

TCEQ Interoffice Memorandum

To: Nicole Bealle, Regional Director, R12
Andy Goodridge, Assistant Regional Director, R12
Jason Ybarra, Special Assistant to the Regional Director, R12

From: Tracie Phillips, Ph.D.
Janet Hamilton, Ph.D., D.A.B.T.
Stony Lo, Ph.D.
Toxicology, Risk Assessment, and Research Division
Office of the Executive Director

Date: February 24, 2022

Subject: Health Effects Review of 2020 Ambient Air Network Monitoring Data in Region 12, Houston

Key Points

- Approximately 0.000024% (1 out of more than 4,216,250 samples) of measured hourly concentrations exceeded a health-based Air Monitoring Comparison Value (AMCV). This hourly level of benzene was measured at the Lynchburg Ferry site.
- Approximately 0.00012% (5 out of more than 4,216,250 samples) of measured hourly concentrations exceeded an odor-based AMCV. Accordingly, a few hourly levels (e.g., 1,3-butadiene and styrene) at two Region 12 sites could have resulted in the perception of odors if people were exposed. Assuming exposure, the monitored concentrations would not be expected to cause direct, short-term adverse health effects (e.g., eye irritation), and the infrequency and generally low magnitude of the exceedances are not indicative of persistent, strong odors with the potential to cause odor-related health effects (e.g., nausea, headache).
- Except for one annual average of benzene, annual average concentrations for all other chemicals and metals from 1-hour and 24-hour measurements were below their respective long-term AMCVs.
 - At Channelview Drive Water Tower (formerly Jacinto Port), the annual average of benzene exceeded the AMCV by 1.5 times. However, the fifteen-year average was below the long-term AMCV, which is a more appropriate comparison as the long-term AMCV is a lifetime value.

Background

The primary purpose of this memorandum is to convey the Toxicology, Risk Assessment, and Research Division's (TD) evaluation of ambient air toxics sampling conducted at monitoring sites in Region 12-Houston during 2020. The TD reviewed summary results for volatile organic compounds (VOCs) from 24-hour canister samples, 1-hour automated gas-chromatography (autoGC) VOC samples, 24- and 8-hour carbonyl samples, 30-minute rolling averages of 5-

minute hydrogen sulfide samples, and 24-hour metals samples from filters designed to collect particulate matter with an aerodynamic diameter of 2.5 microns or less (PM_{2.5}).

Historically, this memorandum has evaluated data from the TCEQ and Enhanced Industry-Sponsored Monitoring (EISM) sites, which are reported to the TCEQ on a regular basis. Industry-sponsored air monitoring networks that are not routinely reported to the TCEQ are also included. The TD requested these data from the respective industry groups and included them in our evaluation, as detailed below. Only summary data on highs and averages are provided for the Houston Regional Monitoring (HRM) sites; the total number of samples collected over the year is not known. Therefore, a qualifier of 'more than' is used before values that include these data. Except for lead, data for criteria pollutants (i.e., compounds having National Ambient Air Quality Standards (NAAQS)) were not evaluated for this memorandum. Appendix 1 contains the lists of the target analytes evaluated for this review.

Information regarding monitoring sites and target analyte data reviewed by the TD is presented in Table 1 and summarized below:

- 24-hour canister VOC sampling at:
 - 12 TCEQ sites
 - 6 HRM sites outside of the EISM sites, and
 - 3 Texas City/La Marque Community Air Monitoring Network (TCLAMN) sites.
- 24-hour carbonyl sampling at 2^a sites.
- 8-hour carbonyl sampling at 1^b site.
- 24-hour metals sampling at 2 sites.
- 1-hour autoGC VOC sampling at:
 - 6 TCEQ sites,
 - 10^c EISM sites,
 - 1 TCLAMN site, and
 - 1 HRM site.
- 5-minute hydrogen sulfide (H₂S) sampling at:
 - 1 TCEQ site,
 - 3 EISM sites.

^a Carbonyl sampling is seasonal, depending on the site, part of the year could be 24 hour, 8 hour, or 3 hour.

^b Carbonyl sampling is seasonal, depending on the site, part of the year could be 24 hour, 8 hour, or 3 hour.

^c Danciger site was deactivated 7/7/2020.

Table 1. Monitoring Sites Located in TCEQ Region 12

County	EPA Site ID	Site Name and Location	Network	Monitored Compounds
Galveston	N/A	2nd Avenue Monitoring Station (29.386981, -94.91912)	TCLAMN ^d	VOC (24-hour canister, 1/12 days ^e ; autoGC)
Galveston	N/A	Avenue A Monitoring Station (29.37435, -94.96364)	TCLAMN	VOC (24-hour canister)
Harris	48-201-0058	Baytown 7201 ½ Bayway Dr	TCEQ	VOC (24-hour canister)
Harris	48-201-6000	Cesar Chavez 4829A Galveston Rd	TCEQ	VOC (autoGC)
Harris	48-201-0026	Channelview 1405 Sheldon Rd	TCEQ	VOC (autoGC)
Harris	48-201-1035	Clinton 9525 ½ Clinton Dr	TCEQ	VOC (autoGC), Carbonyls ^f
Brazoria	48-039-1003	Clute 426 Commerce St	TCEQ	VOC (24-hour canister)
Brazoria	48-039-0618	Danciger ^g Along US Hwy 1459 in Brazoria County	EISM ^h - SI Group ⁱ	VOC (autoGC)
Brazoria	48-039-1012	Freeport South Ave I 207 South Avenue I	TCEQ	Metals (PM _{2.5})
Harris	48-201-0057	Galena Park 304 Stewart St	TCEQ	VOC (autoGC / 24-hour canister)
Harris	48-201-0055	Houston Bayland Park 6400 Bissonnet St	TCEQ	VOC (24-hour canister)

^d TCLAMN – Texas City/La Marque Community Air Monitoring Network.^e The typical schedule for 24-hour canisters is to collect one 24-hour sample every six days. This sampler is collecting one 24-hour sample every twelve days.^f This carbonyl sampler collects seasonally: in 2020, one 24-hour sample every six days from April through October, from January through March and November through December no samples were collected.^g This site was deactivated 7/7/2020.^h EISM – Enhanced Industry-Sponsored Monitoring, this acronym is followed by the industry group responsible for the sampling.ⁱ Sweeny Industry Group.

County	EPA Site ID	Site Name and Location	Network	Monitored Compounds
Harris	48-201-1039	Houston Deer Park #2 4514 ½ Durant St	TCEQ	VOC (autoGC, 24-hour canister), Carbonyls ^j , Metals (PM _{2.5})
Harris	48-201-0803	HRM #3 Haden Rd 1504 ½ Haden Dr	TCEQ/EISM - HRM ^k	VOC (24-hour canister)/VOC (autoGC)
Harris	N/A	HRM 1 Central Street 1501 Central Street, Houston	HRM	VOCs (24-hour canister)
Harris	N/A	HRM 4 Sheldon Rd 16200 Miller Road 1, Channelview	HRM	VOC (24-hour canister)
Harris	N/A	HRM 7 W Baytown 4606 W. Baker Rd, Baytown	HRM	VOC (24-hour canister)
Harris	N/A	HRM 8 LaPorte 11426 Fairmont Pkwy, La Porte	HRM	VOC (24-hour canister)
Chambers	N/A	HRM 10 Mont Belvieu 13618 Hatcherville Rd, Mont Belvieu	HRM	VOC (24-hour canister)
Chambers	N/A	HRM 11 E Baytown 8620 West Bay Rd, Baytown	HRM	VOC (24-hour canister)
Harris	N/A	HRM 16 Deer Park 601 East 8th Street, Deer Park	HRM	VOC (autoGC)
Harris	48-201-0036	Channelview Drive Water Tower ^l 1st St and Elsbeth St	TCEQ	VOC (24-hour canister)
Brazoria	48-039-1016	Lake Jackson 109-B Brazoria Hwy 332- W	EISM – FI Group ^m	VOC (autoGC)

^j This carbonyl sampler collects seasonally: in 2020, one 24-hour sample every six days from April through May and September through October, from June through August, this sampler switched to a more intensive sampling schedule where it collected three 8-hour samples every three days, and from January through March and November through December no samples were collected.

^k HRM – Houston Regional Monitoring.

^l Site was previously named Jacinto Port, in 2021 it was moved, switched to an autoGC sampler, and re-named to Channelview Drive Water Tower. The site name Jacinto Port does not appear in TAMIS anymore and all data (old canister and new autoGC) are now associated with the name Channelview Drive Water Tower.

^m FI Group – Freeport Industry Group.

County	EPA Site ID	Site Name and Location	Network	Monitored Compounds
Harris	48-201-1015	Lynchburg Ferry 1001 B Lynchburg Rd	TCEQ/EISM - HRM	VOC (24-hour canister)/VOC (autoGC)
Harris	48-201-0307	Manchester East Avenue Nⁿ 9401 ½ Manchester Rd	TCEQ	VOC (24-hour canister)
Harris	48-201-0069	Milby Park 2201-a Central St	TCEQ	VOC (autoGC)
Galveston	N/A	North Site (29.429228, -94.971503)	TCLAMN	VOC (24-hour canister, 1/12 days)
Brazoria	48-039-1607	Oyster Creek 901 County Road 792	EISM - Freeport LNG	VOC (AutoGC), H ₂ S
Harris	48-201-1049	Pasadena North 702 Light Company Rd	TCEQ	VOC (24-hour canister)
Harris	48-201-0061	Shoreacres 3903 ½ Old Hwy 146	TCEQ	VOC (24-hour canister)
Galveston	48-167-0056	Texas City 34th St 2212 North 34th St	EISM - TCLAMN	VOC (autoGC)
Galveston	48-167-0005	Texas City Ball Park 2516 ½ Texas Ave	TCEQ	H ₂ S, VOC (24-hour canister)
Galveston	48-167-0615	Texas City BP 31st Street (Site 1) 302 31st Street South	EISM – Marathon Petroleum Co.	H ₂ S, 4 VOCs (SRIGC)
Galveston	48-167-0621	Texas City BP Logan Street (Site 3) 303 Logan Street	EISM – Marathon Petroleum Co.	H ₂ S, 4 VOCs (SRIGC)
Galveston	48-167-0683	Texas City 11th Street 569 11th Street South	EISM – Marathon Petroleum Co.	1 VOC (SRIGC)
Harris	48-201-0617	Wallisville Rd 4727 Wallisville Rd	EISM - HRM	VOC (autoGC)

ⁿ Site was previously named Manchester/Central, in 2021 it was moved, switched to an autoGC sampler, and re-named to Manchester East Avenue N. The site name Manchester/Central does not appear in TAMIS anymore and all data (old canister and new autoGC) are now associated with the name Manchester East Avenue N.

All data collected at TCEQ monitors are analyzed by the TCEQ laboratory and should meet a 75% data completeness objective. At EISM and industry network monitors, data are collected by a third-party contractor and should also meet a 75% data completeness objective. One-hour autoGC VOC, 30-minute H₂S, as well as 8-hour carbonyl data were evaluated for potential acute health (e.g., irritation), odor, and vegetation concerns, as were any 24-hour sample results (e.g., VOCs, carbonyls, metals) that exceeded short-term air monitoring comparison values (AMCVs). Twenty-four-hour air samples collected every 6th day on a yearly basis are designed to provide representative long-term average concentrations. In order to be able to evaluate 24-hour monitoring data more fully, the TCEQ has developed 24-hour AMCVs for specific chemicals. As such, 24-hour sample results were compared to the available TCEQ 24-hour AMCVs for the following:

- 1,3-butadiene
- 2,2-dimethylbutane
- 2,3-dimethylbutane
- 2-methylpentane
- 3-methylpentane
- acrolein
- aluminum
- arsenic
- benzene
- cadmium
- chromium
- cobalt
- manganese
- molybdenum
- nickel
- vanadium
- crotonaldehyde
- ethylene dibromide
- ethylene dichloride
- formaldehyde
- n-hexane

However, because short-term or peak concentrations may be significantly different than 24-hour sample concentrations, daily concentrations have limited use in evaluating the potential for more acute (e.g., 30-60 minute) health effects, unlike the shorter-term data reviewed herein (e.g., 1-hour autoGC data, 30-minute H₂S data). The annual averages from 1-hour autoGC and 24-hour samples (VOCs, carbonyls, and metals) were evaluated for potential chronic health and vegetation concerns. Measured chemical concentrations were compared to appropriate comparison values (e.g., the National Ambient Air Quality Standards (NAAQS) value, TCEQ health-, odor-, and vegetation-based AMCVs). Information on AMCVs may be obtained via the internet (<https://www.tceq.texas.gov/toxicology/amcv/about>) or by contacting the TD (512-239-1795). Exceedance of an AMCV does not necessarily mean that adverse effects would be expected (e.g., health-based AMCVs are set at levels well below concentrations at which adverse effects have been observed), but rather that further evaluation is required.

Evaluation

1-Hour, 8-hour, and 30-minute Concentrations

The vast majority of the 1-hour autoGC VOC concentrations were below their respective TCEQ short-term, health-, odor-, and/or vegetation-based AMCVs. For example, about 99.9999% of

the more than 4,216,250 1-hour VOC measurements from the TCEQ, EISM, HRM, and TCLAMN network autoGC monitors in Region 12 were below their short-term AMCVs. Only one (approximately 0.000024%) hourly autoGC measurement collected at these Region 12 monitors exceeded a TCEQ short-term, health-based AMCV (see discussion below). Five hourly measurements (approximately 0.00012%) exceeded an odor-based AMCV over this time period (Table 2). Additionally, 100% of the 1,462 8-hour carbonyl concentrations measured in Region 12 were below their respective AMCVs and there were no 30-minute exceedances of the value of the H₂S standard. Therefore, the TD would not expect short-term, adverse health effects, vegetation effects, or odors to be associated with the vast majority of 1-hour, 8-hour, or 30-minute measurements monitored in Region 12.

Further evaluation was conducted for the monitored concentrations that exceeded their respective short-term, health- and/or odor-based AMCVs to determine the potential for adverse health effects or odors. One concentration of benzene was the only instance in which any of the monitored 1-hour concentrations exceeded their respective short-term, health-based AMCVs. The benzene exceedance occurred at Lynchburg Ferry, where the reported hourly benzene concentration of 376.5 ppb_v was measured on September 30, 2020 at 1 am. This measured value was 2.1 times higher than the health-based 1-hour AMCV of 180 ppb_v. The magnitude of the exceedance is low (2-fold) and transient in nature (the only exceedance measured in 2020). Considering the inherent precautionary nature of the 1-hour AMCV along with the underlying toxicity data, adverse health effects would not be expected if exposure to this concentration had occurred.

The monitored 1-hour autoGC VOC concentrations that exceeded their respective odor-based comparison levels are shown below in Table 2. In total, there were 5 odor-based AMCV exceedances by 1-hour autoGC data in Region 12. These exceedances are slightly lower than, or similar to, the number of exceedances in 2019 (6 exceedances), 2018 (11 exceedances), 2017 (5 exceedances), 2016 (7 exceedances), 2015 and 2014 (5 exceedances each year), and 2013 (8 exceedances), and are appreciably lower than the number of exceedances in 2012 (14 exceedances), 2011 (19 exceedances), and 2010 (75 exceedances). Additionally, they are significantly lower compared to 2009 (37 exceedances), 2008 (82 exceedances), and 2007 (103 exceedances).

Table 2. Odor-Based AMCV Exceedances by 1-Hour AutoGC VOC Concentrations

Site	Chemical	Number of 1-Hour Concentrations above Odor-Based AMCV	Maximum Measured Concentration (ppb _v)	Odor-Based AMCV (ppb _v)
Lynchburg Ferry	Styrene	4	89.9	26

Site	Chemical	Number of 1-Hour Concentrations above Odor-Based AMCV	Maximum Measured Concentration (ppb _v)	Odor-Based AMCV (ppb _v)
HRM #3 Haden Rd	1,3-butadiene	1	275.1	230

The monitored odor-based AMCV exceedances would not be expected to cause direct acute adverse health effects (e.g., eye irritation). Additionally, the infrequency (only ≈0.00012% of hourly measurements) and generally low magnitude of the exceedances (e.g., < 3.5 times the odor-based AMCV) are not indicative of persistent, strong odors with the potential to cause odor-related health effects (e.g., nausea, headache), although exposure to some chemical concentrations could have resulted in the perception of odors.

24-Hour Concentrations

All of the 24-hour canister measurements, for which there are 24-hour, chemical-specific AMCVs available, were below their health- and welfare-based AMCVs in Region 12. Therefore, these monitored concentrations would not be expected to cause short-term adverse health effects or odorous conditions.

Annual Average Concentrations

All annual averages were below their respective long-term AMCVs, except for one compound (benzene) at one site.

- Based on the 3,353 24-hour metals measurements, all monitored annual average concentrations of metals were below their respective long-term comparison values (e.g., long-term AMCVs)
- Based on averages from more than 68,051 24-hour canister measurements and more than 4,216,250 hourly autoGC measurements (TCEQ, EISM, HRM, and TCLAMN network autoGC sites), all annual VOC concentrations were also less than their respective long-term AMCVs, with the exception of one chemical (benzene at Channelview Drive Water Tower (formerly known as Jacinto Port)):
 - The benzene annual average concentration at Channelview Drive Water Tower was 2.08 ppb_v, which is 1.5 times greater than the long-term AMCV of 1.4 ppb_v. The Channelview Drive Water Tower site had a canister sampler in 2020 that collected a 24-hour sample once every sixth day. These 24-hour samples collected every 6th day on a yearly basis are designed to provide representative long-term average concentrations. Two elevated 24-hour benzene concentrations of 15.8 and 29.6 ppb (measured on August 12 and December 16, respectively) are major contributors to the benzene annual average of 2.1 ppb. This marks two consecutive years that this monitor has been above the long-

term benzene AMCV. However, the two elevated 24-hour benzene values appear to be transient in nature. Annual evaluations calculate an annual average using 1-years' worth of data for comparison to a long-term AMCV. However, longer-term data are even more appropriate for comparison to a long-term AMCV because the long-term AMCV is designed to protect an individual over a lifetime of exposure (e.g., 70 years). Since the canister at this site has been collecting data since 2006, a fifteen-year average, which provides more information for the long-term, can be calculated. The fifteen-year benzene average is 1.18 ppb_v, which is lower than the long-term, health-based AMCV. In order to better assess what is going on in this area, and help identify potential sources, the TCEQ decided to replace the canister sampler with an autoGC. An autoGC provides hourly data 22 hours each day (the instrument undergoes calibration for 2 hours each day), 7 days a week, 365 days a year, assuming no disruption in data collection. These data not only provide concentrations that can be used for evaluating the potential for acute health effects, they also provide the opportunity to look at pollution roses (i.e., directionality). Due to space and logistical issues, the site was relocated in 2021 to accommodate an autoGC and re-named Channelview Drive Water Tower. Of note, the site name Jacinto Port does not appear in TAMIS anymore and all data (old canister, 2006-2020, and new autoGC, 2021 onward) are now associated with the name Channelview Drive Water Tower.

In conclusion, approximately 99.95% of all annual averages were below their respective long-term AMCVs and no long-term, adverse health or vegetation effects would be expected due to exposure to those concentrations.

Freeport Air Pollutant Watch List (APWL) Area for Arsenic, Cobalt, Nickel, & Vanadium

Elevated short-term nickel, arsenic, vanadium, and cobalt levels exceeding their respective short-term AMCVs were measured near Gulf Chemical and Metallurgical Corporation in Freeport during yearly mobile monitoring trips conducted 2005-2010. Due to the elevated metals concentrations, the Freeport area (Site# 1201^o) was added to the APWL in 2005. In May of 2011, the Freeport South Avenue I monitoring site was activated. This site is located northeast of the facility of concern, within a residential area, and monitors for speciated PM_{2.5} metals. Since this site's activation in May of 2011, 100% of all speciated PM_{2.5} metals short-term and annual averages have been below their respective AMCVs; no adverse health effects would be expected due to exposure to these concentrations. The TCEQ will continue to evaluate relevant air monitoring data and any additional information for this APWL site within the context of the APWL protocol

<https://www.tceq.texas.gov/assets/public/implementation/tox/apwl/protocol2012.pdf>.

^o <https://www.tceq.texas.gov/assets/public/implementation/tox/apwl/map/1201freeport.pdf>

Nicole Bealle, Regional Director, Region 12, et al.

February 24, 2022

Page 10 of 12

If you have any questions regarding this memorandum, please contact Tracie Phillips, Ph.D. by phone at (512) 239-2269 or email at Tracie.Phillips@tceq.texas.gov, or Janet Hamilton, Ph.D., D.A.B.T. by phone at (512) 239-0557 or email at Janet.Hamilton@tceq.texas.gov, or Stony Lo, Ph.D. by phone at (512) 239-0576 or email at Stony.Lo@tceq.texas.gov. For questions regarding the APWL, you may visit the TCEQ website at <https://www.tceq.texas.gov/toxicology/apwl/apwl-index.html>.

Appendix 1. Monitored Air Toxics in Region 12

List 1. Target VOC Analytes in Canister Samplers*

1,1,2,2-Tetrachloroethane	4-Methyl-1-Pentene	Methylcyclohexane
1,1,2-Trichloroethane	Acetylene	Methylcyclopentane
1,1-Dichloroethane	Benzene	m-Ethyltoluene
1,1-Dichloroethylene	Bromomethane	n-Butane
1,2,3-Trimethylbenzene	Carbon Tetrachloride ^a	n-Decane
1,2,4-Trimethylbenzene	Chlorobenzene	n-Heptane
1,2-Dichloropropane	Chloroform	n-Hexane
1,3,5-Trimethylbenzene	Chloromethane	n-Nonane
1,3-Butadiene	cis-1,3-Dichloropropene	n-Octane
1-Butene ^a	cis-2-Butene	n-Pentane
1-Hexene & 2-Methyl-1-Pentene ^a	cis-2-Hexene	n-Propylbenzene
1-Pentene	cis-2-Pentene	n-Undecane
2,2,4-Trimethylpentane	Cyclohexane	o-Ethyltoluene
2,2-dimethylbutane ^a	Cyclopentane	o-Xylene
2,3,4-Trimethylpentane	Cyclopentene	p-Diethylbenzene
2,3-Dimethylbutane	Dichlorodifluoromethane	p-Ethyltoluene
2,3-Dimethylpentane	Dichloromethane ^a	Propane
2,4-Dimethylpentane	Ethane	Propylene
2-Chloropentane ^a	Ethylbenzene	Styrene
2-Methyl-2-Butene	Ethylene	Tetrachloroethylene
2-Methylheptane	ethylene dibromide ^a	Toluene
2-methylhexane ^a	ethylene dichloride ^a	trans-1,3-Dichloropropene
2-methylpentane ^a	Isobutane	trans-2-Butene
3-Methyl-1-Butene	Isopentane	trans-2-Hexene
3-Methylheptane	Isoprene	trans-2-Pentene
3-Methylhexane	Isopropylbenzene ^a	Trichloroethylene
3-Methylpentane	m-Diethylbenzene	Trichlorofluoromethane
	Methyl Chloroform ^a	Vinyl Chloride

^a Not monitored at the HRM 1, 4,7, 8, 10, and 11 sites.

List 2. Target Carbonyl Analytes

2,5-Dimethylbenzaldehyde	Crotonaldehyde	Methacrolein
Acetaldehyde	Formaldehyde	o-Tolualdehyde
Acetone	Heptanal	Propionaldehyde
Acrolein - Unverified	Hexanaldehyde	Valeraldehyde
Benzaldehyde	Isovaleraldehyde	m & p-Tolualdehyde
Butyraldehyde	Methyl Ethyl Ketone (MEK)	

List 3. Target Metal Analytes

Aluminum (PM _{2.5})	Cobalt (PM _{2.5})	Selenium (PM _{2.5})
Antimony (PM _{2.5})	Copper (PM _{2.5})	Tin (PM _{2.5})
Arsenic (PM _{2.5})	Lead (PM _{2.5})	Vanadium (PM _{2.5})
Barium (PM _{2.5})	Manganese (PM _{2.5})	Zinc (PM _{2.5})
Cadmium (PM _{2.5})	Molybdenum (PM _{2.5})	
Chromium (PM _{2.5})	Nickel (PM _{2.5})	

List 4. Target VOC Analytes in AutoGC

1,2,3-Trimethylbenzene	Acetylene	Toluene ^e
1,2,4-Trimethylbenzene	Benzene ^{c,e,f}	cis-2-Butene
1,3,5-Trimethylbenzene	Cyclohexane	cis-2-Pentene
1,3-Butadiene ^c	Cyclopentane	m/p Xylene
1-Butene ^b	Ethane	n-Butane
1-Pentene	Ethylbenzene	n-Decane
2,2,4-Trimethylpentane	Ethylene	n-Heptane
2,2-Dimethylbutane ^b	Isobutane	n-Hexane ^e
2,3,4-Trimethylpentane	Isopentane	n-Nonane
2,3-Dimethylpentane	Isoprene	n-Octane
2,4-Dimethylpentane	Isopropylbenzene ^b	n-Pentane ^e
2-Methyl-2-Butene ^a	Methylcyclohexane	n-Propylbenzene
2-Methylheptane	Methylcyclopentane	n-Undecane ^a
2-Methylhexane ^b	Propane	o-Xylene
3-Methylheptane	Propylene	trans-2-Butene
3-Methylhexane	Styrene	trans-2-Pentene

^a Only monitored at the Danciger, HRM #3 Haden Rd, HRM 16, Lake Jackson, Lynchburg Ferry, Oyster Creek, Texas City 34th St, and Wallisville Rd monitoring sites.

^b Not monitored at the HRM 16 monitoring site.

^c 2nd Avenue Monitoring Station only monitored for these compounds, in addition to those listed in List 5.

^e These are the only compounds monitored at the TX City BP Logan and TX City BP 31st sites.

^f This is the only compound monitored at the TX City 11th St site.

List 5. Additional AutoGC Analytes Monitored at 2nd Avenue Monitoring Site

Vinyl Chloride