

Tullamarine Landfill

Community information



Community air monitoring program Reports Three and Four

In February 2011 EPA initiated a community air monitoring program in the vicinity of the closed Tullamarine Landfill. The monitoring was undertaken over a 12 month period to address community concerns about potential health effects arising from exposure to pollutants coming from the landfill.

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Monitoring took place at four sites within the local residential area. 12 months of monitoring has now been completed at those four sites.

A further fifth site is located between the airport and the landfill. Monitoring at this site didn't commence until August 2011 and results for this site will be reviewed after 12 months of monitoring.

This report presents the results of the monitoring that has been undertaken from February 2011 to February 2012 at the four residential locations. Monitoring for the airport location is provided for monitoring undertaken from August 2011 to February 2012.

Sampling and analysis has been undertaken for a wide range of pollutants. Some of these pollutants (such as benzene) arise from a number of sources including motor vehicles as well as domestic and industrial sources, while others (such as vinyl chloride and other chlorinated solvents) are likely to be emitted from the landfill only and therefore act as a marker for the landfill gases.

Results

The results of the monitoring for all five sites are summarised in Tables 1-2. The results are compared with national and international air quality standards.

The results show that for many substances the levels that were monitored were below detectable level. For all substances that were at measurable levels in residential areas, they were all less than the relevant air quality standards.

For the substances that are widely spread in urban air, such as benzene, toluene and xylenes, the levels measured in the residential area were comparable to those measured in other areas of Melbourne.

As part of the Tullamarine Landfill - Community Health and Environment

Report research carried out by EPA in 2010, air dispersion modelling and a risk assessment was undertaken for three indicator pollutants:

- Benzene, toluene and xylene
- Trichloroethylene
- Vinyl Chloride

The monitoring of these substances has found that the concentrations of all these substances are low in the residential area. Vinyl chloride and trichloroethylene were below detectable levels in all of the samples. These monitoring results support the findings of the air modelling and risk assessment report released by EPA in February.

Of approximately 280 samples collected and analysed from the five sites, two samples returned a markedly higher than average reading for three substances: benzene, toluene and xylene. The levels whilst close to the benzene and xylene guidelines did not exceed the annual guideline for all three.

The elevated levels were measured in similar proportions on the same day at residential site 1 and airport site 5 while experiencing moderate northerly winds. Similar proportions of benzene, toluene and xylene levels in the two samples indicate a common source.

The source of the elevated levels is unknown and one potential source in particular at the airport site could be from petrol and other motor vehicle emissions.

The northerly wind during sampling, elevated levels measured both at the airport and the residential sites on the same day, as well as a lack of the general landfill marker compounds trichloroethylene and vinyl chloride in both sample indicates the landfill is an unlikely source.

EPA's continued monitoring of airport site 5 will enable further investigation of potential local sources of these compounds.

METHODS USED TO MONITOR AND ASSESS AIR QUALITY

Air samples were collected over a 24 hour period in canisters placed in the yards of four homes and at the airport site. The samples were collected and analysed using a gas chromatograph - mass spectrometer (GC- mass spec) and based on USEPA Method TO-14A¹. The GC-Mass Spec is used to identify what pollutants are present within the air samples taken within the vicinity of the Tullamarine Landfill and at what concentrations.

The air quality data collected has been compared against air quality objectives used by EPA to assess the risk that these gases may pose to human health. The air quality objectives are a set of concentrations, determined by scientific research, which have been found to protect the health of people when they may be in contact with the air pollutant for short period 24 hours a day, seven days a week (up to two weeks) or longer period of one year or more over a 70 year lifetime. These objectives contain a margin of safety that ensures protection of people who may be more sensitive to exposure to the pollutants, such as people with existing illness, children and older adults.

The objectives used have been taken from three sources:

- The Air Toxics National Environment Protection Measure (Air Toxics) NEPM
- Texas Commission for Environmental Quality (TCEQ)
- United States Agency for Toxic Substances and Disease Registry (ATSDR)

¹ USEPA Method TO-14A: Determination of Volatile Organic Compounds (VOCs) in air collected using specially-prepared Canisters with subsequent analysis by Gas Chromatography.

Table 1: Tullamarine Landfill monitoring results

COMPOUND	SITE 1		SITE 2		SITE 3		SITE 4		SITE 5 - AIRPORT		GUIDELINE ppb
	Average ppb	Max ppb	Average ppb	Max ppb	Average ppb	Max ppb	Average ppb	Max ppb	Average ppb	Max ppb	
Trichloroethylene	bdl	bdl	0.1	0.8	bdl	bdl	bdl	bdl	bdl	bdl	10 (TCEQ)
Vinyl chloride	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	
Benzene	2.9	160	0.3	1.2	0.4	2.3	0.3	1.3	21	690	3 (NEPM)
Toluene	7.0	150	2.3	70	2.4	18	2.1	30	18	560	100 (NEPM)
Methane, chloro-	0.8	2.5	0.8	5.5	0.9	3.5	0.8	2.5	1.1	3.4	50 (TCEQ)
Formaldehyde	2.5	7.6	*	*	2.1	4.7	*	*	3.9	8.0	40# (NEPM)
Benzene, 1,2,4-trichloro-	1.2	4.1	1.3	6.0	bdl	bdl	bdl	bdl	bdl	bdl	13 (ATSDR)
Benzene, 1,2,4-trimethyl	0.6	2.7	0.5	1.8	0.5	1.5	0.5	2.4	0.8	2.1	25 (TCEQ)
Benzene, 1,2-dichloro-	bdl	bdl	0.5	1.8	bdl	bdl	bdl	bdl	bdl	bdl	47 (ATSDR)
Xylene, m- & p-	3.7	163	0.8	9.1	0.8	4.1	0.5	1.5	25	770	200 (NEPM)
Xylene, o-	2.0	82	0.3	2.7	0.4	2.7	0.3	2.2	12	370	200 (NEPM)
Methane, dichlorodifluoro	0.5	0.8	0.5	0.7	0.5	0.7	0.5	0.6	0.5	0.7	1,000 (TCEQ)
Benzene, 1,3,5-trimethyl-	0.6	2.8	bdl	bdl	0.5	1.6	0.5	2.0	bdl	bdl	25 (TCEQ)
Benzene, 1,3-dichloro-	bdl	bdl	bdl	bdl	0.5	1.5	bdl	bdl	bdl	bdl	3# (ATSDR)
Benzene, 1,4-dichloro-	bdl	bdl	bdl	bdl	0.5	2.7	bdl	bdl	bdl	bdl	10 (ATSDR)
Benzene, chloro-	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	
Benzene, ethyl-	0.2	1.2	0.2	2.0	0.2	0.6	0.1	0.5	0.1	0.4	450 (TCEQ)
Buta-1,3-diene, 1,1,2,3,4,4-hexachloro-	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	
Butadiene	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	
Carbon tetrachloride	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	
Chloroform	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.1	0.4	
Ethane, 1,1,1-trichloro-	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	
Ethane, 1,1,2,2-tetrachloro-	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	
Ethane, 1,1,2-trichloro-	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	
Ethane, 1,1,2-trichloro- 1,2,2-trifluoro	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	
Ethane, 1,1-dichloro-	bdl	bdl	0.1	0.4	0.1	0.8	0.1	0.5	0.1	0.6	100 (TCEQ)
Ethane, 1,2-dibromo-	bdl	bdl	bdl	bdl	bdl			bdl	bdl	bdl	
Ethane, 1,2-dichloro-	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	
Ethane, dichlorotetrafluoro-	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	
Ethene, 1,1-dichloro-, (E)-	0.1	1.0	0.1	0.9	0.1	1.1	bdl	bdl	bdl	bdl	86 (TCEQ)
Ethene, 1,2-dichloro-, (E)-	0.2	0.8	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	N/A
Ethylene, tetrachloro-	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	
Methane, bromo-	0.1	1.5	0.2	0.9	bdl	bdl	0.2	1.5	bdl	bdl	3 (TCEQ)
Methane, trichloromonofluoro-	0.2	0.3	0.1	0.4	0.1	0.5	0.1	0.5	0.1	0.3	1000 (TCEQ)
Methylene chloride	0.3	4.8	0.2	2.6	0.5	15	0.2	1.9	0.2	1.1	100 (TCEQ)
Prop-1-ene, 1,3-dichloro-, (E)-	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	
Prop-1-ene, 1,3-dichloro-, (Z)-	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	
Propane, 1,2-dichloro-	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.2	0.9	
Styrene	2.1	5.0	bdl	bdl	2.4	12	bdl	bdl	2.3	8.8	110 ((TCEQ)

Key - All guidelines are annual averages, in cases where there is no annual average, 24-hour average is used instead, denoted by **#** - 24-hour average; **bdl** - below detection limit; ***** - not monitored at this site; **N/A** - not available

NEPM - Air Toxics National Environmental Protection Measure, **TCEQ** - Texas Centre for Environmental Quality **ATSDR** - US Agency for Toxic Substances and Disease Registry; ppb - parts per billion.