

TCEQ Interoffice Memorandum

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Guy Wilkins, Water/Pantex Manager, R1

From: Angela Curry, MS *AC*
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Office of the Executive Director

Date: May 27, 2021

Subject: Toxicological Evaluation of 2017-2019 Ambient Air Network and Department of Energy (DOE) Pantex Facility Volatile Organic Compound (VOC) Monitoring Data in Region 1, Amarillo

Conclusions

- Average concentrations of all reported volatile organic compound (VOCs) were below their air monitoring comparison values (AMCVs) and would not be expected to cause adverse health effects.
- Twenty-four hour VOC concentrations of benzene and 1,3-butadiene were below their 24hour AMCVs and would not be expected to cause adverse health effects.
- One-hour concentrations of all reported VOCs were below their short-term AMCVs and would not be expected to cause adverse health effects or odors.
- Rolling 3-month concentrations of lead measured as total suspended particulate (TSP) were below the appropriate health comparison value and would not be expected to cause chronic adverse health effects. This monitor was deactivated on 11/29/2018.

Background

The Texas Commission on Environmental Quality (TCEQ) Monitoring Division in conjunction with the TCEQ Region 1-Amarillo staff conducts air monitoring at the Department of Energy (DOE) Pantex Facility, Amarillo, for VOCs. Currently, there are three Pantex-related air monitors in Region 1, two monitors on-site, and one off-site. Air samples collected at the two monitors on-site at Pantex are not representative of ambient air. In addition to Pantex-related air monitors, the TCEQ conducts ambient air monitoring at one lead TSP monitor in Region 1. This memorandum evaluates air monitoring data on a chemical-by-chemical basis.

Table 2 shows the number of samples collected at Pantex Sites 4, 5, and 7 from January 2017 through December 2019. No samples were collected at the Pantex 4 monitoring site during 2019 since this site is located next to a Pantex firing station which underwent a major electrical overhaul (which began sometime in 2018) and power to the site was shut off. Due to the overhaul, there weren't enough samples collected to calculate an annual average in 2018. The Pantex 5 monitoring site is located predominantly downwind of the Pantex burning grounds; one additional VOC monitoring site, Pantex Site 7, collects event-triggered one-hour VOC samples. The sampling schedule goal for Pantex 4 and 5 is to collect 25 samples over the course of the year. Annual averages can be calculated if there are at least 19 samples, which would meet 75% completeness.

Results for VOCs were reported in parts per billion by volume (ppbv). Information about the monitoring sites is presented in Table 1. The specific VOCs evaluated are listed in List 1 in Attachment A. The Request Report numbers for samples that were reviewed in this evaluation are listed in Table 2 in Attachment A. VOC samples collected at all Pantex-related sites are typically collected during an emission event or other triggered event and are believed to represent worst-case conditions. The number of samples collected at each monitor is less than what the TCEQ considers a minimum number of samples required to meet data completeness objectives in order to calculate an accurate and representative annual average concentration. However, since sample concentrations are believed to represent worst-case conditions, annual average concentrations based on these 24-hour samples are calculated for each chemical using available data and are assumed to be representative of the year and are conservatively biased high.

In order to evaluate 24-hour monitoring data more fully, TCEQ has developed 24-hour AMCVs for 1,3-butadiene and benzene. As such, 24-hour samples were compared to the available TCEQ 24-hour AMCVs for these two chemicals. Because short-term or peak concentrations are not necessarily captured by 24-hour samples, daily concentrations have limited use in evaluating the potential for acute health effects. The TD evaluated the reported annual average concentrations from 24-hour samples for each target analyte for potential chronic health and vegetation concerns by comparing measured chemical concentrations to long-term AMCVs.

More information about AMCVs is available online at:

<http://www.tceq.texas.gov/toxicology/AirToxics.html#amcv>.

In addition to the Pantex-related VOC air monitors, one lead TSP air monitor is located in Region 1. Results for TSP were reported in $\mu\text{g}/\text{m}^3$. As lead is a criteria pollutant, applicable lead TSP levels (i.e., rolling three-month averages) were compared to the national ambient air quality standards (NAAQS) of $0.15 \mu\text{g}/\text{m}^3$.

Table 1. Monitoring Sites Located in TCEQ Region 1

City and Site Location	County	EPA Site ID	Monitored Compounds
Pantex 4 , SW of FM 293 and FM 2373 Intersection	Carson	480650004	24-hour VOCs
Pantex 5 , W of FM 293 and 2373 Intersection	Carson	480650005	24-hour VOCs
Pantex 7 , Masterson Pump Station	Carson	480650007	1-hour VOCs (event triggered)
Amarillo SH 136 , 7100 State Highway 136	Potter	483750024	Lead (TSP)

Evaluation

Short-Term Data

Table 2 lists the number of samples that were collected at Pantex Sites 4, 5, and 7 from January 2017 through December 2019. Table 3 (in Attachment A) lists the Request Report numbers for all VOC samples received from January 2017 through December 2019. All 1-hour and 24-hour VOC concentrations were below their respective short-term AMCVs and would not be expected to cause short-term adverse health effects or odors.

Table 2. Number of Sample Collected at Pantex Sites 4, 5, and 7 from January 2017 through December 2019.

Monitoring Site	Sample Duration	2017	2018	2019
Pantex 4	24-hr	23	13	0
Pantex 5	24-hr	23	24	17
Pantex 7	1-hr	0	2	4

Long-Term Data

The calculated annual average of the 24-hour VOC results was assumed to represent average or above-average conditions based on sampling practices as discussed above. The calculated annual average concentrations of all VOCs were well below their respective long-term AMCVs. Adverse health effects would not be expected to occur from exposure to the monitored levels of VOCs.

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Lead

This monitor was deactivated on November 29, 2018. The rolling 3-month average of lead TSP at the Amarillo SH 136 monitor in January and November of 2018 were reported as 0.00222 and 0.00684 $\mu\text{g}/\text{m}^3$, respectively, which are well below the 0.15 $\mu\text{g}/\text{m}^3$ comparison value for lead. A 3-month rolling average was not reported for 2017. The 2017 and 2018 annual average lead concentrations of 0.0023087 and 0.0020905 $\mu\text{g}/\text{m}^3$, respectively, which are more representative of long-term exposure, were also below the comparison value.

If you have any questions regarding the contents of this review, please do not hesitate to contact me at 512-239-1306 or via email at angela.curry@tceq.texas.gov.

Attachment A

List 1. Target VOC Analytes in Canister Samples

1,1,1-trichloroethane	acetylene	methylene chloride
1,1,2,2-tetrachloroethane	acrolein	n-butane
1,1,2-trichloroethane	benzene	n-decane
1,1-dichloroethane	bromomethane	n-heptane
1,1-dichloroethylene	carbon tetrachloride	n-hexane
1,2,3-trimethylbenzene	chlorobenzene	n-nonane
1,2,4-trimethylbenzene	chloroform	n-octane
1,2-dichloropropane	chloromethane	n-pentane
1,3,5-trimethylbenzene	cis-1,3-dichloropropene	n-propylbenzene
1,3-butadiene	cis-2-butene	n-undecane
1-butene	cis-2-hexene	o-ethyltoluene
1-hexene and 2-methyl-1-pentene	cis-2-pentene	o-xylene
1-pentene	cumene	p-diethylbenzene
2,2,4-trimethylpentane	cyclohexane	p-ethyltoluene
2,2-dimethylbutane	cyclopentane	propane
2,3,4-trimethylpentane	cyclopentene	propylene
2,3-dimethylbutane	dichlorodifluoromethane	styrene
2,3-dimethylpentane	ethane	tetrachloroethylene
2,4-dimethylpentane	ethylbenzene	toluene
2-chloropentane	ethylene	trans-1,3-dichloropropene
2-methyl-2-butene	ethylene dibromide	trans-2-butene
2-methylheptane	ethylene dichloride	trans-2-hexene
2-methylhexane	isobutane	trans-2-pentene
2-methylpentane	isopentane	trichloroethylene
3-methyl-1-butene	isoprene	trichlorofluoromethane
3-methyl-1-butene and cyclopentene	m-diethylbenzene	vinyl chloride
3-methylheptane	m-ethyltoluene	
3-methylpentane	methylcyclohexane	
3-methylhexane m/p-xylene	methylcyclopentane	
	4-methyl-1-pentene	

List 2. Target Metal Analyte

Lead (TSP)

Table 3. Request Report Numbers for 24-hour and 1 hour VOC Canister Samples Collected from January 2017 through December 2019 at Pantex Sites 4, 5, and 7.

Request Report Number	Sample Date	Pantex Site Names
1702007	1/10/2017	4,5
1702018	1/31/2017	4,5
1703005	2/28/2017	4,5
1704003	3/14/2017	4,5
1704001	3/3/2017	4,5
1705008	4/13/2017	4,5
1704012	3/31/2017	4,5
1705018	4/28/2017	4,5
1706006	5/11/2017	4,5
1706007	5/18/2017	4,5
1706016	5/25/2017	4,5
1707011	6/20/2017	4,5
1707004	6/7/2017	4
1708004	7/17/2017	4,5
1708012	7/27/2017	4,5
1709008	8/11/2017	4,5
1709011	8/25/2017	4,5
1710005	9/21/2017	4,5
1711005	10/19/2017	4,5
1711007	10/27/2017	4,5
1712001	11/13/2017	4,5
1712004	11/20/2017	4,5
1801001	12/4/2017	4,5
1801006	12/29/2017	5
1801007	1/8/2018	4,5
1802005	1/31/2018	5
1803006	2/26/2018	4,5
1803011	3/8/2018	4,5
1804001	3/19/2018	4,5
1805003	4/12/2018	4,5
1804010	3/26/2018	4,5
1805010	4/19/2018	4,5
1805014	4/30/2018	4,5
1806001	5/14/2018	4,5

1806004	5/17/2018	4,5
1806009	5/23/2018	4,5
1806014	5/31/2018	4,5
1806015	5/29/2018	4,5
1807009	7/19/2018	5
1808009	8/13/2018	5
1808007	7/31/2018	5
1807008	6/25/2018	5
1810006	9/17/2018	5
1808012	8/21/2018	7
1811007	10/16/2018	5
1811006	10/29/2018	5
1812003	11/19/2018	5
1901002	12/13/2018	5
1812004	11/29/2018	5
1901003	1/10/2019	5
1902006	1/31/2019	5
1902007	2/14/2019	5
1903017	3/21/2019	5
1904009	4/11/2019	5
1904011	3/28/2019	7
1904012	4/2/2019	7
1905010	4/20/2019	7
1905011	4/25/2019	5
1906006	5/23/2019	5
1906007	6/3/2019	5
1907002	6/10/2019	5
1907001	6/20/2019	5
1907003	6/24/2019	5
1907012	6/27/2019	7
1907014	7/11/2019	5
1908011	7/22/2019	5
1908012	7/29/2019	5
1910009	9/26/2019	5
2001006	12/16/2019	5
2001005	12/11/2019	5