

**QUALITY ASSURANCE AUDIT REPORT
Executive Summary**

**North Texas Commission
Ambient Air and Meteorological Monitoring**

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EXECUTIVE SUMMARY

On June 20th through June 28th, 2016, an audit team from the AECOM ambient air group in Austin, Texas conducted performance and technical system audits of the North Texas Commission (NTC) ambient air monitoring network, providing an independent assessment of the monitoring program.

The monitoring program at NTC consists of continuous gas chromatographs (GC), volatile organic compound (VOC) canister collection systems, and meteorological sensors including wind speed, wind direction, temperature, and barometric pressure.

The performance audit results indicate acceptable responses for measurement systems with the exceptions summarized below.

At Kennedale, while attaching the audit canister to the sample line of the auto GC system, the audit team noticed the sample line was cracked from being placed in the sample inlet box at a hard 90 degree angle. The line then snapped when removed for the audit. The audit team repaired the line and notified operations and data validation staff of the problem. The data validation team undertook a thorough review of the data prior to the repair. The data do not appear compromised.

The wind direction sensors were found to be outside the total maximum error specification of $\pm 5^\circ$ at four sites: Decatur, Elm Fork, UTA Campus, and Flower Mound. These sensors were realigned and found to be within the audit objective. The operations and data validation staff were notified of these issues and are tracking these concerns to ensure that affected data are properly managed.

The wind direction sensors were slightly outside of the audit guidance of $\pm 3^\circ$ for linearity at Decatur and Flower Mound. Although the linearity was outside of the specified $\pm 3^\circ$, the maximum total error was within specification of $\pm 5^\circ$. The sensors will be re-evaluated during next quarter's audits.

The wind speed sensor bearings were outside of the audit guidance of 0.5 g-cm for the torque test at Benbrook and UTA Campus. New bearings were installed at these sites.

Out of the 48 compounds being analyzed, three compounds (propylene, 1,2,3-trimethylbenzene, and n-undecane) were found to be outside of the audit objective of 70% - 130% recovery at several sites, while 1,2,4-trimethylbenzene, n-decane, and styrene were outside of audit parameters at Everman and Ethylene at Mansfield. These audit results are comparable

historically to other AECOM auto-GC audits. No problems were identified in the quality control procedures at any of these sites that would indicate a persistent measurement error.

Technical systems audit results demonstrate satisfactory operational procedures for collecting valid data.

Below are the audit standard results for all network GCs:

Compound Name	Audit Conc (ppbc)	Benbrook		Decatur		Dish		Eagle Mountain	
		GC Response ppbc	%Rec	GC Response ppbc	%Rec	GC Response ppbc	%Rec	GC Response ppbc	%Rec
Ethane	8.3	7.9	95.0%	8.5	102.5%	7.5	90.6%	7.9	95.3%
Ethylene	8.3	6.3	75.6%	7.0	83.9%	6.2	75.1%	6.4	77.3%
Propane	12.0	13.0	108.3%	12.9	107.4%	11.6	97.0%	12.2	101.3%
Propylene	12.4	9.4	76.4%	10.0	80.7%	8.2	66.4%	8.7	70.3%
Iso-Butane	16.2	19.8	122.3%	18.9	117.1%	16.5	101.9%	18.4	113.6%
N-Butane	16.0	20.1	125.3%	18.8	117.4%	16.6	104.0%	18.3	114.5%
Acetylene	8.3	7.2	86.7%	7.6	90.7%	6.3	76.0%	7.7	93.0%
Trans-2-Butene	16.0	19.6	122.6%	18.9	117.8%	16.6	103.8%	18.2	113.9%
1-Butene	16.2	19.6	121.4%	18.8	116.3%	16.5	102.0%	18.3	113.5%
Cis-2-Butene	17.3	20.9	120.7%	19.7	114.2%	17.6	102.0%	19.0	110.0%
Cyclopentane	20.6	24.4	118.7%	23.9	116.2%	21.0	102.1%	23.8	115.4%
Iso-Pentane	21.4	26.5	123.8%	25.4	118.7%	22.2	103.8%	24.6	115.0%
N-Pentane	20.4	25.5	124.9%	24.4	119.5%	21.5	105.2%	24.3	118.9%
1,3-Butadiene	16.8	19.9	118.3%	19.8	117.8%	16.8	100.2%	19.3	114.6%
Trans-2-Pentene	21.0	25.0	119.2%	24.1	115.0%	20.5	97.8%	23.2	110.3%
1-Pentene	20.6	23.5	113.9%	23.3	113.2%	19.1	92.6%	21.6	104.9%
Cis-2-Pentene	22.0	25.7	116.8%	24.6	111.7%	20.3	92.3%	22.9	104.0%
2,2-Dimethylbutane	25.2	31.0	123.1%	27.9	110.8%	23.4	92.8%	24.5	97.3%
2-Methylpentane	24.5	30.3	123.8%	27.2	111.0%	24.6	100.5%	24.4	99.8%
Isoprene	20.8	20.0	96.1%	19.1	92.0%	16.7	80.1%	18.1	87.0%
n-Hexane	25.2	25.6	101.6%	24.4	96.9%	24.0	95.2%	24.0	95.1%
Methylcyclopentane	25.4	25.0	98.5%	23.8	93.7%	21.7	85.3%	23.1	91.0%
2,4-Dimethylpentane	29.7	32.0	107.9%	33.0	111.1%	31.9	107.5%	33.0	111.1%
Benzene	25.0	23.5	94.1%	25.4	101.8%	23.3	93.4%	23.9	95.7%
Cyclohexane	25.0	25.5	102.2%	25.2	101.1%	23.8	95.2%	26.0	104.2%
2-Methylhexane	30.0	26.8	89.4%	26.7	89.2%	23.4	78.2%	25.5	85.0%
2,3-Dimethylpentane	30.0	32.7	109.1%	32.6	108.7%	33.5	111.9%	35.2	117.6%
3-Methylhexane	29.4	29.5	100.2%	29.2	99.2%	28.7	97.7%	30.6	104.1%
2,2,4-Trimethylpentane	33.6	33.4	99.5%	33.6	100.0%	32.2	95.8%	33.4	99.3%
n-Heptane	29.4	28.9	98.2%	30.7	104.5%	27.6	93.9%	28.6	97.3%
Methylcyclohexane	29.4	29.3	99.7%	28.9	98.4%	28.1	95.5%	29.5	100.4%
2,3,4-Trimethylpentane	33.0	31.2	94.7%	32.5	98.6%	31.1	94.4%	32.8	99.5%
Toluene	29.1	26.2	90.1%	27.5	94.3%	27.1	93.2%	28.1	96.6%
2-Methylheptane	33.3	31.5	94.6%	32.7	98.2%	31.9	95.8%	33.3	100.0%
3-Methylheptane	33.3	31.8	95.6%	32.5	97.6%	32.5	97.8%	33.1	99.3%
n-Octane	33.0	31.7	96.1%	32.3	98.0%	31.2	94.7%	32.2	97.8%
Ethylbenzene	33.3	28.7	86.3%	31.4	94.3%	29.0	87.0%	30.1	90.4%
M&P-Xylene	66.6	56.4	84.7%	60.2	90.4%	57.0	85.7%	58.6	88.0%
Styrene	32.6	25.3	77.6%	26.0	79.7%	25.3	77.5%	26.1	79.9%
O-Xylene	32.6	29.7	91.1%	30.9	94.5%	28.6	87.6%	31.0	95.0%
N-Nonane	36.7	33.2	90.3%	34.4	93.7%	32.9	89.6%	35.0	95.3%
Isopropylbenzene	35.6	31.1	87.4%	34.3	96.4%	31.8	89.1%	33.9	95.0%
n-Propylbenzene	35.3	29.7	84.2%	32.9	93.3%	30.8	87.2%	32.5	92.1%
1,3,5-Trimethylbenzene	36.4	28.1	77.4%	34.4	94.5%	30.2	83.1%	33.0	90.8%
1,2,4-Trimethylbenzene	36.0	26.5	73.6%	31.0	86.2%	29.6	82.2%	31.2	86.6%
n-Decane	40.8	32.0	78.5%	33.5	82.1%	34.0	83.3%	36.3	89.1%
1,2,3-Trimethylbenzene	34.9	25.3	72.4%	27.2	78.0%	27.0	77.4%	27.4	78.6%
n-Undecane	43.6	29.3	67.3%	29.1	66.8%	29.8	68.3%	30.1	69.1%

Compound Name	Audit Conc (ppbc)	Elm Fork		Everman		Flower Mound		Godley	
		GC Response ppbc	%Rec	GC Response ppbc	%Rec	GC Response ppbc	%Rec	GC Response ppbc	%Rec
Ethane	8.3	7.6	91.6%	7.8	93.3%	7.6	91.8%	8.3	99.4%
Ethylene	8.3	6.2	74.8%	6.6	79.6%	6.1	73.7%	7.0	83.5%
Propane	12.0	12.3	102.3%	12.1	100.6%	11.4	94.8%	12.2	102.0%
Propylene	12.4	8.7	70.6%	9.6	77.5%	8.8	71.0%	9.4	75.8%
Iso-Butane	16.2	17.1	105.8%	18.3	113.2%	16.2	100.4%	18.2	112.7%
N-Butane	16.0	17.3	108.2%	18.3	114.2%	16.3	102.1%	18.0	112.6%
Acetylene	8.3	7.7	92.3%	6.6	79.3%	6.7	80.9%	7.1	85.8%
Trans-2-Butene	16.0	17.1	106.8%	18.0	112.3%	16.3	101.6%	17.9	111.6%
1-Butene	16.2	17.1	105.8%	17.9	110.6%	16.2	100.0%	17.6	108.7%
Cis-2-Butene	17.3	18.1	104.5%	19.0	109.7%	17.1	99.1%	19.0	109.7%
Cyclopentane	20.6	22.0	106.9%	23.2	112.4%	20.0	97.2%	23.2	112.4%
Iso-Pentane	21.4	22.8	106.7%	24.0	112.3%	21.7	101.5%	24.2	113.1%
N-Pentane	20.4	21.6	105.7%	23.5	115.1%	20.9	102.3%	23.3	114.1%
1,3-Butadiene	16.8	17.0	101.1%	18.7	111.1%	17.0	101.2%	17.1	101.9%
Trans-2-Pentene	21.0	21.8	103.9%	22.8	108.4%	20.9	99.4%	21.2	101.0%
1-Pentene	20.6	20.1	97.4%	22.1	107.0%	20.2	98.0%	21.1	102.2%
Cis-2-Pentene	22.0	22.2	100.8%	23.3	105.9%	21.4	97.2%	19.8	89.9%
2,2-Dimethylbutane	25.2	26.7	106.0%	26.4	104.7%	25.1	99.5%	27.6	109.5%
2-Methylpentane	24.5	26.6	108.5%	26.4	108.0%	25.1	102.4%	26.8	109.3%
Isoprene	20.8	17.6	84.5%	19.0	91.1%	16.7	80.4%	17.0	81.8%
n-Hexane	25.2	25.5	101.2%	21.9	87.0%	22.1	87.7%	27.7	109.7%
Methylcyclopentane	25.4	24.8	97.5%	22.6	89.0%	21.1	82.9%	22.6	89.0%
2,4-Dimethylpentane	29.7	30.8	103.8%	28.9	97.5%	31.9	107.3%	33.8	113.7%
Benzene	25.0	25.0	100.3%	21.7	87.1%	23.2	93.1%	23.1	92.5%
Cyclohexane	25.0	25.3	101.2%	25.1	100.7%	25.1	100.7%	25.8	103.4%
2-Methylhexane	30.0	27.8	92.9%	22.1	73.7%	23.9	79.6%	22.6	75.4%
2,3-Dimethylpentane	30.0	32.0	106.7%	33.2	110.9%	34.2	114.1%	35.9	119.9%
3-Methylhexane	29.4	29.6	100.6%	28.3	96.3%	30.7	104.4%	29.1	99.0%
2,2,4-Trimethylpentane	33.6	33.1	98.5%	30.4	90.4%	31.1	92.6%	33.1	98.6%
n-Heptane	29.4	29.6	100.7%	26.5	90.3%	27.7	94.1%	27.1	92.3%
Methylcyclohexane	29.4	29.2	99.5%	27.3	92.8%	26.8	91.1%	29.1	98.8%
2,3,4-Trimethylpentane	33.0	31.9	96.7%	28.7	87.2%	30.2	91.6%	30.7	93.3%
Toluene	29.1	27.5	94.5%	22.3	76.7%	25.4	87.3%	26.0	89.2%
2-Methylheptane	33.3	32.3	97.0%	28.4	85.5%	30.6	91.9%	30.8	92.7%
3-Methylheptane	33.3	33.0	99.1%	29.0	87.2%	32.4	97.3%	31.6	94.9%
n-Octane	33.0	32.3	98.0%	28.5	86.6%	31.4	95.2%	30.7	93.1%
Ethylbenzene	33.3	30.5	91.6%	26.5	79.5%	28.0	84.1%	28.3	84.9%
M&P-Xylene	66.6	59.4	89.2%	51.3	77.1%	52.6	79.0%	55.1	82.7%
Styrene	32.6	24.5	74.9%	20.6	63.1%	23.5	72.0%	24.2	74.1%
O-Xylene	32.6	29.6	90.6%	27.9	85.5%	28.9	88.6%	29.6	90.7%
N-Nonane	36.7	34.3	93.5%	30.4	82.8%	32.6	88.8%	32.4	88.3%
Isopropylbenzene	35.6	32.8	92.0%	29.2	82.0%	31.5	88.2%	31.5	88.5%
n-Propylbenzene	35.3	31.9	90.5%	27.1	76.8%	29.9	84.7%	30.0	85.1%
1,3,5-Trimethylbenzene	36.4	29.3	80.4%	27.7	76.3%	31.7	87.1%	29.5	81.2%
1,2,4-Trimethylbenzene	36.0	29.9	83.1%	24.9	69.1%	28.4	79.0%	28.2	78.4%
n-Decane	40.8	34.7	84.9%	27.1	66.4%	32.5	79.7%	30.0	73.4%
1,2,3-Trimethylbenzene	34.9	27.7	79.3%	22.7	64.9%	25.6	73.3%	25.5	72.9%
n-Undecane	43.6	32.7	75.1%	24.9	57.1%	30.3	69.6%	30.8	70.6%

Compound Name	Audit Conc (ppbc)	Kennedale		Mansfield		Rhome		Rushing		UTA Campus	
		GC Response ppbc	%Rec	GC Response ppbc	%Rec	GC Response ppbc	%Rec	GC Response ppbc	%Rec	GC Response ppbc	%Rec
Ethane	8.3	7.7	92.5%	7.3	87.3%	8.3	100.1%	8.0	96.6%	7.7	91.9%
Ethylene	8.3	6.1	73.2%	5.0	59.5%	6.3	76.0%	5.8	70.0%	6.5	77.9%
Propane	12.0	12.8	106.6%	12.3	102.4%	12.8	106.8%	12.4	103.0%	12.0	100.2%
Propylene	12.4	9.9	80.4%	8.8	71.1%	8.3	67.4%	8.4	67.9%	8.7	70.7%
Iso-Butane	16.2	17.9	111.0%	17.4	107.5%	18.1	112.3%	18.3	113.4%	18.0	111.4%
N-Butane	16.0	18.1	112.9%	17.9	111.7%	18.3	114.4%	18.5	115.8%	18.2	113.5%
Acetylene	8.3	6.0	72.6%	6.7	80.6%	6.5	77.8%	6.1	73.0%	6.4	76.8%
Trans-2-Butene	16.0	17.7	110.9%	17.6	110.1%	18.2	113.6%	17.8	111.5%	18.2	113.8%
1-Butene	16.2	17.6	108.9%	17.4	107.7%	18.1	112.3%	17.7	109.7%	17.9	111.0%
Cis-2-Butene	17.3	18.8	109.0%	18.6	107.9%	19.2	111.0%	19.1	110.5%	19.3	111.4%
Cyclopentane	20.6	22.8	110.9%	22.5	109.4%	23.2	112.4%	23.1	112.0%	22.8	110.7%
Iso-Pentane	21.4	23.8	111.2%	23.8	111.1%	24.3	113.5%	24.3	113.4%	24.1	112.8%
N-Pentane	20.4	23.2	113.6%	22.9	112.2%	23.6	115.5%	23.4	114.8%	23.2	113.5%
1,3-Butadiene	16.8	18.4	109.7%	17.9	106.8%	18.8	111.9%	18.0	107.1%	18.3	108.9%
Trans-2-Pentene	21.0	22.8	108.3%	21.4	102.1%	22.8	108.6%	22.2	105.5%	22.3	106.2%
1-Pentene	20.6	22.2	107.9%	20.7	100.7%	22.2	107.8%	21.1	102.3%	21.6	104.7%
Cis-2-Pentene	22.0	23.9	108.6%	22.0	99.9%	23.5	106.9%	23.2	105.5%	22.8	103.5%
2,2-Dimethylbutane	25.2	28.0	111.0%	26.5	105.0%	28.2	112.1%	27.9	110.6%	27.6	109.5%
2-Methylpentane	24.5	27.6	112.6%	26.3	107.6%	27.4	111.8%	27.3	111.5%	26.5	108.3%
Isoprene	20.8	20.8	100.0%	18.8	90.4%	18.9	91.0%	19.0	91.3%	19.2	92.4%
n-Hexane	25.2	25.8	102.2%	23.9	94.9%	24.8	98.5%	27.7	110.1%	24.3	96.5%
Methylcyclopentane	25.4	22.1	86.8%	22.4	87.9%	23.6	92.6%	22.3	87.7%	22.4	88.1%
2,4-Dimethylpentane	29.7	35.2	118.6%	30.9	104.1%	32.1	108.1%	33.0	111.3%	32.6	109.7%
Benzene	25.0	24.3	97.3%	22.8	91.5%	24.6	98.6%	23.7	94.8%	24.7	99.0%
Cyclohexane	25.0	25.7	102.9%	24.0	96.2%	26.4	105.8%	27.1	108.4%	25.3	101.4%
2-Methylhexane	30.0	24.1	80.4%	25.0	83.4%	25.9	86.5%	23.1	77.1%	24.4	81.4%
2,3-Dimethylpentane	30.0	35.6	118.9%	31.0	103.5%	33.7	112.6%	36.8	122.9%	33.8	112.7%
3-Methylhexane	29.4	31.2	106.1%	27.4	93.1%	31.1	105.6%	30.6	104.0%	29.0	98.7%
2,2,4-Trimethylpentane	33.6	32.9	97.8%	31.3	93.1%	32.5	96.7%	33.0	98.3%	32.6	97.0%
n-Heptane	29.4	28.8	97.9%	27.1	92.0%	28.3	96.3%	28.0	95.3%	28.3	96.4%
Methylcyclohexane	29.4	30.8	104.7%	27.7	94.3%	30.1	102.5%	29.2	99.3%	28.5	96.9%
2,3,4-Trimethylpentane	33.0	32.7	99.1%	30.6	92.8%	32.3	97.8%	32.1	97.5%	30.7	93.2%
Toluene	29.1	31.5	108.1%	27.3	93.8%	27.2	93.5%	28.9	99.2%	27.3	93.9%
2-Methylheptane	33.3	34.2	102.8%	30.3	91.1%	32.5	97.6%	33.3	99.9%	31.4	94.3%
3-Methylheptane	33.3	34.2	102.7%	30.5	91.7%	33.8	101.5%	33.2	99.7%	31.4	94.4%
n-Octane	33.0	34.4	104.5%	30.0	90.9%	31.4	95.1%	31.4	95.1%	31.1	94.3%
Ethylbenzene	33.3	31.9	96.0%	28.1	84.5%	28.2	84.6%	29.3	88.0%	28.4	85.3%
M&P-Xylene	66.6	62.2	93.4%	54.3	81.6%	55.0	82.6%	60.6	91.0%	55.4	83.2%
Styrene	32.6	25.7	78.6%	24.3	74.3%	25.2	77.3%	23.2	71.2%	24.9	76.3%
O-Xylene	32.6	34.8	106.5%	28.5	87.4%	29.4	90.1%	31.7	97.1%	28.7	87.9%
N-Nonane	36.7	37.4	101.9%	32.3	88.0%	32.6	88.7%	35.6	96.9%	32.4	88.2%
Isopropylbenzene	35.6	36.0	101.0%	30.6	85.8%	31.7	88.9%	33.1	92.8%	30.8	86.4%
n-Propylbenzene	35.3	32.4	92.0%	29.1	82.4%	30.8	87.3%	32.0	90.7%	29.6	84.0%
1,3,5-Trimethylbenzene	36.4	35.7	98.3%	28.2	77.6%	32.1	88.3%	34.0	93.5%	27.6	75.8%
1,2,4-Trimethylbenzene	36.0	31.5	87.6%	28.2	78.2%	31.3	87.0%	32.4	90.0%	27.9	77.6%
n-Decane	40.8	38.5	94.3%	31.6	77.4%	32.6	80.0%	35.6	87.4%	31.7	77.7%
1,2,3-Trimethylbenzene	34.9	26.0	74.5%	23.9	68.4%	27.7	79.2%	28.4	81.4%	24.3	69.7%
n-Undecane	43.6	28.7	66.0%	27.2	62.4%	33.9	77.9%	36.2	83.2%	26.3	60.3%