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March 12, 2004

NAICC-A Secretariat  
Attention: Muriel Constantineau  
Environmental Canada  
10<sup>th</sup> Floor, 351 St. Joseph Boulevard  
Gatineau, Quebec, K1A 0H3  
Fax: 819-953-8903

Dear Ms. Constantineau:

**Re: National Framework for Petroleum Refinery Emission Reductions**

I am writing to submit comments on the February 3, 2004 Discussion Document prepared by the National Framework for Petroleum Refinery Emission Reductions Steering Committee for the National Air Issues Coordinating Committee-Other Air Issues (NAICC-A) which serves the Canadian Council of Ministers of the Environment (CCME).

The OPHA is a volunteer, non-profit organization that does research, education and advocacy on issues that impact on the health of the public. Our members, who are health promoters, epidemiologists, toxicologists, researchers, policy analysts and doctors who work in public health departments and community centres across Ontario, are very concerned about air pollution and its impacts on human health.

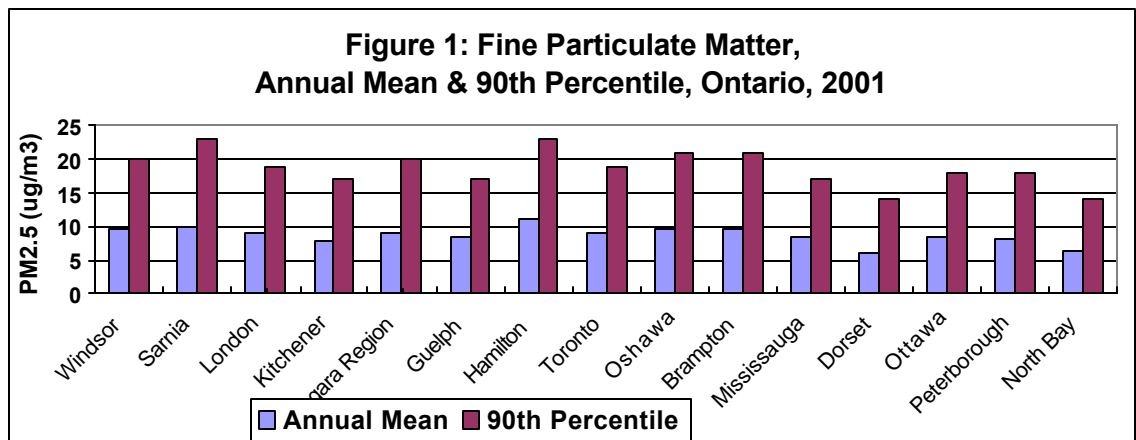
**Air Pollution is a Significant Health Concern in Ontario**

Air pollution contributes to a significant burden of illness in Ontario. In June 2000, the Ontario Medical Association (OMA) released a report in which it estimated that two air pollutants in Ontario's air – fine particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) and ground-level ozone – were contributing to about 1,900 premature deaths, 9,800 hospital admissions, 13,000 emergency room visits and 47 million minor illness days in Ontario each year (OMA, 2000). These estimates reflect acute health outcomes alone. A number of epidemiological studies conducted in recent years suggest that air pollution is also contributing to the development of chronic heart and lung disease, which suggests that the number of health outcomes could be much greater than what is suggested by the OMA's estimates.

### Air Levels of Fine Particulate Matter are Too High in Ontario

Ambient air monitoring conducted by the Ontario Ministry of the Environment suggests that residents in many Ontario communities are being exposed to excessive levels of fine particulate matter (PM<sub>2.5</sub>) on a fairly frequent basis.

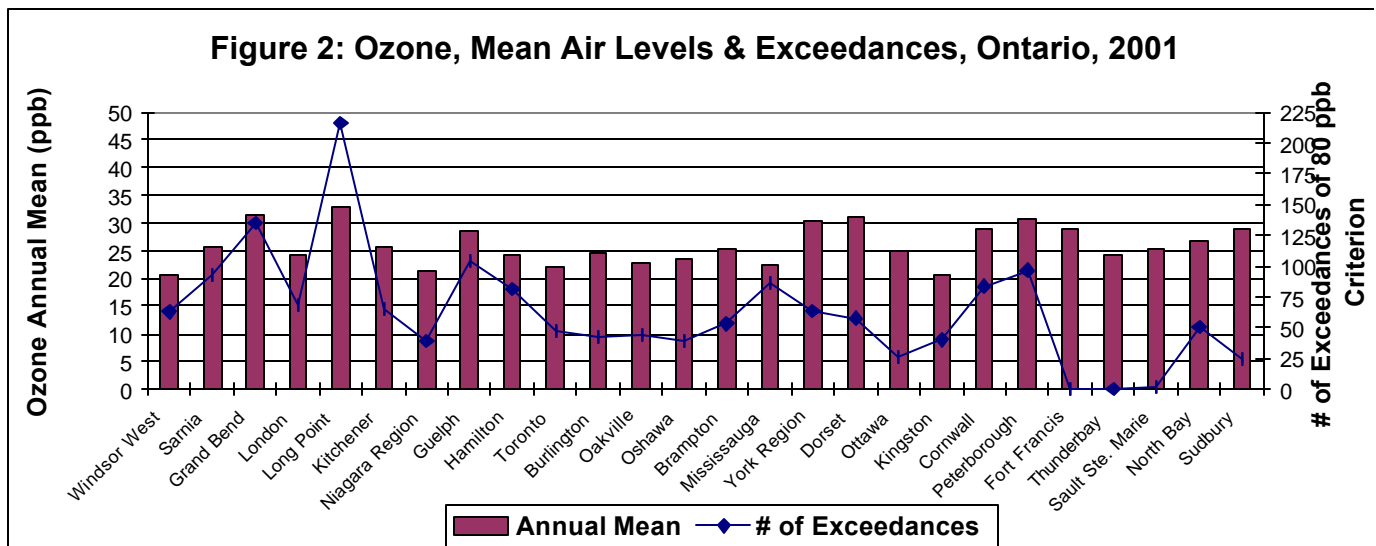
In 1999, the Federal Provincial Working Group on Air Quality Objectives and Guidelines identified 25 ug/m<sup>3</sup> (24-hour) for PM<sub>10</sub> and **15 ug/m<sup>3</sup> (24-hour) for PM<sub>2.5</sub>** as the lowest air levels that have been clearly and consistently associated with premature deaths and hospitalizations (NAAQO, 1999b). As is illustrated in Figure 1 below, air levels of PM<sub>2.5</sub> exceeded the health-based reference level of 15 ug/m<sup>3</sup> at least 10% of the time in many communities in Ontario in 2001 (MOE, 2003, Appendix). While fine particulate matter can be emitted directly, most of the PM<sub>2.5</sub> in Ontario's air is formed in the atmosphere from other air pollutants such as sulphur dioxide (SO<sub>2</sub>) and NO<sub>x</sub> (MOE, 2003).



### Air Levels of Ozone are Too High in Ontario

Air monitoring has also demonstrated that residents in many communities in Ontario are being exposed to excessive levels of ozone on a very frequent basis. In 1999, the Federal Provincial Working Group on Air Quality Objectives and Guidelines identified **20 ppb and 25 ppb for ozone (1-hour)** as the lowest air levels clearly and consistently associated with premature deaths and respiratory hospitalizations respectively (NAAQO, 1999). As is illustrated in Figure 2, the annual

mean for ozone was greater than the hourly health-based reference level of 20 ppb in many communities in 2001. In fact, Figure 2 illustrates that the 1-hour air quality criterion of 80 ppb, was exceeded many times in communities across Ontario in 2001 (MOE, 2003, appendix data). Ozone is a secondary air pollutant formed in the atmosphere when volatile organic compounds (VOCs) react with nitrogen oxides (NO<sub>x</sub>) in the presence of sunlight.



### Benzene Levels are Too High in Most Communities

Benzene is a cancer initiator that has been clearly linked to acute myeloid leukemia as well as other blood disorders, reproductive effects, and depression of the immune system. The U.S. Environmental Protection Agency has estimated that the cancer potency for benzene by inhalation is 0.0000041 per ug/m<sup>3</sup>. This potency corresponds to one excess cancer for every one million people exposed for a lifetime to air levels of 0.24 ug/m<sup>3</sup> of benzene. A “one in a million cancer risk” is the level of risk deemed tolerable for environmental contaminants by many agencies around the world (TPH, 2002). Air levels of benzene commonly exceed the health-based reference levels of 0.24 ug/m<sup>3</sup> in urban centres that experience high levels of traffic because of benzene emitted from vehicles when petroleum products are burned as fuel (TPH, 2002).

## **Ontario Refineries are Significant Contributors of Smog & Benzene**

When we examine the data contained in the Discussion Document, it is clear that refineries are significant contributors of air pollution on both a national and a provincial basis.

In 2002, on a national basis, they were responsible for:

- ❑ 5.3% of sulphur dioxide emitted from all industrial sources;
- ❑ 4.6% of the nitrogen oxides;
- ❑ 5.7% of the volatile organic compounds;
- ❑ 5.1% of directly emitted PM<sub>2.5</sub>; and
- ❑ 18.7% of the benzene.

In 2001, on a provincial basis, refineries were responsible for about:

- ❑ 10% of the sulphur dioxide emitted from all sources (i.e. 55.911 kilotonnes) and
- ❑ 6% of the nitrogen oxides emitted from all industrial sources (i.e. 10.455 kilotonnes) in 2001 (MOE, 2002).

## **Emission Impacts Focused on Sarnia**

The data contained in Appendix E of the Discussion Document indicates that, in Ontario, the bulk of refinery emissions are being released in or around Sarnia. For example, 75% of the sulphur dioxide and 96% of the benzene being released from Ontario's seven refineries is being released in the Sarnia area. This focused released could have implications for air quality in communities downwind of Sarnia, but it could also have implications for local air quality in Sarnia. For example, air levels of sulphur dioxide are higher in Sarnia than for any other community monitored in Ontario. While 22 of the 24 communities monitoring in Ontario in 2001 had sulphur dioxide readings than ranged from 6.1 ppb to 0.7 ppb, the annual mean for Sarnia was 12.5 ppb (MOE, 2003).

## **75% Confidence Interval is Not an Acceptable Goal**

The Benchmarking Sub-group had a background report prepared that compared emissions from facilities in Canada and the United States using factors such as quantity of crude processed as the common denominator. While this Sub-group appears to be recommending "benchmarking of emissions performance" as a means of setting emission reduction goals for the refinery sector in Canada, it is not clear what "goals" they would

like to achieve, nor how those goals would be achieved (i.e. with mandatory or voluntary programs).

On page 9 of the Discussion Document, it appears that the Benchmarking Sub-group is recommending that facilities should have to reduce their emissions to a point where that fall within a 75% confidence interval of the mean (of a correlation between emissions and the quantity of crude processed) for all facilities operating in North America today. The OPHA does not consider this to be an acceptable goal for the sector as a whole. Judging by the graph on page 9 of the Discussion paper, this goal would have very little impact on most of the facilities operating in North American. It is also far too loose, reflects nothing about what could be achieved technically, and reflects nothing about the emission reductions that may be necessary for the protection of public health.

### **Benchmarking Does Identify Poor Performers**

The OPHA does appreciate however, that benchmarking does appear to identify those facilities that are particularly poor performers with respect to emissions. The graphs in Appendix E of the Discussion Report, which identify the Canadian refineries that are operating outside of the 75% confidence interval for the mean of emissions relative to production, suggest that a number of Ontario facilities are particularly heavy emitters of:

- sulphur dioxide (i.e. Imperial Oil and Shell in Sarnia),
- carbon monoxide (i.e. Imperial Oil in Nanticoke and Sunoco in Sarnia);
- volatile organic compounds (i.e. Imperial Oil in Sarnia),
- PM<sub>10</sub> (i.e. Imperial Oil and Shell in Sarnia), and
- benzene (i.e. Imperial Oil, Sunoco, Shell, Nova Chemicals in Sarnia).

The OPHA could accept the use of the benchmarking tool as a means of identifying those facilities that should be targeted for very rapid reductions in their emissions, and could accept the 75% confidence interval, as the first of many steps for emission reductions for those facilities.

### **HEIDI II seems like a Useful Tool**

The Health Effects Indicator Decision Index II (HEIDI II), developed under the direction of the Health Prioritization Sub-Group, sounds like a useful tool for prioritizing air pollutants to be targeted for action. From the Discussion Document however, it is not clear how HEIDI II would be used. The OPHA would be concerned if this tool were used in a way that relieved facilities of the obligation to comply with new or existing regulations or standards. We could however, support its use to identify additional contaminants to be targeted for regulatory action or to establish priorities for action at the facility basis.

### **Goals must be Ambitious, Health Protective and Enforceable**

The OPHA would like to see ambitious goals set for this sector. Those goals should be driven by the attainment of health-based reference levels for the criteria air contaminants and for toxic air pollutants such as benzene and 1,3-butadiene. While we appreciate that jurisdictions within Canada use different regulatory tools to “control” emissions from industrial facilities, it is important that the goals agreed upon in this process be captured in regulations that make them mandatory and enforceable at a facility level in all jurisdictions.

We want to thank you for giving us the opportunity to comment on the Discussion Paper. If you have any questions about these comments, please feel free to contact the OPHA Environmental Health Coordinator, Kim Perrotta, directly at 905-628-9437.

Your truly,



David MacKinnon  
Executive Director

cc. David Anderson, Federal Minister of the Environment  
George Smitherman, Minister of Health and Long-Term Care  
Leona Dombrowsky, Minister of the Environment  
Kim Perrotta, Environmental Health Manager, OPHA

**References:**

NAAQO (1999a). National Ambient Air Quality Objectives for Ground Level Ozone. *Science Assessment Document*. Report by the Federal Provincial Working Group on Air Quality Objectives and Guidelines. Environment Canada, July 1999.

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