56k	unknown	none
Sample Tower	Aluma Tower	B	illegible	none
Siting Criteria	Siting Criteria	1	None	None

APPENDIX B

CASTNET Site Spot Report Forms

EEMS Spot Report

Data Compiled: 4/12/2019 8:19:08 AM

SiteVisitDate	Site	Technician
02/25/2019	ALC188	Martin Valvur

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	9	0.26	c	**P**
2	Temperature max error	P	4	0.5	9	0.42	c	**P**
3	Ozone Slope	P	0	1.1	4	0.96029	unitless	**P**
4	Ozone Intercept	P	0	5	4	0.55012	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99988	unitless	**P**
6	Ozone % difference avg	P	7	10	4	3.0	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	0.84	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.34	ppb	**P**
9	Flow Rate average % difference	P	10	5	3	2.38	%	**P**
10	Flow Rate max % difference	P	10	5	3	2.6	%	**P**
11	DAS Voltage average error	P	7	0.003	70	0.0002	V	**P**
12	Shelter Temperature average error	P	5	2	12	0.93	c	**P**
13	Shelter Temperature max error	P	5	2	12	0.96	c	**P**

SiteVisitDate	Site	Technician
02/25/2019	ALC188	Martin Valvur

Field Systems Comments

1 **Parameter:** SitingCriteriaCom

The site is well located with respect to CASTNET siting criteria, however there is a small campground 0.5 km to the northwest which may be a source of smoke.

2 **Parameter:** ShelterCleanNotes

The site is clean and neat.

EEMS Spot Report

Data Compiled: 4/12/2019 8:44:45 AM

SiteVisitDate	Site	Technician
02/27/2019	BBE401	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	0.26	c	**P**
2	Temperature2meter max error	P	5	0.5	3	0.29	c	**P**
3	Ozone Slope	P	0	1.1	4	0.99057	unitless	**P**
4	Ozone Intercept	P	0	5	4	0.23958	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
6	Ozone % difference avg	P	7	10	4	0.8	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	0.56	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.22	ppb	**P**
9	Flow Rate average % difference	P	10	5	3	0.69	%	**P**
10	Flow Rate max % difference	P	10	5	3	0.81	%	**P**
11	DAS Voltage average error	P	14	0.003	28	0.0001	V	**P**
12	Shelter Temperature average error	P	5	2	15	0.66	c	**P**
13	Shelter Temperature max error	P	5	2	15	1.08	c	**P**

SiteVisitDate	Site	Technician
02/27/2019	BBE401	Martin Valvur

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

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

2 **Parameter:** ShelterCleanNotes

The shelter is clean, neat, and well organized.

3 **Parameter:** MetSensorComme

The two meter temperature sensor has been moved from 1.6 to 2.0 meters above the ground.

4 **Parameter:** MetOpMaintCom

The signal cables have been replaced since the previous audit visit.

EEMS Spot Report

Data Compiled: 4/14/2019 8:51:59 PM

SiteVisitDate	Site	Technician
03/19/2019	EVE419	Sandy Grenville

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Flow Rate average % difference	P	10	5	3	0.56	%	**P**
2	Flow Rate max % difference	P	10	5	3	0.79	%	**P**
3	DAS Voltage average error	P	8	0.003	42	0.0001	V	**P**

SiteVisitDate	Site	Technician
03/19/2019	EVE419	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.

2 **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:** SiteOpsProcComm

Assistance was provided to the site operators regarding questions relating to the SSRF. The rationale and importance of properly recording the vegetation observations was discussed. Gloves were not used when changing the filter and the channels were not flagged as invalid when the tower was lowered.

2 **Parameter:** DocumentationCo

Electronic checklists within Dataview for the dry deposition filter procedures are not completed during site visits.

3 **Parameter:** SitingCriteriaCom

Small parking lot for park employees and fire fighting equipment is within 100 meters of the site.

4 **Parameter:** ShelterCleanNotes

The shelter is very clean, neat and well organized. Repairs have been made since the previous audit.

5 **Parameter:** PollAnalyzerCom

The dry deposition flow controller was recently replaced by the site operator. It has not been calibrated onsite.

6 **Parameter:** MetSensorComme

The 10 meter temperature sensor has been removed and temperature is now being measured using a combination RH/temperature sensor mounted in a naturally aspirated shield at approximately 2 meters above the ground. The temperature measurement system was not challenged with an audit standard.

EEMS Spot Report

Data Compiled: 4/15/2019 8:39:37 AM

SiteVisitDate	Site	Technician
03/26/2019	GAS153	Sandy Grenville

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.98742	unitless	**P**
2	Ozone Intercept	P	0	5	4	-1.85433	ppb	**P**
3	Ozone correlation	P	0	0.995	4	1.00000	unitless	**P**
4	Ozone % difference avg	P	7	10	4	6.7	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	-1.77	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-1.97	ppb	**Fail**

EEMS Spot Report

Data Compiled: 4/15/2019 8:33:30 AM

SiteVisitDate	Site	Technician
03/19/2019	IRL141	Sandy Grenville

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.00208	unitless	**P**
2	Ozone Intercept	P	0	5	4	-1.09943	ppb	**P**
3	Ozone correlation	P	0	0.995	4	1.00000	unitless	**P**
4	Ozone % difference avg	P	7	10	4	3.2	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	-1.07	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-1.12	ppb	**P**

EEMS Spot Report

Data Compiled: 4/14/2019 8:27:47 PM

SiteVisitDate	Site	Technician
03/01/2019	PAL190	Martin Valvur

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	18	0.03	c	**P**
2	Temperature max error	P	4	0.5	18	0.04	c	**P**
3	Ozone Slope	P	0	1.1	4	0.99603	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.33515	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
6	Ozone % difference avg	P	7	10	4	1.5	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-0.11	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.4	ppb	**P**
9	Flow Rate average % difference	P	10	5	6	0.55	%	**P**
10	Flow Rate max % difference	P	10	5	6	0.66	%	**P**
11	DAS Voltage average error	P	7	0.003	63	0.0001	V	**P**
12	Shelter Temperature average error	P	5	2	18	1.66	c	**P**
13	Shelter Temperature max error	P	5	2	18	1.99	c	**P**

SiteVisitDate	Site	Technician
03/01/2019	PAL190	Martin Valvur

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The ozone sample train is leak tested every two weeks.

2 **Parameter:** SitingCriteriaCom

The site is located 40 km southeast of Amarillo TX which has a population of approximately 178,000.

3 **Parameter:** ShelterCleanNotes

The shelter is in good condition.

4 **Parameter:** MetSensorComme

The meteorological tower and sensors have been removed.

EEMS Spot Report

Data Compiled: 4/15/2019 8:44:50 AM

SiteVisitDate	Site	Technician
03/27/2019	SUM156	Eric Hebert

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.02263	unitless	**P**
2	Ozone Intercept	P	0	5	4	-2.10227	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	-2.26	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-1.64	ppb	**Fail**

APPENDIX C

CASTNET Ozone Performance Evaluation Forms

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
IRL141-Sandy Grenville-03/19/2019						
1	3/19/2019	DAS	Campbell	000340	CR3000	2119
2	3/19/2019	Ozone	ThermoElectron Inc	000609	49i A1NAA	1009241782
3	3/19/2019	Ozone Standard	ThermoElectron Inc	000446	49i A3NAA	CM08200022
4	3/19/2019	Zero air pump	Werther International	06909	C 70/4	000829161

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241782	IRL141	Sandy Grenville	03/19/2019	Ozone	000609

Slope:	1.00208	**Slope:**	0.00000
Intercept	-1.09943	**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	1.00290	**Intercept**	0.10980
Cert Date	9/7/2018	**CorrCoff**	1.00000

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.42	0.30	-0.77	ppb		-1.07
primary	2	14.21	14.05	12.93	ppb		-1.12
primary	3	36.46	36.24	35.31	ppb	-2.6	
primary	4	69.30	68.99	67.91	ppb	-1.58	
primary	5	115.36	114.91	114.10	ppb	-0.71	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.20	pass
Span	1.016	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	99.9 kHz	pass
Cell A Noise	0.6 ppb	pass
Cell A Flow	0.73 lpm	pass
Cell A Pressure	734.5 mmHg	pass
Cell A Tmp.	31.5 C	pass
Cell B Freq.	104.4 kHz	pass
Cell B Noise	0.5 ppb	pass
Cell B Flow	0.73 lpm	pass
Cell B Pressure	733.6 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
GAS153-Sandy Grenville-03/26/2019						
1	3/26/2019	DAS	Campbell	000635	CR3000	4934
2	3/26/2019	Ozone	ThermoElectron Inc	000705	49i A1NAA	1030244807
3	3/26/2019	Ozone Standard	ThermoElectron Inc	000371	49i A3NAA	0726124692
4	3/26/2019	UPS	APC	missing	BP6505	NB0009260535
5	3/26/2019	Zero air pump	Werther International	06865	C 70/4	000814277

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244807	GAS153	Sandy Grenville	03/26/2019	Ozone	000705

Slope:	0.98742	**Slope:**	0.00000
Intercept	-1.85433	**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	1.00290	**Intercept**	0.10980
Cert Date	9/7/2018	**CorrCoff**	1.00000

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.50	0.38	-1.39	ppb		-1.77
primary	2	15.40	15.24	13.27	ppb		-1.97
primary	3	36.85	36.63	34.12	ppb	-7.1	
primary	4	67.49	67.18	64.42	ppb	-4.19	
primary	5	111.40	110.96	107.80	ppb	-2.89	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.70	pass
Span	1.038	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	102.2 kHz	pass
Cell A Noise	0.9 ppb	pass
Cell A Flow	0.64 lpm	pass
Cell A Pressure	708.9 mmHg	pass
Cell A Tmp.	35.4 C	pass
Cell B Freq.	91.5 kHz	pass
Cell B Noise	0.6 ppb	pass
Cell B Flow	0.66 lpm	pass
Cell B Pressure	709.5 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
SUM156-Eric Hebert-03/27/2019						
1	3/27/2019	DAS	Campbell	000335	CR3000	2114
2	3/27/2019	Ozone	ThermoElectron Inc	000724	49i A1NAA	1105347328
3	3/27/2019	Ozone Standard	ThermoElectron Inc	000511	49i A3NAA	0922236888
4	3/27/2019	Zero air pump	Werther International	06882	C 70/4	000815255

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347328	SUM156	Eric Hebert	03/27/2019	Ozone	000724

Slope:	1.02263	**Slope:**	0.00000
Intercept	-2.10227	**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	1.00290	**Intercept**	0.10980
Cert Date	9/7/2018	**CorrCoff**	1.00000

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.45	0.33	-1.93	ppb		-2.26
primary	2	15.68	15.52	13.88	ppb		-1.64
primary	3	37.87	37.65	36.55	ppb	-2.96	
primary	4	69.83	69.51	68.90	ppb	-0.88	
primary	5	112.13	111.69	112.10	ppb	0.37	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.70	pass
Span	1.015	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	101.2 kHz	pass
Cell A Noise	Not tested	pass
Cell A Flow	0.71 lpm	pass
Cell A Pressure	718.4 mmHg	pass
Cell A Tmp.	37.8 C	pass
Cell B Freq.	88.5 kHz	pass
Cell B Noise	Not tested	pass
Cell B Flow	0.64 lpm	pass
Cell B Pressure	719.0 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass