

TCEQ Interoffice Memorandum

To: Susan Clewis, Regional Director, R14

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Subject: Health Effects Review of 2020 Ambient Air Network Monitoring Data in Region 14, Corpus Christi

Conclusions

- Reported concentrations of hydrogen sulfide (H₂S) were below the numerical value of the 30-minute state standard for residential areas.
- All hourly and annual average concentrations of volatile organic compounds (VOCs) reported at automated gas chromatograph (autoGC) monitoring sites were below their short-term and long-term air monitoring comparison values (AMCVs) and would not be expected to cause acute or chronic adverse health effects, vegetation effects, or odor concerns.
- All 24-hour and annual average concentrations of metals and VOCs reported at canister monitoring sites, with the exception of the annual concentration of ethylene dichloride (EDC) at the Formosa Point Comfort Plant site, were below their respective TCEQ AMCVs. Exposure to all 24-hour and annual average VOC and metals concentrations would not be expected to result in long-term adverse health or vegetation effects. The long-term concentrations of EDC at the Formosa Point Comfort Plant site are discussed below:
 - At the Formosa Point Comfort Plant Site, the EDC annual average (1-year) exceeded the long-term AMCV by 1.9 times. The site is located within the facility's property line; however, because of Formosa's proximity to residential areas, the TD is actively engaging their representatives to pursue actions aimed at reducing ambient EDC concentrations in Point Comfort.

Background

The primary purpose of this memorandum is to convey the Toxicology, Risk Assessment, and Research Division's (TD's) evaluation of ambient air toxics sampling conducted at ambient air monitoring sites in Region 14, Corpus Christi during 2020. The TCEQ Monitoring Division reported the data for the TCEQ-operated monitoring sites evaluated in this memorandum; other data were received from the industry sponsored ambient air networks: Cheniere Energy and Gulf Coast Growth Ventures (GCGV), Valero, and Formosa, in San Patricio, Nueces, and Calhoun Counties, respectively.

The TD evaluated ambient air sampling data for VOCs from 24-hour canister samples and 1-hour autoGC samples, 24-hour metals samples from filters designed to collect particulate matter with an aerodynamic diameter of 2.5 micrometers or less (PM_{2.5}), and 30-minute rolling averages of hydrogen sulfide (H₂S) samples from 13 monitoring sites in TCEQ Region 14, Corpus Christi (see Table 1 for the specific monitored compounds at each of the 13 sites). Except for lead, data for criteria pollutants (i.e., compounds having a National Ambient Air Quality Standard) were not evaluated for this memorandum. For a complete list of all chemicals evaluated, please see List 1, List 2, and List 3 in Attachment A.

One-hour autoGC VOC and 30-minute H₂S data were evaluated for potential acute health, odor, and vegetation concerns, as were any 24-hour samples (e.g., VOCs, metals) that exceeded short-term AMCVs. Twenty-four-hour air samples collected every 6th or 12th 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 samples 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
- benzene
- cadmium
- chromium
- cobalt
- ethylene dibromide
- ethylene dichloride
- manganese
- 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 acute 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 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 for lead, TCEQ health-, odor-, and vegetation-based AMCVs). More information about AMCVs is available online at: <https://www.tceq.texas.gov/toxicology/amcv/about>.

All data collected at TCEQ monitors are analyzed by the TCEQ laboratory and should meet a 75% data completeness objective. At industry sponsored monitors such as Cheniere Energy, GCGV, Valero, and Formosa Plastics Corporation, data are collected by a third-party contractor and should also meet a 75% data completeness objective. Thus, only long-term data that met the 75% completeness objective were evaluated in this memorandum.

Table 1. Air Monitoring Sites in Region 14, Corpus Christi

Site Name and Location	EPA Site ID	Network	County	Monitored Compounds
Corpus Christi Hillcrest 1802 Nueces Bay Blvd	48-355-0029	TCEQ	Nueces	VOCs (every 6 th -day 24-hr canister)
Corpus Christi Palm 1511 Palm Drive	48-355-0083	TCEQ	Nueces	VOCs (autoGC)
Dona Park 5707 Up River Rd	48-355-0034	TCEQ	Nueces	VOCs (every 6 th -day 24-hr canister) & PM _{2.5} Metals
Corpus Christi Huisache 3810 Huisache St	48-355-0032	TCEQ	Nueces	VOCs (every 6 th -day 24-hr canister) & H ₂ S
Oak Park Elementary School (27.79940, -97.43255)	N/A	Valero	Nueces	VOCs (every 6 th -day for first quarter and every 12 th -day thereafter 24-hr canister)
Point Comfort Plant Site (28.68161, -96.55162)	N/A	Formosa Plastics Corporation	Calhoun	VOCs (every 2 nd -day 24-hr canister)
Point Comfort City Hall Site (28.67776, -96.55440)	N/A	Formosa Plastics Corporation	Calhoun	VOCs (every 6 th -day 24-hr canister)
Point Comfort School Site (28.67806, -96.55776)	N/A	Formosa Plastics Corporation	Calhoun	VOCs (every 6 th -day 24-hr canister)
Point Comfort Park Site (28.68183, -96.56072)	N/A	Formosa Plastics Corporation	Calhoun	VOCs (every 6 th -day 24-hr canister)

Site Name and Location	EPA Site ID	Network	County	Monitored Compounds
Point Comfort North Site (28.71832, -96.55507)	N/A	Formosa Plastics Corporation	Calhoun	VOCs (once a month 24-hr canister)
Gregory Fresno Site ^a Stephen F. Austin Elementary 401 Fresnos St. Gregory, TX	N/A	Gregory-Portland	San Patricio	VOCs (AutoGC)
Portland Buddy Ganem Site ^b 307 Buddy Ganem St. GP High School Portland, TX	N/A	Gregory-Portland	San Patricio	VOCs (AutoGC), EtO ^c (every 6 th -day 24-hr canister)
Portland Broadway Site ^b 175 Broadway Blvd. Old East Cliff	N/A	Gregory-Portland	San Patricio	VOCs (AutoGC), EtO ^c (every 6 th -day 24-hr canister)

^aSite activated October 1, 2019

^bSite activated January 1, 2020

^cReported concentrations of EtO are semi-quantitative and experimental

Abbreviations: H₂S – hydrogen sulfide; PM_{2.5} – particulate matter of 2.5 micrometers or less in diameter; VOC – volatile organic compound; EtO – ethylene oxide

Evaluation

Short-Term Data (30-minute, Hourly, and 24-hour)

VOCs and Metals

The reported hourly average concentrations of the targeted VOCs measured were either not detected or were below their respective short-term AMCVs. Similarly, all available 24-hour VOC canister and metals concentrations were below their respective 24-hour AMCVs. Therefore, acute adverse health or vegetation effects and odors are not expected to occur as a result of short-term exposure to the reported levels of these chemicals.

Hydrogen Sulfide (H₂S)

All reported 30-minute rolling averages at the Corpus Christi Huisache site were below the level of the state 30-minute H₂S standard.

Long-Term Data (Annual Averages)

VOCs

The TD compared the calculated annual average concentrations for each target VOC to their respective long-term AMCVs to evaluate the potential for chronic health and vegetation effects. Annual average concentrations of all the targeted VOCs, except EDC, evaluated at the TCEQ and industry-sponsored canister monitoring sites were below their respective long-term AMCVs. Exposure to all annual average VOC concentrations would not be expected to result in long-term adverse health or vegetation effects. A brief discussion of reported annual EDC concentrations is provided below.

Ethylene Dichloride (EDC)

During 2020, the Plant Site in the Formosa Network reported an annual average EDC concentration (1.36 ppb) that exceeded the long-term EDC AMCV of 0.72 ppb. Several elevated 24-hour EDC values at the Plant Site contributed to the annual average concentration of 1.36 ppb, all of which were below the corresponding health-based 24-hour AMCV (94 ppb). The Plant Site is located within the facility's property; however, because of the proximity to residential areas, the TD is actively engaging Formosa to take actions aimed at reducing ambient EDC concentrations in Point Comfort.

Metals

All annual average PM_{2.5} metals concentrations collected at the Corpus Christi Dona Park monitoring site were below their respective long-term comparison values. Exposure to these reported concentrations would not be expected to result in long-term adverse health effects.

If you have any questions regarding the content of this review, please do not hesitate to contact Darrell McCant by phone at (512) 239-4477 or via email at Darrell.McCant@tceq.texas.gov.

Attachment A

List 1. Target VOC Canister

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

¹ Formosa Plastics Corporation

² Valero- Oak Park site only

³ Gregory-Portland (Portland-Buddy Ganem & -Broadway sites only)

List 2. Target Metal Analytes

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

List 3. Target Analytes at AutoGC Sites

1-Butene	Benzene	N-Heptane
1-Pentene	C-2-Butene	N-Hexane
1,2,3-Trimethylbenzene	C-2-Pentene	N-Nonane
1,2,4-Trimethylbenzene	Cyclohexane	N-Octane
1,3-Butadiene	Cyclopentane	N-Pentane
1,3,5-Trimethylbenzene	Ethane	N-Propylbenzene
2-Methylheptane	Ethyl Benzene	O-Xylene
2-Methylhexane	Ethylene	P-Xylene + M-Xylene
2,2-Dimethylbutane	Isobutane	Propane
2,2,4-Trimethylpentane	Isopentane	Propylene
2,3-Dimethylpentane	Isoprene	Styrene
2,3,4-Trimethylpentane	Isopropyl Benzene – Cumene	T-2-Butene
2,4-Dimethylpentane	Methylcyclohexane	T-2-Pentene
3-Methylheptane	Methylcyclopentane	Toluene
3-Methylhexane	N-Butane	
Acetylene	N-Decane	