Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 03/13/2023	Location: Oak Ridge, Tennessee
Date: 00/10/2020	Location: Oak Ridge, Terricosee

AOS Number: 47-001-0101

Site Name: Freel's Bend O3 Pollutants: O3

Print Name / Signature / Initials / Duties

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist
2: EMH

Air Monitoring Site Evaluation Summary

Local Site Name: Freel's Bend O3	Initials: EMH		Date: 03/13/2023		
Site meets EPA siting criteria:	I Yes □ No				
If No, explain:					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
Freel's Bend Road	145.0 m	W	Thru St	NA	NA
Bull Run Road	700.0 m	N	Local St	NA	NA
Pumphouse Road	1492.6 m	NE	Local St	NA	NA
Bethel Valley Road	1849.5 m	N	Local St	10093	2022
Electrical Utilities Company: City of Oak Rice	lge Electric		Meter #: 1	15623305	
Additional Comments:					
1. Arrival, departure, and photo	times are Eastern t	ime.			
2. Shelter temperature was 72	degrees F (22.2 deg	grees C)			
3. Shelter is bolted to cement p	ad.				
4. Fire extinguisher is in good of					
5. SO2 sampling ended 12/31/2	2019.				
6. Shelter is located on gated D	Department of Energ	y (DOE) p	roperty.		

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Freel's Bend O3	Initials: EMH	03/13/23
APC auditor should document in Site Log – time / date / weather cond	ditions/purpose of visit / APC staff	present [\(\text{Yes} \(\pi \) No] Completed
Arrival Time: 1:30 pm Departure Time: 2:30 pm	Primary Operator: Erir	Sturgill
Observer(s):		
SITE [Yes No] -Security Fence Yes No] -Razor/Barb Wi	ire [□ Yes □ No ■ NA] Grass /	Shrubs Cut
[Yes No NA] Bare Soil Area [Yes No NA] Vand	_	
Date: [□ Yes □ No] Police Report		
Issues:		
SHELTER - Not Present		
Interior Arrival Temperature: 23.2 °C (from data logger) Op	perator Site Visits: 1	_ per [□ week □ month □
[□ Yes • No] Leaking Roof [Damaged: □Ceiling / □ Floo	or / Walls] [Yes No]	Clean / Neat
$[\ \boxdot \ Yes \ \Box \ No]$ Fire Extinguisher $[\ \Box \ Yes \ \boxdot \ No]$ Insect / Wildle	ife Issues [□ Yes 🗈 No] Gaso	oline (inside shelter)
Issues:		
Exterior Type: [¬Freezer / ¬Wood Building / ¬Brick-Block / ¬Steep Beight of Roof: 3.0 meters Roofing Meters Ro		-last single plu membrane
Yes ■ No] Needs Maintenance (specify)		
[☐ Yes ☑ No] Tied Down (type)		
[Yes No] Electrically Grounded [Yes No] Roof R		
Roof Access: [Stairs / Ladder / Not Present] [Y		Hazard)
PLATFORMS: ■ Not Present Condition: [□ Yes □ No] Good [□ Yes □ No] Needs Main	tenance	
Issues:		
RECORDS AT SITE: Documents available (QAPPs, SOPs) [Yes No]	lectronic/□ Hardcopy/□Both	
Logbooks at site [♠ Yes □ No] □ Electronic/□ Hardcopy/♠ H	Both	
Comments		

MSEF	: Local Site N	ame: Freel's	Ber	nd O3	Initials: EMF	Date: 03	3/13/23
MON	ITOR(s):			Locatio	n: Exterior Sample	ers [□ Roof / □Grou	ınd / ■ Not Present]
Moni	tor(s)	Manufactu	rer	Model	Serial Nu	mber	
	O3	Teledyne	•	T400		2284	
	BRATOR(s):	□ Not Present			_	eck Gases Vented Certification	
QC	Make	Mode	el S	Serial Numl	oer	Date	Date
QC	Teled	yne T703	3	64	18	01/31/23	07/31/23
		_				o] Precision Checks	ent and notify agency mgr. [■ Yes □ No] Audits (Required)
Issues:							
CYLI	NDER GAS S Or:	ΓANDARDS:		■ Not Present		0, should not be in servi	ce and should be replaced)
QC	Gas Standa	rd PSI Reading		Expiration Date	Standard Concentration Serial		l Number
Issues:							

MSEF: Local Site N	ame: Freel's Bend O3	Initials: EMH	Date: 03/13/23	3
DATA COLLECTI	ON/DOCUMENTATIO	ON:		
Data loggers/Moder	ms:			
Make	Model	Serial Number	Data logger/Modem	Main/Backup
Raven	R55V	2R93610268021016	Modem	Main
Agilaire	8872	532A	Datalogger	Main
	STRUMENTATION: In			
		Uninterruptable Power Sodel): Teledyne T701 (S		
				. 1
•	em: Silica Gel Pink / eds Service Last Service I	Blue] / □Charcoal / □Pural Date: 02/14/23	ni / =Hopcalite / =Other Condition:	:l

Cartridge System: [Silica Gel Pink / Blue] / Charcoal / Purafil / Hopcalite / Other:	
ssues:	
Probe Line(s): [Beneal Cleaned] - Frequency: 1/year Last Service Date: 02/14/23	
¶ Yes □ No] Clean [¶ Yes □ No] Heated [□ Yes ¶ No] Insulated [□ Yes ¶ No] Moisture [□ Yes ¶ No] Retra	ctable
□ Yes ■ No] Old / Unused Lines [□ Yes ■ No] Lo Flo Manifold	
□ Yes • No] Any Open Ports? -> How many analyzers using manifold?	
ssues:	
OUTDOOR SAMPLERS Not Present Yes No] Locked Yes No] Electrically Grounded Yes No] Stabilized Yes No] Clean Insi	ide
□ Yes □ No] Head/Separator Clean	
Operator / Log: VSCC/WINS Clean Schedule: PM 10 Head Clean Schedule:	
ssue(s):	
COLLOCATED SAMPLERS: Not Present (39.4 inches = 1 meter)	
Pollutant Flow (Hi / Lo) *Separation Distance (meters)	

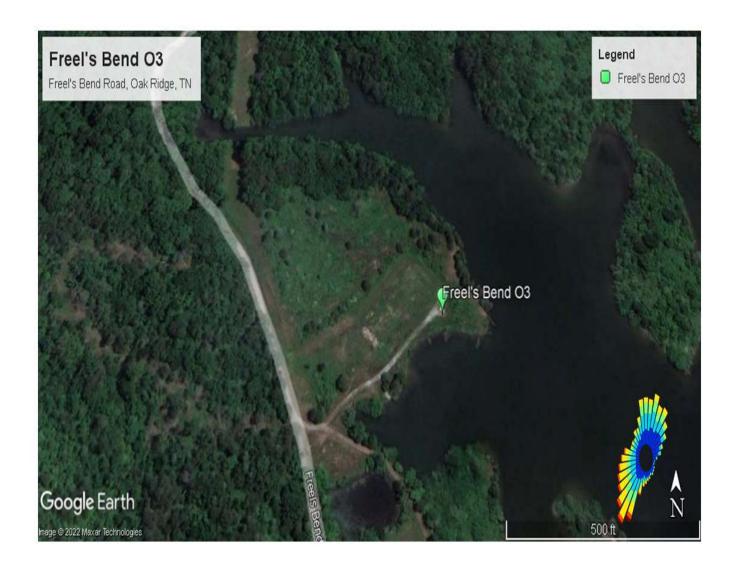
^{*}Collocated monitors **must be within 4 meters of each other** and at least **2 meters apart** for flow rates **greater than 200 liters/min** or at **least 1 meter apart** for samplers having flow rates **less than 200 liters/min** to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

MSEF: Local Site Name: Freel's Bend O3	Initials: EMH	Date: 03/13/23	3
PROBE SYSTEM(s): External			
Inlet Type: [Single Line / □ Dual Line / □ Bell Type (Ca	AS design)		
Funnel(s): [■ Rain Shield / □Part of Probe] Funnel M	aterial: [□Teflon® / 🖥 Gla	ss / Stainless Steel /	Other:]
Probe Line(s): $[\blacksquare \text{ Teflon}^{\otimes} / \square \text{ Other:} _$	Probe Fitting(s): [Tefl	on® /□ Other:	/ Not Present]
Residence Time: 5.8 sec	(20 sec. max	(Refer to chart for max	kimum line lengths)
Issue(s):			

	Inlet	Inlat I agation	*Horizontal	*Vertical	Monitorin	ng SCALE
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)	Distance (meters) If Applicable	Distance (meters) If Applicable	AQS	Annual Network Plan
O3	4.0	Side of Shelter			Urban	Urban

FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb) When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

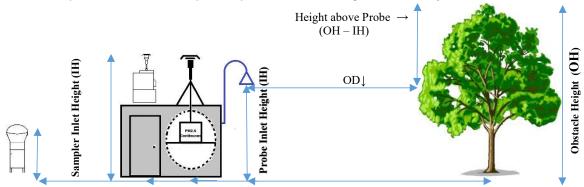
Aerial Photo with Wind Rose



Source: Google Earth Pro

Imagery Date: ____

OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be $\geq [2*(OH-IH)]$

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstacle	AZ
1	Trees	10.9	4.0	13.8	67.0		233
2	Tree	10.9	4.0	13.8	36.4		66
3	Tree	13.2	4.0	18.4	32.2		58
4	Trees	12.8	4.0	17.6	33.0		51
5	Trees	13.1	4.0	18.2	35.0		43
6	Tree	15.5	4.0	23.0	60.0		13
7	Tree	6.2	4.0	4.4	45.0		4
8	Trees	10.9	4.0	13.8	52.0		6
9	Tree	9.0	4.0	10.0	58.0		333
10	Tree	9.9	4.0	11.8	67.0		297
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Nam	e: Free	l's Bend O3	Initials: EMH	Date: 03/13/23
	32.2			
TREE DRIPLINE(s):			nlet to dripline) \Box No	
	33.0	•	nlet to dripline) □ Not	
	35.0	•	nlet to dripline) □ Not	
Should be greater than 20 me	eters from t	he dripline of tree(s) and I	must be 10 meters fron	n the dripline when the tree(s) act as an obstruction
Issues:				
Minor Sources:				
_	-	present? (especially	- '	
			s, fireplaces, diesel	heating
	generator	s near NO_2 or SO_2	analyzers	
Issues: None				
1554C5.				
Additional Info	ormat	ion:		
Closest tree is grea	ter than	n 20 meters fro	m probe; theref	ore there are no tree
dripline issues.				

SITE DRAWING -

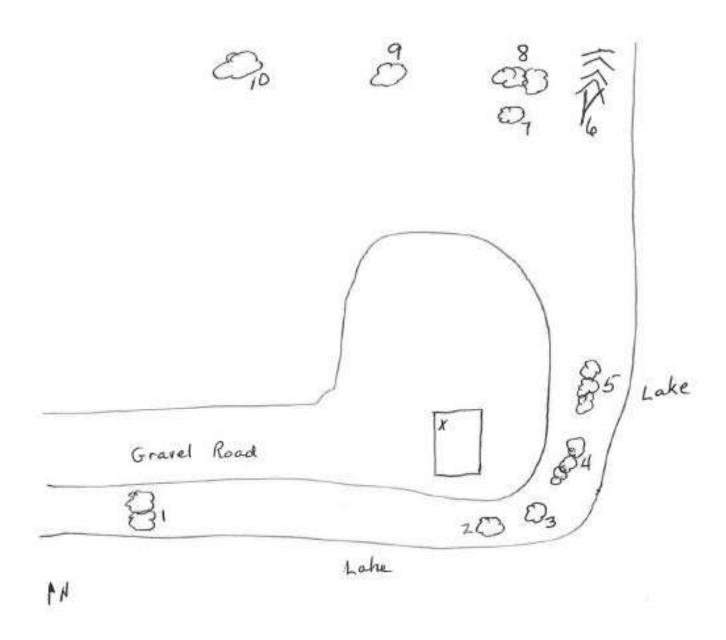
Direction NORTH Primary Wind Dir Security Issues Sloping Areas

Please Indicate: (relevant distance / height measurements)

Monitoring Shelter Probe Position(s) **Exterior Samplers** Met Tower Security Fencing

Nearby Trees/Shrubs Roadways Buildings Walls Other Obstructions

Possible Sources Paved / Unpaved Areas Nearby Construction Flues, Vents, Boilers Meat Cooking



UNRESTRICTED AIR FLOW: > 270° Estimated Degrees of Clearance

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Freel's Bend O3 Initials: EMH Date: 03/13/23

Camera [APC / Personal – Owner: Minolta MN12Z

Photo: 001 Date: 03/13/23 Time: 2:15 pm Photographer: EMH Description: North Directional



Photo: 002 Date: 03/13/23 Time: 2:15 pm Photographer: EMH Description: Northeast Directional



Photo: 003 Date: 03/13/23 Time: 2:15 pm Photographer: EMH Description: East Directional



Photo: 004 Date: 03/13/23 Time: 2:15 pm Photographer: EMH Description: Southeast Directional



Photo: 005 Date: _____ Time: ____ Photographer: _EMH ____ Description: _South Directional



Photo: 006 Date: _____ D3/13/23 Time: _____ Photographer: _____ EMH _____ Description: _____ Southwest Directional



Photo: 007 Date: 03/13/23 Time: 2:15 pm Photographer: EMH Description: West Directional



Photo: 008 Date: _____ Time: ____ Photographer: EMH ____ Description: Northwest Directional



Photo: 009 Date: O3/13/23 Time: 2:15 pm Photographer: EMH Description: Site



Photo: 010 Date: _____ Time: ____ Photographer: ____ EMH ____ Description: ____ Probe



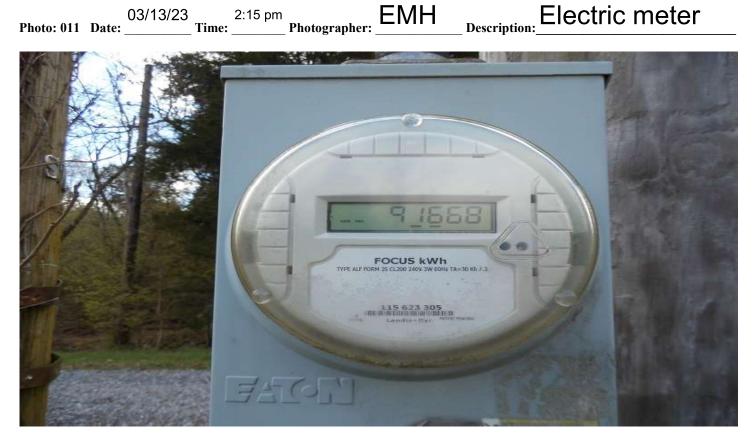


Photo: 012 Date: _____ Time: _____ Photographer: _____ Description: _____

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

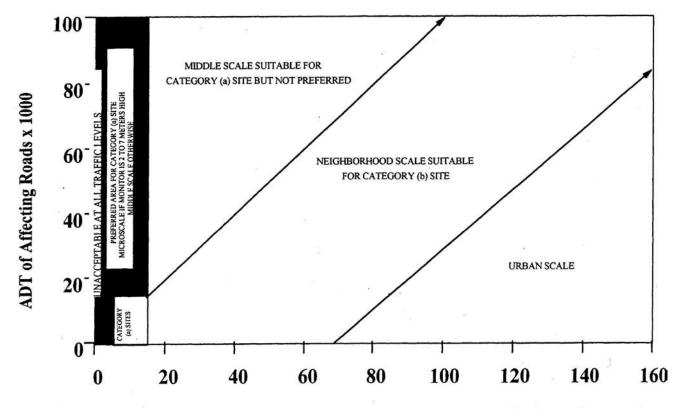


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time						
Flow Rate	1/8" ID	5/32" ID	3/16" ID			
(liters/min)	feet	feet	feet			
0.1	13.8	8.8	6.1			
0.2	27.6	17.7	12.3			
0.3	41.4	26.5	18.4			
0.4	55.3	35.4	24.6			
0.5	69.1	44.2	30.7			
0.6	82.9	53.0	36.8			
0.7	96.7	61.9	43.0			
0.8	110.5	70.7	49.1			
0.9	124.3	79.6	55.3			
1	138.1	88.4	61.4			
1.1	151.9	97.2	67.5			
1.2	165.8	106.1	73.7			
1.3	179.6	114.9	79.8			
1.4	193.4	123.8	85.9			
1.5	207.2	132.6	92.1			
1.6	221.0	141.4	98.2			
1.7	234.8	150.3	104.4			
1.8	248.6	159.1	110.5			
1.9	262.4	168.0	116.6			
2	276.3	176.8	122.8			

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 03/14/23	Location: Maryville, Tennessee
	LOCALION: Ividity vine, Terricosee

AQS Number: 47-009-0011

Site Name: Maryville PM Pollutants: PM2.5

Print Name / Signature / Initials / Duties

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist

Air Monitoring Site Evaluation Summary

Local Site Name: Maryville PM		Initials: EMH			
Site meets EPA siting criteria:	■ Yes □ No				
If No, explain:					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
Sequoyah Avenue	85.0 m	S	Local St	NA	NA
Brown School Road	606.0 m	NE	Local St	4676	2022
Genesis Street	607.0 m	SW	Local St	1416	2022
Cheltenham Road	563.0 m	NW	Local St	522	2022
Additional Comments:1. Arrival, departure and photo2. Platform is in fair condition.		se nails. D	Decking cons	sists of 11	
boards (60"L x 6"W x 1"T).					

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Maryville PM	Initials: EMH	Date: 03/14/23
APC auditor should document in Site Log – time / date / weather con		
Arrival Time: 10:10 am Departure Time: 11:00 an	Primary Operator: JUS	tin Long
Observer(s):		
SITE		
[🖪 Yes 🗆 No] -Security Fence [🗗 Yes 🗆 No] -Razor/Barb W	Vire [₾ Yes 🗆 No 🗆 NA] Grass/S	Shrubs Cut
[Yes No a NA] Bare Soil Area [Yes No a NA] Vand	dalism – [□ Inside / □ Outside]	
Date: [Yes No] Police Repo	ort Filed	
Issues:		
PLATFORMS: Not Present		
Condition: [Yes No] Good [Yes No] Needs Main	ntenance	
Issues:		
RECORDS AT SITE:		
Documents available (QAPPs, SOPs) [♠ Yes □ No] ♠ F	Electronic/□ Hardcopy/□Both	
Logbooks at site [■ Yes □ No] □ Electronic/□ Hardcopy/■	Both	
Comments:		

MONITOR(s):

Monitor(s)	Manufacturer	Model	Serial Number
PM2.5	Met One	BAM 1022	T17009

Location: Exterior Samplers [Roof / Ground / Not Present]

Make	Model	Serial Number	Data logger/Modem	Main/Backuj
Raven	R55V	2R93610225021016	Modem	Main
	·	-		
		Present lly Grounded [♣ Yes □ No] St:	abilized [≜ Yes □ No] Clo	ean Inside
Yes ■ No] Locked Yes □ No] Head/Se	[■ Yes □ No] Electrical parator Clean	lly Grounded [# Yes \square No] Sta		
Yes ■ No] Locked Yes □ No] Head/Se	[Yes No] Electrical	lly Grounded [# Yes \square No] Sta		
Yes \square No] Head/Se p	[■ Yes □ No] Electrical parator Clean	1/30 days PM 10 H		
Yes ■ No] Locked Yes □ No] Head/Se perator / Log: VS	[■ Yes □ No] Electrical parator Clean CC/WINS Clean Schedule	lly Grounded [Yes No] State No] State		

MSEF: Local Site Name: Maryville PM

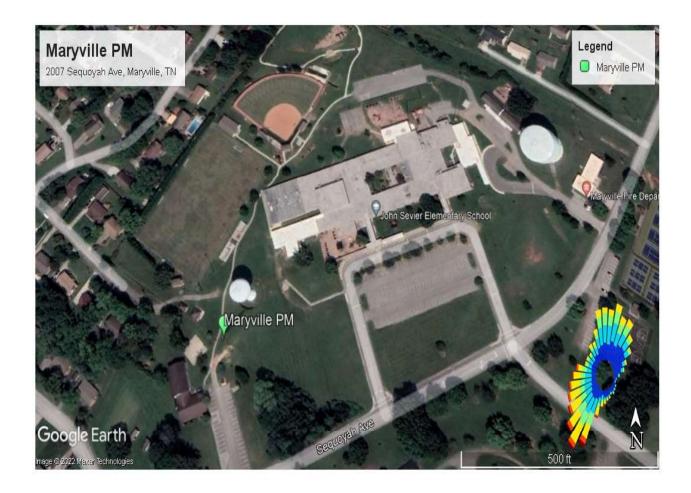
^{*}Collocated monitors must be within 4 meters of each other and at least 2 meters apart for flow rates greater than 200 liters/min or at least 1 meter apart for samplers having flow rates less than 200 liters/min to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

	Inlet	Inlet I coeffee	*Horizontal	*Vertical	Monitorin	ng SCALE
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)	Distance (meters) If Applicable	Distance (meters) If Applicable	AQS	Annual Network Plan
PM 2.5	2.6	Ground			Neighborhood	Neighborhood

FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb)

When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

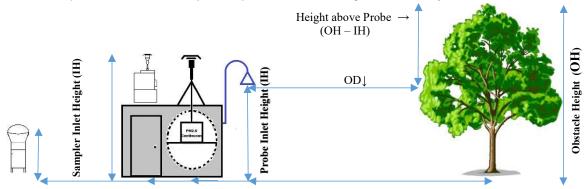
Aerial Photo with Wind Rose



Source: Google Earth Pro

Imagery Date: ____

OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be $\geq [2*(OH-IH)]$

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstacle	AZ
1	Water Tower	27.0	2.6	48.8	34.7	✓	45
2	Tree	19.3	2.6	33.4	51.5		125
3	Trees	9.2	2.6	13.2	27.0		133
4	Shrub	4.0	2.6	2.8	20.0		191
5	Building	6.9	2.6	8.6	35.2		263
6	Trees	13.0	2.6	20.8	37.0		297
7	Tree	3.4	2.6	1.6	46.0		315
8	Building	4.1	2.6	3.0	27.8		341
9	Building	5.7	2.6	6.2	56.5		348
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Nan	ne: Mary	ville PM	Initials: _	EMH	Date: 03/14/23
TREE DRIPLINE(s):	27.0	meters (nearest	inlet to dripline)	□ No Trees	Present
`,	37.0	meters (neares	t inlet to dripline)	☐ Not Present	
	46.0	meters (neares	t inlet to dripline)	☐ Not Present	
Should be greater than 20 m	eters from t	he dripline of tree(s) and	d must be 10 me	ters from the d	ripline when the tree(s) act as an obstruction
Issues:					
Minor Sources:					
_	-	present? (especial	-	-	
		mnies, smoke stac		diesel heat	ng
	generator	s near NO ₂ or SC	2 anaiyzers		
Issues: None					
Additional Info	armat	ion·			
			41 6	- 41	
The closest tree is	greater	tnan 20 mete	rs; therefore	e there ar	e no tree dripline issues.
Object #1 (Water to	ower) is	considered a	n obstacle.	It falls w	ithin one 90 degree
					flow around the PM
	111010 111	an 270 degre		ti lotou un	
inlet.					

MSEF: Local Site Name: Maryville PM

Initials:

Date: _ 03/14/23

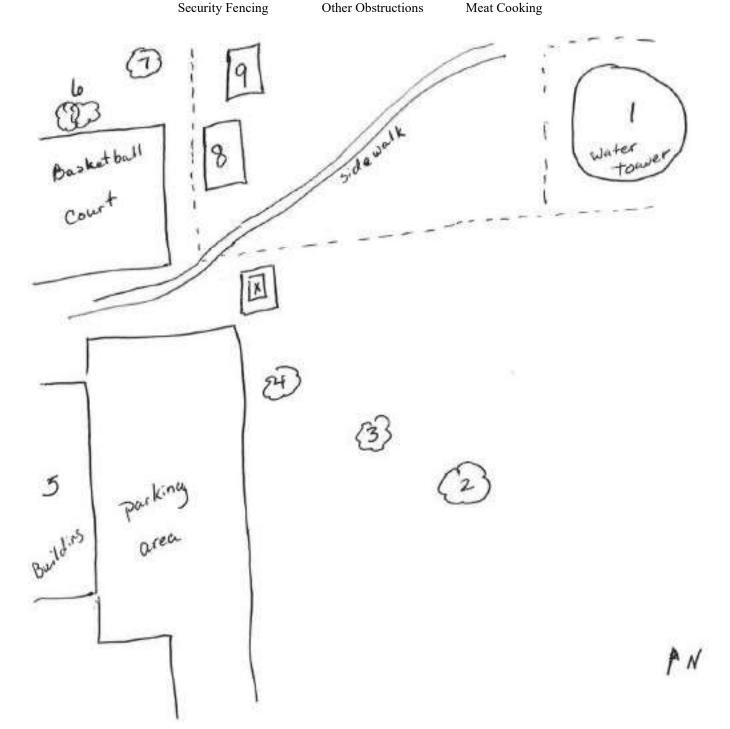
Direction NORTH Primary Wind Dir Security Issues Sloping Areas

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

Monitoring Shelter Probe Position(s) **Exterior Samplers** Met Tower

Nearby Trees/Shrubs Roadways Buildings Walls Other Obstructions

Possible Sources Paved / Unpaved Areas Nearby Construction Flues, Vents, Boilers Meat Cooking



UNRESTRICTED AIR FLOW: > 270° Estimated Degrees of Clearance

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Maryville PM Initials: EMH Date: 03/14/23

Camera [APC / Personal – Owner: Minolta MN12Z

Photo: 001 Date: 03/14/23 Time: 10:45 am Photographer: EMH Description: North Directional



Photo: 002 Date: 03/14/23 Time: 10:45 am Photographer: EMH Description: Northeast Directional



Photo: 003 Date: 03/14/23 Time: Photographer: EMH Description: East Directional



Photo: 004 Date: _____ 10:45 am Photographer: EMH _____ Description: Southeast Directional



Photo: 005 Date: _____ 10:45 am Photographer: _EMH _____ Description: _South Directional



Photo: 006 Date: _____ 10:45 am Photographer: _EMH _____ Description: _____ Southwest Directional



Photo: 007 Date: 03/14/23 Time: 10:45 am Photographer: EMH Description: West Directional



Photo: 008 Date: _____ 10:45 am Photographer: EMH _____ Description: Northwest Directional



Photo: 009 Date: O3/14/23 Time: Photographer: EMH Description: Site



Photo: 010 Date: _____ Time: ____ Photographer: _EMH ____ Description: _____ Monitor





Photo: 012	Date:	Time:	Photographer:	Description:	
------------	-------	-------	---------------	--------------	--

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

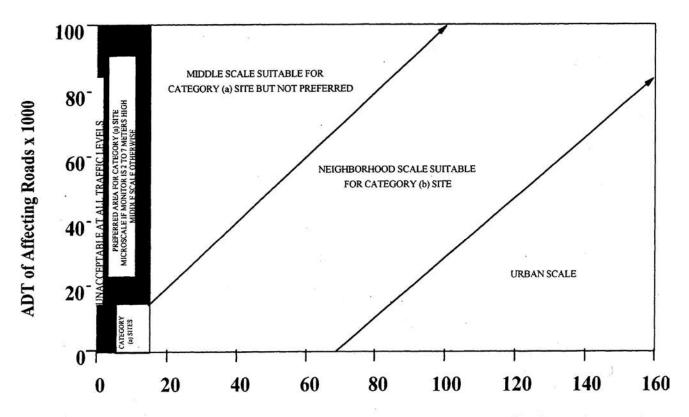


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time						
Flow Rate	1/8" ID	5/32" ID	3/16" ID			
(liters/min)	feet	feet	feet			
0.1	13.8	8.8	6.1			
0.2	27.6	17.7	12.3			
0.3	41.4	26.5	18.4			
0.4	55.3	35.4	24.6			
0.5	69.1	44.2	30.7			
0.6	82.9	53.0	36.8			
0.7	96.7	61.9	43.0			
0.8	110.5	70.7	49.1			
0.9	124.3	79.6	55.3			
1	138.1	88.4	61.4			
1.1	151.9	97.2	67.5			
1.2	165.8	106.1	73.7			
1.3	179.6	114.9	79.8			
1.4	193.4	123.8	85.9			
1.5	207.2	132.6	92.1			
1.6	221.0	141.4	98.2			
1.7	234.8	150.3	104.4			
1.8	248.6	159.1	110.5			
1.9	262.4	168.0	116.6			
2	276.3	176.8	122.8			

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 03/23/23 Location: Dyersburg, Tennessee

AQS Number: 47-045-0004

Site Name: Dyersburg PM Pollutants: PM2.5

Print Name / Signature / Initials / Duties

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist

2:_____

Air Monitoring Site Evaluation Summary

Local Site Name: Dyersburg PM		Initials: EMH		Date: 03/23/23	
Site meets EPA siting criteria:	■ Yes □ No				
If No, explain:					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
Greenway Street	134.0 m	N	Local St	NA	NA
Parr Avenue	104.5 m	E	Local St	7007	2022
Electrical					
Utilities Company: Dyersburg Ele	ectric System		Meter #: _1	41259421	
Additional Comments:					
1. Arrival, departure and photo	times are Central ti	me.			
2. The platform with the BAM monit					
consists of 6 boards (60" L x 6		•	_ x 2.5" W x	1"). The c	other
platform with old TEOM shelte	er needs to be remov	ea.			

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Dyersburg PM	Initials: EMH	Date: 03/23/23
APC auditor should document in Site Log – time / date / weather	conditions/purpose of visit / APC staff r	oresent [# Yes No] Completed
Arrival Time: 1:05 pm Departure Time: 2:10 p	om Primary Operator: Bra	nd Garrett
Observer(s):		
SITE [• Yes No] -Security Fence [• Yes No] -Razor/Barb	o Wire [≞ Yes □ No □ NA] Grass/S	Shrubs Cut
[Yes No a NA] Bare Soil Area [Yes No a NA] Va	andalism – [□ Inside / □ Outside]	
Date: [□ Yes □ No] Police Ro	eport Filed	
Issues:		
PLATFORMS: Not Present Condition: Yes No] Good Peeds M		
Issues:		
RECORDS AT SITE: Documents available (QAPPs, SOPs) [Yes No]	■ Electronic/□ Hardcopy/□Both	
Logbooks at site [■ Yes □ No] □ Electronic/□ Hardcopy	y/ ≞ Both	
Comments:		
MONITOR(s):	Location: Exterior Samplers [□ Ro	of / □Ground / □ Not Present

MONITOR(s):

Monitor(s)	Manufacturer	Model	Serial Number
PM2.5	Met One	BAM 1022	C20241

Make	Model	Serial Number	Data logger/Modem	Main/Backu
Raven	R55V	2R91110670021009		Main
UTDOOR SAMP		Present ly Grounded [■ Yes □ No] Sta	ahilizad [# Ves = No] Cla	an Incida
- Ves □ Nol Hand/San	eretor Clean	-		
Yes □ No] Head/Sep	arator Clean	1/ 30 days _{PM 10} H	1/	30 dav
novetor / Logi VSC	CC/WING Clean Cahadula	. II OO GAYS _{DM TI}	and Clean Schoduler 17	oo aayo

Pollutant	Flow (Hi / Lo)	*Separation Distance (meters)

^{*}Collocated monitors **must be within 4 meters of each other** and at least **2 meters apart** for flow rates **greater than 200 liters/min** or at **least 1 meter apart** for samplers having flow rates **less than 200 liters/min** to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

	Inlet	Inlet I coeffor	*Horizontal	*Vertical	Monitorin	ng SCALE
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)	Distance (meters) If Applicable	Distance (meters) If Applicable	AQS	Annual Network Plan
PM 2.5	2.5	Ground			Neighborhood	Neighborhood

FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb)

When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

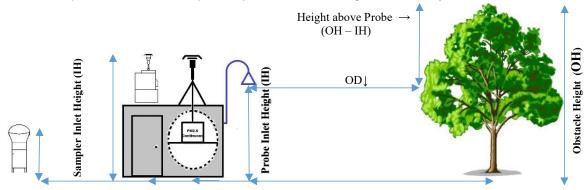
Aerial Photo with Wind Rose



Source: Google Earth Pro

Imagery Date: ____

OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be $\geq [2*(OH-IH)]$

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstacle	AZ
1	Apartment Building	5.2	2.5	5.4	32.3		345
2	Apartment Building	5.2	2.5	5.4	22.8		315
3	Trees	8.1	2.5	11.2	22.0		294
4	Trees	12.0	2.5	19.0	24.5		91
5	Trees	12.3	2.5	19.6	38.0		58
6	Trees	11.0	2.5	17.0	45.0		47
7	Tree	11.6	2.5	18.2	55.2		42
8	Building	3.7	2.5	2.4	27.0		68
9	Substation	4.8	2.5	4.6	95.0		22
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Name	: Dyer	sburg PM	Initials: EMH	Date: 03/23/23
TREE DRIPLINE(s):	22.0	meters (nagrast	nlet to dripline) □ N o	Trees Present
TREE DIGIT EIT (E(s)	24.5		inlet to dripline) \square No	
-	38.0		inlet to dripline) \square No	
- Should be greater than 20 met	ers from t			m the dripline when the tree(s) act as an obstruction.
201100				
ssues:				
Minor Sources:		.0 (C D) (1)	
_	-	` - •	y for PM samplers)	
		nnies, smoke staci s near NO ₂ or SO ₂	ks, fireplaces, diese	i neating
_	ncraior		g allaryzers	
ssues: None				
		•		
Additional Info	rmat	ion:		
he closest tree is g	reater	than 20 meter	s from inlet; the	refore there are no tree
ripline issues.				

Direction NORTH Primary Wind Dir Security Issues Sloping Areas

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

Monitoring Shelter Probe Position(s) **Exterior Samplers** Met Tower

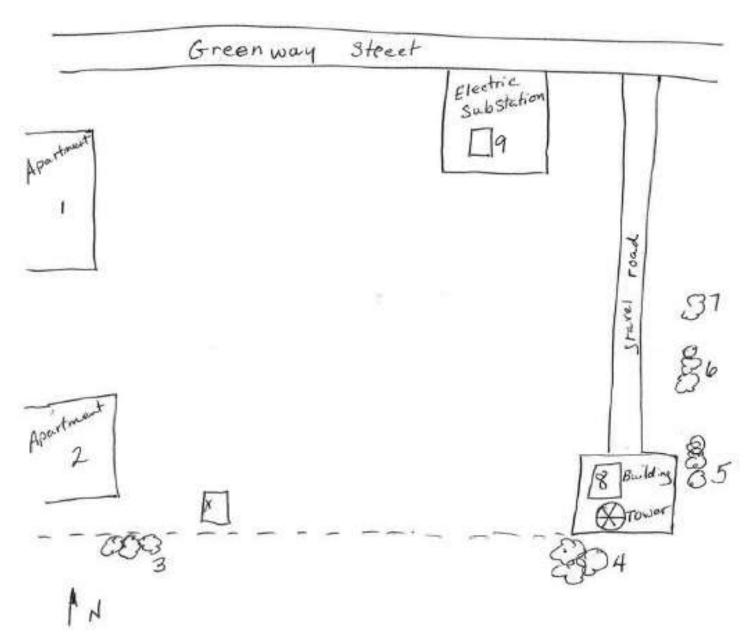
Nearby Trees/Shrubs Roadways Buildings Walls

Possible Sources Paved / Unpaved Areas **Nearby Construction** Flues, Vents, Boilers

Security Fencing

Other Obstructions

Meat Cooking



Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Dyersburg PM Initials: EMH Date: 03/23/23

Camera [APC / Personal – Owner: Minolta MN12Z

Photo: 001 Date: 03/23/23 Time: 1:45 pm Photographer: EMH Description: North Directional



Photo: 002 Date: 03/23/23 Time: 1:45 pm Photographer: EMH Description: Northeast Directional



Photo: 003 Date: 03/23/23 Time: 1:45 pm Photographer: EMH Description: East Directional



Photo: 004 Date: _____ 1:45 pm ____ Photographer: _____ EMH ____ Description: _____ Southeast Directional



Photo: 005 Date: 03/23/23 Time: 1:45 pm Photographer: EMH Description: South Directional



Photo: 006 Date: _____ 1:45 pm ____ Photographer: _____ EMH ____ Description: _____ Southwest Directional



Photo: 007 Date: 03/23/23 Time: 1:45 pm Photographer: EMH Description: West Directional



Photo: 008 Date: _____ 1:45 pm ____ Photographer: _____ EMH ____ Description: _____ Northwest Directional



Photo: 009 Date: O3/23/23 Time: 1:45 pm Photographer: EMH Description: Site



Photo: 010 Date: 03/23/23 Time: 1:45 pm Photographer: EMH Description: Monitor



Photo: 011 Date: 03/23/23 Time: 1:45 pm Photographer: EMH Description: Electric meter



Photo: 012 Date: _____ Photographer: _____ Description: _____

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

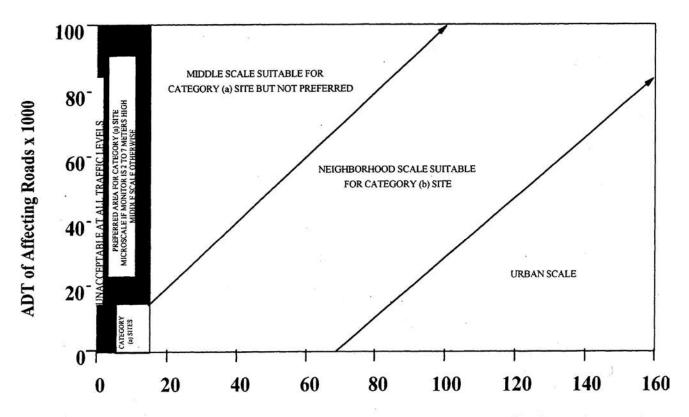


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time						
Flow Rate	1/8" ID	5/32" ID	3/16" ID			
(liters/min)	feet	feet	feet			
0.1	13.8	8.8	6.1			
0.2	27.6	17.7	12.3			
0.3	41.4	26.5	18.4			
0.4	55.3	35.4	24.6			
0.5	69.1	44.2	30.7			
0.6	82.9	53.0	36.8			
0.7	96.7	61.9	43.0			
0.8	110.5	70.7	49.1			
0.9	124.3	79.6	55.3			
1	138.1	88.4	61.4			
1.1	151.9	97.2	67.5			
1.2	165.8	106.1	73.7			
1.3	179.6	114.9	79.8			
1.4	193.4	123.8	85.9			
1.5	207.2	132.6	92.1			
1.6	221.0	141.4	98.2			
1.7	234.8	150.3	104.4			
1.8	248.6	159.1	110.5			
1.9	262.4	168.0	116.6			
2	276.3	176.8	122.8			

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 03/14/2023	Location: New Market, Tennessee
AQS Number: 47-089-0002	

Site Name: New Market O3 Pollutants: O3

Print Name / Signature / Initials / Duties

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist

2: EMH

Air Monitoring Site Evaluation Summary

Local Site Name: New Market O3	Initials: EMH		Date: 03/14/2023		
Site meets EPA siting criteria: ■ Ye	es 🗆 No				
If No, explain:					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
Forester Road	10.0 m	N	Local St	NA	NA
Lost Creek Road	696.0 m	W	Local St	402	2022
Electrical					
Utilities Company: Appalachian Elec	tric Corp.		Meter #: _3	33594941	
Additional Comments:					
1. Arrival, departure and photo time	es are Eastern ti	mes.			
2. Forester Road is 10.0 meters a			red by the la	ser range	finder).
3. Shelter temperature was 72 deg					
4. Fire extinguisher is in good con					
5. Shelter is bolted to cement pad	-				

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: New Market O3	Initials: EMH	
APC auditor should document in Site Log – time / date / weather condi	tions/purpose of visit / APC staff	present [Yes No] Completed
Arrival Time: 11:55 am Departure Time: 12:35 pm	Primary Operator: Erin	Sturgill
Observer(s):		
SITE		
$[\square \ Yes \ \textcircled{\tiny{!}} \ No] \ \textbf{-Security Fence} \ [\square \ Yes \ \textcircled{\tiny{!}} \ No] \ \textbf{-Razor/Barb Win}$	re [🖪 Yes 🗆 No 🗆 NA] Grass /	Shrubs Cut
$[\ \square \ \ Yes \ \square \ \ No \ \square \ \ NA] \ \textbf{Bare Soil Area} \ [\ \square \ \ Yes \ \square \ \ No \ \square \ \ NA] \ \textbf{Vanda}$	lism – [□ Inside / □ Outside]
Date: [□ Yes □ No] Police Report	t Filed	
Issues:		
SHELTER - □ Not Present		
Interior Arrival Temperature: 23.8 °C (from data logger) Ope	erator Site Visits: 1	_ per [□ week □ month □
[□ Yes • No] Leaking Roof [Damaged: □Ceiling / □ Floor	r / 🗆 Walls] [🗈 Yes 🗆 No] (Clean / Neat
$[\ \boxdot \ Yes \ \Box \ No] \ Fire \ Extinguisher \ [\ \Box \ Yes \ \boxdot \ No] \ Insect \ / \ Wildlife$	fe Issues [Yes • No] Gase	oline (inside shelter)
Issues:		
Exterior Type: [¬Freezer / ¬Wood Building / ¬Brick-Block / ¬Ste Height of Roof: 3.0 meters Roofing M		-last single ply membrane
[□ Yes ■ No] Needs Maintenance (specify)		
[Yes No] Tied Down (type)		
[Yes No] Electrically Grounded [Yes No] Roof Ra		
Roof Access: [Stairs / Ladder / Not Present] [Ye		Hazard)
Issues:		
PLATFORMS: ■ Not Present Condition: [□ Yes □ No] Good [□ Yes □ No] Needs Maint	enance	
Issues:		
RECORDS AT SITE: Documents available (QAPPs, SOPs) [Yes No] Ele	ectronic/□ Hardcopy/□Both	
Logbooks at site [■ Yes □ No] ■ Electronic/□ Hardcopy/□B	oth	
Comments		

MSEF:	: Local Site Nan	ne: New Mar	ket O3	_Initials: EMH	Date: 03	3/14/23
MONI	TOR(s):		Locatio	on: Exterior Sample	rs [□ Roof / □Grou	nd / • Not Present]
Monit	tor(s)	Manufacture	r Model	Serial Nun	nber	
	O3	Teledyne	T400			
CALIB	BRATOR(s):	□ Not Present Model	[¶ Yes	□ No] Are Q C Cho	eck Gases Vented Certification	Outside Shelter?
QC	Wake	Model	Scriai Ivuin	DCI	Date	Date
QC	Teledyn	e T703	6	45	01/31/23	07/31/23
·	•			on line? [□ Yes ■ N rations [■ Yes □ No (Required	Precision Checks	
	NDER GAS STA	ANDARDS:	■ Not Presen), should not be in servic	e and should be replace
QC	Gas Standar	d PSI Reading	Expiration Date	Standard Concentrati	on Serial	Number
Issues:						

MSEF: Local Site N	Name: New Market O3	Initials: EMH	Date: 03/14/23	3
DATA COLLECTI Data loggers/Mode	ON/DOCUMENTATIO	ON:		
Make	Model	Serial Number	Data logger/Modem	Main/Backup
Raven	R55V	2R93610246021016	Modem	Main
Agilaire	8872	513	Datalogger	Main

SUPPORTING INSTRUMENTATION: Internal Not Present
[■ Yes □ No] Temperature Sensor [□ Yes ■ No] Uninterruptable Power Supply
Zero Air System: Commercial System (Make / Model): Teledyne T701 (SN 1344)
Cartridge System: [Silica Gel Pink / Blue] / Charcoal / Purafil / Hopcalite / Other:
[Yes No] Needs Service Last Service Date: 02/13/23 Condition:
Issues:
Probe Line(s): [#Replaced / Cleaned] – Frequency: 1/ year Last Service Date: 02/13/23
[■ Yes □ No] Clean [■ Yes □ No] Heated [□ Yes ■ No] Insulated [□ Yes ■ No] Moisture [□ Yes ■ No] Retractable
[□ Yes ■ No] Old / Unused Lines [□ Yes ■ No] Lo Flo Manifold
[□ Yes • No] Any Open Ports? -> How many analyzers using manifold?
Issues:
OUTDOOR SAMPLERS [Yes No] Locked Yes No] Electrically Grounded Yes No] Stabilized Yes No] Clean Inside
[Yes No] Head/Separator Clean
Operator / Log: VSCC/WINS Clean Schedule: PM 10 Head Clean Schedule:
Issue(s):

Pollutant	Flow (Hi / Lo)	*Separation Distance (meters)		

(39.4 inches = 1 meter)

COLLOCATED SAMPLERS: • Not Present

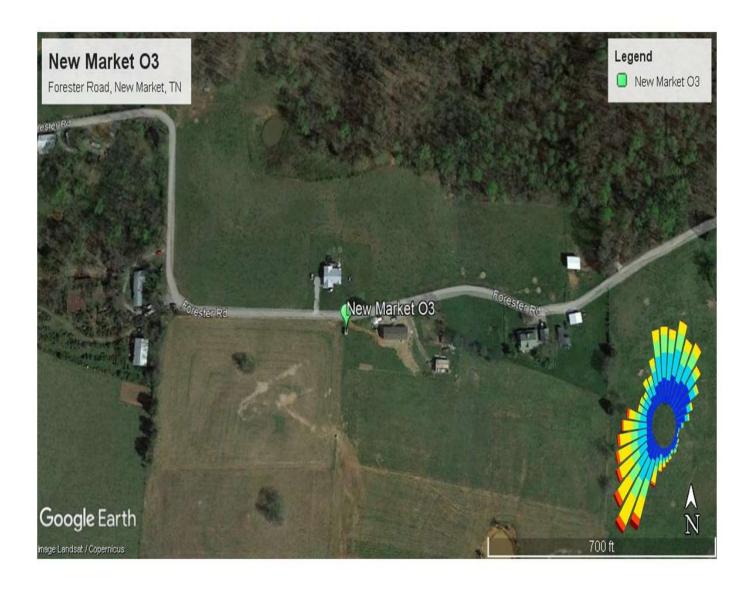
^{*}Collocated monitors **must be within 4 meters of each other** and at least **2 meters apart** for flow rates **greater than 200 liters/min** or at **least 1 meter apart** for samplers having flow rates **less than 200 liters/min** to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

MSEF: Local Site Name: New Market O3	Initials: EMH	Date: 03/14/2	3
PROBE SYSTEM(s): External			
Inlet Type: [♣ Single Line / □ Dual Line / □ Bell Type (CA	S design)]		
Funnel(s): [■ Rain Shield / □Part of Probe] Funnel Ma	aterial: [□Teflon® / 🖥 Gla	ss / Stainless Steel /	□ Other:]
Probe Line(s) : $[\blacksquare \text{ Teflon}^{\$} / \square \text{ Other:} \]$ I	Probe Fitting(s): [Tefle	on [®] /□ Other:	/ Not Present]
Residence Time: 5.8 seconds	(20 sec. max	(Refer to chart for ma	ximum line lengths)
Issue(s):			

	Inlet	Inlet I and in	*Horizontal	*Vertical	Monitoring SCALE		
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)	Distance (meters) If Applicable	Distance (meters) If Applicable	AQS	Annual Network Plan	
O3	4.0	Side of Shelter			Neighborhood	Neighborhood	

FOR Horizontal and Vertical Distances: Separation Distance = $(1 \text{ meter for } O_3, SO_2,) \& (2 \text{ meters for PM}, Pb)$

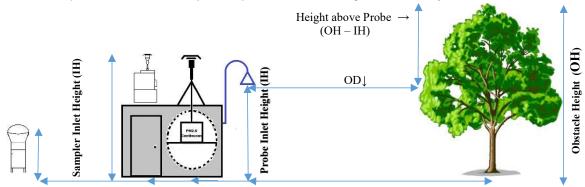
When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.



Source: Google Earth Pro

Imagery Date: ____

OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be \geq [2*(OH-IH)]

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstacl	e AZ
1	Blue house	4.5	4.0	1.0	36.0		10
2	Tree	14.3	4.0	20.6	22.0		68
3	Green house	6.2	4.0	4.4	38.8		90
4	Trees	9.7	4.0	11.4	133.0		212
5	Trees	10.6	4.0	13.2	102.0		285
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Nam	ne: New	Market 03	Initials: _	MH —————	Date: 03/14/23
	22.0				
TREE DRIPLINE(s):		meters (nearest i	=		resent
	102.0	meters (nearest:	inlet to dripline)	☐ Not Present	
	133.0	meters (nearest	- ·		
Should be greater than 20 m	eters from th	ne dripline of tree(s) and	must be 10 met	ers from the drip	line when the tree(s) act as an obstruction
Issues:					
Minor Sources:					
• Groundcover, gr	rass, etc p	resent? (especially	y for PM samp	olers)	
_	_	nnies, smoke stacl			g
		s near NO ₂ or SO ₂			
Issues. None					
Issues: NONE					
	4	•			
Additional Info	ormat	ion:			
The closest tree is	greater	than 20 meter	s from the p	probe; thei	refore there are no
tree dripline issues			<u> </u>		
tree dripinie issues.					

MSEF: Local Site Name: New Market O3 Initials: EMH

Date: _ 03/14/23

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

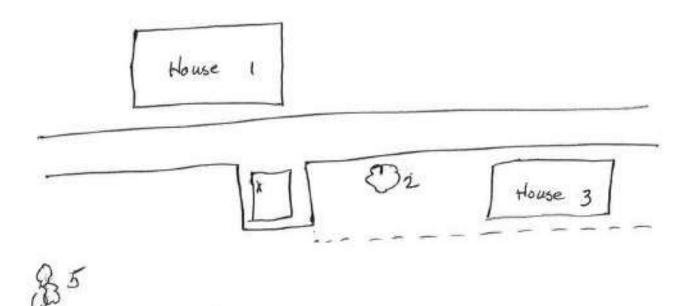
Direction NORTH Primary Wind Dir Security Issues Sloping Areas

Monitoring Shelter Probe Position(s) **Exterior Samplers** Met Tower

Security Fencing

Nearby Trees/Shrubs Roadways Buildings Walls Other Obstructions

Possible Sources Paved / Unpaved Areas Nearby Construction Flues, Vents, Boilers Meat Cooking





UNRESTRICTED AIR FLOW: > 270 ° Estimated Degrees of Clearance

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: New Market O3 Initials: EMH Date: 03/14/23

Camera [APC / Personal – Owner: Minolta MN12Z

Photo: 001 Date: 03/14/23 Time: 12:20 pm Photographer: EMH Description: North Directional



Photo: 002 Date: 03/14/23 Time: 12:20 pm Photographer: EMH Description: Northeast Directional



Photo: 003 Date: _____ Time: ____ Photographer: _EMH ____ Description: _East Directional



Photo: 004 Date: _____ Time: ____Photographer: EMH _____Description: _____Southeast Directional



Photo: 005 Date: 03/14/23 Time: 12:20 pm Photographer: EMH Description: South Directional



Photo: 006 Date: _____ 12:20 pm Photographer: EMH _____ Description: Southwest Directional



Photo: 007 Date: 03/14/23 Time: 12:20 pm Photographer: EMH Description: West Directional



Photo: 008 Date: _____ Time: ____ Photographer: EMH ____ Description: Northwest Directional



Photo: 009 Date: O3/14/23 Time: Photographer: EMH Description: Site



Photo: 010 Date: ______ Time: _____ Photographer: _____ EMH ____ Description: _____ Probe

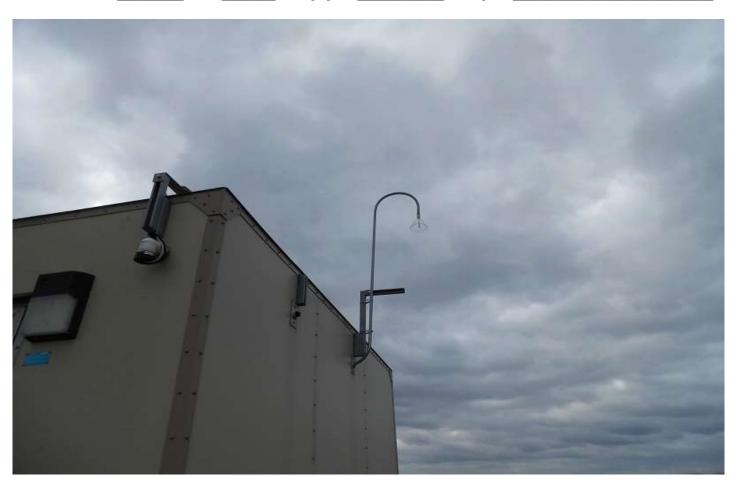


Photo: 011 Date: _____ Photographer: EMH _____ Description: Electric meter

CLZOD RAOW SW. TYPE C1S SOTA 1.0Kh
APPALACHIAN E C 189243 Shall
IMPRIMENTAL HER HILL
STATE OF THE STATE OF TH

Photo: 012 Date:	Time:	Photographer:	Description:	

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

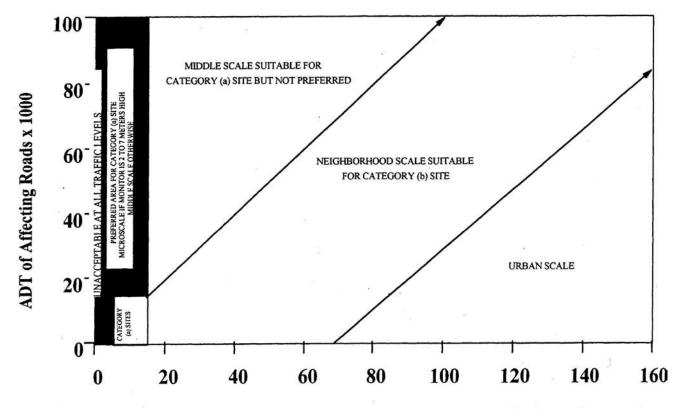


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time					
Flow Rate	1/8" ID	5/32" ID	3/16" ID		
(liters/min)	feet	feet	feet		
0.1	13.8	8.8	6.1		
0.2	27.6	17.7	12.3		
0.3	41.4	26.5	18.4		
0.4	55.3	35.4	24.6		
0.5	69.1	44.2	30.7		
0.6	82.9	53.0	36.8		
0.7	96.7	61.9	43.0		
0.8	110.5	70.7	49.1		
0.9	124.3	79.6	55.3		
1	138.1	88.4	61.4		
1.1	151.9	97.2	67.5		
1.2	165.8	106.1	73.7		
1.3	179.6	114.9	79.8		
1.4	193.4	123.8	85.9		
1.5	207.2	132.6	92.1		
1.6	221.0	141.4	98.2		
1.7	234.8	150.3	104.4		
1.8	248.6	159.1	110.5		
1.9	262.4	168.0	116.6		
2	276.3	176.8	122.8		

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 02/23/23	Location	Loretto.	Tennessee
	LOCALIOIL	LOI CILO,	1 0111100000

AQS Number: 47-099-0003

Site Name: Loretto PM Pollutants: PM2.5

Print Name / Signature / Initials / Duties

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist
2:

Air Monitoring Site Evaluation Summary

Local Site Name: Loretto PM	Initials: EMH		Date: 02/23/23		
Site meets EPA siting criteria:	■ Yes □ No				
If No, explain:					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
Busby Road	268.2 m	S	Local St	1501	2022
Electrical					
Utilities Company: NA			Meter #: N	IA	
Additional Comments:					
1. Electricity for site is provided	d by the City of Lore	etto.			
2. Arrival, departure and photo	times are in Central	time.			
3. Decking boards were replace	ed 7/19/22.				
4. Site is located within the fend	ced-area of the Lore	etto wastew	ater plant.		
5. Loretto is one of the sites wit	th a purple air senso	or and a we	eather station	n.	

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Loretto PM	Initials: E	.MH	Date: 02/23/23
APC auditor should document in Site Log – time / date / weat			
Arrival Time:10:35 am Departure Time:	25 am Primary Operato	_{r:} Hat	tie Benet
Observer(s):			
SITE			
[• Yes 🗆 No] -Security Fence [• Yes 🗆 No] -Razor/Ba	arb Wire [Yes No NA] Grass/S	Shrubs Cut
[□ Yes □ No 🗈 NA] Bare Soil Area [□ Yes □ No 🗈 NA]	$Vandalism-[\ \Box\ Inside\ /\ \Box$	Outside]	
Date: [□ Yes □ No] Police	Report Filed		
Issues:			
PLATFORMS: Not Present			
Condition: [Yes No] Good [Yes No] Needs	s Maintenance		
Issues:			
RECORDS AT SITE:			
Documents available (QAPPs, SOPs) [■ Yes No	o] □ Electronic/□ Hardcopy	y/□Both	
Logbooks at site [● Yes □ No] □ Electronic/□ Hardc	opy/ Both		
Comments:			
MONITOR(s):	Location: Exterior Sample	ers [□ Roo	of / 🖪 Ground / 🗆 Not Present]

Monitor(s)	Manufacturer	Model	Serial Number
PM2.3	Met One	BAM 1022	T17015

Make	Model	Serial Number	Data logger/Modem	Main/Backu
Raven	R55V	2R0033042601	B118 Modem	Main
	PLERS [Yes No] Elect		No] Stabilized [■ Yes □ No] C	lean Inside
Yes □ No] Head/Se j perator / Log: VS	parator Clean CC/WINS Clean Scho	edule: 1/14days	PM ₁₀ Head Clean Schedule:	′14 days
sue(s):				
COLLOCATED S	SAMPLERS: • N	ot Present	(39.4 inches = 1 meter)	
	Pollutant	Flow	*Separation Distance	20

MSEF: Local Site Name: Loretto PM

^{*}Collocated monitors must be within 4 meters of each other and at least 2 meters apart for flow rates greater than 200 liters/min or at least 1 meter apart for samplers having flow rates less than 200 liters/min to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

	Inlet	T. L. A.	*Horizontal	*Vertical	Monitoring SCALE		
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)	Distance (meters) If Applicable	Distance (meters) If Applicable	AQS	Annual Network Plan	
PM 2.5	2.6	Ground			Regional	Regional	

FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb)

When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

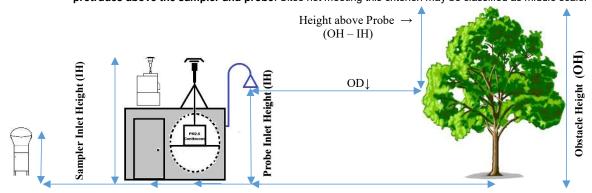
Aerial Photo with Wind Rose



Source: Google Earth Pro

Imagery Date: 01/07/20

OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be $\geq [2*(OH-IH)]$

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obsta	icle	AZ
1	Trees	16.4	2.6	27.6	40.0			150
2	Pine Tree	12.0	2.6	18.8	45.0			176
3	Tree	4.6	2.6	4.0	60.0			201
4	Building	4.5	2.6	3.8	19.2			344
5	Trees	24.0	2.6	42.8	60.0			22
6	Trees	24.0	2.6	42.8	64.0			33
7	Pine Trees	21.0	2.6	36.8	67.0			66
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

TREE DRIPLINE(s): 40.0	MSEF: Local Site Nam	e: Lore	tto PM	_Initials: EMH	Date: 02/23/23
Minor Sources: Groundcover, grass, etc present? (especially for PM samplers) Excessive number of chimnies, smoke stacks, fireplaces, diesel heating Off road diesel generators near NO₂ or SO₂ analyzers Issues: None	TREE DRIPH INIE(a).	40.0		· · · · · · · · · · · · · · · · · · ·	D
meters (nearest inlet to dripline) Not Present Should be greater than 20 meters from the dripline of tree(s) and must be 10 meters from the dripline when the tree(s) act as an obstruction. Issues: Minor Sources: Groundcover, grass, etc present? (especially for PM samplers) Excessive number of chimnies, smoke stacks, fireplaces, diesel heating Off road diesel generators near NO ₂ or SO ₂ analyzers Issues: None Additional Information: The closest tree is greater than 20.0 from the inlet; therefore there are no tree	TREE DRIPLINE(S):		·	= '	
Should be greater than 20 meters from the dripline of tree(s) and must be 10 meters from the dripline when the tree(s) act as an obstruction. Issues: Minor Sources: Groundcover, grass, etc present? (especially for PM samplers) Excessive number of chimnies, smoke stacks, fireplaces, diesel heating Off road diesel generators near NO ₂ or SO ₂ analyzers Issues: None Additional Information: The closest tree is greater than 20.0 from the inlet; therefore there are no tree			`	• /	
Minor Sources: • Groundcover, grass, etc present? (especially for PM samplers) • Excessive number of chimnies, smoke stacks, fireplaces, diesel heating • Off road diesel generators near NO ₂ or SO ₂ analyzers Issues: None Additional Information: The closest tree is greater than 20.0 from the inlet; therefore there are no tree	Should be greater than 20 me	eters from t			
Minor Sources: • Groundcover, grass, etc present? (especially for PM samplers) • Excessive number of chimnies, smoke stacks, fireplaces, diesel heating • Off road diesel generators near NO ₂ or SO ₂ analyzers Issues: None Additional Information: The closest tree is greater than 20.0 from the inlet; therefore there are no tree	Icenoe.				
 Groundcover, grass, etc present? (especially for PM samplers) Excessive number of chimnies, smoke stacks, fireplaces, diesel heating Off road diesel generators near NO₂ or SO₂ analyzers None Additional Information: The closest tree is greater than 20.0 from the inlet; therefore there are no tree	155ucs				
 Groundcover, grass, etc present? (especially for PM samplers) Excessive number of chimnies, smoke stacks, fireplaces, diesel heating Off road diesel generators near NO₂ or SO₂ analyzers Issues: None Additional Information: The closest tree is greater than 20.0 from the inlet; therefore there are no tree	Minor Sources				
Excessive number of chimnies, smoke stacks, fireplaces, diesel heating Off road diesel generators near NO ₂ or SO ₂ analyzers None		ass, etc n	present? (especially f	or PM samplers)	
None Additional Information: The closest tree is greater than 20.0 from the inlet; therefore there are no tree	_	-	` -	- ′	ating
Additional Information: The closest tree is greater than 20.0 from the inlet; therefore there are no tree	 Off road diesel g 	generator	s near NO ₂ or SO ₂ a	nalyzers	
Additional Information: The closest tree is greater than 20.0 from the inlet; therefore there are no tree	Lauras, None				
The closest tree is greater than 20.0 from the inlet; therefore there are no tree	issues:				
The closest tree is greater than 20.0 from the inlet; therefore there are no tree					
The closest tree is greater than 20.0 from the inlet; therefore there are no tree					
The closest tree is greater than 20.0 from the inlet; therefore there are no tree					
The closest tree is greater than 20.0 from the inlet; therefore there are no tree	Additional Info	rmat	ion·		
				ha inlat: therefor	there are no tree
dripline issues.		greater	111011 20.0 110111 1	The inner, therefore	
	dripline issues.				

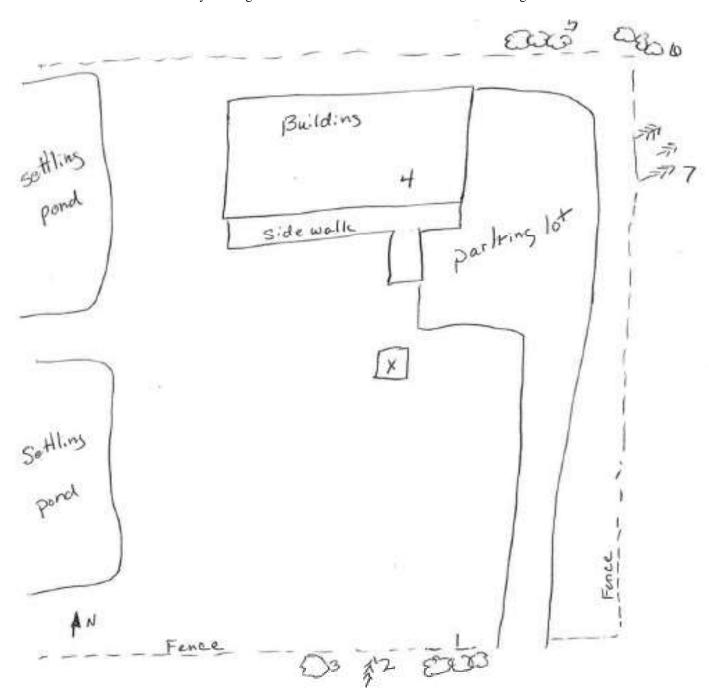
Date: 02/23/23

SITE DRAWING -

Direction NORTH Primary Wind Dir Security Issues Sloping Areas Please Indicate: (relevant distance / height measurements)

Monitoring Shelter Nearby Trees/Shrubs
Probe Position(s) Roadways
Exterior Samplers Buildings
Met Tower Walls
Security Fencing Other Obstructions

Possible Sources Paved / Unpaved Areas Nearby Construction Flues, Vents, Boilers Meat Cooking



UNRESTRICTED AIR FLOW: > 270° Estimated Degrees of Clearance

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Loretto PM Initials: EMH Date: 02/23/23

Camera [APC / Personal – Owner: Minolta MN12Z

Photo: 001 Date: 02/23/23 Time: 11:10 am Photographer: EMH Description: North Directional



Photo: 002 Date: 02/23/23 Time: 11:10 am Photographer: EMH Description: Northeast Directional



Photo: 003 Date: _____ Time: ____Photographer: _EMH ____Description: _East Directional



Photo: 004 Date: ______ 11:10 am _____ Photographer: ______ EMH ______ Description: ______ Southeast Directional



Photo: 005 Date: 02/23/23 Time: 11:10 am Photographer: EMH Description: South Directional



Photo: 006 Date: ______ 11:10 am Photographer: ______ EMH _____ Description: ______ Southwest Directional



Photo: 007 Date: _____ 11:10 am Photographer: _EMH _____ Description: _West Directional



Photo: 008 Date: _____ Time: ____Photographer: _EMH ____Description: ____Northwest Directional



Photo: 009 Date: _____ Time: ____ Photographer: _____ EMH ____ Description: _____ Site



Photo: 010 Date: 02/23/23 Time: Photographer: EMH Description: Monitor



L HOTO! ATT	Date:	1 me:	_ r notographer:	Description:
Photo: 012	Date:	Time:	Photographer:	Description:
			~ I	

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

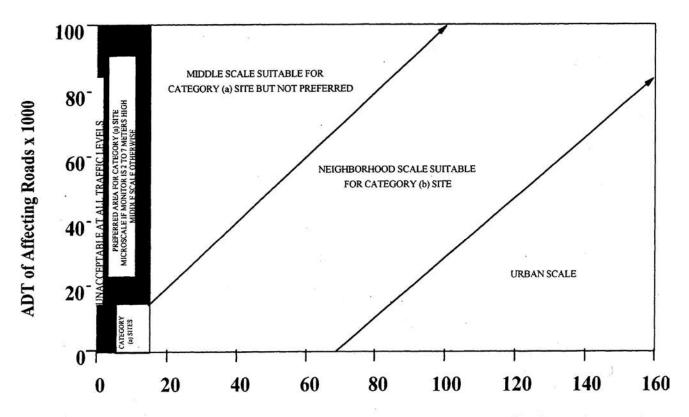


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line (1/4" Line OD / 20 Sec Residence Time					
Flow Rate	1/8" ID	5/32" ID	3/16" ID			
(liters/min)	feet	feet	feet			
0.1	13.8	8.8	6.1			
0.2	27.6	17.7	12.3			
0.3	41.4	26.5	18.4			
0.4	55.3	35.4	24.6			
0.5	69.1	44.2	30.7			
0.6	82.9	53.0	36.8			
0.7	96.7	61.9	43.0			
0.8	110.5	70.7	49.1			
0.9	124.3	79.6	55.3			
1	138.1	88.4	61.4			
1.1	151.9	97.2	67.5			
1.2	165.8	106.1	73.7			
1.3	179.6	114.9	79.8			
1.4	193.4	123.8	85.9			
1.5	207.2	132.6	92.1			
1.6	221.0	141.4	98.2			
1.7	234.8	150.3	104.4			
1.8	248.6	159.1	110.5			
1.9	262.4	168.0	116.6			
2	276.3	176.8	122.8			

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 03/13/2023	Location: Loudon, Tennesse
Date: 03/13/2023	Location: Loudon, Tennesse

AQS Number: 47-105-0109

Site Name: Loudon Pollutants: 03, PM2.5

Print Name / Signature / Initials / Duties

1: (Team Lead)	Evelyn Haskin	Evelyn Haskin	EMH	Site Specialist	

2:_____EMH

Air Monitoring Site Evaluation Summary

Local Site Name: Loudon		Initials:	EMH	Date: 03/13/2023	
Site meets EPA siting criteria: ■ Yes	□ No				
If No, explain:					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
Highway 72	109.0 m	N	Major Highway	10274	2022
Roberts Road	176.0 m	S	Local St	NA	NA
Electrical			<u> </u>	1	
Utilities Company: Loudon Utilities			Meter #: 30	6726580	
Additional Comments:					
1. Arrival, departure and photo time	es are Eastern ti	me.			
2. Shelter temperature is 73 degree	es F (22.8 degre	es C).			
3. Shelter is bolted to cement pad.					
4. Fire extinguisher is in good cond	ition.				
5. Distance between O3 probe to E	BAM 1 inlet is 4.	5 meters a	nd distance	between (03 probe
to BAM 2 inlet is 3.8 meters.					
6. Both platforms are in fair condition	on. Paint peeling	off of both	n platforms v	vith BAM 1	1
being the worse of the two platform	S.				
BAM 1 platform consists of 5 board	ls (60"L x 6" W :	x 1"T) and	one board (6	60" L x 6"V	W x 1"T).
BAM 2 platform consists of 11 boar	ds (60"L x 6" W	x 1"T).			
7. The Loudon site has a weather s	tation located o	n the roof	of the shelte	r.	

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Loudon	Initials: EMH	
APC auditor should document in Site Log – time / date / wea	ather conditions/purpose of visit / APC staff	present [Yes No] Completed
Arrival Time: 3:15 pm Departure Time: 4:1	5 pm Primary Operator: Jus	tin Long
Observer(s):		
SITE [Yes No] -Security Fence Yes No] -Razor/E	Barb Wire [≞ Yes □ No □ NA] Grass	/Shrubs Cut
[Yes No A NA] Bare Soil Area [Yes No A NA	a] Vandalism – [□ Inside / □ Outside	e]
Date: [Yes No] Polic Issues:		
SHELTER - □ Not Present		
Interior Arrival Temperature: 23.1 °C (from data logge	er) Operator Site Visits: 1	per [□ week □ month □
[□ Yes • No] Leaking Roof [Damaged: □Ceiling	/ □ Floor / □ Walls] [♣ Yes □ No]	Clean / Neat
$[\begin{tabular}{l} \blacksquare \end{tabular}$ Yes $\end{tabular}$ No] Fire Extinguisher $[\end{tabular}$ Yes $\begin{tabular}{l} \blacksquare \end{tabular}$ No] Insect	/ Wildlife Issues [Yes No] Gas	oline (inside shelter)
Issues:		
Exterior Type: [¬Freezer / ¬Wood Building / ¬Brick-Blo Height of Roof: 3.0 meters Ro		p-last single ply membrane
☐ Yes ■ No] Needs Maintenance (specify)		
[☐ Yes☑ No] Tied Down (type)		
[♠ Yes □ No] Electrically Grounded [□ Yes ♠ No]	Roof Railing	
Roof Access: [□ Stairs / □ Ladder / □ Not Present Issues:) Hazard)
PLATFORMS: Not Present Condition: Yes No] Good Yes No] Need		
Issues:		
RECORDS AT SITE: Documents available (QAPPs, SOPs) [Yes N	lo]	1
Logbooks at site [■ Yes □ No] □ Electronic/□ Hard	copy/•Both	
Comments:		

MONITO		e: Loudon	Laasta	• Exterior Complex	n I□ Doof / □Cross	nd / - Not Duccom	
		 Manufacture		Serial Num		na / □ Not Presen	
Monitor	03	Teledyne	T400	Seriai Nuili	2282		
	.5 (1)	Met One	BAM 1022		W17126		
	1.5 (2)	Met One					
CALIBRA	ATOR(s):	Not Present	[■ Yes □	No] Are QC Chec			
QC	Make	Model	Serial Numb	er	Certification Date	Expiration Date	
				1 -	Date	Date	
QC	Teledyne	e T703	644		01/31/23	07/31/23	
QC	Teledyne	T703	644				
s any anal	yzer samplin	g shelter air thro	ough its calibration [■ Yes □ No] Calibra Not Required)	line? [□ Yes ■ No	01/31/23 Digital of the process of	07/31/23	
s any anal All Gas Stan	yzer samplin	g shelter air thro	ough its calibration	line? [Yes No	01/31/23 Digital of the process of	07/31/23 Int and notify agency n [■ Yes □ No] Au	
s any anal All Gas Stan ssues:	yzer samplin	g shelter air throall Filters during:	ough its calibration	line? [□ Yes ■ No tions [■ Yes □ No] (Required)	01/31/23 Digital of the process of	07/31/23 ent and notify agency n [■ Yes □ No] Au (Required)	

MSEF: Local Site Name: Loudon	Initials: EMH	Date: 03/13/23
-------------------------------	---------------	----------------

DATA COLLECTION/DOCUMENTATION:

Data loggers/Modems:

Make	Model	Serial Number	Data logger/Modem	Main/Backup
Raven	R55V	2R93610095011016	Modem	Main
Agilaire	8872	519A	Datalogger	Main

SUPPORTING INSTRUMENTATION: Internal \square N	ot Present
[■ Yes □ No] Temperature Sensor [□ Yes ■ No] Uninterr	
Zero Air System: Commercial System (Make / Model): Tele	edyne T701 (SN 1341)
	harcoal / ¬Purafil / ¬Hopcalite / ¬Other:
[Yes • No] Needs Service Last Service Date: 02/	14/23 Condition:
Issues:	
Probe Line(s): [#Replaced / Cleaned] - Frequency:	/year Last Service Date: 02/14/23
[■ Yes □ No] Clean [■ Yes □ No] Heated [□ Yes ■ No] Insu	lated [□ Yes ■ No] Moisture [□ Yes ■ No] Retractable
[□ Yes ■ No] Old / Unused Lines [□ Yes ■ No] Lo Flo Mar	nifold
[□ Yes ♠ No] Any Open Ports? -> How many analyzers us	sing manifold?
Issues:	
OUTDOOR SAMPLERS	[■ Yes □ No] Stabilized [■ Yes □ No] Clean Inside
[■ Yes □ No] Head/Separator Clean	
Operator / Log: VSCC/WINS Clean Schedule: 1/30 days	PM ₁₀ Head Clean Schedule: 1/30 days
Issue(s):	

COLLOCATED SAMPLERS: Not Present (39.4 inches = 1 meter)

Pollutant	Flow (Hi / Lo)	*Separation Distance (meters)
PM2.5	Lo	1.9
PM2.5	Lo	1.9

^{*}Collocated monitors **must be within 4 meters of each other** and at least **2 meters apart** for flow rates **greater than 200 liters/min** or at **least 1 meter apart** for samplers having flow rates **less than 200 liters/min** to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

MSEF: Local Site Name: Loudon	Initials: EMH	Date: 03/13/23	
PROBE SYSTEM(s): External	sent		
Inlet Type: [♣ Single Line / □ Dual Line / □ Bell Type	e (CAS design)]		
Funnel(s): [■ Rain Shield / □Part of Probe] Funne	l Material: [□Teflon® / 🖣 Gla	ss / Stainless Steel /	Other:]
Probe Line(s): [■ Teflon® / □ Other:	_] Probe Fitting(s): [■ Tefl	on [®] /□ Other:	/ Not Present]
Residence Time: 6.0 sec	(20 sec. max) (Refer to chart for maxi	mum line lengths)
Icene(e).			

	Inlet	Inlat I and an	*Horizontal	*Vertical	Monitoring SCALE	
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)	Distance (meters) If Applicable	Distance (meters) If Applicable	AQS	Annual Network Plan
O3	4.5	Side of Shelter			Neighborhood	Neighborhood
PM 2.5	2.6	Ground	1.9		Neighborhood	Neighborhood
PM 2.5	2.6	Ground	1.9		Neighborhood	Neighborhood

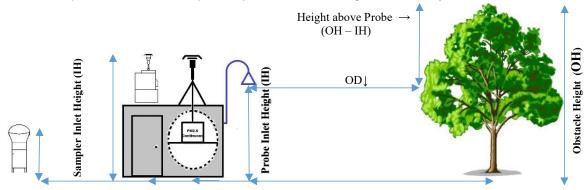
FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb)

When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

Aerial Photo with Wind Rose



Source: Google Earth Pro Imagery Date: _____ OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be $\geq [2*(OH-IH)]$

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstacle	AZ
1	School	7.3	4.5	5.6	104.0		84
2	Tree	17.1	4.5	25.2	74.2		115
3	Tree	13.9	4.5	18.8	112.0		130
4	Tree	14.0	4.5	19.0	136.0		139
5	Trees	14.4	2.6	23.6	48.0		290
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Nam	ne: Louc	lon	Initials: E	MH	Date: 03/13/23
	48.0				_
TREE DRIPLINE(s):	74.2	meters (nearest i			Present
		meters (nearest i	• '		
Should be greater than 20 mg	112.0	meters (nearest i	. ,		inline when the tree/e) get as an abetruction
Should be greater than 20 mil	eters nom t	ne dripline of free(s) and	must be 10 mete	ers from the an	ipline when the tree(s) act as an obstruction
Issues:					
Minor Sources:					
	rass, etc r	oresent? (especially	for PM samp	lers)	
_	-	nnies, smoke stack	-	,	ng
 Off road diesel g 	generator	s near NO ₂ or SO ₂	analyzers		_
Issues: None					
155465.					
Additional Info					
Objects # 1, 2, 3, a	nd 4: di	stances are me	easured fro	m O3 pro	be
Object # 5: distance	e meas	ured from BAN	l 1 inlet		
The closest tree is	greater	than 20 meters	s from both	probe or	inlets; therefore there
		than 20 motors		probe or	
are no tree dripline	issue.				

Initials:

Date: _03/13/23

Direction NORTH Primary Wind Dir Security Issues Sloping Areas

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

Monitoring Shelter Probe Position(s) **Exterior Samplers** Met Tower

Nearby Trees/Shrubs Roadways Buildings Walls

Possible Sources Paved / Unpaved Areas Nearby Construction Flues, Vents, Boilers Meat Cooking

Security Fencing Other Obstructions

Highway 72 Turn around area Fence NA

UNRESTRICTED AIR FLOW: > 270° Estimated Degrees of Clearance

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Loudon Initials: EMH Date: 03/13/23

Camera [APC / Personal – Owner: Minolta MN12Z

Photo: 001 Date: 03/13/23 Time: 3:55 pm Photographer: EMH Description: North Directional



Photo: 002 Date: 03/13/23 Time: 3:55 pm Photographer: EMH Description: Northeast Directional



Photo: 003 Date: _____ Time: ____ Photographer: _EMH ____ Description: _East Directional



Photo: 004 Date: _____ 3:55 pm ____ Photographer: _____ EMH ____ Description: _____ Southeast Directional



Photo: 005 Date: 03/13/23 Time: 3:55 pm Photographer: EMH Description: South Directional



Photo: 006 Date: _____ 3:55 pm ____ Photographer: _____ Description: _____ Southwest Directional



Photo: 007 Date: 03/13/23 Time: 3:55 pm Photographer: EMH Description: West Directional



Photo: 008 Date: _____ Time: ____ Photographer: _EMH ____ Description: ____Northwest Directional



Photo: 009 Date: O3/13/23 Time: Photographer: EMH Description: Site



Photo: 010 Date: 03/13/23 Time: 3:55 pm Photographer: EMH Description: Shelter and O3 probe



Photo: 011 Date: _____ Time: ____ Photographer: ____ EMH ____ Description: ____ Monitors



Photo: 012 Date: O3/13/23 Time: S:55 pm Photographer: EMH Description: Electric meter



CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

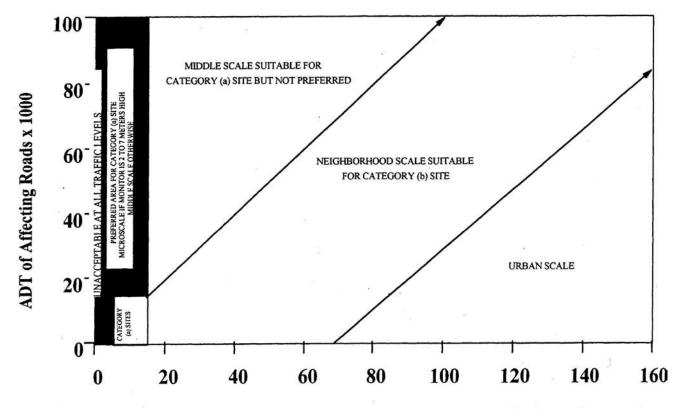


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time						
Flow Rate	1/8" ID	5/32" ID	3/16" ID			
(liters/min)	feet	feet	feet			
0.1	13.8	8.8	6.1			
0.2	27.6	17.7	12.3			
0.3	41.4	26.5	18.4			
0.4	55.3	35.4	24.6			
0.5	69.1	44.2	30.7			
0.6	82.9	53.0	36.8			
0.7	96.7	61.9	43.0			
0.8	110.5	70.7	49.1			
0.9	124.3	79.6	55.3			
1	138.1	88.4	61.4			
1.1	151.9	97.2	67.5			
1.2	165.8	106.1	73.7			
1.3	179.6	114.9	79.8			
1.4	193.4	123.8	85.9			
1.5	207.2	132.6	92.1			
1.6	221.0	141.4	98.2			
1.7	234.8	150.3	104.4			
1.8	248.6	159.1	110.5			
1.9	262.4	168.0	116.6			
2	276.3	176.8	122.8			

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 02/06/23	Location	Athens.	Tennessee
	LOCAHOH	Autono,	1 0111103300

AQS Number: 47-107-1002

Site Name: Athens PM Pollutants: PM2.5

Print Name / Signature / Initials / Duties

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist

Air Monitoring Site Evaluation Summary

Local Site Name: Athens PM		Initials:	ЕМН	Date: 02/06/23	
J	¶ Yes □ No				
If No, explain:					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffi Year
Knoxville Avenue	85.0 m	N	Local St	NA	NA
North Jackson Road	104.5 m	W	Local St	4966	2022
Electrical					·
Utilities Company: Athens Power			Meter #: A	P 11233	
Additional Comments:					
1. Arrival, departure and photo	times are in Easterr	n time.			
2. Platforms need repair. BAM					k
TEOM Platform: 10 boards (60	L X 6:WX1"I) and 1	board (60	"L X 3"VV X 1	l" I)	

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Athens PM	Initials: EMH	Date: 02/06/23
APC auditor should document in Site Log – time / date / weat	ther conditions/purpose of visit / APC staff p	resent [Yes No] Completed
Arrival Time: 11:50 am Departure Time: 12:4	45 pm Primary Operator: Ste	phanie Dyer
Observer(s):		
SITE [Yes No] -Security Fence Yes No] -Razor/Ba	arb Wire [□ Yes □ No ₾ NA] Grass/S	Shrubs Cut
[Yes No NA] Bare Soil Area [Yes No NA]	$] \ Vandalism - [\Box \ Inside \ / \ \Box \ Outside]$	
Date: [□ Yes □ No] Police Issues: See Comment on page 2.	e Report Filed	
PLATFORMS: Not Present Condition: Yes No] Good Yes No] Needs	s Maintenance	
Issues: See Comment on page 2.		
RECORDS AT SITE: Documents available (QAPPs, SOPs) [Yes No	o]	
Logbooks at site [♠ Yes □ No] □ Electronic/□ Hardc	* *	
Comments: Hardcopy logbook on sit	te in operator cannot a	ccess eSIMS.
MONITOR(s):	Location: Exterior Samplers I□ Roo	of / #Ground / □ Not Present)

Monitor(s)	Manufacturer	Model	Serial Number
PM2.5	Met One	BAM 1022	T21579

Make	Model	Serial Number	Data logger/Modem	Main/Backuj
Raven	R55V	2R93140235011014	Modem	Main
		Present		
Yes ■ No] Locked	[■ Yes □ No] Electrical	Present ly Grounded [■ Yes □ No] Sta	abilized [■ Yes □ No] Clo	ean Inside
Ves □ Nol Head/Sen	[Yes No] Electrical	ly Grounded [¶ Yes □ No] Sta		
Yes ■ No] Locked Yes □ No] Head/Sep perator / Log: VSC	[Yes No] Electrical	ly Grounded [Yes No] State 1/30 days PM 10 H		
Yes ■ No] Locked Yes □ No] Head/Sep perator / Log: VSC	[Yes No] Electrical parator Clean CC/WINS Clean Schedule	ly Grounded [Yes No] State 1/30 days PM 10 H		

_____Initials: EMH Date: ____02/06/23

MSEF: Local Site Name: Athens PM

^{*}Collocated monitors must be within 4 meters of each other and at least 2 meters apart for flow rates greater than 200 liters/min or at least 1 meter apart for samplers having flow rates less than 200 liters/min to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

	Inlet	Inlet I coeffee	*Horizontal	*Vertical	Monitorin	ng SCALE
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)	Distance (meters) If Applicable	Distance (meters) If Applicable	AQS	Annual Network Plan
PM 2.5	2.6	Ground			Neighborhood	Neighborhood

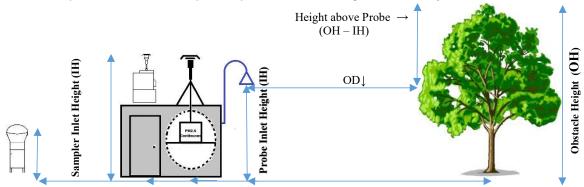
FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb)

When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

Aerial Photo with Wind Rose



Source: Google Earth Pro Imagery Date: ____ OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be $\geq [2*(OH-IH)]$

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstacle	AZ
1	YMCA Building	8.0	2.6	10.8	52.0		12
2	Tree	18.0	2.6	30.8	64.0		38
3	Tree	14.0	2.6	22.8	90.0		53
4	Tree	12.6	2.6	20.0	84.0		69
5	Blue Building	6.0	2.6	6.8	31.8		149
6	Shed	3.4	2.6	1.6	23.4		259
7	Carport	3.5	2.6	1.8	25.0		305
8	Church	7.0	2.6	8.8	33.0		314
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

TREE DRIPLINE(s): 64.0 meters (nearest inlet to dripline) No Trees Present	. 02/06/23
ineters (nearest inlet to dripline) No Trees Present	
meters (nearest inlet to dripline) □ Not Present meters (nearest inlet to dripline) □ Not Present	
Should be greater than 20 meters from the dripline of tree(s) and must be 10 meters from the dripline who	en the tree(s) act as an obstruction.
	,
Issues:	
Minor Sources:	
 Groundcover, grass, etc present? (especially for PM samplers) 	
• Excessive number of chimnies, smoke stacks, fireplaces, diesel heating	
 Off road diesel generators near NO₂ or SO₂ analyzers 	
Issues: None	
	
Additional Information:	
Closest tree is greater than 20.0 meters from inlet; therefore there	are no tree
dripline issue.	
<u></u>	

Direction NORTH Primary Wind Dir Security Issues Sloping Areas

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

Monitoring Shelter Probe Position(s) **Exterior Samplers** Met Tower

Nearby Trees/Shrubs Roadways Buildings Walls

Possible Sources Paved / Unpaved Areas Nearby Construction Flues, Vents, Boilers Meat Cooking

Security Fencing Other Obstructions

Knoxville y MCA Church Parking lot Carport Blue Building

UNRESTRICTED AIR FLOW: > 270 ° Estimated Degrees of Clearance

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Athens PM Initials: EMH Date: 02/06/23

Camera [APC / Personal - Owner: Minolta MN12Z

Photo: 001 Date: 02/06/23 Time: 12:35 pm Photographer: EMH Description: North Directional





Photo: 003 Date: 02/06/23 Time: Photographer: EMH Description: East Directional





Photo: 005 Date: 02/06/23 Time: 12:35 pm Photographer: EMH Description: South Directional





Photo: 007 Date: _____ Time: ____ Photographer: _EMH ____ Description: _West Directional



Photo: 008 Date: _____ D2/06/23 Time: _____ Photographer: _____ EMH _____ Description: _____ Northwest Directional



Photo: 009 Date: O2/06/23 Time: Photographer: EMH Description: Site



Photo: 010 Date: 02/06/23 Time: 12:35 pm Photographer: EMH Description: Monitor





Photo: 012 Date: _____ Time: _____ Photographer: _____ Description: _____

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

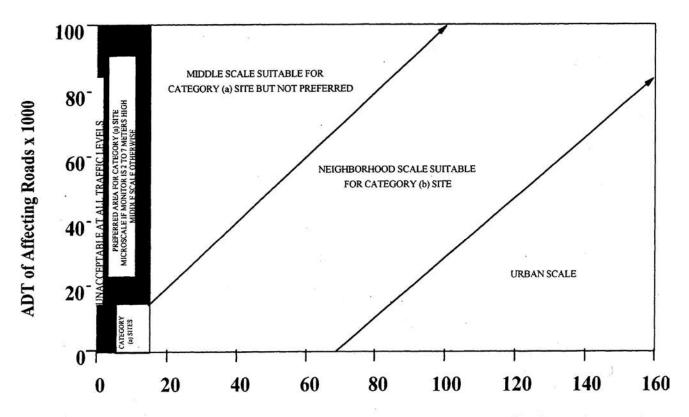


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time					
Flow Rate	1/8" ID	5/32" ID	3/16" ID		
(liters/min)	feet	feet	feet		
0.1	13.8	8.8	6.1		
0.2	27.6	17.7	12.3		
0.3	41.4	26.5	18.4		
0.4	55.3	35.4	24.6		
0.5	69.1	44.2	30.7		
0.6	82.9	53.0	36.8		
0.7	96.7	61.9	43.0		
0.8	110.5	70.7	49.1		
0.9	124.3	79.6	55.3		
1	138.1	88.4	61.4		
1.1	151.9	97.2	67.5		
1.2	165.8	106.1	73.7		
1.3	179.6	114.9	79.8		
1.4	193.4	123.8	85.9		
1.5	207.2	132.6	92.1		
1.6	221.0	141.4	98.2		
1.7	234.8	150.3	104.4		
1.8	248.6	159.1	110.5		
1.9	262.4	168.0	116.6		
2	276.3	176.8	122.8		

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 03/23/23 Location: Jackson, Tennessee

AQS Number: 47-113-0010

Site Name: Jackson PM Pollutants: PM2.5

Print Name / Signature / Initials / Duties

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist

2:

Air Monitoring Site Evaluation Summary

Local Site Name: Jackson PM	Initials: EMH		Date: 03/23/23		
Site meets EPA siting criteria:	Yes □ No				
If No, explain:					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
Demonbreun Drive	245.0 m	NW	Local St	NA	NA
North Highland Avenue	1101.8 m	W	Major St	12115	2022
Electrical		1		1	
Utilities Company: Jackson Electric	Authority		Meter #: _R	D2-19181	9
Additional Comments:					
1. Arrival, departure and photo ti	mes are Central ti	me.			
2. Platform has paint peeling off b		onsists of 6	boards (38	.5" L X 6" \	<i>N</i> x 1"T).
3. Fencing makes an enclosed c					
4. Jackson is one of the sites wit	h a purple air sens	sor.			

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Jackson PM	Initials: EMH	Date: 03/23/23
APC auditor should document in Site Log – time / date / weather condition		
Arrival Time: 10:30 am Departure Time: 11:30 am P	rimary Operator: Day	vid Norville
Observer(s):		
SITE		
$ \begin{tabular}{l} \blacksquare \ Yes \ \square \ No] \ \textbf{-Security Fence} \ [\square \ Yes \ \blacksquare \ No] \ \textbf{-Razor/Barb Wire} \ [$	🗅 Yes 🗆 No 🗆 NA] Grass/ S	Shrubs Cut
[□ Yes □ No • NA] Bare Soil Area [□ Yes □ No • NA] Vandalisi	m – [□ Inside / □ Outside]	
Date: [□ Yes □ No] Police Report Fi	iled	
Issues:		
PLATFORMS: □ Not Present		
Condition: [Yes No] Good [Yes No] Needs Maintena	ance	
Issues:		
RECORDS AT SITE:		
Documents available (QAPPs, SOPs) [Yes No]	ronic/□ Hardcopy/□Both	
Logbooks at site [■ Yes □ No] □ Electronic/□ Hardcopy/□Both	1	
Comments:		

MONITOR(s):

Monitor(s)	Manufacturer	Model	Serial Number
PM2.5	Met One	BAM 1022	C20236

Location: Exterior Samplers [Roof / Ground / Not Present]

MSEF: Local Site N	Name: Jackson	PM Initials: EMI	H Date: 03/23/2	23
DATA COLLECT	ION/DOCUMENTAT	TION:		
Data loggers/Mode	ms:			
Make	Model	Serial Number	Data logger/Modem	Main/Backup
Raven	R55V	2R93330040021016	Modem	Main
OUTDOOR SAMP [□ Yes ■ No] Locked		Present ly Grounded [∄ Yes □ No] Sta	abilized [≞ Yes □ No] Clo	ean Inside
[■ Yes □ No] Head/Sep		1/30 days	1/	30 days
Operator / Log: VSC	CC/WINS Clean Schedule:	1/ 30 days _{PM 10} H	ead Clean Schedule:	ouays
Issue(s):				
COLLOCATED SA	AMPLERS: • Not Pr	esent	(39.4 inches = 1 meter)	

*Collocated monitors **must be within 4 meters of each other** and at least **2 meters apart** for flow rates **greater than 200 liters/min** or at **least 1 meter apart** for samplers having flow rates **less than 200 liters/min** to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

*Separation Distance

(meters)

Flow

(Hi/Lo)

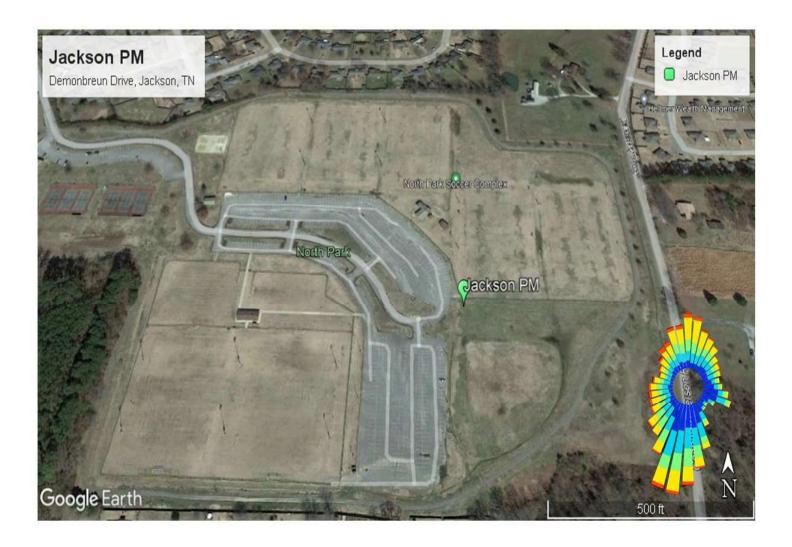
Pollutant

	Inlet	Tollad I a sadian	ortion Ground, Ground, Distance (meters)	*Vertical Distance (meters) If Applicable	Monitoring SCALE	
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)			AQS	Annual Network Plan
PM 2.5	2.6	Ground			Neighborhood	Neighborhood

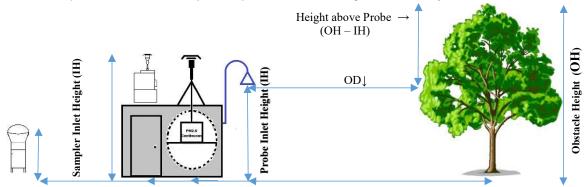
FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb)

When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

Aerial Photo with Wind Rose



Source: Google Earth Pro Imagery Date: ____ OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be $\geq [2*(OH-IH)]$

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	stacle	AZ
1	Building	4.5	2.6	3.8	97.5		359
2	Building	3.0	2.6	0.8	79.0		5
3	Mobile Home	4.3	2.6	3.4	252.0		90
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

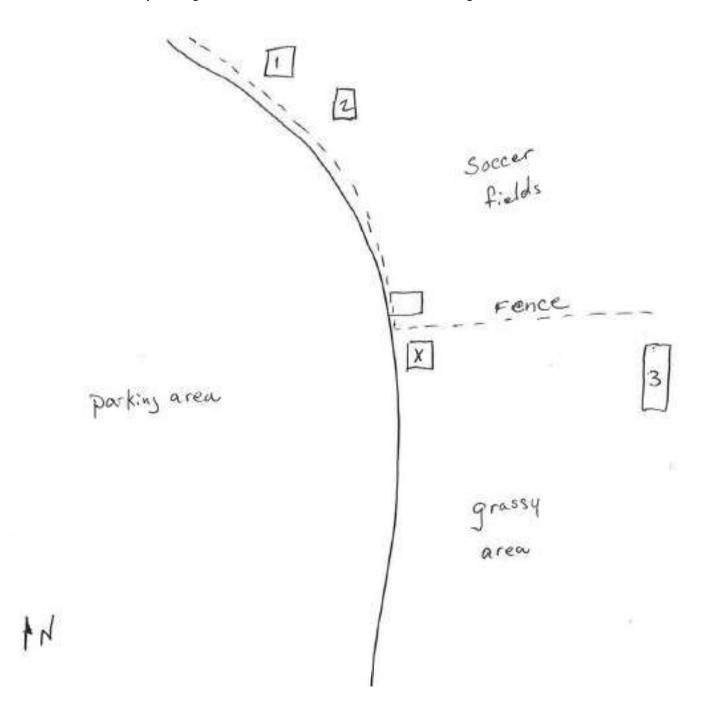
MSEF: Local Site Name:	ickson PM	Initials: EMH	Date: 03/23/23
TREE DRIPLINE(s):	meters (nearest	inlet to dripline) ■ No Tre	es Present
		inlet to dripline) □ Not Preso	
		inlet to dripline) □ Not Preso	
Should be greater than 20 meters from			dripline when the tree(s) act as an obstruction.
Issues:			
Minor Sources:			
Groundcover, grass, e	to present? (especial)	y for PM samplers)	
		ks, fireplaces, diesel he	ating
 Off road diesel genera 		=	5
_		-	
Issues: None			
Additional Inform	ation:		
			· · · · · · · · · · · · · · · · · · ·

MSEF: Local Site Name:

Direction NORTH Primary Wind Dir Security Issues Sloping Areas

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

Monitoring Shelter Nearby Trees/Shrubs Possible Sources Probe Position(s) Roadways Paved / Unpaved Areas **Exterior Samplers** Buildings Nearby Construction Met Tower Walls Flues, Vents, Boilers Other Obstructions Security Fencing Meat Cooking



UNRESTRICTED AIR FLOW: > 270 ° Estimated Degrees of Clearance

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Jackson PM Initials: EMH Date: 03/23/23

Camera [APC / Personal – Owner: Minolta MN12Z

Photo: 001 Date: 03/23/23 Time: 10:55 am Photographer: EMH Description: North Directional



Photo: 002 Date: 03/23/23 Time: 10:55 am Photographer: EMH Description: Northeast Directional



Photo: 003 Date: _____ Time: ____ Photographer: EMH ____ Description: East Directional



Photo: 004 Date: _____ 10:55 am Photographer: EMH _____ Description: Southeast Directional



Photo: 005 Date: 03/23/23 Time: 10:55 am Photographer: EMH Description: South Directional



Photo: 006 Date: _____ 10:55 am Photographer: EMH _____ Description: Southwest Directional



Photo: 007 Date: ______ 10:55 am _____ Photographer: ______ EMH _____ Description: ______ West Directional



Photo: 008 Date: _____ 10:55 am Photographer: _____ Photographer: _____ Description: _____ Northwest Directional



Photo: 009 Date: O3/23/23 Time: Photographer: EMH Description: Site



Photo: 010 Date: 03/23/23 Time: 10:55 am Photographer: EMH Description: Monitor



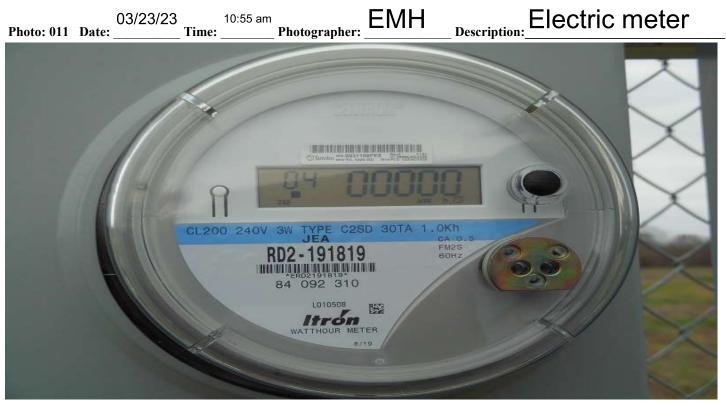


Photo: 012 Date: _____ Time: _____ Photographer: _____ Description: _____

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

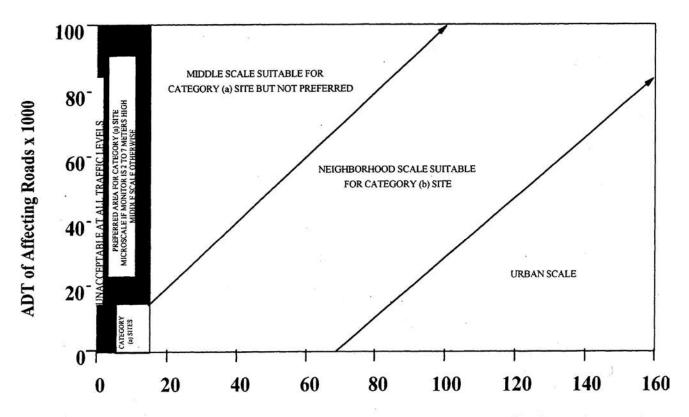


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time								
Flow Rate	1/8" ID	5/32" ID	3/16" ID					
(liters/min)	feet	feet	feet					
0.1	13.8	8.8	6.1					
0.2	27.6	17.7	12.3					
0.3	41.4	26.5	18.4					
0.4	55.3	35.4	24.6					
0.5	69.1	44.2	30.7					
0.6	82.9	53.0	36.8					
0.7	96.7	61.9	43.0					
0.8	110.5	70.7	49.1					
0.9	124.3	79.6	55.3					
1	138.1	88.4	61.4					
1.1	151.9	97.2	67.5					
1.2	165.8	106.1	73.7					
1.3	179.6	114.9	79.8					
1.4	193.4	123.8	85.9					
1.5	207.2	132.6	92.1					
1.6	221.0	141.4	98.2					
1.7	234.8	150.3	104.4					
1.8	248.6	159.1	110.5					
1.9	262.4	168.0	116.6					
2	276.3	176.8	122.8					

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 02/23/23	Location	Columbia.	Tennessee
1/4/5.02/20	I (UCALIUII)	Octambia,	10111100000

AQS Number: 47-119-2007

Site Name: Columbia PM Pollutants: PM2.5

Print Name / Signature / Initials / Duties

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist

Air Monitoring Site Evaluation Summary

Local Site Name: Columbia PM		Initials:	ЕМН	Date: 02/2	Date: 02/23/23	
Site meets EPA siting criteria: Yes	s 🗆 No					
If No, explain:						
Tangent Roads						
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year	
Nashville Highway	100.0 m	W	Major Highway	40382	2022	
Electrical						
Utilities Company: Columbia Power a	ınd Water Syste	m	Meter #: _1	13050		
Additional Comments:						
1. Arrival, departure and photo time	es are in Centra	time.				
2. Decking boards on platform wer						
3. A hardcopy logbook is located of	on site in case th	e operator	cannot acce	ess eSIMS).	
4. Columbia is one of the sites with	n a purple air ser	nsor.				

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Columbia PM	Initi	ials: EMH	Date: 02/23/23
APC auditor should document in Site Log – time / date / wer		-	
Observer(s):			
SITE [• Yes = No] -Security Fence [• Yes = No] -Razor/F	Barb Wire [∄ Yes □ N	lo □ NA] Grass/ 5	Shrubs Cut
[Yes No NA] Bare Soil Area [Yes No NA	A] Vandalism – [\square In	side / □ Outside]	
Date: [\to Yes \to No] Police	e Report Filed		
Issues:			
PLATFORMS: Not Present Condition: Yes No] Good Place Sues:			
RECORDS AT SITE: Documents available (QAPPs, SOPs) [• Yes 🗆 N	No]	[ardcopy/□Both	
Logbooks at site [■ Yes □ No] □ Electronic/□ Hard	copy/•Both		
Comments:			
MONITOR(s):	Location: Exterior	r Samplers [□ Ro	of / □Ground / □ Not Present]

Monitor(s)	Manufacturer	Model	Serial Number
PM2.5	Met One	BAM 1022	W12887

	ms:			
Make	Model	Serial Number	Data logger/Modem	Main/Backuj
Raven	R55V	2R93330095011016	Modem	Main
	_	Present ly Grounded [■ Yes □ No] Sta	abilized [■ Yes □ No] Cle	ean Inside

*Collocated monitors must be within 4 meters of each other and at least 2 meters apart for flow rates greater than 200 liters/min or at least 1 meter apart for samplers having flow rates less than 200 liters/min to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

*Separation Distance

(meters)

Flow

(Hi/Lo)

Pollutant

	Inlet	Inlet I coeffee	*Horizontal	*Vertical	Monitorin	ng SCALE
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)	Distance (meters) If Applicable	Distance (meters) If Applicable	AQS	Annual Network Plan
PM 2.5	2.6	Ground			Neighborhood	Neighborhood

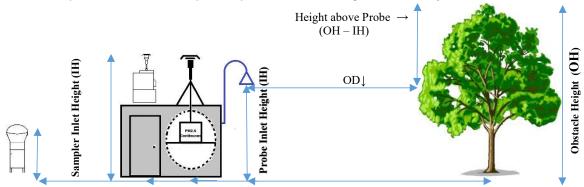
FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb)

When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

Aerial Photo with Wind Rose



Source: Google Earth Pro Imagery Date: ____ OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be $\geq [2*(OH-IH)]$

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstacle	AZ
1	Trees	5.2	2.6	5.2	13.0		59
2	Trees	6.2	2.6	7.2	13.0		94
3	Trees	7.4	2.6	9.6	13.0		110
4	Building	4.0	2.6	2.8	46.0		223
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

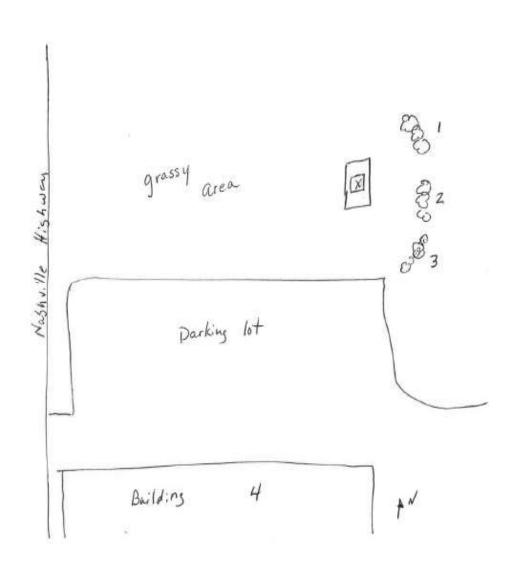
AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Nam	_{ie:} Colu	mbia PM	Initials: El	MH Da	nte:
TREE DRIPLINE(s):	10.8	meters (nearest	inlet to dripline)	□ No Trees Prese	ent
.,	11.8		inlet to dripline)		
	12.0	meters (nearest	inlet to dripline)	□ Not Present	
Should be greater than 20 me	eters from t	he dripline of tree(s) and	d must be 10 mete	rs from the dripline	when the tree(s) act as an obstruction.
Issues:					
Minor Sources:					
	rass, etc p	present? (especial	ly for PM sampl	lers)	
_	-	mnies, smoke stac	•		
 Off road diesel § 	generator	s near NO ₂ or SC	0_2 analyzers		
Issues:					
133403.					
A 1114 1 T C	4	•			
Additional Info					
The cedars trees (east to	southeast of t	he inlet) are	greater thar	10 meters from the
inlet but less than 2	0 mete	rs from the inl	et. None of	these are ta	ll enough to be
considered obstacle	es; ther	efore there ar	e no tree drip	oline issues.	
			·		

MSEF: Local Site Name:

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

Direction NORTH Primary Wind Dir Security Issues Sloping Areas Monitoring Shelter Probe Position(s) Exterior Samplers Met Tower Security Fencing Nearby Trees/Shrubs Roadways Buildings Walls Other Obstructions Possible Sources
Paved / Unpaved Areas
Nearby Construction
Flues, Vents, Boilers
Meat Cooking



UNRESTRICTED AIR FLOW: > 270 ° Estimated Degrees of Clearance

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Columbia PM Initials: EMH Date: 02/23/23

Camera [APC / Personal – Owner: Minolta MN12Z

Photo: 001 Date: 02/23/23 Time: 1:45 pm Photographer: EMH Description: North Directional



Photo: 002 Date: 02/23/23 Time: 1:45 pm Photographer: EMH Description: Northeast Directional





Photo: 004 Date: _____ Time: ____Photographer: EMH _____Description: _____Southeast Directional



Photo: 005 Date: 02/23/23 Time: 1:45 pm Photographer: EMH Description: South Directional





Photo: 007 Date: _____ Time: ____ Photographer: _EMH ____ Description: West Directional



Photo: 008 Date: _____ Time: ____ Photographer: _EMH ____ Description: ____Northwest Directional



Photo: 009 Date: O2/23/23 Time: 1:45 pm Photographer: EMH Description: Site



Photo: 010 Date: O2/23/23 Time: 1:45 pm Photographer: EMH Description: Monitor





Photo: 012 Date: _____ Time: ____ Photographer: _____ Description: _____

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

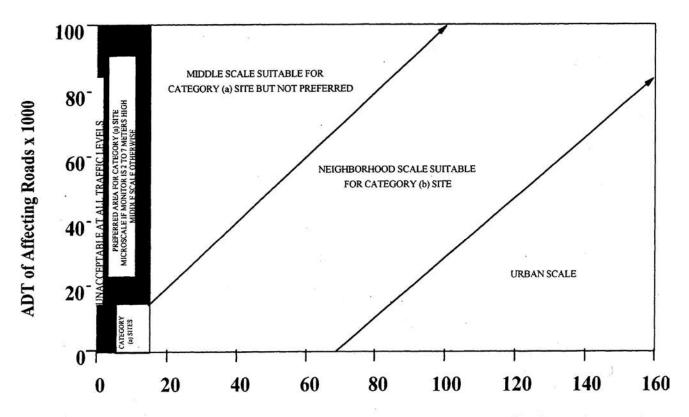


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time						
Flow Rate	Flow Rate 1/8" ID 5/32" ID 3/16"					
(liters/min)	feet	feet	feet			
0.1	13.8	8.8	6.1			
0.2	27.6	17.7	12.3			
0.3	41.4	26.5	18.4			
0.4	55.3	35.4	24.6			
0.5	69.1	44.2	30.7			
0.6	82.9	53.0	36.8			
0.7	96.7	61.9	43.0			
0.8	110.5	70.7	49.1			
0.9	124.3	79.6	55.3			
1	138.1	88.4	61.4			
1.1	151.9	97.2	67.5			
1.2	165.8	106.1	73.7			
1.3	179.6	114.9	79.8			
1.4	193.4	123.8	85.9			
1.5	207.2	132.6	92.1			
1.6	221.0	141.4	98.2			
1.7	234.8	150.3	104.4			
1.8	248.6	159.1	110.5			
1.9	262.4	168.0	116.6			
2	276.3	176.8	122.8			

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 01/26/23 Location: Clarksville, Tennessee

AQS Number: 47-125-2001

Site Name: Clarksville PM Pollutants: PM2.5

Print Name / Signature / Initials / Duties

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist

Air Monitoring Site Evaluation Summary

Local Site Name: Clarksville PM	Initials:	EMH	Date: 01/26/23		
Site meets EPA siting criteria:	Yes □ No				
If No, explain:					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
Unknown Road	114.0 m	N to NE	Thru St	NA	NA
West Coyote Trail Road	116.4 m	W	Local St	NA	NA
Peachers Mill Road	573.0 m	E	Major St	20098	2022
Utilities Company: Clarksville Power Additional Comments: 1. Arrival, departure and photo		time.	Meter #: <u>9</u>		
2. Monitor is located in an enclo	osed cage.				
3. One board on platform is co	mpletely rotten. Bo	oards are 6	60' L x 5" W	x 1" T. Th	nere are
11 boards without spacing betw	veen them.				
4. Clarksville is one of the sites	with a purple air se	nsor.			

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Clarksville PM		Initials: EMH	Date: 01/26/23
APC auditor should document in Site Log – time / d	late / weather condition	ns/purpose of visit / APC staff pr	esent [Yes No] Completed
Arrival Time: 11:20 am Departure Tim	e: P	rimary Operator: <u>Joh</u>	n Helton
Observer(s):			
SITE			
[• Yes 🗆 No] -Security Fence [\square Yes • No] -R	Razor/Barb Wire [Yes □ No □ NA] Grass/S	hrubs Cut
[🗆 Yes 🗆 No 🖲 NA] Bare Soil Area [🗆 Yes 🗆 N	lo 🗈 NA] Vandalis i	$\mathbf{m} - [\Box \mathbf{Inside} / \Box \mathbf{Outside}]$	
Date: [o] Police Report F	iled	
Issues:			
PLATFORMS: Not Present			
Condition: [Yes No] Good [Yes No]	o] Needs Maintena	ance	
Issues:			
RECORDS AT SITE:			
Documents available (QAPPs, SOPs) [• Y	Yes □ No] 🗈 Electr	ronic/□ Hardcopy/□Both	
Logbooks at site [■ Yes □ No] □ Electronic/□	□ Hardcopy/•Both	ı	
Comments: Hardcopy logbook l	kept on site		
MONITOR(s):	Location	: Exterior Samplers [□ Roo	f / 🖪 Ground / 🗆 Not Present]

MONITOR(s):

Monitor(s)	Manufacturer	Model	Serial Number
PM2.5	Met One	BAM 1022	W12880

Take	Model	Serial Number	Data logger/Modem	Main/Backu
Raven	R55V	2R9610254021016	Modem	Main
			<u> </u>	
	PLERS □ Not	Present ly Grounded [■ Yes □ No] Sta	ahilized 「■ Yes □ No] Cle	ean Inside
-	arator Clean	-		
es 🗆 No neau/sep		1/30 davs	1/3	30 davs
-	CC/WINS Clean Schedule:	: <u>1/30 days</u> _{РМ 10} н	ead Clean Schedule:	

MSEF: Local Site Name: Clarksville PM Initials: EMH Date: 01/26/23

(meters)

(Hi/Lo)

	Inlet	Inlet I coeffee	*Horizontal	*Vertical	Monitorin	itoring SCALE	
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)	Distance (meters) If Applicable Distance (meters) If Applicable		AQS	Annual Network Plan	
PM 2.5	2.6	Ground			Neighborhood	Neighborhood	

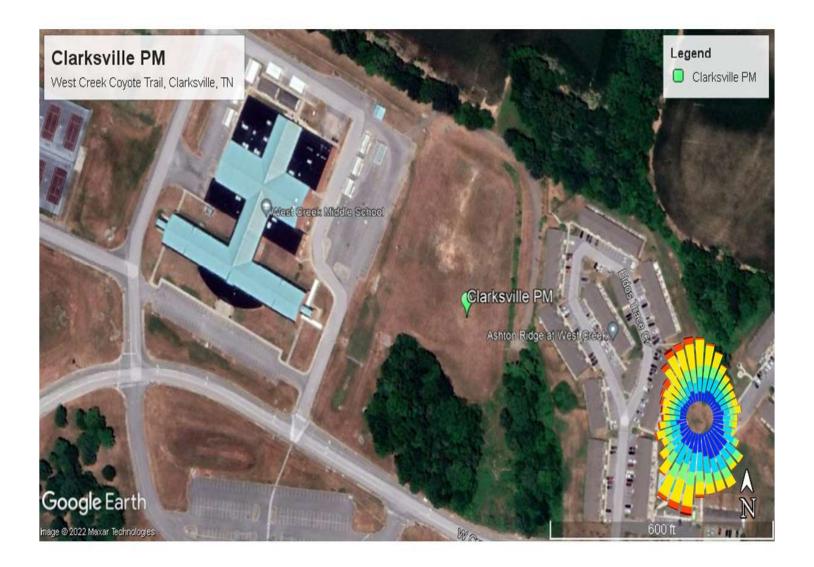
FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb)

Pollutant

When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

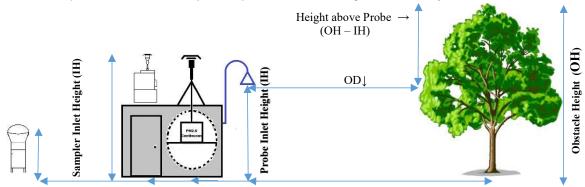
^{*}Collocated monitors must be within 4 meters of each other and at least 2 meters apart for flow rates greater than 200 liters/min or at least 1 meter apart for samplers having flow rates less than 200 liters/min to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

Aerial Photo with Wind Rose



Imagery Date: ____ Source: Google Earth Pro

OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be \geq [2*(OH-IH)]

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Oł	ostac	ele	AZ
1	School	17.0	2.6	28.8	148.0				319
2	Tree	23.0	2.6	40.8	133.0				4
3	Trees	20.0	2.6	34.8	125.0				20
4	Trees	22.0	2.6	38.8	119.0				31
5	Apartment	7.0	2.6	8.8	66.0				69
6	Apartment	6.9	2.6	8.6	62.0				80
7	Trees	21.6	2.6	38.0	70.0				125
8	Trees	19.0	2.6	32.8	47.0				228
9									
10									
11									
12									
13									
14									
15									
16									
17									
18								1	
19									
20									

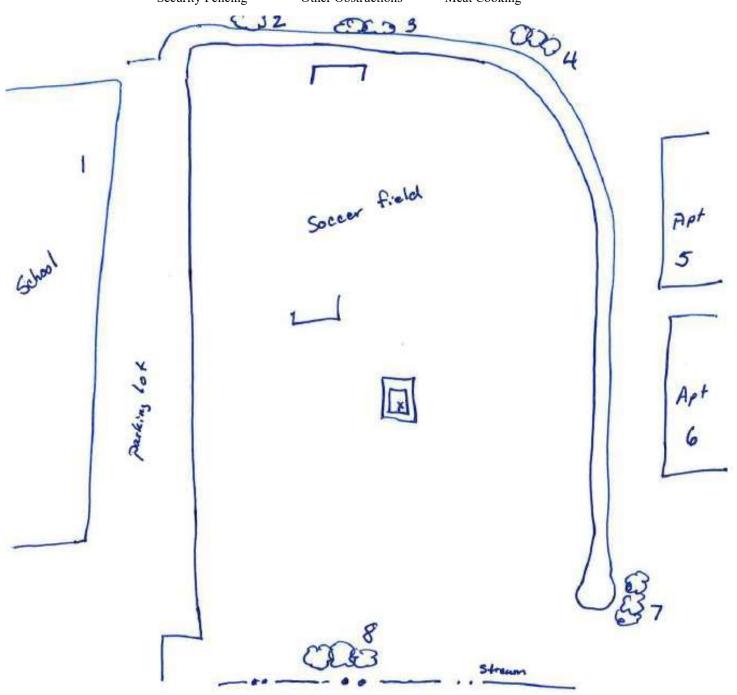
AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Nam	e: Clarl	ksville PM	Initials: El	MH D	oate: 01/26/23
TREE DRIPLINE(s):	47.0 NA	meters (nearest in			sent
	NA	meters (nearest in	- ,		
Should be greater than 20 me	eters from t				e when the tree(s) act as an obstruction.
Issues:					
Excessive numbOff road diesel §	er of chir	oresent? (especially nnies, smoke stack s near NO ₂ or SO ₂	s, fireplaces, c		
Issues: None					
Additional Info	ormat	ion:			
Closest trees are g	reater t	han 20 meters	from inlet; t	herefore th	ere are no tree
dripline issues.					
			_	_	

Direction NORTH Primary Wind Dir Security Issues Sloping Areas

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

Monitoring Shelter Nearby Trees/Shrubs Possible Sources Probe Position(s) Roadways Paved / Unpaved Areas **Exterior Samplers** Buildings Nearby Construction Met Tower Walls Flues, Vents, Boilers Security Fencing Other Obstructions Meat Cooking



> 270 Estimated Degrees of Clearance **UNRESTRICTED AIR FLOW:**

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Clarksville PM Initials: EMH Date: 01/26/23

Camera [APC / Personal – Owner: Minolta M12Z

Photo: 001 Date: 01/26/23 Time: 12:00 pm Photographer: EMH Description: North Directional



Photo: 002 Date: 01/26/23 Time: 12:00 pm Photographer: EMH Description: Northeast Directional



Photo: 003 Date: 01/26/23 Time: 12:00 pm Photographer: EMH Description: East Directionnal



Photo: 004 Date: _____ Time: ____Photographer: _EMH ____Description: _Southeast Directional



Photo: 005 Date: 01/26/23 Time: 12:00 pm Photographer: EMH Description: South Directional



Photo: 006 Date: _____ Time: ____ Photographer: _____ EMH ____ Description: _____ Southwest Directional



Photo: 007 Date: 01/26/23 Time: 12:00 pm Photographer: EMH Description: West Directional



Photo: 008 Date: _____ 12:00 pm Photographer: _____ Photographer: _____ Description: _____ Northwest Directional



Photo: 009 Date: O1/26/23 Time: Photographer: EMH Description: Site



Photo: 010 Date: 01/26/23 Time: 12:00 pm Photographer: EMH Description: Electric meter



Photo: 011	Date:	Time:	Photographer:	EMH	Description:

 Photo: 012
 Date: ______ Time: ______ Photographer: _______ Description: ______

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

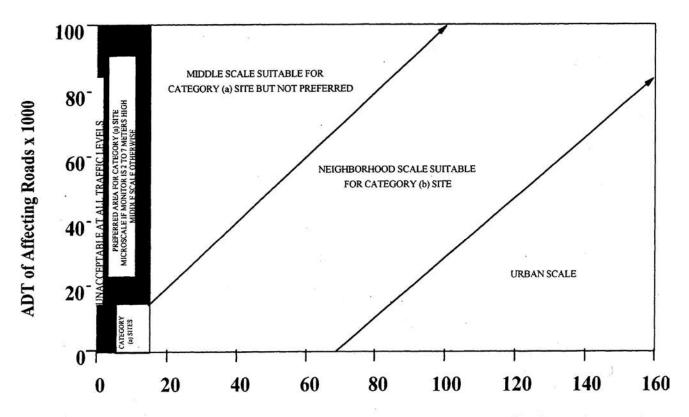


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time					
Flow Rate	1/8" ID	5/32" ID	3/16" ID		
(liters/min)	feet	feet	feet		
0.1	13.8	8.8	6.1		
0.2	27.6	17.7	12.3		
0.3	41.4	26.5	18.4		
0.4	55.3	35.4	24.6		
0.5	69.1	44.2	30.7		
0.6	82.9	53.0	36.8		
0.7	96.7	61.9	43.0		
0.8	110.5	70.7	49.1		
0.9	124.3	79.6	55.3		
1	138.1	88.4	61.4		
1.1	151.9	97.2	67.5		
1.2	165.8	106.1	73.7		
1.3	179.6	114.9	79.8		
1.4	193.4	123.8	85.9		
1.5	207.2	132.6	92.1		
1.6	221.0	141.4	98.2		
1.7	234.8	150.3	104.4		
1.8	248.6	159.1	110.5		
1.9	262.4	168.0	116.6		
2	276.3	176.8	122.8		

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 02/28/23	I acation:	Cookeville,	Tennessee
	LOCAHOH:	Occide vine,	1 0111100000

AQS Number: 47-141-0005

Site Name: Cookeville PM Pollutants: PM2.5

Print Name / Signature / Initials / Duties

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist

Air Monitoring Site Evaluation Summary

Local Site Name: Cookeville PM	Initials:	EMH	Date: 02/28/23		
Site meets EPA siting criteria:	l Yes □ No				
If No, explain:					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
Denton Avenue	50.0 m	E	Local St	NA	NA
East 20th Street	166.4 m	N	Local St	NA	NA
North Washington Avenue	348.0 m	W	Local St	14187	2022
Electrical					
Utilities Company: Cookeville Utili	ty District		Meter #: 2	0274	
Additional Comments:					
1. Arrival, departure and photo	times are Central ti	me.			
2. Paint is peeling off the platfo	rm. Platform decki	ng consists	of 5 board	(60"L x 6"\	W x 1"T
and 1 board (60"L x 2.5"W x 1"	Τ).				

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Cookeville PM	Initials: EMH	Date: 02/28/23
APC auditor should document in Site Log – time / date / weather conditions/processing Arrival Time: 11:35 am Departure Time: Prince	-	
Observer(s):		
SITE [Yes No] -Security Fence Yes No] -Razor/Barb Wire Yes No] -Razor/Barb Wire Yes No NA] Vandalism -	Yes □ No □ NA] Grass/ \$	
Date: [□ Yes □ No] Police Report Filed Issues:	d	
PLATFORMS: Not Present Condition: Yes • No] Good Seeds Maintenance	ce	
Issues:		
RECORDS AT SITE: Documents available (QAPPs, SOPs) [Yes No] Electron	nic/□ Hardcopy/□Both	
Logbooks at site [♠ Yes □ No] □ Electronic/□ Hardcopy/♠Both		
Comments:		

MONITOR(s):

Monitor(s)	Manufacturer	Model	Serial Number
PM2.5	Met One	BAM 1022	W17128

Location: Exterior Samplers [Roof / Ground / Not Present]

ta loggers/Modem	ON/DOCUMENTAT ns:	ION:		
Make	Model	Serial Number	Data logger/Modem	Main/Backup
Raven	R55V	2R91110007021009	Modem	Main
	LERS □ Not Yes □ No] Electrical	Present ly Grounded [■ Yes □ No] Sta	abilized [≞ Yes □ No] Cle	ean Inside

Pollutant	Flow (Hi / Lo)	*Separation Distance (meters)		

^{*}Collocated monitors **must be within 4 meters of each other** and at least **2 meters apart** for flow rates **greater than 200 liters/min** or at **least 1 meter apart** for samplers having flow rates **less than 200 liters/min** to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

	Inlet	Inlet I coeffor	*Horizontal	*Vertical	Monitoring SCALE	
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)	Distance (meters) If Applicable	Distance (meters) If Applicable	AQS	Annual Network Plan
PM 2.5	2.6	Ground	NA	NA	Neighborhood	Neighborhood

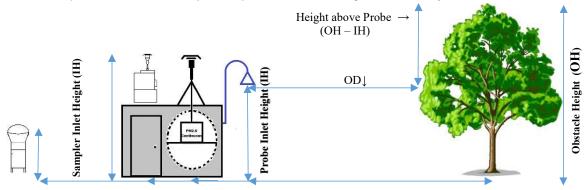
FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb)

When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

Aerial Photo with Wind Rose



Source: Google Earth Pro Imagery Date: ____ OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be \geq [2*(OH-IH)]

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstac	le AZ
1	Church	9.0	2.6	12.8	50.9		4
2	Trees	24.0	2.6	42.8	58.0		14
3	Tree	22.0	2.6	38.8	34.0	√	34
4	Tree	19.0	2.6	32.8	27.0		40
5	Tree	21.8	2.6	38.4	26.5	√	68
6	Tree	21.8	2.6	38.4	30.0	V	73
7	Garage	4.2	2.6	3.2	7.7		84
8	Tree	10.0	2.6	14.8	17.0		128
9	Tree	16.6	2.6	28.0	42.5		152
10	Trees	16.2	2.6	27.2	54.0		184
11	Trees	18.6	2.6	32.0	64.8		232
12	Tree	8.8	2.6	12.4	46.9		271
13	Tree	18.8	2.6	32.4	42.0		295
14	Trees	16.8	2.6	28.4	41.0		304
15	Tree	17.4	2.6	29.6	46.8		321
16	Shed	4.0	2.6	2.8	48.9		333
17							
18							
19							
20							

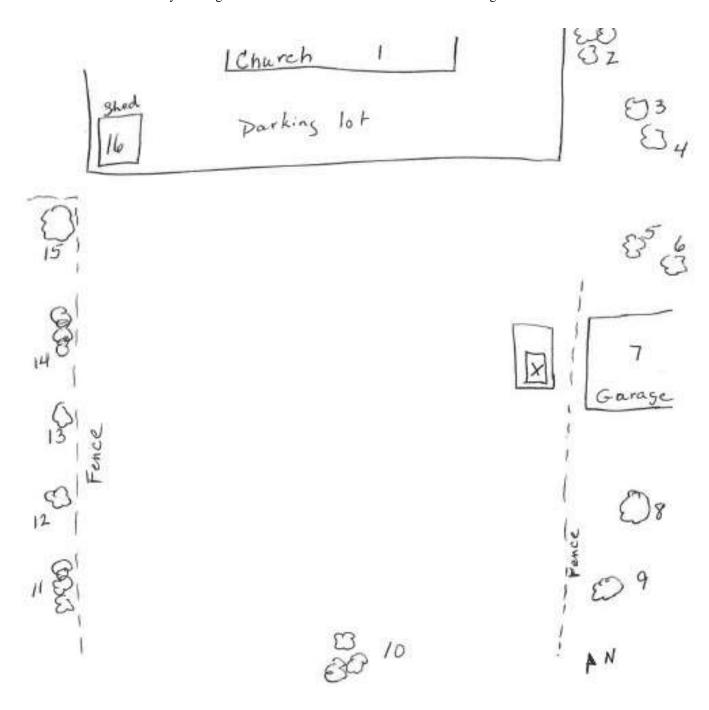
AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Nan	ne: Cool	keville PM	Initials: E	MH	Date: 02/28/23	
TREE DRIPLINE(s):	17.0	meters (nearest	inlet to dripline)	□ No Trees	Present	
	26.5	meters (nearest	inlet to dripline)	□ Not Present		
	27.0	meters (nearest	inlet to dripline)	□ Not Present		
Should be greater than 20 m	eters from t	he dripline of tree(s) and	must be 10 meter	ers from the dr	pline when the tree(s) act as an obstru	ıction.
Issues:						
Minor Sources:						
 Groundcover, g 	rass, etc p	present? (especiall	y for PM samp	lers)		
		nnies, smoke stac		diesel heati	ng	
 Off road diesel; 	generator	s near NO_2 or SO	2 analyzers			
Issues: None						
Additional Info	ormat	ion·				
			fall within th	ne same	90 degree quadrant.	—
Therefore there is 2					-	
Therefore there is 2	<u> </u>			v around	the FWI met.	
The tree (Object #8	3) is 17.	0 meters from	the inlet bu	t is not c	onsidered an obstacle	 :
The tree does not p	ose a t	ree dripline iss	sue.			
The trees (Ohiects	#34	5 and 6) which	are conside	ered obs	tacles are greater than	
		•				
20 meters from the	iniet ar	ia ao not pose	a tree dripii	ne issue	•	
						—
				· · · · · · · · · · · · · · · · · · ·		

Direction NORTH Primary Wind Dir Security Issues Sloping Areas

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

Monitoring Shelter Nearby Trees/Shrubs Possible Sources Paved / Unpaved Areas Probe Position(s) Roadways **Exterior Samplers** Buildings Nearby Construction Met Tower Walls Flues, Vents, Boilers Security Fencing Other Obstructions Meat Cooking



Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Cookeville PM Initials: EMH Date: 02/28/23

Camera [APC / Personal – Owner: Minolta M12Z

Photo: 001 Date: 02/28/23 Time: 12:20 pm Photographer: EMH Description: North Directional



Photo: 002 Date: 02/28/23 Time: 12:20 pm Photographer: EMH Description: Northeast Directional



Photo: 003 Date: ______ D2/28/23 Time: ______ Photographer: ______ EMH _____ Description: ______ East Directional



Photo: 004 Date: 02/28/23 Time: 12:20 pm Photographer: EMH Description: Southeast Directional



Photo: 005 Date: _____ Time: ____ Photographer: _EMH ____ Description: _South Directional



Photo: 006 Date: _____ Time: ____ Photographer: EMH _____ Description: _____ Southwest Directional



Photo: 007 Date: _____ Time: ____ Photographer: _EMH ____ Description: _West Directional



Photo: 008 Date: 02/28/23 Time: 12:20 pm Photographer: EMH Description: Northwest Directional



Photo: 009 Date: O2/28/23 Time: Photographer: EMH Description: Site



Photo: 010 Date: 02/28/23 Time: 12:20 pm Photographer: EMH Description: Monitor



Photo: 011 Date: _____ 12:20 pm Photographer: _EMH _____ Description: _Electric meter



Photo: 012 Date: _____ Time: _____ Photographer: _____ Description: _____

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

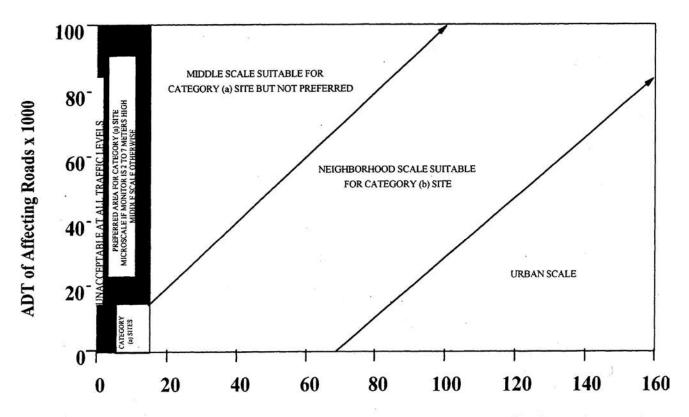


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time					
Flow Rate	1/8" ID	5/32" ID	3/16" ID		
(liters/min)	feet	feet	feet		
0.1	13.8	8.8	6.1		
0.2	27.6	17.7	12.3		
0.3	41.4	26.5	18.4		
0.4	55.3	35.4	24.6		
0.5	69.1	44.2	30.7		
0.6	82.9	53.0	36.8		
0.7	96.7	61.9	43.0		
0.8	110.5	70.7	49.1		
0.9	124.3	79.6	55.3		
1	138.1	88.4	61.4		
1.1	151.9	97.2	67.5		
1.2	165.8	106.1	73.7		
1.3	179.6	114.9	79.8		
1.4	193.4	123.8	85.9		
1.5	207.2	132.6	92.1		
1.6	221.0	141.4	98.2		
1.7	234.8	150.3	104.4		
1.8	248.6	159.1	110.5		
1.9	262.4	168.0	116.6		
2	276.3	176.8	122.8		

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 02/28/23 Location: Harriman, Tennessee

AQS Number: 47-145-0004

Site Name: Harriman PM Pollutants: PM2.5

Print Name / Signature / Initials / Duties

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist

2:_____

Air Monitoring Site Evaluation Summary

Local Site Name: Harriman PM		Initials:	EMH	Date: 02/28/23	
Site meets EPA siting criteria:	Yes Do				
110, сарын.					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
Emory Drive	78.8 m	NE	Local St	1916	2022
Clinton Street	75.6 m	S	Local St	NA	NA
North Roane Street	121.0 m	NW	Local St	11559	2022
Georgia Street	223.4 m	SW	Local St	1190	2022
Additional Comments: 1. Arrival, departure and photo	times are Eastern ti	me.			
2. There are two platforms on s	site: one for the BA	M monitor	and one wi	th a TEON	√l sheltei
used for storage. The BAM plat	form decking has 5	boards (60)"I x 6" W x	1"T) and (one
board (60" L x 2.5" W x 1" T). T				<u> </u>	
 (48" L x 6" W x 1" T). Both plati					
(40 LXO WXT T). Dolli piati	oms are weathere	d and start	ing to crack	•	

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Harriman PM	Initials:	EMH	Date: 02/28/23
APC auditor should document in Site Log – time / date / v	reather conditions/purpose of visi	it / APC staff pı	esent [Yes No] Completed
Arrival Time: 3:00 pm Departure Time: 3	255 pm Primary Oper	_{ator:} Jus	tin Long
Observer(s):			
SITE			
[• Yes \square No] -Security Fence [• Yes \square No] -Razor	Barb Wire [a Yes □ No □]	NA] Grass/S	hrubs Cut
[Yes No ANA] Bare Soil Area [Yes No AN	[A] Vandalism – [□ Inside	/ □ Outside]	
Date: [ice Report Filed		
Issues:			
PLATFORMS: □ Not Present			
Condition: [♠ Yes □ No] Good [□ Yes □ No] Ne	eds Maintenance		
Issues:			
RECORDS AT SITE:			
Documents available (QAPPs, SOPs) [Yes =	No] □ Electronic/□ Hardo	opy/□Both	
Logbooks at site [♠ Yes □ No] □ Electronic/□ Han	* •		
Comments: Hardcopy logbook loca	ated on site.		

MONITOR(s):

Monitor(s)	Manufacturer	Model	Serial Number
PM 2.5	Met One	BAM 1022	W19944

Location: Exterior Samplers [Roof / Ground / Not Present]

MSEF: Local Site N	Name: Harrimar	PM Initials: EMI	H Date: 02/28/2	23
DATA COLLECTI	ION/DOCUMENTAT	TION:		
Data loggers/Mode	ms:			
Make	Model	Serial Number	Data logger/Modem	Main/Backup
Raven	R55V	2R91110046011009	Modem	Main
- [∎ Ves □ No] Head/Sen	[Yes No] Electrical	Present ly Grounded [Yes No] Sta 1/30 days PM 10 H		
Issue(s):				
COLLOCATED SA	AMPLERS: • Not Pr	esent	(39.4 inches = 1 meter)	

Flow

(Hi / Lo)

Pollutant

*Separation Distance

(meters)

	Inlet	Index I and an	*Horizontal Distance (meters) If Applicable	*Vertical Distance (meters) If Applicable	Monitoring SCALE		
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)			AQS	Annual Network Plan	
PM 2.5	2.6	Ground	NA	NA	Urban	Urban	

FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb)

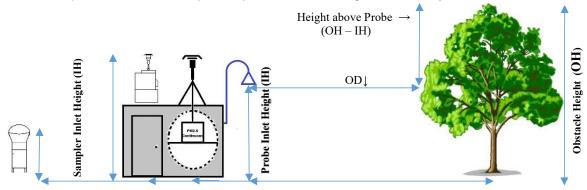
When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

^{*}Collocated monitors must be within 4 meters of each other and at least 2 meters apart for flow rates greater than 200 liters/min or at least 1 meter apart for samplers having flow rates less than 200 liters/min to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

Aerial Photo with Wind Rose



Source: Google Earth Pro Imagery Date: ____ OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be $\geq [2*(OH-IH)]$

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstacle	AZ
1	School	7.6	2.6	10.0	40.0		304
2	Trees	6.0	2.6	6.8	79.2		350
3	Tree	14.0	2.6	22.8	93.6		9
4	House	6.0	2.6	6.8	110.0		18
5	Church	7.6	2.6	10.0	57.0		45
6	Tree	8.7	2.6	12.2	44.0		55
7	Tree	12.0	2.6	18.8	53.0		75
8	Tree	13.0	2.6	20.8	52.4		124
9	Trees	17.4	2.6	29.6	71.2		132
10	Tree	26.2	2.6	47.2	83.0		156
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Nam	ie: Harr	ıman PM	Initials: EMH	Date: 02/28/23
	44.0			
TREE DRIPLINE(s):			inlet to dripline) □ No T	
	52.4	`	inlet to dripline) □ Not P	
a	53.0	`	inlet to dripline) □ Not P	
Should be greater than 20 mo	eters from t	he dripline of tree(s) and	must be 10 meters from	the dripline when the tree(s) act as an obstruction
Issues:				
Minor Sources:				
• Groundcover, gr	rass, etc p	present? (especiall	y for PM samplers)	
			ks, fireplaces, diesel	heating
 Off road diesel § 	generator	s near NO ₂ or SO	2 analyzers	
_{Issues:} None				
issues				
Additional Info	ormat	ion:		
			m PM inlet: there	efore there are no tree
_	itei tiiai		The first trient	
Iripline issues.				

Date: 02/28/23 Harriman PM **Initials: MSEF**: Local Site Name:

Direction NORTH Primary Wind Dir Security Issues

Sloping Areas

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

Monitoring Shelter Probe Position(s) **Exterior Samplers**

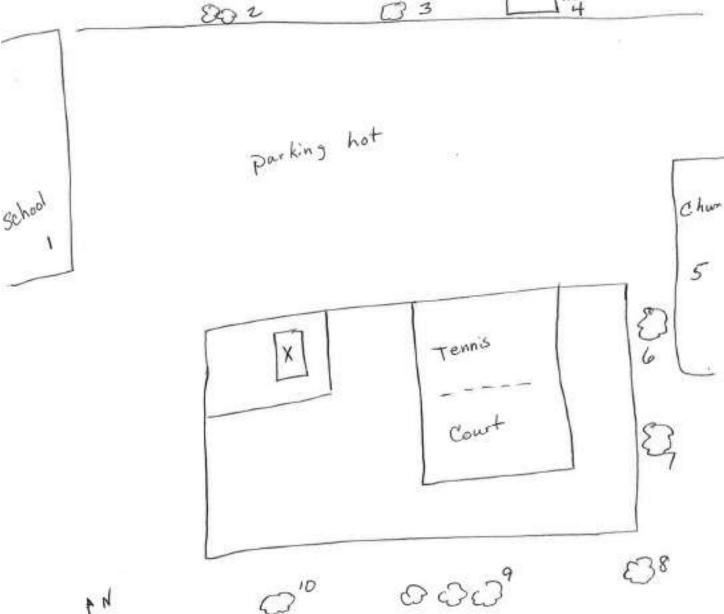
Nearby Trees/Shrubs Roadways Buildings Walls

Possible Sources Paved / Unpaved Areas Nearby Construction Flues, Vents, Boilers Meat Cooking

Met Tower Security Fencing

Other Obstructions

House



UNRESTRICTED AIR FLOW: > 270 ° Estimated Degrees of Clearance

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Harriman PM Initials: EMH Date: 02/28/23

Camera [APC / Personal – Owner: Minolta MN12Z

Photo: 001 Date: 02/28/23 Time: 3:40 pm Photographer: EMH Description: North Directional



Photo: 002 Date: 02/28/23 Time: 3:40 pm Photographer: EMH Description: Northeast Directional



Photo: 003 Date: 02/28/23 Time: 2:40 pm Photographer: EMH Description: East Directional



Photo: 004 Date: ______ 3:40 pm _____ Photographer: ______ EMH _____ Description: ______ Southeast Directional



Photo: 005 Date: 02/28/23 Time: 3:40 pm Photographer: EMH Description: South Directional





Photo: 007 Date: _____ Time: ____ Photographer: _EMH ____ Description: _West Directional



Photo: 008 Date: _____ Time: ____ Photographer: _EMH ____ Description: ____Northwest Directional



Photo: 009 Date: O2/28/23 Time: 3:40 pm Photographer: EMH Description: Site



Photo: 010 Date: ______ Time: _____ Photographer: _____ EMH ____ Description: ______ Monitor





Photo: 012	Date:	Time:	Photographer:	Description:

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

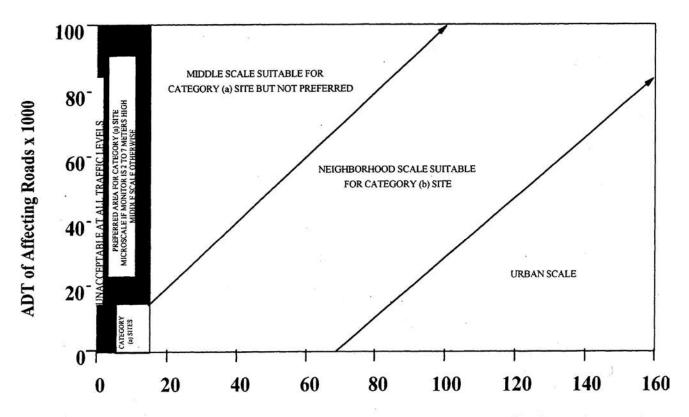


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line (1/4" Line OD / 20 Sec Residence Time						
Flow Rate	1/8" ID	3/16" ID					
(liters/min)	feet	feet	feet				
0.1	13.8	8.8	6.1				
0.2	27.6	17.7	12.3				
0.3	41.4	26.5	18.4				
0.4	55.3	35.4	24.6				
0.5	69.1	44.2	30.7				
0.6	82.9	53.0	36.8				
0.7	96.7	61.9	43.0				
0.8	110.5	70.7	49.1				
0.9	124.3	79.6	55.3				
1	138.1	88.4	61.4				
1.1	151.9	97.2	67.5				
1.2	165.8	106.1	73.7				
1.3	179.6	114.9	79.8				
1.4	193.4	123.8	85.9				
1.5	207.2	132.6	92.1				
1.6	221.0	141.4	98.2				
1.7	234.8	150.3	104.4				
1.8	248.6	159.1	110.5				
1.9	262.4	168.0	116.6				
2	276.3	176.8	122.8				

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 03/15/23 Location: Kingsport, Tennessee

AQS Number: 47-163-1007

Site Name: Kingsport PM Pollutants: PM2.5

Print Name / Signature / Initials / Duties

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist

2:

Air Monitoring Site Evaluation Summary

Local Site Name: Kingsport PM		Initials: EMH		Date: 03/15/23	
Site meets EPA siting criteria:	■ Yes □ No				
If No, explain:					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
East Center Street	197.5 m	S	Local St	12513	2022
D Street	47.0 m	W	Local St	NA	NA
Westmoreland Avenue	37.8 m	N	Local St	NA	NA
E Street	52.4 m	E	Local St	NA	NA
Additional Comments: 1. Arrival, departure and photo	times are Eastern ti	me.			
2. The distance between the ut	tility pole and PM inl	et is 1.4 me	eters.		
3. The platform decking consists of	f 26 boards (89" L x 6"	W x 1" T) a	nd one board	(89" L x 6"	W x 1"T).

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Kingsport PM	Initials: EMH	Date: 03/15/23
APC auditor should document in Site Log – time / date / weather cor Arrival Time: 2:00 pm Departure Time: 3:05 pn		
Observer(s):		
SITE [• Yes - No] -Security Fence [• Yes - No] -Razor/Barb W		
[□ Yes □ No • NA] Bare Soil Area [□ Yes □ No • NA] Vand	dalism – [□ Inside / □ Outside]	
Date: [□ Yes □ No] Police Repo	ort Filed	
Issues:		
PLATFORMS: Not Present		
Condition: [Yes No] Good [Yes No] Needs Main	ntenance	
Issues:		
RECORDS AT SITE: Documents available (QAPPs, SOPs) [Yes No]	Electronic/□ Hardcopy/□Both	
Logbooks at site [■ Yes □ No] □ Electronic/□ Hardcopy/■	Both	
Comments:		

MONITOR(s):

Monitor(s)	Manufacturer	Model	Serial Number
PM2.5	Met One	BAM 1022	W17127

Location: Exterior Samplers [Roof / Ground / Not Present]

ta loggers/Mode Make	Model	Serial Number	Data logger/Modem	Main/Backup
Raven	R55V	2R9333002011016	Modem	Main

COLLOCATED SAMPLERS: • Not Present

(39.4 inches = 1 meter)

Pollutant	Flow (Hi / Lo)	*Separation Distance (meters)

^{*}Collocated monitors must be within 4 meters of each other and at least 2 meters apart for flow rates greater than 200 liters/min or at least 1 meter apart for samplers having flow rates less than 200 liters/min to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

	Inlet	Inlet I coeffee	*Horizontal	*Vertical	Monitoring SCALE	
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)	Distance (meters) If Applicable	Distance (meters) If Applicable	AQS	Annual Network Plan
PM 2.5	2.7	Ground			Urban	Urban

FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb)

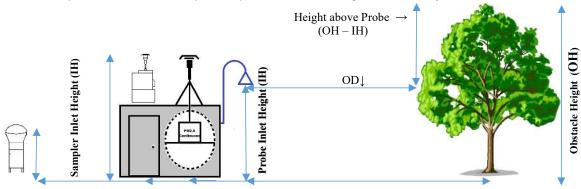
When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

Aerial Photo with Wind Rose



Source: Google Earth Pro Imagery Date: ____

OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be $\geq [2*(OH-IH)]$

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstacle	AZ
1	Tree	9.7	2.7	14.2	31.0		41
2	Tree	6.6	2.7	7.8	32.0		19
3	Tree	6.6	2.7	7.8	32.0		4
4	Tree	4.7	2.7	4.0	18.0		332
5	Tree	3.3	2.7	1.2	11.6		341
6	Shrubs	3.1	2.7	0.8	10.0		14
7	Tree	6.4	2.7	7.4	15.8		51
8	Shrubs	2.6	2.7	NA	12.3		66
9	Trees	4.0	2.7	2.6	18.0		75
10	Tree	12.0	2.7	18.6	27.4		99
11	Tree	10.6	2.7	15.8	19.5		121
12	Tree	8.8	2.7	12.2	16.6		311
13							
14							
15							
16							
17							
18							
19							
20							

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Name	: Kingsport PM	Initials: EMH	Date: 03/15/23
ΓREE DRIPLINE(s): _	12.0 motors (inlatta drindina) — No Troco	a Dungant
I KEE DKIFLINE(S)		inlet to dripline) No Tree	
_		inlet to dripline) □ Not Preser	
	-	inlet to dripline) \square Not Preserved.	^{nt} dripline when the tree(s) act as an obstructio
mould be greater than 20 mot	or tree and and	muot bo 10 motoro nom the	anpinio when the tree(e) det de diffessituette
ssues:			
Minor Sources:			
	ss, etc present? (especially	y for PM samplers)	
_	r of chimnies, smoke stack		ting
	enerators near NO ₂ or SO ₂	_	5
		- ,	
ssues: None			
Additional Info	rmation.		
he closest tree has	a tree dripline of 12.	.0 meters and is no	t an obstacle.

MSEF: Local Site Name: Kingsport PM Initials: EMH

Date: 03/15/23

Direction NORTH Primary Wind Dir Security Issues Sloping Areas

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

Monitoring Shelter Probe Position(s) **Exterior Samplers**

Security Fencing

Met Tower

Roadways Buildings

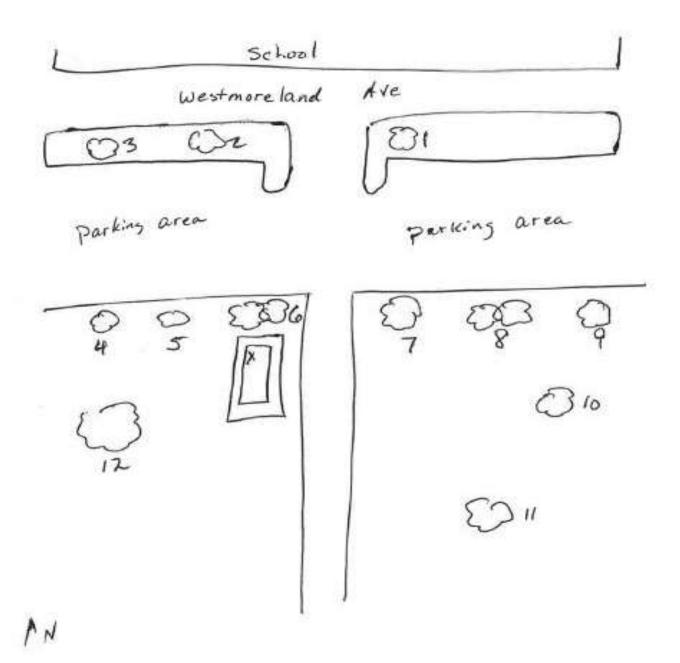
Walls Other Obstructions

Nearby Trees/Shrubs

Possible Sources

Paved / Unpaved Areas Nearby Construction Flues, Vents, Boilers

Meat Cooking



Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Kingsport PM Initials: EMH Date: 03/15/23

Camera [APC / Personal – Owner: _____] Make/Model: Minolta MN12Z

Photo: 001 Date: 03/15/23 Time: 2:50 pm Photographer: EMH Description: North Directional



Photo: 002 Date: 03/15/23 Time: 2:50 pm Photographer: EMH Description: Northeast Directional



Photo: 003 Date: 03/15/23 Time: 2:50 pm Photographer: EMH Description: East Directional



Photo: 004 Date: _____ Time: ____Photographer: _EMH _____Description: _Southeast Directional



Photo: 005 Date: 03/15/23 Time: 2:50 pm Photographer: EMH Description: South Directional



Photo: 006 Date: 03/15/23 Time: 2:50 pm Photographer: EMH Description: Southwest Directional



Photo: 007 Date: 03/15/23 Time: 2:50 pm Photographer: EMH Description: West Directional



Photo: 008 Date: 03/15/23 Time: 2:50 pm Photographer: EMH Description: Northwest Directional



Photo: 009 Date: O3/15/23 Time: 2:50 pm Photographer: EMH Description: Site



Photo: 010 Date: 03/15/23 Time: 2:50 pm Photographer: EMH Description: Monitor





Photo: 012 Date: _____ Time: ____ Photographer: _____ Description: _____

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

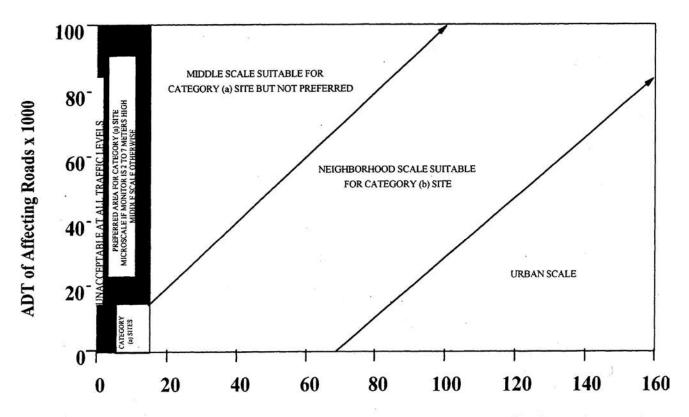


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time					
Flow Rate	1/8" ID	5/32" ID	3/16" ID		
(liters/min)	feet	feet	feet		
0.1	13.8	8.8	6.1		
0.2	27.6	17.7	12.3		
0.3	41.4	26.5	18.4		
0.4	55.3	35.4	24.6		
0.5	69.1	44.2	30.7		
0.6	82.9	53.0	36.8		
0.7	96.7	61.9	43.0		
0.8	110.5	70.7	49.1		
0.9	124.3	79.6	55.3		
1	138.1	88.4	61.4		
1.1	151.9	97.2	67.5		
1.2	165.8	106.1	73.7		
1.3	179.6	114.9	79.8		
1.4	193.4	123.8	85.9		
1.5	207.2	132.6	92.1		
1.6	221.0	141.4	98.2		
1.7	234.8	150.3	104.4		
1.8	248.6	159.1	110.5		
1.9	262.4	168.0	116.6		
2	276.3	176.8	122.8		

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 03/16/2023	Location: Kingsport, Tennessee

AQS Number: 47-163-2002

Site Name: Blountville O3 Pollutants: O3

Print Name / Signature / Initials / Duties

EMH

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist

Air Monitoring Site Evaluation Summary

Local Site Name: Blountville O3		Initials: EMH		Date: 03/16/2023	
Site meets EPA siting criteria:	■ Yes □ No				
If No, explain:					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
Shawnee Drive	13.0 m	N	Local St	NA	NA
Hill Road	174.4 m	E	Local St	NA	NA
Memorial Boulevard	254.5 m	N	Local St	6700	2022
Fall Creek Road	847.8 m	W	Local St	2307	2022
Electrical					
Utilities Company: Appalachian E	lectric Power		Meter #: _7	83638139	
Additional Comments:					
1. Arrival, departure and photo	times are Eastern ti	me.			
2. Shelter is located within gate	ed park.				
3. Shelter temperature was 72	degrees F (22.2 C).				
4. The fire extinguisher is in go	od condition.				
5. The shelter is bolted to ceme	ent pad.				

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Blountville O3	Initials: EMH	Date: 03/16/23
APC auditor should document in Site Log – time / date / v	weather conditions/purpose of visit / APC staff	present [♠ Yes □ No] Completed
Arrival Time: 11:40 am Departure Time: 1	2:25 pm Primary Operator: Dar	niel Bowers
Observer(s):		
SITE [Yes No] -Security Fence [Yes No] -Razor	-/Barb Wire [a Yes □ No □ NA] Grass,	Shrubs Cut
[Yes No NA] Bare Soil Area [Yes No No	NA] Vandalism – [□ Inside / □ Outside]
Date: [
SHELTER - Not Present		
Interior Arrival Temperature: 23.1 °C (from data lo	gger) Operator Site Visits: 1	_ per [
[□ Yes • No] Leaking Roof [Damaged: □Ceilin	ng / Floor / Walls] [Yes No]	Clean / Neat
[Yes No] Fire Extinguisher Yes No] Insec	ct / Wildlife Issues [Yes No] Gas	oline (inside shelter)
Issues:		
Exterior Type: [¬Freezer / ¬Wood Building / ¬Brick-B Height of Roof: 3.0 meters		-last single ply membrane
☐ Yes ■ No] Needs Maintenance (specify)		
[☐ Yes ☑ No] Tied Down (type)		
[□ Yes □ No] Electrically Grounded [□ Yes • No	o] Roof Railing	
Roof Access: [Stairs / Ladder / Not Prese		Hazard)
PLATFORMS: ■ Not Present Condition: [□ Yes □ No] Good [□ Yes □ No] Ne	eds Maintenance	
Issues:		
RECORDS AT SITE: Documents available (QAPPs, SOPs) [Yes =	No]	
Logbooks at site [a Yes □ No] □ Electronic/□ Ha	rdcopy/•Both	
Comments		

MSEF	: Local Site Nar	ne: Blountvill	e O3	Initials: EMH	Date: 03	/16/23
MONI	ITOR(s):		Locatio	on: Exterior Sample	rs [□ Roof / □Grou	nd / ■ Not Present]
Moni	tor(s)	Manufacture	r Model	Serial Nun	nber	
	O3	Teledyne	T400		4514	
CALI	BRATOR(s):	□ Not Present	[■ Yes t	⊐ No] Are QC Cho	eck Gases Vented	Outside Shelter?
QC	Make	Model	Serial Num	ber	Certification Date	Expiration Date
QC	Teledyr	ne T703	64	46	02/09/23	08/08/23
						ent and notify agency mgr. [■ Yes □ No] Audits (Required)
Issues:						
CYLII VENDO	NDER GAS ST	ANDARDS:	■ Not Presen), should not be in servic	e and should be replaced)
QC	Gas Standar	d PSI Reading	Expiration Date	Standard Concentration Serial		Number
Issues:						

MSEF: Local Site	Name: Blountville O3	Initials: EMH	Date: 03/16/23	3
DATA COLLECT	ION/DOCUMENTATI	ON:		
Data loggers/Mode	ems:			
Make	Model	Serial Number	Data logger/Modem	Main/Backup
Raven	R55V	2R93740156011016	Modem	Main
Agilaire	8872	518	Datalogger	Main
■ Yes □ No] Tempera Zero Air System: C Cartridge Syst	ommercial System (Make / M	o] Uninterruptable Power S Model): Teledyne T701 (S Blue] / Charcoal / Pura	N 1339)	:]

Probe Line	e(s): [■Replaced / □Cleane	ed] – Frequency: 1/ year	Last Service Date: 02/13/23	_	
[■ Yes □ No]	Clean [■ Yes □ No] Heated	[□ Yes ■ No] Insulated [□ Y	Yes ■ No] Moisture [□ Yes ■ No] Retractable	;	
[□ Yes ■ No]	Old / Unused Lines [Yes	s No] Lo Flo Manifold			
[□ Yes • No]	Any Open Ports? -> How	many analyzers using manif	old?		
Issues:					
OUTDOOR SAMPLERS [Yes No] Locked [Yes No] Electrically Grounded [Yes No] Stabilized [Yes No] Clean Inside					
[□ Yes □ No]	Head/Separator Clean				
Operator / 1	Log: VSCC/WINS Clean Sch	edule: P	M ₁₀ Head Clean Schedule:	_	
Issue(s):					
COLLOCATED SAMPLERS: Not Present (39.4 inches = 1 meter)					
	Pollutant	Flow	*Separation Distance		

(meters)

(Hi/Lo)

^{*}Collocated monitors **must be within 4 meters of each other** and at least **2 meters apart** for flow rates **greater than 200 liters/min** or at **least 1 meter apart** for samplers having flow rates **less than 200 liters/min** to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

MSEF: Local Site Name: Blountville O3	Initials: EMH	Date: 03/16/2	3
PROBE SYSTEM(s): External	t		
Inlet Type: [\blacksquare Single Line / \square Dual Line / \square Bell Type (C	AS design)]		
Funnel(s): [■ Rain Shield / □Part of Probe] Funnel M	Iaterial: [□Teflon® / 🖥 Gla	ss / Stainless Steel /	☐ Other:]
Probe Line(s): [■ Teflon® / □ Other:]	Probe Fitting(s): [■ Tefle	on [®] /□ Other:	/ Not Present]
Residence Time: 5.4 seconds	(20 sec. max	(Refer to chart for max	ximum line lengths)
Issue(s):			

	Inlet	Inlet I coeffee	*Horizontal	*Vertical	Monitorin	ng SCALE
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)	Distance (meters) If Applicable	Distance (meters) If Applicable	AQS	Annual Network Plan
O3	4.6	Side of Shelter			Neighborhood	Neighborhood

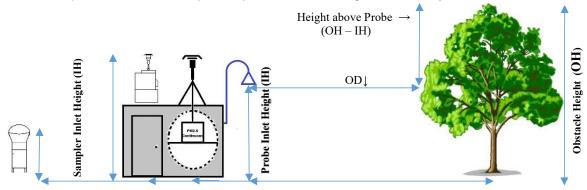
FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb)

When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

Aerial Photo with Wind Rose



Source: Google Earth Pro Imagery Date: _____ OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be $\geq [2*(OH-IH)]$

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstacle	AZ
1	Trees	13.6	4.6	18.0	32.0		352
2	House	3.9	4.6	NA	35.7		16
3	Trees	15.2	4.6	21.6	34.0		84
4	Community Center	3.3	4.6	NA	13.4		116
5	Trees	18.9	4.6	28.6	44.0		299
6	Trees	20.0	4.6	30.8	52.0		312
7	Trees	10.0	4.6	10.8	24.0		344
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Nam	ne: Blou	ntville O3	Initials: EMH	_{Date:} 03/16/23
	040			
TREE DRIPLINE(s):			inlet to dripline) \Box No Tro	
	32.0	·	inlet to dripline) □ Not Pre	
	34.0	`	inlet to dripline) □ Not Pre	
Should be greater than 20 mg	eters from t	he dripline of tree(s) and	must be 10 meters from th	ne dripline when the tree(s) act as an obstruction
Issues:				
Minor Sources:				
	rass, etc p	resent? (especially	y for PM samplers)	
_	-	` - '	ks, fireplaces, diesel he	eating
 Off road diesel g 	generator	s near NO ₂ or SO ₂	analyzers	
Issues: None				
Issues:				
Additional Info	armat	ion·		
			- £ 4	the surfaces the surface are
		than 20 meter	s from the probe;	therefore there are no
tree dripline issues.	•			
				_

MSEF: Local Site Name: Blountville O3

Initials: EMH

Date: 03/16/23

Direction NORTH Primary Wind Dir Security Issues Sloping Areas

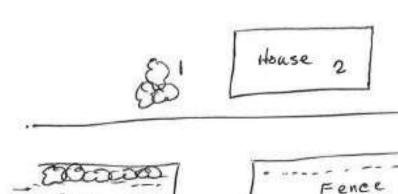
SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

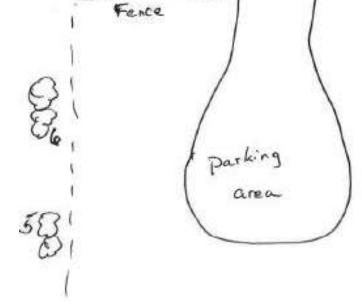
Monitoring Shelter Probe Position(s) **Exterior Samplers** Met Tower

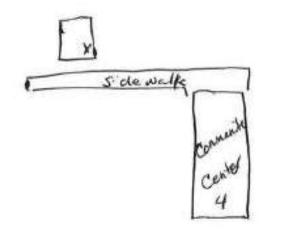
Security Fencing

Nearby Trees/Shrubs Roadways Buildings Walls Other Obstructions

Possible Sources Paved / Unpaved Areas Nearby Construction Flues, Vents, Boilers Meat Cooking









UNRESTRICTED AIR FLOW: > 270 ° Estimated Degrees of Clearance

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Blountville O3 Initials: EMH Date: 03/16/23

Camera [APC / Personal – Owner: Minotla MN12Z

Photo: 001 Date: 03/16/23 Time: 12:10 pm Photographer: EMH Description: North Directional

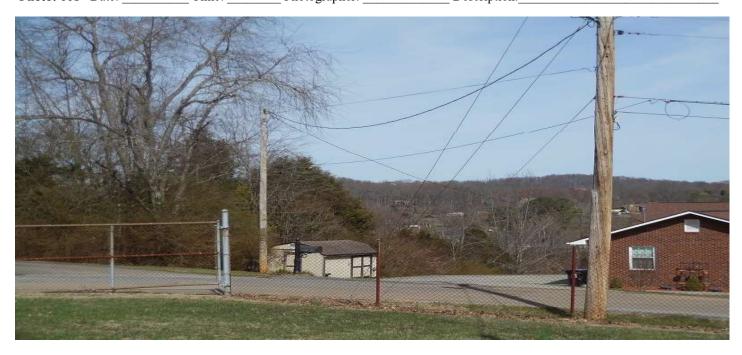


Photo: 002 Date: 03/16/23 Time: 12:10 pm Photographer: EMH Description: Northeast Directional



Photo: 003 Date: 03/16/23 Time: Photographer: EMH Description: East Directional



Photo: 004 Date: _____ 12:10 pm Photographer: _____ EMH ____ Description: _____ Southeast Directional



Photo: 005 Date: 03/16/23 Time: 12:10 pm Photographer: EMH Description: South Directional



Photo: 006 Date: 03/16/23 Time: 12:10 pm Photographer: EMH Description: Southwest Directional



Photo: 007 Date: 03/16/23 Time: 12:10 pm Photographer: EMH Description: West Directional



Photo: 008 Date: _____ 12:10 pm Photographer: EMH _____ Description: Northwest Directional



Photo: 009 Date: O3/16/23 Time: Photographer: EMH Description: Site



Photo: 010 Date: _____ Time: ____ Photographer: _EMH ____ Description: _Probe



Photo: 011 Date: 03/16/23 Time: 12:10 pm Photographer: EMH Description: Electric meter

Property of American Electric Poperty of Amer

Photo: 012 Date: _____ Time: _____ Photographer: _____ Description:

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

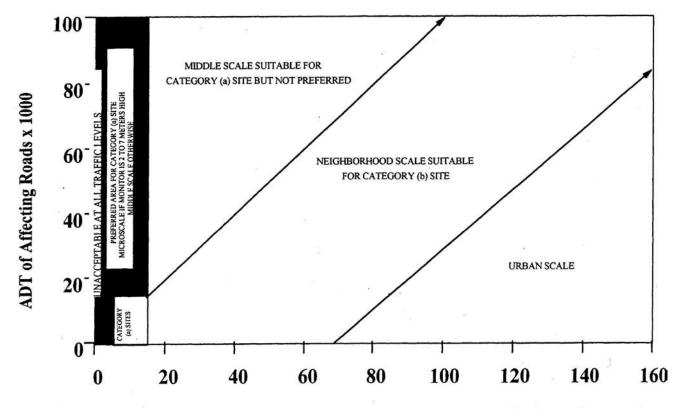


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line (DD / 20 Se	Residence	e Time
Flow Rate	1/8" ID	5/32" ID	3/16" ID
(liters/min)	feet	feet	feet
0.1	13.8	8.8	6.1
0.2	27.6	17.7	12.3
0.3	41.4	26.5	18.4
0.4	55.3	35.4	24.6
0.5	69.1	44.2	30.7
0.6	82.9	53.0	36.8
0.7	96.7	61.9	43.0
0.8	110.5	70.7	49.1
0.9	124.3	79.6	55.3
1	138.1	88.4	61.4
1.1	151.9	97.2	67.5
1.2	165.8	106.1	73.7
1.3	179.6	114.9	79.8
1.4	193.4	123.8	85.9
1.5	207.2	132.6	92.1
1.6	221.0	141.4	98.2
1.7	234.8	150.3	104.4
1.8	248.6	159.1	110.5
1.9	262.4	168.0	116.6
2	276.3	176.8	122.8

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 03/16/2023	Location: Kingsport,	Tennessee

AQS Number: 47-163-2003

Site Name: Kingsport O3 Pollutants: O3

Print Name / Signature / Initials / Duties

1: (Team Lead)	Evelyn Haskin	Evelyn Haskin	EMH	Site Specialist
2.			EMH	

Air Monitoring Site Evaluation Summary

Local Site Name: Kingsport O3		Initials: EMH		Date: 03/16/2023	
Site meets EPA siting criteria:	l Yes □ No				
If No, explain:					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
Bloomingdale Road	240.0 m	N	Local St	2332	2022
Packing House Road	198.0 m	E	Local St	NA	NA
Kentron Drive	37.5 m	SE	Local St	NA	NA
New Beason Well Road	455.0 m	W	Local St	4673	2022
Electrical					
Utilities Company: Appalachian El	ectric Power		Meter #: <u>7</u>	84207275	
Additional Comments:					
1. Arrival, departure and photo		mes.			
2. Shelter temperature was 75 of	degrees F (23.9 C)				
3. The fire extinguisher is in good	od condition.				
4. The shelter is bolted down to					
5. Kingsport O3 is one of the sit	tes with a weather s	station (loca	ated on roof	of shelter)).

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Kingsport O3	Initials: EMH	03/16/23
APC auditor should document in Site Log – time / date / weather cond		
Arrival Time: 3:15 pm Departure Time: 4:00 pm	Primary Operator: Dar	iel Bowers
Observer(s):		
SITE [Yes No] -Security Fence Yes No] -Razor/Barb Wi	re [• Yes □ No □ NA] Grass /	Shrubs Cut
[Yes No a NA] Bare Soil Area [Yes No a NA] Vanda	_	
Date: [□ Yes □ No] Police Repor	-	•
Issues:		
SHELTER - Not Present		
Interior Arrival Temperature: 23.5 °C (from data logger) Ope	erator Site Visits: 1	_ per [□ week □ month □
[□ Yes • No] Leaking Roof [Damaged: □Ceiling / □ Floo	or / Walls] [# Yes No]	Clean / Neat
$[\P \ Yes \ \square \ No] \ Fire \ Extinguisher \ [\square \ Yes \ \P \ No] \ Insect \ / \ Wildlife \ A \ No]$	fe Issues [□ Yes ♠ No] Gaso	pline (inside shelter)
Issues:		
Exterior Type: [=Freezer / =Wood Building / =Brick-Block / =St Height of Roof: 3.0 meters Roofing N		-last single ply membrane
Yes ■ No] Needs Maintenance (specify)		
[Yes No] Tied Down (type)		
[Yes □ No] Electrically Grounded □ Yes • No] Roof R :		
Roof Access: [Stairs / Ladder / Not Present] [Your Stairs / Not Present]		Hazard)
PLATFORMS: ■ Not Present Condition: [□ Yes □ No] Good [□ Yes □ No] Needs Maint	tenance	
Issues:		
RECORDS AT SITE: Documents available (QAPPs, SOPs) [Yes No] El	ectronic/□ Hardcopy/□Both	
Logbooks at site [■ Yes □ No] □ Electronic/□ Hardcopy/■E	Both	
Comments		

MSEF	: Local Site Nai	_{ne:} Kingspor	t O3	Initials: EMH	Date: 03	/16/23
MON	ITOR(s):		Locatio	on: Exterior Sample	rs [□ Roof / □Grou	nd / • Not Present]
Moni	tor(s)	Manufacture	r Model	Serial Nur	nber	
	O3	Teledyne	T400		4513	
CALI	BRATOR(s):	□ Not Present	[■ Yes t	⊐ No] Are QC Cho	eck Gases Vented	Outside Shelter?
QC	Make	Model	Serial Num	ber	Certification Date	Expiration Date
QC	Teledyı	ne T703	64	3 01/31/23		07/30/23
] Precision Checks	ent and notify agency mgr. [■ Yes □ No] Audits (Required)
Issues:						
CYLII VENDO	NDER GAS ST Dr:	ANDARDS:	■ Not Presen), should not be in servic	e and should be replaced)
QC	Gas Standar	PSI Reading	Expiration Date	Standard Concentrati	Serial	Number
Issues:						

I	MSEF: Local Site Nam	e: Kingsport O3	Initials: EMH	Date: 03/16/23	3
	DATA COLLECTION Data loggers/Modems:		ON:		
	Make	Model	Serial Number	Data logger/Modem	Main/Backup
	Raven	R55V	2R93610116021016	Modem	Main
	Agilaire	8872	514	Datalogger	Main
	3				
	3				

SUPPORTING INSTRUMENTATION: Internal - Not Present
[■ Yes □ No] Temperature Sensor □ Yes ■ No] Uninterruptable Power Supply Zero Air System: Commercial System (Make / Model): Teledyne T701 (SN 1348)
Cartridge System: [Silica Gel Pink / Blue] / Charcoal / Purafil / Hopcalite / Other:] [Yes • No] Needs Service Last Service Date: 02/13/23 Condition:
Issues:
Probe Line(s): [#Replaced / Cleaned] – Frequency: 1/ year Last Service Date: 02/13/23
[■ Yes □ No] Clean [■ Yes □ No] Heated [□ Yes ■ No] Insulated [□ Yes ■ No] Moisture [□ Yes ■ No] Retractable
[□ Yes ■ No] Old / Unused Lines [□ Yes ■ No] Lo Flo Manifold
[□ Yes ® No] Any Open Ports? -> How many analyzers using manifold?
Issues:
OUTDOOR SAMPLERS [Yes No] Locked Yes No] Electrically Grounded Yes No] Stabilized Yes No] Clean Inside
[□ Yes □ No] Head/Separator Clean
Operator / Log: VSCC/WINS Clean Schedule: PM ₁₀ Head Clean Schedule:
Issue(s):

COLLOCATED SAMPLERS: Not Present (39.4 inches = 1 meter)

Flow *Separation Distance

Pollutant	Flow (Hi / Lo)	*Separation Distance (meters)

^{*}Collocated monitors **must be within 4 meters of each other** and at least **2 meters apart** for flow rates **greater than 200 liters/min** or at **least 1 meter apart** for samplers having flow rates **less than 200 liters/min** to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

MSEF: Local Site Name: Kingsport O3	Initials: EMH	Date: 03/16/2	3
PROBE SYSTEM(s): External □ Not Present Inlet Type: [■ Single Line / □ Dual Line / □ Bell Type (CA	S design)]		
Funnel(s): [■ Rain Shield / □Part of Probe] Funnel Ma	nterial: [□Teflon® / 🖥 Gla	ss / Stainless Steel /	Other:]
Probe Line(s) : [□ Teflon® / □ Other:] F	Probe Fitting(s): [Tefl	on [®] /□ Other:	/ Not Present]
Residence Time: 5.8 seconds	(20 sec. max) (Refer to chart for max	ximum line lengths)
Issue(s):			

	Inlet	Inlet I coeffee	*Horizontal	*Vertical	Monitorin	ng SCALE
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)	Distance (meters) If Applicable	Distance (meters) If Applicable	AQS	Annual Network Plan
O3	4.2	Side of Shelter			Neighborhood	Neighborhood

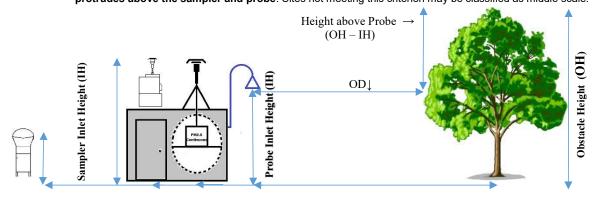
FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb)

When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

Aerial Photo with Wind Rose



Source: Google Earth Pro Imagery Date: _____ OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be $\geq [2*(OH-IH)]$

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstacle	AZ
1	School	7.9	4.2	7.4	30.3		2.0
2	Shrubs	6.7	4.2	5.0	14.8		144
3	Shrubs	5.2	4.2	2.0	12.0		197
4	Tree	8.2	4.2	8.0	18.0		284
5	Trees	16.5	4.2	24.6	32.6		302
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Nam	e: King	sport O3	Initials: E	MH		
There boiled there?	12.0	, , ,				
TREE DRITE EIT (E(s)	14.8	meters (hearest finet to dripfine)				
	18.0	`	1 /			
Should be greater than 20 me		meters (nearest i	* '		ipline when the tree(s) act as an obstruction	
Official De greater than 20 me	tors nom t	ne dripinie of tree(s) and	mast be 10 met		ipline when the tree(3) act as an obstruction	
Issues:						
Minor Sources:						
	ass, etc r	present? (especially	y for PM samp	olers)		
_	-	mnies, smoke stacl	-		ng	
		s near NO ₂ or SO ₂	_			
Issues: None						
Issues:						
Additional Info			Object # 4)	are not o	considered obstacles and	
the dripline is greate						
<u> </u>						

MSEF: Local Site Name:

Kingsport O3

Initials:

Date: 03/16/23

Direction NORTH Primary Wind Dir Security Issues Sloping Areas

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

Monitoring Shelter Probe Position(s) **Exterior Samplers** Met Tower

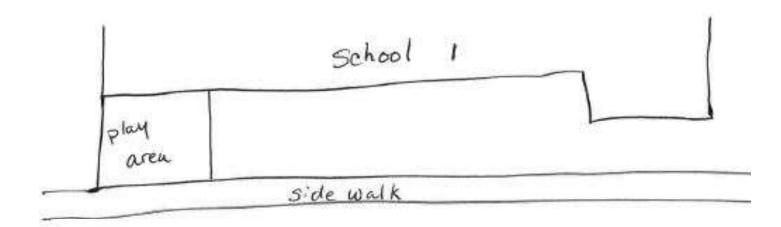
Nearby Trees/Shrubs Roadways Buildings Walls

Possible Sources Paved / Unpaved Areas **Nearby Construction** Flues, Vents, Boilers

Security Fencing

Other Obstructions

Meat Cooking





Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Kingsport O3 Initials: EMH Date: 03/16/23

Camera [APC / Personal – Owner: Minolta MN12Z

Photo: 001 Date: 03/16/23 Time: 3:45 pm Photographer: EMH Description: North Directional



Photo: 002 Date: 03/16/23 Time: 3:45 pm Photographer: EMH Description: Northeast Directional



Photo: 003 Date: 03/16/23 Time: 2:45 pm Photographer: EMH Description: East Directional



Photo: 004 Date: _____ 3:45 pm ____ Photographer: _____ EMH ____ Description: _____ Southeast Directional



Photo: 005 Date: 03/16/23 Time: 3:45 pm Photographer: EMH Description: South Directional

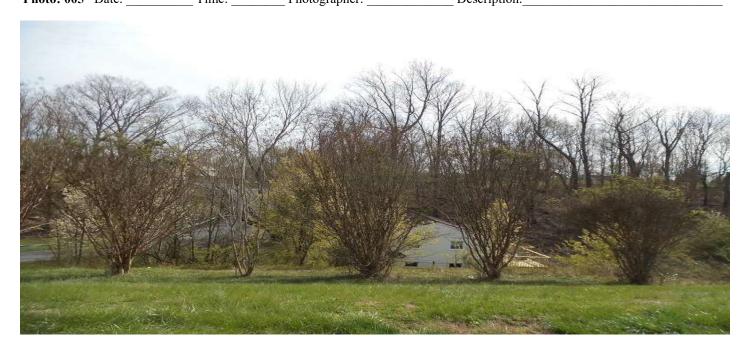


Photo: 006 Date: _____ 3:45 pm ____ Photographer: _____ EMH ____ Description: _____ Southwest Directional



Photo: 007 Date: 03/16/23 Time: 3:45 pm Photographer: EMH Description: West Directional



Photo: 008 Date: _____ 3:45 pm ____Photographer: _____ EMH ____ Description: _____Northwest Directional



Photo: 009 Date: O3/16/23 Time: Photographer: EMH Description: Site



Photo: 010 Date: _____ Time: ____ Photographer: _____ EMH ____ Description: _____ Probe





Photo: 012 Date: _____ Time: _____ Photographer: _____ Description: _____

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

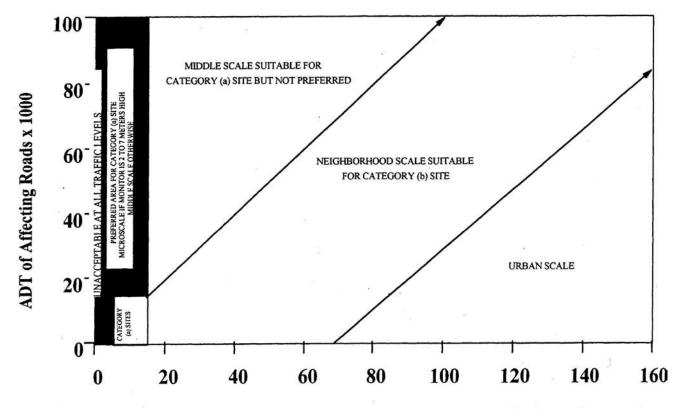


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time						
Flow Rate	1/8" ID	5/32" ID	3/16" ID			
(liters/min)	feet	feet	feet			
0.1	13.8	8.8	6.1			
0.2	27.6	17.7	12.3			
0.3	41.4	26.5	18.4			
0.4	55.3	35.4	24.6			
0.5	69.1	44.2	30.7			
0.6	82.9	53.0	36.8			
0.7	96.7	61.9	43.0			
0.8	110.5	70.7	49.1			
0.9	124.3	79.6	55.3			
1	138.1	88.4	61.4			
1.1	151.9	97.2	67.5			
1.2	165.8	106.1	73.7			
1.3	179.6	114.9	79.8			
1.4	193.4	123.8	85.9			
1.5	207.2	132.6	92.1			
1.6	221.0	141.4	98.2			
1.7	234.8	150.3	104.4			
1.8	248.6	159.1	110.5			
1.9	262.4	168.0	116.6			
2	276.3	176.8	122.8			

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 03/16/23	Location	Bristol.	Tennessee
1) x 1 E : 0 0 / 1 0 / 2 0	LOCALION	Dilotoi,	1 0111100000

AQS Number: 47-163-3004

Site Name: Exide Pb Pollutants: Pb

Print Name / Signature / Initials / Duties

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist

Air Monitoring Site Evaluation Summary

Local Site Name: Exide Pb	Initials:	EMH	Date: 03/16/23		
Site meets EPA siting criteria: If No, explain: See comment on pa	■ Yes □ No ge 7.				
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
Red Deer Road	122.4 m	sw	Local St	NA	NA
Exide Drive	212.8 m	S	Local St	5222	2022
Edison Circle	5.8 m	SW	Local St	NA	NA
Electrical Utilities Company: Appalacian Ele	ectric Power		Meter #: _4	5938	
Additional Comments:					
1. Arrival, departure and photo			f O1 beende	/ 26!!! · · · · ·	
2. The platform is in fair condition		<u>.</u>		•	<u>`</u>
and one board (36"L x 2.5" W x	1"T). The steps cons	sists a 3 - st	ep metal fran	ne (23" tal	l) and the
three boards (36"L x 11" W x 1	"T). The top step ne	eds replac	cing.		
3. Both Tish Hi-vol monitors do					
- Boar Horrin vor morniore de	Tiot have condition	10010.			

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Exide Pb	_ Initials: EMH	Date: 03/16/23
APC auditor should document in Site Log – time / date / weather conditions/ Arrival Time: 10:30 am Departure Time: 11:25 am Pri		
Observer(s):		
SITE [= Yes • No] -Security Fence [= Yes • No] -Razor/Barb Wire [=	Yes □ No • NA] Grass /S	Shrubs Cut
[□ Yes □ No 🗈 NA] Bare Soil Area [□ Yes □ No 🗈 NA] Vandalism	-[□ Inside / □ Outside]	
Date: [□ Yes □ No] Police Report File	ed	
Issues:		
PLATFORMS: Not Present Condition: Ves No] Good Ves No] Needs Maintenar	nce	
Issues:		
RECORDS AT SITE: Documents available (QAPPs, SOPs) [Yes No] Electro	onic/□ Hardcopy/□Both	
Logbooks at site [■ Yes □ No] ■ Electronic/□ Hardcopy/□Both		
Comments:		

MONITOR(s):

Monitor(s)	Manufacturer	Model	Serial Number
Pb (1)	Tisch	Hi-Vol	NA
Pb (2)	Tisch	Hi-Vol	NA

Location: Exterior Samplers [Roof / Ground / Not Present]

ata loggers/Mode	ems:			
Make	Model	Serial Number	Data logger/Modem	Main/Back
NA	NA	NA	NA	NA
		ot Present ally Grounded [■ Yes □ No] Stabilized [≜ Yes □ No] Cle	ean Inside
- Ves □ Nol Head/Ser	[Yes No] Electrica	ally Grounded [■ Yes □ No	-	
Yes ■ No] Locked Yes □ No] Head/Ser	[Yes No] Electrica	ally Grounded [■ Yes □ No] Stabilized [Yes No] Cle 10 Head Clean Schedule:	

Pollutant	Flow (Hi / Lo)	*Separation Distance (meters)
Pb	Hi	2.3
Pb	Hi	2.3

^{*}Collocated monitors **must be within 4 meters of each other** and at least **2 meters apart** for flow rates **greater than 200 liters/min** or at **least 1 meter apart** for samplers having flow rates **less than 200 liters/min** to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

	Inlet Inlet Location		*Horizontal	*Vertical	Monitoring SCALE	
Pollutant(s)	Height (meters)	(Side of Shelter, Ground, Roof)	Distance (meters) If Applicable	Distance (meters) If Applicable	AQS	Annual Network Plan
Pb	2.0	Ground	2.3		Urban	Urban
Pb	2.0	Ground	2.3		Urban	Urban

FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb)

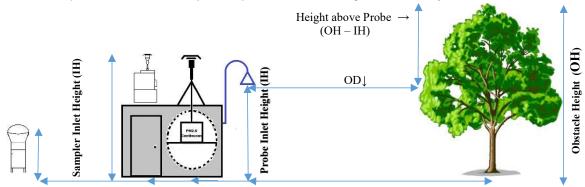
When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

MSEF: Local Site Name: Exide Pb Initials: EMH Date: 03/16/23

Aerial Photo with Wind Rose



Source: Google Earth Pro Imagery Date: _____ OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be \geq [2*(OH-IH)]

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstacle	AZ
1	Tree	4.9	2.0	5.8	5.8	\checkmark	351
2	Tree	6.0	2.0	8.0	50.1		340
3	Trees	14.4	2.0	24.8	44.0		318
4	Trees	13.4	2.0	22.8	33.0		308
5	Trees	17.3	2.0	30.6	20.5	\checkmark	265
6	Trees	14.2	2.0	24.4	25.6	\checkmark	203
7	Trees	13.5	2.0	23.0	25.0	1	131
8	Old Exide Plant	14.4	2.0	24.8	156.0		79
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Nam	_{ie:} Exid	le Pb	Initials: E	EMH	Date: 03/1	6/23
TREE DRIPLINE(s):	5.8	meters (neare	st inlet to dripline)	□ No Trees I	Present	
	20.5	meters (neare	st inlet to dripline)	☐ Not Present		
	25.0	`	st inlet to dripline)			
Should be greater than 20 m	eters from	the dripline of tree(s) a	ind must be 10 me f	ters from the drip	oline when the tree	e(s) act as an obstruction.
Issues:						
Minor Sources:						
• Groundcover, gr		` .	•	,		
• Excessive numb		•		diesel heatir	ng	
Off road diesel g	generatoi	rs near NO_2 or S	O_2 analyzers			
Issues: None						-
Additional Info	ormat	tion:				
Objects # 3 - 7 are	trees (ı	running NW-\	W-SW) are o	n the oppo	osite of Edi	son Circle
across the platform.	. Objec	t # 3 are trees	NW of the 4	shorter p	ines. Obje	ct # 4 are the
four short pines with	nin the	tree row. Ob	ect #5 are th	e pine tre	es between	the 4 shorter
pines and hardwood	ds acro	ss from the pl	atform. Obje	ct # 6 are	the hardwo	ood trees and
Object # 7 are the p	oine tre	es SW of the	hardwoods.			
Objects # 1, 5, 6 ar	nd 7 are	e considered	obstacles.			
The Exide site is Al	PC's or	nly point-sour	ce oriented a	ir monitor	ing site. Th	ne trees
(Object # 5, 6, and	7) are <u>v</u>	within the tree	eline northwe	st-west of	the monitor	ors. These
obstacles fall outsid	de of th	e 180-degree	arc betweer	n the form	er Exide pl	ant and the
lead monitors. There	efore t	he site meets	EPA siting of	criteria.		

MSEF: Local Site Name:

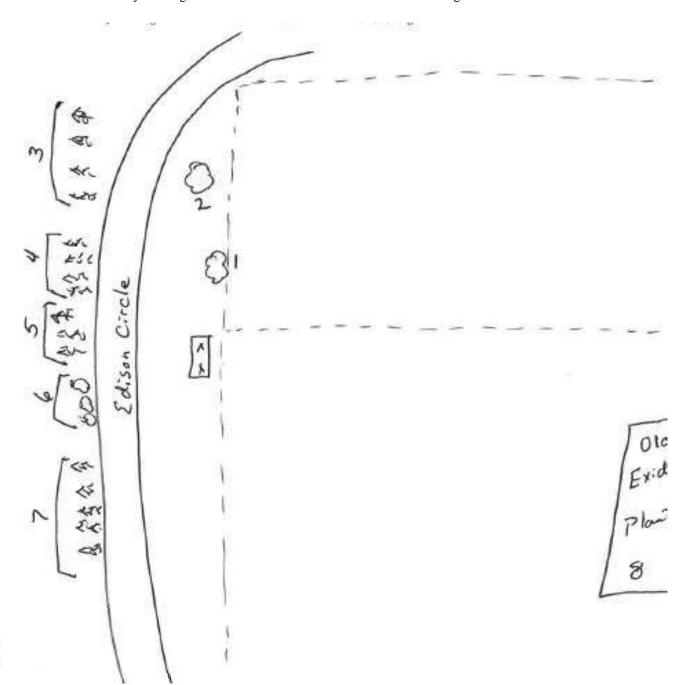
Direction NORTH Primary Wind Dir Security Issues Sloping Areas

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

Monitoring Shelter Probe Position(s) **Exterior Samplers** Met Tower Security Fencing

Nearby Trees/Shrubs Roadways Buildings Walls Other Obstructions

Possible Sources Paved / Unpaved Areas Nearby Construction Flues, Vents, Boilers Meat Cooking



UNRESTRICTED AIR FLOW: 260 **°** Estimated Degrees of Clearance

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Exide Pb Initials: EMH Date: 03/16/23

Camera [APC / Personal – Owner: Minolta MN12Z

Photo: 001 Date: 03/16/23 Time: 11:15 am Photographer: EMH Description: North Directional



Photo: 002 Date: 03/16/23 Time: 11:15 am Photographer: EMH Description: Northeast Directional



Photo: 003 Date: 03/16/23 Time: Photographer: EMH Description: East Directional



Photo: 004 Date: _____ 11:15 am Photographer: _EMH _____ Description: _____ Southeast Directional



Photo: 005 Date: 03/16/23 Time: 11:15 am Photographer: EMH Description: South Diectional



Photo: 006 Date: _____ 11:15 am Photographer: _____ EMH ____ Description: _____ Southwest Directional



Photo: 007 Date: 03/16/23 Time: 11:15 am Photographer: EMH Description: West Directional



Photo: 008 Date: _____ Time: ____ Photographer: EMH ____ Description: Northwest Directional



Photo: 009 Date: 03/16/23 Time: 11:15 am Photographer: EMH Description: Site



Photo: 010 Date: ______ Time: _____ Photographer: _EMH _____ Description: ______ Monitors



Photo: 011 Date: 03/16/23 Time: 11:15 am Photographer: EMH Description: Electric meter



Photo: 012 Date: _____ Time: _____ Photographer: _____ Description:

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

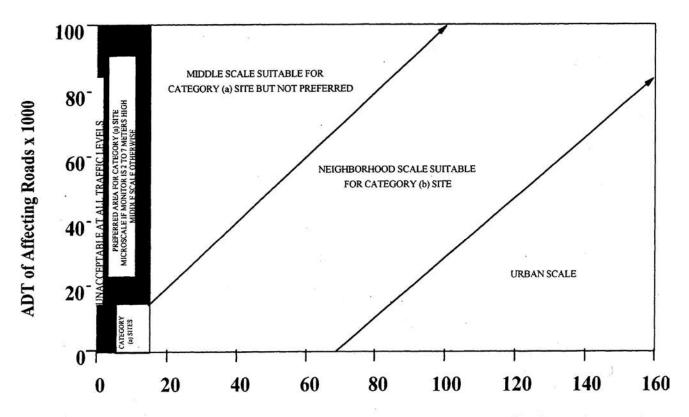


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time						
Flow Rate	1/8" ID	5/32" ID	3/16" ID			
(liters/min)	feet	feet	feet			
0.1	13.8	8.8	6.1			
0.2	27.6	17.7	12.3			
0.3	41.4	26.5	18.4			
0.4	55.3	35.4	24.6			
0.5	69.1	44.2	30.7			
0.6	82.9	53.0	36.8			
0.7	96.7	61.9	43.0			
0.8	110.5	70.7	49.1			
0.9	124.3	79.6	55.3			
1	138.1	88.4	61.4			
1.1	151.9	97.2	67.5			
1.2	165.8	106.1	73.7			
1.3	179.6	114.9	79.8			
1.4	193.4	123.8	85.9			
1.5	207.2	132.6	92.1			
1.6	221.0	141.4	98.2			
1.7	234.8	150.3	104.4			
1.8	248.6	159.1	110.5			
1.9	262.4	168.0	116.6			
2	276.3	176.8	122.8			

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 03/15/2023	Location: Kingsport, Tennessee
Date: US/ 13/2023	Location: Kingsport, Tennessee

AOS Number: 47-163-6001

Site Name: Eastman RNR Pollutants: SO2

Print Name / Signature / Initials / Duties

EMH

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist

Air Monitoring Site Evaluation Summary

Local Site Name: Eastman RNR	Initials:	EMH	Date: 03/15/2023		
Site meets EPA siting criteria:	■ Yes □ No				
If No, explain:					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
Wilbrn Drive	37.5 m	S	Local St	NA	NA
East Center Street	91.0 m	E	Local St	12513	2022
Memorial Boulevard	160.8	S	Local St	6975	2022
Utilities Company: Appalachian E Additional Comments:			Meter #: <u>7</u>	89183326	
 Arrival, departure and photo Shelter temperature was 76 					
3. The vendor for the SO2 cyli	nder is Praxair.				

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Eastman RNR	Initials: EMH	Date: 03/15/23
APC auditor should document in Site Log – time / date / weather cond	litions/purpose of visit / APC staff 1	present [Yes No] Completed
Arrival Time: 3:10 pm Departure Time: 3:45 pm	Primary Operator: Ror	nie Wilhoit
Observer(s):		
SITE		
$ \begin{tabular}{ll} \blacksquare \ Yes \ \square \ No] \ \textbf{-Security Fence} \ \ \blacksquare \ Yes \ \square \ No] \ \textbf{-Razor/Barb With tabular Ves} \\ \end{tabular} $	ire [Yes No NA] Grass/	Shrubs Cut
[□ Yes □ No • NA] Bare Soil Area [□ Yes □ No • NA] Vand	alism – [□ Inside / □ Outside]	
Date: [□ Yes □ No] Police Report	rt Filed	
Issues:		
SHELTER - Not Present		
Interior Arrival Temperature: 23.5 °C (from data logger) Op	erator Site Visits: 1	_ per [□ week □ month □
[□ Yes • No] Leaking Roof [Damaged: □Ceiling / □ Floo	or / 🗆 Walls] [🗗 Yes 🗆 No] (Clean / Neat
[Yes a No] Fire Extinguisher [Yes a No] Insect / Wildl	ife Issues [□ Yes 🗈 No] Gaso	pline (inside shelter)
Issues:		
Exterior Type: [=Freezer / =Wood Building / =Brick-Block / =St Height of Roof: 2.4 meters Roofing N		
[□ Yes ■ No] Needs Maintenance (specify)		
[☐ Yes ☑ No] Tied Down (type)		
[Yes □ No] Electrically Grounded [□ Yes • No] Roof R		
Roof Access: [Stairs / Ladder / Not Present] [Y		Hazard)
PLATFORMS: ■ Not Present Condition: [□ Yes □ No] Good [□ Yes □ No] Needs Main		
Issues:		
RECORDS AT SITE: Documents available (QAPPs, SOPs) [Yes No] E	lectronic/□ Hardcopy/□Both	
Logbooks at site [♠ Yes □ No] □ Electronic/□ Hardcopy/♠ H	Both	
Comments		

MSEF	: Local Site Nan	_{ne:} Eastman	RNR	_ _{Initials:} EMH	Date:	5/15/23
MON	ITOR(s):		Locatio	on: Exterior Sample	rs [□ Roof / □Grou	nd / Not Present
Moni	tor(s)	Manufacture	r Model	Serial Nun	ıber	
	SO2	Teledyne	T100		2262	
CALI	BRATOR(s):	□ Not Present	[■ Yes	□ No] Are QC Che		
QC	Make	Model	Serial Num	ner –	Certification Date	Expiration Date
QC	Teledyr	ne T700	25	597	11/29/22	05/29/23
				on line? [□ Yes ■ N rations [■ Yes □ No] (Required	Precision Checks	
	NDER GAS ST	ANDARDS:	□ Not Presen		, should not be in servic	e and should be replace
QC	Gas Standar	d PSI Reading	Expiration Date	Standard Concentration	Serial	Number
QC	SO2	1650	02/26/24	14.96	JA	.01477
Issues:						

MSEF: L	ocal Site Name: Eas	tman RNR	Initials: EMH	Date: 03/15/2	3
DATA CO	OLLECTION/DOC	UMENTATI	ION:		
Data logge	ers/Modems:				
Make	Mode	l	Serial Number	Data logger/Modem	Main/Backup
R	aven	R55V	2R93610043021016	Modem	Main
Ag	gilaire	8872	515	Datalogger	Main
[■ Yes □ No Zero Air S Carti] Temperature Senso ystem: Commercial S ridge System: [□ Silic	r [□ Yes ■ N ystem (Make / N ea Gel □ Pink /	Internal - Not Present o] Uninterruptable Power S Model): Teledyne T701 (S Blue] / Charcoal / Pura	N 557) fil / Hopcalite / Other	
Issues:				Condition:	
	_		requency: 1/ year La		
-	-	=	es ■ No] Insulated [□ Yes ■ N	No] Moisture [□ Yes ■ No	o] Retractable
] Old / Unused Lines] Any Onen Ports? —	_	Lo Fio Manifold analyzers using manifold?		
OUTDOO [Yes No [Yes No Operator /] Head/Separator Clea	■ Not P D Electrically n dean Schedule:	Present Prounded [□ Yes □ No] State PM 10 H		
	ATED SAMPLERS			(39.4 inches = 1 meter)	
202200	Pollutant		Flow (Hi / Lo)	*Separation Distance (meters)	·

^{*}Collocated monitors **must be within 4 meters of each other** and at least **2 meters apart** for flow rates **greater than 200 liters/min** or at **least 1 meter apart** for samplers having flow rates **less than 200 liters/min** to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

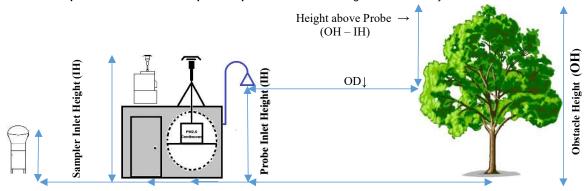
MSEF: Local Site Name: Eastman RNR	Initials: EMH	Date: 03/15/2	3
PROBE SYSTEM(s): External			
Inlet Type: [■ Single Line / □ Dual Line / □ Bell Type	(CAS design)]		
Funnel(s): [■ Rain Shield / □Part of Probe] Funnel	Material : [□Teflon® / ■ Gla	ss / Stainless Steel /	☐ Other:
Probe Line(s): [■ Teflon® / □ Other:] Probe Fitting(s): [Tefle	on® /□ Other:	/ \square Not Present
Residence Time: 5.3 seconds	(20 sec. max	(Refer to chart for max	ximum line lengths)
Issue(s):			

	Inlet Height (meters)	eight (Side of Shelter, Ground,	*Horizontal Distance (meters) If Applicable	*Vertical Distance (meters) If Applicable	Monitoring SCALE		
Pollutant(s)					AQS	Annual Network Plan	
SO2	3.2	Side of Shelter			Urban	Urban	

FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb) When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.



Source: Google Earth Pro Imagery Date: _____ OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be $\geq [2*(OH-IH)]$

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)		tacle	AZ
1	Condos	4.0	3.2	1.6	24.8			357
2	Tree	17.2	3.2	28.0	46.0			53
3	Tree	18.0	3.2	29.6	56.0			58
4	Tree	11.8	3.2	17.2	48.3			69
5	Grey Building	6.8	3.2	7.2	63.0			126
6	Shed	3.3	3.2	0.2	18.2			310
7								
8								
9								
10								
11								
12						Ī		
13								
14								
15								
16								
17						Ī		
18								
19						Ī		
20								

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Nam	ne: Eastr	man RNR	Initials: _	:MH	Date: 03/15/23	
	46.0					
TREE DRIPLINE(s):		meters (nearest i			resent	
	48.3	meters (nearest i	inlet to dripline)	☐ Not Present		
		meters (nearest i	- /			
Should be greater than 20 m	eters from th	ne dripline of tree(s) and	must be 10 met	ters from the drip	line when the tree(s) act as an ob	struction.
Issues:						
Minor Sources:						
• Groundcover, gr	rass, etc p	resent? (especially	for PM sam	olers)		
 Excessive numb 	er of chin	nnies, smoke stacl	s, fireplaces,	diesel heatin	g	
 Off road diesel; 	generators	s near NO ₂ or SO ₂	analyzers			
Issues: None						
Issues:						
Additional Info	ormati	ion:				
The closest tree is	greater	than 20 meter	s from the	probe; the	refore there are no t	tree
dripline issues.				<u>'</u>		
dipilite issues.						

MSEF: Local Site Name: ____Eastman RNR

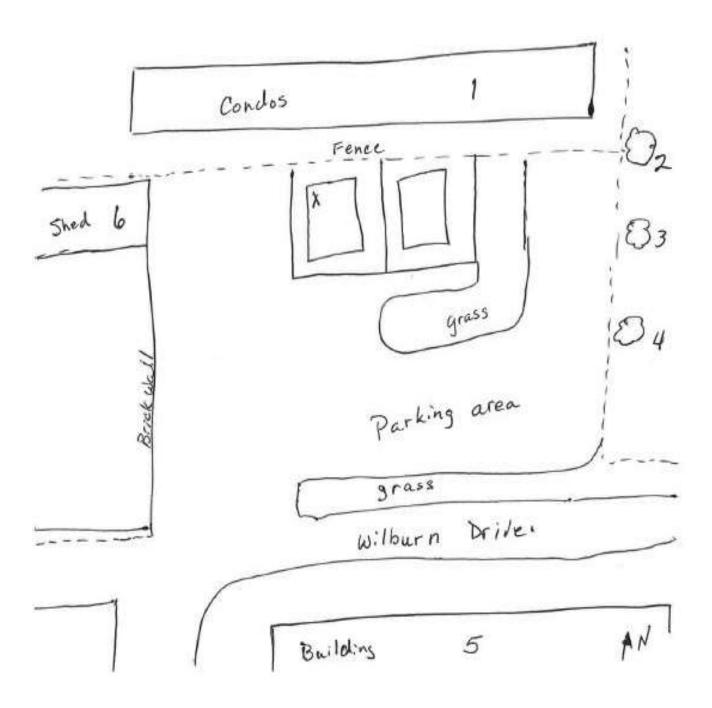
Initials: EMH

Date: 03/15/23

Direction NORTH Primary Wind Dir Security Issues Sloping Areas

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

Monitoring Shelter Nearby Trees/Shrubs Possible Sources Probe Position(s) Roadways Paved / Unpaved Areas **Exterior Samplers** Buildings Nearby Construction Met Tower Walls Flues, Vents, Boilers Security Fencing Other Obstructions Meat Cooking



UNRESTRICTED AIR FLOW: > 270 ° Estimated Degrees of Clearance

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Eastman RNR Initials: EMH Date: 03/15/23

Camera [APC / Personal – Owner: Minolta MN12Z

Photo: 001 Date: 03/15/23 Time: 3:35 pm Photographer: EMH Description: North Directional



Photo: 002 Date: 03/15/23 Time: 3:35 pm Photographer: EMH Description: Northeast Directional



Photo: 003 Date: 03/15/23 Time: 2:35 pm Photographer: EMH Description: East Directional



Photo: 004 Date: 03/15/23 Time: 3:35 pm Photographer: EMH Description: Southeast Directional



Photo: 005 Date: 03/15/23 Time: 3:35 pm Photographer: EMH Description: South Directional



Photo: 006 Date: _____ Time: ____ Photographer: EMH _____ Description: Southwest Directional



Photo: 007 Date: 03/15/23 Time: 3:35 pm Photographer: EMH Description: West Directional

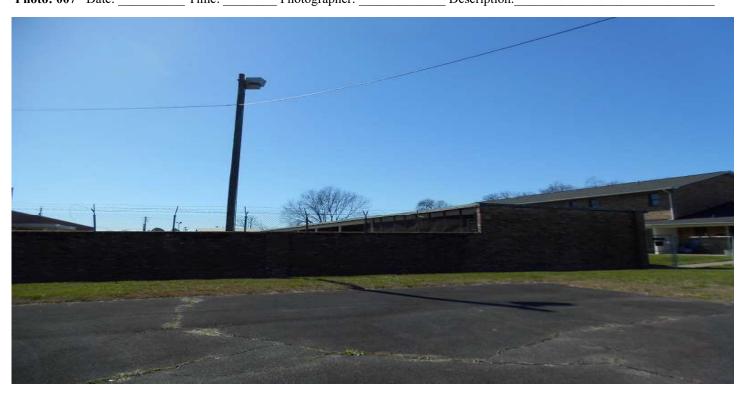


Photo: 008 Date: 03/15/23 Time: 3:35 pm Photographer: EMH Description: Northwest Directional



Photo: 009 Date: O3/15/23 Time: 3:35 pm Photographer: EMH Description: Site



Photo: 010 Date: _____ Time: ____ Photographer: _____ EMH ____ Description: _____ Probe





Photo: 012 Date: _____ Time: _____ Photographer: _____ Description: _____

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

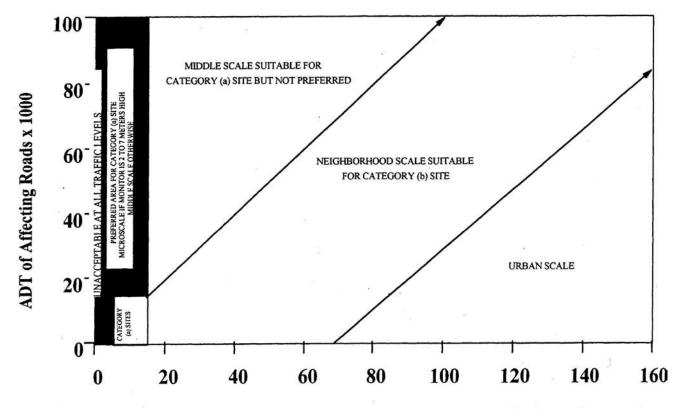


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time				
Flow Rate	1/8" ID	5/32" ID	3/16" ID	
(liters/min)	feet	feet	feet	
0.1	13.8	8.8	6.1	
0.2	27.6	17.7	12.3	
0.3	41.4	26.5	18.4	
0.4	55.3	35.4	24.6	
0.5	69.1	44.2	30.7	
0.6	82.9	53.0	36.8	
0.7	96.7	61.9	43.0	
0.8	110.5	70.7	49.1	
0.9	124.3	79.6	55.3	
1	138.1	88.4	61.4	
1.1	151.9	97.2	67.5	
1.2	165.8	106.1	73.7	
1.3	179.6	114.9	79.8	
1.4	193.4	123.8	85.9	
1.5	207.2	132.6	92.1	
1.6	221.0	141.4	98.2	
1.7	234.8	150.3	104.4	
1.8	248.6	159.1	110.5	
1.9	262.4	168.0	116.6	
2	276.3	176.8	122.8	

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 03/16/2023	Location: Kingsport, Tennessee
400000	

AQS Number: 47-163-6002

Site Name: Eastman Skyland SO2 Pollutants: SO2

Print Name / Signature / Initials / Duties

1: (Team Lead)	Evelyn Haskin	Evelyn Haskin	EMH	Site Specialist	
					_
7 .			EMH		

Air Monitoring Site Evaluation Summary

Local Site Name: Eastman Skyland SO2		Initials:	_ Initials: EMH		Date: 03/16/2023	
Site meets EPA siting criteria:	■ Yes □ No					
If No, explain:						
Tangent Roads						
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year	
Skyland Drive	48.2 m	NW	Local St	NA	NA	
Bagwell Street	25.1 m	S	Local St	NA	NA	
Cooks Valley Road	577.6 m	N	Local St	64	2022	
Memorial Boulevard	943.6 m	N	Local St	9090	2022	
East Line Drive	512.0 m	W	Local St	729	2022	
Electrical	-1 5		-	00404005		
Utilities Company: Appalachian E	electric Power		Meter #: <u>7</u>	83191035		
Additional Comments:						
1. Arrival, departure and photo	times are Eastern ti	me.				
2. Shelter temperature was 72	degrees F (22.2 C).					
3. Shelter is built on concrete to	base.					
4.The vendor for the SO2 cylin	nder is NexAir.					

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Eastman Skyland SO2	Initials: EMH	
APC auditor should document in Site Log – time / date / weather condi	tions/purpose of visit / APC staff p	oresent [Yes No] Completed
Arrival Time: 12:30 pm Departure Time: 1:25 pm	Primary Operator: Ron	Wilhoit
Observer(s):		
SITE		
$ \begin{tabular}{ll} \blacksquare \ Yes \ \square \ No] \ \textbf{-Security Fence} \ \begin{tabular}{ll} \blacksquare \ Yes \ \square \ No] \ \textbf{-Razor/Barb With} \\ \end{tabular} $	re [Yes No • NA] Grass/	Shrubs Cut
$[\ \ \text{Yes} \ \text{No} \ \text{NA}] \textbf{Bare Soil Area} [\ \ \text{Yes} \ \text{No} \ \text{NA}] \textbf{Vanda}$	lism – [□ Inside / □ Outside]	
Date: [□ Yes □ No] Police Repor	t Filed	
Issues:		
SHELTER - Not Present		
Interior Arrival Temperature: 23.3 °C (from data logger) Ope	erator Site Visits: 1	_ per [□ week □ month □
[□ Yes • No] Leaking Roof [Damaged: □Ceiling / □ Floo	r / 🗆 Walls] [🗈 Yes 🗆 No] (Clean / Neat
[Yes • No] Fire Extinguisher [Yes • No] Insect / Wildli	fe Issues [Yes No] Gaso	pline (inside shelter)
Issues:		
Exterior Type: [Freezer / Wood Building / Brick-Block / Steel		
[□ Yes ■ No] Needs Maintenance (specify)		
[☐ Yes ☑ No] Tied Down (type)		
[□ Yes □ No] Electrically Grounded [♠ Yes □ No] Roof Ra		
Roof Access: [Stairs / D Ladder / D Not Present] [Ye	s • No] Loose Decking (Trip	Hazard)
Issues:		
PLATFORMS: ■ Not Present Condition: [□ Yes □ No] Good [□ Yes □ No] Needs Maint	enance	
Issues:		
RECORDS AT SITE: Documents available (QAPPs, SOPs) [Yes No] Ele	ectronic/□ Hardcopy/□Both	
Logbooks at site [♠ Yes □ No] □ Electronic/□ Hardcopy/♠B	oth	
Comments		

MSEF	: Local Site Na	me: Eastman	Skyland SO2	Initials: EMH	Date: 03	/16/23	
MON	ITOR(s):		Locatio	on: Exterior Sample	rs [□ Roof / □Grou	nd / ■ Not Present]	
Moni	tor(s)	Manufacture	er Model Serial Number				
	SO2	Teledyne	T100	9 4300			
CALI	BRATOR(s):	□ Not Present	[■ Yes t	⊐ No] Are QC Che	eck Gases Vented	Outside Shelter?	
QC	Make	Model	Serial Numl	Serial Number		Expiration Date	
QC	Teledy	ne T700	3515		11/16/22	05/15/23	
Is any analyzer sampling shelter air through its calibration line? [Yes No] If yes, photo, document and notify agency mgr. All Gas Standards Pass thru all Filters during: Yes No] Calibrations Yes No] Precision Checks Not Required) Not Required)							
	NDER GAS ST OR:		□ Not Presen), should not be in servic	e and should be replaced	
QC	Gas Standar	rd PSI Reading	Expiration Date	Standard Concentrati	- Serial	Number	
QC	SO2	700	12/27/26	15.5 ppm		016443	
Issues:							

	ame: Eastman Skyland		Date: 03/16/23	3
Data loggers/Moden		JN:		
Make	Model	Serial Number	Data logger/Modem	Main/Backup
Raven	R55V	2R94120251011016	Modem	Main
Agilaire	8872	510	Datalogger	Main
[■ Yes □ No] Temperat		nternal - Not Present Uninterruptable Power Sodel): Teledyne T701 (S		
Cartridge System	m: [Silica Gel Pink /	Date: 09/01/22	fil / □Hopcalite / □Other	
	eplaced / □Cleaned] – Fre		st Service Date: 09/01/	

[□ Yes ■ No] Old / Unused Lines [□ Yes ■ No] Lo Flo Manifold
[Yes • No] Any Open Ports? -> How many analyzers using manifold?
Issues:

[Yes | No] Clean [Yes | No] Heated [Yes | No] Insulated [Yes | No] Moisture [Yes | No] Retractable

OUTDOOR SAMPLERS Not Present

COLLOCATED SAMPLERS: • Not Present

Issue(s): _____

[□ Yes □ No] Locked [□ Yes □ No] Electrically Grounded [□ Yes □ No] Stabilized [□ Yes □ No] Clean Inside [□ Yes □ No] Head/Separator Clean

Operator / Log: VSCC/WINS Clean Schedule: _____ PM 10 Head Clean Schedule: _____

Pollutant	Flow (Hi / Lo)	*Separation Distance (meters)

(39.4 inches = 1 meter)

^{*}Collocated monitors must be within 4 meters of each other and at least 2 meters apart for flow rates greater than 200 liters/min or at least 1 meter apart for samplers having flow rates less than 200 liters/min to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

MSEF: Local Site Name: Eastman Skyland SO	Initials: EMH	Date: 03/16/	⁷ 23
PROBE SYSTEM(s): External □ Not Present Inlet Type: [Single Line / □ Dual Line / □ Bell Type (CA			
Funnel(s): [■ Rain Shield / □Part of Probe] Funnel Ma	aterial: [□Teflon® / 🖥 G	lass / Stainless Steel	/ 🗆 Other:
Probe Line(s): [■ Teflon® / □ Other:] I	Probe Fitting(s): [■ Te	flon [®] /□ Other:	/ Not Present
Residence Time: 16.3 seconds	(20 sec. ma	ax) (Refer to chart for n	naximum line lengths)
Issue(s):			

	Inlet	Inlet Location (Side of Shelter, Ground, Roof)	*Horizontal Distance (meters) If Applicable	*Vertical	Monitoring SCALE		
Pollutant(s)	Height (meters)			Distance (meters) If Applicable	AQS	Annual Network Plan	
SO2	12.0	Tower			Urban	Urban	

FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb) When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

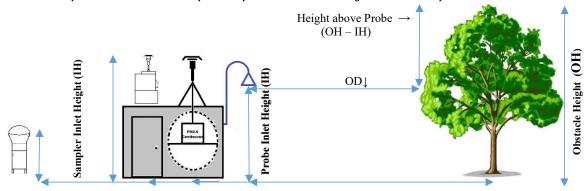
Aerial Photo with Wind Rose



Source: Google Earth Pro

Imagery Date: _____

OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be \geq [2*(OH-IH)]

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstacle	AZ
1	Tree	12.1	12.0	0.2	24.6		243
2	Water Tower	18.8	12.0	13.6	12.1	√	321
3	Trees	12.0	12.0	NA	24.4		11
4	Tree	8.6	12.0	NA	29.0		30
5	Trees	18.6	12.0	13.2	51.0		137
6	Tree	6.9	12.0	NA	23.4		239
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

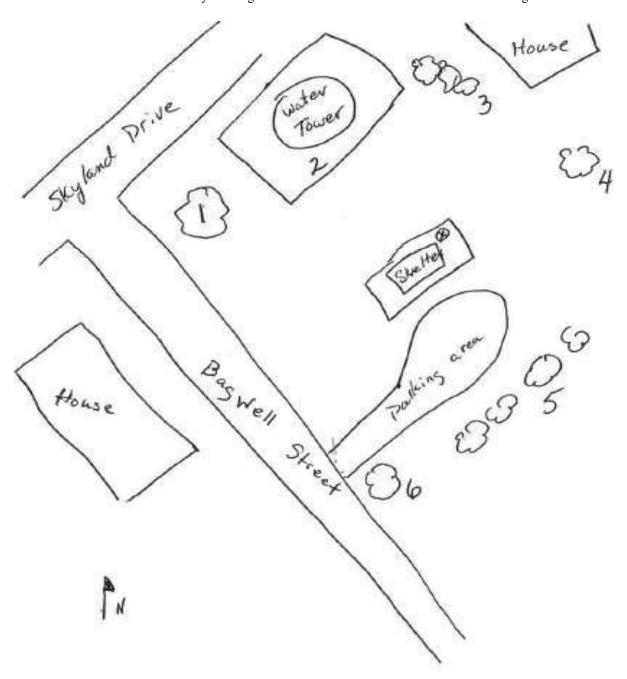
MSEF: Local Site Nam	ne: Eastr	man Skyland SO2 Initials: EMH	Date: 03/16/23
	23.4		
TREE DRIPLINE(s):		meters (nearest inlet to dripline) No Tree	
	24.4 24.6	meters (nearest inlet to dripline) □ Not Prese	
Should be greater than 20 mg		meters (nearest inlet to dripline) □ Not Prese the dripline of tree(s) and must be 10 meters from the	
Siloulu be greater than 20 mi	eters nom u	ne dripline of tree(s) and must be 10 meters from the	unpline when the free(s) act as an obstruction.
Issues:			
Minor Sources:			
	rass, etc p	present? (especially for PM samplers)	
• Excessive numb	er of chir	nnies, smoke stacks, fireplaces, diesel hea	ating
 Off road diesel ; 	generator	s near NO ₂ or SO ₂ analyzers	
Issues: None			
188ues:			
Additional Info	ormat	ion:	
The closest tree is	greater	than 20 meters from the tower; the	nerefore there are no
tree dripline issues			
	•		
Object #2 (Water to	ower) is	considered an obstacle. It falls v	vithin one 90-degree
quadrant, allowing	more th	nan 270 degrees of unrestricted	airflow around the probe.
			· · ·
			_

MSEF: Local Site Name:

Please Indicate: (relevant distance / height measurements)

SITE DRAWING -Direction NORTH Primary Wind Dir Security Issues Sloping Areas

Monitoring Shelter Nearby Trees/Shrubs Possible Sources Probe Position(s) Roadways Paved / Unpaved Areas **Exterior Samplers** Buildings Nearby Construction Met Tower Walls Flues, Vents, Boilers Other Obstructions Security Fencing Meat Cooking



UNRESTRICTED AIR FLOW: > 270 ° Estimated Degrees of Clearance

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Eastman Skyland SO2 Initials: EMH Date: 03/16/23

Camera [APC / Personal – Owner: Minolta MN12Z

Photo: 001 Date: 03/16/23 Time: 1:30 pm Photographer: EMH Description: North Directional



Photo: 002 Date: 03/16/23 Time: 1:30 pm Photographer: EMH Description: Northeast Directional



Photo: 003 Date: 03/16/23 Time: 1:30 pm Photographer: EMH Description: East Directional



Photo: 004 Date: _____ 1:30 pm ____ Photographer: _____ EMH ____ Description: _____ Southeast Directional



Photo: 005 Date: 03/16/23 Time: 1:30 pm Photographer: EMH Description: South Directional



Photo: 006 Date: _____ 1:30 pm ____ Photographer: _____ Description: _____ Southwest Directional



Photo: 007 Date: 03/16/23 Time: 1:30 pm Photographer: EMH Description: West Directional



Photo: 008 Date: _____ 1:30 pm ____ Photographer: _____ EMH ____ Description: _____ Northwest Directional



Photo: 009 Date: O3/16/23 Time: 1:30 pm Photographer: EMH Description: Site

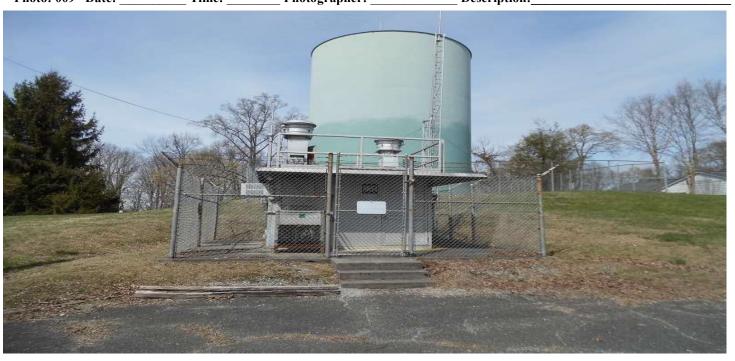


Photo: 010 Date: 03/16/23 Time: 1:30 pm Photographer: EMH Description: Tower



Photo: 011 Date: 03/16/23 Time: 1:30 pm Photographer: EMH Description: Electric meter



Photo: 012 Date: _____ Time: _____ Photographer: _____ Description: _____

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

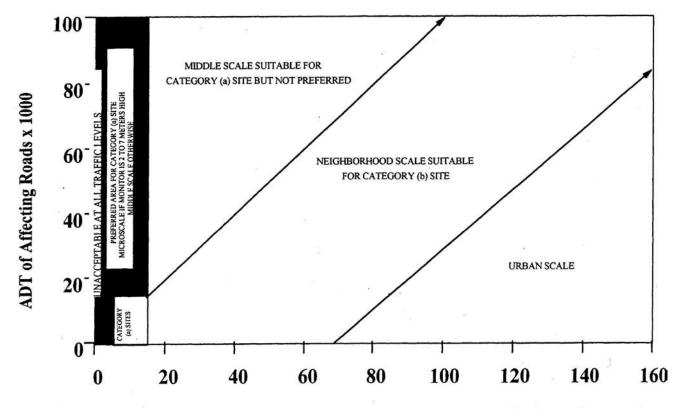


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time							
Flow Rate	1/8" ID	5/32" ID	3/16" ID				
(liters/min)	feet	feet	feet				
0.1	13.8	8.8	6.1				
0.2	27.6	17.7	12.3				
0.3	41.4	26.5	18.4				
0.4	55.3	35.4	24.6				
0.5	69.1	44.2	30.7				
0.6	82.9	53.0	36.8				
0.7	96.7	61.9	43.0				
0.8	110.5	70.7	49.1				
0.9	124.3	79.6	55.3				
1	138.1	88.4	61.4				
1.1	151.9	97.2	67.5				
1.2	165.8	106.1	73.7				
1.3	179.6	114.9	79.8				
1.4	193.4	123.8	85.9				
1.5	207.2	132.6	92.1				
1.6	221.0	141.4	98.2				
1.7	234.8	150.3	104.4				
1.8	248.6	159.1	110.5				
1.9	262.4	168.0	116.6				
2	276.3	176.8	122.8				

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 03/15/2023	Location: Kingsport, Tennessee			
AQS Number: 47-163-6003				
Site Name: Eastman Andrew Johnson SO2	Pollutants: SO2			
Print Name / Signa	ture / Initials / Duties			

EMH Site Specialist

2. EMH

1: (Team Lead) Evelyn Haskin Evelyn Haskin

Air Monitoring Site Evaluation Summary

Local Site Name: Eastman Andrew	Initials:	EMH	Date: 03/15/2023		
Site meets EPA siting criteria:	Yes □ No				
If No, explain:					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
Ormond Drive	289.2 m	N	Local St	NA	NA
East Sevier Avenue	159.0 m	W	Local St	NA	NA
Montrose Street	21.0 m	E	Local St	NA	NA
Bruce Stree	9.0 m	E	Local St	NA	NA
Konnarock Road	388.0 m	S to SW	Local St	3634	2022
North Eastman Road Sherwood Road	510.0 m 280.0 m	N E	Local St Local St	7521 1158	2022
Additional Comments: 1. Arrival, departure and photo ti 2. Shelter temperature was 72 de 3. The fire extinguisher is in good	egrees F (22.2 C).				
4. Shelter is bolted down to ceme					
5. The vendor for the SO2 cylind	er is Praxair.				
6. A weather station is attached					

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Eastman Andrew Johnson SO2 Initials: EMH Date: 03/15/23
APC auditor should document in Site Log – time / date / weather conditions/purpose of visit / APC staff present [♠ Yes □ No] Completed
Arrival Time: 11:45 am Departure Time: 1:15 pm Primary Operator: Matthew Hayes
Observer(s):
SITE [• Yes • No] -Security Fence [• Yes • No] -Razor/Barb Wire [• Yes • No • NA] Grass/Shrubs Cut
[□ Yes □ No ♠ NA] Bare Soil Area [□ Yes □ No ♠ NA] Vandalism – [□ Inside / □ Outside]
Date: [□ Yes □ No] Police Report Filed Issues:
SHELTER - Not Present
Interior Arrival Temperature: 23.1 oC (from data logger) Operator Site Visits: 1 per [week month month
[Yes No] Leaking Roof [Damaged: Ceiling / Floor / Walls] [Yes No] Clean / Neat
[Yes No] Fire Extinguisher Yes No] Insect / Wildlife Issues Yes No] Gasoline (inside shelter)
Issues:
Exterior Type: [¬Freezer / ¬Wood Building / ¬Brick-Block / ¬Steel] Height of Roof: 3.0 meters Roofing Material: Steel with Duro-last single ply membrane
[□ Yes ■ No] Needs Maintenance (specify)
[☐ Yes ☑ No] Tied Down (type)
[Yes □ No] Electrically Grounded [□ Yes No] Roof Railing
Roof Access: [Stairs / Ladder / Not Present] [Yes No] Loose Decking (Trip Hazard)
Issues:
PLATFORMS: ■ Not Present Condition: [□ Yes □ No] Good [□ Yes □ No] Needs Maintenance
Issues:
RECORDS AT SITE: Documents available (QAPPs, SOPs) [♠ Yes □ No] ♠ Electronic/□ Hardcopy/□Both
Logbooks at site [■ Yes □ No] ■ Electronic/□ Hardcopy/□Both
Comments:

MSEF	MSEF: Local Site Name: Eastman Andrew Johnson SO2 Initials: EMH Date: 03/15/23								
MONI	ITOI	R (s):			Locatio	on: Exterior Sample	ers [□ Roof / □Gro	und / □ Not Present]	
Moni	tor(s) [Manufacture	r	Model Serial Number				
	SO	2	Teledyne		T100		2261		
CALI	BRA	TOR(s):	Not Present		[∄ Yes □	□ No] Are QC Ch	eck Gases Vented	d Outside Shelter?	
QC		Make	Model	Sei	Serial Number		Certification Date	Expiration Date	
QC		Teledyne	T700		4153		03/06/23	09/07/23	
All Gas Issues:	Is any analyzer sampling shelter air through its calibration line? [Yes No] If yes, photo, document and notify agency mgr. All Gas Standards Pass thru all Filters during: Yes No] Calibrations Yes No] Precision Checks (Required) Issues: CYLINDER GAS STANDARDS: Not Present VENDOR: (PSI Reading < 200, should not be in service and should be replaced)								
QC	Ga	s Standard	PSI	_	piration	Standard	- Seria	al Number	
QC		SO2	Reading 1450		Date 1/05/23	Concentrat		J13668	
QU		302	1430	1	1/03/23	тэ.э ррпп	J	3 13000	
Issues:							I		

MSEF: Local Site Name: Eastman Andrew Johnson SO2 Initials: EMH	Date: 03/15/23
DATA COLLECTION/DOCUMENTATION:	

Data loggers/Modems:

Make	Model	Serial Number	Data logger/Modem	Main/Backup
Raven	R55V	2R93610083011016	Modem	Main
Datalogger Agilaire		8872 511		Main

SUPPORT	TING INSTRUMENTAT	ION: Internal □ Not Presen	t	
	Temperature Sensor []		·	
Zero Air S	ystem: Commercial System (1	Make / Model): Teledyne T	701 (SN 1349)	
		_	′ □Purafil / □ <mark>Hopcalite</mark> / □Other:	
[□ Ye	s • No] Needs Service Last	Service Date: 06/06/22	Condition:	
Issues:				
Probe Lin	e(s): [≣Replaced / □Cleane	d] – Frequency: 1/ year	Last Service Date: 06/06/22	
[■ Yes □ No]] Clean [■ Yes □ No] Heated	[□ Yes ■ No] Insulated [□	Yes ■ No] Moisture [□ Yes ■ No] Retrac	table
[□ Yes ■ No]	Old / Unused Lines [Ve	s • No] Lo Flo Manifold		
[□ Yes • No	Any Open Ports? -> How	many analyzers using man	ifold?	
Issues:				
		■ Not Present trically Grounded [□ Yes [□ No] Stabilized [□ Yes □ No] Clean Insid	le
[□ Yes □ No] Head/Separator Clean			
Operator /	Log: VSCC/WINS Clean Sch	edule:	PM ₁₀ Head Clean Schedule:	
Issue(s):				
COLLOC	ATED SAMPLERS:	Not Present	(39.4 inches = 1 meter)	
	Pollutant	Flow (Hi / Lo)	*Separation Distance (meters)	

^{*}Collocated monitors **must be within 4 meters of each other** and at least **2 meters apart** for flow rates **greater than 200 liters/min** or at **least 1 meter apart** for samplers having flow rates **less than 200 liters/min** to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

MSEF: Local Site Name: Eastman Andrew Jo	Initials: EMH	Date: 03/15/	23
PROBE SYSTEM(s): External □ Not I Inlet Type: [Single Line / □ Dual Line / □ Bell T	Present [ype (CAS design)]		
Funnel(s): [■ Rain Shield / □Part of Probe] Fur	nnel Material: [□Teflon® / 🖥 C	Glass / Stainless Steel	/ □ Other:
Probe Line(s): [■ Teflon® / □ Other:	Probe Fitting(s): [Tell Tell Tell Tell Tell Tell Tell Te	eflon [®] /□ Other:	/ Not Present
Residence Time: 5.9 seconds	(20 sec. m	nax) (Refer to chart for m	naximum line lengths)
Issue(s):			

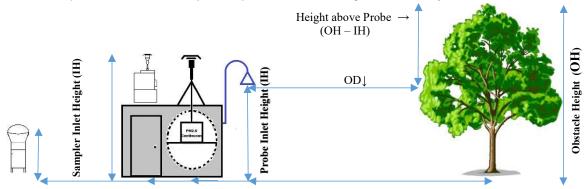
Inle	Inlet Inlet Location		*Horizontal	*Vertical	Monitorin	ring SCALE	
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)	Ground, Distance (meters)	(meters)	Distance (meters) If Applicable	AQS	Annual Network Plan
SO2	4.8	Side of Shelter			Urban	Urban	

FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb) When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

Source: Google Earth Pro

Imagery Date: _____

OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be \geq [2*(OH-IH)]

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstacle	AZ
1	School	5.3	4.8	1.0	146.0		343
2	Trees	25.6	4.8	41.6	145.0		333
3	Tree	24.6	4.8	39.6	125.0		335
4	Trees	24.8	4.8	40.0	125.0		359
5	Trees	20.1	4.8	30.6	100.0		5
6	Tree	20.4	4.8	31.2	59.6		9
7	Tree	20.0	4.8	30.4	68.0		49
8	Tree	20.0	4.8	30.4	26.3	√	165
9	Tree	20.8	4.8	32.0	43.0		187
10	Trees	22.8	4.8	36.0	52.0		194
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Nan	ne: Eastma	nan Andrew Johnson SO2 Initials: EMH Date: 03/15/23
	26.0	
TREE DRIPLINE(s):		meters (nearest inlet to dripline) No Trees Present
	43.0	meters (nearest inlet to dripline) □ Not Present
	52.0	meters (nearest inlet to dripline) Not Present
Should be greater than 20 m	eters from t	the dripline of tree(s) and must be 10 meters from the dripline when the tree(s) act as an obstru
Issues:		
Minor Sources:		
 Groundcover, g 	rass, etc p	present? (especially for PM samplers)
 Excessive number 	er of chir	mnies, smoke stacks, fireplaces, diesel heating
 Off road diesel 	generator	rs near NO ₂ or SO ₂ analyzers
Issues: None		
issues:		
Additional Info	ormat	tion:
		than 20 meters from probe; therefore there are no tree
dripline issues.	-	
<u> </u>		
Object #8 (Tree) is	consid	dered an obstacle. The tree falls within one 90 degree
quadrant allowing	more tl	than 270 degrees of unrestricted airflow around the prob
quadrant, anoving	111010 ti	That 27 0 dogrood of announced annow around the prob

EMH

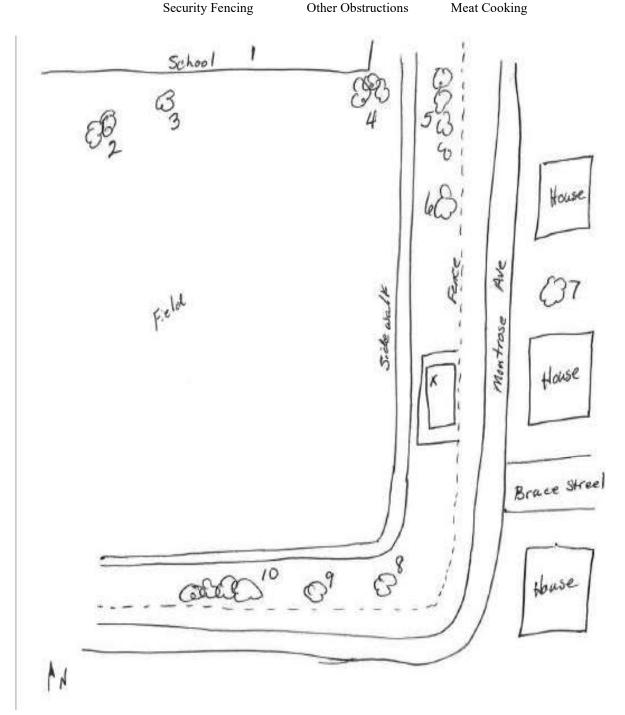
Initials:

Date: _ 03/15/23

MSEF: Local Site Name:

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

Direction NORTH Primary Wind Dir Security Issues Sloping Areas Monitoring Shelter Probe Position(s) Exterior Samplers Met Tower Nearby Trees/Shrubs Roadways Buildings Walls Other Obstructions Possible Sources
Paved / Unpaved Areas
Nearby Construction
Flues, Vents, Boilers
Meat Cooking



UNRESTRICTED AIR FLOW: > 270° Estimated Degrees of Clearance

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Eastman Andrew Johnson SO2 Initials: EMH Date: 03/15/23

Camera [APC / Personal – Owner: Minolta MN12Z

Photo: 001 Date: 03/15/23 Time: 1:05 pm Photographer: EMH Description: North Directional



Photo: 002 Date: 03/15/23 Time: 1:05 pm Photographer: EMH Description: Northeast Directional





____Southeast Directional Photo: 004 Date: _____ Time: _____ Photographer: _____





Photo: 006 Date: 03/15/23 Time: 1:05 pm Photographer: EMH Description: Southwest Directional



Photo: 007 Date: 03/15/23 Time: 1:05 pm Photographer: EMH Description: West Directional



Photo: 008 Date: _____ Time: ____ Photographer: _EMH ____ Description: ____Northwest Directional



Photo: 009 Date: 03/15/23 Time: 1:05 pm Photographer: EMH Description: Site Directional



Photo: 010 Date: _____ Time: ____ Photographer: _EMH ____ Description: _Probe



Photo: 011 Date: 03/15/23 Time: 1:05 pm Photographer: EMH Description: Electric meter



Photo: 012 Date: _____ Time: _____ Photographer: _____ Description: _____

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

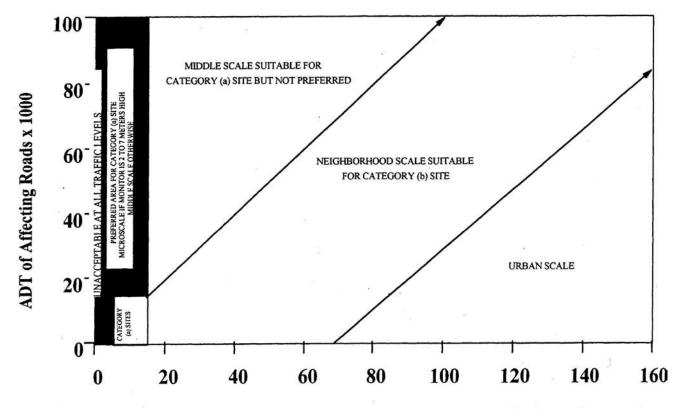


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time						
Flow Rate	1/8" ID	5/32" ID	3/16" ID			
(liters/min)	feet	feet	feet			
0.1	13.8	8.8	6.1			
0.2	27.6	17.7	12.3			
0.3	41.4	26.5	18.4			
0.4	55.3	35.4	24.6			
0.5	69.1	44.2	30.7			
0.6	82.9	53.0	36.8			
0.7	96.7	61.9	43.0			
0.8	110.5	70.7	49.1			
0.9	124.3	79.6	55.3			
1	138.1	88.4	61.4			
1.1	151.9	97.2	67.5			
1.2	165.8	106.1	73.7			
1.3	179.6	114.9	79.8			
1.4	193.4	123.8	85.9			
1.5	207.2	132.6	92.1			
1.6	221.0	141.4	98.2			
1.7	234.8	150.3	104.4			
1.8	248.6	159.1	110.5			
1.9	262.4	168.0	116.6			
2	276.3	176.8	122.8			

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 03/15/2023	Location: Kingsport, Tennessee

AQS Number: 47-163-6004

Site Name: Eastman Happy Hill SO2 Pollutants: SO2

Print Name / Signature / Initials / Duties

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist

2:____EMH

Air Monitoring Site Evaluation Summary

Local Site Name: Eastman Happy Hill SO2		Initials: EMH		Date: 03/15/2023	
Site meets EPA siting criteria: ■ Ye	s 🗆 No				
If No, explain:					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
Happy Hill Road	22.6 m	NE	Local St	NA	NA
South Eastman Road	648.0 m	NW	Local St	525	2022
Mooreland Road	168.0 m	N	Local St	480	2022
Electrical Utilities Company: Appalachian Elect	ric Power		Meter #: 7	83184544	
Additional Comments:					
1. Arrival, departure and photo tim	es are Eastern ti	me.			
2. Shelter temperature was 71 deg	gree F (21.3 C)				
3. Fire extinguisher is in good con-					
4. Shelter is bolted to cement pad.					
5. The vendor of the SO2 cylinder					
6. A weather station is located on	roor or sheller.				

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Eastman Happy Hill SO2	Initials: EMH	Date: 03/15/23
APC auditor should document in Site Log – time / date / weather cond	ditions/purpose of visit / APC staff p	oresent [Yes No] Completed
Arrival Time: 10:45 am Departure Time: 11:40 am	Primary Operator: Mat	thew Hayes
Observer(s):		
SITE [Yes No] -Security Fence [Yes No] -Razor/Barb W	ire [≞ Yes □ No □ NA] Grass /	Shrubs Cut
[□ Yes □ No ♠ NA] Bare Soil Area [□ Yes □ No ♠ NA] Vand	alism – [□ Inside / □ Outside]	
Date: [□ Yes □ No] Police Repo		
SHELTER - Not Present		
Interior Arrival Temperature: 23.3 °C (from data logger) Op	perator Site Visits: 1	_ per [ੈ week □ month □
$[\ \square \ Yes \ \blacksquare \ No] \ Leaking \ Roof [Damaged: \ \square Ceiling \ / \ \square \ Flo$	or / □ Walls] [Clean / Neat
$[\begin{tabular}{ll} \blacksquare \ Yes \ \Box \ No \end{tabular}]$ Fire Extinguisher $[\ \Box \ Yes \ \boxdot \ No \end{tabular}]$ Insect / Wildle	ife Issues [□ Yes ੈ No] Gaso	oline (inside shelter)
Issues:		
Exterior Type: [=Freezer / =Wood Building / =Brick-Block / =S Height of Roof: 3.0 meters Roofing B		last single ply membrane
☐ Yes ■ No] Needs Maintenance (specify)		
[☐ Yes ☑ No] Tied Down (type)		
[■ Yes □ No] Electrically Grounded [□ Yes ■ No] Roof R		
Roof Access: [Stairs / Ladder / Not Present] [Y	es • No] Loose Decking (Trip	Hazard)
Issues:		
PLATFORMS: ■ Not Present Condition: [□ Yes □ No] Good [□ Yes □ No] Needs Main	itenance	
Issues:		
RECORDS AT SITE: Documents available (QAPPs, SOPs) [Yes No]	lectronic/□ Hardcopy/□Both	
Logbooks at site [♠ Yes □ No] □ Electronic/□ Hardcopy/♠	Both	
Comments		

MSEF:	: Local Site Nan	ne: Eastman H	appy Hill SO2	Initials: EMH	Date: 03	/15/23		
MONI	TOR(s):		Locatio	on: Exterior Sample	rs [□ Roof / □Grou	nd / • Not Present]		
Monit	tor(s)	Manufacture	r Model	Serial Nun	nber			
	SO2	Teledyne	T100	3211				
		□ Not Present		□ No] Are QC Che	eck Gases Vented Certification	Outside Shelter?		
QC	Make	Model	Serial Num	ner	Date	Date		
QC	Teledyn	e T700	35	514	03/08/23	09/07/23		
·	•			on line? [□ Yes ■ N rations [■ Yes □ No (Required	Precision Checks			
_	NDER GAS STA		□ Not Presen), should not be in servic	e and should be replac		
QC	Gas Standar	d PSI Reading	Expiration Date	Standard Concentration	- Serial	Number		
QC	SO2	1550	02/26/24	14.88		01465		
ssues:								

	ame: Eastman Happ ON/DOCUMENTAT	by Hill SO2 Initials: EMH	Date: 03/15/23	3
Data loggers/Moder				
Make	Model	Serial Number	Data logger/Modem	Main/Backup
Raven	R55V	2R9361026911016	Modem	Main
Agilaire	8872	494	Datalogger	Main
SUPPORTING INS	TRUMENTATION:	Internal □ Not Present		
	-	No] Uninterruptable Power S Model): Teledyne T701 (S	110	
			NI 055\	

- ·	_	□Purafil / □Hopcalite / □Other:	
[Yes • No] Needs Service La	st Service Date: U8/31/22	Condition:	
Issues:			
Probe Line(s): [■Replaced / □Clea	nned] – Frequency: 1/ year	Last Service Date: 08/31/22	
[■ Yes □ No] Clean [■ Yes □ No] Hea	ted [Yes No] Insulated [To Yes Mo]	Yes ■ No] Moisture [□ Yes ■ No] Retra	ctable
[□ Yes ■ No] Old / Unused Lines [□	Yes • No] Lo Flo Manifold		
[□ Yes • No] Any Open Ports? -> H	ow many analyzers using mani	fold?	
Issues:			
OUTDOOR SAMPLERS [Yes No] Locked Yes No] E		No] Stabilized [□ Yes □ No] Clean Insi d	de
[□ Yes □ No] Head/Separator Clean			
Operator / Log: VSCC/WINS Clean	Schedule: I	PM ₁₀ Head Clean Schedule:	
Issue(s):			
COLLOCATED SAMPLERS:	■ Not Present	(39.4 inches = 1 meter)	
Pollutant	Flow	*Separation Distance	

^{*}Collocated monitors **must be within 4 meters of each other** and at least **2 meters apart** for flow rates **greater than 200 liters/min** or at **least 1 meter apart** for samplers having flow rates **less than 200 liters/min** to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

MSEF: Local Site Name: Eastman Happy	y Hill SO2 Initials: EMH	Date: 03/15/	723
PROBE SYSTEM(s): External □ Not Inlet Type: [♣ Single Line / □ Dual Line / □ Bell T	Present Type (CAS design)]		
Funnel(s): [■ Rain Shield / □Part of Probe] Fu	nnel Material: [□Teflon® / 🖥 C	Glass / □ Stainless Steel	/ Other:
Probe Line(s) : [■ Teflon® / □ Other:	Probe Fitting(s): [Te	eflon [®] /□ Other:	/ Not Present
Residence Time: 15.0 seconds	(20 sec. m	ax) (Refer to chart for n	naximum line lengths)
Issue(s):			

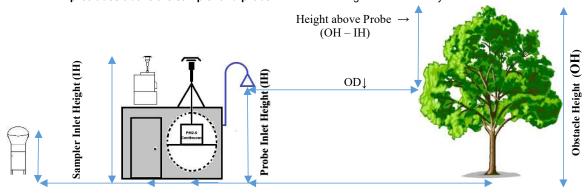
	Inlet	Inlet I coeffor	*Horizontal	*Vertical	Monitorin	ng SCALE
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)	Distance (meters) If Applicable	Distance (meters) If Applicable	AQS	Annual Network Plan
SO2	11.0	Tower			Urban	Urban

FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb) When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

Aerial Photo with Wind Rose



Source: Google Earth Pro Imagery Date: _____ OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be \geq [2*(OH-IH)]

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Ob	stac	le	AZ
1	House	5.4	11.0	NA	49.0				29
2	Trees	20.8	11.0	19.6	66.0				33
3	Tree	20.8	11.0	19.6	71.4				27
4	Tree	20.3	11.0	18.6	66.0				21
5	Tree	11.7	11.0	1.4	49.8				8
6	Tree	12.0	11.0	2.0	30.8				11
7	Tree	12.2	11.0	2.4	20.8				355
8	Tree	19.6	11.0	17.2	29.0				340
9	Tree	19.6	11.0	17.2	24.0				329
10	Barn	5.2	11.0	NA	12.0				50
11	Trees	12.7	11.0	3.4	36.0				66
12	Trees	15.0	11.0	8.0	37.0				140
13									
14									
15									
16									
17									
18									
19							Τ	1	
20									

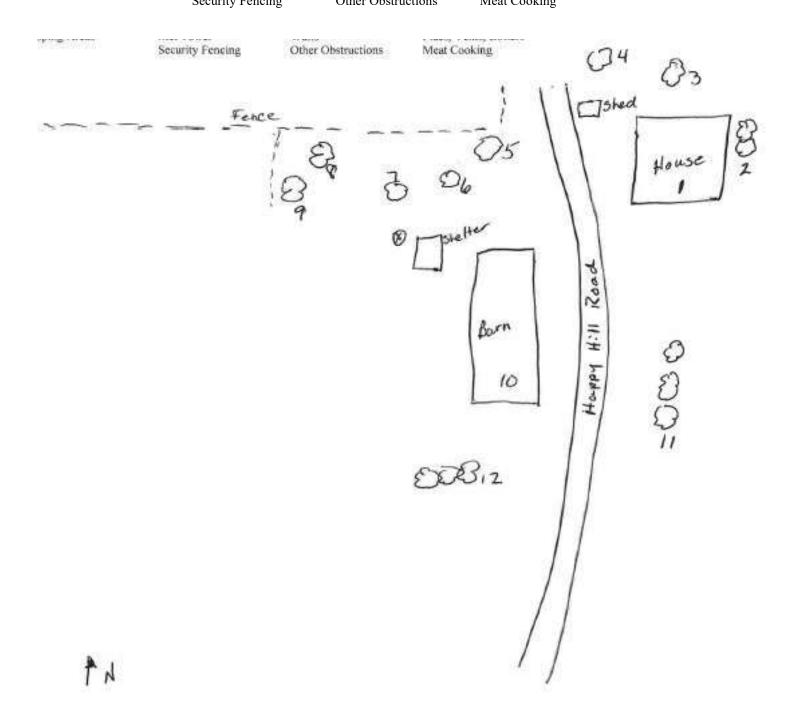
AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Name: Eastman Happy Hill SO2 Initials: EMH Date: 03/15/23	
10.0	
TREE DRIPLINE(s): 19.0 meters (nearest inlet to dripline) No Trees Present	
meters (nearest inlet to dripline) □ Not Present	
meters (nearest inlet to dripline) □ Not Present Should be greater than 20 meters from the dripline of tree(s) and must be 10 meters from the dripline when the tree(s) act as an o	hstruction
	boti dotion.
Issues:	
Minor Sources:	
• Groundcover, grass, etc present? (especially for PM samplers)	
 Excessive number of chimnies, smoke stacks, fireplaces, diesel heating 	
 Off road diesel generators near NO₂ or SO₂ analyzers 	
Issues: None	
Additional Information:	
The closest tree is 20.8 meters from tower with a tree dripline of 19.0 meters. The	
tree is not considered an obstacle.	

MSEF: Local Site Name:

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

Direction NORTH Primary Wind Dir Security Issues Sloping Areas Monitoring Shelter Nearby Trees/Shrubs Possible Sources
Probe Position(s) Roadways Paved / Unpaved Areas
Exterior Samplers Buildings Nearby Construction
Met Tower Walls Flues, Vents, Boilers
Security Fencing Other Obstructions Meat Cooking



Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Eastman Happy Hill SO2 Initials: EMH Date: 03/15/23

Camera [APC / Personal – Owner: Minolta MN12Z

Photo: 001 Date: 03/15/23 Time: 11:30 am Photographer: EMH Description: North Directional



Photo: 002 Date: 03/15/23 Time: 11:30 am Photographer: EMH Description: Northeast Directional



Photo: 003 Date: O3/15/23 Time: 11:30 am Photographer: EMH Description: East Directional





Photo: 005 Date: ______ Time: _____ Photographer: _EMH _____ Description: _South Directional



Photo: 006 Date: 03/15/23 Time: 11:30 am Photographer: EMH Description: Southwest Directional



Photo: 007 Date: _____ 11:30 am Photographer: _EMH _____ Description: _West Directional



Photo: 008 Date: _____ Time: ____ Photographer: EMH _____ Description: _____ Northwest Directional



Photo: 009 Date: O3/15/23 Time: Photographer: EMH Description: Site



Photo: 010 Date: 03/15/23 Time: 11:30 am Photographer: EMH Description: Shelter and tower



Photo: 011 Date: 03/15/23 Time: 11:30 am Photographer: EMH Description: Electric meter



Photo: 012 Date: _____ Time: _____ Photographer: _____ Description: _____

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

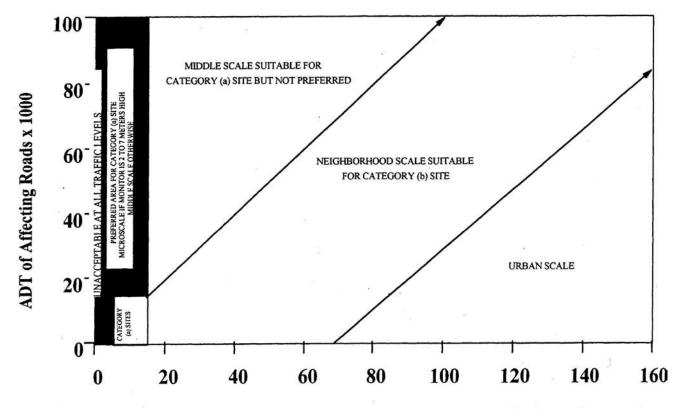


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time						
Flow Rate	1/8" ID	5/32" ID	3/16" ID			
(liters/min)	feet	feet	feet			
0.1	13.8	8.8	6.1			
0.2	27.6	17.7	12.3			
0.3	41.4	26.5	18.4			
0.4	55.3	35.4	24.6			
0.5	69.1	44.2	30.7			
0.6	82.9	53.0	36.8			
0.7	96.7	61.9	43.0			
0.8	110.5	70.7	49.1			
0.9	124.3	79.6	55.3			
1	138.1	88.4	61.4			
1.1	151.9	97.2	67.5			
1.2	165.8	106.1	73.7			
1.3	179.6	114.9	79.8			
1.4	193.4	123.8	85.9			
1.5	207.2	132.6	92.1			
1.6	221.0	141.4	98.2			
1.7	234.8	150.3	104.4			
1.8	248.6	159.1	110.5			
1.9	262.4	168.0	116.6			
2	276.3	176.8	122.8			

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 01/05/2023 Loc	ation: Hendersonville,	Tennessee

AQS Number: 47-165-0007

Site Name: Hendersonville Pollutants: 03, PM2.5

Print Name / Signature / Initials / Duties

1: (Team Lead)	Evelyn Haskin	Evelyn Haskin	EMH	Site Specialist	
7 .			EMH		

Air Monitoring Site Evaluation Summary

Local Site Name: Hendersonville		Initials:	EMH	Date: 01/05/2023		
Site meets EPA siting criteria:	s 🗆 No					
If No, explain:						
Tangent Roads						
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year	
Overlook Circle	68.5 m	N	Local St	NA	NA	
Power Plant Road	255.0 m	NW	Local St	NA	NA	
Rockland Road	607.5 m	N	Local St	9590	2022	
Electrical Utilities Company: Nashville Electric	System		Meter #: _3	34974		
Additional Comments:						
1. Arrival, departure and photo tim	es are Central ti	me.				
2. Ken Cooper is the O3 operator a	and John Helton	is the PM	operator.			
3. Fire extinguisher is in good cond	dition (Nov 2018)).				
4. Site is located within the fenced	I-in area of the L	IS Corp of	Engineers.			
5. Detached stairs are located on t	he east side of t	he shelter.				
6. The site is one with a multi-pollu	tant experiment	al sensor to	ower and a v	weather st	ation.	
7. The inside shelter temperature v	vas 74 degrees	F (23.3 de	grees C).			
8. 1-5-23 site evaluation conducted	d prior to set-up	for 2023 oz	zone season).		
9. Site set up for O3 season on 2/2	15/23.					
10. Platform - 14 boards (84' L x 6	" W x 1" T); platf	orm needs	replacing.			

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Hendersonville	Initials: EMH	Date: 01/05/23
APC auditor should document in Site Log – time / date / weath	ner conditions/purpose of visit / APC staff	present [■ Yes □ No] Completed
Arrival Time: 1:05 pm Departure Time: 2:15	pm Primary Operator: Ker	n Cooper/John Helton
Observer(s):		
SITE [Yes No] -Security Fence Yes No] -Razor/Ba	rb Wire [≞ Yes □ No □ NA] Grass,	/Shrubs Cut
[Yes No NA] Bare Soil Area [Yes No NA]	Vandalism – [□ Inside / □ Outside	.]
Date: [Yes No] Police Issues: Arrival temperature taken 2/15/23	Report Filed	
SHELTER - Not Present		
Interior Arrival Temperature: 22.5 °C (from data logger)	Operator Site Visits: 1	_ per [□ week □ month □
[□ Yes • No] Leaking Roof [Damaged: □Ceiling /	□ Floor / □ Walls] [• Yes □ No]	Clean / Neat
[Yes No] Fire Extinguisher [Yes No] Insect / Yes Arrival temperature taken 2/15/23	Wildlife Issues [□ Yes 🗗 No] Gas	oline (inside shelter)
Exterior Type: [¬Freezer / ¬Wood Building / ¬Brick-Block Height of Roof: 3.0 meters Roo	k / ®Steel] fing Material: Steel w/ Duro-	last single ply membrane
Yes ■ No] Needs Maintenance (specify)		
[☐ Yes ☐ No] Tied Down (type) Bolted to cement p	pad	
[♠ Yes □ No] Electrically Grounded [□ Yes ♠ No] R	oof Railing	
Roof Access: [♠ Stairs / □ Ladder / □ Not Present] Issues:	□ Yes • No] Loose Decking (Trip	Hazard)
PLATFORMS: □ Not Present Condition: [□ Yes ♠ No] Good	Maintenance	
Issues: Boards dried and cracked, need repl	acing	
RECORDS AT SITE: Documents available (QAPPs, SOPs) [Yes No]	■ Electronic/□ Hardcopy/□Both	l
Logbooks at site [♠ Yes □ No] □ Electronic/□ Hardco	ppy/•Both	
Comments. Hardcopy logbooks for PM monit	tors on site	

10N	ITOR(s):		Location	: Exterior Samplers	[□ Roof / ■ Groun	nd / □ Not Preser
		Manufacture		Serial Num		
	03	Teledyne	T400		4512	
PΝ	12.5 (BAM)	Met One	BAM 1022	T17005		
PM	2.5 (2025-i)	Teledyne	2025-i	2	0251W2123017	08
ALI	BRATOR(s):	□ Not Present	[Yes -]	No] Are QC Chec	k Gases Vented	Outside Shelter
QC	Make	Model	Serial Number	er	Certification Oate	Expiration Date
QC	Teledyn	e T703	326		02/10/23	08/10/23
			320	,	02/10/23	06/10/23
			320		02/10/23	06/10/23
ll Gas	analyzer samplin	g shelter air thro	ugh its calibration ■ Yes □ No] Calibrat Not Required)	line? [□ Yes ■ No]	If yes, photo, docume	nt and notify agency n
ll Gas	analyzer samplin Standards Pass thru NDER GAS ST	g shelter air thro all Filters during: [ugh its calibration ■ Yes □ No] Calibrat	line? [Yes No] tions [Yes No] I (Required)	If yes, photo, docume	nt and notify agency n [■ Yes □ No] Au (Required)
ll Gas sues: YLI	analyzer samplin Standards Pass thru NDER GAS ST	g shelter air thro all Filters during: [ANDARDS:	ugh its calibration ■ Yes □ No] Calibrat Not Required)	line? [Yes No] tions [Yes No] I (Required)	If yes, photo, docume Precision Checks	nt and notify agency n [■ Yes □ No] Au (Required)

		•	•

MSEF:	Local Site Name:	Hendersonville	Initials: EMH	Date: 01/05/23
-------	------------------	----------------	---------------	----------------

DATA COLLECTION/DOCUMENTATION:

Data loggers/Modems:

Make Model		Serial Number	Data logger/Modem	Main/Backup	
Raven	R55V	2R94120103021016	Modem	Main	
Agailaire	8872	534	Datalogger	Main	

SUPPORTING INSTRUMENTATION: Internal - Not Present
[□ Yes □ No] Temperature Sensor [□ Yes ■ No] Uninterruptable Power Supply
Zero Air System: Commercial System (Make / Model): Teledyne T701 (SN: 1347)
Cartridge System: [Silica Gel Pink / Blue] / Charcoal / Purafil / Hopcalite / Other:
[Yes No] Needs Service Last Service Date: 02/15/23 Condition:
Issues:
Probe Line(s): [■Replaced / □Cleaned] – Frequency: 1/year Last Service Date: 02/15/23
[■ Yes □ No] Clean [■ Yes □ No] Heated [□ Yes ■ No] Insulated [□ Yes ■ No] Moisture [□ Yes ■ No] Retractable
[□ Yes ■ No] Old / Unused Lines [□ Yes ■ No] Lo Flo Manifold
[□ Yes • No] Any Open Ports? -> How many analyzers using manifold?
Issues:
OUTDOOR SAMPLERS
[■ Yes □ No] Head/Separator Clean
Operator / Log: VSCC/WINS Clean Schedule: 1/30 days PM ₁₀ Head Clean Schedule: 1/30 days
Issue(s):

COLLOCATED SAMPLERS: Dot Present (39.4 inches = 1 meter)

Pollutant	Flow (Hi / Lo)	*Separation Distance (meters)
PM 2.5	Lo	1.8
PM 2.5	Lo	1.8

^{*}Collocated monitors **must be within 4 meters of each other** and at least **2 meters apart** for flow rates **greater than 200 liters/min** or at **least 1 meter apart** for samplers having flow rates **less than 200 liters/min** to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

MSEF: Local Site Name: Hendersonville	_Initials: EMH	Date: 01/05/2	.3
PROBE SYSTEM(s): External □ Not Present			
Inlet Type: [≜ Single Line / □ Dual Line / □ Bell Type (CAS d	lesign)]		
Funnel(s): [■ Rain Shield / □Part of Probe] Funnel Mate	erial: [□Teflon® / 🖥 Gla	ss / Stainless Steel /	□ Other:
Probe Line(s): [Teflon® / Other: Probe Line(s): [Teflon® / Other: Probe Line(s): Probe Lin	obe Fitting(s): [Tefl	on [®] /□ Other:	/ \square Not Present
Residence Time: 6.0 secs	(20 sec. max) (Refer to chart for ma	ximum line lengths)
Issue(s).			

	Inlet	Inlet Leastion	*Horizontal	*Vertical	Monitorin	ng SCALE
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof) Distance (meters) If Applicable	Distance (meters) If Applicable	AQS	Annual Network Plan	
O3	4.2	Side of Shelter	7.9		Urban	Urban
PM2.5 (BAM)	2.6	Ground	1.8		Urban	Urban
PM 2.5 (2025-i)	2.6	Ground	1.8		Urban	Urban

FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb) When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

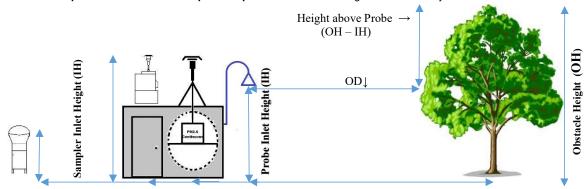
Aerial Photo with Wind Rose



Source: Google Earth Pro

Imagery Date: _____

OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

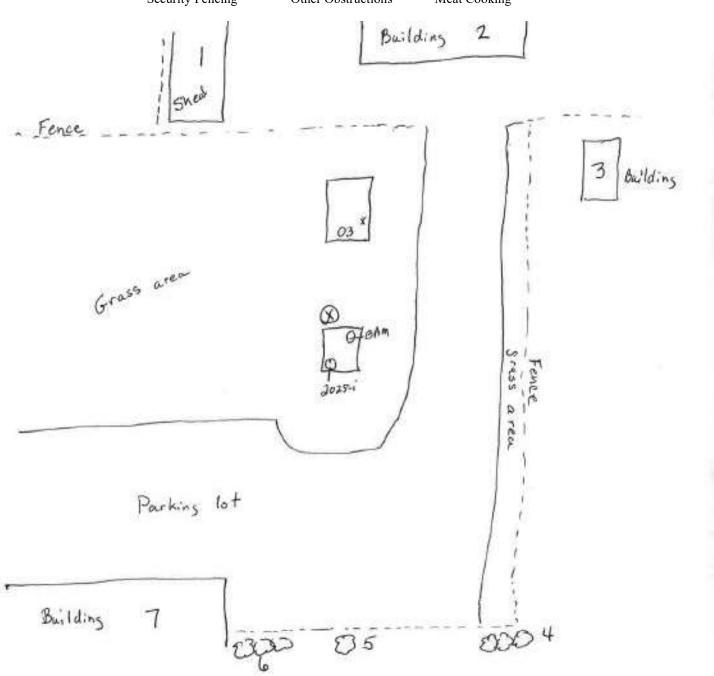
OD MUST be \geq [2*(OH-IH)]

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstacle	AZ
1	Shed	4.2	2.6	3.2	16.8		3
2	Building	10.8	4.2	13.2	36.8		60
3	Building	4.2	4.2	0	42.6		90
4	Trees	10.5	2.6	15.8	42.0		195
5	Tree	15.4	2.6	25.6	42.5		216
6	Trees	10.6	2.6	16.0	43.0		227
7	Building	5.0	2.6	4.5	31.2		272
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Nam	ne: Hend	dersonville	Initials: E	EMH 	
TREE DRIPLINE(s):	42.0	meters (nearest	inlet to dripline)	□ No Trees	Present
	42.5	meters (nearest	inlet to dripline)	□ Not Present	t
	43.0	meters (nearest	• /		
Should be greater than 20 m	eters from t	he dripline of tree(s) and	must be 10 met	ters from the d	ripline when the tree(s) act as an obstruction.
Issues:					
Minor Sources:	4	40 / 11	C DM	1)	
_	-	oresent? (especiall mnies, smoke stac	•	- /	ina
		s near NO_2 or SO		diesei neat	mg
	5-11-1-11-1	2 11001 1 (0 2 01 2 0	2 411411 2 2 1 2		
Issues: None					
Additional Info	ormat	ion:			
Closest tree is great			om the DM	2025 i in	
Closest tree is gree	itei tiiai	1 ZO METERS III		2023-1111	<u></u>
The distance to Ob	iect # 1	was measure	d from the	BAM inle	
The distance to Ob					
					<u>_</u>
The distance to Ob	ject # 4	though #7 we	ere measure	ed from 2	025-i inlet.

Date: _ 01/05/23 Hendersonville Initials: EMH **MSEF**: Local Site Name: SITE DRAWING -Please Indicate: (relevant distance / height measurements) Direction NORTH Monitoring Shelter Nearby Trees/Shrubs Possible Sources Primary Wind Dir Probe Position(s) Roadways Paved / Unpaved Areas Security Issues **Exterior Samplers** Buildings Nearby Construction Sloping Areas Met Tower Walls Flues, Vents, Boilers Security Fencing Other Obstructions Meat Cooking



UNRESTRICTED AIR FLOW: > 270 ° Estimated Degrees of Clearance

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Hendersonville Initials: EMH Date: 01/05/23

Camera [APC / Personal - Owner: EMH Make/Model: Moto cell phone

Photo: 001 Date: 01/05/23 Time: 2:00 pm Photographer: EMH Description: North Directional



Photo: 002 Date: 01/05/23 Time: 2:00 pm Photographer: EMH Description: Northeast Directional



Photo: 003 Date: 01/05/23 Time: 2:00 pm Photographer: EMH Description: East Directional



Photo: 004 Date: _____ D1/05/23 Time: ____ Photographer: ____ EMH ____ Description: _____ Southeast Directional







Photo: 007 Date: _____ Time: ____ Photographer: EMH _____ Description: West Directional



Photo: 008 Date: _____ Time: ____ Photographer: EMH ____ Description: Northwest Directional



Photo: 009 Date: 01/05/23 Time: 2:00 pm Photographer: EMH Description: Site



Photo: 010 Date: _____ Time: _____ Photographer: _EMH _____ Description: _Electric meter



Photo: 011	Date:	_ Time:	_ Photographer:	EMH	_ Description:

 Photo: 012
 Date: ______ Time: ______ Photographer: ______ Description: ______

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

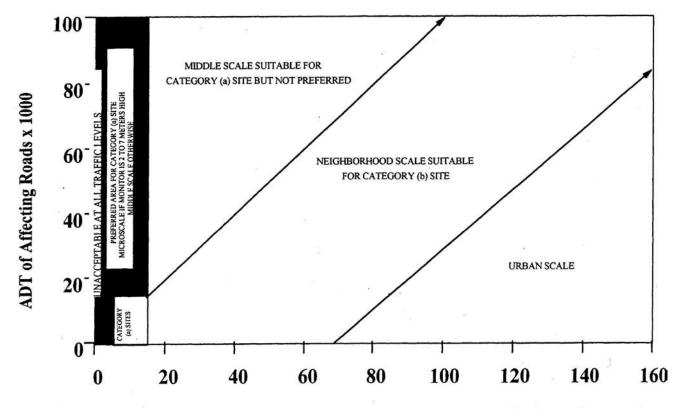


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time					
Flow Rate	1/8" ID	5/32" ID	3/16" ID		
(liters/min)	feet	feet	feet		
0.1	13.8	8.8	6.1		
0.2	27.6	17.7	12.3		
0.3	41.4	26.5	18.4		
0.4	55.3	35.4	24.6		
0.5	69.1	44.2	30.7		
0.6	82.9	53.0	36.8		
0.7	96.7	61.9	43.0		
0.8	110.5	70.7	49.1		
0.9	124.3	79.6	55.3		
1	138.1	88.4	61.4		
1.1	151.9	97.2	67.5		
1.2	165.8	106.1	73.7		
1.3	179.6	114.9	79.8		
1.4	193.4	123.8	85.9		
1.5	207.2	132.6	92.1		
1.6	221.0	141.4	98.2		
1.7	234.8	150.3	104.4		
1.8	248.6	159.1	110.5		
1.9	262.4	168.0	116.6		
2	276.3	176.8	122.8		

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 01/20/2023	Location: Fairview, Tennessee
------------------	-------------------------------

AQS Number: 47-187-0106

Site Name: Fairview O3 Pollutants: O3

Print Name / Signature / Initials / Duties

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist

2: EMH

Air Monitoring Site Evaluation Summary

Local Site Name: Fairview O3			_ Initials: EMH		Date: 01/20/2023	
Site meets EPA siting criteria:	■ Yes □ No					
If No, explain:						
Tangent Roads						
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year	
Unknown Road	15.8 m	Е	Thru st	NA	NA	
Cumberland Drive	401.0 m	N	Local St	2242	2022	
Highway 100	432.0 m	W	Local St	8417	2022	
Electrical Utilities Company: Middle Tennes	ssee Electric		Meter #: _5	39170		
Additional Comments:						
1. Arrival, departure and photo	times are Central tir	me.				
2. The distance between unknown	own service road an	d the O3 p	robe is 13.0	meters (m	neasured	
using laser range finder).						
3. The distance between the pr	robe and utility pole	is 2.7 mete	ers.			
4. Fire extinguisher is in good	condition. (Nov 2018	5)				
5. QAPP, SOP and eSIMS (AP	C's electronic logbo	ok) is avail	able electro	nically via	the	
Agilaire 8872 or the operator's	computer.					
6. The shelter temperature durin	g the the 1/20/23 eva	luation was	74 degrees	F (23.3 de	grees C).	
7. Fairview is one of the sites	with a multi-pollutan	t experime	ntal sensor t	ower		
and a weather station.						

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Fairview O3	Initials: EMH	01/20/23
APC auditor should document in Site Log – time / date / weather cond	litions/purpose of visit / APC staff [present [Yes No] Completed
Arrival Time: 10:15 am Departure Time: 11:00 am	Primary Operator: Ken	Cooper
Observer(s):		
SITE [• Yes = No] -Security Fence [• Yes = No] -Razor/Barb W	ire [≞ Yes □ No □ NA] Grass/	Shrubs Cut
[□ Yes □ No 🗈 NA] Bare Soil Area [□ Yes □ No 🗈 NA] Vand	alism – [□ Inside / □ Outside]	I
Date: [Yes No] Police Reports Arrival temperature recorded on 2/22/23.	rt Filed	
SHELTER - Not Present		
Interior Arrival Temperature: 25.0 °C (from data logger) Op	erator Site Visits: 1	_ per [□ week □ month □
[□ Yes ♠ No] Leaking Roof [Damaged: □Ceiling / □ Floo	or / 🗆 Walls] [🗗 Yes 🗆 No] (Clean / Neat
[Yes □ No] Fire Extinguisher [□ Yes No] Insect / Wildl Issues: Arrival temperature recorded on 2/22/23.	ife Issues [□ Yes 🗈 No] Gaso	Dline (inside shelter)
Exterior Type: [¬Freezer / ¬Wood Building / ¬Brick-Block / •State Height of Roof: 3.0 meters Roofing N		ast single ply membrane
Yes ■ No] Needs Maintenance (specify)		
[☐ Yes☑ No] Tied Down (type) Shelter bolted down to	cement pad	
[¶ Yes □ No] Electrically Grounded [□ Yes ¶ No] Roof R	ailing	
Roof Access: [Stairs / Ladder / Not Present] [Y	es • No] Loose Decking (Trip	Hazard)
Issues:		
PLATFORMS: Not Present Condition: [Yes No] Good [Yes No] Needs Main	tenance	
Issues:		
RECORDS AT SITE: Documents available (QAPPs, SOPs) [Yes No] E	lectronic/□ Hardcopy/□Both	
Logbooks at site [♠ Yes □ No] □ Electronic/□ Hardcopy/♠l	Both	
Commenter Hardcopy logbook at site in case ope	rator does not have acc	cess to the internet

MSEF	: Local Site Nan	ne: Fairview	O3	Initials: EMH	Date: 01	/20/23
MONI	TOR(s):		Locatio	on: Exterior Sample	rs [□ Roof / □Grou	nd / Not Present
Moni	tor(s)	Manufacture	r Model	Serial Nur	nber	
O3		Teledyne	T400		4510	
CALII	BRATOR(s):	□ Not Present	[■ Yes t	⊐ No] Are QC Cho	Cartification	
QC	Make	Model	Serial Numl	ber	Certification Date	Expiration Date
QC	Teledyr	ie T703	32	27	02/06/23	08/06/23
] Precision Checks	ent and notify agency mgr. [Yes No] Audits (Required)
Issues:						
CYLIN	NDER GAS ST. Dr:	ANDARDS:	■ Not Presen), should not be in servic	e and should be replaced)
QC	M' Cas Standard		Standard Concentrati	Serial	Number	
Issues:						

	MSEF: Local Site Name: Fairview O3 Initials: EMH Date: 01/20/23 DATA COLLECTION/DOCUMENTATION:							
I	DATA COLLECTION	N/DOCUMENTATIO	N:					
I	Data loggers/Modems:	}						
	Make	Model	Serial Number	Data logger/Modem	Main/Backup			
	Raven	R55V	2R93330185011016	Modem	Main			
	Agilaire	8872	517	Datalogger	Main			

SUPPORTING INSTRUMENTATION: Internal Not Present [■ Yes □ No] Temperature Sensor □ Yes ■ No] Uninterruptable Power Supply Zero Air System: Commercial System (Make / Model): Teledyne T701 (SN: 1345) Cartridge System: [| Silica Gel | Pink / | Blue] / | Charcoal / | Purafil / | Hopcalite / | Other: [□ Yes • No] Needs Service Last Service Date: 02/21/23 **Condition:** Probe Line(s): [Replaced / Cleaned] – Frequency: 1/year Last Service Date: 02/21/23 [■ Yes □ No] Clean [■ Yes □ No] Heated [□ Yes ■ No] Insulated [□ Yes ■ No] Moisture [□ Yes ■ No] Retractable □ Yes No] Old / Unused Lines □ Yes No] Lo Flo Manifold □ Yes • No] Any Open Ports? -> How many analyzers using manifold? Issues: _____ **OUTDOOR SAMPLERS ■** Not Present [Yes No] Locked [Yes No] Electrically Grounded [Yes No] Stabilized [Yes No] Clean Inside [□ Yes □ No] Head/Separator Clean Operator / Log: VSCC/WINS Clean Schedule: _____ PM₁₀ Head Clean Schedule: _____ Issue(s): _____ **COLLOCATED SAMPLERS:** • Not Present (39.4 inches = 1 meter)*Separation Distance Flow **Pollutant** (Hi / Lo) (meters)

^{*}Collocated monitors **must be within 4 meters of each other** and at least **2 meters apart** for flow rates **greater than 200 liters/min** or at **least 1 meter apart** for samplers having flow rates **less than 200 liters/min** to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

MSEF: Local Site Name: Fairview O3	Initials: EMH	Date: 01/20/2	23
PROBE SYSTEM(s): External	nt		
Inlet Type: [♣ Single Line / □ Dual Line / □ Bell Type (0	CAS design)]		
Funnel(s): [■ Rain Shield / Part of Probe] Funnel N	Material: [□Teflon® / 🖥 Gla	ass / □ Stainless Steel /	□ Other:]
Probe Line(s): [■ Teflon® / □ Other:]	Probe Fitting(s): [■ Tefl	on® /□ Other:	/ Not Present]
Residence Time: 5.8 sec	(20 sec. max	x) (Refer to chart for ma	aximum line lengths)
Issue(s):			

	Inlet	Inlet I coeffee	*Horizontal	*Vertical	Monitoria	ng SCALE
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)	Distance (meters) If Applicable	Distance (meters) If Applicable	AQS	Annual Network Plan
O3	4.2	Side of Shelter			Urban	Urban

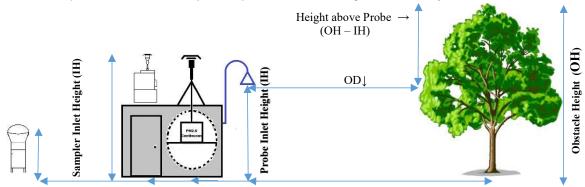
FOR Horizontal and Vertical Distances: Separation Distance = $(1 \text{ meter for } O_3, SO_2,) \& (2 \text{ meters for PM}, Pb)$

When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

Aerial Photo with Wind Rose



Source: Google Earth Pro Imagery Date: _____ OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be $\geq [2*(OH-IH)]$

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstacle	AZ
1	School	6.0	4.2	3.6	42.4		38
2	Shed	4.6	4.2	0.8	41.8		73
3	Tree	10.0	4.2	9.4	82.0		115
4	Trees	12.2	4.2	12.6	82.0		135
5	Building	3.2	4.2	NA	60.0		181
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

	ie:	view O3	Initials: EMH	Date: 01/20/23
	00.0			
TREE DRIPLINE(s):			inlet to dripline) No Tree	
	82.0		t inlet to dripline) Not Prese	
Chauld ha to the 20 ma			t inlet to dripline) Not Prese	
Should be greater than 20 m	eters from ti	ne dripline of tree(s) and	a must be 10 meters from the	dripline when the tree(s) act as an obstruction
Issues:				
Minor Sources:				
• Groundcover, gr	rass, etc p	resent? (especial	ly for PM samplers)	
 Excessive numb 	er of chir	nnies, smoke stac	cks, fireplaces, diesel hea	ating
 Off road diesel; 	generators	s near NO ₂ or SO	2 analyzers	
Issues: None				
Issues:				
Additional Info		ione		
Additional Info	ormat	ion:		
Closest trees are g	reater th	າan 20 meters	s from O3 probe; the	erefore there are no tree
dripline issues.				

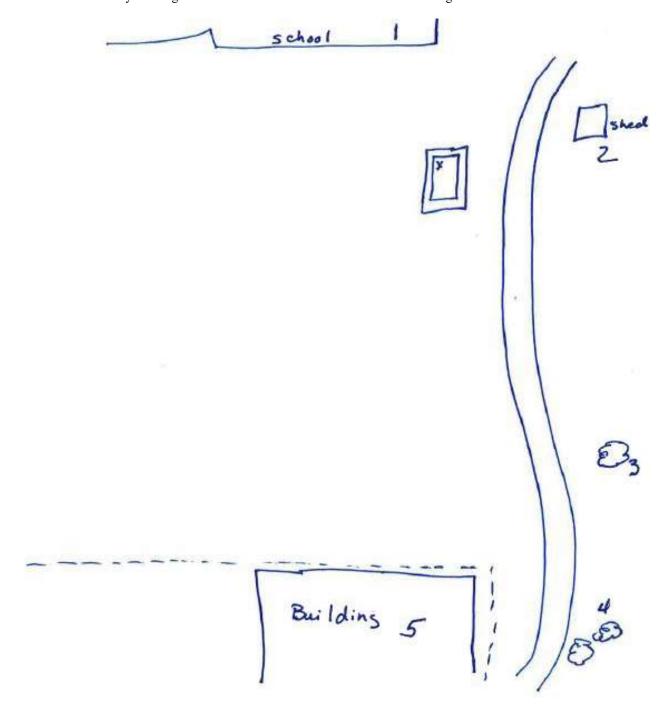
Fairview O3 **MSEF:** Local Site Name:

Initials:

Direction NORTH Primary Wind Dir Security Issues Sloping Areas

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

Monitoring Shelter Nearby Trees/Shrubs Possible Sources Roadways Probe Position(s) Paved / Unpaved Areas **Exterior Samplers** Buildings Nearby Construction Met Tower Walls Flues, Vents, Boilers Other Obstructions Security Fencing Meat Cooking



UNRESTRICTED AIR FLOW: > 270° Estimated Degrees of Clearance

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Fairview O3 Initials: EMH Date: 01/20/23

Camera [APC / Personal - Owner: APC | Minolta 12Z

Photo: 001 Date: 01/20/23 Time: 10:45 am Photographer: EMH Description: North directional



Photo: 002 Date: 01/20/23 Time: 10:45 am Photographer: EMH Description: Northeast directional



Photo: 003 Date: _____ 10:45 am Photographer: EMH _____ Description: East directional



Photo: 004 Date: _____ 10:45 am Photographer: _EMH _____ Description: ______Southeast directional

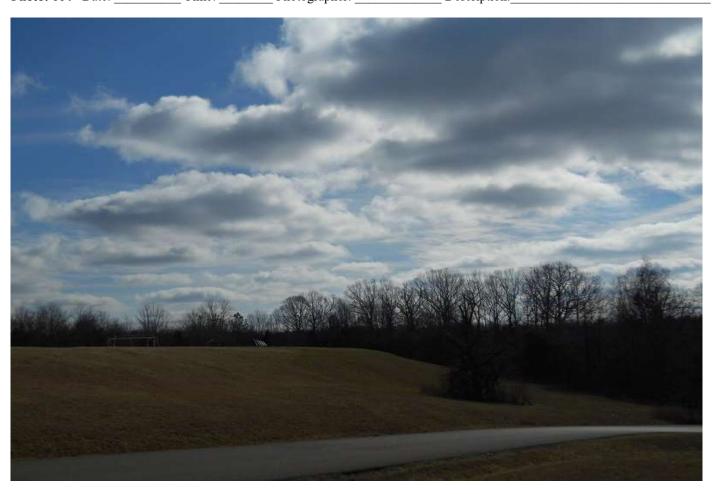


Photo: 005 Date: 01/20/23 Time: 10:45 am Photographer: EMH Description: South directional



Photo: 006 Date: _____ 10:45 am Photographer: _____ Photographer: _____ Description: _____ Southwest directional

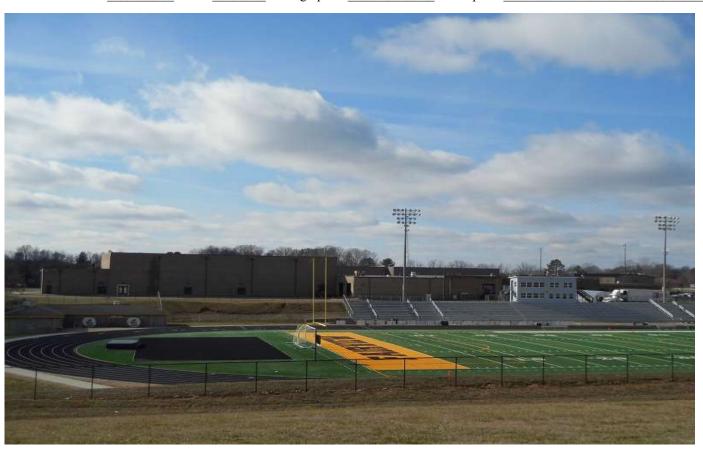




Photo: 008 Date: _____ 10:45 am Photographer: _____ Photographer: _____ Description: _____ Northwest directional



Photo: 009 Date: 01/20/23 Time: 10:45 am Photographer: EMH Description: Site



Photo: 010 Date: _____ Time: ____ Photographer: _EMH ____ Description: _Electric meter



Photo: 011	Date:	_ Time:	_ Photographer:	EMH	_ Description:

 Photo: 012
 Date: ______ Time: ______ Photographer: ______ Description: ______

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ¹² (meters)
≤1,000	10	10
10,000	10	20
15,000	20	30
20,000	30	40
40,000	50	60
70,000	100	100
≥110,000	250	250

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

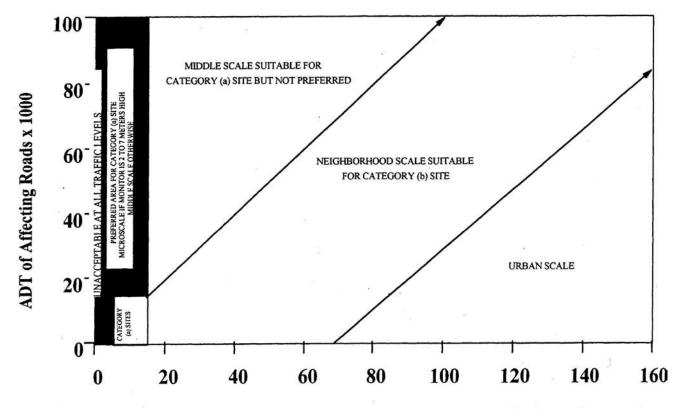


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time					
Flow Rate	1/8" ID	5/32" ID	3/16" ID		
(liters/min)	feet	feet	feet		
0.1	13.8	8.8	6.1		
0.2	27.6	17.7	12.3		
0.3	41.4	26.5	18.4		
0.4	55.3	35.4	24.6		
0.5	69.1	44.2	30.7		
0.6	82.9	53.0	36.8		
0.7	96.7	61.9	43.0		
0.8	110.5	70.7	49.1		
0.9	124.3	79.6	55.3		
1	138.1	88.4	61.4		
1.1	151.9	97.2	67.5		
1.2	165.8	106.1	73.7		
1.3	179.6	114.9	79.8		
1.4	193.4	123.8	85.9		
1.5	207.2	132.6	92.1		
1.6	221.0	141.4	98.2		
1.7	234.8	150.3	104.4		
1.8	248.6	159.1	110.5		
1.9	262.4	168.0	116.6		
2	276.3	176.8	122.8		

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.

Tennessee Environment and Conservation Division of Air Pollution Control

William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 15th Floor Nashville, Tennessee 37243



Air Monitoring Site Evaluation TDEC APC

Date: 01/06/2023	Location: Lebanon, Tennessee
Date: 0 1/00/2023	Location, remiessee

AQS Number: 47-189-0103

Site Name: Cedars O3 Pollutants: O3

Print Name / Signature / Initials / Duties

1: (Team Lead) Evelyn Haskin Evelyn Haskin EMH Site Specialist
2: EMH

Air Monitoring Site Evaluation Summary

Local Site Name: Cedars O3	Initials: EMH		Date: 01/06/2023		
Site meets EPA siting criteria:	■ Yes □ No				
If No, explain:					
Tangent Roads					
Road Name	Distance from Probe/Inlet	Direction	Road Type	Traffic Count	Traffic Year
Cedar Forest Road	72.0 m	N	Local St	109	2022
Electrical					
Utilities Company: Middle Tennes	ssee Electric		Meter #: _4	03615	
Additional Comments:					
1. Arrival, departure and photo	times are Central tin	me.			
2. Shelter temperature was 70	degrees F on 1/6/23	3.			
3. Fire extinguisher is good cor	ndition (May 2018).				

MONITORING SITE EVALUATION FORM (MSEF)

Local Site Name: Cedars O3	Initials: EMH	Date: 01/06/23
APC auditor should document in Site Log – time / date / weather condi	tions/purpose of visit / APC staff pi	resent [Yes No] Completed
Arrival Time: 12:15 pm Departure Time: 1:15 pm	Primary Operator: Ken	Cooper
Observer(s):		
SITE [Yes No]-Security Fence [Yes No]-Razor/Barb Win	e [□ Yes □ No • NA] Grass/S	Shrubs Cut
[Yes No NA] Bare Soil Area [Yes No NA] Vanda	lism – [□ Inside / □ Outside]	
Date: [Yes No] Police Report Issues: Arrival temperature taken on 2/16/23.	t Filed	
SHELTER - Not Present		
Interior Arrival Temperature: 25.0 °C (from data logger) Ope	erator Site Visits: 1	per [□ week □ month □]
[□ Yes ♠ No] Leaking Roof [Damaged: □Ceiling / □ Floor	r / 🗆 Walls] [🗗 Yes 🗆 No] C	lean / Neat
[Yes No] Fire Extinguisher [Yes No] Insect / Wildlif Issues: Arrival temperature taken on 2/16/23.	e Issues [□ Yes • No] Gasol	line (inside shelter)
Exterior Type: [¬Freezer / ¬Wood Building / ¬Brick-Block / •Ste Height of Roof: 3.0 meters Roofing M	el] aterial: Steel w/ Duro-la	ast single ply membrane
☐ Yes ■ No] Needs Maintenance (specify)		
[☐ Yes ☐ No] Tied Down (type) Bolted down to cement		
[Yes No] Electrically Grounded [Yes No] Roof Ra	9	
Roof Access: [Stairs / Ladder / Not Present] [Ye Issues:		[azard]
PLATFORMS: ■ Not Present Condition: [□ Yes □ No] Good [□ Yes □ No] Needs Mainte	enance	
Issues:		
RECORDS AT SITE: Documents available (QAPPs, SOPs) [Yes No] Ele	ectronic/□ Hardcopy/□Both	
Logbooks at site [♠ Yes □ No] □ Electronic/□ Hardcopy/♠B	oth	
Comments		

MSEF: Local Site Name: Cedars O3				Initials: EMH	Date: 01	/06/23	
MONI	TOR(s):		Locatio	on: Exterior Sample	rs [□ Roof / □Grou	nd / • Not Present]	
Moni	tor(s)	Manufacture	r Model	Serial Nun	Serial Number		
03		Teledyne	T400		2283		
CALII	BRATOR(s):	□ Not Present	[■ Yes t	□ No] Are QC Cho	eck Gases Vented	Outside Shelter?	
QC	Make	Model	Serial Num	ber	Certification Date	Expiration Date	
QC	Teledyn	e T703	32	28	02/06/23	07/06/23	
•	• •			on line? [□ Yes ■ Norations [■ Yes □ No] Precision Checks		
_	NDER GAS STA	ANDARDS:	■ Not Presen), should not be in servic	e and should be replac	
QC	Gas Standar	d PSI Reading	Expiration Date	Standard Concentrati	Serial	Number	
Issues:							

MSEF: Local S	Site Name: Cedars O3	Initials: EMF	Date: 01/06/2	3
DATA COLLI	ECTION/DOCUMENTA	TION:		
Data loggers/N	Iodems:			
Make	Model	Serial Number	Data logger/Modem	Mai

Make	Model	Serial Number	Data logger/Modem	Main/Backup
Raven	R55V	2R9333016711016	Modem	Main
Agilaire	8872	1048	Datalogger	Main

SUPPORT	TING INSTRUMENTATION	ON: Internal - Not Presen	t	
-	Temperature Sensor [Ye		* * *	
Zero Air Sy	ystem: Commercial System (M	ake / Model): Teledyne T	701 (SN: 1343)	
			□Purafil / □Hopcalite / □Other:	
[□ Yes	s • No] Needs Service Last S	ervice Date: 02/15/25	Condition:	
Issues:				
Probe Line	e(s): [■ Replaced / □Cleaned] - Frequency: 1/year	Last Service Date: 02/15/23	
[■ Yes □ No]	Clean [■ Yes □ No] Heated	[□ Yes ■ No] Insulated [□	Yes ■ No] Moisture [□ Yes ■ No] Retracta	ble
[□ Yes ■ No]	Old / Unused Lines [Yes	■ No] Lo Flo Manifold		
[□ Yes • No]	Any Open Ports? -> How n	nany analyzers using man	ifold?	
Issues:				
		Not Present	□ No] Stabilized [□ Yes □ No] Clean Inside	
[□ Yes □ No]	Head/Separator Clean			
Operator /	Log: VSCC/WINS Clean Sche	dule:	PM ₁₀ Head Clean Schedule:	
Issue(s):				
COLLOC	ATED SAMPLERS: • No	ot Present	(39.4 inches = 1 meter)	
	Pollutant	Flow (Hi / Lo)	*Separation Distance (meters)	

^{*}Collocated monitors **must be within 4 meters of each other** and at least **2 meters apart** for flow rates **greater than 200 liters/min** or at **least 1 meter apart** for samplers having flow rates **less than 200 liters/min** to preclude airflow interference, unless a waiver is in place as approved by the Regional Administrator pursuant to section 3 of Appendix A.

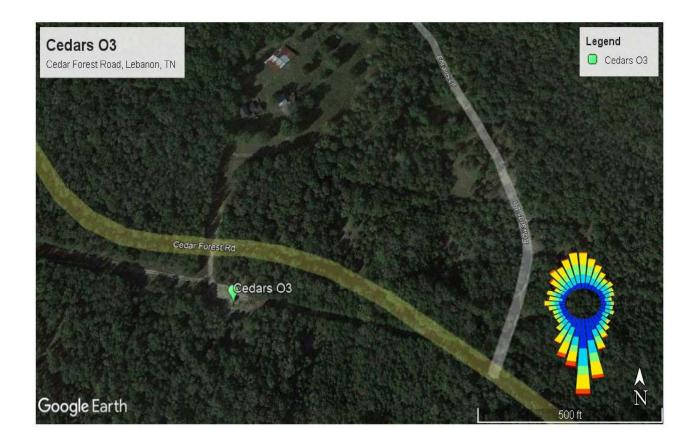
MSEF: Local Site Name: Cedars O3	Initials: EMH	Date: 01/06/23	3
PROBE SYSTEM(s): External	nt		
Inlet Type: [\blacksquare Single Line / \square Dual Line / \square Bell Type (CAS design)]		
Funnel(s): [■ Rain Shield / □Part of Probe] Funnel	Material: [□Teflon® / 🖥 Gla	ss / Stainless Steel /	Other:]
Probe Line(s): $[\blacksquare \text{ Teflon}^{\circledast} / \Box \text{ Other: } _$	Probe Fitting(s): [■ Tefle	on [®] /□ Other:	/ Not Present]
Residence Time: 8.5 sec	(20 sec. max) (Refer to chart for max	kimum line lengths)
Issue(s):			

	Inlet	Tulad I anadian	*Horizontal	*Vertical	Monitoring SCALE	
Pollutant(s)	Height (meters)	Inlet Location (Side of Shelter, Ground, Roof)	Distance (meters) If Applicable	(meters) (meters)		Annual Network Plan
O3	4.2	Side of Shelter			Urban	Urban

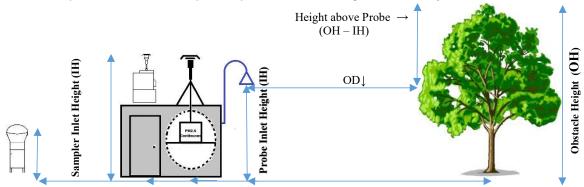
FOR Horizontal and Vertical Distances: Separation Distance = (1 meter for O₃, SO₂,) & (2 meters for PM, Pb)

When probe is located on a rooftop, this separation distance is in reference to walls, parapets, or penthouses located on roof.

Aerial Photo with Wind Rose



Source: Google Earth Pro Imagery Date: ____ OBSTRUCTION(s): Distance from sampler, probe to obstacle, such as a building, must be at least twice the height the obstacle protrudes above the sampler and probe. Sites not meeting this criterion may be classified as middle scale.



Obstacle Distance(s) (OD)

All distances in meters

OD MUST be $\geq [2*(OH-IH)]$

No.	Object(s)	Object/Obstacle Height (OH)	Sampler/Probe Inlet Height (IH)	[2*(OH- IH)]	Object/Obstacle Distance (OD)	Obstacle	AZ
1	Tree	6.8	4.2	5.2	22.7		18
2	Tree	5.8	4.2	3.2	16.5		24
3	Tree	5.8	4.2	3.2	15.8		26
4	Tree	9.4	4.2	10.4	20.4		38
5	Tree	7.8	4.2	7.2	23.5		55
6	Tree	8.3	4.2	8.2	16.5		60
7	Trees	7.8	4.2	7.2	20.0		75
8	Trees	11.3	4.2	14.2	30.0		101
9	Tree	7.4	4.2	6.4	21.0		116
10	Tree	7.1	4.2	5.8	18.2		126
11	Tree	7.1	4.2	5.8	16.8		134
12	Tree	7.4	4.2	6.4	19.0		146
13	Tree	11.3	4.2	14.2	20.5		150
14	Trees	7.8	4.2	7.2	18.8		163
15	Trees	6.6	4.2	4.8	14.4		215
16							
17							
18							
19							
20							

AZ (Azimuth reading). Please identify each of these objects/obstacles in the SITE DRAWING (page 10)

MSEF: Local Site Nam	_{ie:} Ceda	ars O3	Initials: EN	IH Date:	01/06/23
TREE DRIPLINE(s):	14.4	meters (nearest	inlet to dripline)	No Trees Present	
	15.8	meters (nearest	inlet to dripline)	Not Present	
	16.5	•	inlet to dripline)		
Should be greater than 20 me	eters from t	he dripline of tree(s) and	must be 10 meters	from the dripline whe	n the tree(s) act as an obstruction.
Issues:		····			
Minor Sources:					
_	-	present? (especial)	•		
		nnies, smoke stac		esel heating	
•	generator	s near NO ₂ or SO	2 analyzers		
Issues: None					
1554651					
A 110.0					
Additional Info	ormat	ion:			
The closest tree is	14.4 me	eters from the	probe. None	of the trees a	re considered
obstacles and are g	greater	than 10 meter	s from the pro	be. There a	re no tree
dripline issues.					
·					

Direction NORTH Primary Wind Dir Security Issues Sloping Areas

SITE DRAWING - **Please Indicate:** (relevant distance / height measurements)

Monitoring Shelter Probe Position(s) **Exterior Samplers** Met Tower

Nearby Trees/Shrubs Roadways Buildings Walls

Possible Sources Paved / Unpaved Areas Nearby Construction Flues, Vents, Boilers

Security Fencing

Other Obstructions

Meat Cooking

Road Rorest Cedar power line

UNRESTRICTED AIR FLOW: > 270 ° Estimated Degrees of Clearance

Must have unrestricted airflow 270 degrees around the probe or sampler; 180 degrees if the probe is on the side of a building or a wall.

PHOTO LOG: Local Site Name: Cedars O3 Initials: EMH Date: 01/06/23

Camera [

APC / Personal - Owner: EMH

Moto Cell Phone

Photo: 001 Date: 01/06/23 Time: 12:15 pm Photographer: EMH Description: North Directional



Photo: 002 Date: 01/06/23 Time: 12:15 pm Photographer: EMH Description: Northeast Directional



Photo: 003 Date: ____01/06/23 Time: ____Photographer: _EMH ____Description: _East Directional



Photo: 004 Date: _____ 12:15 pm Photographer: EMH _____ Description: Southeast Directional



Photo: 005 Date: 01/06/23 Time: 12:15 pm Photographer: EMH Description: South Directional



Photo: 006 Date: ______ 12:15 pm _____ Photographer: ______ EMH _____ Description: ______ Southwest Directional



Photo: 007 Date: 01/06/23 Time: 12:15 pm Photographer: EMH Description: West Directional



Photo: 008 Date: _____ Time: _____Photographer: EMH ______ Description: Northwest Directional



Photo: 009 Date: 01/06/23 Time: 1:10 pm Photographer: EMH Description: Site



Photo: 010 Date: _____ Time: ____ Photographer: _EMH _____ Description: _Electric meter



Photo: 011	Date:	_ Time:	Photographer:	EMH	Description:

 Photo: 012
 Date: ______ Time: ______ Photographer: ______ Description: ______

CFR Part 58, Appendix E, Tables and Figures

Roadway average daily traffic, vehicles per day	Minimum distance ¹ (meters)	Minimum distance ^{1 2} (meters)	
≤1,000	10	10	
10,000	10	20	
15,000	20	30	
20,000	30	40	
40,000	50	60	
70,000	100	100	
≥110,000	250	250	

Table E-1 of Appendix E to Part 58—Minimum Separation Distance Between Roadways and Probes for Monitoring Neighborhood and Urban Scale Ozone (O_3)

¹Distance from the edge of the nearest traffic lane. The distance for intermediate traffic counts should be interpolated from the table values based on the actual traffic count.

Required Pollutant Probe Height (meters) vs Monitoring Scale:

Pollutant	Micro	Middle	Neighborhood	Urban	Regional
O_3		2-15	2-15	2-15	2-15
SO ₂		2-15	2-15	2-15	2-15
PM, Pb	2-7	2-7	2-15	2-15	2-15

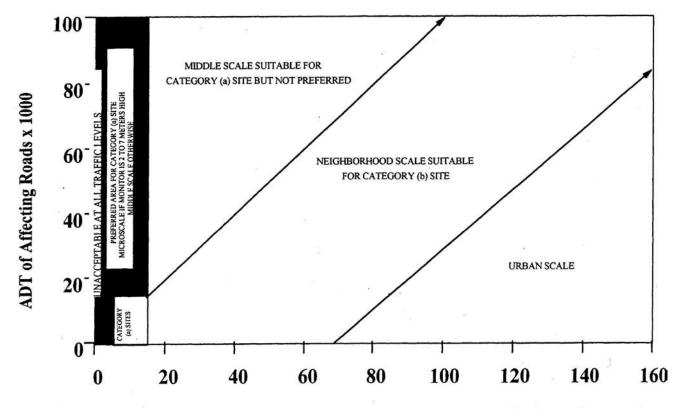


Figure E-1. Distance of PM samplers to nearest traffic lane (meters)

²Applicable for ozone monitors whose placement has not already been approved as of December 18, 2006.

Residence Time: The chart provides the maximum probe line length (in feet) of ½" OD tubing at given flow rate - using a 20 second residence time. The ID's shown are for thick (1/8"), intermediate (5/32") and thin (3/16") wall Teflon[®] tubing. The line lengths shown **do not** account for any lo-flo manifold volumes as part of the probe system.

1/4" Line OD / 20 Sec Residence Time						
Flow Rate	1/8" ID	5/32" ID	3/16" ID			
(liters/min)	feet	feet	feet			
0.1	13.8	8.8	6.1			
0.2	27.6	17.7	12.3			
0.3	41.4	26.5	18.4			
0.4	55.3	35.4	24.6			
0.5	69.1	44.2	30.7			
0.6	82.9	53.0	36.8			
0.7	96.7	61.9	43.0			
0.8	110.5	70.7	49.1			
0.9	124.3	79.6	55.3			
1	138.1	88.4	61.4			
1.1	151.9	97.2	67.5			
1.2	165.8	106.1	73.7			
1.3	179.6	114.9	79.8			
1.4	193.4	123.8	85.9			
1.5	207.2	132.6	92.1			
1.6	221.0	141.4	98.2			
1.7	234.8	150.3	104.4			
1.8	248.6	159.1	110.5			
1.9	262.4	168.0	116.6			
2	276.3	176.8	122.8			

SUPPORTING INSTRUMENTATION

Temperature Sensor: the shelter must have a temperature sensor inside connected to the data logger. The sensor is not directly required in the regulation, but is needed to demonstrate the operational conditions of the analyzer meet the FRM/FEM requirements.

Uninterruptable Power Supply – not required, but a UPS can offer additional protection to the expensive equipment in the monitoring shelter.

On-Site Computer: not required, can act as a data backup device, can have electronic strip chart information for QC/QA purposes. The operator may utilize a laptop pc instead of one on-site.

Zero Air System:

For a Commercial System: give the make and model

For a home built Cartridge System: identify the cartridges present, if any need service, date of last service, and condition of system. Identify any issues with either system.

Data Logger: Identify system at site

Identify how the analyzers are connected the data logger.

Strip Chart: Is the operator proficient at retrieving and viewing the strip chart?

Does the operator know what it means?

Is the time-scale of the strip chart accurate with the actual or standard time?

INDEX

Local Site Name: prefer name used by agency monitoring staff for this site, this field should be completed for each page of the evaluation form, if a sheet ever separates from the logbook it can be returned to the proper place.

Initials: Initials of auditor completing form.

Date: current date site is entered by auditor

Reminder: If present, the auditor should add comment to the Site Logbook including: time, date, purpose of visit, auditors present.

Arrival Time: time auditors arrive at site

Departure Time: time auditors depart site

Primary Operator: the sites main operator, include parameters responsible for

Observers: person(s) at site, attending agency staff, site operators, other EPA, State auditors present

Networks: check all that apply, indicates type / purpose of monitoring conducted at site

SITE (Questions to ask yourself)

Security Fence: present or not? Security fencing can help with sample integrity. Is there more than one lock on gate, who has access other than monitoring staff?

Razor/Barb Wire - present or not? Note condition if damaged or aging – rusted? Is wire hanging down out of proper place?

Grass/Shrubs Cut: Is the grass and/or shrubs at the monitoring site cut and trimmed? Who is responsible for grass/shrub/tree maintenance? Is it regularly maintained?

Bare Soil: Does the site area consist of bare soil? Could be a local source for PM samplers (40 CFR Part 58 Appendix E, §3)

Vandalism – Any vandalism history at Site? Inside or Outside / check both if necessary? Date of last occurrence. Were police notified? If vandalism is current/ how serious/ gunfire into shelter?, loss of equipment/records?

SHELTER – Interior note condition/age of shelter, roof issues, water damage, and t, mold - insect issues, any electrical issues, is it clean, are the instruments securely mounted, loud pumps, is the lock secure

Arrival Temperature: Ask operator to provide current reading from data logging system if available. Values should be 20-30 °C generally, can depend on instrumentation present – FRM-FEM designations, and is specified in TDEC DAPC's QAPP. Some agencies keep the shelters near the upper limit in winter to help poorly insulated shelters maintain temperature overnight. May become too warm during mid-day hours. Conversely, an agency may keep the shelter cool in summer to help with high temperatures. Teledyne analyzers are designated FEM for a range of 5-40 °C. Therefore, TDEC DAPC keeps shelters with these monitors within this range (still keeping in mind the 2 deg SD requirement). Shelters are generally kept about 25-26 °C in the warmest months to reduce condensation in sample lines and analyzer.

Operator Site Visits: how many times per week or month, what is the schedule? Does logbook confirm?

Leaking Roof: Does roof leak, evidence may be apparent, question operator?

Damage: Ceiling, Wall, Floor: document damage if present – how long did leak exist before repair?

Clean / Neat: Is interior of shelter maintained, are the floors/counters/walls clean, well-organized, neat in appearance?

Fire Extinguisher: not required by EPA, good idea.

Insect/Wildlife Issues: Termites? Ants? Wasps/Bees? / Larger wildlife causing problems (such as nesting in the undercarriage or walls or digging dens near the foundation/supports)?

Thermometer (min/max): not required, but good insurance measure should temperature probe fail. Operator should document reading at site visit and reset.

Gasoline: Gasoline for weed trimmers, etc. is dangerous to have inside the shelter and can impact concentration values. Gasoline should not be stored in same environment as sample equipment, away from pumps and other electrical equipment as well.

Monitors: document the instrumentation present – monitor / manufacturer / model / serial #, look at the age and/or condition of the instrumentation, clean/dirty, and examine lines for moisture, cleanliness, and kinks/cracks. Moisture in the sample line can scrub pollutant concentrations – data will have to be invalidated if moisture found – determine how long the moisture has been present. Exterior Samplers – roof or ground.

Met: define the met instrumentation present or not.

Calibrators: can be ozone, gas blenders, audit calibrators, note condition, clean/dirty, and examine lines for moisture, cleanliness, kinks/cracks, examine line from calibrator to analyzer – it should be capped or connected to a solenoid or the calibrator – if the end is open the analyzer may be sampling shelter air – photograph, document, show operator – correct problem, note in site log. For each calibrator present at the site, if the site contains no standards, mark the not present selection and move to the next section.

QA/QC Vented? – Gases should be vented, it's unhealthy for operators to breathe these pollutant concentrations.

Is analyzer sampling Shelter Air? - if the analyzer is sampling shelter air, even partially, all of the data impacted must be invalidated. Some examples of items that can cause this problem are a leaking filter holder or fitting and an uncapped TTP system or sample line tee.

FILTERS: For precision checks and audits, all gas standards (including Ozone) MUST pass through the sample line filter at the back of or internal to the instrument. Check the plumbing, interview the operator and qa auditor on this point. Calibrations may or may not pass through the filter, if it does it should be a clean filter and the records – logbook should indicate an ending precision check, then the filter change, then the calibration. If the calibration gas does not pass through the filter, there should be a probe line integrity check after the calibration – demonstrating the probe line has not impacted the pollutant concentration during the calibration.

Cylinder Gas Standards: complete the table as noted: QA/QC how is the standard used for QA or QC operations?, Gas Standard meaning CO, SO2, NO, NO2, the PSI reading - a low reading (<=200) is a warning that the tank should be considered empty – the gas regulator cannot reliably control lower than this reading. Note the expiration date, standard concentration and tank serial number from the certification information with the tank.