

Wood Buffalo Environmental Association  
Human Exposure Monitoring Program  
— Program Boundaries —



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**WOOD BUFFALO  
ENVIRONMENTAL ASSOCIATION  
HUMAN EXPOSURE  
MONITORING PROGRAM  
(WBEA—HEMP)**



**2006 MONITORING YEAR  
SUMMARY REPORT**

**FORT MACKAY**

**APRIL 2008**



The organizations listed below are recognized for their continued support and assistance of the ongoing monitoring program. It should be acknowledged that representatives for some of these organizations have changed over time and that the contributions of these individuals were valued and appreciated.

**Wood Buffalo Environmental Association – Human Exposure Monitoring Committee (WBEA-HEMC)**

**Science Advisory Team of Alberta Health & Wellness**

WBEA HEMC and the Science Team would like to thank the efforts of the project co-ordinator and field staff that were instrumental in the deployment of the 2006 Human Exposure Monitoring Program (HEMP).

Finally, the Science Team and WBEA HEMC would also like to gratefully acknowledge the contributions made by all the volunteers in the community of Fort MacKay whose participation in this program was critical to its success.

*Disclaimer: The organizations represented on the Human Exposure Monitoring Program Steering Committee are recognized for their contributions and support of the WBEA Human Exposure Monitoring Program. Although the program is directed by a multi-stakeholder consultation process, this scientific report may not reflect the views of these organizations. Any inquiries regarding the methods utilized in compiling and analyzing information and samples collected from the participants should be directed towards the Surveillance and Environmental Health Branch, Alberta Health and Wellness.*

## LESSONS LEARNED

**Indoor sources of air contaminants are the biggest influence to personal exposure.**

**As we spend most of our time in our homes, we have to reduce indoor sources of air contaminants**

### What can I do?

- ◆ Ask people to not smoke in your home or vehicle.
- ◆ **Change** your furnace filters often to remove dust.
- ◆ **Do not** use air fresheners or scented cleaning products.
- ◆ **Turn on** fans in cooking hoods to remove grease particles from cooking oils.
- ◆ **Turn on** fans in washrooms to remove steam.
- ◆ **Buy** solid wood furniture. Pressed wood contains many types of VOCs.
- ◆ **Do not** run vehicles in garage or near the entrance to your home.
- ◆ **Make** sure your furnace is in good working condition.
- ◆ **Participate** in the monitoring program when it returns to your community.





## VOLATILE ORGANIC COMPOUNDS

Volatile organic compounds (VOCs) are a variety of chemicals which contain carbon. Examples of the 13 VOCs tested are:

**Benzene Toluene Ethylbenzene Xylene Octane**

### Outdoor

- ◆ Vehicle exhaust
- ◆ Industrial activities
- ◆ Gasoline & fuels

### Indoor

- ◆ Cleaning products
- ◆ Paints & glues
- ◆ Carpets & furnishings
- ◆ Tobacco smoke
- ◆ Air fresheners
- ◆ Pressed wood products
- ◆ Wallpaper

### Health effects from VOC exposure:

- ◆ Watery eyes and nose irritation
- ◆ Nausea
- ◆ Wheezing and coughing

### Personal exposure to VOCs is determined by indoor sources.

- ◆ Three VOCs have ambient guidelines—benzene, ethylbenzene and toluene. None of the monitors exceeded these guideline levels.

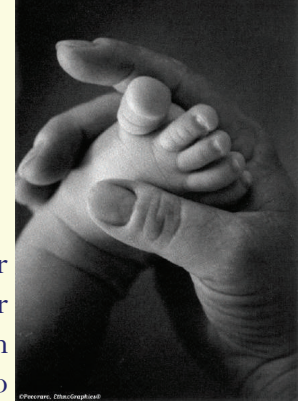
## PURPOSE OF HEMP

### What does HEMP mean?

Human Exposure Monitoring Program

### Why human monitoring?

A lot of monitoring is done in our world. But it is rare that we monitor ourselves. HEMP is a program which monitors people and their exposure to contaminants in the air.



### Why are we doing this?

We want to better understand:

- ◆ What pollutants we are being exposed to
- ◆ How we are exposed to them
- ◆ How can we reduce or remove our exposure
- ◆ What health effects we may experience if we are exposed.

### When was this started?

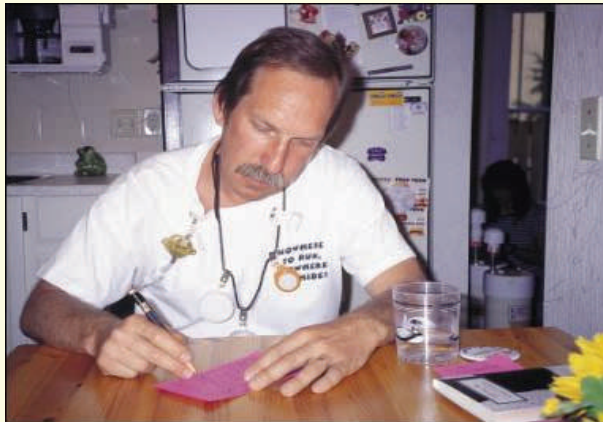
- ◆ 2005—completed in Fort Chipewyan and Fort McMurray
- ◆ 2006—Fort MacKay and Fort McMurray First Nations Gregoire Lake/Anzac
- ◆ 2007—Fort McMurray



## WHAT DID WE DO?

### A participant would:

- Wear personal air monitors to sample the air in their breathing zone for 24 hours per day for 7 consecutive days.
- Have air monitoring stations set up inside and outside their homes.
- Answer questions about their health, diet and other life-style factors.



- A map showing the program area is located at the end of this report -

## PARTICULATE MATTER (PM<sub>2.5</sub>)

**Particulate Matter** is a mixture of particles of varying sizes which float in the air. When particles are smaller than 2.5 microns, they can enter the lungs.

Outdoor	Indoor
<ul style="list-style-type: none"><li>◆ Fires or smoke</li><li>◆ Exhausts from industries</li><li>◆ Dust</li></ul>	<ul style="list-style-type: none"><li>◆ Tobacco smoke</li><li>◆ Air fresheners or aerosols</li><li>◆ Cooking &amp; cleaning</li></ul>

### Health effects from PM<sub>2.5</sub> exposure:

- ◆ Lung irritation and infections
- ◆ For those with asthma, increased rate of attacks or wheezing.
- ◆ Overtime reduced lung function

### Personal exposure to PM<sub>2.5</sub> is low

- ◆ Personal exposure appears to be influenced by indoor levels or sources.
- ◆ Outdoor levels were low and do not appear to be influencing personal exposure.
- ◆ Indoor levels may be affected by activities in home E.g. smoking, dust or cooking.



## OZONE (O<sub>3</sub>)

Ozone is gas produced by or from:

### Outdoor

- ◆ Naturally produced in the atmosphere
- ◆ Industrial activity

### Indoor

- ◆ Arcing of electric motors
- ◆ Improperly working air cleaners
- ◆ Smoking

### Health effects from O<sub>3</sub> exposure:

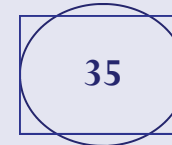
- ◆ Cough
- ◆ Chest discomfort
- ◆ Nose and throat irritation

### All monitors detected O<sub>3</sub> below current guidelines

- ◆ Personal and indoor monitors detected ozone at very low levels.
- ◆ Highest levels of O<sub>3</sub> were detected outdoors.
- ◆ Important to understand that O<sub>3</sub> can be destroyed easily by other air pollutants. Therefore, outdoor levels are not good indicators of personal exposure.
- ◆ For these participants, exposure to O<sub>3</sub> appears to be related to indoor levels or sources.

## ABOUT THE PARTICIPANTS

How many participants did this program have?



### What did we learn about them?

- ◆ More women enrolled in the program than men
- ◆ 80% indicated they had a paid job outside of the home
- ◆ Exposed to second hand smoke for 2 hours every day
- ◆ All had lived in Fort MacKay for more than 5 years
- ◆ Spent 69% of their time indoors at home

### Why do we collect this information?

- ◆ To understand how people are exposed to air contaminants





## NITROGEN DIOXIDE (NO<sub>2</sub>)

NO<sub>2</sub> is a gas produced by or from:

### Outdoor

- ◆ Vehicles
- ◆ Power Plants
- ◆ Oil and gas plants
- ◆ Forest Fires

### Indoor

- ◆ Gas appliances
- ◆ Unvented combustion appliances
- ◆ Smoking

### Health effects from NO<sub>2</sub> exposure:

- ◆ Lung irritation
- ◆ Eyes, nose and throat irritation
- ◆ High levels of respiratory illness

### All monitors detected NO<sub>2</sub> lower than existing air quality guidelines

- ◆ Personal levels are very similar to indoor and outdoor levels.
- ◆ Personal exposure appears to be related to both indoor and outdoor sources.

## SULFUR DIOXIDE (SO<sub>2</sub>)

SO<sub>2</sub> is a gas produced by or from:

### Outdoor

- Diesel vehicles
- Gas plants
- Pulp and paper mills
- Power plants
- Boilers

### Indoor

- ◆ Off gassing from fabrics and furnishings
- ◆ Damaged building materials

### Health effects from SO<sub>2</sub> exposure:

- ◆ Lung irritation
- ◆ Reduced lung function
- ◆ Nose and throat irritation

### All monitors detected SO<sub>2</sub> below existing air quality guidelines.

- ◆ All monitors detected levels which were very low.
- ◆ Outdoor monitors detected levels above personal or indoor monitors.
- ◆ Personal exposure appears to be related to levels in a person's home