TCEQ Interoffice Memorandum

To: Kathryn Sauceda, Regional Director, Region 10

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Subject: Health Effects Review of 2021 Ambient Air Network Monitoring Data in Region 10, Beaumont

Conclusions

- All reported annual average concentrations of volatile organic compounds (VOCs) were below their respective long-term air monitoring comparison values (AMCVs) and would not be expected to cause chronic adverse human health or vegetation effects.
- All measured hourly VOC concentrations were below their respective short-term AMCVs and would not be expected to cause acute adverse human health or vegetation effects, or odor concerns.
- All measured 24-hour VOC concentrations were below their respective 24-hour AMCVs and would not be expected to cause acute adverse health effects.
- All reported concentrations of hydrogen sulfide (H_2S), except for three exceedances at the SETRPC Port Arthur site, were below the numerical value of the 30-minute residential state standard.

Background

This memorandum conveys the Toxicology, Risk Assessment, and Research Division's (TD's) evaluation of ambient air sampling conducted at monitoring sites in Region 10-Beaumont for 2021. Information about the locations of the monitoring sites, monitored compounds, and links to more information on the sites is provided in Table 1.

A brief summary of the monitoring sites is provided below:

- 1-hour autoGC VOC monitoring at 3 sites
- Every sixth-day 24-hour canister VOC sampling at 6 sites
- Every 12th-day 24-hour canister VOC sampling at 6 sites
- H_2S monitoring at 2 sites

The Texas Commission on Environmental Quality (TCEQ) Monitoring Division and the South East Texas Regional Planning Commission (SETRPC) operated the air monitoring sites and reported the data for all chemicals evaluated in this memorandum. Lists of all target analytes at these monitoring locations are included in Attachment A.

Chemicals were evaluated individually by comparing the reported concentrations to their respective AMCVs. All one-hour concentrations collected from the ambient air monitoring sites in Table 1 were evaluated for their potential to cause acute (short-term) adverse health and welfare (odor potential and vegetation) effects. The TD calculated the annual averages of these one-hour data to determine their potential to cause chronic (long-term) adverse health and vegetation effects.

Data from 24-hour canister samples taken every 6th- (TCEQ) or 12th-day (SETRPC) were also evaluated and are designed, when averaged over one year, to provide representative long-term average concentrations. In order to be able to evaluate 24-hour monitoring data more fully, TCEQ has developed 24-hour AMCVs for specific chemicals, including 1,3-butadiene; 2,2-dimethylbutane; 2,3-dimethylbutane; 2-methylpentane; 3-methylpentane; benzene; ethylene dibromide; ethylene dichloride; and n-hexane. As such, 24-hour canister samples were compared to the available TCEQ 24-hour AMCVs. However, because short-term or peak concentrations are not necessarily captured by 24-hour samples, they have limited use in evaluating the potential for acute health effects. Annual concentrations calculated from 24-hour samples for each target analyte were compared to their respective long-term AMCVs to evaluate the potential for chronic health and vegetation concerns. More information about AMCVs is available on the Toxicology's AMCV webpage. Hydrogen sulfide samples were compared to the numerical value of the 30-minute residential state standard for H_2S.

Meeting the data completeness objective helps to ensure the representativeness of calculated annual average concentrations. All of the SETRPC and majority of the TCEQ monitoring data reviewed met or exceeded TCEQ's 75 percent data completeness objective except for the analytes at the following monitoring sites:

- Beaumont Downtown (autoGC): 2,4-dimethylpentane, methylcyclopentane
- Nederland 17th Street: acetylene
- Port Arthur Memorial School: 1,3-butadiene, styrene

Table 1. Monitoring Sites Located in TCEQ Region 10 Evaluated in this Memorandum

Site Name and Location	Type of Monitor	EPA Site Number	Network	Monitored Compounds
Beaumont Downtown 1086 Vermont Ave, Beaumont	24-hour every 6th-day canister & hourly autoGC	48-245-0009	TCEQ	84 VOCs(canister); 46 VOCs(autoGC)
Port Arthur West 623 Ellias St, Port Arthur	24-hour, every 6th-day canister	48-245-0011	TCEQ	84 VOCs
Groves 3355 Grandview Ave & 32nd St, Port Neches	24-hour, every 6th-day canister	48-245-0014	TCEQ	84 VOCs
Port Neches Avenue L 605 Avenue L, Port Neches	24-hour, every 6th-day canister	48-245-0017	TCEQ	84 VOCs
Jefferson County Airport End of 90th St, Port Arthur	24-hour, every 6th-day canister	48-245-0018	TCEQ	84 VOCs
Beaumont Mary 598 Craig Street, Beaumont	24-hour, every 6th day canister, and H_2S	48-245-1050	TCEQ	84 VOCs, H_2S
Nederland 17th Street 1516 17th St, Nederland	hourly autoGC	48-245-1035	TCEQ	46 VOCs
SETRPC 41 West Orange 2811 Austin Ave, Orange	24-hour, every 12th-day canister	--	SETRPC	52 VOCs
SETRPC 42 Mauriceville Intersection of TX Hwys 62 & 12, Port Arthur	24-hour, every 12th-day canister	48-361-1100	SETRPC	52 VOCs
SETRPC 43 Jefferson Co Airport Jefferson County Airport, Port Arthur	24-hour, every 12th-day canister	48-245-0102	SETRPC	52 VOCs
SETRPC 44 Beaumont, 1149 Pearl St, Beaumont	24-hour, every 12th-day canister	--	SETRPC	52 VOCs
SETRPC 45 Port Neches Fire Station 1209 Merriman St, Port Neches	24-hour, every 12th-day canister	--	SETRPC	52 VOCs

Site Name and Location	Type of Monitor	EPA Site Number	Network	Monitored Compounds
SETRPC 48 Old Cove School 1214 Dupont, Orange	24-hour, every 12th-day canister	--	SETRPC	52 VOCs
SETRPC 49 Port Arthur 6956 James Gamble Dr, Port Arthur	24-hour, every 12th-day canister, and H_2S	48-245-0628	SETRPC	52 VOCs, H_2S
Port Arthur Memorial School, SETRPC 50, 2200 Jefferson Dr, Port Arthur	hourly autoGC	48-245-0021	SETRPC	benzene, 1,3-butadiene, styrene

Evaluation

AutoGC Data

All measured hourly and annual average VOC concentrations from the Beaumont Downtown, Port Arthur Memorial School, and Nederland High School autoGC monitors were below their respective short-term and long-term AMCVs. Therefore, acute, or chronic adverse health effects, odorous conditions, or vegetation effects would not be expected to occur as a result of exposure to the reported levels of VOCs at these monitoring sites.

Canister Data

All measured 24-hour VOC concentrations were below their 24-hour AMCVs and would not be expected to cause adverse health effects. All annual average VOC concentrations from 24-hour canister samplers were below their respective long-term AMCVs and would not be expected to result in long-term health or vegetation effects.

Hydrogen Sulfide (H_2S)

At SETRPC Port Arthur on July 26, 2021, three 30-minute H_2S rolling averages exceeded the numerical value of the 30-minute residential state regulatory H_2S standard (80 ppb). The highest 30-minute concentration of H_2S at this monitor in 2021 was 85 ppb. Since the odor range for H_2S is 0.5-300 ppb, the measured levels of H_2S were likely odorous. Overall, the exceedances of the value of the state regulatory standard do not represent an immediate threat to human health or wellness as the lowest concentration that has shown H S-specific health effects in people (mild respiratory effects in 2/10 asthmatic individuals exposed for 30-minutes) is 2,000 ppb.

If you have any questions regarding this review, please contact Stanley Aniagu at Stanley.Aniagu@tceq.texas.gov, Allison Jenkins at Allison.Jenkins@tceq.texas.gov, or Anthony Tran at Anthony.Tran@tceq.texas.gov.

Attachment A

List 1. Target VOC Analytes in TCEQ Canister Samples

1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethylene
1,2,3-Trimethylbenzene
1,2,4-Trimethylbenzene
1,2-Dichloropropane
1,3,5-Trimethylbenzene
1,3-Butadiene
1-Butene
1-Hexene+2-Methyl-1-Pentene
1-Pentene
2,2,4-Trimethylpentane
2,2-Dimethylbutane (Neohexane)
2,3,4-Trimethylpentane
2,3-Dimethylbutane
2,3-Dimethylpentane
2,4-Dimethylpentane
2-Chloropentane
2-Methyl-2-Butene
2-Methylheptane
2-Methylhexane
2-Methylpentane (Isohexane)
3-Methyl-1-Butene
3-Methylheptane
3-Methylhexane
3-Methylpentane
4-Methyl-1-Pentene
Acetylene
Benzene
Bromomethane
Carbon Tetrachloride
Chlorobenzene
Chloroform
Chloromethane (Methyl Chloride)
cis-1,3-Dichloropropene
cis-2-Butene
cis-2-Hexene
cis-2-Pentene
Cyclohexane
Cyclopentane
Cyclopentene
Dichlorodifluoromethane
Dichloromethane (Methylene Chloride)
Ethane
Ethylbenzene
Ethylene
Ethylene Dibromide (1,2-Dibromoethane)
Ethylene Dichloride (1,2-Dichloroethane)
Isobutane
Isopentane (2-Methylbutane)
Isoprene
Isopropylbenzene (Cumene)
m-Diethylbenzene
m-Ethyltoluene
Methyl Chloroform (1,1,1-Trichloroethane)
Methylcyclohexane
Methylcyclopentane
n-Butane
n-Decane
n-Heptane
n-Hexane
n-Nonane
n-Octane
n-Pentane
n-Propylbenzene
n-Undecane
o-Ethyltoluene
o-Xylene
p-Diethylbenzene
p-Ethyltoluene
Propane
Propylene
Styrene
Tetrachloroethylene
Toluene
trans-1-3-Dichloropropene
trans-2-Butene
trans-2-Hexene
trans-2-Pentene
Trichloroethylene
Trichlorofluoromethane
Vinyl Chloride

List 2. Target VOC Analytes in AutoGC Samples

1-Butene	Benzene	n-Decane
1-Pentene	c-2-Butene	n-Heptane
1,2,3-Trimethylbenzene	c-2-Pentene	n-Hexane
1,2,4-Trimethylbenzene	Cyclohexane	n-Nonane
1,3-Butadiene	Cyclopentane	n-Octane
1,3,5-Trimethylbenzene	Ethane	n-Pentane
2-Methylheptane	Ethyl Benzene	n-Propylbenzene
2-Methylhexane	Ethylene	o-Xylene
2,2-Dimethylbutane	Isobutane	p-Xylene + m-Xylene
2,2,4-Trimethylpentane	Isopentane	Propane
2,3-Dimethylpentane	Isoprene	Propylene
2,3,4-Trimethylpentane	Isopropyl Benzene - Cumene	Styrene
2,4-Dimethylpentane	Methylcyclohexane	t-2-Butene
3-Methylheptane	Methylcyclopentane	t-2-Pentene
3-Methylhexane	n-Butane	Toluene
Acetylene		

List 3. Target VOC Analytes in SETRPC Canister Samples

1,1,1-Trichloroethane	Butyl acrylate	Methylene chloride
1,2,4-Trimethylbenzene	Carbon disulfide	Naphthalene
1,2-Dichloroethane	Carbon tetrachloride	n-Butane
1,3-Butadiene	Chlorobenzene	n-Decane
1-Butanol	Chloroform	n-Hexane
1-Octene	Cumene	n-Octane
1-Pentene	Cyclohexane	n-Pentane
2,2,4-Trimethylpentane & 1-Hexene	Ethane	o-Xylene
2-Butanone	Ethylbenzene	Propane
2-Methyl- 1-pentene	Ethylene	Propylene
3-Methylpentane	Hexanal	p-Xylene + m-Xylene
Acetaldehyde	Isobutene + 1-Butene	Styrene
Acetone	Isohexane	t-Butylbenzene
Acetonitrile	Isopentane	Toluene
a-Pinene	Isoprene	Trichloroethylene
Benzene	Methanol	Trichlorofluoromethane
b-Pinene	Methyl-t-butyl ether	Vinyl acetate
	Methylcyclohexane	Vinyl chloride