Oklahoma Department of Environmental Quality Air Quality Division 2023

Air Monitoring Network Plan



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Introduction

This report documents the annual review of the air-monitoring network operated by the Oklahoma Department of Environmental Quality's ("DEQ") Air Quality Division ("AQD"). When finalized as the Annual Monitoring Network Plan ("ANP"), it will be submitted by July 1, 2023 to the United State Environmental Protection Agency ("EPA") as required by 40 CFR 58.10 and provide the framework for establishing and maintaining Oklahoma's air quality surveillance system. AQD uses data collected by this network for comparison to the National Ambient Air Quality Standards ("NAAQS"). AQD maintains its ambient air monitoring network in accordance with the quality assurance requirements of 40 CFR Part 58, Appendix A; performs within specifications in accordance with 40 CFR Part 58, Appendix B; follows procedures outlined within 40 CFR Part 58, Appendix C; designs its network in accordance with 40 CFR Part 58, Appendix D; and locates its sites to meet all requirements of 40 CFR Part 58, Appendix E.

Below is a summary of changes that have been approved by Region 6 EPA, and implemented since the last ANP:

- 40-143-0235: State and Local Air Monitoring Station ("SLAMS") SO2 resumed collection on 12/19/2022 following completion of construction.
- 40-019-0297: Ozone Special Purpose Monitor ("SPM") began collection on 02/23/2023.
- 40-085-0300: Ozone SPM halted collection on 12/06/2022.
- 40-069-0324: Ozone SPM began collection on 02/28/2023.
- 40-067-0671: Ozone SPM began collection on 03/27/2023.
- 40-075-0711: Ozone SPM halted collection on 12/05/2022.

Table 1 is a list of all currently existing ambient air monitoring sites that AQD operates and maintains as of 05/02/2023. Table 2 is a list of proposed changes. "Air Quality System ("AQS") Site ID#" in column one is a unique identification number assigned to each monitoring site in the state network. AQS is a national air-monitoring database maintained by the EPA.

Contact Information

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Table 1. Air Monitoring Site Information:

AQS Site #	Address/ Location	Latitude	Longitude	Pollutants Measured	Sampling/Analysis Method	Station Type	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable	CSA - CBSA ¹
				PM 2.5	Sequential FRM/ Micro-gravimetric filter weighing	SLAMS	(1 in 6)	Population Exposure	Neighborhood	Yes	
40- 109-	9- and Shartel, 35.472920	35.472920	-97.527090	PM 10	Sequential FRM/ Micro-gravimetric filter weighing	SLAMS	(1 in 6)	Population Exposure	Neighborhood	Yes	OKC-Shawnee CSA
0035	OKC	33.472720		PM 10	Sequential FRM/ Micro-gravimetric filter weighing	SLAMS	(1 in 12) Collocated	Quality Assurance Collocation	Neighborhood	Yes	OKC CBSA
				PM 10 - PM 2.5	Paired Gravimetric	SPM	(1 in 6)	Population Exposure	Neighborhood	No	
40-	S.E. 19th St., Moore			Ozone	U.V. Absorption	SLAMS	Continuous	Population Exposure	Urban	Yes	OKC-Shawnee
027-	Water	35.320105	-97.484099	PM 2.5	Broadband Spectroscopy	SPM ³	Continuous	Population Exposure	Urban	Yes	CSA - OKC
0049	Tower, Moore			PM 10	Broadband Spectroscopy	SPM	Continuous	Population Exposure	Urban	No	CBSA
40- 109- 0096	12880 A N.E. 10th, Choctaw	35.477801	-97.303044	Ozone	U.V. Absorption	SLAMS	Continuous	Population Exposure	Urban	Yes	OKC-Shawnee CSA - OKC CBSA
				NO ₂	Chemiluminescence	SLAMS	Continuous	Highest Concentration / Near-Road	Micro	Yes	
40-	3112 N.			PM 2.5	Broadband Spectroscopy	SLAMS	Continuous	Population Exposure	Micro	Yes	OKC-Shawnee CSA
109- 0097	Grand Blvd, OKC	35.503070	-97.577981	PM 10	Broadband Spectroscopy	SPM	Continuous	Population Exposure	Micro	No	- OKC
				СО	Gas Filter Correlation	SLAMS	Continuous	Population Exposure	Micro	Yes	CBSA
				Black Carbon	Optical Absorption	SLAMS	Continuous	Population Exposure	Micro	No	
40- 017- 0101	12575 NW 10 th , Water Tower, Yukon	35.479215	-97.751503	Ozone	U.V. Absorption	SLAMS	Continuous	Population Exposure	Neighborhood	Yes	OKC-Shawnee CSA - OKC CBSA
40- 037- 0144	City Water Plant, Mannford	36.105481	-96.361196	Ozone	U.V. Absorption	SLAMS	Continuous	Population Exposure	Urban	Yes	Tulsa- Muskogee- Bartlesville CSA - Tulsa CBSA

AQS Site #	Address/ Location	Latitude	Longitude	Pollutants Measured	Sampling/Analysis Method	Station Type	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable	CSA - CBSA ¹
40	502 E. 144th			Ozone	U.V. Absorption	SLAMS	Continuous	Upwind Background	Urban	Yes	Tulsa- Muskogee-
40- 143- 0174	Pl., Tulsa South,	35.953708	-96.004975	PM 2.5	Broadband Spectroscopy	SPM ³	Continuous	Population Exposure	Urban	Yes	Bartlesville CSA
01/4	Tulsa			PM 10	Broadband Spectroscopy	SPM	Continuous	Population Exposure	Urban	No	Tulsa CBSA
40-	1710 W.			$\mathrm{SO}_2{}^4$	U.V. Fluorescence	SLAMS	Continuous	Source Oriented	Neighborhood	Yes	Tulsa- Muskogee- Bartlesville
143- 0175	Charles Page Blvd. Tulsa	36.149877	-96.011664	H_2S	U.V. Fluorescence	SPM ⁵	Continuous	Source Oriented	Neighborhood	No	CSA - Tulsa CBSA
40- 143- 0178	18707 E. 21st St., Tulsa East, Tulsa	36.133802	-95.764537	Ozone	U.V. Absorption	SLAMS	Continuous	Population Exposure	Urban	Yes	Tulsa- Muskogee- Bartlesville CSA - Tulsa CBSA
40-	OK-10, Oklahoma			Ozone	U.V. Absorption	SPM	Continuous	Regional Transport	Regional	No ⁶	Tulsa- Muskogee-
147-	Union	36.918242	-95.632127	PM 2.5	Broadband spectroscopy	SPM ³	Continuous	Regional Transport	Regional	No ⁶	Bartlesville CSA
0207	School, Lenapah			PM 10	Broadband spectroscopy	SPM	Continuous	Regional Transport	Regional	No ⁶	Bartlesville CBSA
40- 113- 0226	1521 S. Lombard, Skiatook	36.355860	-96.012430	Ozone	U.V. Absorption	SLAMS	Continuous	Population Exposure	Urban	Yes	Tulsa- Muskogee- Bartlesville CSA - Tulsa CBSA
40-	2443 S.			$\mathrm{SO}_2{}^4$	U.V. Fluorescence	SLAMS	Continuous	Source Oriented	Middle	Yes	Tulsa- Muskogee-
143- 0235	Jackson Ave., Tulsa	36.126945	-95.998941	H_2S	U.V. Fluorescence	SPM	Continuous	Source Oriented	Middle	No	Bartlesville CSA - Tulsa CBSA
				Ozone	U.V. Absorption	SPM	Continuous	Regional Transport	Regional	No ⁶	
40-	Memorial Dr.,			PM 2.5	Broadband Spectroscopy	SLAMS	Continuous	Regional Transport	Regional	Yes	Not in CSA
019- 0297	Healdton City Lake, Healdton	34.244189	-97.462931	PM 10	Broadband Spectroscopy	SPM	Continuous	Regional Transport	Regional	No	Ardmore CBSA

AQS Site #	Address/ Location	Latitude	Longitude	Pollutants Measured	Sampling/Analysis Method	Station Type	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable	CSA - CBSA ¹
40- 069- 0324	Murray State College, Tishomingo	34.2114818	-96.676936	Ozone	U.V. Absorption	SPM	Continuous	Regional Transport	Regional	No ⁶	Not in MSA/ CBSA
			Ozone	U.V. Absorption	SLAMS	Continuous	Regional Transport	Regional	Yes		
40-	104 Airport Rd.,			PM 2.5	Broadband Spectroscopy	SLAMS	Continuous Primary	Population Exposure	Regional	Yes	Not in CSA
121- 0415	McAlester Municipal	34.885608	-95.784410	PM 10	Broadband Spectroscopy	SPM	Continuous	Population Exposure	Regional	No	- McAlester
0413	Airport, McAlester			PM 2.5	Sequential FRM/ Micro-gravimetric Filter Weighing	SLAMS	(1 in 6) Collocated	Quality Assurance/ Method Collocation	Regional	Yes	CBSA
40-	108 N Main	24.920206	05 942742	Lead	Hi-Volume	SLAMS	(1 in 6)	Source Oriented	Neighborhood	Yes	Not in CSA
121- 0416	St., Savanna	34.829396	-95.843642	Lead	Hi-Volume	SLAMS	(1 in 12) Collocated	Quality Assurance	Neighborhood	Yes	McAlester CBSA
40- 047- 0555	11826 N 30th St, Kremlin	36.512363	-97.845959	$\mathrm{SO}_2{}^4$	U.V. Fluorescence	SLAMS	Continuous	Source Oriented	Neighborhood	Yes	Not in CSA - Enid CBSA
40-	306 E Otoe,	26 (0710)	6 -97.081350	$\mathrm{SO}_2{}^4$	U.V. Fluorescence	SLAMS	Continuous	Population Exposure/ Source Oriented	Neighborhood	Yes	Not in CSA
071- 0604	Ponca City	36.697186	-97.081330	PM 2.5	Broadband Spectroscopy	SLAMS	Continuous	Population Exposure	Neighborhood	Yes	Ponca City CBSA
				PM 10	Broadband Spectroscopy	SPM	Continuous	Population Exposure	Neighborhood	No	
40-	2211 NW			Ozone	U.V. Absorption	SLAMS	Continuous	Population Exposure	Urban	Yes	
031- 0651	25 th ,	34.632980	-98.428790	PM 2.5	Broadband Spectroscopy	SPM ³	Continuous	Population Exposure	Urban	Yes	Not in CSA - Lawton CBSA
0031	Lawton			PM 10	Broadband Spectroscopy	SPM	Continuous	Population Exposure	Urban	No	Zumen ezen
40- 067- 0671	Lake Waurika Corp. of Eng. Office, Waurika	34.226639	-98.035440	Ozone	U.V. Absorption	SPM	Continuous	Regional Transport	Regional	No ⁶	Not in CSA/ CBSA

AQS Site #	Address/ Location	Latitude	Longitude	Pollutants Measured	Sampling/Analysis Method	Station Type	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable	CSA - CBSA ¹		
40	Seiling			Ozone	U.V. Absorption	SLAMS	Continuous	General Background	Regional	Yes			
40- 043-	Municipal Airport,	36.158414	-98.931973	PM 2.5	Broadband Spectroscopy	SLAMS	Continuous	General Background	Regional	Yes	Not in CSA/ CBSA		
0860	Seiling			PM 10	Broadband Spectroscopy	SPM	Continuous	General Background	Regional	No			
						$\mathrm{SO}_2{}^4$	U.V. Fluorescence	SLAMS	Continuous	Population Exposure	Urban	Yes	
				Ozone	U.V. Absorption	SLAMS	Continuous	Highest Concentration	Urban	Yes			
				СО	Gas Filter Correlation	SLAMS	Continuous	General Background	Urban	Yes			
40- 109-	2501 E. Memorial Rd., Oklahoma	35.614131	-97.475083	NO ₂	Chemiluminescence	SLAMS	Continuous	Max Precursor Emissions Impact/ Areawide NO2 and RA40 NO2 for OKC CBSA	Urban	Yes	OKC-Shawnee CSA - OKC		
1037	Christian University, OKC			Chemical Speciation	Low Volume Gravimetric/Micro- gravimetric filter weighing	SLAMS	(1 in 6)	Population Exposure	Urban	No	CBSA		
					PM 2.5	Sequential FRM/ Micro-gravimetric filter weighing	SLAMS	(1 in 3) Collocated	Population Exposure/ Method Collocation	Urban	Yes		
				PM 2.5	Broadband Spectroscopy	SLAMS	Continuous Primary	Population Exposure	Urban	Yes			
				PM 10	Broadband Spectroscopy	SLAMS	Continuous	Population Exposure	Urban	Yes			
40- 087- 1074	Kessler, McClain County	34.984686	-97.522753	Ozone	U.V. Absorption	SLAMS	Continuous	Background	Regional	Yes	OKC-Shawnee CSA - OKC CBSA		

AQS Site #	Address/ Location	Latitude	Longitude	Pollutants Measured	Sampling/Analysis Method	Station Type	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable	CSA - CBSA ¹
				Ozone	U.V. Absorption	NCore/ SLAMS	Continuous	Maximum Precursor Emissions Impact	Urban	Yes	
				Trace Level NO2	Chemiluminescence	NCore/ SLAMS	Continuous	Maximum Precursor Emissions Impact/ Area-wide NO2 and RA40 NO2 for Tulsa CBSA	Urban	Yes	
				Trace level NOy	Chemiluminescence	NCore/ SLAMS	Continuous	Maximum Precursor Emissions Impact	Urban	No	
	3520 1/2 N. Peoria,			Trace level CO	Gas Filter Correlation	NCore/ SLAMS	Continuous	Population Exposure	Urban	Yes	Tulsa- Muskogee-
40- 143-	North Tulsa- Fire Station	36.204902	-95.976537	Trace level SO ₂ ⁴	U.V. Fluorescence	NCore/ SLAMS	Continuous	Population Exposure	Urban	Yes	Bartlesville CSA
1127	#24, Tulsa			PM 2.5	Sequential FRM/ Micro-gravimetric filter weighing	NCore/ SLAMS	(1 in 3) Primary	Population Exposure	Urban	Yes	Tulsa CBSA
				PM 2.5	Sequential FRM/ Micro-gravimetric filter weighing	NCore/ SLAMS	(1 in 6) Collocated	Quality Assurance Collocation	Urban	Yes	
				PM 2.5	Broadband Spectroscopy	NCore/ SPM ³	Continuous	Population Exposure	Urban	Yes	
				PM 10	Broadband Spectroscopy	NCore/ SPM ³	Continuous	Population Exposure	Urban	Yes	
				PM 10	Sequential FRM/ Micro-gravimetric filter weighing	NCore/ SLAMS	(1 in 3)	Population Exposure	Urban	Yes	
				PM 10 - PM 2.5	Paired Gravimetric – "calculated"	NCore/ SPM	(1 in 3)	Population Exposure	Urban	No	
				Chemical Speciation	Low Volume Gravimetric/Micro- gravimetric filter weighing	NCore/ SLAMS	(1 in 3)	Population Exposure	Urban	No	

 ¹ Combined Statistical Area and Core-Based Statistical Area abbreviated to CSA and CBSA, respectively, for all tables.
 ² Oklahoma City has been abbreviated to OKC for all tables.
 ³ PM 2.5 SPM monitors are used to support the state's Health Advisory Program and will remain SPMs.
 ⁴ AQS shows two SO₂ monitors due to reports being entered for both hourly and 5-minute data.
 ⁵ H₂S SPMs are used to monitor major sources in the Tulsa area in response to the state-implemented H₂S ambient standard and will remain SPMs.
 All AQD sites and monitors conform to 40 CFR, Subchapter C, Part 58 Appendix A, Appendix C (see methods in column 6 of table 2), and Appendices D & E.

⁶ 40-147-0207, 40-019-0297, 40-069-0324, 40-067-0671, are intentionally designed as SPMs to capture less than 3 years of data and therefore will not be compared to NAAQS values for the purpose of attainment/non-attainment designations.

Note – The PM 2.5/10 (2 parameters/1 monitor) listed as "broadband spectroscopy" at 40-109-1037 and 40-143-1127 are API Model T640x instruments designated NAAQS comparable for PM 2.5 and PM 10. All others are API Model T640 instruments designated NAAQS comparable for PM 2.5 and Non-NAAQS comparable for PM 10.

Table 2. AQD Network Proposed Changes

Monitoring Sites to be Relocated:

AQS Site #	Address/ Location	Latitude	Longitude	Pollutants Measured	Sampling/ Analysis Method	Station Type	Operating Schedule	Monitoring Objective	Spatial Scale	NAAQS Comparable	CSA- MSA/ CBSA
40-	502 E. 144th			Ozone	U.V. Absorption	SLAMS	Continuous	Upwind Background	Urban	Yes	Tulsa- Muskogee-
143- 0174	Pl., Tulsa South,	35.953708	-96.004975	PM 2.5	Broadband Spectroscopy	SPM	Continuous	Population Exposure	Urban	Yes	Bartlesville CSA
01/4	Tulsa			PM 10	Broadband Spectroscopy	SPM	Continuous	Population Exposure	Urban	No	Tulsa MSA
40- 121-	108 N Main	34.829396	-95.843642	Lead	Hi-Volume	SLAMS	(1 in 6)	Source Oriented	Neighborhood	Yes	Not in CSA
0416	St., Savanna	34.029390	-93.043042	Lead	Hi-Volume	SLAMS	(1 in 12) Collocated	Quality Assurance	Neighborhood	Yes	McAlester CBSA

- 40-143-0174: ODEQ is currently discussing the relocation of Site 40-143-0174 with the City of Glenpool. The site is on the verge of not meeting siting criteria as specified by 40 CFR Part 58 Appendix E §5.a. EPA will be provided with specifics of the location including latitude, longitude, and pictures of the proposed site upon completion of a contract with the city.
- 40-121-0416: ODEQ is currently discussing the relocation of Site 40-143-0174 with the City of Savannah. Due to the addition of a collocated sampler at the site, current deck space does not allow for additional sampling required by EPA audits. In order to create extra space, the site will need to be lowered from its current platform and relocated a short distance to the North in order to be an acceptable distance from nearby buildings.

Appendix A: Network Requirements

Parameter	Number of Monitors Required in Part 58 App D	Reason(s) for Requirement Part 58 App D	Number of Other Non-Required SLAMS/SPM Monitors Currently in Operation	Reason(s) for Optional Monitors	Total Monitors Operated
	2	OKC MSA/Population			2
	2	Tulsa MSA/Population			2
Ozone	1	Lawton MSA/Population			1
Ozone	1	NCore			1
			5	SPM and/or Transport	5
	_		6	AQI/Advisories	6
Total	6		11		17
Carbon	1	Near-Road			1
Monoxide	1	NCore			1
			1	Background	1
Total	2		1		3
	1	Near-Road			1
Nitrogen Dioxide	1	NCore; Area-wide NO ₂ and RA40 NO ₂ for Tulsa MSA			1
Dionide	1	Area-wide NO ₂ and RA40 NO ₂ for OKC MSA			1
Total	3				3
NOy	1	NCore			1
Total	1				1
	1	NCore			1
Sulfur	1	SO ₂ DRR ²			1
Dioxide	1	Tulsa CBSA PWEI			1
Dioxide			2	Major Source	2
			1	OKC MSA/Population	1
Total	5		3		6
Hydrogen Sulfide			2	Population/State Standard	2
Total			2		2
Lead	1	Sources > 0.5 tons/year			1
Lead	1	QA Collocation			1
Total	2				2
	2	OKC MSA/Population Tulsa MSA -			2
	2	Population/NCore Method Collocation			2
	1	QA Collocation			1
$PM2.5^{3}$	1	Background			1
	1	Transport			1
	1	Near-Road			1
			6	AQI/Advisories	6
			1	SPM/Transport	1
Total	9		7		16

Parameter	Number of Monitors Required in Part 58 App D	Reason(s) for Requirement Part 58 App D	Number of Other Non- Required SLAMS/SPM Monitors Currently in Operation	Reason(s) for Optional Monitors	Total Monitors Operated
	2	OKC MSA/Population			2
	1	Tulsa MSA/NCore			1
	1	QA Collocation			1
			1	AQI/Advisories (NAAQS Comparable)	1
PM10 ^{1,4}			1	Background (Non- NAAQS Comparable)	1
			6	AQI/Advisories (Non- NAAQS Comparable)	6
			2	SPM/Transport (Non- NAAQS Comparable)	2
Total	4		10		14
PM10 - 2.5	1	NCore			1
(Coarse)			1	Supplemental	1
Total	1		1		2

¹There are 9 sites utilizing the API T640 technology, currently collecting non-NAAQS PM10 data.

² Though listed as being required under 40 CFR Part 58 Appendix D, the DRR monitors are required under 40 CFR Part 51.

³ Per 40 CFR Part 58 Table D-5 of Appendix D, while the Enid MSA has a population of >50,000, Oklahoma DEQ has met the minimum monitoring requirements due to the statewide PM 2.5 being <85% of PM 2.5 NAAQS.

⁴Per 40 CFR Part 58 Table D-4 of Appendix D, while the Lawton MSA has a population of >100,000, Oklahoma DEQ has met the minimum monitoring requirements due to statewide PM 10 being <80% of PM 10 NAAQS. Note – This chart reflects existing network conditions.

Appendix B: PWEI¹ Numbers for Determination of Minimum SO₂ Sites

MSA/CBSA	Counties	2021 SO ₂	Total Emissions ²	2021 Population ³	PWEI ²
WISA/CBSA		Emissions ² (tons)	(tons)	(people)	(tons/million people)
	Oklahoma County	176			
	Cleveland County	6			
	Canadian County	182			
Oklahoma City	Grady County	40	421	1,441,647	606
	Logan County	1			
	McClain County	15			
	Lincoln Couinty	1			
	Tulsa County	318			
	Rogers County	4,653			
	Wagoner County	10			
Tulsa	Creek County	251	5,420	1,023,988	5,550
	Osage County	4	·		·
	Okmulgee County	182			
	Pawnee County	2			
т ,	Comanche County	4	4	127.542	0
Lawton	Cotton County	0	4	127,543	0
Stillwater	Payne County	14	14	81,989	1
Shawnee	Pottawatomie County	2	2	73,019	0
Muskogee	Muskogee County	6,848	6,848	66,146	452
Enid(cbsa)	Garfield County	16,976	16,976	61,926	1,051
Bartlesville	Washington County	2	2	52,772	0
Tahlequah	Cherokee County	4	4	47,627	0
Ardmore	Carter County	327	328	59 507	19
Aramore	Love County	1	328	58,507	19
Ponca City	Kay County	2,533	2,533	43,732	110
McAlester	Pittsburg County	29	29	43,633	1
Duncan	Stephens County	61	61	43,129	2
Durant	Bryan County	230	230	47,105	10
Ada	Pontotoc County	125	125	38,163	4
Miami	Ottowa County	1	1	30,340	0
Weatherford	Custer County	6	6	28,163	0
Altus	Jackson County	0	0	24,777	0
Elk City	Beckham County	13	13	22,046	0
Guymon	Texas County	18	18	20,865	0
Woodward	Woodward County	13	13	23,967	0

¹40 CFR Appendix D to Part 58 §4.4.2 *Requirement for Monitoring by the Population Weighted Emissions Index.* (a) The population weighted emissions index (PWEI) shall be calculated by States for each core based statistical area (CBSA) they contain or share with another State or States for use in the implementation of or adjustment to the SO₂ monitoring network. The PWEI shall be calculated by multiplying the population of each CBSA, using the most current census data or estimates, and the total amount of SO₂ in tons per year emitted within the CBSA area, using an aggregate of the most recent county level emissions data available in the National Emissions Inventory for each county in each CBSA. The resulting product shall be divided by one million, providing a PWEI value, the units of which are million persons-tons per year. For any CBSA with a calculated PWEI value equal to or greater than 1,000,000, a minimum of three SO₂ monitors are required within that CBSA. For any CBSA with a calculated PWEI value equal to or greater than 100,000, but less than 1,000,000, a minimum of one SO₂ monitor is required within that CBSA.

²Values truncated to whole tons or whole tons/million people.

³All population estimates based on the 2021 Census estimations found at https://www.census.gov/data/tables/time-series/demo/popest/2020s-total-metro-and-micro-statistical-areas.html.

Appendix C: Further Comments

Monitoring of NAAQS Parameters:

Oklahoma DEQ is monitoring for all NAAQS parameters in the state of Oklahoma as well as additional parameters such as H₂S.

Areas of Environmental Concerns:

The Oklahoma ambient air-monitoring network includes coverage of Oklahoma's most populated cities, Oklahoma City and Tulsa, as well as coverage throughout the state in less populated cities and rural communities. As seen in Figure 1, the Oklahoma DEQ maintains extensive coverage in both Tulsa and Oklahoma City by having sites within the cities, as well as sites placed on the outskirts of the cities in each of the cardinal directions. The ambient air-monitoring network is also designed to help monitor transport from surrounding areas. Transport monitoring sites are located around the state borders to monitor for both Ozone and PM from surrounding metropolitan areas or local burning for field management into or out of the state. These sites are typically not considered NAAQS comparable as they often transition between different locations to allow for a wider view of Oklahoma's air quality over time, so the data is primarily used for our real-time Health Advisory network, which provides Oklahoma citizens with consistent updates of their Air Quality. This network coverage includes a variety of sources such as SO₂, Ozone, and Particulate Matter ("PM").



Figure 1: Oklahoma Department of Environmental Quality's Air Monitoring Network.

The EPA Environmental Justice ("EJ") Screening Tool provides insights into how the air-monitoring network covers a variety of communities in the state. Figure 2 and Figure 3, which show PM and Ozone respectively, provide a macro view of the state in relation to these pollutants. The Oklahoma ambient air-monitoring network provides coverage for these sources through the metropolitan and rural monitoring sites.

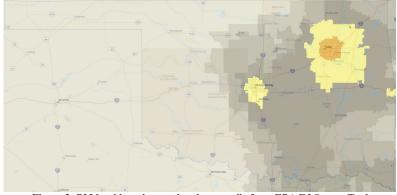


Figure 2: PM level based on national percentile from EPA EJ Screen Tool



Figure 3: Ozone level based on national percentile from EPA EJ Screen Tool

The EPA EJ Screen Tool also provides insights into how individual ambient air-monitoring sites are meeting community needs. Tulsa, being a primary EJ concern, also contains our National Core ("NCore") Multipollutant site and National Air Toxics Trend Station ("NATTS") to provide an extensive array of data for the Tulsa community. Tulsa site 40-143-1127 is indicated with a black "+" in Figure 4. Figure 4 and Figure 5 show the EPA EJ Screen Tool Demographic Index ("DI") in Tulsa around site 40-143-1127 as well as a breakdown of the DI of the community immediately around the site.

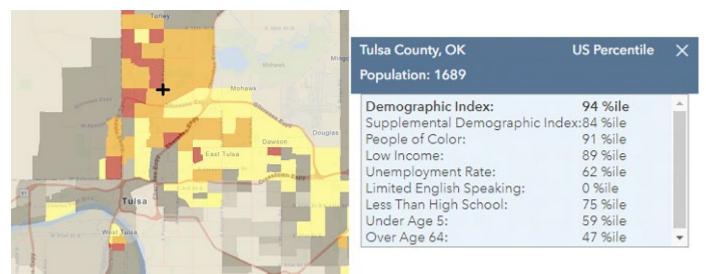


Figure 4: Site 40-143-1127 DI from EPA EJ Screen Tool

Figure 5: Site 40-143-1127 local DI Breakdown

Transport monitoring sites also assist in providing information to rural communities about their local air quality. Healdton site 40-019-0297 is indicated with a black "+" in Figure 6. Figure 6 and Figure 7 show the EPA EJ Screen Tool set to show Ozone level with Supplemental Demographic Index ("SDI") in Healdton around site 40-019-0297 as well as a breakdown of the SDI of the community immediately around the site.



Figure 6: Site 40-019-0297 SDI from EPA EJ Screen Tool

Figure 7: Site 40-019-0297 local SDI Breakdown

Near-Road Addition to Tulsa:

EPA's current regulatory requirements from 40 CFR Appendix D to Part 58 § 4.3.2(a) states as follows:

Within the NO₂ network, there must be one microscale near-road NO₂ monitoring station in each CBSA with a population of 1,000,000 or more persons to monitor a location of expected maximum hourly concentrations sited near a major road with high AADT counts as specified in paragraph 4.3.2(a)(1) of this appendix. An additional near-road NO₂ monitoring station is required for any CBSA with a population of 2,500,000 persons or more, or in any CBSA with a population of 1,000,000 or more persons that has one or more roadway segments with 250,000 or greater AADT counts to monitor a second location of expected maximum hourly concentrations. CBSA populations shall be based on the latest available census figures.

The Tulsa MSA has the second largest population in Oklahoma behind the Oklahoma City MSA, with an estimated population of 1,023,988 based on the 2021 Census Data Estimates found on the US Census Bureau website, (https://www.census.gov/data/tables/time-series/demo/popest/2020s-total-metro-and-micro-statistical-areas.html).

As per 40 CFR Appendix D to Part 58 § 4.3.2(a), the Tulsa MSA will now require a near-road NO2 monitoring site, as the population has exceeded 1,000,000 persons. DEQ will now begin the process of grant application and site evaluations to establish a new Near Road NO2 monitoring site, with operation anticipated to begin around Summer 2025.

Photochemical Assessment Monitoring Station (PAMS) Addition to Tulsa:

EPA's current regulatory requirements from 40 CFR Appendix D to Part 58 § 5(a) states as follows:

State and local monitoring agencies are required to collect and report PAMS measurements at each NCore site required under paragraph 3(a) of this appendix located in a CBSA with a population of 1,000,000 or more, based on the latest available census figures.

The Tulsa MSA has the second largest population in Oklahoma behind the Oklahoma City MSA, with an estimated population of 1,023,988 based on the 2021 Census Data Estimates found on the US Census Bureau

website, (https://www.census.gov/data/tables/time-series/demo/popest/2020s-total-metro-and-micro-statistical-areas.html).

As per 40 CFR Appendix D to Part 58 § 4.3.2(a), the Tulsa MSA will now require a PAMS monitoring site, as the population has exceeded 1,000,000 persons. DEQ will now begin the process of grant application and site evaluations to establish a new PAMS monitoring site, with operation anticipated to begin around Summer 2025.

Prevention of Significant Deterioration Air Monitoring:

The Oklahoma DEQ monitoring network meets all requirements found in 40 CFR Part 58, Appendix B. PSD monitoring is currently not necessary for the Oklahoma DEQ.

Maintenance Plans for Discontinuation of SLAMS Monitors:

Oklahoma currently is in attainment with all NAAQS and is not under a SIP Maintenance Plan.

Division of MSA/CBSA Monitoring Responsibilities with other Agencies:

Oklahoma DEQ understands some of its monitoring area is shared with Tribal Nations and Arkansas DEQ. Oklahoma DEQ has no standing agreements with Tribal Nations or Arkansas DEQ for the division of monitoring responsibilities to fulfill monitoring requirements at this time. Oklahoma DEQ will continue to monitor the situation and maintain its current connections with these two entities and address any deficiencies should they arise.

National Air Toxics Trends Station, State Air Toxics Monitoring Network, and National Atmospheric Deposition Programs

Oklahoma DEQ maintains a list of Toxic Air Contaminants ("TAC") of concern. When these toxins routinely violate the Maximum Acceptable Ambient Concentration ("MAAC") an Area of Concern ("AOC") is designated. Oklahoma DEQ operates three air toxics sites, one National Air Toxics Trends Station ("NATTS") in Tulsa, Oklahoma ("TMOK") and two non-NATTS sites, one in Oklahoma City, Oklahoma ("OCOK"), and one in Tulsa, Oklahoma ("TOOK").

Oklahoma DEQ just opened a new non-NATTS air toxics short term special study monitoring site in partnership with the Quapaw Nation Environmental Department in Commerce, Oklahoma ("COOK"). Additionally, Oklahoma DEQ operates four Mercury Deposition Network ("MDN") sites, OK01, OK04, OK06, OK31 and one National Trends Network ("NTN") site, OK01. See chart below for detailed location data.

TMOK is comparable to OCOK due to their siting locations in their respective cities. TOOK is an outlier being more of an industrial station. Primarily, we see many of Oklahoma's concentrations affected by temperatures, often increasing in the summer and decreasing in the cooler winter months. Due to construction surrounding TOOK causing a temporary site shutdown, not enough data is available for meaningful analysis.

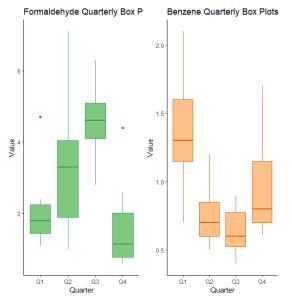


Figure 8: OCOK Quarterly Formaldehyde and Benzene analysis

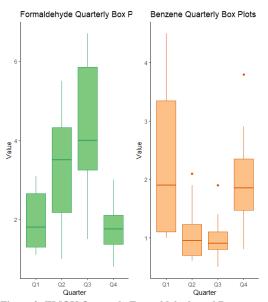


Figure 9: TMOK Quarterly Formaldehyde and Benzene analysis

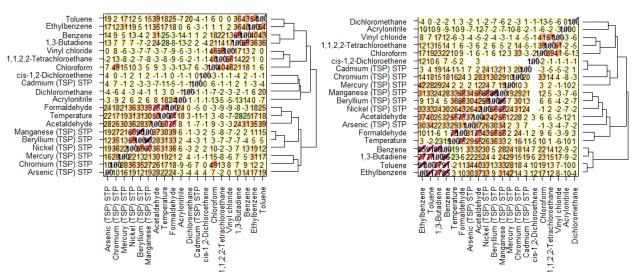
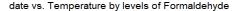
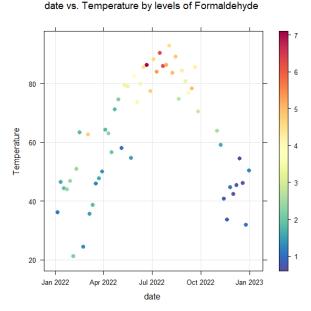


Figure 10: OCOK Toxics Comparison

Figure 11: TMOK Toxics Comparison





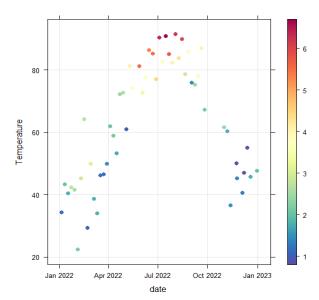


Figure 12: OCOK Formaldehyde Temperature Analysis

Figure 12: TMOK Formaldehyde Temperature Analysis

Site Identifier	Address/Location	Latitude	Longitude	Pollutants Measured
40-143-0235 TOOK	2443 S. Jackson Ave., Tulsa	36.126945	-95.998941	Toxics
40-155-0522 COOK	Commerce OK	36.926603	-94.873439	Toxics
40-109-1037 OCOK	2501 E. Memorial Rd., Oklahoma Christian University, OKC	35.614131	-97.475083	Toxics
40-143-1127 TMOK	3520 1/2 N. Peoria, North Tulsa- Fire Station #24, Tulsa	36.204902	-95.976537	Toxics
OK01	McGee Creek State Park	34.315439	-95.8894	Mercury NTN
OK04	Lake Murray Sate Park	34.103233	-97.070817	Mercury
OK06	Wichita Mountains Wildlife Refuge	34.73425	-98.709517	Mercury
OK31	Copan, Oklahoma	36.908115	-95.88235	Mercury

Lead (Pb) Monitoring

Currently only one lead monitoring site location, with an associated collocated sampler, is operated at 108 N Main St., Savanna Oklahoma (AQS Site # 40-121-0416).

DEQ's Pb monitoring network is sufficient to meet 40 CFR Part 58 Appendix D Section 4.5 requirements, which states "At a minimum, there must be one source-oriented SLAMS site located to measure the maximum Pb concentration in ambient air resulting from each non-airport Pb source which emits 0.50 or more tons per year and from each airport which emits 1.0 or more tons per year based on either the most recent National Emission Inventory (http://www.epa.gov/ttn/chief/eiinformation.html) or other scientifically justifiable methods and data (such as improved emissions factors or site-specific data) taking into account logistics and the potential for population exposure"

The 2020 National Emissions Inventory includes air emissions sources of both criteria and hazardous air pollutants, and data are available for many facilities and county totals. However, as this data is compiled on a

triennial basis, DEQ has many datasets reflecting more up to date information. In all cases possible, the most recent site specific data is utilized in making these determinations.

There are currently no facilities reporting over 0.5 tons of Pb emissions.

Review of Site Conditions

The ODEQ home office currently has inadequate laboratory space for use by monitoring staff when conducting instrument maintenance and repair operations. This has also affected our ability to maintain accurate inventories. Multiple solutions to this issue are being evaluated.

Appendix D: EPA Response to 2022 Annual Network Plan



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6 1201 ELM STREET, SUITE 500 DALLAS, TEXAS 75270

November 2, 2022

Ms. Cheryl E. Bradley
Environmental Programs Manager
Data and Planning Section
Oklahoma Department of Environmental Quality
P.O. Box 1677
Oklahoma City, Oklahoma 73101-1677

Dear Ms. Bradley:

Thank you for your correspondence to the U.S. Environmental Protection Agency from the Oklahoma Department of Environmental Quality submitting the Oklahoma 2022 Annual Monitoring Network Plan (2022 Plan) for ambient air. The EPA has completed its review of the 2022 Plan to ensure it meets the minimum requirements of 40 Code of Federal Regulations Part 58 and its appendices.

We appreciate your efforts in submitting a timely 2022 Plan, which we received on July 1, 2022. Also, we appreciate the efforts of the ODEQ to manage and maintain the ambient air monitoring network in Oklahoma in compliance with the Clean Air Act.

The network review process presents an opportunity for the EPA and the ODEQ to collaborate on the air monitoring network design. See 40 CFR Part 58 Appendix D, Section 1.1.2. The EPA has conducted its review of the 2022 Plan including proposed network modifications to ensure the air quality surveillance system continues to meet applicable requirements. The EPA is approving your 2022 plan as meeting the minimum requirements per 40 CFR Part 58 and Appendices, including Section 58.10 and Section 58.14. Also, the EPA acknowledges your update regarding environmental justice considerations, including the ODEQ's non-NAAQS transport monitoring, and toxics monitoring, neither of which is specifically required by federal monitoring requirements in 40 CFR Part 58; rather, it is at the discretion of Oklahoma. Additionally, for next year's Plan, monitoring requirements in the Tulsa area will change, as the most recent (2021) U.S. Census population estimate for the Tulsa MSA is 1,000,000 or more persons; updates needed include: nitrogen dioxide (NO₂) near road, carbon monoxide (CO), Photochemical Assessment Monitoring Stations and particulate matter monitoring. Details regarding these requirements, and other specifics from our review of the 2022 Plan, are enclosed. We are available to discuss our review with you if you have any questions.

For the 2022 Plan, this approval action is consistent with EPA's determination that the 2022 Plan meets federal requirements for Oklahoma's ambient air monitoring network.

As described in EPA's enclosed Technical Comments, the EPA is also approving the 2022 Plan consistent with EPA's October 1, 2020, approval of Oklahoma's request under section 10211(a) of SAFETEA to administer this program in certain areas of Indian country.

We note, however, that the EPA is currently reviewing our October 1, 2020, SAFETEA approval and anticipates engaging in further discussons with tribal governments and the State of Oklahoma as part of this review. The EPA also notes that the October 1, 2020, approval is the subject of a pending challenge in federal court. (*Pawnee v. Regan*, No. 20-9635 (10th Cir.)). Pending completion of the EPA's review, the EPA is proceeding with this action in accordance with the October 1, 2020, approval. The EPA may make any appropriate adjustments to the approval of Oklahoma's 2022 Plan to reflect the outcome of the SAFETEA review. Additional details about the EPA's SAFETEA approval are enclosed.

We look forward to our continued partnership with the ODEQ on our common goal to establish and maintain an approvable and comprehensive monitoring. If you have any questions, please contact me at (214) 665-7593, or your staff may contact Mr. Jeffrey Robinson, Branch Manager, Air Permits, Monitoring and Grants Branch, at (214) 665-6435.

Sincerely,
David F. Garcia, P.E.
Director
Air and Radiation Division

Enclosure: Technical Comments

Technical Comments

2022 Annual Monitoring Network Plan Technical Comments

The Oklahoma 2022 Annual Monitoring Network Plan (ANP) was received on July 1, 2022 (2022 Plan). In accordance with the requirements of 40 Code of Federal Regulations (CFR) Part 58 and its appendices, the U.S. Environmental Protection Agency (EPA) has reviewed the 2022 Plan and our comments are provided below. These comments reflect the EPA's efforts in collaboration with the Oklahoma Department of Environmental Quality (ODEQ) to maintain minimum monitoring requirements required under Part 58.

General Comments – Indian country

Following the U.S. Supreme Court decision in *McGirt v Oklahoma*, 140 S.Ct. 2452 (2020), the Governor of the State of Oklahoma requested approval under Section 10211(a) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act of 2005: A Legacy for Users, Pub. Law 109-59, 119 Stat. 1144, 1937 (August 10, 2005) ("SAFETEA"), to administer in certain areas of Indian country (as defined at 18 U.S.C. § 1151) the State's environmental regulatory programs that were previously approved by the EPA outside of Indian country.

On October 1, 2020, the EPA approved Oklahoma's SAFETEA request to administer all of the State's EPA-approved environmental regulatory programs, including the Ambient Air Quality Surveillance requirements in 40 CFR Part 58 [specifically, the 2021 Annual Monitoring Network Plan (2021 Plan)¹], in the requested areas of Indian country. As requested by Oklahoma, the EPA's approval under SAFETEA does not include Indian country lands, including rights-of-way running through the same, that: (1) qualify as Indian allotments, the Indian titles to which have not been extinguished, under 18 U.S.C. § 1151(c); (2) are held in trust by the United States on behalf of an individual Indian or Tribe; or (3) are owned in fee by a Tribe, if the Tribe (a) acquired that fee title to such land, or an area that included such land, in accordance with a treaty with the United States to which such Tribe was a party, and (b) never allotted the land to a member or citizen of the Tribe (collectively "excluded Indian country lands").

EPA's approval under SAFETEA expressly provided that to the extent EPA's prior approvals of Oklahoma's environmental programs excluded Indian country, any such exclusions are superseded for the geographic areas of Indian country covered by the EPA's approval of Oklahoma's SAFETEA request.² The approval also provided that future revisions or amendments to Oklahoma's approved environmental regulatory programs would extend to the covered areas of Indian country (without any further need for additional requests under SAFETEA).

¹ 40 CFR Part 58.10.

² The EPA approved the 2021 Plan in accordance with EPA's October 1, 2020. SAFETEA approval. The EPA's approval of Plans prior to 2021 relating to Oklahoma's ambient air quality, including the 2020 Annual Monitoring Network Plan approved on October 22, 2020, were not approved to apply in areas of Indian country located in the state. Such prior limitations are superseded by the EPA's approval of Oklahoma's SAFETEA request.

As explained above, the EPA is approving Oklahoma's 2022 Annual Monitoring Network Plan. Consistent with EPA's October 1, 2020, SAFETEA approval, this 2022 Plan will apply to all Indian country within the State of Oklahoma, other than the excluded Indian country lands.¹

General Comments - Clean Air Act

We appreciate the ODEQ's submittal of the 2022 Plan in accordance with 40 CFR §58.10.

Environmental Justice Considerations

The EPA recognizes that the 2022 Plan meets the minimum federal regulatory requirements outlined at 40 CFR 58.10 and Appendices A through E. The EPA acknowledges the update regarding environmental justice considerations² provided in the 2022 Plan, including the ODEQ's non-NAAQS transport monitoring, and toxics monitoring, neither of which is specifically required by federal monitoring requirements in 40 CFR Part 58; rather, it is at the discretion of Oklahoma. (See the 2022 Plan, Appendix C, pp. 19 - 22).

Pb Monitoring

For the 2023 Plan, for Pb monitoring, please provide an explanatory statement as part of the Plan text, confirming that the Pb monitoring network is sufficient to meet 40 CFR Part 58 Appendix D Section 4.5 requirements. We recognize that Pb monitoring is included in Table 1, and would appreciate discussion of the network in the Plan.

Operation of monitoring network in accordance with 40 CFR Part 58 and Appendices A, B, C, D, and E. We appreciate the ODEQ's operation of the ambient air monitoring network in accordance with minimum federal requirements defined in 40 CFR Part 58 and Appendices A through E.

Air Quality System (AQS). Thank you for your efforts to ensure that the information in the ANP and the AQS is complete and consistent. Please continue to update the AQS, and to correlate the details of each monitoring location in the ANP with the AQS.

¹ In accordance with Executive Order 13990, the EPA is currently reviewing our October 1, 2020, SAFETEA approval and is engaging in further consultation with tribal governments and discussions with the state of Oklahoma as part of this review. The EPA also notes that the October 1, 2020, approval is the subject of a pending challenge in federal court. (*Pawnee v. Regan*, No. 20-9635 (10th Cir.)). Pending completion of EPA's review, the EPA is proceeding with this action in accordance with the October 1, 2020, approval. The EPA may make any appropriate adjustments to the approval of Oklahoma's 2022 Plan and SO2 Annual Report to reflect the outcome of the SAFETEA review.

² Executive Order 14008, January 27, 2021. Federal Register / vol. 86, No. 19, February 1, 2021, p. 7619. Securing Environmental Justice and Spurring Economic Opportunity. Section 219. *Policy*.

[&]quot;To secure an equitable economic future, the United States must ensure that environmental and economic justice are key considerations in how we govern. That means . . . turning disadvantaged communities – historically marginalized and overburdened – into healthy, thriving communities . . . ".

Monitoring Requirements in the Tulsa Area

To meet the minimum monitoring requirements in CBSA's with 1,000,000 or more persons, for ambient air monitoring in the Tulsa area, please coordinate with the EPA for approval in advance of updates needed for the following: NO₂ near road, CO, Photochemical Assessment Monitoring Stations (PAMS), and PM; see specific requirements in the discussion per pollutant below.

Ozone (O₃) Monitoring (40 CFR Part 58, Appendix D Section 4.1)

The ODEQ is meeting the minimum requirements for its Ozone monitoring network design.

The EPA appreciates the updates on the Special Purpose Monitors (AQS #s 40-147-0217 and AQS ID 40-147-0207) for ozone measurements. Also, we thank the ODEQ for the update on all non-essential ozone sites being temporarily shut down for maintenance during the ozone season hiatus.

We look forward to receiving information in the future from the ODEQ regarding a proposed short relocation of the existing Glenpool ozone monitoring site in Tulsa (AQS ID 40-143-0174).

Carbon Monoxide (CO) Monitoring (40 CFR Part 58, Appendix D Section 4.2)

The ODEQ is meeting the minimum requirements for its carbon monoxide (CO) monitoring network design. In next year's Plan, based on the most recent population estimate, additional CO monitoring requirements will need to be met in the Tulsa area. See details above: *Monitoring Requirements in the Tulsa Area*.

Additional requirements for next year's Plan for the Tulsa MSA include an additional CO monitor in conjunction with additional near-road NO₂ monitoring. We look forward to working with the ODEQ on these changes.

Nitrogen Dioxide (NO₂) Monitoring (40 CFR Part 58, Appendix D Section 4.3)

The ODEQ is meeting the minimum requirements for its nitrogen dioxide (NO₂) monitoring network design.

For next year's Plan, please see the sections above (*Monitoring Requirements in the Tulsa Area*) and below regarding additional near-road monitoring for nitrogen oxides (NO, NO₂, NO_X).

Near-Road (NO₂) Monitoring Site [40 CFR 58 Appendix D Section 4.3.2(a)]

The ODEQ is meeting the minimum requirements for its Near-Road (NO₂) monitoring network design. In next year's Plan, additional Near-Road (NO₂) monitoring requirements need to be met in the Tulsa area.

Additional requirements for next year's Plan for the Tulsa MSA include an additional near-road NO₂ monitoring station. The EPA looks forward to working with the ODEQ on these changes.

<u>Photochemical Assessment Monitoring Stations (PAMS) parameters addition to the Tulsa NCore site (40 CFR Part 58, Appendix D Section 5(a))</u>

Previously for the Tulsa MSA, PAMS monitoring was not required; however, based on the most recent population estimate, for next year's Plan, PAMS monitoring will need to be added in the Tulsa area.

Additional requirements for next year's Plan for the Tulsa MSA include PAMS monitoring. We look forward to working with the ODEQ on these changes.

Sulfur Dioxide (SO₂) Monitoring (40 CFR Part 58, Appendix D Section 4.4)

The ODEQ is meeting the minimum requirements for its SO₂ monitoring network design. See 40 CFR Part 58, Appendix D Section 4.4. The EPA acknowledges that no changes were proposed to the Oklahoma SO₂ network in the 2022 Plan.

Lead (Pb) Monitoring (40 CFR Part 58, Appendix D Section 4.5)

The ODEQ is meeting the minimum network design requirements for ambient air quality monitoring for Pb. The EPA acknowledges that no changes were proposed to Oklahoma's monitoring network for Pb in the 2022 Plan.

Particulate Matter (PM) Monitoring (40 CFR Part 58, Appendix D Section 4.6 and 4.7)

The ODEQ is meeting the minimum network design requirements for ambient air quality monitoring for particulate matter (PM).

Particulate Matter of 2.5 Microns or Less (PM2.5) (40 CFR Part 58, Appendix D Section 4.7)

The plan to relocate the PM_{2.5} monitor at the Tulsa Glenpool site (AQS ID 40-143-0174) will be reviewed when specifics of the new location are provided.

PM_{2.5} Quality Assurance Collocation

For the PM_{2.5} monitors which the ODEQ operates using Federal Reference Method (FRM) number 145, collocation is met at the North Tulsa site (AQS ID 40-143-1127).

For the PM_{2.5} monitors which the ODEQ operates using Federal Equivalent Method (FEM) number 236, collocation is met at the McAlester site (AQS ID 40-121-0415).

For the PM_{2.5} monitors which the ODEQ operates using FEM number 238, collocation is met at the Oklahoma City North site (AOS ID 40-109-1037).

Multiple PM Measurements from an individual monitor

The EPA appreciates the continued use of the T640X monitors to report both NAAQS and non-NAAQS measurements throughout ODEQ's monitoring network.

Particulate Matter of 10 Microns or Less (PM₁₀) (40 CFR Part 58, Appendix D Section 4.6)

For the 2023 plan, we note that monitoring requirements in Tulsa will change, as the most recent U.S. Census population estimate for the Tulsa MSA is over 1,000,000 or more persons. The establishment of a new PM_{10} monitor will be required. We look forward to working with ODEQ on this as needed.

The plan to relocate the PM_{10} monitor at the Tulsa Glenpool site (AQS ID 40-143-0174) will be reviewed when specifics of the new location are provided.

PM₁₀ Quality Assurance Collocation

For the PM₁₀ Manual monitors which the ODEQ operates using Federal Reference Method (FRM) number 127, collocation is met at the Central Fire Station site (AQS ID 40-109-0035).

Near-Road (PM_{2.5}) Monitoring Site [40 CFR 58 Appendix D Section 4.3.2(a) and 4.7.1(b)(2)]

The ODEQ is meeting the minimum requirements for its Near-Road (PM_{2.5}) monitoring network design. In next year's Plan, additional Near-Road (PM_{2.5}) monitoring requirements need to be met in the Tulsa area.