



## **Augmented Air Sampling - Dundalk, Ontario Summer, 2016**

*Presented to the Township of Southgate Council, September 21, 2016*

### **Introduction**

During the summer of 2016, ambient air sampling for formaldehyde was conducted in the town of Dundalk as a joint project of the Grey Bruce Health Unit (GBHU) and the local Ministry of Environment and Climate Change (MOECC) office, with technical support from Public Health Ontario (PHO).

The reason for this specific sampling regimen was to augment the results of sampling carried out by the MOECC in 2014 in response to complaints about odours emanating from waste recovery facilities on Eco Parkway. At that time, all health-based parameters tested for were within acceptable limits with the exception of one isolated, transient result related to formaldehyde. Formaldehyde is a colourless gas with a disagreeable odour. It is produced naturally through events such as forest fires and the decomposition of organic matter. However most exposures to formaldehyde stem from human sources<sup>1</sup>. These include combustion emissions, tobacco smoke and off-gassing from plastics and various types of building materials. Short term, low level exposure to formaldehyde can produce irritation of the eyes, nose and throat. If these exposures are prolonged, they can exacerbate existing respiratory conditions such as asthma. At very high levels, formaldehyde can be carcinogenic.<sup>2</sup>

Ongoing human exposure to formaldehyde is common. Health Canada reports that typical daily household levels of formaldehyde range from approximately 16 – 33 parts per billion (ppb) with highs to 77 ppb<sup>3</sup>. Exposure to levels of formaldehyde below 40 ppb should produce no adverse health effects. This is known as the Acute Minimal Response Level (AMRL).

The transient formaldehyde result observed in the 2014 sampling study was 72 ppb based on a maximum half hour concentration. PHO reports this level can produce mild and reversible irritation of the eyes and respiratory tract in sensitive individuals.

There was no evidence to suggest that this formaldehyde result was associated with odour emissions from the waste recovery facilities referred to above. However, GBHU and MOECC undertook to conduct further sampling in order to determine whether or not there were potential health impacts associated with these emissions. Note that attempts were made to conduct this sampling in the summer of 2015, however the appropriate sampling equipment was unavailable at that time.

### **Method**

Sampling was carried out using a Graywolf © FM-801 Formaldehyde Multi Mode Monitor, provided by PHO. Technical staff from PHO also provided training and support to MOECC personnel on device set-up, calibration and use. (Refer to Appendix A of this report for details about device operation and sampling methodology). Sampling was conducted on July 12<sup>th</sup>, July 28<sup>th</sup> and August 4<sup>th</sup>. Sample location sites are illustrated on Figure 1 below.

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<sup>1</sup> [Environment and Climate Change Canada - Formaldehyde](#)

<sup>2</sup> [Health Canada - Formaldehyde](#)

<sup>3</sup> [Health Canada - Formaldehyde](#)

## **Results**

Sample results are tabled in Figure 2. It will be noted that sampling dates and times encompass a range of weather conditions. As well, the table indicates whether odour was present at the time of sampling. With the exception of one sample, all readings were below the detection limit of the monitoring device and therefore also well below the AMRL of 40 ppb. The one sample yielding a detectable level tested at 30 ppb, below the AMRL, and did not correspond to either of the two sampling periods when odour was detectable. As well, the sample was obtained from a site upwind of the waste recovery facilities.

## **Conclusion**

Based on both the results of this summer's augmented air sampling and those of the original sampling program of 2014, we conclude that emissions from the waste recovery facilities on Eco Parkway do not contribute significantly, if at all, to public exposure to substances of health concern. With the exception of the one minor adverse formaldehyde reading detected in 2014, all health-based parameters have been observed to be within acceptable limits. Moreover, there is no evidence to suggest that any substances detected at any level originate from these facilities rather than from other sources commonly found in human environments.

*GBHU acknowledges with thanks the assistance provided by the following individuals in completing this initiative:*

- *Rick Chappell, Owen Sound District Manager, MOECC*
- *Sierra Gillies, Senior Environmental Officer, MOECC*
- *Lisa Hines, Junior Environmental Officer, MOECC*
- *Jacqueline Otterbein, Practicum Student, MOECC*
- *Sunil Varughese, Environmental Health Analyst, PHO*
- *Seema Sharma, Practicum Student, PHO*

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### Appendix A Dundalk Formaldehyde Testing Methodology

Ministry of the Environment and Climate Change (MOECC) staff selected four air sampling locations based on the 2014 Dundalk Odour Monitoring Report and additional locations as determined by the MOECC.

The GrayWolf Sensing Solutions Formaldehyde Multimode Monitor FM-801 was used to measure the concentration of formaldehyde. Under the direction and advice of GrayWolf Sensing Solutions Technical Support and the Operation Manual, a standard methodology was followed for each day of sampling.

A one hour Prior Exposure Procedure was performed at the beginning of each sample day in accordance with the Operation Manual. This allowed the sensor cartridge to optimally respond to formaldehyde. Measurements were recorded in the Continuous Mode.

Each individual measurement period was 30 minutes in length. Results were recorded manually and stored in the internal memory at the end of each half hour. There were 30 minute travel times between recorded samples in order to move between the air sampling locations. The monitor recorded measurements during the travel time but the data was not relevant to the four air sampling locations and was discarded.

The following methodology was performed in accordance with the Operation Manual:

1. Ensure the detachable formaldehyde sensor cartridge is in the fridge the night before the testing day
2. Collect all required equipment and arrive at the first air sampling location
3. Mount the GreyWolf © Formaldehyde Multimode Monitor FM-801 on a standard photography tripod stand
4. Record temperature, humidity, humidex, pressure, wind direction, wind speed using the Environment Canada weather website.
5. Record GPS coordinates of the air sampling location
6. Follow the “Formaldehyde Multimode Monitor FM-801 Operation Manual” (Page 20-23) for Continuous Measurement Mode instructions:
  - Place tripod and monitor in an open space away from direct sunlight when possible (tin foil was used to shade the monitor to limit sunlight exposure when applicable)
  - Turn on monitor
  - Select Continuous Measurement Mode and select Next
  - Enter Sampling No. and select Next
  - Insert the formaldehyde sensor cartridge and select Start
  - Usage Expectancy is displayed, select Next
  - Prior Exposure Procedure is automatically started for 60 minutes and a baseline value will appear once complete

- Measurement will automatically progress until it is manually stopped. Concentration is measured in parts per billion every 30 minutes. The data is automatically stored in the internal memory
7. Move equipment to next air sampling location. Monitoring will continue during the travel time but the data recorded is not relevant to the air sampling results and was discarded.
  8. Repeat Steps 4 through 7 for each of the three remaining sampling locations.
  9. Select Stop on the monitor to end the measurement period
  10. Remove formaldehyde sensor cartridge at the end of the measurement period
  11. Return all equipment to the Owen Sound District Office and place formaldehyde sensor cartridge in the fridge
  12. Download data from the monitor to a laptop using the WolfSense PC data transfer software
  13. Review the monitor-recorded data with manual notes to ensure consistency
  14. Provide measurement results to the appropriate MOECC and Grey Bruce Health Unit staff for review

Repeat the complete methodology for each sampling day. A total of three sampling days were completed on the following dates:

July 12, 2016

July 28, 2016

August 4, 2016