

---

**DATE:** April 28, 2011

**REPORT TITLE:** AIR QUALITY MODELLING AND MONITORING PROGRAM FOR THE REGION OF PEEL

**FROM:** Janette Smith, Commissioner of Health Services  
David L. Mowat, MBChB, MPH, FRCPC, Medical Officer of Health

---

## **RECOMMENDATION**

**That the proposed Air Quality Modelling and Monitoring Program for the Region of Peel be approved in principle;**

**And further, that the Ontario Ministry of the Environment be requested to upgrade one of the two existing ambient air monitors to monitor for volatile organic compounds and ammonia.**

### **REPORT HIGHLIGHTS**

- There are concerns about air quality in Peel region, and the negative health effects of poor air quality are well-documented.
- The Ontario Ministry of Environment operates only two ambient air monitors in Peel; one in Mississauga on the University of Toronto Mississauga campus and the other behind Peel Manor in Brampton.
- Consequently, a detailed community-wide picture of air quality is lacking, and drivers of poor air quality locally are not well understood.
- An air quality modelling and monitoring program for Peel region will provide data to help understand and address sources of poor air quality and assist in the assessment of land use planning and transportation decisions.

## **DISCUSSION**

### **1. Background**

Concern about the quality of our air is long-standing in Peel region. Air pollution causes a myriad of health effects ranging from respiratory irritation to infections to premature death.

Partly as a result of air quality complaints in the late 1980's and early 1990's the Ontario Ministry of the Environment (MOE) initiated the Clarkson Airshed Study in 2000. The Phase II report, released in late 2006, concluded that at times, especially during smog events, concentrations of particulate matter can be elevated and are contributing to a taxed airshed with respect to air quality.

April 28, 2011

## AIR QUALITY MODELLING AND MONITORING PROGRAM FOR THE REGION OF PEEL

For some years the Canadian Council of Ministers of the Environment have been discussing a more comprehensive approach to managing air quality and pollution reduction. In October, 2010 the Federal / Territorial / Provincial Ministers of the Environment agreed to move forward with a new collaborative Air Quality Management System to better protect human health and the environment. The Ontario Ministry of the Environment is currently considering an Air Zone Management System pilot project in the Oakville-Clarkson area, the purpose of which would be to provide insight into how cumulative emissions of criteria air contaminants could be addressed within an air zone management system.

Understanding air quality is important to managing growth in a healthy and sustainable manner and to adapt to and mitigate climate change impacts. In 2010, the air quality policies in the Region of Peel Official Plan were enhanced and approved by Council and the Ministry of Municipal Affairs and Housing. Included in the new policies is Policy 2.2.3.3.8, "monitor and model air quality to accurately establish local air emissions in Peel and report on the findings from the monitoring and modelling". These policies were developed in collaboration with many stakeholders including planning staff from the local area municipalities.

The 2011-2014 Region of Peel Strategic Plan Strategic Action 1.3 calls on the Region to improve air quality, and to mitigate and adapt to climate change. A Term of Council Priority is to reduce greenhouse gas emissions. 2011 actions include development and adoption of a Climate Change Strategy, including targets for greenhouse gas reductions. While the focus of this report to Council is on modeling and monitoring of criteria air contaminants, actions to reduce greenhouse gas emissions will also reduce criteria air contaminants.

Air modeling and monitoring is also included as a proposed action in the City of Mississauga Living Green Master Plan. Peel Public Health staff have been involved in the consultations for the Living Green Master Plan and have provided input.

The Region of Peel is undertaking a number of actions to improve air quality. A summary of these actions can be found in the companion report to Council entitled, "2011 Actions to Improve Air Quality". This report also highlights actions taken over the last ten years.

## 2. Air Quality Modelling and Monitoring

The Ontario Ministry of the Environment (MOE) operates a provincial network of air monitoring stations, only two of which are located in Peel region (one in Mississauga on the University of Toronto Mississauga campus and the other behind Peel Manor in Brampton).

Each station monitors six air pollutants: ozone, fine particulate matter, nitrogen dioxide, sulphur dioxide, carbon monoxide and total reduced sulphur compounds. Data from these monitors are used by the MOE to inform the public about air quality, to monitor provincial air quality trends and to inform air policy.

While the two air monitoring stations in Peel region provide some useful data, because they are at fixed locations, they provide limited data for Mississauga and Brampton and no data for Caledon. The data provided is not sufficiently detailed to draw conclusions about local air quality or the potential impact of development decisions on air quality.

Additional fixed air monitors are not currently planned by the Ministry of the Environment, would be very expensive to establish and maintain, and would still only provide limited, localized information.

April 28, 2011

## AIR QUALITY MODELLING AND MONITORING PROGRAM FOR THE REGION OF PEEL

One solution which has been implemented in other jurisdictions, including Halton region and the City of Ottawa, is a combination of air quality modelling and mobile monitors. Air quality models are mathematical representations of how pollutants behave in the atmosphere. In general, the inputs to a model include:

- Terrain characteristics,
- Land use,
- Emissions from point sources (i.e., industrial facilities),
- Emissions from area sources (i.e., residential neighbourhoods and commercial areas),
- Meteorological information; and
- The physical and chemical processes related to the pollutants being modelled.

Using these inputs, air quality models predict air quality on local, regional and long-range scales. Air quality modelling is a valuable tool because it can provide information on existing air quality at a point in time and allow tracking of changes over time. Model runs can quickly and cost-effectively be updated and therefore can provide a "living" picture of the state of air quality in the Region.

Air monitoring is essential to validate air modelling results by ensuring that the concentrations predicted by a model are realistic. This can best be achieved by using mobile (as opposed to permanently fixed) monitors that can be moved around the Region as needed.

Implementation of a combined airshed modelling and monitoring program in Peel will allow:

- Characterization of air quality across the Region of Peel;
- Determination of the contribution of different sectors to air quality;
- Establishment of a tool that can be used to assess the impacts of population growth and broad land use and transportation policies on local air quality;
- Better informed planning, educational programs and social marketing campaigns.

### 3. Proposed Program for Peel

In the fall of 2010, Peel Public Health contracted Novus Environmental Inc. to recommend a preferred air modelling and monitoring approach for the Region of Peel. This report was reviewed by staff at the Ministry of the Environment and Halton Region Health Department. The following outlines the recommended approach.

The proposed pollutants to be modeled include fine particulate matter ( $PM_{2.5}$ ), ozone, oxides of nitrogen, sulphur dioxide, carbon monoxide, ammonia and volatile organic compounds. The emissions sources to be included in the model include:

- Transportation (including off-road);
- Industry (including power generation);
- Agriculture/biogenic emissions;
- Community and residential;
- Long-range sources (i.e., transboundary).

Existing inventories and data will be used to inform the modelling:

- Transboundary data will be sought from the U.S. Environmental Protection Agency and Environment Canada;
- Data related to point source emissions will be drawn from Environment Canada's National Pollutant Release Inventory;

April 28, 2011

## AIR QUALITY MODELLING AND MONITORING PROGRAM FOR THE REGION OF PEEL

- Ambient air quality data will be sought from the Ministry of Environment;
- Data related to transportation will be sought from the Ministry of Transportation, the Greater Toronto Airport Authority, the local area municipalities and Region of Peel data;
- Land use data will be drawn from local area municipality and Region of Peel data.

Novus recommended that the models be validated using mobile monitors (i.e., air pointers and passive samplers) which can be moved around the Region, and with data from the two existing fixed air monitors operated by the Ministry of the Environment. In this regard, Novus recommended that the Ministry be requested to upgrade one of the two existing monitoring stations to include volatile organic compounds and ammonia for the purpose of model validation.

### FINANCIAL IMPLICATIONS

An air modelling and monitoring program is a new initiative for the Region of Peel and has not been accounted for in the 2011 budget. Novus has estimated that implementation and maintenance of the recommended program will cost approximately \$653,000 over a five year period (approximately \$130,000 per year). Pending approval in principle of this proposal from Council, Peel Public Health intends to release a tender to solicit bids for a contract renewable for a period of five years for inclusion in the 2012 budget cycle.

### CONCLUSION

An air quality modelling and monitoring program for Peel region will provide data to help understand and address sources of poor air quality and how population growth and land use, including transportation decisions, may impact air quality in the future.



Janette Smith  
Commissioner of Health Services



David L. Mowat, MBChB, MPH, FRCPC  
Medical Officer of Health

### Approved for Submission:



D. Szwarc, Chief Administrative Officer

*For further information regarding this report, please contact Paul Callanan at extension 2802 or via email at [paul.callanan@peelregion.ca](mailto:paul.callanan@peelregion.ca)*

c. Legislative Services  
Manager, Financial Support Unit (FSU)

