



May 1, 2020

Morgan Dickie
Air Monitoring Program
Metro Public Health Department
2500 Charlotte Avenue
Nashville, Tennessee 37209
Reference: First Quarter 2020 TDEC / Performance Audits

Dear Ms. Dickie:

This report contains the results of performance audits conducted by personnel from Tennessee's Air Quality Assurance Program on March 12, 2020. The audits were performed on various instruments at the Near Road location in the Metropolitan Davidson County air monitoring network, including gaseous analyzers for O₃, SO₂, NO₂, CO and particle samplers for PM_{2.5}.

During the first quarter Quality Assurance Performance Audits (QAPA), Tennessee Air Quality Assurance personnel audited the non-ozone gas analyzers with certified gas concentrations that were delivered from the Teledyne 750U's verified mass flow controllers to determine the accuracy of SO₂, NO₂ and CO analyzers. Times were verified by www.time.gov, and temperatures were verified using a transfer standard (Streamline Pro). The flow rate of each low volume particle sampler was checked against a specified design flow rate and a transfer standard (Streamline Pro). All TDEC QA equipment is verified against a certified standard to ensure its accuracy. These audits were conducted to ensure that each air monitor within the Metropolitan Davidson County network was operating within accepted criteria established by federal regulations and guidance documents. Acceptable limits of these performance audits are published in 40 Code of Federal Regulations (CFR) Part 58 and QA Handbook Volume II, which establish federal standards for Quality Assurance and Quality Control practices for ambient air monitoring. These acceptable limits should be considered in conjunction with your last approved Quality Assurance Plan.

It is noted that due to circumstances beyond our control (i.e. tornado, COVID-19), only Near Road was audited during the first quarter of 2020.

Results from the first quarter, 2020 QAPAs, demonstrate that the Davidson County air monitoring network was operating within acceptable limits of federal regulations and quality assurance guidelines. All QAPA results were noted in the instrument log books and summarized in the following pages of this report.

If we can be of any further assistance or should there be questions regarding this audit, please email me at Ben.Hartsfield@tn.gov or call (615) 532-0597.

Sincerely,

A handwritten signature in blue ink that reads "Ben Hartsfield".

Ben Hartsfield
Environmental Consultant 1
Quality Assurance Section

Reviewed by Michelle Oakes

A handwritten signature in blue ink that reads "Michelle Oakes".

cc: A. Pratt, APC; M. Oakes, APC; R. Brawner, APC; G. Walshe-Langford, Davidson County

*Air Pollution Control Division
Quality Assurance Performance Audit*

Site: Near Road CO
 Audit Quarter: 1Q 2020
 AQS #: 47-037-0040
 Auditor: Ben Hartsfield
 Date of Audit: 3/12/2020

Instrument Model: Teledyne T300 Serial Number: 1360 Data Logger Model: ESC 8832 Data Logger Serial Number: A4689K			<u>Audit Equipment:</u> Teledyne T750U SN 71 Teledyne 751H SN 183 Praxair FA02370 CO 201.7 PPM 6/26/2022 Streamline Pro SN 150306 www.time.gov		
<u>Measured Parameter sccm/LPM</u>	<u>Audit Value ppm</u>	<u>Monitor Response ppm</u>	<u>Difference</u>	<u>Acceptable Range</u>	<u>Level *</u>
0cc/5L	0	-0.137		<±0.41 ppm	Zero
190cc/4L	9.146	8.795	-3.8%	<±15.1%	6
190cc/10L	3.760	3.562	-5.3%	<±15.1%	5
100cc/10L	1.997	1.832	-8.3%	<±15.1%	4
50cc/10L	1.003	0.893	-11.0%	<±15.1%	4
30cc/10L	0.603	0.531	-11.9%	<±15.1%	3
0cc/10L	0	-0.144		<±0.41 ppm	Zero
Data Logger Time	10:43:06	10:42:00	00:01:06	<±00:01:00*	
Data Logger Temperature	26.2	27.2	1.0	<±2.1°C	

Audit Notes:

- *The data logger time acceptable range of <±00:01:00 is a State recommendation.

Recommendation:

- Please abide by the EPA approved QAPP with regards to data logger time accuracy.

Site: Near Road NO₂
Audit Quarter: 1Q 2020
AQS #: 47-037-0040
Auditor: Ben Hartsfield
Date of Audit: 3/12/2020

Instrument Model: Thermo 42i TL NO₂ Serial Number: 1324658812 Data Logger Model: ESC 8832 Data Logger Serial Number: A4689K			<u>Audit Equipment:</u> Teledyne T750U SN 71 Teledyne 751H SN 183 Praxair FA02370 NO/NO _x 10.99 PPM 6/26/2022 Streamline Pro SN 150306 www.time.gov			
<u>Measured Parameter sccm/LPM</u>	<u>Audit Value ppb</u>	<u>Monitor Response ppb</u>	<u>Difference</u>	<u>Acceptable Range</u>	<u>Level *</u>	
0cc/10L	0	0	0.0	<±3.1 ppb	Zero	
1350mv-150cc/10L	112	107	4.5%	<±15.1%	7	
1100mv-50cc/10L	71	68	4.2%	<±15.1%	6	
950mv-30cc/10L	47	45	4.3%	<±15.1%	5	
0cc/10L	0	0	0.0	<±3.1 ppb	Zero	

Site: Near Road NO_x
Audit Quarter: 1Q 2020
AQS #: 47-037-0040
Auditor: Ben Hartsfield
Date of Audit: 3/12/2020

Instrument Model: Thermo 42i NO_x Serial Number: 1324658812 Data Logger Model: ESC 8832 Data Logger Serial Number: A4689K			<u>Audit Equipment:</u> Teledyne T750U SN 71 Teledyne 751H SN 183 Praxair FA02370 NO/NO _x 10.99 PPM 6/26/2022 Streamline Pro SN 060504 www.time.gov			
<u>Measured Parameter sccm/LPM</u>	<u>Audit Value ppb</u>	<u>Monitor Response ppb</u>	<u>Difference</u>	<u>Acceptable Range</u>	<u>Level *</u>	
0cc/10L	0	0	0.0	<±3.1 ppb	Zero	
150cc/10L	162	159	-1.9%	<±15.1%		
100cc/10L	108	105	-2.8%	<±15.1%		
60cc/10L	65	64	-1.5%	<±15.1%		
20cc/11L	21	21	0.0%	<±15.1%		
0cc/10L	0	0	0.0	<±3.1 ppb	Zero	

Site: Near Road NO
Audit Quarter: 1Q 2020
AQS #: 47-037-0040
Auditor: Ben Hartsfield
Date of Audit: 3/21/2020

Instrument Model: Thermo 42i NO Serial Number: 1324658812 Data Logger Model: ESC 8832 Data Logger Serial Number: A4689K		Audit Equipment: Teledyne T750U SN 153 Teledyne 751H SN 183 Praxair FA02370 NO/NO _x 10.99 PPM 6/26/2022 Streamline Pro SN 150306 www.time.gov			
<u>Measured Parameter sccm/LPM</u>	<u>Audit Value ppb</u>	<u>Monitor Response ppb</u>	<u>Difference</u>	<u>Acceptable Range</u>	<u>Level *</u>
0cc/10L	0	0	0.0	<±3.1 ppb	Zero
150cc/10L	162	159	-1.9%	<±15.1%	
100cc/10L	108	105	-2.8%	<±15.1%	
60cc/10L	65	64	-1.5%	<±15.1%	
20cc/11L	21	21	0.0%	<±15.1%	
0cc/10L	0	0	0.0	<±3.1 ppb	Zero

Converter Efficiency: 97.8%

Site: Near Road SO2
Audit Quarter: 1Q 2020
AQS #: 47-037-0040
Auditor: Ben Hartsfield
Date of Audit: 3/21/2020

Instrument Model: Thermo 43i SO2 Serial Number: 1182890005 Data Logger Model: ESC 8832 Data Logger Serial Number: A4689K		Audit Equipment: Teledyne T750U SN 71 Teledyne 751H SN 183 Praxair FA02370 CO 201.7 PPM 6/26/2022 Streamline Pro SN 150306 www.time.gov			
<u>Measured Parameter sccm/LPM</u>	<u>Audit Value ppb</u>	<u>Monitor Response ppb</u>	<u>Difference</u>	<u>Acceptable Range</u>	<u>Level *</u>
0cc/10L	0	0	0	<±3.1 ppb	Zero
100cc/10L	130	128	-1.5%	<±15.1%	7
50cc/10L	65	63	-3.1%	<±15.1%	6
30cc/10L	39	38	-2.6%	<±15.1%	5
10cc/10L	13	12	-7.6%	<±15.1%	4
0cc/10L	0	0	0.0	<±3.1 ppb	Zero
Data Logger Time	10:43:06	10:42:00	00:01:06	<±00:01:00*	
Data Logger Temperature	26.2	27.2	1.0	<±2.1°C	

Site: Near Road
Audit Quarter: 1Q 2020
AQS #: 47-037-0040
Auditor: Ben Hartsfield
Date of Audit: 3/21/2020

Instrument Model: BAM Serial Number: W21428		<u>Audit Equipment:</u> Streamline Pro SN C150306 www.time.gov		
<u>Measured Parameter</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>Difference</u>	<u>Acceptable Range</u>
Sample Flow: LPM	16.47	16.7	1.4%	+/-4.1% (5.1%)
Barometric Pressure: mmHg	744.5	743	1.5	+/-10.1 mmHg
Ambient Temperature: °C	18.5	18.3	-0.2°C	+/-2.1°C
External Leak Check:		0.8		≤25 mmHg
Monitor Time:	09:29:00	09:28:28	-0:00:35	+/-00:05:00

Audit Notes:

1. The monitors audited showed satisfactory correlation with our audit standard.
2. The results were noted in the instrument log books and listed in this report.
3. *The data logger time acceptable range of <±00:01:00 is a State recommendation.

Recommendations:

1. Please abide by the EPA approved QAPP with regards to data logger time accuracy.

Any questions concerning the audits or any comments made in connection with the audits may be addressed to me at (615) 532-0597 or at Ben.Hartsfield@tn.gov.

Sincerely,



Ben Hartsfield
 Environmental Consultant 1
 Quality Assurance Program