



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6

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DALLAS, TX 75202-2733

December 7, 2018

MEMORANDUM

Subject: Browns Tree Care Dump – Evaluation of Air Sampling Results
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To: Matthew Loesel
On-Scene Coordinator

Summary:

The memorandum provides an evaluation of air sampling results for the Browns Tree Care Dump facility near Bella Vista, Arkansas. Twenty-four-hour air samples for semivolatile organic compounds (SVOCs) and volatile organic compounds (VOCs) were collected on November 10, 2018. The air samples were collected at five locations, which included an on-site sample location (Location 7) and an upwind background location near Longleat Lane (Location 10).

EPA Regional Screening Levels (RSLs) for residential air are used to identify compounds that need additional evaluation and are not intended to be directly used as air action levels. The results of the SVOC and VOC sampling were compared to both the chronic RSL (70 years) and the subchronic (2 weeks to 7 years) RSL for residential air. The RSLs represent levels which are without adverse non-cancer effects over a time period.

All SVOCs and VOCs at all the off-site sample locations (Locations 6, 8, 9 and 10) are at acceptable levels. In all the off-site samples, benzene levels were equivalent to the benzene level of $3.8 \mu\text{g}/\text{m}^3$ at the upwind background location (Location 10) and did not exceed the chronic RSL of $31 \mu\text{g}/\text{m}^3$.

Benzene was detected at the on-site sample location (Location 7) at a level of $100 \mu\text{g}/\text{m}^3$ which exceeds the chronic RSL of $31 \mu\text{g}/\text{m}^3$. However, the on-site benzene level of $100 \mu\text{g}/\text{m}^3$ is within a factor of two of the subchronic RCL of $82 \mu\text{g}/\text{m}^3$ and therefore does not represent an immediate health concern.

For communication purposes with the public, we are reporting concentrations in parts-per-million (ppm) since most publicly available health literature from Centers for Disease Control and Prevention (CDC) and Agency for Toxic Substances and Disease Registry (ATSDR) uses this measurement ($100 \mu\text{g}/\text{m}^3$ equals 0.03 ppm). Brief exposure (5-10 minutes) to very high levels of benzene in the air (10,000 – 20,000 ppm) can result in death, according to the ATSDR. Lower levels (700 to 3,000 ppm) can cause drowsiness, dizziness, rapid heart rate, headaches, tremor, confusion and unconsciousness. In most cases, people will stop feeling these effects when they are no longer exposed and begin to breathe fresh air.

Semivolatile organic compounds (SVOCs):

- Phenol – Location 7 (on-site) had the highest concentration ($2.1 \mu\text{g}/\text{m}^3$) and the other sample locations were equivalent to the background level ($0.057 \mu\text{g}/\text{m}^3$). The screening level for phenol is $210 \mu\text{g}/\text{m}^3$; therefore, phenol is unlikely to cause adverse health effects.
- 2-methylphenol (o-cresol) - Location 7 (on-site) had the highest concentration ($1.3 \mu\text{g}/\text{m}^3$) and the other sample locations were equivalent to the background level ($0.016 \mu\text{g}/\text{m}^3$). The screening level for o-cresol is $630 \mu\text{g}/\text{m}^3$; therefore, o-cresol is unlikely to cause adverse health effects.
- 4-methylphenol/3-methylphenol (m- and p-cresol) - Location 7 (on-site) had the highest concentration ($2.2 \mu\text{g}/\text{m}^3$) and the other sample locations were equivalent to the background level ($0.036 \mu\text{g}/\text{m}^3$). The screening level for 4-methylphenol/3-methylphenol is $630 \mu\text{g}/\text{m}^3$; therefore, 4-methylphenol/3-methylphenol is unlikely to cause adverse health effects.
- 2,4-dimethylphenol - Location 7 (on-site) had the highest concentration ($0.94 \mu\text{g}/\text{m}^3$) and wasn't detected at the background location. There is no EPA screening level for 2,4-dimethylphenol. The screening level for phenol of $210 \mu\text{g}/\text{m}^3$ is used as a surrogate; therefore, 2,4-dimethylphenol is unlikely to cause adverse health effects.
- Naphthalene - Location 7 (on-site) had the highest concentration ($1.6 \mu\text{g}/\text{m}^3$) and the other sample locations were equivalent to the background level ($0.037 \mu\text{g}/\text{m}^3$). The non-cancer screening level for naphthalene is $3.1 \mu\text{g}/\text{m}^3$; therefore, naphthalene is unlikely to cause adverse non-cancer health effects.
- 2-methylnaphthalene - Location 7 (on-site) had the highest concentration ($0.91 \mu\text{g}/\text{m}^3$) and the other sample locations were equivalent to the background level ($0.023 \mu\text{g}/\text{m}^3$). There is no EPA screening level available for 2-methylnaphthalene and the non-cancer screening level for naphthalene of $3.1 \mu\text{g}/\text{m}^3$ is used as a surrogate. Therefore, 2-methylnaphthalene is unlikely to cause adverse non-cancer health effects.
- Acenaphthene - Location 7 (on-site) had the only detection at a concentration of $0.049 \mu\text{g}/\text{m}^3$. There is no EPA screening level for acenaphthene and the non-cancer screening level for naphthalene of $3.1 \mu\text{g}/\text{m}^3$ is used as a surrogate. Therefore, acenaphthene is unlikely to cause adverse non-cancer health effects.
- Dibenzofuran - Location 7 (on-site) had the highest concentration ($0.19 \mu\text{g}/\text{m}^3$) and wasn't detected at the background location. There is no EPA screening level for dibenzofuran and the non-cancer screening level for tetrahydrofuran of $2,100 \mu\text{g}/\text{m}^3$ is used as a surrogate. Therefore, dibenzofuran is unlikely to cause adverse non-cancer health effects.
- Fluorene - Location 7 (on-site) had the highest concentration ($0.097 \mu\text{g}/\text{m}^3$) and wasn't detected at the background location. There is no EPA screening level for fluorene and the non-cancer screening level for naphthalene of $3.1 \mu\text{g}/\text{m}^3$ is used as a surrogate. Therefore, fluorene is unlikely to cause adverse non-cancer health effects.

- Phenanthrene - Location 7 (on-site) had the highest concentration ($0.11 \mu\text{g}/\text{m}^3$) and the other sample locations were equivalent to the background level ($0.032 \mu\text{g}/\text{m}^3$). There is no EPA screening level for phenanthrene and the non-cancer screening level for naphthalene of $3.1 \mu\text{g}/\text{m}^3$ is used as a surrogate. Therefore, phenanthrene is unlikely to cause adverse non-cancer health effects.
- Anthracene - Location 7 (on-site) had the only detection at a concentration of $0.02 \mu\text{g}/\text{m}^3$. There is no EPA screening level for anthracene and the non-cancer screening level for naphthalene of $3.1 \mu\text{g}/\text{m}^3$ is used as a surrogate. Therefore, anthracene is unlikely to cause adverse non-cancer health effects.
- Fluoranthene - Location 7 (on-site) had the only detection at a concentration of $0.023 \mu\text{g}/\text{m}^3$. There is no EPA screening level for fluoranthene and the non-cancer screening level for naphthalene of $3.1 \mu\text{g}/\text{m}^3$ is used as a surrogate. Therefore, fluoranthene is unlikely to cause adverse non-cancer health effects.
- Pyrene - Location 7 (on-site) had the only detection at a concentration of $0.018 \mu\text{g}/\text{m}^3$. There is no EPA screening level for pyrene and the non-cancer screening level for naphthalene of $3.1 \mu\text{g}/\text{m}^3$ is used as a surrogate. Therefore, pyrene is unlikely to cause adverse non-cancer health effects.

Volatile organic compounds (VOCs):

- Ethanol – Ethanol was detected at an equivalent concentration at four out of five locations, including the background, with a range of $5.8 \mu\text{g}/\text{m}^3$ to $22 \mu\text{g}/\text{m}^3$. There is no EPA screening level for ethanol and the screening level for methanol of $21,000 \mu\text{g}/\text{m}^3$ is used as a surrogate. Therefore, ethanol is unlikely to cause adverse health effects.
- Acetone - Location 7 (on-site) had the only detection at a concentration of $100 \mu\text{g}/\text{m}^3$. Acetone has a screening level of $32,000 \mu\text{g}/\text{m}^3$. Therefore, acetone is unlikely to cause adverse health effects. In addition, acetone is a common laboratory contaminant.
- 2-propanol (isopropanol) - Location 7 (on-site) had the only detection at a concentration of $26 \mu\text{g}/\text{m}^3$. Isopropanol has a screening level of $210 \mu\text{g}/\text{m}^3$. Therefore, isopropanol is unlikely to cause adverse health effects.
- Hexane – Hexane was detected at an equivalent concentration at three out of five locations, including the background, with a range of $4.2 \mu\text{g}/\text{m}^3$ to $9.4 \mu\text{g}/\text{m}^3$. Hexane has a screening level of $730 \mu\text{g}/\text{m}^3$. Therefore, hexane is unlikely to cause adverse health effects.
- 2-butanone (methyl ethyl ketone (MEK)) - Location 7 (on-site) had the only detection at a concentration of $38 \mu\text{g}/\text{m}^3$. MEK has a screening level of $5,200 \mu\text{g}/\text{m}^3$. Therefore, MEK is unlikely to cause adverse health effects. In addition, MEK is a common laboratory contaminant.
- Tetrahydrofuran - Location 7 (on-site) had the only detection at a concentration of $34 \mu\text{g}/\text{m}^3$. the screening level for tetrahydrofuran is $2,100 \mu\text{g}/\text{m}^3$; therefore, tetrahydrofuran is unlikely to cause adverse non-cancer health effects.
- 2,2,4-Trimethylpentane – 2,2,4-Trimethylpentane was detected at all five locations with a range of $5.1 \mu\text{g}/\text{m}^3$ to $22 \mu\text{g}/\text{m}^3$ and with Location 10 (upwind background) having the highest level. There is no EPA screening level for 2,2,4-trimethylpentane and the screening level for n-pentane of $1,000 \mu\text{g}/\text{m}^3$ is used as a surrogate. Therefore, 2,2,4-trimethylpentane is unlikely to cause adverse health effects.
- Benzene – On-site sample location (Location 7) had the highest benzene level ($100 \mu\text{g}/\text{m}^3$) and the off-site sample locations were equivalent to the upwind background level ($3.8 \mu\text{g}/\text{m}^3$). Benzene has a chronic (i.e., 70 years) non-cancer screening level of $31 \mu\text{g}/\text{m}^3$. On-site sample (Location 7) was the only location to exceed the chronic (i.e., 70 year) non-cancer screening level of $31 \mu\text{g}/\text{m}^3$. The off-site sample locations do not exceed the chronic (i.e., 70 years) non-cancer screening level for benzene and do not appear to present an unacceptable health risk. Therefore, all off-site sample results for benzene in air are at an acceptable level.

Benzene has a subchronic (i.e., 2 weeks to 7 years). non-cancer screening level of $82 \mu\text{g}/\text{m}^3$. Subchronic non-cancer screening levels represent levels which are without adverse non-cancer effects over an intermediate time period (i.e., up to 7 years). Therefore, the on-site benzene level of $100 \mu\text{g}/\text{m}^3$ is within a factor of two of the subchronic non-cancer screening level of $82 \mu\text{g}/\text{m}^3$. Therefore, the benzene level of $100 \mu\text{g}/\text{m}^3$ at the on-site sample location does not represent an immediate health concern.

Benzene has an Acute Exposure Guideline Levels (AEGLs). The AEGL-1 is the level of a compound that is predicted that the public, including sensitive individuals, could experience discomfort and irritation. However, the effects are not disabling, are temporary and reversible upon cessation of exposure. The eight-hours AEGL-1 for benzene is 28,000 $\mu\text{g}/\text{m}^3$. The twenty-four-hour on-site sample location level of 100 $\mu\text{g}/\text{m}^3$ was almost 300 times less than the eight-hour AEGL-1 for benzene.

- Heptane - Heptane was detected at an equivalent concentration at three out of five locations, including the background, with a range of 3.9 $\mu\text{g}/\text{m}^3$ to 8.1 $\mu\text{g}/\text{m}^3$. Heptane has a screening level of 420 $\mu\text{g}/\text{m}^3$. Therefore, heptane is unlikely to cause adverse health effects.
- Toluene - Location 7 (on-site) had the highest concentration (72 $\mu\text{g}/\text{m}^3$) and the other sample locations were equivalent to the background level (24 $\mu\text{g}/\text{m}^3$). Toluene has a screening level of 5,200 $\mu\text{g}/\text{m}^3$. No location exceeded the screening level. Therefore, toluene is unlikely to cause adverse effects.
- Ethyl benzene - Ethyl benzene was detected at an equivalent concentration at three out of five locations, including the background, with a range of 4.2 $\mu\text{g}/\text{m}^3$ to 13 $\mu\text{g}/\text{m}^3$. Ethyl benzene has a non-cancer screening level of 1,000 $\mu\text{g}/\text{m}^3$. Therefore, ethyl benzene is unlikely to cause adverse non-cancer health effects.
- m,p-Xylene - m,p-Xylene was detected at an equivalent concentration at three out of five locations, including the background, with a range of 15 $\mu\text{g}/\text{m}^3$ to 24 $\mu\text{g}/\text{m}^3$. m,p-Xylene has a screening level of 100 $\mu\text{g}/\text{m}^3$. Therefore, m,p-Xylene is unlikely to cause adverse health effects.
- o-Xylene - o-Xylene was detected at an equivalent concentration at three out of five locations, including the background, with a range of 5.3 $\mu\text{g}/\text{m}^3$ to 10 $\mu\text{g}/\text{m}^3$. o-Xylene has a screening level of 100 $\mu\text{g}/\text{m}^3$. Therefore, o-xylene is unlikely to cause adverse health effects.
- 4-Ethyltoluene – 4-Ethyltoluene was detected at an equivalent concentration at three out of five locations, including the background, with a range of 5.8 $\mu\text{g}/\text{m}^3$ to 6.7 $\mu\text{g}/\text{m}^3$. There is no EPA screening level for 4-ethyltoluene and the screening level for toluene of 5,200 $\mu\text{g}/\text{m}^3$ is used as a surrogate. Therefore, 4-ethyltoluene is unlikely to cause adverse health effects.
- 1,2,4-Trimethylbenzene - 1,2,4-Trimethylbenzene was detected at an equivalent concentration at three out of five locations, including the background, with a range of 4.9 $\mu\text{g}/\text{m}^3$ to 5.7 $\mu\text{g}/\text{m}^3$. 1,2,4-Trimethylbenzene has a screening level for toluene of 63 $\mu\text{g}/\text{m}^3$ and is unlikely to cause adverse health effects.
- Methyl Acetate - Location 7 (on-site) had the only detection at a concentration of 38 $\mu\text{g}/\text{m}^3$. There is no EPA screening level for methyl acetate and the screening level for ethyl acetate of 73 $\mu\text{g}/\text{m}^3$ is used as a surrogate. Therefore, methyl acetate is unlikely to cause adverse health effects.