

# TCEQ Interoffice Memorandum

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**To:** Brad Jones, Regional Director, R1  
Eddy Vance, Air/Water/Waste Section Manager, R1

**From:** Shannon Ethridge, MS, DABT *SE.*  
Toxicology Division, Office of the Executive Director

**Date:** July 29, 2016

**Subject:** Health Effects Review of 2015 Ambient Air Network Monitoring Data for Lead and 2015 Air Monitoring Data for Volatile Organic Compounds, Department of Energy (DOE) Pantex Facility, TCEQ Region 1, Amarillo

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## Conclusions

- Annual average concentrations of all reported volatile organic compound (VOCs) were below their long-term 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 24-hour 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 average and annual average 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.

## 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.

From January 2015 through December 2015, 24 valid 24-hour samples for VOCs were collected at the Pantex 4 monitoring site located predominantly upwind of the burning grounds. During this same time period, 25 valid 24-hour samples for VOCs were collected at the Pantex 5 monitoring site located predominantly downwind of the Pantex burning grounds. One additional VOC monitoring site, Pantex Site 7, collected 13 event-triggered one-hour VOC samples during 2015. Results for VOCs were reported in parts per billion by volume (ppb<sub>v</sub>). 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  $0.15 \mu\text{g}/\text{m}^3$ ; however, annual average lead TSP concentrations were also evaluated since they are more representative of long-term lead exposure from a health perspective.

**Table 1. Monitoring Sites Located in TCEQ Region 1**

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

## **Evaluation**

### **Short-Term Data**

Thirteen one-hour VOC samples were collected at Site 7 during 2015, and all VOC concentrations were below their one-hour AMCVs and would not be expected to cause short-term adverse health effects or odors. Twenty-four hour VOC concentrations of benzene and 1,3-butadiene measured at all sites were below their 24-hour AMCVs and would not be expected to cause adverse health effects.

### **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 reported 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.

## **Lead**

On November 12, 2008, the U.S. Environmental Protection Agency (EPA) finalized the 0.15  $\mu\text{g}/\text{m}^3$  National Ambient Air Quality Standards (NAAQS) for lead based on a rolling three-month average concentration (73 Federal Register 66964). In general, the rule requires source-oriented ambient air lead monitoring at sites with actual annual lead emissions of one or more tons per year. In December of 2015, the rolling three-month average of lead TSP at the Amarillo SH 136 monitor was reported as 0.00311  $\mu\text{g}/\text{m}^3$ , which is well below the 0.15  $\mu\text{g}/\text{m}^3$  comparison value for lead. The annual average lead concentration of 0.00268  $\mu\text{g}/\text{m}^3$ , which is more representative of long-term exposure, was also below the comparison value.

If you have any questions regarding the contents of this review, please do not hesitate to contact me at 512-239-1822 or via email at [Shannon.Ethridge@tceq.texas.gov](mailto:Shannon.Ethridge@tceq.texas.gov).

## Attachment A

### List 1. Target VOC Analytes in Canister Samples

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

**List 2. Target Metal Analyte**

**Lead (TSP)**

**Table 2. Request Report Numbers for 24-hour and 1 hour VOC Canister Samples Collected from January 2015 through December 2015 at Pantex Sites 4, 5, and 7.**

Request Report Number	Sample Date	Pantex Site Names
1502009	1/19/2015	4,5
1502010	1/10/2015	7
1502019	2/15/2015	7
1502020	2/4/2015	4,5
1503003	2/19/2015	4,5
1503004	2/20/2015	7
1503018	3/2/2015 & 3/23/15	7 (2 samples)
1504013	3/24/2015	4,5
1504014	3/31/2015	7
1504018	3/30/2015	4,5
1504019	4/12/2015	7
1505004	4/6/2015	4,5
1505009	4/20/2015	4,5
1505012	4/22/2015	4,5
1506001	5/18/2015	4,5
1506003	6/3/2015	7
1506004	5/21/2015	4,5
1506015	5/28/2015	4,5
1506023	6/8/2015	4,5
1507003	6/10/2015	4,5
1507013	6/30/2015	4,5
1507015	7/16/2015	4,5
1508008	7/23/2015	4,5
1508018	7/30/2015	4,5
1508023	8/10/2015	4,5
1509012	9/2/2015	4,5
1510010	10/14/2015	7
1511008	10/12/2015	4,5
1511009	10/15/2015	5
1511017	11/5/2015	4,5
1511018	11/11/2015	7
1512004	11/23/2015	7
1512005	11/19/2015	4,5
1512015	12/12/2015	7
1512016	12/3/2015	4,5
1512025	12/12/2015	7
1512026	12/10/2015	4,5