2019 – 2nd Quarter Report

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

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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 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 June 2019, 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 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, 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 Second Quarter 2019

This report consists of the systems and performance and other audit results from the CASTNET sites visited during the second quarter (April through June) of 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
CVL151	FSA	EPA	4/13/2019	Coffeeville
CVL151	O_3 PE	EPA	4/13/2019	Coffeeville
CVL151	Flow	EPA	4/13/2019	Coffeeville
CHE185	FSA	EPA/tribal	4/15/2019	Cherokee Nation
CHE185	O_3 PE	EPA/tribal	4/15/2019	Cherokee Nation
CHE185	Flow	EPA/tribal	4/15/2019	Cherokee Nation
CAD150	FSA	EPA	4/16/2019	Caddo Valley
CAD150	O_3 PE	EPA	4/16/2019	Caddo Valley
CAD150	Flow	EPA	4/16/2019	Caddo Valley
LAV410	FSA	NPS	5/7/2019	Lassen Volcanic NP
LAV410	O_3 PE	NPS	5/7/2019	Lassen Volcanic NP
LAV410	Flow	NPS	5/7/2019	Lassen Volcanic NP
PIN414	FSA	NPS	5/8/2019	Pinnacles NM
PIN414	O_3 PE	NPS	5/8/2019	Pinnacles NM
PIN414	Flow	NPS	5/8/2019	Pinnacles NM

Side ID	Audit Type	Sponsor	Site Visit Date	Station Name
YOS404	FSA	NPS	5/13/2019	Yosemite NP – Turtleback Dome
YOS404	O_3 PE	NPS	5/13/2019	Yosemite NP – Turtleback Dome
YOS404	Flow	NPS	5/13/2019	Yosemite NP – Turtleback Dome
SEK430	FSA	NPS	5/14/2019	Sequoia NP – Ash Mountain
SEK430	O_3 PE	NPS	5/14/2019	Sequoia NP – Ash Mountain
SEK430	Flow	NPS	5/14/2019	Sequoia NP – Ash Mountain
ROM406	FSA	NPS	6/6/2019	Rocky Mtn NP
ROM406	O_3 PE	NPS	6/6/2019	Rocky Mtn NP
ROM406	Flow	NPS	6/6/2019	Rocky Mtn NP
ROM206	FSA	EPA	6/11/2019	Rocky Mtn NP
ROM206	O_3 PE	EPA	6/11/2019	Rocky Mtn NP
ROM206	Flow	EPA	6/11/2019	Rocky Mtn NP
CND125	FSA	EPA	6/14/2019	Candor
CND125	Flow	EPA	6/14/2019	Candor
WSP144	FSA	EPA	6/17/2019	Washington's Crossing State Park
WSP144	O_3 PE	EPA	6/17/2019	Washington's Crossing State Park
WSP144	Flow	EPA	6/17/2019	Washington's Crossing State Park

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
PET427	O_3	NPS	4/8/2019	Petrified Forest NP
GRC474	O_3	NPS	4/9/2019	Grand Canyon NP
CHA467	O_3	NPS	4/11/2019	Chiricahua NM
SND152	O_3	EPA	4/27/2019	Sand Mountain
ESP127	O_3	EPA	4/28/2019	Edgar Evins
SAL133	O_3	EPA	5/8/2019	Salamonie Reservoir
COW137	O_3	EPA	6/13/2019	Coweeta

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). The HAL is currently being transitioned to the WSLH.

2.2 Project Objectives

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

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

2.3 NADP Sites Visited Second Quarter 2019

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

Table 4. Sites Surveyed – Second Quarter 2019

Side ID	Network	Visit Date	Station Name
AZ98	AMoN	4/11/2019	Chiricahua
OK99	AMoN	4/15/2019	Stilwell
OK05	MDN	4/15/2019	Hugo
OK97	MDN	4/15/2019	Tuskahoma
MS30	AMoN	4/16/2019	Coffeeville
AL99	AMoN	4/27/2019	Sand Mountain Research & Extension Center
TN07	AMoN	4/28/2019	Edgar Evins
IN20	AMoN	5/8/2019	Roush Lake
CA44	AMoN	5/13/2019	Yosemite NP - Turtleback Dome
CA83	AMoN	5/14/2019	Sequoia NP - Ash Mountain
WI31	NTN	5/17/2019	Devil's Lake
MN27	MDN/NTN	5/20/2019	Lamberton
MN01	NTN	5/21/2019	Cedar Creek
NC25	AMoN	6/13/2019	Coweeta
NC26	MDN	6/17/2019	Candor
NJ98	AMoN	6/17/2019	Washington Crossing CASTNET
NC26	AMoN	6/17/2019	Candor
NJ30	MDN	6/19/2019	New Brunswick
WY06	AMoN	6/30/2019	Pinedale

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*
CVL151-Sandy Grenville-04/13/2019						
1	4/13/2019	Computer	Dell	07033	Inspiron 15	Unknown
2	4/13/2019	DAS	Campbell	000410	CR3000	2508
3	4/13/2019	Elevation	Elevation	None	1	None
4	4/13/2019	Filter pack flow pump	Thomas	04282	107CAB18B	129800010140
5	4/13/2019	Flow Rate	Apex	000858	AXMC105LPMDPCV	illegible
6	4/13/2019	Infrastructure	Infrastructure	none	none	none
7	4/13/2019	Modem	Raven	06462	V42221	0808338333
8	4/13/2019	Ozone	ThermoElectron Inc	000737	49i A1NAA	1105347312
9	4/13/2019	Ozone Standard	ThermoElectron Inc	000464	49i A3NAA	0622717858
10	4/13/2019	Sample Tower	Aluma Tower	03540	A	none
11	4/13/2019	Shelter Temperature	Campbell	none	107-L	none
12	4/13/2019	Siting Criteria	Siting Criteria	None	1	None
13	4/13/2019	Temperature	RM Young	04447	41342	4545
14	4/13/2019	Zero air pump	Werther International	06867	C 70/4	000814279

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2508	CVL151	Sandy Grenville	04/13/2019	DAS	Primary

Das Date: 4 /13/2019
Das Time: 17:29:42
Das Day: 103

Audit Date 4 /13/2019
Audit Time 17:29:42
Audit Day 103

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
7	0.0000	0.0000	0.0000	V	V	0.0000
7	0.1000	0.0999	0.0999	V	V	0.0000
7	0.3000	0.2997	0.2997	V	V	0.0000
7	0.5000	0.4996	0.4996	V	V	0.0000
7	0.7000	0.6996	0.6995	V	V	-0.0001
7	0.9000	0.8994	0.8993	V	V	-0.0001
7	1.0000	0.9993	0.9991	V	V	-0.0002

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	illegible	CVL151	Sandy Grenville	04/13/2019	Flow Rate	000858

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**	-0.04
1.32%	1.32%			**Cal Factor Full Scale**	0.96
				Rotometer Reading:	1.5

Desc.	Test type	Input l/m	Input Corr_	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalI	PctDifference
primary	pump off	0.000	0.000	0.02	0.000	-0.04	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.000	-0.10	l/m	l/m	
primary	test pt 1	1.524	1.520	1.55	0.000	1.50	l/m	l/m	-1.32%
primary	test pt 2	1.524	1.520	1.55	0.000	1.50	l/m	l/m	-1.32%
primary	test pt 3	1.524	1.520	1.55	0.000	1.50	l/m	l/m	-1.32%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	0.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	300 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	1105347312	CVL151	Sandy Grenville	04/13/2019	Ozone	000737

Slope:	0.98143	**Slope:**	0.00000
Intercept	0.14908	**Intercept**	0.00000
CorrCoff	0.99990	**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	0.41	0.29	0.10	ppb		-0.19
primary	2	14.89	14.73	14.46	ppb		-0.27
primary	3	35.24	35.02	34.65	ppb	-1.06	
primary	4	70.10	69.78	69.62	ppb	-0.23	
primary	5	111.90	111.46	108.90	ppb	-2.32	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	-0.30	pass
Span	1.019	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	94.0 kHz	pass
Cell A Noise	0.6 ppb	pass
Cell A Flow	0.69 lpm	pass
Cell A Pressure	702.3 mmHg	pass
Cell A Tmp.	30.5 C	pass
Cell B Freq.	95.1 kHz	pass
Cell B Noise	0.8 ppb	pass
Cell B Flow	0.00 lpm	Fail
Cell B Pressure	702.3 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	4545	CVL151	Sandy Grenville	04/13/2019	Temperature	04447

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

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.05	0.08		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.37	0.22	0.000	0.2	C	-0.03
primary	Temp Mid Range	24.73	24.41	0.000	24.4	C	-0.05
primary	Temp High Range	48.86	48.36	0.000	48.3	C	-0.08

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

Shelter Temperature Data For

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	CVL151	Sandy Grenville	04/13/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.11	0.16		

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	22.43	22.12	0.000	22.0	C	-0.09
primary	Temp Mid Range	22.95	22.64	0.000	22.5	C	-0.16
primary	Temp Mid Range	22.91	22.60	0.000	22.5	C	-0.08

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	Technician	Site Visit Date
CVL151	Sandy Grenville	04/13/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810	640 cuft

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Ozone	CVL151	Sandy Grenville	04/13/2019	Cell B Flow	ThermoElectron	3879	☐	☐

This analyzer diagnostic check is outside the manufacturer's recommended value.

Field Systems Comments

1 **Parameter:** DasComments

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

2 **Parameter:** SitingCriteriaCom

The site is located in a Pine forest on USFS managed land. The tree line has been cut back to at least 17 meters from the site.

3 **Parameter:** ShelterCleanNotes

The shelter is somewhat cluttered. The shelter roof is still leaking and the walls are rotten at the seams and corners. The shelter is in poor condition and has deteriorated further since the previous audit visit.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	CVL151	**Technician**	Sandy Grenville	**Site Visit Date**	04/13/2019

Site Sponsor (agency)	EPA	**USGS Map**	Coker Lake
Operating Group	Private - USFS	**Map Scale**	
AQS #	28-161-9991	**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	34.0028
Deposition Measurement	dry, wet	**QAPP Longitude**	-89.7989
Land Use	woodland - evergreen	**QAPP Elevation Meters**	134
Terrain	rolling	**QAPP Declination**	0.2
Conforms to MLM	Marginally	**QAPP Declination Date**	2/22/2006
Site Telephone	(662) 623-7334	**Audit Latitude**	34.002747
Site Address 1	Forest Road 809	**Audit Longitude**	-89.799183
Site Address 2	Tombigbee National Forest	**Audit Elevation**	138
County	Yalobusha	**Audit Declination**	-0.95
City, State	Tillatoba, MS		**Present**
Zip Code	38961	**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** Ekto **Model** 8810 **Shelter Size** 640 cuft

Shelter Clean ☑ **Notes** The shelter is somewhat cluttered. The shelter roof is still leaking and the walls are rotten at the seams and corners. The shelter is in poor condition and has deteriorated further since the previous audit visit.

Site OK ☑ **Notes**

Driving Directions From interstate 55 take exit 220 east on highway 330. Continue approximately 5 miles and turn left (north) at the Forest Service sign for the Yalobusha County Work Center and Jamie L. Whitter Plant Materials Center. Immediately after the facility turn left on forest service road 802. Continue approximately 1.5 miles to the stop sign and turn left on road 809. Continue approximately 0.3 miles to the first road on the left.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID CVL151 **Technician** Sandy Grenville **Site Visit Date** 04/13/2019

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	17 m	☐
Obstacles to wind	10 times obstacle height		☑

Siting Distances OK ☐

Siting Criteria Comment

The site is located in a Pine forest on USFS managed land. The tree line has been cut back to at least 17 meters from the site.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	CVL151	Technician	Sandy Grenville	Site Visit Date	04/13/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID CVL151 **Technician** Sandy Grenville **Site Visit Date** 04/13/2019

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 CVL151 **Technician** Sandy Grenville **Site Visit Date** 04/13/2019

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?	☐	17 meters

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 12 meters
4	Describe dry dep sample tube.		3/8 teflon by 12 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	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:

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID CVL151 **Technician** Sandy Grenville **Site Visit Date** 04/13/2019

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:

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID CVL151 **Technician** Sandy Grenville **Site Visit Date** 04/13/2019

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	☑	June 2007	☐
HASP	☑	Feb 2014	☑
Field Ops Manual	☑	Feb 2014	☑
Calibration Reports	☑		☑
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	CVL151	Technician	Sandy Grenville	Site Visit Date	04/13/2019

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID CVL151 **Technician** Sandy Grenville **Site Visit Date** 04/13/2019

Site operation procedures

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

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

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

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID CVL151 **Technician** Sandy Grenville **Site Visit Date** 04/13/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07033
DAS	Campbell	CR3000	2508	000410
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18B	129800010140	04282
Flow Rate	Apex	AXMC105LPMDPC	illegible	000858
Infrastructure	Infrastructure	none	none	none
Modem	Raven	V42221	0808338333	06462
Ozone	ThermoElectron Inc	49i A1NAA	1105347312	000737
Ozone Standard	ThermoElectron Inc	49i A3NAA	0622717858	000464
Sample Tower	Aluma Tower	A	none	03540
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	4545	04447
Zero air pump	Werther International	C 70/4	000814279	06867

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
CHE185-Sandy Grenville-04/15/2019						
1	4/15/2019	DAS	Environmental Sys Corp	120283	8832	A0382
2	4/15/2019	Elevation	Elevation	None	1	None
3	4/15/2019	Filter pack flow pump	Thomas	00498	107CAB18	0000110
4	4/15/2019	Flow Rate	Apex	000641	AXMC105LPMDPCV	116
5	4/15/2019	Infrastructure	Infrastructure	none	none	none
6	4/15/2019	Met tower	Universal Tower	03662	unknown	none
7	4/15/2019	Modem	US Robotics	05624	unknown	unknown
8	4/15/2019	Modem	Raven	06984	H4222-C	0808685382
9	4/15/2019	Ozone	Ecotech	87161	EC9810B	10-0064
10	4/15/2019	Sample Tower	Aluma Tower	000054	B	AT-81213-T12
11	4/15/2019	Shelter Temperature	unknown	none	none	015
12	4/15/2019	Shield (10 meter)	RM Young	04620	Aspirated 43408	none
13	4/15/2019	Siting Criteria	Siting Criteria	None	1	None
14	4/15/2019	Temperature	RM Young	05047	41342VC	9682
15	4/15/2019	Zero air pump	Ecotech	none	8301LC	01-0658

DAS Data Form

DAS Time Max Error: 0.15

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	A0382	CHE185	Sandy Grenville	04/15/2019	DAS	Primary

Das Date: 4 /15/2019
Das Time: 18:15:00
Das Day: 105

Audit Date 4 /15/2019
Audit Time 18:15:09
Audit Day 105

Low Channel:		High Channel:	
Avg Diff:	**Max Diff:**	**Avg Diff:**	**Max Diff:**
0.0020	0.0030	0.0020	0.0030

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
6	0.0000	0.0000	-0.0029	V	V	-0.0029
6	0.1000	0.1000	0.0971	V	V	-0.0029
6	0.3000	0.2998	0.2968	V	V	-0.0030
6	0.5000	0.4997	0.4984	V	V	-0.0013
6	0.7000	0.6996	0.6982	V	V	-0.0014
6	0.9000	0.8995	0.8981	V	V	-0.0014
6	1.0000	0.9993	0.9979	V	V	-0.0014

Flow Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	116	CHE185	Sandy Grenville	04/15/2019	Flow Rate	000641

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
2.05%	2.16%			**Cal Factor Full Scale**	5.011
				Rotometer Reading:	1.5

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	0.00	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.0000	0.00	l/m	l/m	
primary	test pt 1	1.531	1.530	1.50	0.0000	1.50	l/m	l/m	-2.03%
primary	test pt 2	1.534	1.530	1.50	0.0000	1.50	l/m	l/m	-1.96%
primary	test pt 3	1.530	1.530	1.50	0.0000	1.50	l/m	l/m	-2.16%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	0.3 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 Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
Ecotech	10-0064	CHE185	Sandy Grenville	04/15/2019	Ozone	87161

Slope:	0.99049	**Slope:**	0.00000
Intercept	0.12824	**Intercept**	0.00000
CorrCoff	0.99999	**CorrCoff**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	1180030022	**Tfer Desc.**	Ozone primary stan
Tfer ID	01114		
Slope	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	0.58	0.46	0.27	ppb		-0.19
primary	2	14.98	14.82	15.00	ppb		0.18
primary	3	36.21	35.99	35.95	ppb	-0.11	
primary	4	69.81	69.49	69.03	ppb	-0.66	
primary	5	112.20	111.76	110.70	ppb	-0.95	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	Functioning	pass
Offset	0.2676	pass
Span	0.947	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	N/A	pass
Cell A Noise	1.0 ppb	pass
Cell A Flow	0.49 lpm	pass
Cell A Pressure	705.5 mmHg	pass
Cell A Tmp.	34.1 C	pass
Cell B Freq.	N/A	pass
Cell B Noise	N/A	pass
Cell B Flow	N/A	pass
Cell B Pressure	N/A	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	9682	CHE185	Sandy Grenville	04/15/2019	Temperature	05047

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

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.39	0.57		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.30	0.15	0.0000	0.2	C	0.08
primary	Temp Mid Range	25.49	25.16	0.0000	24.6	C	-0.57
primary	Temp High Range	48.22	47.73	0.0000	47.2	C	-0.51

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
unknown	015	CHE185	Sandy Grenville	04/15/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.26	0.33		

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	24.03	23.71	0.000	24.0	C	0.33
primary	Temp Mid Range	24.88	24.56	0.000	24.4	C	-0.17
primary	Temp Mid Range	25.11	24.78	0.000	25.1	C	0.27

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	Technician	Site Visit Date
CHE185	Sandy Grenville	04/15/2019

Shelter Make	Shelter Model	Shelter Size
Shelter One	8128	768 cuft

Sensor Component		Condition		Status	
Sensor Component	Sample Tower Type	Condition	Type B	Status	pass
Sensor Component	Conduit	Condition	N/A	Status	pass
Sensor Component	Met Tower	Condition	Fair	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:** SiteOpsProcComm

The site is well maintained and operated. Very good sample change out procedures are being used by the site operator.

2 **Parameter:** SitingCriteriaCom

The site is located in a pasture with grazing cattle sometimes as close as 5 meters.

3 **Parameter:** ShelterCleanNotes

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

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	CHE185	**Technician**	Sandy Grenville	**Site Visit Date**	04/15/2019

Site Sponsor (agency)	EPA	**USGS Map**	Stilwell West
Operating Group	Cherokee Nation OES	**Map Scale**	
AQS #		**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone, NOy, ammonia	**QAPP Latitude**	35.7507
Deposition Measurement	dry, Hg, passive ammonia	**QAPP Longitude**	-94.6700
Land Use	agriculture, pasture	**QAPP Elevation Meters**	299
Terrain	rolling	**QAPP Declination**	3.25
Conforms to MLM	Marginally	**QAPP Declination Date**	9/16/2005
Site Telephone	(918) 696-5604	**Audit Latitude**	35.750786
Site Address 1	Cherry Tree	**Audit Longitude**	-94.669789
Site Address 2	Dahlonegah School	**Audit Elevation**	305
County	Adair	**Audit Declination**	2
City, State	Stilwell, OK		**Present**
Zip Code	74960	**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 **Shelter Size** 768 cuft

Shelter Clean ☑ **Notes** The shelter is in very good condition, clean, neat, and well organized.

Site OK ☑ **Notes**

Driving Directions From interstate 40 take exit 311 and go north on route 59 toward Stilwell. Continue approximately 18 miles. About 5 miles south of Stilwell turn left (west) on an unmarked road. There is a sign for Cherry Tree Baptist Church and Dahlonegah school. Continue to the end of the road at the school. The site is on the right behind the ball fields.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID CHE185 **Technician** Sandy Grenville **Site Visit Date** 04/15/2019

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 in a pasture with grazing cattle sometimes as close as 5 meters.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	CHE185	Technician	Sandy Grenville	Site Visit Date	04/15/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	CHE185	Technician	Sandy Grenville	Site Visit Date	04/15/2019

1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	☑	Temperature only
2	Are all the meteorological sensors operational online, and reporting data?	☑	Temperature only
3	Are the shields for the temperature and RH sensors clean?	☑	
4	Are the aspirated motors working?	☑	
5	Is the solar radiation sensor's lens clean and free of scratches?	☑	N/A
6	Is the surface wetness sensor grid clean and undamaged?	☑	N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	☑	N/A
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	CHE185	Technician	Sandy Grenville	Site Visit Date	04/15/2019

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 10 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet and analyzer
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 CHE185 **Technician** Sandy Grenville **Site Visit Date** 04/15/2019

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 CHE185 **Technician** Sandy Grenville **Site Visit Date** 04/15/2019

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	☐	Nov 2011	☑
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?	☑	
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	CHE185	Technician	Sandy Grenville	Site Visit Date	04/15/2019

Site operation procedures

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

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

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

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

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

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

Provide any additional 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 CHE185 **Technician** Sandy Grenville **Site Visit Date** 04/15/2019

Site operation procedures

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

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

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

The site is well maintained and operated. Very good sample change out procedures are being used by the site operator.

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

Site ID CHE185 **Technician** Sandy Grenville **Site Visit Date** 04/15/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Environmental Sys Corp	8832	A0382	120283
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	0000110	00498
Flow Rate	Apex	AXMC105LPMDPC	116	000641
Infrastructure	Infrastructure	none	none	none
Met tower	Universal Tower	unknown	none	03662
Modem	Raven	H4222-C	0808685382	06984
Modem	US Robotics	unknown	unknown	05624
Ozone	Ecotech	EC9810B	10-0064	87161
Sample Tower	Aluma Tower	B	AT-81213-T12	000054
Shelter Temperature	unknown	none	015	none
Shield (10 meter)	RM Young	Aspirated 43408	none	04620
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	9682	05047
Zero air pump	Ecotech	8301LC	01-0658	none

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
CAD150-Sandy Grenville-04/16/2019						
1	4/16/2019	Computer	Dell	07029	Inspiron 15	Unknown
2	4/16/2019	DAS	Campbell	000421	CR3000	2530
3	4/16/2019	Elevation	Elevation	None	1	None
4	4/16/2019	Filter pack flow pump	Thomas	00462	107CA110	09883403-01-4
5	4/16/2019	Flow Rate	Apex	000597	AXMC105LPMDPCV	illegible
6	4/16/2019	Infrastructure	Infrastructure	none	none	none
7	4/16/2019	Modem	Digi	07195	LRS4	unknown
8	4/16/2019	Ozone	ThermoElectron Inc	000624	49i A1NAA	1009241792
9	4/16/2019	Ozone Standard	ThermoElectron Inc	000495	49i A3NAA	0622717849
10	4/16/2019	Sample Tower	Aluma Tower	03538	A	none
11	4/16/2019	Shelter Temperature	Campbell	none	107-L	none
12	4/16/2019	Siting Criteria	Siting Criteria	None	1	None
13	4/16/2019	Temperature	RM Young	04682	41342VC	9699
14	4/16/2019	Zero air pump	Werther International	06914	C 70/4	000829156

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2530	CAD150	Sandy Grenville	04/16/2019	DAS	Primary

Das Date: 4 /16/2019
Das Time: 10:03:42
Das Day: 106

Audit Date 4 /16/2019
Audit Time 10:03:42
Audit Day 106

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

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	0.0000	0.0000	V	V	0.0000
7	0.1000	0.0999	0.0999	V	V	0.0000
7	0.3000	0.2998	0.2997	V	V	-0.0001
7	0.5000	0.4996	0.4996	V	V	0.0000
7	0.7000	0.6995	0.6995	V	V	0.0000
7	0.9000	0.8994	0.8994	V	V	0.0000
7	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
Apex	illegible	CAD150	Sandy Grenville	04/16/2019	Flow Rate	000597

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**	-0.025
1.32%	1.32%			**Cal Factor Full Scale**	0.968
				Rotometer Reading:	1.5

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	-0.02	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	-0.01	l/m	l/m	
primary	test pt 1	1.518	1.520	1.54	0.000	1.50	l/m	l/m	-1.32%
primary	test pt 2	1.517	1.520	1.54	0.000	1.50	l/m	l/m	-1.32%
primary	test pt 3	1.519	1.520	1.54	0.000	1.50	l/m	l/m	-1.32%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	270 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1009241792	CAD150	Sandy Grenville	04/16/2019	Ozone	000624

Slope:	0.98939	**Slope:**	0.00000
Intercept	-1.43004	**Intercept**	0.00000
CorrCoff	0.99988	**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	0.48	0.36	-1.78	ppb		-2.14
primary	2	14.80	14.64	12.98	ppb		-1.66
primary	3	35.77	35.55	34.93	ppb	-1.76	
primary	4	69.50	69.18	66.90	ppb	-3.35	
primary	5	113.56	113.12	110.20	ppb	-2.62	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Dirty	Fail
Battery Backup	N/A	pass
Offset	0.20	pass
Span	1.037	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	115.7 kHz	pass
Cell A Noise	0.9 ppb	pass
Cell A Flow	0.69 lpm	pass
Cell A Pressure	727.9 mmHg	pass
Cell A Tmp.	33.6 C	pass
Cell B Freq.	98.1 kHz	pass
Cell B Noise	0.8 ppb	pass
Cell B Flow	0.71 lpm	pass
Cell B Pressure	728.5 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	9699	CAD150	Sandy Grenville	04/16/2019	Temperature	04682

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

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Er**	**Abs Avg Err**	**Abs Max Er**
0.08	0.16		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.36	0.21	0.000	0.3	C	0.05
primary	Temp Mid Range	25.64	25.31	0.000	25.3	C	-0.03
primary	Temp High Range	47.65	47.16	0.000	47.0	C	-0.16

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	CAD150	Sandy Grenville	04/16/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Er	Abs Avg Err	Abs Max Er
0.27	0.31		

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	24.30	23.98	0.000	24.3	C	0.31
primary	Temp Mid Range	24.71	24.39	0.000	24.7	C	0.31
primary	Temp Mid Range	25.50	25.17	0.000	25.4	C	0.2

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	CAD150	Technician	Sandy Grenville	Site Visit Date	04/16/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810	640 cuft

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Ozone	CAD150	Sandy Grenville	04/16/2019	Inlet Filter Condit	ThermoElectron	3512	☐	☐
Ozone inlet filter dirty								

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The ozone analyzer sample train filter is replaced and the system is leak tested monthly.

2 **Parameter:** ShelterCleanNotes

Some shelter floor tiles are cracked and there is indication of insect damage below the heater.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	CAD150	**Technician**	Sandy Grenville	**Site Visit Date**	04/16/2019

Site Sponsor (agency)	EPA	**USGS Map**	Caddo Valley
Operating Group	Ouachita Baptist University	**Map Scale**	
AQS #		**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	34.1792
Deposition Measurement	dry, wet	**QAPP Longitude**	-93.0989
Land Use	woodland - mixed	**QAPP Elevation Meters**	71
Terrain	gently rolling	**QAPP Declination**	2.3
Conforms to MLM	Marginally	**QAPP Declination Date**	12/28/2004
Site Telephone	(870) 246-0030	**Audit Latitude**	34.179278
Site Address 1	DeGray Regulating Dam	**Audit Longitude**	-93.098755
Site Address 2	Route 390	**Audit Elevation**	78
County	Clark	**Audit Declination**	1.3
City, State	Arkadelphia, AR		
Zip Code	71923	**Fire Extinguisher** ☑ Present	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** Ekto **Model** 8810 **Shelter Size** 640 cuft

Shelter Clean ☑ **Notes** Some shelter floor tiles are cracked and there is indication of insect damage below the heater.

Site OK ☑ **Notes**

Driving Directions From Interstate 30 in Arkadelphia take exit 78 and turn west on route 7. Go south on Lower Dam Pike, route 390, immediately west of the interstate. This road runs parallel to the interstate for approximately 1/2 mile and then turns west. Continue for approximately 1 mile, the site will be on the left just before the dam.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID CAD150 **Technician** Sandy Grenville **Site Visit Date** 04/16/2019

Potential Interferent	Minimum Distance From Measurement Apparatus	Distance	Pass = Checked
Large Point Source of SO2 or NOx	20 to 40 km		☑
Major industrial complex	10 to 20 km		☑
City > 50,000 population	40 km		☑
City 10,000 to 50,000 population	10 km		☑
City 1,000 to 10,000 population	5 km		☑
Major highway, airport or rail yard	2 km		☑
Secondary road, heavily traveled	500 m		☑
Secondary road, lightly traveled	200 m		☑
Feedlot operations	500 m		☑
Intensive agricultural ops (including aerial spraying)	500 m		☑
Limited agricultural operations	200 m		☑
Large parking lot	200 m		☑
Small parking lot	100 m		☑
Tree line	50 m	30m	☐
Obstacles to wind	10 times obstacle height		☑

Siting Distances OK ☑

Siting Criteria Comment

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	CAD150	Technician	Sandy Grenville	Site Visit Date	04/16/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	CAD150	Technician	Sandy Grenville	Site Visit Date	04/16/2019

1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	☑	Temperature only
2	Are all the meteorological sensors operational online, and reporting data?	☑	Temperature only
3	Are the shields for the temperature and RH sensors clean?	☑	
4	Are the aspirated motors working?	☑	N/A
5	Is the solar radiation sensor's lens clean and free of scratches?	☑	N/A
6	Is the surface wetness sensor grid clean and undamaged?	☑	N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	☑	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 CAD150 **Technician** Sandy Grenville **Site Visit Date** 04/16/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

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

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID CAD150 **Technician** Sandy Grenville **Site Visit Date** 04/16/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

1	Do the DAS instruments appear to be in good condition and well maintained?	☑	
2	Are all the components of the DAS operational? (printers, modem, backup, etc)	☑	
3	Do the analyzer and sensor signal leads pass through lightning protection circuitry?	☐	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?	☐	Shelter not grounded
7	Does the instrument shelter have a stable power source?	☑	
8	Is the instrument shelter temperature controlled?	☑	

		Stable	Grounded
9	Is the met tower stable and grounded?	☐	☐
10	Is the sample tower stable and grounded?	☑	☐
11	Tower comments?	Sample tower is stable but not grounded. 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 CAD150 **Technician** Sandy Grenville **Site Visit Date** 04/16/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑		☑
SSRF	☑		☑
Site Ops Manual	☐		☐
HASP	☑	2016	☑
Field Ops Manual	☑	Oct 2014	☑
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 CAD150 **Technician** Sandy Grenville **Site Visit Date** 04/16/2019

Site operation procedures

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

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

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

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

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

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

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

The ozone analyzer sample train filter is replaced and the system is leak tested monthly.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID CAD150 **Technician** Sandy Grenville **Site Visit Date** 04/16/2019

Site operation procedures

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

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

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

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

Site ID CAD150 **Technician** Sandy Grenville **Site Visit Date** 04/16/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07029
DAS	Campbell	CR3000	2530	000421
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA110	09883403-01-4	00462
Flow Rate	Apex	AXMC105LPMDPC	illegible	000597
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LRS4	unknown	07195
Ozone	ThermoElectron Inc	49i A1NAA	1009241792	000624
Ozone Standard	ThermoElectron Inc	49i A3NAA	0622717849	000495
Sample Tower	Aluma Tower	A	none	03538
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	9699	04682
Zero air pump	Werther International	C 70/4	000829156	06914

Site Inventory by Site Visit

Site Visit Date		*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
LAV410-Martin Valvur-05/07/2019						
1	5/7/2019	Computer	Hewlett Packard	none	unknown	5CB1520H6L
2	5/7/2019	DAS	Environmental Sys Corp	90535	8816	2026
3	5/7/2019	Elevation	Elevation	None	1	None
4	5/7/2019	Filter pack flow pump	Thomas	none	107CA18B	081700057768
5	5/7/2019	Flow Rate	Alicat	none	MC-10SLPM-D-PCV	134657
6	5/7/2019	Infrastructure	Infrastructure	none	none	none
7	5/7/2019	Mainframe	Climatronics	none	100081	1377
8	5/7/2019	Mainframe power supply	Climatronics	none	101074	858
9	5/7/2019	Met tower	Rohn	none	unknown	none
10	5/7/2019	Modem	US Robotics	none	56k	unknown
11	5/7/2019	Ozone	ThermoElectron Inc	90834	49C	49C-520012-328
12	5/7/2019	Ozone Standard	ThermoElectron Inc	90567	49C	49C-59283-322
13	5/7/2019	Sample Tower	Aluma Tower	923314	B	AT-5324-F6-O
14	5/7/2019	Shelter Temperature	DRI	none	Unknown	Unknown
15	5/7/2019	Shield (2 meter)	Climatronics	01199	100325	1290
16	5/7/2019	Siting Criteria	Siting Criteria	None	1	None
17	5/7/2019	Temperature Translator	Climatronics	03629	100088-2	398
18	5/7/2019	Temperature2meter	Climatronics	03794	100093	ARS101
19	5/7/2019	Zero air pump	Werther International	none	PC70/4	847660

DAS Data Form

DAS Time Max Error: 1.45

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	2026	LAV410	Martin Valvur	05/07/2019	DAS	Primary

Das Date: 5 /7 /2019
Das Time: 07:23:30
Das Day: 127

Audit Date 5 /7 /2019
Audit Time 07:22:03
Audit Day 127

Low Channel:		High Channel:	
Avg Diff:	**Max Diff:**	**Avg Diff:**	**Max Diff:**
0.0001	0.0004	0.0001	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
13	0.0000	-0.0005	-0.0003	V	V	0.0002
13	0.1000	0.1005	0.1005	V	V	0.0000
13	0.3000	0.2998	0.2996	V	V	-0.0002
13	0.5000	0.4996	0.4996	V	V	0.0000
13	0.7000	0.7002	0.6998	V	V	-0.0004
13	0.9000	0.8999	0.9000	V	V	0.0001
13	1.0000	1.0002	1.0001	V	V	-0.0001

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Alicat	134657	LAV410	Martin Valvur	05/07/2019	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 % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	-0.008
				Cal Factor Full Scale	5.05
0.29%	0.43%			**Rotometer Reading:**	3.55

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	0.0000	0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.0000	0.01	l/m	l/m	
primary	test pt 1	3.022	3.020	2.98	0.0000	3.02	l/m	l/m	-0.13%
primary	test pt 2	3.023	3.020	2.97	0.0000	3.01	l/m	l/m	-0.43%
primary	test pt 3	3.027	3.020	2.98	0.0000	3.01	l/m	l/m	-0.30%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Fair	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	6.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	0.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	90 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	49C-520012-328	LAV410	Martin Valvur	05/07/2019	Ozone	90834

Slope:	0.98111	**Slope:**	0.00000
Intercept	-0.72695	**Intercept**	0.00000
CorrCoff:	0.99986	**CorrCoff:**	0.00000

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

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.14	0.13	0.37	ppb		0.24
primary	2	13.33	13.30	12.02	ppb		-1.28
primary	3	35.86	35.79	33.32	ppb	-7.15	
primary	4	64.83	64.72	62.84	ppb	-2.95	
primary	5	114.13	113.95	111.40	ppb	-2.26	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		Fail
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.000	pass
Span	1.006	pass
Zero Voltage	-0.0003	pass
Fullscale Voltage	0.9999	pass
Cell A Freq.	66.9 kHz	pass
Cell A Noise	0.5 ppb	pass
Cell A Flow	0.65 lpm	pass
Cell A Pressure	609.1 mmHg	pass
Cell A Tmp.	34.8 C	pass
Cell B Freq.	84.8 kHz	pass
Cell B Noise	0.4 ppb	pass
Cell B Flow	0.59 lpm	pass
Cell B Pressure	608.8 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Climatronics	ARS101	LAV410	Martin Valvur	05/07/2019	Temperature2meter	03794

Mfg	Climatronics
SN/Owner ID	398 03629
Parameter:	Temperature Translator

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

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.06	0.13		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	0.18	0.19	0.0000	0.15	C	-0.04
primary	Temp Mid Range	26.82	26.83	0.0000	26.70	C	-0.13
primary	Temp High Rang	47.00	47.01	0.0000	47.03	C	0.02

Sensor Component	Properly Sited	Condition	Properly sited	Status	pass
Sensor Component	Shield	Condition	Clean	Status	pass
Sensor Component	Blower	Condition	Not functioning	Status	Fail
Sensor Component	Blower Status Switch	Condition	N/A	Status	pass
Sensor Component	System Memo	Condition	See comments	Status	pass

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
DRI	Unknown	LAV410	Martin Valvur	05/07/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
1.12	1.75		

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	20.36	20.37	0.000	21.8	C	1.44
primary	Temp Mid Range	23.80	23.81	0.000	22.1	C	-1.75
primary	Temp Mid Range	21.94	21.95	0.000	22.1	C	0.17

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	LAV410	Technician	Martin Valvur	Site Visit Date	05/07/2019

Shelter Make	Shelter Model	Shelter Size
		1150 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	Signs of wear	Status	pass
Sensor Component	Tubing Type	Condition	3/8 teflon	Status	pass
Sensor Component	Sample Train	Condition	Good	Status	pass

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Temperature2meter	LAV410	Martin Valvur	05/07/2019	Blower	Climatronics	4323	☐	☐
The forced-air blower for the shield is not functioning.								
Temperature2meter	LAV410	Martin Valvur	05/07/2019	System Memo	Climatronics	4323	☐	☐
The sensor signal cables are showing signs of wear.								

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The ozone inlet filter is changed and the sample line conditioned every two weeks or as needed.

2 **Parameter:** SitingCriteriaCom

The site is located at the end of a park service facility parking lot, in a fire station. The tree line is near the building, but the prevailing wind direction is from the clearing. Tree height above the sample inlet is not twice as far away as it is high above the inlet.

3 **Parameter:** ShelterCleanNotes

The inside equipment is located in room within the fire station, clean, neat, and organized.

4 **Parameter:** PollAnalyzerCom

Trees violate the ozone sample inlet siting criteria.

5 **Parameter:** MetOpMaintCom

The temperature sensor signal cable has deteriorated and is in need of replacement. The aspirated motor for temperature sensor is not functioning and the temperature measurement data quality are affected.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	LAV410	Technician	Martin Valvur	Site Visit Date	05/07/2019

Site Sponsor (agency)	NPS	USGS Map	Manzanita Lake
Operating Group	NPS	Map Scale	
AQS #	06-065-1004	Map Date	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone, IMPROVE	QAPP Latitude	40.5403
Deposition Measurement	dry, wet	QAPP Longitude	-121.5764
Land Use	woodland - evergreen	QAPP Elevation Meters	1756
Terrain	complex	QAPP Declination	
Conforms to MLM	Marginally	QAPP Declination Date	
Site Telephone	(530) 335-7214	Audit Latitude	40.539991
Site Address 1	38050 Hwy 36E	Audit Longitude	-121.576462
Site Address 2		Audit Elevation	1755
County	Shasta	Audit Declination	14.5
City, State	Mineral, CA		
Zip Code	96063	Fire Extinguisher (Present) ☑	Inspected April 2017
Time Zone	Pacific	First Aid Kit ☑	
Primary Operator		Safety Glasses ☐	
Primary Op. Phone #		Safety Hard Hat ☑	
Primary Op. E-mail		Climbing Belt ☐	
Backup Operator		Security Fence ☐	
Backup Op. Phone #		Secure Shelter ☑	
Backup Op. E-mail		Stable Entry Steps ☑	

Shelter Working Room	☑	Make		Model		Shelter Size	1150 cuft
Shelter Clean	☑	Notes	The inside equipment is located in room within the fire station, clean, neat, and organized.				
Site OK	☑	Notes					

Driving Directions

From Redding take route 44 east for approximately 45 miles. At the park, and intersection of 44 and 89, turn right onto route 89. Turn right at the first road into the fire station and maintenance area. Take the first left, the site is behind the fire station at the end of the parking lot. One room in the fire station houses the climate controlled equipment.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID LAV410 **Technician** Martin Valvur **Site Visit Date** 05/07/2019

Potential Interferent	Minimum Distance From Measurement Apparatus	Distance	Pass = Checked
Large Point Source of SO2 or NOx	20 to 40 km		☑
Major industrial complex	10 to 20 km		☑
City > 50,000 population	40 km		☑
City 10,000 to 50,000 population	10 km		☑
City 1,000 to 10,000 population	5 km		☑
Major highway, airport or rail yard	2 km		☑
Secondary road, heavily traveled	500 m		☑
Secondary road, lightly traveled	200 m		☑
Feedlot operations	500 m		☑
Intensive agricultural ops (including aerial spraying)	500 m		☑
Limited agricultural operations	200 m		☑
Large parking lot	200 m		☑
Small parking lot	100 m	25 m	☐
Tree line	50 m	10 m	☐
Obstacles to wind	10 times obstacle height		☑

Siting Distances OK ☐

Siting Criteria Comment

The site is located at the end of a park service facility parking lot, in a fire station. The tree line is near the building, but the prevailing wind direction is from the clearing. Tree height above the sample inlet is not twice as far away as it is high above the inlet.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	LAV410	Technician	Martin Valvur	Site Visit Date	05/07/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	LAV410	Technician	Martin Valvur	Site Visit Date	05/07/2019

1	Do all the meterological sensors appear to be intact, in good condition, and well maintained?	☑	N/A
2	Are all the meteorological sensors operational online, and reporting data?	☑	N/A
3	Are the shields for the temperature and RH sensors clean?	☑	
4	Are the aspirated motors working?	☐	Not functioning
5	Is the solar radiation sensor's lens clean and free of scratches?	☑	N/A
6	Is the surface wetness sensor grid clean and undamaged?	☑	N/A
7	Are the sensor signal and power cables intact, in good condition, and well maintained?	☐	Signs of wear
8	Are the sensor signal and power cable connections protected from the elements and well maintained?	☑	

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

The temperature sensor signal cable has deteriorated and is in need of replacement. The aspirated motor for temperature sensor is not functioning and the temperature measurement data quality are affected.

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	LAV410	Technician	Martin Valvur	Site Visit Date	05/07/2019

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

1	Do the sample inlets have at least a 270 degree arc of unrestricted airflow?	☑	
2	Are the sample inlets 3 - 15 meters above the ground?	☑	
3	Are the sample inlets > 1 meter from any major obstruction, and 20 meters from trees?	☐	< 10 meters

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 10 meters
4	Describe dry dep sample tube.		3/8 teflon by 10 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	Flow line only
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

Trees violate the ozone sample inlet siting criteria.

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID LAV410 **Technician** Martin Valvur **Site Visit Date** 05/07/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

1	Do the DAS instruments appear to be in good condition and well maintained?	☑	
2	Are all the components of the DAS operational? (printers, modem, backup, etc)	☑	
3	Do the analyzer and sensor signal leads pass through lightning protection circuitry?	☑	
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	LAV410	Technician	Martin Valvur	Site Visit Date	05/07/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑	DataView2	☑
SSRF	☑		☑
Site Ops Manual	☑	July 2012	☑
HASP	☐		☐
Field Ops Manual	☐		☐
Calibration Reports	☑	Not current	☐
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	LAV410	Technician	Martin Valvur	Site Visit Date	05/07/2019

Site operation procedures

1	Has the site operator attended a formal CASTNET training course? If yes, when and who instructed?	☐	Informal training provided by ARS during maintenance visits
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	☑	Not performed	☑
Automatic Precision Level Tests	☑	Daily	☑
Manual Precision Level Test	☑	Not performed	☑
Analyzer Diagnostics Tests	☑	Alarm values only	☑
In-line Filter Replacement (at inlet)	☑	Monthly	☑
In-line Filter Replacement (at analyze	☑	N/A	☑
Sample Line Check for Dirt/Water	☐		☐
Zero Air Desiccant Check	☐		☐

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

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

The ozone inlet filter is changed and the sample line conditioned every two weeks or as needed.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	LAV410	Technician	Martin Valvur	Site Visit Date	05/07/2019

Site operation procedures

1	Is the filter pack being changed every Tuesday as scheduled?	☑	Filter changed between 11:00 and 13:00
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, dataview
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	☑	Weekly	☑
Sample Line Check for Dirt/Water	☐	Weekly	☑

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

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID LAV410 **Technician** Martin Valvur **Site Visit Date** 05/07/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	unknown	5CB1520H6L	none
DAS	Environmental Sys Corp	8816	2026	90535
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18B	081700057768	none
Flow Rate	Alicat	MC-10SLPM-D-PCV	134657	none
Infrastructure	Infrastructure	none	none	none
Mainframe	Climatronics	100081	1377	none
Mainframe power supply	Climatronics	101074	858	none
Met tower	Rohn	unknown	none	none
Modem	US Robotics	56k	unknown	none
Ozone	ThermoElectron Inc	49C	49C-520012-328	90834
Ozone Standard	ThermoElectron Inc	49C	49C-59283-322	90567
Sample Tower	Aluma Tower	B	AT-5324-F6-O	923314
Shelter Temperature	DRI	Unknown	Unknown	none
Shield (2 meter)	Climatronics	100325	1290	01199
Siting Criteria	Siting Criteria	1	None	None
Temperature Translator	Climatronics	100088-2	398	03629
Temperature2meter	Climatronics	100093	ARS101	03794
Zero air pump	Werther International	PC70/4	847660	none

Site Inventory by Site Visit

Site Visit Date		*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
PIN414-Martin Valvur-05/08/2019						
1	5/8/2019	Computer	Hewlett Packard	none	8460 elitebook	CNU13607G
2	5/8/2019	DAS	Environmental Sys Corp	90612	8816	2615
3	5/8/2019	Elevation	Elevation	None	1	None
4	5/8/2019	Filter pack flow pump	Thomas	none	107CAB18	0000158
5	5/8/2019	Flow Rate	Alicat	none	Unknown	Unknown
6	5/8/2019	Infrastructure	Infrastructure	none	none	none
7	5/8/2019	Modem	Hughesnet	none	Unknown	Unknown
8	5/8/2019	Ozone	ThermoElectron Inc	90765	49C	49c-74530376
9	5/8/2019	Ozone Standard	ThermoElectron Inc	none	49C	0425208055
10	5/8/2019	Sample Tower	Aluma Tower	928348	B	AT-5381-F9-3
11	5/8/2019	Shelter Temperature	ARS	none	none	none
12	5/8/2019	Siting Criteria	Siting Criteria	None	1	None
13	5/8/2019	Temperature Translator	Climatronics	none	100088-2	397
14	5/8/2019	Temperature2meter	Climatronics	none	100093	missing

DAS Data Form

DAS Time Max Error: 0.95

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	2615	PIN414	Martin Valvur	05/08/2019	DAS	Primary

Das Date: 5 /8 /2019
Das Time: 13:20:03
Das Day: 128

Audit Date 5 /8 /2019
Audit Time 13:21:00
Audit Day 128

Low Channel:

Avg Diff:	Max Diff:
0.0002	0.0005

High Channel:

Avg Diff:	Max Diff:
0.0002	0.0005

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
15	0.0000	0.0000	0.0000	V	V	0.0000
15	0.1000	0.1002	0.1002	V	V	0.0000
15	0.3000	0.2990	0.2991	V	V	0.0001
15	0.5000	0.5009	0.5014	V	V	0.0005
15	0.7000	0.6994	0.6995	V	V	0.0001
15	0.9000	0.8997	0.9002	V	V	0.0005
15	1.0000	0.9999	1.0004	V	V	0.0005

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Alicat	Unknown	PIN414	Martin Valvur	05/08/2019	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 % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0.058
1.22%	1.41%			**Cal Factor Full Scale**	4.964
				Rotometer Reading:	3.15

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	0.0000	0.11	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.0000	0.12	l/m	l/m	
primary	test pt 1	2.976	2.970	3.01	0.0000	3.01	l/m	l/m	1.41%
primary	test pt 2	2.982	2.980	3.01	0.0000	3.01	l/m	l/m	0.97%
primary	test pt 3	2.979	2.970	3.01	0.0000	3.01	l/m	l/m	1.28%

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**	260 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	49c-74530376	PIN414	Martin Valvur	05/08/2019	Ozone	90765

Slope:	1.00749	**Slope:**	0.00000
Intercept	-0.27178	**Intercept**	0.00000
CorrCoff:	0.99999	**CorrCoff:**	0.00000

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

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.40	0.39	0.33	ppb		-0.06
primary	2	15.06	15.03	14.70	ppb		-0.33
primary	3	35.03	34.97	35.06	ppb	0.26	
primary	4	65.31	65.20	65.10	ppb	-0.15	
primary	5	110.05	109.87	110.60	ppb	0.66	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	-0.2	pass
Span	0.999	pass
Zero Voltage	-0.0020	pass
Fullscale Voltage	0.9980	pass
Cell A Freq.	64.9 kHz	pass
Cell A Noise	0.4 ppb	pass
Cell A Flow	0.77 lpm	pass
Cell A Pressure	709.9 mmHg	pass
Cell A Tmp.	29.2 C	pass
Cell B Freq.	64.9 kHz	pass
Cell B Noise	0.5 ppb	pass
Cell B Flow	0.80 lpm	pass
Cell B Pressure	709.2 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 Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Climatronics	missing	PIN414	Martin Valvur	05/08/2019	Temperature2meter	none

Mfg	Climatronics	
SN/Owner ID	397	none
Parameter:	Temperature Translator	

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

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.15	0.31		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	0.23	0.24	0.0000	0.22	C	-0.02
primary	Temp Mid Range	24.80	24.81	0.0000	24.69	C	-0.12
primary	Temp High Rang	48.40	48.41	0.0000	48.10	C	-0.31

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	PIN414	Martin Valvur	05/08/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.58	0.74		

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	24.90	24.91	0.000	25.7	C	0.74
primary	Temp Mid Range	27.55	27.56	0.000	27.9	C	0.29
primary	Temp Mid Range	28.52	28.53	0.000	27.8	C	-0.71

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	Technician	Site Visit Date
PIN414	Martin Valvur	05/08/2019

Shelter Make	Shelter Model	Shelter Size
Alan pre-fab	s/n 861168 1808	512 cuft

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

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The site operator reviews data each week to ensure proper operation of sensors and instruments.

2 **Parameter:** ShelterCleanNotes

The lighting has been repaired. The shelter has been cleaned and organized.

3 **Parameter:** MetOpMaintCom

The temperature sensor signal cable is deteriorating.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	PIN414	**Technician**	Martin Valvur	**Site Visit Date**	05/08/2019

Site Sponsor (agency)	NPS	**USGS Map**	North Chalone Peak
Operating Group	NPS	**Map Scale**	
AQS #	06-069-0003	**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone, IMPROVE	**QAPP Latitude**	36.4850
Deposition Measurement	dry, wet	**QAPP Longitude**	-121.1556
Land Use	woodland - scrub	**QAPP Elevation Meters**	335
Terrain	complex	**QAPP Declination**	
Conforms to MLM	Marginally	**QAPP Declination Date**	
Site Telephone	(831) 389-4586	**Audit Latitude**	36.483235
Site Address 1	5000 Hwy 146	**Audit Longitude**	-121.156876
Site Address 2		**Audit Elevation**	317
County	San Benito	**Audit Declination**	13.5
City, State	Paicines, CA		
Zip Code	95043	**Fire Extinguisher** ☑	Inspected May 2017
Time Zone	Pacific	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☐	
Primary Op. Phone #		**Safety Hard Hat** ☐	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Present

Shelter Working Room	☑	**Make**	Alan pre-fab	**Model**	s/n 861168 1808	**Shelter Size**	512 cuft
Shelter Clean	☑	**Notes**	The lighting has been repaired. The shelter has been cleaned and organized.				
Site OK	☑	**Notes**					

Driving Directions From Hollister proceed south on route 25 to highway 146 and the entrance to Pinnacles National Monument. Turn west on 146 and continue to the fee station. Less than 1/2 mile from the fee station the site will be visible 100 yards from the road on the right up a hill.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID PIN414 **Technician** Martin Valvur **Site Visit Date** 05/08/2019

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	PIN414	Technician	Martin Valvur	Site Visit Date	05/08/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	PIN414	Technician	Martin Valvur	Site Visit Date	05/08/2019

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

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

The temperature sensor signal cable is deteriorating.

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	PIN414	Technician	Martin Valvur	Site Visit Date	05/08/2019

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 10 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☐	
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 PIN414 **Technician** Martin Valvur **Site Visit Date** 05/08/2019

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	PIN414	Technician	Martin Valvur	Site Visit Date	05/08/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑	DataView2	☑
SSRF	☑		☑
Site Ops Manual	☑	Jan 2006	☑
HASP	☐		☐
Field Ops Manual	☐		☐
Calibration Reports	☑		☐
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedule	☐		☐

1	Is the station log properly completed during every site visit?	☑	Dataview checklists
2	Are the Site Status Report Forms being completed and current?	☑	Flow section only
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 PIN414 **Technician** Martin Valvur **Site Visit Date** 05/08/2019

Site operation procedures

1	Has the site operator attended a formal CASTNET training course? If yes, when and who instructed?	☐	Trained by previous operator, ARS provides updates semiannually
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	☑	Monthly	☑
Confirm Reasonableness of Current Values	☑	Weekly	☑
Test Surface Wetness Response	☐	N/A	☑

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

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

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

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

The site operator reviews data each week to ensure proper operation of sensors and instruments.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	PIN414	Technician	Martin Valvur	Site Visit Date	05/08/2019

Site operation procedures

1	Is the filter pack being changed every Tuesday as scheduled?	☑	Filter changed mornings 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 and dataview checklists
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 PIN414 **Technician** Martin Valvur **Site Visit Date** 05/08/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	8460 elitebook	CNU13607G	none
DAS	Environmental Sys Corp	8816	2615	90612
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	0000158	none
Flow Rate	Alicat	Unknown	Unknown	none
Infrastructure	Infrastructure	none	none	none
Modem	Hughesnet	Unknown	Unknown	none
Ozone	ThermoElectron Inc	49C	49c-74530376	90765
Ozone Standard	ThermoElectron Inc	49C	0425208055	none
Sample Tower	Aluma Tower	B	AT-5381-F9-3	928348
Shelter Temperature	ARS	none	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature Translator	Climatronics	100088-2	397	none
Temperature2meter	Climatronics	100093	missing	none

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
YOS404-Martin Valvur-05/13/2019						
1	5/13/2019	DAS	Environmental Sys Corp	90645	8816	2558
2	5/13/2019	Elevation	Elevation	None	1	None
3	5/13/2019	Filter pack flow pump	Thomas	none	107CAB18	081700057763
4	5/13/2019	Flow Rate	Alicat	none	Unknown	150929
5	5/13/2019	Infrastructure	Infrastructure	none	none	none
6	5/13/2019	Met tower	unknown	none	unknown	none
7	5/13/2019	Modem	Sierra wireless	none	unknown	LA82610183001005
8	5/13/2019	Ozone	ThermoElectron Inc	90763	49C	49C-74534-376
9	5/13/2019	Ozone Standard	ThermoElectron Inc	90524	49C	49C-58308-318
10	5/13/2019	Sample Tower	Aluma Tower	none	B	none
11	5/13/2019	Shelter Temperature	ARS	none	none	none
12	5/13/2019	Siting Criteria	Siting Criteria	None	1	None
13	5/13/2019	Temperature2meter	RM Young	none	41342	18748
14	5/13/2019	Zero air pump	Werther International	none	PC70/4	531397

DAS Data Form

DAS Time Max Error: 0.92

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	2558	YOS404	Martin Valvur	05/13/2019	DAS	Primary

Das Date: 5 /13/2019
Das Time: 08:12:45
Das Day: 133

Audit Date 5 /13/2019
Audit Time 08:11:50
Audit Day 133

Low Channel:

Avg Diff:	Max Diff:
0.0001	0.0003

High Channel:

Avg Diff:	Max Diff:
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
2	0.0000	0.0001	0.0003	V	V	0.0002
2	0.1000	0.0998	0.0999	V	V	0.0001
2	0.3000	0.2998	0.2995	V	V	-0.0003
2	0.5000	0.5000	0.4998	V	V	-0.0002
2	0.7000	0.7000	0.6999	V	V	-0.0001
2	0.9000	0.8998	0.8997	V	V	-0.0001
2	1.0000	0.9999	0.9999	V	V	0.0000

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Alicat	150929	YOS404	Martin Valvur	05/13/2019	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 % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	-0.034
				Cal Factor Full Scale	5
0.14%	0.23%			**Rotometer Reading:**	3.3

Desc.	Test type	Input l/m	Input Corr	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.05	0.0000	0.06	l/m	l/m	
primary	leak check	0.000	0.000	0.02	0.0000	0.03	l/m	l/m	
primary	test pt 1	3.007	3.000	3.01	0.0000	2.99	l/m	l/m	-0.23%
primary	test pt 2	2.998	2.990	3.01	0.0000	3.00	l/m	l/m	0.17%
primary	test pt 3	3.009	3.000	3.01	0.0000	3.00	l/m	l/m	-0.03%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	3.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	280 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	49C-74534-376	YOS404	Martin Valvur	05/13/2019	Ozone	90763

Slope:	1.01307	**Slope:**	0.00000
Intercept	-0.42535	**Intercept**	0.00000
CorrCoff:	0.99995	**CorrCoff:**	0.00000

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

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	-0.03	-0.03	0.18	ppb		0.21
primary	2	15.05	15.02	14.42	ppb		-0.6
primary	3	35.02	34.96	34.53	ppb	-1.24	
primary	4	65.02	64.91	65.34	ppb	0.66	
primary	5	112.35	112.17	113.40	ppb	1.09	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.3	pass
Span	0.994	pass
Zero Voltage	0.0008	pass
Fullscale Voltage	1.0003	pass
Cell A Freq.	85.8 kHz	pass
Cell A Noise	0.4 ppb	pass
Cell A Flow	0.62 lpm	pass
Cell A Pressure	619.4 mmHg	pass
Cell A Tmp.	33.2 C	pass
Cell B Freq.	76.4 kHz	pass
Cell B Noise	0.6 ppb	pass
Cell B Flow	0.62 lpm	pass
Cell B Pressure	618.9 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	18748	YOS404	Martin Valvur	05/13/2019	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 Err	Abs Avg Err	Abs Max Err
0.15	0.24		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	0.22	0.23	0.0000	-0.01	C	-0.24
primary	Temp Mid Range	23.59	23.60	0.0000	23.52	C	-0.08
primary	Temp High Rang	46.64	46.65	0.0000	46.53	C	-0.12

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	YOS404	Martin Valvur	05/13/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
1.61	2.31		

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	21.80	21.81	0.000	23.1	C	1.31
primary	Temp Mid Range	21.90	21.91	0.000	23.1	C	1.21
primary	Temp Mid Range	21.50	21.51	0.000	23.8	C	2.31

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	Technician	Site Visit Date
YOS404	Martin Valvur	05/13/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8812 (s/n 3515-2)	768 cuft

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

Field Systems Comments

1 **Parameter:** ShelterCleanNotes

The site is neat, clean, and well organized. The shelter roof is leaking and is currently covered with a tarp.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	YOS404	**Technician**	Martin Valvur	**Site Visit Date**	05/13/2019

Site Sponsor (agency)	NPS	**USGS Map**	El Capitan
Operating Group	NPS	**Map Scale**	
AQS #	06-043-0003	**Map Date**	
Meteorological Type	Climatronics		
Air Pollutant Analyzer	Ozone, CO, NOx, IMPROVE	**QAPP Latitude**	37.7133
Deposition Measurement	dry	**QAPP Longitude**	-119.7061
Land Use	mountain top, woodland - evergreen	**QAPP Elevation Meters**	1605
Terrain	complex	**QAPP Declination**	
Conforms to MLM	Marginally	**QAPP Declination Date**	
Site Telephone	(209) 372-4411	**Audit Latitude**	37.713251
Site Address 1	Turtleback Dome	**Audit Longitude**	-119.706196
Site Address 2		**Audit Elevation**	1599
County	Mariposa	**Audit Declination**	13.5
City, State	Yosemite National Park, CA		
Zip Code	95389	**Fire Extinguisher** ☐	Not present
Time Zone	Pacific	**First Aid Kit** ☐	
Primary Operator		**Safety Glasses** ☐	Not present
Primary Op. Phone #		**Safety Hard Hat** ☐	Not present
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Present

Shelter Working Room	☑	**Make**	Ekto	**Model**	8812 (s/n 3515-2)	**Shelter Size**	768 cuft
Shelter Clean	☑	**Notes**	The site is neat, clean, and well organized. The shelter roof is leaking and is currently covered with a tarp.				
Site OK	☑	**Notes**					

Driving Directions

From Mariposa take route 140 into Yosemite. From the loop road, take route 41 toward Oakhurst. Continue uphill and through the tunnel. Approximately one mile past the tunnel look for a dirt road on the left. Continue approximately 1/2 mile past the gate to the communication station at the top of Turtleback Dome. The site is another 100 yards on the path behind the station.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID YOS404 **Technician** Martin Valvur **Site Visit Date** 05/13/2019

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	YOS404	Technician	Martin Valvur	Site Visit Date	05/13/2019

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)	☑	N/A
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	YOS404	Technician	Martin Valvur	Site Visit Date	05/13/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	YOS404	Technician	Martin Valvur	Site Visit Date	05/13/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 10 meters
4	Describe dry dep sample tube.		3/8 teflon by 10 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	
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	YOS404	Technician	Martin Valvur	Site Visit Date	05/13/2019

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	YOS404	Technician	Martin Valvur	Site Visit Date	05/13/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑	DataView2	☑
SSRF	☑		☑
Site Ops Manual	☑	Jan 2006	☑
HASP	☐		☐
Field Ops Manual	☐		☐
Calibration Reports	☑		☐
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedule	☐		☐

1	Is the station log properly completed during every site visit?	☑	Dataview
2	Are the Site Status Report Forms being completed and current?	☑	Flow section only
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	YOS404	Technician	Martin Valvur	Site Visit Date	05/13/2019

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	YOS404	Technician	Martin Valvur	Site Visit Date	05/13/2019

Site operation procedures

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

QC Check Performed		Frequency	Compliant
Multi-point MFC Calibrations	☑	Semiannually	☑
Flow System Leak Checks	☑	Weekly	☑
Filter Pack Inspection	☑	Weekly	☑
Flow Rate Setting Checks	☑	Weekly	☑
Visual Check of Flow Rate Rotometer	☑	Weekly	☑
In-line Filter Inspection/Replacement	☑	Monthly	☑
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 YOS404 **Technician** Martin Valvur **Site Visit Date** 05/13/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
DAS	Environmental Sys Corp	8816	2558	90645
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	081700057763	none
Flow Rate	Alicat	Unknown	150929	none
Infrastructure	Infrastructure	none	none	none
Met tower	unknown	unknown	none	none
Modem	Sierra wireless	unknown	LA82610183001005	none
Ozone	ThermoElectron Inc	49C	49C-74534-376	90763
Ozone Standard	ThermoElectron Inc	49C	49C-58308-318	90524
Sample Tower	Aluma Tower	B	none	none
Shelter Temperature	ARS	none	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature2meter	RM Young	41342	18748	none
Zero air pump	Werther International	PC70/4	531397	none

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
SEK430-Martin Valvur-05/14/2019						
1	5/14/2019	Computer	Hewlett Packard	none	6560 b	5CB1520H7P
2	5/14/2019	DAS	Environmental Sys Corp	90649	8816	2562
3	5/14/2019	Elevation	Elevation	None	1	None
4	5/14/2019	Filter pack flow pump	Thomas	none	107CAB18	120000014367
5	5/14/2019	flow rate	Tylan	03384	FC280AV	AW9403014
6	5/14/2019	Infrastructure	Infrastructure	none	none	none
7	5/14/2019	Met tower	Aluma Tower	none	B	none
8	5/14/2019	MFC power supply	Tylan	03679	RO-32	FP9403015
9	5/14/2019	Modem	US Robotics	none	56k	unknown
10	5/14/2019	Ozone	ThermoElectron Inc	90715	49C	49C-66829-354
11	5/14/2019	Ozone Standard	ThermoElectron Inc	90752	49C	49C-74532-376
12	5/14/2019	Shelter Temperature	ARS	none	none	none
13	5/14/2019	Shield (2 meter)	RM Young	none	Aspirated 43408	none
14	5/14/2019	Siting Criteria	Siting Criteria	None	1	None
15	5/14/2019	Temperature Translator	RM Young	00819	41406-X	063143
16	5/14/2019	Temperature2meter	RM Young	none	41342	8472
17	5/14/2019	Zero air pump	Werther International	none	C 70/4	000838301

DAS Data Form

DAS Time Max Error: 1.9

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	2562	SEK430	Martin Valvur	05/14/2019	DAS	Primary

Das Date: 5 /14/2019
Das Time: 09:00:54
Das Day: 134

Audit Date 5 /14/2019
Audit Time 08:59:00
Audit Day 134

Low Channel:

Avg Diff:	Max Diff:
0.0003	0.0008

High Channel:

Avg Diff:	Max Diff:
0.0003	0.0008

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
12	0.0000	-0.0004	-0.0004	V	V	0.0000
12	0.1000	0.0995	0.0995	V	V	0.0000
12	0.3000	0.3000	0.3002	V	V	0.0002
12	0.5000	0.4995	0.5001	V	V	0.0006
12	0.7000	0.6999	0.7002	V	V	0.0003
12	0.9000	0.9008	0.9012	V	V	0.0004
12	1.0000	1.0003	1.0011	V	V	0.0008

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Tylan	AW9403014	SEK430	Martin Valvur	05/14/2019	flow rate	03384

Mfg	Tylan	
SN/Owner ID	FP9403015	03679
Parameter:	MFC power supply	

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

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0.099
1.23%	1.44%			**Cal Factor Full Scale**	5.53
				Rotometer Reading:	3.1

Desc.	Test type	Input l/m	Input Corr	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	-0.07	0.0000	0.05	l/m	l/m	
primary	leak check	0.000	0.000	-0.07	0.0000	0.05	l/m	l/m	
primary	test pt 1	3.050	3.040	2.48	0.0000	3.01	l/m	l/m	-1.12%
primary	test pt 2	3.060	3.050	2.48	0.0000	3.01	l/m	l/m	-1.44%
primary	test pt 3	3.050	3.040	2.48	0.0000	3.01	l/m	l/m	-1.12%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Poor	**Status**	fail
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	-1.5 cm	**Status**	fail
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	49C-66829-354	SEK430	Martin Valvur	05/14/2019	Ozone	90715

Slope:	0.96157	**Slope:**	0.00000
Intercept	0.10304	**Intercept**	0.00000
CorrCoff:	0.99998	**CorrCoff:**	0.00000

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

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.11	0.10	0.46	ppb		0.36
primary	2	14.48	14.45	13.86	ppb		-0.59
primary	3	36.34	36.27	34.99	ppb	-3.59	
primary	4	65.64	65.53	62.75	ppb	-4.33	
primary	5	110.38	110.20	106.30	ppb	-3.6	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	-0.1	pass
Span	0.982	pass
Zero Voltage	-0.0007	pass
Fullscale Voltage	0.9997	pass
Cell A Freq.	90.1 kHz	pass
Cell A Noise	0.7 ppb	pass
Cell A Flow	0.73 lpm	pass
Cell A Pressure	706.0 mmHg	pass
Cell A Tmp.	34.6 C	pass
Cell B Freq.	92.0 kHz	pass
Cell B Noise	0.5 ppb	pass
Cell B Flow	0.73 lpm	pass
Cell B Pressure	705.4 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	8472	SEK430	Martin Valvur	05/14/2019	Temperature2meter	none

Mfg	RM Young
SN/Owner ID	063143 00819
Parameter:	Temperature Translator

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

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.23	0.37		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	0.21	0.22	0.0000	-0.04	C	-0.26
primary	Temp Mid Range	22.65	22.66	0.0000	22.59	C	-0.07
primary	Temp High Rang	46.82	46.83	0.0000	46.46	C	-0.37

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	none	SEK430	Martin Valvur	05/14/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.29	0.46		

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	21.18	21.19	0.000	21.7	C	0.46
primary	Temp Mid Range	22.02	22.03	0.000	22.3	C	0.3
primary	Temp Mid Range	23.10	23.11	0.000	23.2	C	0.12

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	Technician	Site Visit Date
SEK430	Martin Valvur	05/14/2019

Shelter Make	Shelter Model	Shelter Size
Alan pre-fab	s/n 861166 1808	512 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 Data Form

F-02058-1500-S1-rev002

Site ID	SEK430	Technician	Martin Valvur	Site Visit Date	05/14/2019

Site Sponsor (agency)	NPS	USGS Map	Case Mountain
Operating Group	NPS	Map Scale	
AQS #	06-107-0009	Map Date	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone, IMPROVE, BAM	QAPP Latitude	
Deposition Measurement	dry	QAPP Longitude	
Land Use	woodland - mixed	QAPP Elevation Meters	
Terrain	complex	QAPP Declination	
Conforms to MLM	Marginally	QAPP Declination Date	
Site Telephone		Audit Latitude	36.489469
Site Address 1	Southern Sierra Research Center	Audit Longitude	-118.829153
Site Address 2	Highway 198	Audit Elevation	510
County	Tulare	Audit Declination	13.1
City, State	Sequoia National Park, CA		
Zip Code	93262	Fire Extinguisher ☑	Inspected May 2015
Time Zone	Pacific	First Aid Kit ☑	
Primary Operator		Safety Glasses ☑	
Primary Op. Phone #		Safety Hard Hat ☐	
Primary Op. E-mail		Climbing Belt ☐	
Backup Operator		Security Fence ☐	
Backup Op. Phone #		Secure Shelter ☑	
Backup Op. E-mail		Stable Entry Steps ☑	

Present

Shelter Working Room	☑	Make	Alan pre-fab	Model	s/n 861166 1808	Shelter Size	512 cuft
Shelter Clean	☑	Notes	The shelter is aging but is in fair condition and kept clean, neat, and well organized.				
Site OK	☑	Notes					

Driving Directions

From highway 99 take 198 east through Three Rivers. Continue approximately 7 miles to the entrance to Sequoia National Park. Less than one mile past the Fee both, take the first paved road to the right at the Southern Sierra Research Center. The site is on the hill behind the center.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID SEK430 **Technician** Martin Valvur **Site Visit Date** 05/14/2019

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

Siting Distances OK ☐

Siting Criteria Comment

The site is a wooded area with spaced trees on three sides and a steep drop in elevation on the west side. Although not strictly conforming to siting criteria it is elevated in a wide valley and representative of the area. Trees are still within 5 meters, however none are higher than the CASTNET sample inlets.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	SEK430	Technician	Martin Valvur	Site Visit Date	05/14/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	SEK430	Technician	Martin Valvur	Site Visit Date	05/14/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	SEK430	Technician	Martin Valvur	Site Visit Date	05/14/2019

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?	☐	Trees within 10 meters

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 16 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?	☐	
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 filter pack sample tubing has been spliced with tygon tubing about 5 meters above the ground. The tygon tubing is brown and beginning to deteriorate.

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID SEK430 **Technician** Martin Valvur **Site Visit Date** 05/14/2019

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?	☐	The shelter ground may not be adequate
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?	The met sensors are mounted on the sample tower.	

Provide any additional 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	SEK430	Technician	Martin Valvur	Site Visit Date	05/14/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑	DataView2	☑
SSRF	☑		☑
Site Ops Manual	☑	Jan 2006	☑
HASP	☐		☐
Field Ops Manual	☐		☐
Calibration Reports	☑		☐
Ozone z/s/p Control Charts	☐		☐
Preventive maintenance schedule	☐		☐

1	Is the station log properly completed during every site visit?	☑	Dataview
2	Are the Site Status Report Forms being completed and current?	☑	SSRFs are reviewed before sending
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	SEK430	Technician	Martin Valvur	Site Visit Date	05/14/2019

Site operation procedures

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	SEK430	Technician	Martin Valvur	Site Visit Date	05/14/2019

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?	☑	Flow and observation sections only
3	Are data downloads and backups being performed as scheduled?	☐	No longer required
4	Are general observations being made and recorded? How?	☑	SSRF
5	Are site supplies on-hand and replenished in a timely fashion?	☑	
6	Are sample flow rates recorded? How?	☑	SSRF
7	Are samples sent to the lab on a regular schedule in a timely fashion?	☑	
8	Are filters protected from contamination during handling and shipping? How?	☑	Clean gloves on and off
9	Are the site conditions reported regularly to the field operations manager or staff?	☐	

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

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

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID SEK430 **Technician** Martin Valvur **Site Visit Date** 05/14/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	6560 b	5CB1520H7P	none
DAS	Environmental Sys Corp	8816	2562	90649
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18	120000014367	none
flow rate	Tylan	FC280AV	AW9403014	03384
Infrastructure	Infrastructure	none	none	none
Met tower	Aluma Tower	B	none	none
MFC power supply	Tylan	RO-32	FP9403015	03679
Modem	US Robotics	56k	unknown	none
Ozone	ThermoElectron Inc	49C	49C-66829-354	90715
Ozone Standard	ThermoElectron Inc	49C	49C-74532-376	90752
Shelter Temperature	ARS	none	none	none
Shield (2 meter)	RM Young	Aspirated 43408	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature Translator	RM Young	41406-X	063143	00819
Temperature2meter	RM Young	41342	8472	none
Zero air pump	Werther International	C 70/4	000838301	none

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
ROM406-Martin Valvur-06/06/2019						
1	6/6/2019	Computer	Hewlett Packard	none	6730b	USH01700BR
2	6/6/2019	DAS	Environmental Sys Corp	90535	8816	2025
3	6/6/2019	Elevation	Elevation	None	1	None
4	6/6/2019	flow rate	Tylan	03393	FC280AV	AW9403024
5	6/6/2019	Infrastructure	Infrastructure	none	none	none
6	6/6/2019	Met tower	Rohn	none	unknown	none
7	6/6/2019	MFC power supply	Tylan	none	RO-32	illegible
8	6/6/2019	Ozone	ThermoElectron Inc	none	49i A3NAA	0733726103
9	6/6/2019	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	CM08460008
10	6/6/2019	Sample Tower	Aluma Tower	illegible	B	none
11	6/6/2019	Shelter Temperature	ARS	none	unknown	051
12	6/6/2019	Shield (2 meter)	RM Young	none	unknown	none
13	6/6/2019	Siting Criteria	Siting Criteria	None	1	None
14	6/6/2019	Temperature2meter	RM Young	none	41342	17079
15	6/6/2019	Zero air pump	Werther International	none	PC70/4	585590

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Environmental Sys	2025	ROM406	Martin Valvur	06/06/2019	DAS	Primary

Das Date:	6 /6 /2019	**Audit Date**	6 /6 /2019
Das Time:	08:24:00	**Audit Time**	08:25:15
Das Day:	157	**Audit Day**	157

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

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

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Tylan	AW9403024	ROM406	Martin Valvur	06/06/2019	flow rate	03393

Mfg	Tylan		
SN/Owner ID	illegible	none	
Parameter:	MFC power supply		

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

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0.066
1.67%	2.00%			**Cal Factor Full Scale**	5.465
				Rotometer Reading:	3.7

Desc.	Test type	Input l/m	Input Corr	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	-0.06	0.0000	0.08	l/m	l/m	
primary	leak check	0.000	0.000	-0.05	0.0000	0.09	l/m	l/m	
primary	test pt 1	3.010	3.000	3.02	0.0000	2.94	l/m	l/m	-2.00%
primary	test pt 2	3.010	3.000	3.02	0.0000	2.94	l/m	l/m	-2.00%
primary	test pt 3	3.010	3.000	3.02	0.0000	2.97	l/m	l/m	-1.00%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	5.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	180 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	0733726103	ROM406	Martin Valvur	06/06/2019	Ozone	none

Slope:	0.97271	**Slope:**	0.00000
Intercept	-1.15458	**Intercept**	0.00000
CorrCoff:	0.99999	**CorrCoff:**	0.00000

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

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.08	0.07	-0.93	ppb		-1
primary	2	14.75	14.72	12.86	ppb		-1.86
primary	3	38.10	38.03	35.82	ppb	-5.99	
primary	4	65.50	65.39	62.74	ppb	-4.14	
primary	5	111.29	111.11	106.80	ppb	-3.96	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	-0.2	pass
Span	0.990	pass
Zero Voltage	-0.0007	pass
Fullscale Voltage	0.9995	pass
Cell A Freq.	130.8 kHz	pass
Cell A Noise	2.2 ppb	pass
Cell A Flow	0.54 lpm	pass
Cell A Pressure	540.5 mmHg	pass
Cell A Tmp.	40.1 C	pass
Cell B Freq.	82.7 kHz	pass
Cell B Noise	2.0 ppb	pass
Cell B Flow	0.64 lpm	pass
Cell B Pressure	539.9 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass

2 Meter Temperature Data Form

Calc. Difference

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	17079	ROM406	Martin Valvur	06/06/2019	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 Err	Abs Avg Err	Abs Max Err
0.22	0.33		

UseDescription	Test type	InputTmpRaw	InputTmpCorrected	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Rang	0.14	0.15	0.0000	0.23	C	0.08
primary	Temp Mid Range	23.43	23.44	0.0000	23.77	C	0.33
primary	Temp High Rang	48.70	48.71	0.0000	48.96	C	0.25

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ARS	051	ROM406	Martin Valvur	06/06/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
2.00	2.98		

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	21.91	21.92	0.000	24.9	C	2.98
primary	Temp Mid Range	22.69	22.70	0.000	24.4	C	1.74
primary	Temp Mid Range	23.30	23.31	0.000	24.6	C	1.27

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	Technician	Site Visit Date
ROM406	Martin Valvur	06/06/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8814 (s/n 3062-1)	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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
DAS	ROM406	Martin Valvur	06/06/2019	System Memo	Environmental S	2025	☐	☐

Some of the DAS channels are damaged and not functioning. Sensors are being measured on working channels.

Field Systems Comments

1 **Parameter:** DasComments

Only RH, temperature, and AMoN are mounted on the meteorological tower at approximately 2 meters.

2 **Parameter:** ShelterCleanNotes

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

3 **Parameter:** MetSensorComme

The recorded temperature is being measured at 2.5 meters above the ground and < 1 foot above the AMoN enclosure and facing south.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	ROM406	**Technician**	Martin Valvur	**Site Visit Date**	06/06/2019

Site Sponsor (agency)	NPS	**USGS Map**	Longs Peak
Operating Group	NPS	**Map Scale**	
AQS #	08-069-0007	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone, IMPROVE	**QAPP Latitude**	40.2778
Deposition Measurement	dry	**QAPP Longitude**	-105.5453
Land Use	woodland - mixed	**QAPP Elevation Meters**	2743
Terrain	complex	**QAPP Declination**	
Conforms to MLM	Marginally	**QAPP Declination Date**	
Site Telephone	(970) 586-8520	**Audit Latitude**	40.278129
Site Address 1	High Peak Camp	**Audit Longitude**	-105.545635
Site Address 2	Route 7	**Audit Elevation**	2742
County	Larimer	**Audit Declination**	9.0
City, State	Estes Park, CO		
Zip Code	80517	**Fire Extinguisher** ☑	Inspected June 2013
Time Zone	Mountain	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☐	
Primary Op. Phone #		**Safety Hard Hat** ☐	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☐	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Present

Shelter Working Room	☑	**Make**	Ekto	**Model**	8814 (s/n 3062-1)	**Shelter Size**	896 cuft
Shelter Clean	☑	**Notes**	The shelter is clean, neat, organized, and well maintained.				
Site OK	☑	**Notes**					

Driving Directions From Estes Park take route 7 south approximately 8.5 miles. Turn right onto Preservation Road (dirt road) at the sign for High Peak Camp operated by the Salvation Army. The site is approximately 100 meters on the left.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID ROM406 **Technician** Martin Valvur **Site Visit Date** 06/06/2019

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	ROM406	Technician	Martin Valvur	Site Visit Date	06/06/2019

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

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

The recorded temperature is being measured at 2.5 meters above the ground and < 1 foot above the AMoN enclosure and facing south.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	ROM406	Technician	Martin Valvur	Site Visit Date	06/06/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	ROM406	Technician	Martin Valvur	Site Visit Date	06/06/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 10 meters
4	Describe dry dep sample tube.		3/8 teflon by 10 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	Flow line only
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	Clean and dry

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

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID	ROM406	Technician	Martin Valvur	Site Visit Date	06/06/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

Only RH, temperature, and AMoN are mounted on the meteorological tower at approximately 2 meters.

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	ROM406	Technician	Martin Valvur	Site Visit Date	06/06/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

1	Is the station log properly completed during every site visit?	☑	Dataview
2	Are the Site Status Report Forms being completed and current?	☑	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	ROM406	Technician	Martin Valvur	Site Visit Date	06/06/2019

Site operation procedures

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	ROM406	Technician	Martin Valvur	Site Visit Date	06/06/2019

Site operation procedures

1	Is the filter pack being changed every Tuesday as scheduled?	☑	Filter changed mornings
2	Are the Site Status Report Forms being completed and filed correctly?	☑	
3	Are data downloads and backups being performed as scheduled?	☐	no longer required
4	Are general observations being made and recorded? How?	☑	SSRF
5	Are site supplies on-hand and replenished in a timely fashion?	☑	
6	Are sample flow rates recorded? How?	☑	SSRF
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 ROM406 **Technician** Martin Valvur **Site Visit Date** 06/06/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Hewlett Packard	6730b	USH01700BR	none
DAS	Environmental Sys Corp	8816	2025	90535
Elevation	Elevation	1	None	None
flow rate	Tylan	FC280AV	AW9403024	03393
Infrastructure	Infrastructure	none	none	none
Met tower	Rohn	unknown	none	none
MFC power supply	Tylan	RO-32	illegible	none
Ozone	ThermoElectron Inc	49i A3NAA	0733726103	none
Ozone Standard	ThermoElectron Inc	49i A1NAA	CM08460008	none
Sample Tower	Aluma Tower	B	none	illegible
Shelter Temperature	ARS	unknown	051	none
Shield (2 meter)	RM Young	unknown	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature2meter	RM Young	41342	17079	none
Zero air pump	Werther International	PC70/4	585590	none

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
ROM206-Martin Valvur-06/11/2019						
1	6/11/2019	Computer	Dell	07068	Inspiron 15	Unknown
2	6/11/2019	DAS	Campbell	000405	CR3000	2522
3	6/11/2019	Dilution system	Teledyne	000790	T700U	110
4	6/11/2019	Elevation	Elevation	None	1	None
5	6/11/2019	Filter pack flow pump	Thomas	04986	107CA18	040400022185
6	6/11/2019	Flow Rate	Apex	000598	AXMC105LPMDPCV	unknown
7	6/11/2019	Infrastructure	Infrastructure	none	none	none
8	6/11/2019	Modem	Raven	06477	H4222-C	0808311292
9	6/11/2019	Noy	Teledyne	000798	T200U	103
10	6/11/2019	Ozone	ThermoElectron Inc	000676	49i A1NAA	1030244794
11	6/11/2019	Ozone Standard	ThermoElectron Inc	000514	49i A3NAA	0922236892
12	6/11/2019	Sample Tower	Aluma Tower	000810	C	Unknowm
13	6/11/2019	Shelter Temperature	Campbell	none	107-L	none
14	6/11/2019	Siting Criteria	Siting Criteria	None	1	None
15	6/11/2019	Temperature	RM Young	06309	41342	12534
16	6/11/2019	Zero air pump	Werther International	06917	PC70/4	000829166
17	6/11/2019	Zero air system	Teledyne	000777	701H	607

DAS Data Form

DAS Time Max Error: 0

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2522	ROM206	Martin Valvur	06/11/2019	DAS	Primary

Das Date: 6 /11/2019
Das Time: 13:16:00
Das Day: 162

Audit Date 6 /11/2019
Audit Time 13:16:00
Audit Day 162

Low Channel:

Avg Diff:	Max Diff:
0.0002	0.0005

High Channel:

Avg Diff:	Max Diff:
0.0002	0.0005

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

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

Channel	Input	DVM Output	DAS Output	InputUnit	OutputUnit	Difference
7	0.0000	-0.0002	-0.0005	V	V	-0.0003
7	0.1000	0.1000	0.0999	V	V	-0.0001
7	0.3000	0.2997	0.2997	V	V	0.0000
7	0.5000	0.4999	0.4997	V	V	-0.0002
7	0.7000	0.7002	0.6997	V	V	-0.0005
7	0.9000	0.9000	0.8997	V	V	-0.0003
7	1.0000	0.9997	0.9995	V	V	-0.0002

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	unknown	ROM206	Martin Valvur	06/11/2019	Flow Rate	000598

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

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0
				Cal Factor Full Scale	0
1.32%	1.32%			**Rotometer Reading:**	3.85

Desc.	Test type	Input l/m	Input Corr	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.01	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.000	0.00	l/m	l/m	
primary	test pt 1	3.050	3.040	3.07	0.000	3.00	l/m	l/m	-1.32%
primary	test pt 2	3.050	3.040	3.07	0.000	3.00	l/m	l/m	-1.32%
primary	test pt 3	3.052	3.040	3.07	0.000	3.00	l/m	l/m	-1.32%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	No moisture present	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.5 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	1.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	225 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244794	ROM206	Martin Valvur	06/11/2019	Ozone	000676

Slope:	1.00644	**Slope:**	0.00000
Intercept	-0.90695	**Intercept**	0.00000
CorrCoff:	0.99996	**CorrCoff:**	0.00000

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

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.17	0.16	-0.23	ppb		-0.39
primary	2	14.98	14.95	13.94	ppb		-1.01
primary	3	36.96	36.89	35.69	ppb	-3.31	
primary	4	63.87	63.76	63.31	ppb	-0.71	
primary	5	116.38	116.19	116.20	ppb	0.01	

Sensor Component		Condition		Status	
Sensor Component	Sample Train	Condition	Good	Status	pass
Sensor Component	22.5 degree rule	Condition		Status	pass
Sensor Component	Inlet Filter Condition	Condition	Clean	Status	pass
Sensor Component	Battery Backup	Condition	N/A	Status	pass
Sensor Component	Offset	Condition	0.1	Status	pass
Sensor Component	Span	Condition	1.006	Status	pass
Sensor Component	Zero Voltage	Condition	N/A	Status	pass
Sensor Component	Fullscale Voltage	Condition	N/A	Status	pass
Sensor Component	Cell A Freq.	Condition	90.8 kHz	Status	pass
Sensor Component	Cell A Noise	Condition	0.7 ppb	Status	pass
Sensor Component	Cell A Flow	Condition	0.51 lpm	Status	pass
Sensor Component	Cell A Pressure	Condition	521.2 mmHg	Status	pass
Sensor Component	Cell A Tmp.	Condition	33.0 C	Status	pass
Sensor Component	Cell B Freq.	Condition	102.7 kHz	Status	pass
Sensor Component	Cell B Noise	Condition	0.6 ppb	Status	pass
Sensor Component	Cell B Flow	Condition	0.52 lpm	Status	pass
Sensor Component	Cell B Pressure	Condition	520.9 mmHg	Status	pass
Sensor Component	Cell B Tmp.	Condition	N/A	Status	pass
Sensor Component	Line Loss	Condition	Not tested	Status	pass
Sensor Component	System Memo	Condition		Status	pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	12534	ROM206	Martin Valvur	06/11/2019	Temperature	06309

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

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.10	0.15		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.04	0.05	0.000	0.0	C	-0.06
primary	Temp Mid Range	24.03	24.04	0.000	23.9	C	-0.1
primary	Temp High Range	45.99	46.00	0.000	45.9	C	-0.15

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	ROM206	Martin Valvur	06/11/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
1.00	1.49		

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	21.93	21.94	0.000	23.4	C	1.46
primary	Temp Mid Range	21.45	21.46	0.000	23.0	C	1.49
primary	Temp Mid Range	24.22	24.23	0.000	24.2	C	-0.04

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	Technician	Site Visit Date
ROM206	Martin Valvur	06/11/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810 (s/n 2182-1)	640 cuft

Sensor Component		Condition		Status	
Sensor Component	Sample Tower Type	Condition	Type B	Status	pass
Sensor Component	Conduit	Condition	Good	Status	pass
Sensor Component	Met Tower	Condition	N/A	Status	pass
Sensor Component	Moisture Trap	Condition	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:** ShelterCleanNotes

The shelter is clean, neat, and well organized. There are signs of previous roof leaks, but they have been repaired. The floor and counter top have been replaced.

2 **Parameter:** MetSensorComme

The temperature sensor has been removed from the met tower and mounted in a naturally aspirated shield on the sample tower, facing south and over the shelter roof.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	ROM206	**Technician**	Martin Valvur	**Site Visit Date**	06/11/2019

Site Sponsor (agency)	EPA	**USGS Map**	Longs Peak
Operating Group	private	**Map Scale**	
AQS #	08-069-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone, IMPROVE	**QAPP Latitude**	40.2778
Deposition Measurement	dry	**QAPP Longitude**	-105.5453
Land Use	woodland - mixed	**QAPP Elevation Meters**	2743
Terrain	complex	**QAPP Declination**	10.3
Conforms to MLM	Marginally	**QAPP Declination Date**	2/22/2006
Site Telephone	(970) 586-2598	**Audit Latitude**	40.278129
Site Address 1	High Peak Camp	**Audit Longitude**	-105.545635
Site Address 2	Route 7	**Audit Elevation**	2742
County	Larimer	**Audit Declination**	9.0
City, State	Estes Park, CO		**Present**
Zip Code	80517	**Fire Extinguisher**	☑ New in 2015
Time Zone	Mountain	**First Aid Kit**	☑
Primary Operator		**Safety Glasses**	☐
Primary Op. Phone #		**Safety Hard Hat**	☑
Primary Op. E-mail		**Climbing Belt**	☑
Backup Operator		**Security Fence**	☐
Backup Op. Phone #		**Secure Shelter**	☑
Backup Op. E-mail		**Stable Entry Steps**	☑

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810 (s/n 2182-1)	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The shelter is clean, neat, and well organized. There are signs of previous roof leaks, but they have been repaired. The floor and counter top have been replaced.				
Site OK	☑	**Notes**					

Driving Directions From Estes Park take route 7 south approximately 8.5 miles. Turn right onto Preservation Road (dirt road) at the sign for High Peak Camp operated by the Salvation Army. The site is approximately 100 meters on the left.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID ROM206 **Technician** Martin Valvur **Site Visit Date** 06/11/2019

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

Siting Distances OK ☑

Siting Criteria Comment

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	ROM206	Technician	Martin Valvur	Site Visit Date	06/11/2019

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

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

The temperature sensor has been removed from the met tower and mounted in a naturally aspirated shield on the sample tower, facing south and over the shelter roof.

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	ROM206	Technician	Martin Valvur	Site Visit Date	06/11/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	ROM206	Technician	Martin Valvur	Site Visit Date	06/11/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 12 meters
4	Describe dry dep sample tube.		3/8 teflon by 12 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	
9	Is there a rotometer in the dry deposition filter line, and is it clean?	☑	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 ROM206 **Technician** Martin Valvur **Site Visit Date** 06/11/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

Provide any additional 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	ROM206	Technician	Martin Valvur	Site Visit Date	06/11/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S8-rev002

Site ID	ROM206	Technician	Martin Valvur	Site Visit Date	06/11/2019

Site operation procedures

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

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

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

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

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

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

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

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	ROM206	Technician	Martin Valvur	Site Visit Date	06/11/2019

Site operation procedures

1	Is the filter pack being changed every Tuesday as scheduled?	☑	Filter changed evenings
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?	☑	one set of gloves only
9	Are the site conditions reported regularly to the field operations manager or staff?	☑	

QC Check Performed		Frequency	Compliant
Multi-point MFC Calibrations	☑	Semiannually	☑
Flow System Leak Checks	☑	Weekly	☑
Filter Pack Inspection	☐		☐
Flow Rate Setting Checks	☑	Weekly	☑
Visual Check of Flow Rate Rotometer	☑	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 ROM206 **Technician** Martin Valvur **Site Visit Date** 06/11/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07068
DAS	Campbell	CR3000	2522	000405
Dilution system	Teledyne	T700U	110	000790
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	040400022185	04986
Flow Rate	Apex	AXMC105LPMDPC	unknown	000598
Infrastructure	Infrastructure	none	none	none
Modem	Raven	H4222-C	0808311292	06477
Noy	Teledyne	T200U	103	000798
Ozone	ThermoElectron Inc	49i A1NAA	1030244794	000676
Ozone Standard	ThermoElectron Inc	49i A3NAA	0922236892	000514
Sample Tower	Aluma Tower	C	Unknowm	000810
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342	12534	06309
Zero air pump	Werther International	PC70/4	000829166	06917
Zero air system	Teledyne	701H	607	000777

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
CND125-Sandy Grenville-06/14/2019						
1	6/14/2019	Computer	Dell	07015	Inspiron 15	BQ3MC12
2	6/14/2019	DAS	Campbell	000499	CR3000	3816
3	6/14/2019	Elevation	Elevation	None	1	None
4	6/14/2019	Filter pack flow pump	Thomas	01235	107CA18	illegible
5	6/14/2019	Flow Rate	Apex	000838	AXMC105LPMDPCV	54781
6	6/14/2019	Infrastructure	Infrastructure	none	none	none
7	6/14/2019	Modem	Campbell	06346	COM220	1513
8	6/14/2019	Ozone	ThermoElectron Inc	000692	49i A1NAA	1030244803
9	6/14/2019	Ozone Standard	ThermoElectron Inc	000376	49i A3NAA	0726124693
10	6/14/2019	Sample Tower	Aluma Tower	03495	A	none
11	6/14/2019	Shelter Temperature	Campbell	none	107-L	none
12	6/14/2019	Siting Criteria	Siting Criteria	None	1	None
13	6/14/2019	Temperature	RM Young	06402	41342VC	14035
14	6/14/2019	Zero air pump	Werther International	06868	C 70/4	000814284

DAS Data Form

DAS Time Max Error: 0.02

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	3816	CND125	Sandy Grenville	06/14/2019	DAS	Primary

Das Date: 6 /14/2019
Das Time: 19:07:08
Das Day: 165

Audit Date 6 /14/2019
Audit Time 19:07:07
Audit Day 165

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

Mfg	Datel	**Parameter**	DAS
Serial Number	4000392	**Tfer Desc.**	Source generator (D
Tfer ID	01321		
Slope	1.00000	**Intercept**	0.00000
Cert Date	1/22/2015	**CorrCoff**	1.00000

Mfg	Fluke	**Parameter**	DAS
Serial Number	86590148	**Tfer Desc.**	DVM
Tfer ID	01310		
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	0.0000	0.0000	V	V	0.0000
7	0.1000	0.1000	0.1000	V	V	0.0000
7	0.3000	0.3003	0.3002	V	V	-0.0001
7	0.5000	0.5002	0.5001	V	V	-0.0001
7	0.7000	0.7002	0.7001	V	V	-0.0001
7	0.9000	0.9003	0.9002	V	V	-0.0001
7	1.0000	1.0001	1.0000	V	V	-0.0001

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	54781	CND125	Sandy Grenville	06/14/2019	Flow Rate	000838

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 % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	-0.02
				Cal Factor Full Scale	1.01
0.22%	0.67%			**Rotometer Reading:**	1.5

Desc.	Test type	Input l/m	Input Corr	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.00	0.000	-0.02	l/m	l/m	
primary	leak check	0.000	0.000	0.01	0.000	0.00	l/m	l/m	
primary	test pt 1	1.504	1.500	1.48	0.000	1.50	l/m	l/m	0.00%
primary	test pt 2	1.504	1.500	1.48	0.000	1.50	l/m	l/m	0.00%
primary	test pt 3	1.501	1.500	1.47	0.000	1.49	l/m	l/m	-0.67%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	See comments	**Status**	pass
Sensor Component	Filter Distance	**Condition**	4.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	180 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	14035	CND125	Sandy Grenville	06/14/2019	Temperature	06402

Mfg	Extech	**Parameter**	Temperature
Serial Number	H232679	**Tfer Desc.**	RTD
Tfer ID	01228		
Slope	1.00909	**Intercept**	-0.11036
Cert Date	2/12/2019	**CorrCoff**	1.00000

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.57	1.01		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	-0.03	0.08	0.000	0.4	C	0.35
primary	Temp Mid Range	24.87	24.76	0.000	25.8	C	1.01
primary	Temp High Range	48.22	47.89	0.000	47.5	C	-0.35

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	CND125	Sandy Grenville	06/14/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
1.03	1.13		

Mfg	Extech	Parameter	Shelter Temperature
Serial Number	H232679	Tfer Desc.	RTD
Tfer ID	01228		
Slope	1.00909	Intercept	-0.11036
Cert Date	2/12/2019	CorrCoff	1.00000

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	23.99	23.88	0.000	25.0	C	1.07
primary	Temp Mid Range	26.27	26.14	0.000	27.0	C	0.9
primary	Temp Mid Range	25.41	25.29	0.000	26.4	C	1.13

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	CND125	Technician	Sandy Grenville	Site Visit Date	06/14/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810	640 cuft

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	CND125	Sandy Grenville	06/14/2019	Moisture Present	Apex	3900	☐	☐

There is moisture present in the dry deposition sample train inside the shelter.

Field Systems Comments

1 **Parameter:** SitingCriteriaCom

The land owner maintains a pine tree forest on the property within 50 meters of the site. The trees were planted just before the site was installed in 1990 and may or may not be harvested in the future.

2 **Parameter:** ShelterCleanNotes

The shelter is well clean and well organized. There are signs of insect infestation on floor.

3 **Parameter:** MetOpMaintCom

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

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	CND125	**Technician**	Sandy Grenville	**Site Visit Date**	06/14/2019

Site Sponsor (agency)	EPA	**USGS Map**	
Operating Group	private	**Map Scale**	
AQS #	37-123-9991	**Map Date**	
Meteorological Type	Claytronic		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	
Deposition Measurement	dry, Hg, PM2.5, PM10	**QAPP Longitude**	
Land Use	woodland	**QAPP Elevation Meters**	
Terrain	rolling	**QAPP Declination**	
Conforms to MLM	Marginally	**QAPP Declination Date**	
Site Telephone		**Audit Latitude**	35.26333
Site Address 1	136 Perry Drive	**Audit Longitude**	-79.83754
Site Address 2		**Audit Elevation**	172
County	Montgomery	**Audit Declination**	-8
City, State	Candor, NC		**Present**
Zip Code	27229	**Fire Extinguisher**	☑ New in 2015
Time Zone	Eastern	**First Aid Kit**	☑
Primary Operator		**Safety Glasses**	☑
Primary Op. Phone #		**Safety Hard Hat**	☑
Primary Op. E-mail		**Climbing Belt**	☐
Backup Operator		**Security Fence**	☐
Backup Op. Phone #		**Secure Shelter**	☑
Backup Op. E-mail		**Stable Entry Steps**	☑

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The shelter is well clean and well organized. There are signs of insect infestation on floor.				
Site OK	☑	**Notes**					

Driving Directions

From Greensboro take Hwy 220 (future I-73) south to Candor. Exit at 211 west to Candor. At the traffic light turn left (south) onto 220 south and 731 west. Continue approximately 1.3 miles which will take you out of town. Bear right onto 731 west at the split. Take an immediate right onto McCallum Rd. (there is a sign for E-KU-SUMEE at the intersection). Continue approximately 5.4 miles to Perry Drive which is on the left. Turn left onto the gravel road and follow it to the end. The site is behind the house, drive around the grapevines on the left.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID CND125 **Technician** Sandy Grenville **Site Visit Date** 06/14/2019

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	40 m	☐
Obstacles to wind	10 times obstacle height		☑

Siting Distances OK ☑

Siting Criteria Comment

The land owner maintains a pine tree forest on the property within 50 meters of the site. The trees were planted just before the site was installed in 1990 and may or may not be harvested in the future.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	CND125	Technician	Sandy Grenville	Site Visit Date	06/14/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	CND125	Technician	Sandy Grenville	Site Visit Date	06/14/2019

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:

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	CND125	Technician	Sandy Grenville	Site Visit Date	06/14/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 12 meters
4	Describe dry dep sample tube.		3/8 teflon by 12 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	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:

Field Systems Data Form

F-02058-1500-S6-rev002

Site ID	CND125	Technician	Sandy Grenville	Site Visit Date	06/14/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

11	Tower comments?	

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	CND125	Technician	Sandy Grenville	Site Visit Date	06/14/2019

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 2016	☑
HASP	☑	Feb 2014	☑
Field Ops Manual	☑	Oct 2016	☑
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	CND125	Technician	Sandy Grenville	Site Visit Date	06/14/2019

Site operation procedures

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

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

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

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

QC Check Performed		Frequency	Compliant
Multi-point Calibrations	☑	Semiannually	☑
Automatic Zero/Span Tests	☑	Daily	☑
Manual Zero/Span Tests	☑	As needed	☑
Automatic Precision Level Tests	☑	Daily	☑
Manual Precision Level Test	☑	As needed	☑
Analyzer Diagnostics Tests	☑	Weekly	☑
In-line Filter Replacement (at inlet)	☑	Every 2 weeks	☑
In-line Filter Replacement (at analyze	☐	N/A	☑
Sample Line Check for Dirt/Water	☑	Weekly	☑
Zero Air Desiccant Check	☑	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	CND125	Technician	Sandy Grenville	Site Visit Date	06/14/2019

Site operation procedures

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

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

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

Field Systems Data Form

F-02058-1500-S10-rev002

Site ID CND125 **Technician** Sandy Grenville **Site Visit Date** 06/14/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	BQ3MC12	07015
DAS	Campbell	CR3000	3816	000499
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CA18	illegible	01235
Flow Rate	Apex	AXMC105LPMDPC	54781	000838
Infrastructure	Infrastructure	none	none	none
Modem	Campbell	COM220	1513	06346
Ozone	ThermoElectron Inc	49i A1NAA	1030244803	000692
Ozone Standard	ThermoElectron Inc	49i A3NAA	0726124693	000376
Sample Tower	Aluma Tower	A	none	03495
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	14035	06402
Zero air pump	Werther International	C 70/4	000814284	06868

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
WSP144-Korey Devins-06/17/2019						
1	6/17/2019	Computer	Dell	07037	Inspiron 15	Unknown
2	6/17/2019	DAS	Campbell	000430	CR3000	2525
3	6/17/2019	Elevation	Elevation	None	1	None
4	6/17/2019	Filter pack flow pump	Thomas	06021	107CAB18B	060400022648
5	6/17/2019	Flow Rate	Apex	000639	AXMC105LPMDPCV	54780
6	6/17/2019	Infrastructure	Infrastructure	none	none	none
7	6/17/2019	Modem	Digi	07196	LR54	unknown
8	6/17/2019	Ozone	ThermoElectron Inc	000734	49i A1NAA	1105347317
9	6/17/2019	Ozone Standard	ThermoElectron Inc	000543	49i A3NAA	0929938240
10	6/17/2019	Sample Tower	Aluma Tower	000126	B	none
11	6/17/2019	Shelter Temperature	Campbell	none	107-L	none
12	6/17/2019	Siting Criteria	Siting Criteria	None	1	None
13	6/17/2019	Temperature	RM Young	06387	41342VC	13960
14	6/17/2019	Zero air pump	Werther International	06880	C 70/4	000814273

DAS Data Form

DAS Time Max Error: 0.08

Mfg	Serial Number	Site	Technician	Site Visit Date	Parameter	Use Desc.
Campbell	2525	WSP144	Korey Devins	06/17/2019	DAS	Primary

Das Date: 6 /17/2019
Das Time: 13:58:00
Das Day: 168

Audit Date 6 /17/2019
Audit Time 13:58:05
Audit Day 168

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
7	0.0000	0.0000	0.0000	V	V	0.0000
7	0.1000	0.0999	0.0999	V	V	0.0000
7	0.3000	0.2997	0.2997	V	V	0.0000
7	0.5000	0.4996	0.4995	V	V	-0.0001
7	0.7000	0.6995	0.6994	V	V	-0.0001
7	0.9000	0.8994	0.8992	V	V	-0.0002
7	1.0000	0.9993	0.9991	V	V	-0.0002

Flow Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Apex	54780	WSP144	Korey Devins	06/17/2019	Flow Rate	000639

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

DAS 1:		DAS 2:			
A Avg % Diff:	**A Max % Dif**	**A Avg %Diff**	**A Max % Dif**	**Cal Factor Zero**	0.01
0.45%	1.35%			**Cal Factor Full Scale**	1.02
				Rotometer Reading:	1.5

Desc.	Test type	Input l/m	Input Corr	MfcDisp.	OutputSignal	Output S E	InputUnit	OutputSignalU	PctDifference
primary	pump off	0.000	0.000	0.01	0.000	0.02	l/m	l/m	
primary	leak check	0.000	0.000	0.00	0.000	0.01	l/m	l/m	
primary	test pt 1	1.497	1.500	1.48	0.000	1.50	l/m	l/m	0.00%
primary	test pt 2	1.498	1.500	1.49	0.000	1.50	l/m	l/m	0.00%
primary	test pt 3	1.483	1.480	1.48	0.000	1.50	l/m	l/m	1.35%

Sensor Component	Leak Test	**Condition**		**Status**	pass
Sensor Component	Tubing Condition	**Condition**	Good	**Status**	pass
Sensor Component	Filter Position	**Condition**	Good	**Status**	pass
Sensor Component	Rotometer Condition	**Condition**	Clean and dry	**Status**	pass
Sensor Component	Moisture Present	**Condition**	See comments	**Status**	pass
Sensor Component	Filter Distance	**Condition**	2.0 cm	**Status**	pass
Sensor Component	Filter Depth	**Condition**	2.5 cm	**Status**	pass
Sensor Component	Filter Azimuth	**Condition**	180 deg	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347317	WSP144	Korey Devins	06/17/2019	Ozone	000734

Slope:	1.01500	**Slope:**	0.00000
Intercept	-0.94684	**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 % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.20	0.08	-0.77	ppb		-0.85
primary	2	15.27	15.11	14.22	ppb		-0.89
primary	3	35.82	35.60	35.21	ppb	-1.1	
primary	4	66.81	66.50	66.64	ppb	0.21	
primary	5	110.76	110.33	111.00	ppb	0.61	

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.000	**Status**	pass
Sensor Component	Span	**Condition**	1.021	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	101.4 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.8 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.72 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	727.4 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	36.7 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	91.5 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	0.6 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.70 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	728.0 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**	N/A	**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Temperature Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
RM Young	13960	WSP144	Korey Devins	06/17/2019	Temperature	06387

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

DAS 1:		DAS 2:	
Abs Avg Err	**Abs Max Err**	**Abs Avg Err**	**Abs Max Err**
0.11	0.20		

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Low Range	0.14	0.00	0.000	-0.1	C	-0.07
primary	Temp Mid Range	25.45	25.12	0.000	25.1	C	-0.07
primary	Temp High Range	50.04	49.53	0.000	49.3	C	-0.2

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

Shelter Temperature Data For

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
Campbell	none	WSP144	Korey Devins	06/17/2019	Shelter Temperature	none

DAS 1:		DAS 2:	
Abs Avg Err	Abs Max Err	Abs Avg Err	Abs Max Err
0.21	0.31		

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

UseDesc.	Test type	InputTmpRaw	InputTmpCorr.	OutputTmpSignal	OutputSignalEng	OSE Unit	Difference
primary	Temp Mid Range	26.88	26.54	0.000	26.5	C	-0.08
primary	Temp Mid Range	28.63	28.28	0.000	28.0	C	-0.31
primary	Temp Mid Range	25.84	25.51	0.000	25.8	C	0.24

Sensor Component	System Memo	Condition		Status	pass

Infrastructure Data For

Site ID	WSP144	Technician	Korey Devins	Site Visit Date	06/17/2019

Shelter Make	Shelter Model	Shelter Size
Ekto	8810	640 cuft

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

Site Visit Comments

Parameter	Site	Technician	S.V. Date	Component	Mfg	Serial No.	Hazard	Problem
Flow Rate	WSP144	Korey Devins	06/17/2019	Moisture Present	Apex	3875	☐	☐

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

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

Ozone sample line leak-checks are conducted every two weeks.

2 **Parameter:** SitingCriteriaCom

The city of Trenton, estimated population greater than 85,000, is within 20 km of the site.

3 **Parameter:** ShelterCleanNotes

The shelter is in fair condition, clean, very neat, and well organized but beginning to show signs of wear. There is a small leak in the roof near the DAS.

Field Systems Data Form

F-02058-1500-S1-rev002

Site ID	WSP144	**Technician**	Korey Devins	**Site Visit Date**	06/17/2019

Site Sponsor (agency)	EPA	**USGS Map**	Pennington
Operating Group	NJDEP / WCRC	**Map Scale**	
AQS #	34-021-9991	**Map Date**	
Meteorological Type	R.M. Young		
Air Pollutant Analyzer	Ozone	**QAPP Latitude**	
Deposition Measurement	dry, PM2.5, PM10	**QAPP Longitude**	
Land Use	woodland, urban agriculture	**QAPP Elevation Meters**	
Terrain	rolling	**QAPP Declination**	
Conforms to MLM	Marginally	**QAPP Declination Date**	
Site Telephone		**Audit Latitude**	40.312303
Site Address 1	WCRC-FA	**Audit Longitude**	-74.872663
Site Address 2	Church Rd.	**Audit Elevation**	59
County	Mercer	**Audit Declination**	-12.5
City, State	Titusville, NJ		
Zip Code	08560	**Fire Extinguisher** ☑	dated 2015
Time Zone	Eastern	**First Aid Kit** ☑	
Primary Operator		**Safety Glasses** ☑	
Primary Op. Phone #		**Safety Hard Hat** ☑	
Primary Op. E-mail		**Climbing Belt** ☐	
Backup Operator		**Security Fence** ☑	
Backup Op. Phone #		**Secure Shelter** ☑	
Backup Op. E-mail		**Stable Entry Steps** ☑	

Present

Shelter Working Room	☑	**Make**	Ekto	**Model**	8810	**Shelter Size**	640 cuft
Shelter Clean	☑	**Notes**	The shelter is in fair condition, clean, very neat, and well organized but beginning to show signs of wear. There is a small leak in the roof near the DAS.				
Site OK	☑	**Notes**					

Driving Directions

From Philadelphia take I-95 north. Cross the Delaware River into New Jersey and take the first exit, route 29 north, just over the bridge. Continue approximately 4 miles through the traffic light at the intersection of 546 and through the park. Turn right onto Church road at the traffic light. Continue approximately 0.5 miles to the gate for the WCRC-FA on the right. The combination to the lock is 1903. Continue through the gate up the gravel road to the top of the hill and turn right along the edge of the field. Follow the gravel road to the site in the chain-link fenced area.

Field Systems Data Form

F-02058-1500-S2-rev002

Site ID WSP144 **Technician** Korey Devins **Site Visit Date** 06/17/2019

Potential Interferent	Minimum Distance From Measurement Apparatus	Distance	Pass = Checked
Large Point Source of SO2 or NOx	20 to 40 km		☑
Major industrial complex	10 to 20 km		☑
City > 50,000 population	40 km	20 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 city of Trenton, estimated population greater than 85,000, is within 20 km of the site.

Field Systems Data Form

F-02058-1500-S3-rev002

Site ID	WSP144	Technician	Korey Devins	Site Visit Date	06/17/2019

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

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

Field Systems Data Form

F-02058-1500-S4-rev002

Site ID	WSP144	Technician	Korey Devins	Site Visit Date	06/17/2019

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

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

Field Systems Data Form

F-02058-1500-S5-rev002

Site ID	WSP144	Technician	Korey Devins	Site Visit Date	06/17/2019

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

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

Pollutant analyzers and deposition equipment operations and maintenance

1	Do the analyzers and equipment appear to be in good condition and well maintained?	☑	
2	Are the analyzers and monitors operational, on-line, and reporting data?	☑	
3	Describe ozone sample tube.		1/4 teflon by 12 meters
4	Describe dry dep sample tube.		3/8 teflon by 12 meters
5	Are in-line filters used in the ozone sample line? (if yes indicate location)	☑	At inlet only
6	Are sample lines clean, free of kinks, moisture, and obstructions?	☑	Moisture in tubing only
7	Is the zero air supply desiccant unsaturated?	☑	
8	Are there moisture traps in the sample lines?	☑	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	WSP144	Technician	Korey Devins	Site Visit Date	06/17/2019

DAS, sensor translators, and peripheral equipment operations and maintenance

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

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

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

Field Systems Data Form

F-02058-1500-S7-rev002

Site ID	WSP144	Technician	Korey Devins	Site Visit Date	06/17/2019

Documentation

Does the site have the required instrument and equipment manuals?

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

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

	Present		Current
Station Log	☑		☑
SSRF	☑		☑
Site Ops Manual	☑	Oct 2011	☑
HASP	☑	Oct 2011	☑
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	WSP144	Technician	Korey Devins	Site Visit Date	06/17/2019

Site operation procedures

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

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

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

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

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

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

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

Ozone sample line leak-checks are conducted every two weeks.

Field Systems Data Form

F-02058-1500-S9-rev002

Site ID	WSP144	Technician	Korey Devins	Site Visit Date	06/17/2019

Site operation procedures

1	Is the filter pack being changed every Tuesday as scheduled?	☑	Filter changed morinings
2	Are the Site Status Report Forms being completed and filed correctly?	☑	
3	Are data downloads and backups being performed as scheduled?	☐	No longer required
4	Are general observations being made and recorded? How?	☑	SSRF, 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 WSP144 **Technician** Korey Devins **Site Visit Date** 06/17/2019

Site Visit Sensors

Parameter	Manufacturer	Model	S/N	Client ID
Computer	Dell	Inspiron 15	Unknown	07037
DAS	Campbell	CR3000	2525	000430
Elevation	Elevation	1	None	None
Filter pack flow pump	Thomas	107CAB18B	060400022648	06021
Flow Rate	Apex	AXMC105LPMDPC	54780	000639
Infrastructure	Infrastructure	none	none	none
Modem	Digi	LR54	unknown	07196
Ozone	ThermoElectron Inc	49i A1NAA	1105347317	000734
Ozone Standard	ThermoElectron Inc	49i A3NAA	0929938240	000543
Sample Tower	Aluma Tower	B	none	000126
Shelter Temperature	Campbell	107-L	none	none
Siting Criteria	Siting Criteria	1	None	None
Temperature	RM Young	41342VC	13960	06387
Zero air pump	Werther International	C 70/4	000814273	06880

APPENDIX B

CASTNET Site Spot Report Forms

EEMS Spot Report

Data Compiled: 4/25/2019 10:19:21 AM

SiteVisitDate	Site	Technician
04/16/2019	CAD150	Sandy Grenville

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.08	c	**P**
2	Temperature max error	P	4	0.5	6	0.16	c	**P**
3	Ozone Slope	P	0	1.1	4	0.98939	unitless	**P**
4	Ozone Intercept	P	0	5	4	-1.43004	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99988	unitless	**P**
6	Ozone % difference avg	P	7	10	4	4.7	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-2.14	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-1.66	ppb	**Fail**
9	Flow Rate average % difference	P	10	5	3	1.32	%	**P**
10	Flow Rate max % difference	P	10	5	3	1.32	%	**P**
11	DAS Voltage average error	P	7	0.003	70	0.0000	V	**P**
12	Shelter Temperature average error	P	5	2	12	0.27	c	**P**
13	Shelter Temperature max error	P	5	2	12	0.31	c	**P**

SiteVisitDate	Site	Technician
04/16/2019	CAD150	Sandy Grenville

Field Performance Comments

1 **Parameter:** Ozone **SensorComponent:** Inlet Filter Conditi **CommentCode** 91

Ozone inlet filter dirty

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The ozone analyzer sample train filter is replaced and the system is leak tested monthly.

2 **Parameter:** ShelterCleanNotes

Some shelter floor tiles are cracked and there is indication of insect damage below the heater.

EEMS Spot Report

Data Compiled: 4/26/2019 7:58:22 AM

SiteVisitDate	Site	Technician
04/11/2019	CHA467	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	0.97661	unitless	**P**
2	Ozone Intercept	P	0	5	4	0.55123	ppb	**P**
3	Ozone correlation	P	0	0.995	4	0.99994	unitless	**P**
4	Ozone % difference avg	P	7	10	4	1.9	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	1.26	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.37	ppb	**P**

EEMS Spot Report

Data Compiled: 4/25/2019 9:51:08 AM

SiteVisitDate	Site	Technician
04/15/2019	CHE185	Sandy Grenville

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	9	0.39	c	**P**
2	Temperature max error	P	4	0.5	9	0.57	c	**Fail**
3	Ozone Slope	P	0	1.1	4	0.99049	unitless	**P**
4	Ozone Intercept	P	0	5	4	0.12824	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
6	Ozone % difference avg	P	7	10	4	0.7	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-0.19	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	0.18	ppb	**P**
9	Flow Rate average % difference	P	10	5	6	2.05	%	**P**
10	Flow Rate max % difference	P	10	5	6	2.16	%	**P**
11	DAS Voltage average error	P	6	0.003	21	0.0020	V	**P**
12	Shelter Temperature average error	P	5	2	18	0.26	c	**P**
13	Shelter Temperature max error	P	5	2	18	0.33	c	**P**

SiteVisitDate	Site	Technician
04/15/2019	CHE185	Sandy Grenville

Field Systems Comments

1 **Parameter:** SiteOpsProcComm

The site is well maintained and operated. Very good sample change out procedures are being used by the site operator.

2 **Parameter:** SitingCriteriaCom

The site is located in a pasture with grazing cattle sometimes as close as 5 meters.

3 **Parameter:** ShelterCleanNotes

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

EEMS Spot Report

Data Compiled: 7/14/2019 11:54:33

SiteVisitDate	Site	Technician
06/14/2019	CND125	Sandy Grenville

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	12	0.57	c	**Fail**
2	Temperature max error	P	4	0.5	12	1.01	c	**Fail**
3	Flow Rate average % difference	P	10	5	6	0.22	%	**P**
4	Flow Rate max % difference	P	10	5	6	0.67	%	**P**
5	DAS Voltage average error	P	7	0.003	63	0.0001	V	**P**
6	Shelter Temperature average error	P	5	2	18	1.03	c	**P**
7	Shelter Temperature max error	P	5	2	18	1.13	c	**P**

SiteVisitDate	Site	Technician
06/14/2019	CND125	Sandy Grenville

Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** Moisture Present **CommentCode:** 204

There is moisture present in the dry deposition sample train inside the shelter.

Field Systems Comments

1 **Parameter:** SitingCriteriaCom

The land owner maintains a pine tree forest on the property within 50 meters of the site. The trees were planted just before the site was installed in 1990 and may or may not be harvested in the future.

2 **Parameter:** ShelterCleanNotes

The shelter is well clean and well organized. There are signs of insect infestation on floor.

3 **Parameter:** MetOpMaintCom

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

EEMS Spot Report

Data Compiled: 7/14/2019 11:17:11

SiteVisitDate	Site	Technician
06/13/2019	COW137	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	0.96767	unitless	**P**
2	Ozone Intercept	P	0	5	4	0.17821	ppb	**P**
3	Ozone correlation	P	0	0.995	4	0.99958	unitless	**P**
4	Ozone % difference avg	P	7	10	4	5.0	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	1.91	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-1.28	ppb	**P**

EEMS Spot Report

Data Compiled: 4/24/2019 7:52:03 AM

SiteVisitDate	Site	Technician
04/13/2019	CVL151	Sandy Grenville

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	6	0.05	c	**P**
2	Temperature max error	P	4	0.5	6	0.08	c	**P**
3	Ozone Slope	P	0	1.1	4	0.98143	unitless	**P**
4	Ozone Intercept	P	0	5	4	0.14908	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99990	unitless	**P**
6	Ozone % difference avg	P	7	10	4	1.4	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-0.19	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.27	ppb	**P**
9	Flow Rate average % difference	P	10	5	2	1.32	%	**P**
10	Flow Rate max % difference	P	10	5	2	1.32	%	**P**
11	DAS Voltage average error	P	7	0.003	70	0.0001	V	**P**
12	Shelter Temperature average error	P	5	2	12	0.11	c	**P**
13	Shelter Temperature max error	P	5	2	12	0.16	c	**P**

SiteVisitDate	Site	Technician
04/13/2019	CVL151	Sandy Grenville

Field Performance Comments

1 **Parameter:** Ozone **SensorComponent:** Cell B Flow **CommentCode** 99

This analyzer diagnostic check is outside the manufacturer's recommended value.

Field Systems Comments

1 **Parameter:** DasComments

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

2 **Parameter:** SitingCriteriaCom

The site is located in a Pine forest on USFS managed land. The tree line has been cut back to at least 17 meters from the site.

3 **Parameter:** ShelterCleanNotes

The shelter is somewhat cluttered. The shelter roof is still leaking and the walls are rotten at the seams and corners. The shelter is in poor condition and has deteriorated further since the previous audit visit.

EEMS Spot Report

Data Compiled: 7/12/2019 14:41:22

SiteVisitDate	Site	Technician
04/28/2019	ESP127	Korey Devins

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	1.01038	unitless	**P**
2	Ozone Intercept	P	0	5	4	-0.61174	ppb	**P**
3	Ozone correlation	P	0	0.995	4	1.00000	unitless	**P**
4	Ozone % difference avg	P	7	10	4	1.3	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	-0.56	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.58	ppb	**P**

EEMS Spot Report

Data Compiled: 4/26/2019 7:50:36 AM

SiteVisitDate	Site	Technician
04/09/2019	GRC474	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	0.99520	unitless	**P**
2	Ozone Intercept	P	0	5	4	-0.13062	ppb	**P**
3	Ozone correlation	P	0	0.995	4	0.99996	unitless	**P**
4	Ozone % difference avg	P	7	10	4	1.3	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	0.24	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.48	ppb	**P**

EEMS Spot Report

Data Compiled: 7/13/2019 10:50:54

SiteVisitDate	Site	Technician
05/07/2019	LAV410	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	0.06	c	**P**
2	Temperature2meter max error	P	5	0.5	3	0.13	c	**P**
3	Ozone Slope	P	0	1.1	4	0.98111	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.72695	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99986	unitless	**P**
6	Ozone % difference avg	P	7	10	4	5.4	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	0.24	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-1.28	ppb	**P**
9	Flow Rate average % difference	P	10	5	2	0.29	%	**P**
10	Flow Rate max % difference	P	10	5	2	0.43	%	**P**
11	DAS Voltage average error	P	13	0.003	56	0.0001	V	**P**
12	Shelter Temperature average error	P	5	2	6	1.12	c	**P**
13	Shelter Temperature max error	P	5	2	6	1.75	c	**P**

SiteVisitDate	Site	Technician
05/07/2019	LAV410	Martin Valvur

Field Performance Comments

1 **Parameter:** Temperature2meter **SensorComponent:** Blower **CommentCode:** 26

The forced-air blower for the shield is not functioning.

2 **Parameter:** Temperature2meter **SensorComponent:** System Memo **CommentCode:** 4

The sensor signal cables are showing signs of wear.

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The ozone inlet filter is changed and the sample line conditioned every two weeks or as needed.

2 **Parameter:** SitingCriteriaCom

The site is located at the end of a park service facility parking lot, in a fire station. The tree line is near the building, but the prevailing wind direction is from the clearing. Tree height above the sample inlet is not twice as far away as it is high above the inlet.

3 **Parameter:** ShelterCleanNotes

The inside equipment is located in room within the fire station, clean, neat, and organized.

4 **Parameter:** PollAnalyzerCom

Trees violate the ozone sample inlet siting criteria.

5 **Parameter:** MetOpMaintCom

The temperature sensor signal cable has deteriorated and is in need of replacement. The aspirated motor for temperature sensor is not functioning and the temperature measurement data quality are affected.

EEMS Spot Report

Data Compiled: 4/26/2019 7:51:42 AM

SiteVisitDate	Site	Technician
04/08/2019	PET427	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	0.98967	unitless	**P**
2	Ozone Intercept	P	0	5	4	-0.11093	ppb	**P**
3	Ozone correlation	P	0	0.995	4	0.99997	unitless	**P**
4	Ozone % difference avg	P	7	10	4	1.6	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	0.03	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-0.38	ppb	**P**

EEMS Spot Report

Data Compiled: 7/13/2019 12:21:47

SiteVisitDate	Site	Technician
05/08/2019	PIN414	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	0.15	c	**P**
2	Temperature2meter max error	P	5	0.5	3	0.31	c	**P**
3	Ozone Slope	P	0	1.1	4	1.00749	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.27178	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	-0.06	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.33	ppb	**P**
9	Flow Rate average % difference	P	10	5	3	1.22	%	**P**
10	Flow Rate max % difference	P	10	5	3	1.41	%	**P**
11	DAS Voltage average error	P	15	0.003	63	0.0002	V	**P**
12	Shelter Temperature average error	P	5	2	18	0.58	c	**P**
13	Shelter Temperature max error	P	5	2	18	0.74	c	**P**

SiteVisitDate	Site	Technician
05/08/2019	PIN414	Martin Valvur

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

The site operator reviews data each week to ensure proper operation of sensors and instruments.

2 **Parameter:** ShelterCleanNotes

The lighting has been repaired. The shelter has been cleaned and organized.

3 **Parameter:** MetOpMaintCom

The temperature sensor signal cable is deteriorating.

EEMS Spot Report

Data Compiled: 7/13/2019 16:28:49

SiteVisitDate	Site	Technician
06/11/2019	ROM206	Martin Valvur

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	3	0.10	c	**P**
2	Temperature max error	P	4	0.5	3	0.15	c	**P**
3	Ozone Slope	P	0	1.1	4	1.00644	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.90695	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99996	unitless	**P**
6	Ozone % difference avg	P	7	10	4	2.7	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-0.39	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-1.01	ppb	**P**
9	Flow Rate average % difference	P	10	5	9	1.32	%	**P**
10	Flow Rate max % difference	P	10	5	9	1.32	%	**P**
11	DAS Voltage average error	P	7	0.003	56	0.0002	V	**P**
12	Shelter Temperature average error	P	5	2	18	1.00	c	**P**
13	Shelter Temperature max error	P	5	2	18	1.49	c	**P**

SiteVisitDate	Site	Technician
06/11/2019	ROM206	Martin Valvur

Field Systems Comments

1 **Parameter:** ShelterCleanNotes

The shelter is clean, neat, and well organized. There are signs of previous roof leaks, but they have been repaired. The floor and counter top have been replaced.

2 **Parameter:** MetSensorComme

The temperature sensor has been removed from the met tower and mounted in a naturally aspirated shield on the sample tower, facing south and over the shelter roof.

EEMS Spot Report

Data Compiled: 7/13/2019 15:10:45

SiteVisitDate	Site	Technician
06/06/2019	ROM406	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	0.22	c	**P**
2	Temperature2meter max error	P	5	0.5	3	0.33	c	**P**
3	Ozone Slope	P	0	1.1	4	0.97271	unitless	**P**
4	Ozone Intercept	P	0	5	4	-1.15458	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99999	unitless	**P**
6	Ozone % difference avg	P	7	10	4	6.6	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-1.00	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-1.86	ppb	**Fail**
9	Flow Rate average % difference	P	10	5	10	1.67	%	**P**
10	Flow Rate max % difference	P	10	5	10	2.00	%	**P**
11	Shelter Temperature average error	P	5	2	9	2.00	c	**P**
12	Shelter Temperature max error	P	5	2	9	2.98	c	**Fail**

SiteVisitDate	Site	Technician
06/06/2019	ROM406	Martin Valvur

Field Performance Comments

1 **Parameter:** DAS **SensorComponent:** System Memo **CommentCode:** 11

Some of the DAS channels are damaged and not functioning. Sensors are being measured on working channels.

Field Systems Comments

1 **Parameter:** DasComments

Only RH, temperature, and AMoN are mounted on the meteorological tower at approximately 2 meters.

2 **Parameter:** ShelterCleanNotes

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

3 **Parameter:** MetSensorComme

The recorded temperature is being measured at 2.5 meters above the ground and < 1 foot above the AMoN enclosure and facing south.

EEMS Spot Report

Data Compiled: 7/13/2019 14:27:50

SiteVisitDate	Site	Technician
05/14/2019	SEK430	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	0.23	c	**P**
2	Temperature2meter max error	P	5	0.5	3	0.37	c	**P**
3	Ozone Slope	P	0	1.1	4	0.96157	unitless	**P**
4	Ozone Intercept	P	0	5	4	0.10304	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99998	unitless	**P**
6	Ozone % difference avg	P	7	10	4	3.8	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	0.36	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.59	ppb	**P**
9	Flow Rate average % difference	P	10	5	10	1.23	%	**P**
10	Flow Rate max % difference	P	10	5	10	1.44	%	**P**
11	DAS Voltage average error	P	12	0.003	56	0.0003	V	**P**
12	Shelter Temperature average error	P	5	2	18	0.29	c	**P**
13	Shelter Temperature max error	P	5	2	18	0.46	c	**P**

SiteVisitDate	Site	Technician
05/14/2019	SEK430	Martin Valvur

Field Systems Comments

1 **Parameter:** SitingCriteriaCom

The site is a wooded area with spaced trees on three sides and a steep drop in elevation on the west side. Although not strictly conforming to siting criteria it is elevated in a wide valley and representative of the area. Trees are still within 5 meters, however none are higher than the CASTNET sample inlets.

2 **Parameter:** ShelterCleanNotes

The shelter is aging but is in fair condition and kept clean, neat, and well organized.

3 **Parameter:** PollAnalyzerCom

The filter pack sample tubing has been spliced with tygon tubing about 5 meters above the ground. The tygon tubing is brown and beginning to deteriorate.

EEMS Spot Report

Data Compiled: 7/12/2019 14:29:08

SiteVisitDate	Site	Technician
04/27/2019	SND152	Korey Devins

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Ozone Slope	P	0	1.1	4	0.99028	unitless	**P**
2	Ozone Intercept	P	0	5	4	-0.99572	ppb	**P**
3	Ozone correlation	P	0	0.995	4	1.00000	unitless	**P**
4	Ozone % difference avg	P	7	10	4	4.0	%	**P**
5	Ozone Absolute Difference g1	P	7	3	1	-0.95	ppb	**P**
6	Ozone Absolute Difference g2	P	7	1.5	1	-1.14	ppb	**P**

EEMS Spot Report

Data Compiled: 7/14/2019 12:28:38

SiteVisitDate	Site	Technician
06/17/2019	WSP144	Korey Devins

Records with valid pass/fail criteria

Line	Audited Parameter	DAS	Ch. #	Criteria +/-	Counts	QaResult	Units	Pass/Fail
1	Temperature average error	P	4	0.5	12	0.11	c	**P**
2	Temperature max error	P	4	0.5	12	0.20	c	**P**
3	Ozone Slope	P	0	1.1	4	1.015	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.94684	ppb	**P**
5	Ozone correlation	P	0	0.995	4	1.00000	unitless	**P**
6	Ozone % difference avg	P	7	10	4	2.0	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	-0.85	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.89	ppb	**P**
9	Flow Rate average % difference	P	10	5	6	0.45	%	**P**
10	Flow Rate max % difference	P	10	5	6	1.35	%	**P**
11	DAS Voltage average error	P	7	0.003	70	0.0001	V	**P**
12	Shelter Temperature average error	P	5	2	18	0.21	c	**P**
13	Shelter Temperature max error	P	5	2	18	0.31	c	**P**

SiteVisitDate	Site	Technician
06/17/2019	WSP144	Korey Devins

Field Performance Comments

1 **Parameter:** Flow Rate **SensorComponent:** Moisture Present **CommentCode:** 72

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

Field Systems Comments

1 **Parameter:** SiteOpsProcedures

Ozone sample line leak-checks are conducted every two weeks.

2 **Parameter:** SitingCriteriaCom

The city of Trenton, estimated population greater than 85,000, is within 20 km of the site.

3 **Parameter:** ShelterCleanNotes

The shelter is in fair condition, clean, very neat, and well organized but beginning to show signs of wear. There is a small leak in the roof near the DAS.

EEMS Spot Report

Data Compiled: 7/13/2019 13:06:11

SiteVisitDate	Site	Technician
05/13/2019	YOS404	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	0.15	c	**P**
2	Temperature2meter max error	P	5	0.5	3	0.24	c	**P**
3	Ozone Slope	P	0	1.1	4	1.01307	unitless	**P**
4	Ozone Intercept	P	0	5	4	-0.42535	ppb	**P**
5	Ozone correlation	P	0	0.995	4	0.99995	unitless	**P**
6	Ozone % difference avg	P	7	10	4	1.7	%	**P**
7	Ozone Absolute Difference g1	P	7	3	1	0.21	ppb	**P**
8	Ozone Absolute Difference g2	P	7	1.5	1	-0.6	ppb	**P**
9	Flow Rate average % difference	P	10	5	2	0.14	%	**P**
10	Flow Rate max % difference	P	10	5	2	0.23	%	**P**
11	DAS Voltage average error	P	2	0.003	49	0.0001	V	**P**
12	Shelter Temperature average error	P	5	2	18	1.61	c	**P**
13	Shelter Temperature max error	P	5	2	18	2.31	c	**Fail**

SiteVisitDate	Site	Technician
05/13/2019	YOS404	Martin Valvur

Field Systems Comments

1 **Parameter:** ShelterCleanNotes

The site is neat, clean, and well organized. The shelter roof is leaking and is currently covered with a tarp.

APPENDIX C

CASTNET Ozone Performance Evaluation Forms

Site Inventory by Site Visit

Site Visit Date		*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
GRC474-Martin Valvur-04/09/2019						
1	4/9/2019	DAS	Environmental Sys Corp	90602	8816	2270
2	4/9/2019	Ozone	ThermoElectron Inc	none	49i A3NAA	1023943902
3	4/9/2019	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	1130450191
4	4/9/2019	Zero air pump	Werther International	none	PC70/4	531380

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1023943902	GRC474	Martin Valvur	04/09/2019	Ozone	none

Slope:	0.99520	**Slope:**	0.00000
Intercept	-0.13062	**Intercept**	0.00000
CorrCoff	0.99996	**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	0.04	0.03	0.27	ppb		0.24
primary	2	16.00	15.96	15.48	ppb		-0.48
primary	3	36.33	36.26	36.13	ppb	-0.36	
primary	4	64.38	64.27	63.26	ppb	-1.58	
primary	5	116.48	116.29	115.90	ppb	-0.34	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	-0.1	pass
Span	1.013	pass
Zero Voltage	0.0001	pass
Fullscale Voltage	1.000	pass
Cell A Freq.	65.7 kHz	pass
Cell A Noise	0.5 ppb	pass
Cell A Flow	0.69 lpm	pass
Cell A Pressure	592.1 mmHg	pass
Cell A Tmp.	36.2 C	pass
Cell B Freq.	60.5 kHz	pass
Cell B Noise	0.4 ppb	pass
Cell B Flow	0.70 lpm	pass
Cell B Pressure	591.5 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*
CHA467-Martin Valvur-04/11/2019						
1	4/11/2019	DAS	Environmental Sys Corp	90611	8816	2613
2	4/11/2019	Ozone	ThermoElectron Inc	none	49i A3NAA	CM08460007
3	4/11/2019	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	CM08460051
4	4/11/2019	Zero air pump	Werther International	none	PC70/4	000665785

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	CM08460007	CHA467	Martin Valvur	04/11/2019	Ozone	none

Slope:	0.97661	**Slope:**	0.00000
Intercept	0.55123	**Intercept**	0.00000
CorrCoff	0.99994	**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	0.06	0.05	1.31	ppb		1.26
primary	2	15.22	15.19	14.82	ppb		-0.37
primary	3	35.31	35.25	34.54	ppb	-2.03	
primary	4	64.58	64.47	63.71	ppb	-1.19	
primary	5	117.64	117.45	115.35	ppb	-1.8	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	-1.1	pass
Span	1.024	pass
Zero Voltage	0.0006	pass
Fullscale Voltage	1.0006	pass
Cell A Freq.	89.9 kHz	pass
Cell A Noise	1.5 ppb	pass
Cell A Flow	0.73 lpm	pass
Cell A Pressure	615.4 mmHg	pass
Cell A Tmp.	31.6 C	pass
Cell B Freq.	94.2 kHz	pass
Cell B Noise	1.5 ppb	pass
Cell B Flow	0.68 lpm	pass
Cell B Pressure	625.1 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*
SND152-Korey Devins-04/27/2019						
1	4/27/2019	DAS	Campbell	000357	CR3000	2135
2	4/27/2019	Ozone	ThermoElectron Inc	000743	49i A1NAA	1105347321
3	4/27/2019	Ozone Standard	ThermoElectron Inc	000704	49i A3NAA	1030244816
4	4/27/2019	Zero air pump	Werther International	06900	PC70/4	000821894

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347321	SND152	Korey Devins	04/27/2019	Ozone	000743

Slope:	0.99028	**Slope:**	0.00000
Intercept	-0.99572	**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 % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.42	0.30	-0.65	ppb		-0.95
primary	2	15.10	14.94	13.80	ppb		-1.14
primary	3	36.22	36.00	34.62	ppb	-3.91	
primary	4	65.10	64.80	63.11	ppb	-2.64	
primary	5	109.84	109.41	107.40	ppb	-1.85	

Sensor Component	Sample Train	**Condition**	Good	**Status**	pass
Sensor Component	22.5 degree rule	**Condition**		**Status**	pass
Sensor Component	Inlet Filter Condition	**Condition**	Clean	**Status**	pass
Sensor Component	Battery Backup	**Condition**	N/A	**Status**	pass
Sensor Component	Offset	**Condition**	0.40	**Status**	pass
Sensor Component	Span	**Condition**	1.004	**Status**	pass
Sensor Component	Zero Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Fullscale Voltage	**Condition**	N/A	**Status**	pass
Sensor Component	Cell A Freq.	**Condition**	85.8 kHz	**Status**	pass
Sensor Component	Cell A Noise	**Condition**	0.9 ppb	**Status**	pass
Sensor Component	Cell A Flow	**Condition**	0.65 lpm	**Status**	pass
Sensor Component	Cell A Pressure	**Condition**	695.9 mmHg	**Status**	pass
Sensor Component	Cell A Tmp.	**Condition**	34.8 C	**Status**	pass
Sensor Component	Cell B Freq.	**Condition**	80.8 kHz	**Status**	pass
Sensor Component	Cell B Noise	**Condition**	1.1 ppb	**Status**	pass
Sensor Component	Cell B Flow	**Condition**	0.68 lpm	**Status**	pass
Sensor Component	Cell B Pressure	**Condition**	696.2 mmHg	**Status**	pass
Sensor Component	Cell B Tmp.	**Condition**	N/A	**Status**	pass
Sensor Component	Line Loss	**Condition**	Not tested	**Status**	pass
Sensor Component	System Memo	**Condition**		**Status**	pass

Site Inventory by Site Visit

	Site Visit Date	*Parameter*	*Mfg*	*Owner ID*	*Model Number*	*Serial Number*
ESP127-Korey Devins-04/28/2019						
1	4/28/2019	DAS	Campbell	000352	CR3000	2130
2	4/28/2019	Ozone	ThermoElectron Inc	000695	49i A1NAA	1030244801
3	4/28/2019	Ozone Standard	ThermoElectron Inc	000327	49i A3NAA	0622717852
4	4/28/2019	Zero air pump	Werther International	06874	C 70/4	000815256

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1030244801	ESP127	Korey Devins	04/28/2019	Ozone	000695

Slope:	1.01038	**Slope:**	0.00000
Intercept	-0.61174	**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 % Dif**	**A Avg %Diff**	**A Max % Dif**
0.0%	0.0%		

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.52	0.40	-0.16	ppb		-0.56
primary	2	14.95	14.79	14.21	ppb		-0.58
primary	3	34.52	34.31	34.07	ppb	-0.7	
primary	4	67.53	67.22	67.43	ppb	0.31	
primary	5	108.98	108.55	109.00	ppb	0.41	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Moderately clean	pass
Battery Backup	N/A	pass
Offset	-0.2	pass
Span	1.027	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	109.2 kHz	Pass
Cell A Noise	5.6 ppb	Fail
Cell A Flow	0.69 lpm	pass
Cell A Pressure	695.3 mmHg	pass
Cell A Tmp.	34.0 C	pass
Cell B Freq.	95.0 kHz	pass
Cell B Noise	2.5 ppb	pass
Cell B Flow	0.68 lpm	pass
Cell B Pressure	695.9 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*
COW137-Sandy Grenville-06/13/2019					
1 6/13/2019	DAS	Campbell	000401	CR3000	2529
2 6/13/2019	Ozone	ThermoElectron Inc	000726	49i A1NAA	1105347314
3 6/13/2019	Ozone Standard	ThermoElectron Inc	000441	49i A3NAA	CM08200017
4 6/13/2019	Zero air pump	Werther International	06940	C 70/4	000821897

Ozone Data Form

Mfg	Serial Number Tag	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	1105347314	COW137	Sandy Grenville	06/13/2019	Ozone	000726

Slope:	0.96767	**Slope:**	0.00000
Intercept	0.17821	**Intercept**	0.00000
CorrCoff:	0.99958	**CorrCoff:**	0.00000

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

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

UseDescription	ConcGroup	Tfer Raw	Tfer Corr	Site	Site Unit	RelPerDif	AbsDif
primary	1	0.80	1.19	3.10	ppb		1.91
primary	2	15.43	15.70	14.42	ppb		-1.28
primary	3	36.10	36.21	34.20	ppb	-5.71	
primary	4	68.10	67.95	65.30	ppb	-3.98	
primary	5	112.10	111.60	109.00	ppb	-2.36	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.20	pass
Span	1.020	pass
Zero Voltage	N/A	pass
Fullscale Voltage	N/A	pass
Cell A Freq.	116.5 kHz	pass
Cell A Noise	0.8 ppb	pass
Cell A Flow	0.67 lpm	pass
Cell A Pressure	670.5 mmHg	pass
Cell A Tmp.	35.4 C	pass
Cell B Freq.	93.9 kHz	pass
Cell B Noise	0.8 ppb	pass
Cell B Flow	0.67 lpm	pass
Cell B Pressure	671.1 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*
PET427-Martin Valvur-04/08/2019						
1	4/8/2019	DAS	Environmental Sys Corp	90641	8816	2526
2	4/8/2019	Ozone	ThermoElectron Inc	none	49i A3NAA	CM08460048
3	4/8/2019	Ozone Standard	ThermoElectron Inc	none	49i A1NAA	1211052489
4	4/8/2019	Zero air pump	Werther International	none	PC 70/4	531382

Ozone Data Form

Mfg	Serial Number Ta	Site	Technician	Site Visit Date	Parameter	Owner ID
ThermoElectron Inc	CM08460048	PET427	Martin Valvur	04/08/2019	Ozone	none

Slope:	0.98967	**Slope:**	0.00000
Intercept	-0.11093	**Intercept**	0.00000
CorrCoff	0.99997	**CorrCoff**	0.00000

Mfg	ThermoElectron Inc	**Parameter**	ozone
Serial Number	49CPS-70008-364	**Tfer Desc.**	Ozone primary stan
Tfer ID	01110		
Slope	1.00151	**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	0.07	0.06	0.09	ppb		0.03
primary	2	15.00	14.97	14.59	ppb		-0.38
primary	3	37.80	37.73	36.84	ppb	-2.39	
primary	4	63.46	63.35	63.07	ppb	-0.44	
primary	5	117.03	116.84	115.40	ppb	-1.24	

Sensor Component	Condition	Status
Sample Train	Good	pass
22.5 degree rule		pass
Inlet Filter Condition	Clean	pass
Battery Backup	N/A	pass
Offset	0.1	pass
Span	0.997	pass
Zero Voltage	0.0001	pass
Fullscale Voltage	1.000	pass
Cell A Freq.	101.1 kHz	pass
Cell A Noise	0.6 ppb	pass
Cell A Flow	0.67 lpm	pass
Cell A Pressure	615.3 mmHg	pass
Cell A Tmp.	31.9 C	pass
Cell B Freq.	100.5 kHz	pass
Cell B Noise	0.6 ppb	pass
Cell B Flow	0.66 lpm	pass
Cell B Pressure	615.0 mmHg	pass
Cell B Tmp.	N/A	pass
Line Loss	Not tested	pass
System Memo		pass