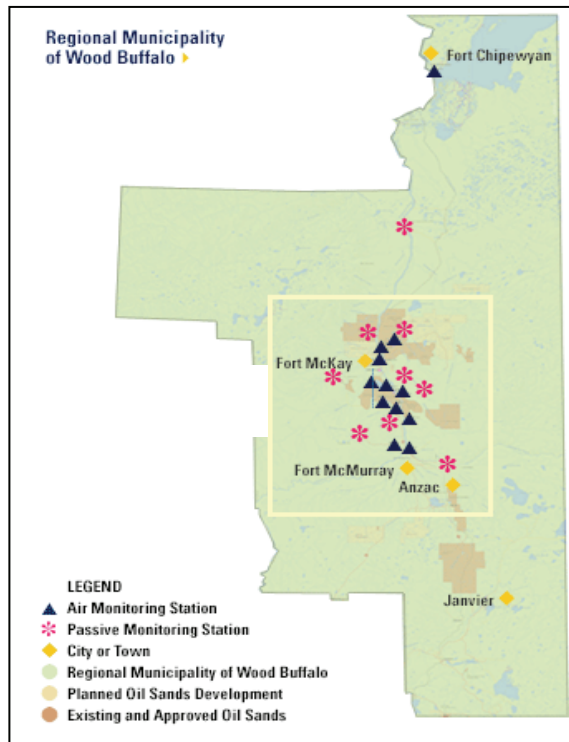


Wood Buffalo Environmental Association
Human Exposure Monitoring Program
— Program Boundaries —



For additional information about the WBEA – HEMP
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**WOOD BUFFALO
ENVIRONMENTAL ASSOCIATION
HUMAN EXPOSURE
MONITORING PROGRAM
(WBEA—HEMP)**



**2005 MONITORING YEAR
SUMMARY REPORT**

FEBRUARY 2007



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 2005 Human Exposure Monitoring Program (HEMP).

Finally, the Science Team and WBEA HEMC would also like to gratefully acknowledge the contributions made by all volunteers in the communities of Fort Chipewyan and Fort McMurray 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 Public Health Surveillance and Environmental Health Branch, Alberta Health and Wellness.

LESSONS LEARNED

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



To better understand how outdoor sources influence personal exposure, we have to reduce exposure to indoor sources.

What can I do?

- ◆ **Avoid** smoking or second hand smoke
- ◆ **Ensure** furnaces, fireplaces or heaters are working properly and change filters regularly
- ◆ **Reduce** the use of air fresheners and scented cleaning products
- ◆ **Turn on** ventilation fans in cooking hoods and bathroom fans to remove grease, cooking particles or vapor
- ◆ **Do not** idle vehicles inside an attached garage or near cold air returns
- ◆ **Avoid** pressed wood furniture products
- ◆ **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	Indoor
◆ Vehicle exhaust	◆ Cleaning products
◆ Industrial activities	◆ Paints & glues
◆ Gasoline & fuels	◆ Carpets & furnishings
	◆ Tobacco smoke
	◆ Air fresheners
	◆ Pressed wood products
	◆ Wallpaper

Health effects from VOC exposure:

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

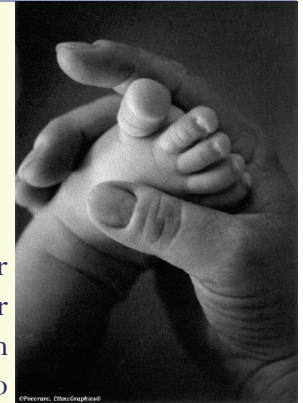
Exposure to the measured VOCs was low for all contaminants

- ◆ In both communities, personal exposure was most affected by indoor sources.

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?

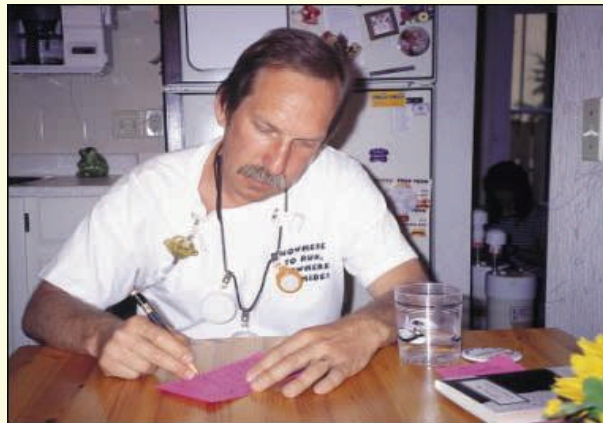
- ◆ 2005 was the first year of the program
- ◆ This same program was done in 2006 in Fort McKay and Fort McMurray First Nations - Anzac/Georgoie Lake



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_{2.5})

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
◆ Fires or smoke	◆ Tobacco smoke
◆ Exhausts from industries	◆ Air fresheners or aerosols
◆ Dust	◆ Cooking & cleaning

Health effects from PM_{2.5} exposure:

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

Exposure to PM_{2.5} was lower than existing and proposed Canada wide standards

- ◆ Levels for Ft. McMurray have decreased from those measured in 2000.
- ◆ In Ft. Chipewyan, personal levels were higher than Ft. McMurray's. However, this exposure appears to be strongly linked to indoor sources or lifestyle choices such as smoking or occupation.



OZONE (O₃)

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 O₃ exposure:

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

Exposure to O₃ was lower than existing guidelines.

- ◆ In Ft. McMurray, personal and indoor levels have decreased since 2000, with a slight increase in outdoor levels. These levels have likely increased due to higher population and industrial activity.
- ◆ In Ft. Chipewyan, levels were higher than those detected in Ft. McMurray.
- ◆ *For ozone, it is important to understand that it is destroyed by other chemicals in the air. Outdoor levels of ozone are not a good reflection of personal exposure.*

ABOUT THE PARTICIPANTS

Two communities participated in 2005:

Fort McMurray

Fort Chipewyan

How many people participated in HEMP?

- ◆ 29 from Ft. McMurray
- ◆ 30 from Ft. Chipewyan



In both communities, the majority of the participants:

- ◆ Were female
- ◆ Spent most of their time indoors at home
- ◆ Lived in their community for 5 years or less
- ◆ Had similar rates of exposure to second hand smoke

Differences between the two participant groups:

- ◆ A higher number of the participants from Ft. Chipewyan were smokers.
- ◆ Level of education was different





NITROGEN DIOXIDE (NO₂)

NO₂ is a gas produced by or from:

Outdoor	Indoor
<ul style="list-style-type: none">◆ Vehicles◆ Power Plants◆ Oil and gas plants◆ Forest Fires	<ul style="list-style-type: none">◆ Gas appliances◆ Unvented combustion appliances◆ Smoking

Health effects from NO₂ exposure:

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

Exposure to NO₂ was lower than existing guidelines.

- ◆ Higher levels were seen in Ft. McMurray compared to similar monitoring completed in 2000. These increases were expected due to an increased population and industrial activity in the area.
- ◆ Participants from Ft. Chipewyan had lower levels than Ft. McMurray.

SULFUR DIOXIDE (SO₂)

SO₂ is a gas produced by or from:

Outdoor	Indoor
<ul style="list-style-type: none">• Diesel vehicles• Gas plants• Pulp and paper mills• Power plants• Boilers	<ul style="list-style-type: none">◆ Off gassing from fabrics and furnishings◆ Damaged building materials

Health effects from SO₂ exposure:

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

Exposure to SO₂ was very low compared to existing guidelines.

- Personal exposure to SO₂ in Ft. McMurray is lower, although outdoor levels are higher when compared to 2000.
- In Ft. Chipewyan, personal exposure levels were the same as those from Ft. McMurray. Ft. Chipewyan's outdoor levels were lower than in Ft. McMurray