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Air quality testing in Morwell - Volatile Organic Compounds

Hazelwood Coal Mine Fire Number 1: 13 March 2014

The Environment Protection Authority (EPA) is testing air quality in Morwell as part of the monitoring program for the Hazelwood coal mine fire. Air samples are being collected for a large number of substances that may be found in this smoke, including Volatile Organic Compounds, sometimes called VOCs. EPA is providing the results to the Department of Health for health advice.

This information is about VOCs. Further information about other substances will be provided when results become available.

What are VOCs?

VOCs are a large group of chemicals containing carbon and give off vapours into air. This includes for example, chemicals such as ethanol, acetone, xylene, benzene, toluene and 1,3 butadiene.

Where do VOCs come from?

VOCs can be produced when things that contain carbon are burned (eg petrol, wood, coal, natural gas and tobacco). Therefore VOCs are commonly found in smoke. VOCs are also found in paints, glues and other products used in the home or workplace. Motor vehicle exhaust also contains VOCs.

How was the testing done for VOCs?

The EPA is testing for VOCs using air sampling canisters during high smoke days. These canisters collect vapours in the air over a 24 hour period.

The canisters are located at three places in Morwell:

- Morwell Bowling Club (52 Hazelwood Rd)
- Maryvale Crescent Early Learning Centre (14 Maryvale Crescent)
- Morwell East (70 Hourigan Rd)

During the smoky conditions, the canisters were located at these three places for two consecutive days on the following dates:

- 26 to 27 February
- 27 to 28 February
- 5 to 6 March
- 6 to 7 March
- 13 to 14 March

The results for 26-27 February and the 27-28 February are now available and are shown in the table below. The Department of Health will provide updates to this sheet as the remaining results become available.

In addition to this work, EPA is also doing a year-long air quality monitoring program with air samples collected every seven days.

What has the VOC testing found so far?

Of the 64 chemicals tested for, 50 were not found. The 14 chemicals that were found are listed in the table.

Chemical	Unit	Morwell East		Morwell Bowling Club		Maryvale Crescent Early Learning Centre		Air Quality Guideline Value ¹
		26 Feb	27 Feb	26 Feb	27 Feb	26 Feb	27 Feb	24 hr ppb
Propene (Propylene)	ppb	4.7	5.7	42	28	24	16	232.4
Dichlorodifluoromethane (Freon12)	ppb	0.89	0.89	0.81	0.84	0.83	0.86	101000
Chloromethane (methyl chloride)	ppb		1.5	1.9	2.0	2.5	1.9	155
1,3-Butadiene	ppb			2.5	1.6	1.6	0.70	145
Acetone	ppb	1.9	2.2	8.0	7.0	5.8	6.2	497
Ethanol	ppb	2.9	94.9	7.2	8.4	5.3	5.4	10084
Carbon disulfide	ppb						0.81	106
2-Butanone (MEK)	ppb			1.1	0.93	0.75	0.82	339
Hexane	ppb			1.2	0.89	0.77		284
Benzene	ppb	1.7	2.1	14	9.7	9.2	6.0	9
Heptane	ppb			0.91	0.70	0.61		2684
Toluene	ppb	0.70	0.92	4.7	3.4	3.0	2.1	531
Ethylbenzene	ppb				0.57			230
Naphthalene	ppb			0.97	1.6			4.29

The Department of Health uses air quality guideline values based on international standards to compare to the measured air levels. These values are listed in the table, and are protective of community health, meaning that if the measured air levels are below these values, health effects are not expected.

These values contain a margin of safety that ensures protection of people who may be more sensitive to breathing air pollutants such as children or the elderly.

What do these VOC levels mean for your health?

All 14 chemicals that were found are not considered a health concern when compared with air quality guideline values that protect community health from an event such as the Hazelwood coal mine fire.

All 14 chemicals are many times lower than their air quality guideline value, except benzene in two of the three locations:

- Maryvale Crescent Early Learning Centre – one result was slightly above the air quality guideline value (ie 9.2 parts per billion compared to 9.0 parts per billion).
- Bowling Club - both results were above the air quality guideline value (ie 14 ppb on 26 February and 9.7 ppb on 27 February compared to 9 ppb).

¹ The air quality values used for this assessment are taken from one of the following sources: The Air Toxics National Environment Protection Measure (Air Toxics NEPM); The United States Agency for Toxic Substances and Disease Registry (ATSDR) or The Ontario Ministry of the Environment (Ontario).

For these benzene levels, the value to compare the test results against is 9 ppb. The result of 14 ppb is close to the value of 9 ppb, which is considered a flag for further investigation. These levels are about 100 times lower than the level where a person may smell benzene (ie 1000 ppb), and significantly below where short-term health effects (such as headaches) are seen (50,000 ppb).

Will this exposure to benzene lead to cancer?

Long-term exposure to benzene (more than a year), mainly in certain occupations, has been linked to changes in blood cells and, in some cases, cancers such as leukaemia.

The results for 24 hour testing cannot be compared against values set to protect the community from long-term health effects of benzene exposure such as cancer. This is because air monitoring hasn't been done for a long enough period.

Therefore, EPA is doing a long-term air monitoring program over a 12 month period to understand:

1. The usual (ie background) levels of benzene in the Morwell environment with or without the current coal fires.
2. What the overall long-term, annual average levels of benzene are in the Morwell community to compare against the 12 month National Environment Protection Measure Monitoring Investigation Level for benzene.

The Department will keep you updated on the next set of results and on the longer term monitoring program.

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