2020 – 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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List of Acronyms and Abbreviations

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

1.0 CASTNET Quarterly Report

1.1 Introduction

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

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

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

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

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

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

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

1.2 Project Objectives

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

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

Table 1. Performance Audit Challenge and Acceptance Criteria

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

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

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

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

- Site locations and configurations match those provided in the CASTNET QAPP.
- Meteorological instruments are in good physical and operational condition and are sited to meet EPA ambient monitoring guidelines (EPA-600/4-82-060).
- Sites are accessible, orderly, and if applicable, compliant with OSHA safety standards.
- Sampling lines are free of leaks, kinks, visible contamination, weathering, and moisture.
- Site shelters provide adequate temperature control.

- All ambient air quality instruments are functional, being operated in the appropriate range, and the zero air supply desiccant is unsaturated.
- All instruments are in current calibration.
- Site documentation (maintenance schedules, on-site SOPs, etc.) is current and log book records are complete.
- All maintenance and on-site SOPs are performed on schedule.
- Corrective actions are documented and appropriate for required maintenance/repair activity.
- Site operators demonstrate an adequate knowledge and ability to perform required site activities, including documentation and maintenance activities.

1.3 CASTNET Sites Visited First Quarter 2020

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 2020. The site locations, visit dates, and parameters audited are included in Table 2.

Table 2. Site Audit Visits

Side ID	Audit Type	Sponsor	Site Visit Date	Station Name
SUM156	Flow	EPA	3/3/2020	Sumatra
SUM156	FSA	EPA	3/3/2020	Sumatra
SUM156	O_3 PE	EPA	3/3/2020	Sumatra

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

Table 3. TTP Pollutant PE Visits

Side ID	PE Audit Type	Sponsor	Site Visit Date	Station Name
ALC188	O_3 PE	EPA	2/17/2020	Alabama-Coushatta
BBE401	O_3 PE	NPS	2/19/2020	Big Bend National Park – K-Bar
PAL190	O_3 PE	EPA	2/20/2020	Palo Duro

1.4 Audit Results

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

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

2.0 NADP Quarterly Report

2.1 Introduction

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

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

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

2.2 Project Objectives

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

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

2.3 NADP Sites Visited First Quarter 2020

This report presents the NADP sites surveyed during the first quarter (January through March) of 2020. The station names and dates of the surveys are presented in Table 4.

Table 4. Sites Surveyed – First Quarter 2020

Side ID	Network	Visit Date	Station Name
TX41	AMoN	2/17/2020	Alabama-Coushatta
TX43	AMoN	2/20/2020	Canonceta
FL23	NTN & AMoN	3/3/2020	Sumatra
FL14	NTN	3/4/2020	Quincy
CO13	NTN	3/10/2020	Fort Collins

2.4 Survey Results

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

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

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

APPENDIX A

CASTNET Audit Report Forms

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
SUM156-Eric Hebert-03/03/2020						
1	3/3/2020	Computer	Dell	07013	Inspiron 15	Unknown
2	3/3/2020	DAS	Campbell	000335	CR3000	2114
3	3/3/2020	Elevation	Elevation	None	1	None
4	3/3/2020	Filter pack flow pump	Thomas	00235	107CA18	00688001783
5	3/3/2020	Flow Rate	Apex	000685	AXMC105LPMDPCV	illegible
6	3/3/2020	Infrastructure	Infrastructure	none	none	none
7	3/3/2020	Modem	Campbell	06353	COM220	1520
8	3/3/2020	Ozone	ThermoElectron Inc	000619	49i A1NAA	1009241791
9	3/3/2020	Ozone Standard	ThermoElectron Inc	000511	49i A3NAA	0922236888
10	3/3/2020	Sample Tower	Aluma Tower	03542	A	none
11	3/3/2020	Shelter Temperature	Campbell	none	107-L	none
12	3/3/2020	Siting Criteria	Siting Criteria	None	1	None
13	3/3/2020	Temperature	RM Young	05043	41342VO	9639
14	3/3/2020	Zero air pump	Werther International	06882	C 70/4	000815255

DAS Data Form

DAS Time Max Error: 0.03

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2114	SUM156	Eric Hebert	03/03/2020	DAS	Primary

Das Date: 3 /3 /2020
Das Time: 09:15:02
Das Day: 63

Audit Date 3 /3 /2020
Audit Time 09:15:00
Audit Day 63

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

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	-0.0001	0.0000	V	V	0.0001
7	0.1000	0.0998	0.0999	V	V	0.0001
7	0.3000	0.2997	0.2996	V	V	-0.0001
7	0.5000	0.4995	0.4995	V	V	0.0000
7	0.7000	0.6995	0.6993	V	V	-0.0002
7	0.9000	0.8993	0.8991	V	V	-0.0002
7	1.0000	0.9992	0.9990	V	V	-0.0002

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	SUM156	Eric Hebert	03/03/2020	Flow Rate	000685

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

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0
				Cal Factor Full Scale	1
0.87%	1.96%			**Rotometer Reading:**	1.65

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	0.00	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.000	0.02	l/m	l/m	
primary	test pt 1	1.487	1.510	1.49	0.000	1.50	l/m	l/m	-0.66%
primary	test pt 2	1.478	1.500	1.49	0.000	1.50	l/m	l/m	0.00%
primary	test pt 3	1.505	1.530	1.49	0.000	1.50	l/m	l/m	-1.96%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	See comments	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	315 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241791	SUM156	Eric Hebert	03/03/2020	Ozone	000619

Slope:	1.03563	**Slope:**	0.00000
Intercept	-1.04683	**Intercept**	0.00000
CorrCoff:	0.99997	**CorrCoff:**	0.00000

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

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.38	0.08	-0.67	ppb		-0.75
primary	2	16.05	15.76	15.43	ppb		-0.33
primary	3	35.25	34.97	34.69	ppb	-0.8	
primary	4	69.33	69.07	70.21	ppb	1.64	
primary	5	109.49	109.25	112.40	ppb	2.84	

Sensor Component	Condition	Status
Audit Pressure	760.4 mmHg	pass
Sample Train	Good	pass
Minimum distance from road met	True	pass
Inlet Filter Condition	Clean	pass
26.6 degree unobstructed rule	False	Fail
Tree dewline >10m or below inlet	False	Fail
Offset	0.000	pass
Span	1.048	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	96.4 kHz	pass
Cell A Noise	0.9 ppb	pass
Cell A Flow	0.72 lpm	pass
Cell A Pressure	724.3 mmHg	pass
Cell A Tmp.	34.9 C	pass
Cell B Freq.	98.6 kHz	pass
Cell B Noise	1.0 ppb	pass
Cell B Flow	0.73 lpm	pass
Cell B Pressure	723.7 mmHg	pass
Line Loss	Not tested	pass
System Memo		pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	9639	SUM156	Eric Hebert	03/03/2020	Temperature	05043

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

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.21	0.26		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.28	0.15	0.000	0.4	C	0.24
primary	Temp Mid Range	27.00	26.66	0.000	26.5	C	-0.14
primary	Temp High Range	48.27	47.76	0.000	47.5	C	-0.26

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	SUM156	Eric Hebert	03/03/2020	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.21	0.33		

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	25.29	24.96	0.000	25.1	C	0.18
primary	Temp Mid Range	25.21	24.88	0.000	25.0	C	0.12
primary	Temp Mid Range	25.99	25.66	0.000	25.3	C	-0.33

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	SUM156	Technician	Eric Hebert	Site Visit Date	03/03/2020

Shelter Make	Shelter Model	Shelter Size
Ekto	8810	640 cuft

Sensor Component		Condition		Status	
Sensor Component	Sample Tower Type	Condition	Type A	Status	pass
Sensor Component	Conduit	Condition	N/A	Status	pass
Sensor Component	Met Tower	Condition	N/A	Status	pass
Sensor Component	Moisture Trap	Condition	Installed	Status	pass
Sensor Component	Power Cables	Condition	Good	Status	pass
Sensor Component	Shelter Temp Control	Condition	Functioning	Status	pass
Sensor Component	Rotometer	Condition	Installed	Status	pass
Sensor Component	Sample Tower	Condition	Fair	Status	pass
Sensor Component	Shelter Condition	Condition	Good	Status	pass
Sensor Component	Shelter Door	Condition	Good	Status	pass
Sensor Component	Shelter Roof	Condition	Good	Status	pass
Sensor Component	Shelter Floor	Condition	Good	Status	pass
Sensor Component	Shelter walls	Condition	Good	Status	pass
Sensor Component	Excessive mold present	Condition	No	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
Sensor Component	System Memo	Condition		Status	pass

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	SUM156	Eric Hebert	03/03/2020	Moisture Present	Apex	4171	☐	☐

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

Field Systems Comments

1 **Parameter:** DasComments

The meteorological tower has been removed. The temperature sensor is mounted in a naturally aspirated shield on the sample tower which is not grounded.

2 **Parameter:** SitingCriteriaCom

The site is surrounded by pine trees on land managed by the forest service. One tree is within 5 meters and is 10 meters tall. A few trees are now >17 meters tall and within 17 meters of the sample tower. Most trees are 30 meters from the sample tower.

3 **Parameter:** ShelterCleanNotes

The shelter is clean and very well organized.. The site operator does an excellent job of organizing and maintaining the site.

4 **Parameter:** PollAnalyzerCom

There is water in the flow tubing outside the shelter. Trees to the north and east violate the siting criteria for ozone.

5 **Parameter:** MetOpMaintCom

The temperature sensor shield is moderately dirty.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	SUM156	**Technician**	Eric Hebert	**Site Visit Date**	03/03/2020

Site Sponsor (agency)	EPA/USFS	**USGS Map**	Sumatra
Operating Group	USFS/private	**Map Scale**	
AQS #	12-077-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	
Deposition Measurement	dry, wet	**QAPP Longitude**	
Land Use	wetlands, woodland - evergreen	**QAPP Elevation Meters**	
Terrain	flat	**QAPP Declination**	
Conforms to MLM	Yes	**QAPP Declination Date**	
Site Telephone	(850) 670-8376	**Audit Latitude**	30.110226
Site Address 1	Rt 65	**Audit Longitude**	-84.99038
Site Address 2	Apalachicola National Forest	**Audit Elevation**	16
County	Liberty	**Audit Declination**	-3
City, State	Bristol, FL		**Present**
Zip Code	32321	**Fire Extinguisher**	☑ New in 2015
Time Zone	Eastern	**First Aid Kit**	☑
Primary Operator		**Safety Glasses**	☑
Primary Op. Phone #		**Safety Hard Hat**	☑
Primary Op. E-mail	none	**Climbing Belt**	☐
Backup Operator	none	**Security Fence**	☐
Backup Op. Phone #		**Secure Shelter**	☑
Backup Op. E-mail		**Stable Entry Steps**	☑

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The shelter is clean and very well organized.. The site operator does an excellent job of organizing and maintaining the site.				
Site OK	☑	**Notes**					

Driving Directions From Tallahassee take Hwy 20 west about 25 miles to Hosford. Turn left (south) on Hwy 65 at the intersection in Hosford. Continue about 22 miles on Hwy 65 past Wilma. Turn right on a dirt road and bear left continuing south parallel to Hwy 65. The site will be visible on the right.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID SUM156 **Technician** Eric Hebert **Site Visit Date** 03/03/2020

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 > 100 vehicles/day	500 m		☑
Secondary road < or = 100 vehicles/day	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		☑

Siting Distances OK ☑

Siting Criteria Comment

The site is surrounded by pine trees on land managed by the forest service. One tree is within 5 meters and is 10 meters tall. A few trees are now >17 meters tall and within 17 meters of the sample tower. Most trees are 30 meters from the sample tower.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	SUM156	Technician	Eric Hebert	Site Visit Date	03/03/2020

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID SUM156 **Technician** Eric Hebert **Site Visit Date** 03/03/2020

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

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

The temperature sensor shield is moderately dirty.

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	SUM156	Technician	Eric Hebert	Site Visit Date	03/03/2020

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

There is water in the flow tubing outside the shelter. Trees to the north and east violate the siting criteria for ozone.

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID SUM156 **Technician** Eric Hebert **Site Visit Date** 03/03/2020

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

11 **Tower comments?**

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

The meteorological tower has been removed. The temperature sensor is mounted in a naturally aspirated shield on the sample tower which is not grounded.

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	SUM156	Technician	Eric Hebert	Site Visit Date	03/03/2020

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑		☑
SSRF	☑		☑
Site Ops Manual	☑	Oct 2010	☐
HASP	☑	Oct 2010	☐
Field Ops Manual	☐		☐
Calibration Reports	☑		☑
Ozone z/s/p Control Charts	☐		☑
Preventive maintenance schedule	☐		☑

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID SUM156 **Technician** Eric Hebert **Site Visit Date** 03/03/2020

Site operation procedures

1	Has the site operator attended a formal CASTNET training course? If yes, when and who instructed?	☑	Trained on-site in 1989
2	Has the backup operator attended a formal CASTNET training course? If yes, when and who instructed?	☐	
3	Is the site visited regularly on the required Tuesday schedule?	☑	
4	Are the standard CASTNET operational procedures being flollowed by the site operator?	☑	
5	Is the site operator(s) knowledgeable of, and able to perform the required site activities? (including documentation)	☑	

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID SUM156 **Technician** Eric Hebert **Site Visit Date** 03/03/2020

Site operation procedures

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

QC Check Performed		Frequency	Compliant
Multi-point MFC Calibrations	☑	Semiannually	☑
Flow System Leak Checks	☑	Weekly	☑
Filter Pack Inspection	☑	Weekly	☑
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 SUM156 **Technician** Eric Hebert **Site Visit Date** 03/03/2020

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07013
DAS	Campbell	CR3000	2114	000335
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	00688001783	00235
Flow Rate	Apex	AXMC105LPMDPC	illegible	000685
Infrastructure	Infrastructure	none	none	none
Modem	Campbell	COM220	1520	06353
Ozone	ThermoElectron Inc	49i A1NAA	1009241791	000619
Ozone Standard	ThermoElectron Inc	49i A3NAA	0922236888	000511
Sample Tower	Aluma Tower	A	none	03542
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VO	9639	05043
Zero air pump	Werther International	C 70/4	000815255	06882

APPENDIX B

CASTNET Site Spot Report Forms

EEMS Spot Report

Data Compiled: 4/20/2020 16:04:27

SiteVisitDate	Site	Technician
02/17/2020	ALC188	Martin Valvur

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.99031	unitless	**P**
2	Ozone Intercept	P	0	5	4	-0.30602	ppb	**P**
3	Ozone correlation	P	0	0.995	4	1.00000	unitless	**P**
4	Ozone % difference avg	P	7	10	4	2.0	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	-0.14	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.57	ppb	**P**

EEMS Spot Report

Data Compiled: 4/20/2020 16:03:32

SiteVisitDate	Site	Technician
02/19/2020	BBE401	Martin Valvur

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.00051	unitless	**P**
2	Ozone Intercept	P	0	5	4	-0.07487	ppb	**P**
3	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
4	Ozone % difference avg	P	7	10	4	0.7	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	0.13	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.3	ppb	**P**

EEMS Spot Report

Data Compiled: 4/20/2020 16:02:15

SiteVisitDate	Site	Technician
02/20/2020	PAL190	Martin Valvur

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.99309	unitless	**P**
2	Ozone Intercept	P	0	5	4	-0.13399	ppb	**P**
3	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
4	Ozone % difference avg	P	7	10	4	0.9	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	-0.11	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.11	ppb	**P**

APPENDIX C

CASTNET Ozone Performance Evaluation Forms

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
ALC188-Martin Valvur-02/17/2020						
1	2/17/2020	DAS	Campbell	000422	CR3000	2523
2	2/17/2020	Ozone	ThermoElectron Inc	000629	49i A1NAA	1009241784
3	2/17/2020	Ozone Standard	ThermoElectron Inc	000694	49i A3NAA	1030244815
4	2/17/2020	Zero air pump	Werther International	06886	C 70/4	000815259

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241784	ALC188	Martin Valvur	02/17/2020	Ozone	000629

Slope:	0.99031	**Slope:**	0.00000
Intercept	-0.30602	**Intercept**	0.00000
CorrCoff:	1.00000	**CorrCoff:**	0.00000

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

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.12	0.08	-0.06	ppb		-0.14
primary	2	17.27	17.18	16.61	ppb		-0.57
primary	3	38.83	38.69	37.95	ppb	-1.93	
primary	4	65.02	64.81	63.76	ppb	-1.63	
primary	5	108.67	108.35	107.10	ppb	-1.16	

Sensor Component	Condition	Status
Audit Pressure	753.5 mmHg	pass
Sample Train	Good	pass
Minimum distance from road met	True	pass
Inlet Filter Condition	Moderately clean	pass
26.6 degree unobstructed rule	True	pass
Tree dewline >10m or below inlet	True	pass
Offset	0.2	pass
Span	1.010	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	87.5 kHz	pass
Cell A Noise	0.8 ppb	pass
Cell A Flow	0.72 lpm	pass
Cell A Pressure	715.5 mmHg	pass
Cell A Tmp.	32.7 C	pass
Cell B Freq.	91.0 kHz	pass
Cell B Noise	0.9 ppb	pass
Cell B Flow	0.71 lpm	pass
Cell B Pressure	714.9 mmHg	pass
Line Loss	Not tested	pass
System Memo		pass

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
BBE401-Martin Valvur-02/19/2020						
1	2/19/2020	DAS	Environmental Sys Corp	90767	8816	4592
2	2/19/2020	Ozone	ThermoElectron Inc	90565	49C	49C-59285-322
3	2/19/2020	Ozone Standard	ThermoElectron Inc	90831	49C	0520012325
4	2/19/2020	Zero air pump	Twin Tower Engineering	none	TT70/4E	526293

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	49C-59285-322	BBE401	Martin Valvur	02/19/2020	Ozone	90565

Slope:	1.00051	**Slope:**	0.00000
Intercept	-0.07487	**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	1.00260	**Intercept**	0.03590
Cert Date	1/14/2020	**CorrCoff**	0.99999

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.02	-0.01	0.12	ppb		0.13
primary	2	16.55	16.47	16.17	ppb		-0.3
primary	3	36.45	36.31	36.11	ppb	-0.55	
primary	4	66.54	66.33	66.52	ppb	0.29	
primary	5	106.60	106.28	106.20	ppb	-0.08	

Sensor Component	Audit Pressure	**Condition**	679.5 mmHg	**Status**	pass
Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	Minimum distance from road met	**Condition**	True	**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Moderately clean	**Status**	pass
Sensor Component	26.6 degree unobstructed rule	**Condition**	True	**Status**	pass
Sensor Component	Tree dewline >10m or below inlet	**Condition**	True	**Status**	pass
Sensor Component	Offset	**Condition**	-0.2	**Status**	pass
Sensor Component	Span	**Condition**	1.011	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	-0.0003	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	0.9999	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	106.5 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	1.8 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.61 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	666.0 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	37.3 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	73.2 mmHg	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	1.0 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.62 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	665.5 mmHg	**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
PAL190-Martin Valvur-02/20/2020						
1	2/20/2020	DAS	Campbell	000343	CR3000	2122
2	2/20/2020	Ozone	ThermoElectron Inc	000726	49i A1NAA	1105347314
3	2/20/2020	Ozone Standard	ThermoElectron Inc	000735	49i A3NAA	0726124696
4	2/20/2020	Zero air pump	Werther International	06922	C 70/4	000836217

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347314	PAL190	Martin Valvur	02/20/2020	Ozone	000726

Slope:	0.99309	**Slope:**	0.00000
Intercept	-0.13399	**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	1.00260	**Intercept**	0.03590
Cert Date	1/14/2020	**CorrCoff**	0.99999

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.10	0.06	-0.05	ppb		-0.11
primary	2	17.76	17.67	17.56	ppb		-0.11
primary	3	36.27	36.14	35.76	ppb	-1.06	
primary	4	67.64	67.42	66.45	ppb	-1.45	
primary	5	113.66	113.32	112.60	ppb	-0.64	

Sensor Component	Condition	Status
Audit Pressure	688.0 mmHg	pass
Sample Train	Good	pass
Minimum distance from road met	True	pass
Inlet Filter Condition	Clean	pass
26.6 degree unobstructed rule	False	Fail
Tree dewline >10m or below inlet	True	pass
Offset	-0.4	pass
Span	1.005	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	79.3 kHz	pass
Cell A Noise	0.9 ppb	pass
Cell A Flow	0.69 lpm	pass
Cell A Pressure	663.2 mmHg	pass
Cell A Tmp.	31.0 C	pass
Cell B Freq.	78.9 kHz	pass
Cell B Noise	0.9 ppb	pass
Cell B Flow	0.70 lpm	pass
Cell B Pressure	662.9 mmHg	pass
Line Loss	Not tested	pass
System Memo		pass