



## SMOG RESPONSE PLAN

### **Goal:**

To provide information and training to employees regarding the health and environmental impact of smog, and the methods of reducing air pollution.

### **Purpose:**

To minimize the potential risk of employees to the effects of smog, and to educate employees on methods of reducing the public sector's contribution to local air pollution.

### **Statement:**

Smog is a distinct form of poor air quality. It contains a mixture of contaminants, one of which is ground level ozone (O<sub>3</sub>). O<sub>3</sub> results primarily from chemical reactions between nitrogen oxides and volatile organic compounds (VOC's) in the presence of sunlight. It is most visible as a brownish yellow haze, principally over urban areas, although suburban and rural areas are not exempt from smog.

Most smog-producing air pollutants in Ontario are released as unburned by-products of gasoline, coal and natural gas, which we use in vehicles, homes and businesses, industrial boilers and power plants. Smog "precursors" are also released by industrial processes, in the evaporation of liquid fuels, and in the use of solvents and other volatile products, such as oil-based paints.

Fine dust and ash are also blown up from roads, construction sites and agricultural areas, and these particulates contribute to Ontario's smog problems. There are some natural sources of smog too – forest fires produce Nox for example, and some VOCs are released by trees – but human activities are mainly responsible for the significant increases in ground-level ozone documented across Canada in recent years.

Smog originates both locally and outside Ontario. On hot summer days, for example, more than 50 percent of the smog-causing ozone that affects Ontario is carried here by the wind from the United States. Still, almost half of the problem originates right here in Ontario. It's our domestic contribution to the smog problem that we need to start addressing more effectively.

### **Health Effects of Smog**

Wherever its location, and whether visible or not, smog is potentially hazardous to human health.

Health impacts can include eyes, nose, and throat irritation, reduction of lung capacity, aggravation of respiratory disease and even premature death.

There is evidence that excessive exposure to ozone can heighten the sensitivity of asthma sufferers to other common airborne allergens. particles that are small enough to be inhaled – especially very fine or ultra-fine particles that can penetrate deeply into the lungs – are also known to have adverse health effects.

The bottom line is that smog and its components aggravate a wide range of health problems; problems that are especially acute for people who suffer from respiratory illnesses such as chronic bronchitis and asthma, and for those who suffer from cardiac problems.

Health studies indicate that more people with respiratory problems are admitted to hospital during periods of high ground-level ozone. Other studies have linked higher death rates to exposure to inhalable particulates.

Younger children are particularly vulnerable to ground-level ozone and ultra-fine particles, since they tend to spend more time outdoors, and their developing respiratory systems work harder and take in comparatively more air than an adult's lungs.

There is a growing body of medical evidence that suggests even relatively low levels of ozone can have an adverse effect on health. Recent studies indicate that there may not be any absolutely safe level of exposure for either ground level ozone or airborne particles.

### **SMOG REDUCTION GUIDELINES**

There are a range of strategies that can be implemented as a means of combating the problem of smog. These smog reduction actions fall into three (3) categories:

#### **YEAR ROUND ACTIONS:**

- anti idling for all public sector vehicles
- anti idling areas for schools and day care centres drop off/pick up zones
- routine inspections of all vehicles to ensure that they are well tuned, operating efficiently and meet provincial "drive clean" standards.

#### **MAY to SEPTEMBER:**

- increase temperature settings in offices with air conditioning
- refuel equipment before 9: 00 am and after 3:00 pm

- minimize use of non essential lighting and electrical equipment
- flexible dress code – to offset 2.1
- delay or postpone the discretionary use of work related vehicle trips
- alternate work arrangements, whenever possible

#### **SMOG "ALERT DAYS":**

- minimize the use of gas powered equipment, such as lawnmowers between the hours of 9:00 am and 3:00 pm
- minimize the spraying of pesticides during the hours of 9:00 am to 3:00 pm
- minimize street sweeping operations between 9:00 am and 3:00 pm
- minimize the use of oil-based paints and other compounds which emit volatile organic compounds (VOC)
- minimize road and roof resurfacing activities during the hours of 9:00 am and 3:00 pm
- minimize the use of vehicles between the hours of 9:00 am and 3:00 pm

#### **NOTIFICATION ISSUES**

Currently the Ministry of Environment (MOE) issues a "smog alert" when the air quality index (AQI) reaches 50 or greater. This typically coincides with high temperatures and humidity and is linked to prevailing wind trends and the consumption of fossil fuels.

Unfortunately, the current MOE Warning System does not always allow sufficient warning in order to implement smog reduction activities in a timely fashion. This warning is currently not issued until around 3:00 pm on the day preceding the "smog alert".

A process to monitor weather conditions and to implement an "air quality alert" (AQA) whenever conditions occur which typically lead to an MOE advisory will be developed. This AQA would be issued approximately two (2) days before a "smog alert day".

#### **NOTIFICATION PROCEDURES – SMOG ALERT DAYS**

1. The Regional Health Department will monitor local weather conditions during the annual smog season (May 1<sup>st</sup> to September 15<sup>th</sup>). When the forecast indicates conditions which may lead to a "smog alert" within the subsequent two (2) days, i.e., temperatures above 80, high UV index and little wind, staff will be notified that a "smog alert day" is imminent in order that they may place employees on alert.
  
2. When the Air Quality Index is expected to reach 50, i.e., a "smog alert" is imminent, the Ministry of the Environment will notify the Medical Officer of Health as early as possible on the day before a "smog alert day". This AQA usually occurs around 3:00 pm.
  
3. The Medical Officer of Health, or designate, will then notify those persons identified as responsible for implementing the smog reduction strategies (the "designated person").

4. The "designated person" will then immediately notify those persons within the organization who are responsible for implementing the smog reduction strategies.
  
5. The Medical Officer of Health will notify the "designated person" when the AQA has been terminated.

**Note:** Wherever possible, notification at all levels shall be in an electronic format.

### STAFF TRAINING

It is critical that employees who are affected by the Smog Response Plan are aware of:

- its content
- their role in the implementation
- what smog is
- the impact of smog on the environment and health
- what they can do to reduce the negative environmental effects of their actions and activities – both as employees and in their personal lives – during a smog alert.

Training sessions will be conducted by a designated staff member to educate employees and raise awareness. The content of the training program will meet the following objectives:

- smog awareness as outlined above
- encouragement for employees to contribute ideas, suggestions and assistance in implementing the program in their work places.
- methods of participation, such as car pools, or bike-to-work days
- methods for employees to submit the best way to take necessary actions during a smog alert, since those who carry out the activities are in the best position to provide advice on potential problems and solutions that work.

### SMOG EFFECT CHART

POLLUTANT	CHARACTERISITICS	SOURCES	ONTARIO CRITERIA	GENERAL HEALTH EFFECTS	GENERAL ECOLOGICAL EFFECTS
<b>Ozone (O<sub>3</sub>)</b>	A colourless gas with a strong smell. Major component of summer smog.	Ozone is not emitted directly into the atmosphere. It is produced by photochemical action on nitrogen oxides and volatile organic compounds	1 h average 80 ppb	Irritation of the lungs and difficulty in breathing. Exposure to high concentrations can result in chest lightness, coughing and wheezing.	Damage to agricultural crops, ornamentals, forests and natural vegetation
<b>Total Suspended Particles (TSP)</b>	Particles of solid or liquid matter that stay suspended in air in the form of dust, mist, aerosols, smoke, fume, soot, etc. Size range 0.1 – 100 microns	Industrial processes including combustion, incineration, construction, metal smelting etc. Also	24 h average  120/ug/m <sub>3</sub>	The smaller the particle the greater the effect on health. Significant effects for people with lung disease, asthma and	Damage to vegetation, deterioration in visibility and contamination of soil.

		exhaust and road dust. Natural sources such as forest fires, ocean spray and volcanic activity	1 y average 60/ug/m <sub>3</sub>	PM10 below.	
<b>Inhalable Particles (PM 10)</b>	Same as TSP, except size range of particles is less than 10 microns.	Same as TSP	24 h average 50/ug/m <sub>3</sub>	Increased hospital admissions and premature deaths	Same as TSP
<b>Total Reduced Sulphur (TRS)</b>	Offensive odours similar to rotten eggs or cabbage	Industrial sources include steel industry, pulp and paper mills and refineries. natural sources.	1 h average 27 ppb (kraft pulp mill)	Not normally considered a health hazard. They are the primary cause of odours.	
<b>Sulphur Dioxide (SO<sub>2</sub>)</b>	Colourless gas with a strong odour similar to burnt matches	Electric utilities and non-ferrous smelters. Also primary metal processing, iron ore smelters, pulp and paper, petroleum refineries etc.	1 h average 250 ppb  24 h average 100 ppb	Breathing discomfort, respiratory illness, aggravation of existing respiratory and cardiovascular disease.  People with asthma, chronic lung or heart disease are most sensitive to SO <sub>2</sub> .	Leads to acid deposition, which causes lake acidification, corrosion and haze. Damage to tree leaves and crops.
<b>Nitrogen Dioxide (NO<sub>2</sub>)</b>	Gas with a pungent and irritating odour	Automobiles, thermal power plants, incineration, etc.  Natural sources include: lightning and soil bacteria.	1 h average 200 ppb	Increasing sensitivity for people with asthma and bronchitis	Leads to acid deposition, adverse effect on vegetation.
<b>Carbon Monoxide (CO)</b>	Colourless, odourless, tasteless and poisonous gas	Major source is transportation sector; i.e., road vehicles, aircraft and railways.	1 h average 30 ppm  8 h average 13 ppm	Impairment of visual perception, work capacity, learning ability and performance of complex tasks.	