



November 10, 2020

Brian Rivera
Knox County Air Quality Management Division
140 Dameron Ave Suite 242
Knoxville, TN 37917

Reference: Third Quarter 2020 TDEC /Performance Audits

Dear Mr. Rivera:

This report contains the results of performance audits conducted by personnel from Tennessee's Air Quality Assurance Program on September 9th- 10th, 2020. The audits were performed on various instruments at multiple monitoring locations throughout the Knox County monitoring network, including gaseous analyzers for ozone, high volume particle samplers for lead (Pb) and/or PM10, and low volume particle samplers for PM2.5. Sites audited include Air Lab, Ameristeel, Bearden, Burnside, East Knox, Rule Street, and Spring Hill.

During the Quality Assurance Performance Audits (QAPA) on September 9th- 10th, 2020, Tennessee Air Quality Assurance personnel audited the flow rate of each high volume and low volume particle (or Pb) sampler against a specified design flow rate (i.e. nominal flow rate of the sampler) and a transfer standard. QA personnel also audited each ozone analyzer with a level three standard using a Teledyne 750 multi-gas calibrator to determine the accuracy of the analyzer against a certified standard. These audits were conducted to ensure that each air monitor within the Knox 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 Quality Assurance Plan.


Results from the third quarter, 2020 QAPA, demonstrate that the Knox County air monitoring network was operating within acceptable limits of federal regulations and quality assurance guidelines. The next TDEC QAPA will be scheduled with Amber Talgo before the second quarter of 2021.

If we can be of any further assistance or should there be questions regarding this audit, please email me at Lance.Allen@tn.gov or call (615)687-7040.

Sincerely,

A handwritten signature in blue ink that reads "D. Lance Allen".

D. Lance Allen
Environmental Consultant
Quality Assurance Section

cc: M. Oakes, APC; Amber Talgo, KCAQ. 
Michelle Oakes (Nov 10, 2020 10:02 CST)

*Air Pollution Control Division
Quality Assurance Performance Audit*

Site: Air Lab
Audit Quarter: 3Q 2020
AQS #: 47-093-1013
Pollutants: PM 2.5 & PM 10
Operators: Barron White and David Colvin
Auditor: Lance Allen

Instrument Model:	Thermo 2025	PM 2.5	Audit Equip: SLP#060504	
Serial Number:	22876			
Audit Date:	9/9/2020			
<u>Measured Parameter</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>Difference</u>	<u>Acceptable Range</u>
Transfer Standard Flow:	16.85	16.70	-0.9%	< ± 4.1%
Design Flow:	16.67	16.70	0.2%	< ±5.1%
Barometric Pressure:	735	736	1	< ± 10.1mm
Ambient Temperature:	29.3	29.2	-0.1	< ± 2.1°C
Filter Temperature:	31.3	30.8	-0.5	< ± 2.1°C
Compartment Temperature:	30.9	30.5	-0.4	< ±2.1°C
External Leak Check:	AF=4	AL=3	pass	≤ 25 mm Hg
Clock Time:	12:05:13	12:04:00	-00:01:13	± 00:01:00 minutes

Instrument Model:	Teledyne T640x	PM 2.5 & 10	Audit Equip: SLP# 060504	
Serial Number:	192			
Audit Date:	9/9/2020			
<u>Measured Parameter</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>Difference</u>	<u>Acceptable Range</u>
Main Flow:	5.02	5.02	0.0%	< ± 5.0%
Aux Flow:	10.83	11.23	3.7%	< ± 5.0%
Total Flow:	15.85	16.23	2.4%	< ± 5.0%
Design Flow:	16.67	16.23	-2.6%	< ± 5.1%
Barometric Pressure:	738	737	-1	< ±10.1 mm
Ambient Temperature:	30.1	30.1	0.0	< ± 2.1°C
Leak Check PM10	AF=0.0LPM	AL=0.0LPM		<±0.2ug
Leak Check PM2.5	AF=0.0LPM	AL=0.0LPM		<±0.2ug
Clock Time 8832 A3760K	12:31:00	12:31:00	-00:00:00	*± 00:01:00 minutes

Remarks:

1. The monitors audited showed satisfactory correlation with our audit standards.
2. All measured parameters were within the acceptable ranges as defined in EPA guidance and regulations.
3. The PM inlets and cyclones were clean.
4. Results were noted in each instrument log book.
5. Systematic criteria, current time \pm one minute of NIST traceable standard, was recorded over one minute on the 2025.
6. * The data logger acceptable time range of $< \pm$ one minute is a State recommendation.

Recommendations:

1. None.

Any questions concerning the audits or any comments made in connection with the audits may be addressed to me at (615) 687-7040 or lance.allen@tn.gov.

Sincerely,

A handwritten signature in blue ink that reads "Lance Allen".

Lance Allen
Environmental Consultant
Quality Assurance Section
Report Date: 10/29/2020



*Air Pollution Control Division
Quality Assurance Performance Audit*

Site: Ameristeel
Audit Quarter: 3Q 2020
AQS #: 47-093-0023
Pollutants: Pb
Operator: Barron White
Auditor: Lance Allen

Instrument Model:	TSP/VFC	Pb	Audit Equip:	Serial #
Serial Number:	P4304		Orifice	10337
Audit Date:	9/9/2020		Streamline Pro	060504
Measured Parameters:	<u>Audit Value</u>	<u>Monitor Response</u>	<u>% Difference</u>	<u>Acceptable Range</u>
Transfer Standard Flow:	38.43	39.09	1.7%	< ± 7.1 %
Design Flow:	40.58	39.91	-1.7%	< ± 10.1 %

Remarks:

1. The monitor audited showed satisfactory correlation with our audit standard.

Recommendations:

1. None.

Any questions concerning the audits or any comments made in connection with the audits may be addressed to me at (615) 687-7040 or lance.allen@tn.gov.

Sincerely,

Lance Allen
Environmental Consultant
Quality Assurance Section

Report Date: 10/29/2020

*Air Pollution Control Division
Quality Assurance Performance Audit*

Site: Bearden
Audit Quarter: 3Q 2020
AQS #: 47-093-0028
Pollutant: PM 2.5
Operator: Barron White
Auditor: Lance Allen

Instrument Model:	Thermo 2025	PM 2.5	<u>Audit Equip:</u>	<u>Serial #</u>
Serial Number:	21894	POC 1	Streamline Pro	060504
Audit Date:	9/10/2020			
<u>Measured Parameter</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>Difference</u>	<u>Acceptable Range</u>
Transfer Standard Flow:	16.70	16.67	-0.2%	< ± 4.1%
Design Flow:	16.67	16.67	0.0%	< ±5.1%
Barometric Pressure:	737	742	5	< ± 10.1mm
Ambient Temperature:	28.5	28.1	-0.4	< ± 2.1°C
Filter Temperature:	30.0	29.3	-0.7	< ± 2.1°C
Compartment Temperature:	31.2	29.4	-1.8	< ±2.1°C
External Leak Check:	AF=8	AL=8	pass	≤ 25 mm Hg
Clock Time:	9:56:00	9:55:23	-00:00:37	± 00:01:00 minutes

Instrument Model:	Thermo 2025	PM 2.5	<u>Audit Equip:</u>	<u>Audit Equip:</u>
Serial Number:	21893	POC 2	Streamline Pro	060504
Audit Date:	9/10/2020			
<u>Measured Parameter</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>Difference</u>	<u>Acceptable Range</u>
Transfer Standard Flow:	16.65	16.61	-0.2%	< ± 4.1%
Design Flow:	16.67	16.61	-0.4%	< ±5.1%
Barometric Pressure:	736	736	0	< ± 10.1mm
Ambient Temperature:	28.6	28.1	-0.5	< ± 2.1°C
Filter Temperature:	30.5	30.3	-0.2	< ± 2.1°C
Compartment Temperature:	33.2	33.3	0.1	< ±2.1°C
External Leak Check:	AF=10	AL=9	pass	≤ 25 mm Hg
Clock Time:	10:07:42	10:07:00	-00:00:42	± 00:01:00 minutes

Remarks:

1. The monitors audited showed satisfactory correlation with our audit standard.
2. All measured parameters were within the acceptable ranges as defined in EPA guidance and regulations.
3. PM 10 inlet and PM 2.5 cyclone were clean.
4. The audit results were noted in the instrument log book.

Recommendations:

1. None.

Any questions concerning the audits or any comments made in connection with the audits may be addressed to me at (615) 687-7040 or lance.allen@tn.gov.

Sincerely,

A handwritten signature in blue ink that reads "Lance Allen".

Lance Allen
Environmental Consultant
Quality Assurance Section

Report Date: 10/29/2020

*Air Pollution Control Division
Quality Assurance Performance Audit*

Site: Burnside
Audit Quarter: 3Q 2020
AQS #: 47-093-0027
Pollutant: Pb
Operator: Barron White
Auditor: Lance Allen

Instrument Model:	TSP/VFC	Pb/POC 1	Audit Equip:	Serial #
Serial Number:	P02875		Orifice	10337
Audit Date:	9/9/2020		Streamline Pro	060504
Measured Parameters:	<u>Audit Value</u>	<u>Monitor Response</u>	<u>% Difference</u>	<u>Acceptable Range</u>
Transfer Flow:	39.00	38.60	-1.0%	< ± 7.1 %
Design Flow:	41.28	39.91	3.4%	< ± 10.1 %
Instrument Model:	TSP/VFC	Pb/POC 2		
Serial Number:	P04302			
Audit Date:	9/9/2020			
Measured Parameters:	<u>Audit Value</u>	<u>Monitor Response</u>	<u>% Difference</u>	<u>Acceptable Range</u>
Transfer Flow:	39.23	39.16	-0.2%	< ± 7.1 %
Design Flow:	41.45	39.91	3.9%	< ± 10.1 %

Remarks:

1. The monitors audited showed satisfactory correlation with our audit standards.
2. All measured parameters were within the acceptable ranges as defined in EPA guidance and regulations.

Recommendations:

1. None.

Any questions concerning the audits or any comments made in connection with the audits may be addressed to me at (615) 687-7040 or lance.allen@tn.gov.

Sincerely,



Lance Allen
 Environmental Consultant
 Quality Assurance Section
 Report Date: 10/29/2020

*Air Pollution Control Division
Quality Assurance Performance Audit*

Site: Mascot-East Knox
Audit Quarter: 3Q 2020
AQS #: 47-093-0021
Pollutant: Ozone
Operator: David Colvin
Auditor: Lance Allen

Instrument Model:	Teledyne T400	O3		<u>Audit Equip:</u>	<u>Serial#</u>
Serial Number:	4006			Teledyne 750U	#112
Data Logger Model:	ESC 8832			Teledyne 751H	#182
Data Logger Serial Number:	A3757K			SLP	#060504
Audit date:	9/9/2020				
<u>Ozone/Gas/Dilution Setting</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>% Difference</u>	<u>Acceptable Range</u>	<u>Audit Level</u>
	ppb	ppb			
0/5000	0	-1	-1	< ± 3.1 ppb	Zero
85	85	83	-2.4%	< ± 15.1 %	5
65	65	64	-1.5%	< ± 15.1 %	4
35	35	34	-2.9%	< ± 15.1 %	3
15	15	15	0.0%	< ± 15.1 % or ± 1.5ppb	2
0/5000	0	0	0	< ± 3.1 ppb	Zero
Data logger time	8:17:00	8:17:00	-00:00:00	*<±1min	
Data logger temperature	26.7	27.0	0.3	< ± 2.1°C	

Remarks:

1. The monitor audited showed satisfactory correlation with our ozone standard.
2. All measured parameters were within the acceptable ranges as defined in EPA guidance and regulations.
3. The results were noted in the instrument's log book.
4. The data logger acceptable time range of < ± one minute is a State recommendation.*

Recommendations:

1. None.

Any questions concerning the audits or any comments made in connection with the audits may be addressed to me at (615) 687-7040 or lance.allen@tn.gov.

Sincerely,



Lance Allen
 Environmental Consultant
 Quality Assurance Section
 Report Date: 11/4/2020

*Air Pollution Control Division
Quality Assurance Performance Audit*

Site: Rule
Audit Quarter: 3Q 2020
AQS #: 47-093-1017
Pollutant: PM 2.5
Operator: Barron White
Auditor: Lance Allen

Instrument Model:	Thermo 2025	PM 2.5	Audit Equip: SLP #060504	
Serial Number:	22654			
Audit Date:	9/9/2020			
<u>Measured Parameter</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>Difference</u>	<u>Acceptable Range</u>
Transfer Standard Flow:	16.84	16.70	-0.8%	< ± 4.1%
Design Flow:	16.67	16.70	0.2%	< ±5.1%
Barometric Pressure:	732	735	3	< ± 10.1mm
Ambient Temperature:	30.5	30.4	-0.1	< ± 2.1°C
Filter Temperature:	33.3	32.1	-1.2	< ± 2.1°C
Compartment Temperature:	32.6	31.0	-1.6	< ±2.1°C
External Leak Check:	AF=3	AL=3	pass	≤ 25 mm Hg
Clock Time:	13:07:15	13:07:00	-00:00:15	± 00:01:00 minutes

Remarks:

1. The monitor audited showed satisfactory correlation with our audit standard.
2. All measured parameters were within the acceptable ranges as defined in EPA guidance and regulations.
3. The PM inlet and cyclone were clean on the 2025.
4. Audit results were noted in the instrument log book.

Recommendations:

1. None.

Any questions concerning the audits or any comments made in connection with the audits may be addressed to me at (615) 687-7040 or lance.allen@tn.gov.

Sincerely,



Lance Allen
 Environmental Consultant
 Quality Assurance Section
 Report Date: 11/4/2020

*Air Pollution Control Division
Quality Assurance Performance Audit*

Site: Springhill
Audit Quarter: 3Q 2020
AQS #: 47-093-1020
Pollutants: Ozone, PM 2.5
Operators: Barron White and David Colvin
Auditor: Lance Allen

Instrument Model:	Teledyne 400e	O3	<u>Audit Equip:</u>		<u>Serial#:</u>
Serial Number:	2013		Teledyne 750U		#112
Data Logger Model:	ESC 8832		Teledyne 751H		#182
Data Logger Serial Number:	A3758K		SLP		#060504
Audit date:	9/10/2020				
<u>Ozone/Gas/Dilution Setting</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>% Difference</u>	<u>Acceptable Range</u>	<u>Audit Level</u>
	ppb	ppb			
0/5000	0	-1	-1	< ± 3.1 ppb	Zero
85	85	83	-2.4%	< ± 15.1 %	5
65	65	64	-1.5%	< ± 15.1 %	4
35	35	35	0.0%	< ± 15.1 %	3
15	15	15	0.0%	< ± 15.1 % or ± 1.5ppb	2
0/5000	0	0	0	< ± 3.1 ppb	Zero
Data logger time	8:01:02	8:01:00	-00:00:02	*<±1min	
Data logger temperature	26.3	26.2	-0.1	< ± 2.1°C	

Instrument Model:	Thermo 2025	PM 2.5	<u>Audit Equip:</u>	
Serial Number:	21892		SLP #060504	
Audit Date:	9/9/2020			
<u>Measured Parameter</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>Difference</u>	<u>Acceptable Range</u>
Transfer Standard Flow:	16.74	16.70	-0.2%	< ± 4.1%
Design Flow:	16.67	16.70	0.2%	< ±5.1%
Barometric Pressure:	735	736	1	< ± 10.1mm
Ambient Temperature:	25.1	24.9	-0.2	< ± 2.1°C
Fliter Temperature:	26.2	27.5	1.3	< ± 2.1°C
Compartment Temperature:	29.4	31.0	1.6	< ±2.1°C
External Leak Check:	AF=6	AL=7	pass	≤ 25 mm Hg
Clock Time:	9:51:41	9:51:00	-00:00:41	± 00:01:00 minutes

Instrument Model:	Super Sass	PM 2.5	Audit Equip: SLP #060504	
Serial Number:	g9188/g9182			
Audit Date:	9/9/2020			
<u>Measured Parameter</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>Difference</u>	<u>Acceptable Range</u>
Transfer Std Flow, Ch1:	6.79	6.7	-1.3%	< ± 10.1%
Transfer Std Flow, Ch2:	6.81	6.7	-1.6%	< ± 10.1%
Barometric Pressure:	735	736	1	< ± 10.1 mm
Ambient Temperature:	26.0	25.9	-0.1	< ± 2.1°C
Filter Temperature, Ch1:	27.0	26.7	-0.3	< ± 2.1°C
Filter Temperature, Ch2:	27.0	26.7	-0.3	< ± 2.1°C
Leak Check, Ch1:		0.0Lpm	pass	<0.1Lpm
Leak Check, Ch3:		0.0Lpm	pass	<0.1Lpm
Clock Time:	10:03:00	10:03:07	-00:00:07	< ± 5:00 minutes

Remarks:

1. The monitors audited showed satisfactory correlation with our audit standards.
2. All measured parameters were within the acceptable ranges as defined in EPA guidance and regulation.
3. PM inlets and cyclones were clean.
4. The URG was at manufacture for repair. Not audited.
5. The audit results were noted in each instrument log book.
6. The data logger acceptable time range of < ± one minute is a State recommendation.*

Recommendations:

1. None.

Any questions concerning the audits or any comments made in connection with the audits may be addressed to me at (615) 687-7040 or lance.allen@tn.gov.

Sincerely,



Lance Allen
Environmental Consultant
Quality Assurance Section

Report Date: 11/4/2020

To: Brian Rivera, Knox County Air Quality Management Division.
cc: M. Oakes, APC; Amber Talgo, KCAQ.

