

Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To: Jed Barker, Regional Director
Alice Cone, Air Section Manager
Brent Wade, Area Director
TCEQ Region 7- Midland

Date: October 3, 2006

From: Neeraja K. Erraguntla, Ph.D.
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Subject: Health Effects Review of the 2005 Ambient Air Network Monitoring Data in Region 7, Midland

Conclusions

- Annual reported volatile organic compounds (VOCs) were monitored at levels below health-based screening values and would not be expected to cause adverse health effects.
- Reported one-hour concentrations of all monitored VOCs at the Odessa-Gonzales and Odessa-Hays monitoring sites were less than their respective health-based and vegetative-based effects screening levels (ESLs) and odor thresholds except for a few exceedances for benzene, ethylene, and 1-butene at the Odessa-Hays site. Exposures to these concentrations would not be expected to cause adverse human health effects or odorous conditions.
- A single one-hour concentration of ethylene (1077 ppb_v) at the Odessa-Hays monitoring site exceeded the 1-hour vegetative-based ESL (1022 ppb_v). Sensitive plant species can undergo vegetative damage on exposure to these concentrations. Ethylene will remain on TCEQ's Air Pollution Watch List (APWL), and TS will encourage efforts to reduce ethylene emissions in those areas.

Background

This memorandum conveys the Toxicology Section's (TS) evaluation of ambient air sampling conducted at two monitoring network sites in Region 7-Midland during 2005. TS reviewed air monitoring summary results for sixty-seven VOCs from 40 minute samples collected each hour by automated gas chromatographs (Auto-GCs) at the Odessa-Gonzales and Odessa-Hays sites from January 1- December 31, 2005. Table 1 contains information regarding the two Auto-GC sites in Region 7-Midland. Table 2 contains a list of the target analytes that were evaluated for this review.

The TCEQ Monitoring Operations Division reported the data for all chemicals evaluated. TS evaluated the reported VOCs for their potential to cause both short-term and long-term adverse health effects, odorous conditions, and vegetative damage. The measured chemical concentrations were compared to their respective short-term and long-term TCEQ ESLs. Information on the ESLs can be obtained by contacting TCEQ (512-239-1795) or visiting the TCEQ website:

<http://www.tceq.state.tx.us/implementation/tox/esl/ESL.Main.htm>

Table 1: Monitoring Site Information for TCEQ Region 7-Midland

| County | City and Site Location | EPA Site ID | Monitored Compounds |
|--------|---|-------------|---------------------|
| Ector | Odessa-Hays, Barrett and Monahans Streets | 48-135-0003 | VOCs |
| Ector | Odessa-Gonzales, 2700 Disney | 48-135-1014 | VOCs |

Evaluation

One-Hour Data (Odessa-Gonzales and Odessa Hays)

Reported one-hour concentrations of all monitored VOCs at the Odessa-Gonzales and Odessa-Hays monitoring sites were less than their respective health-based ESLs and odor thresholds except for ethylene, benzene, and 1-butene at the Odessa-Hays site. However, the frequency of exceedances for benzene, 1-butene, and ethylene at the Odessa-Hays monitoring site are very minimal. TS, therefore believes that exposures to the reported one-hour concentrations of all the monitored VOCs would not be expected to cause adverse human health effects or odorous conditions. Ethylene is discussed below.

Ethylene

At the Odessa-Hays site, a single hourly ethylene concentration (1077 ppb_v) exceeded the 1-hour vegetative-based ESL (1022 ppb_v) in 2005. While exposure to the reported ethylene concentrations would not be expected to cause adverse human health effects or odorous conditions, exposure to the measured ethylene levels can damage sensitive plant species. Examples of vegetative effects of ethylene are loss of leaves, early and profuse flower budding accompanied by premature loss of fruit which leads to reduced crop yields. Ethylene will remain on TCEQ's Air Pollution Watch List (APWL), and TS will encourage efforts to reduce ethylene emissions in those areas.

Annual Average Data

Annual average VOC concentrations were calculated from the hourly data. Annual average levels of all the monitored VOCs were below their respective long-term ESLs. Exposure to the annual average VOC levels measured at these two locations would not be expected to cause adverse health effects.

If you have any questions regarding this evaluation, please do not hesitate to contact me at (512)-239-2492.

Table 2: List of Monitored VOCs

| | |
|--------------------------------|----------------------------|
| 1,2,3-Trimethylbenzene | Isopentane |
| 1,2,4-Trimethylbenzene | Isoprene |
| 1,3,5-Trimethylbenzene | Isopropyl Benzene – Cumene |
| 1,3-Butadiene | Methylcyclohexane |
| 1-Butene | Methylcyclopentane |
| 1-Hexene | Propane |
| 1-Pentene | Propylene |
| 2,2,4-Trimethylpentane | Styrene |
| 2,2-Dimethylbutane | Toluene |
| 2,3,4-Trimethylpentane | a-Pinene |
| 2,3-Dimethylbutane | b-Pinene |
| 2,3-Dimethylpentane | c-2-Butene |
| 2,4-Dimethylpentane | c-2-Hexene |
| 2-Methyl-1-Pentene | c-2-Pentene |
| 2-Methyl-2-Butene | m-Diethylbenzene |
| 2-Methylheptane | m-Ethyltoluene |
| 2-Methylhexane | n-Butane |
| 2-Methylpentane | n-Decane |
| 3-Methyl-1-Butene | n-Heptane |
| 3-Methyl-1-Butene+Cyclopentene | n-Hexane |
| 3-Methylheptane | n-Nonane |
| 3-Methylhexane | n-Octane |
| 3-Methylpentane | n-Pentane |
| 4-Methyl-1-Pentene | n-Propylbenzene |
| Acetylene | n-Undecane |
| Benzene | o-Ethyltoluene |
| Cyclohexane | o-Xylene |
| Cyclopentane | p-Diethylbenzene |
| Cyclopentene | p-Ethyltoluene |
| Ethane | p-Xylene + m-Xylene |
| Ethyl Benzene | t-2-Butene |
| Ethylene | t-2-Hexene |
| Isobutane | t-2-Pentene |
| Isobutene | |

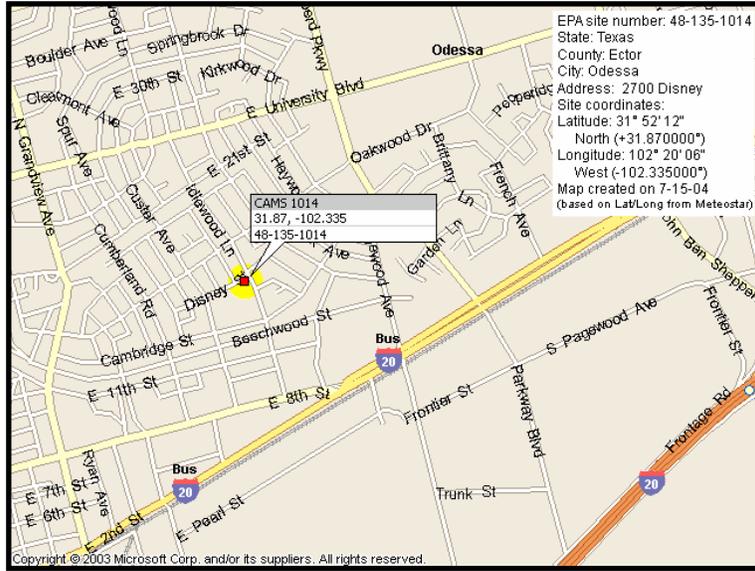


Figure 1: Location of the VOC Monitoring on Disney Street (Odessa-Gonzales)

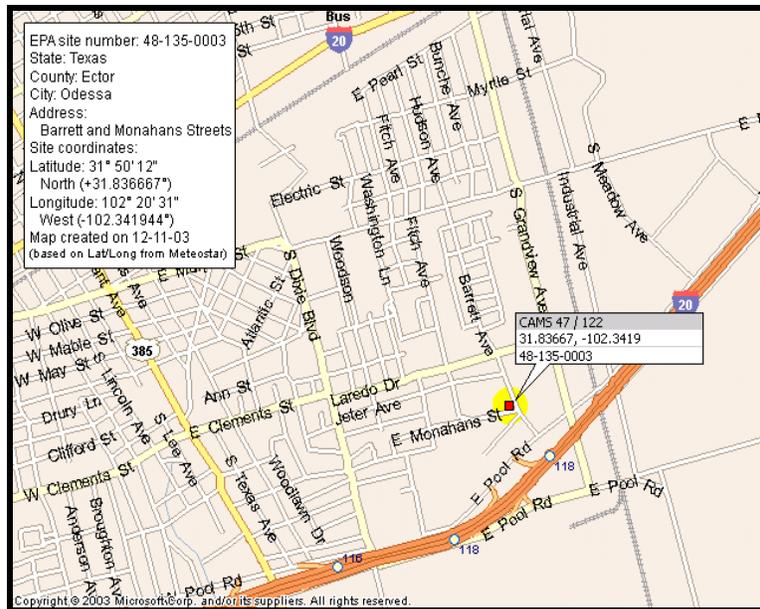


Figure 2: Location of the VOC Monitoring at Barrett and Monahans Street (Odessa-Hays)

cc: (via email)

Casso, Ruben- EPA Region 6, Dallas

Prosperie, Susan- Department of State Health Services