

## **5.0 OZONE**

### **5.1 Update on U.S. and Canadian Regulatory Considerations**

In several of its reports, the International Air Quality Advisory Board has emphasized the significant health impacts of ozone and the nature of the generation and transport of that contaminant affecting significant segments of the transboundary region. In 1997, the United States introduced a new standard of 0.085 ppm ozone concentration in ambient air averaged over an 8-hour period. However, because of the need for data collection and analyses under the new standard, nonattainment areas will largely not be determined until the year 2000.

Given the emerging information on the impact of ozone on human health, the Canadian federal government and the provinces are currently examining replacement of the prevailing national guideline of 82 ppb (0.082 ppm) averaged over one hour with a more stringent target. This action has been prompted in part by recent Health Canada studies, indicating that statistically significant adverse health effects begin in some portion of the population at concentrations as low as 15 ppb.

Of 22 mortality studies reviewed in the preparation of a background paper for the federal-provincial group examining the guideline, 17 reported a consistent and significant association between increases in mortality and ozone air pollution. Southern Ontario, including Toronto, is subjected to elevated levels of ozone, as are Montreal and Vancouver. The Board has discussed activities designed to lower emissions of nitrogen oxides ( $\text{NO}_x$ ), a precursor in the formation of both ozone and fine particulate, in a previous chapter on Acid Gas Emissions. Control of both these contaminants will require, among other initiatives, further restrictions on emissions from the utility and transportation sectors.

### **5.2 Applicability of the Canada/United States Air Quality Agreement**

The 1998 Report on Progress under the Canada/United States Air Quality Agreement gave further detail on binational actions to address the transboundary impacts of this contaminant. It noted that, in April 1997, the EPA Administrator, Carol Browner, and then Canadian Minister of the Environment Sergio Marchi, signed an agreement for development of a Joint Plan of Action for Addressing Transboundary Air Pollution, specifically ozone and particulate matter.

In June 1998, EPA Administrator Carol Browner and Minister of the Environment Christine Stewart signed a Progress Report on the Joint Plan of Action setting targets and schedules toward a negotiated Ozone Annex to the Canada United States Air Quality Agreement as well as a joint plan on inhalable particulate.

The progress report, in support of consideration of an Ozone Annex, included commitments for joint air quality data analyses to determine: the extent of transport of ozone and precursor pollutants within the region and the extent of elevated 8-hour ozone levels; the identification, by trajectory analyses, of source regions within the transboundary region; and modeled forecasts of the outcome of implementation of  $\text{NO}_x$  emission trading.

Similar commitments were made for fine particulate ( $\text{PM}_{2.5}$ ) studies in the transboundary transport regions;

summarization of related human health effects; establishment of joint monitoring initiatives, including joint modeling and modeling intercomparisons; and consideration of an annex on fine particulate under the Agreement.

In the fall of 1998, Minister Stewart renewed her commitment to a spring-of-1999 date for development of recommendations for a negotiated agreement with the United States to limit ground level ozone.

A binational report on work plans to develop the Joint Plan of Action has been completed. Recommendations on the negotiation of an ozone annex and a joint work plan on fine particulate in the transboundary region are to be delivered to the Administrator and the Minister by April of this year.

The Board, in its Special Report on Transboundary Air Quality Issues (1998), advocated a management mechanism for such binational activity through Transboundary Air Pollution Transport Regions. It outlined some of the joint binational activities necessary to support the evolution of such regions, including co-ordinated ambient air quality monitoring and emission inventories.

### **Recommendation:**

**The Commission should request a detailed account from governments of specific progress made toward establishing an Ozone Annex to the Canada United States Air Quality Agreement, including detailed identification of the major issues requiring binational resolution and commitment to a projected schedule for completion of the Annex.**

### **5.3 Continued Utility of MTBE (Methyl tertiary butyl ether) in Gasoline**

Methyl tertiary butyl ether (MTBE) has been used in gasoline since 1978 as a replacement for alkylated lead to improve engine performance and lower emissions. It promotes more complete combustion, thereby reducing emissions of carbon monoxide and volatile organic compounds. Conventional or regular gasoline contains less than three percent MTBE by volume and premium blends can contain up to nine percent. Reformulated gasoline (RFG), developed for use in areas such as Los Angeles that do not meet national air quality standards, can contain up to 11 percent MTBE by volume.

In 1992, the EPA mandated the control of carbon monoxide in 39 metropolitan areas through the winter sale of reformulated gasoline (RFG) containing MTBE. In 1995, the EPA required the year-round sale of reformulated gasoline in about a dozen cities to further control emissions in areas of non-attainment.

However, the environmental effects of this additive are a source of growing concern, particularly its presence in groundwater as a result of leaking underground storage tanks and above-ground spills. Such accidental releases have found their way into groundwater and, because of the high solubility of the additive, spread quickly into some public water supplies. Even at very low concentrations, MTBE makes water unpalatable; at higher concentrations it can have serious effects on human reproduction, including birth defects and infertility.

In 1997, the Maine Department of Environmental Protection established their right to opt out of the EPA's RFG Program because of concerns regarding concentrations of MTBE in public drinking water supplies and private wells. State sampling of over 900 wells in Maine found 15 percent had trace amounts of MTBE, and one percent had levels exceeding the state maximum of 38 ppb.

The possibility of adverse health effects has prompted requests for the EPA to look into the use of MTBE and to search for a replacement. The EPA has labeled MTBE as a possible human carcinogen; however two recent panels in California could not conclude that it indeed is, citing a lack of clear scientific evidence. The panel rulings stated that further research into the subject would be needed.

In California, MTBE accounts for 11 percent of the 30 million U.S. gallons of gasoline used per day. Responding to contamination of some of the most attractive and populated sites, including Lake Tahoe, Santa Monica, and San Francisco Bay, the state commissioned a study of the environmental impacts of the additive by the University of California. The findings of that study, released in the last several weeks, maintain that the clean air benefits of MTBE are outweighed by its negative impact on water quality and the costs of addressing same. In response, on March 25, Governor Gray Davis announced his intention to seek legislation requiring a phase out of the additive by the end of the year 2002. California representatives in Congress are also working toward the elimination of the federal oxygenate requirement in states, such as California, that believe they can demonstrate it is not needed to meet current air quality objectives.

The statement indicating no additional air quality benefit of RFG is made with regard to California Phase 2 reformulated gasoline (CaRFG2). Ca RFG2 is a gasoline which California has specified to optimize the combustion process and the performance of air pollution control systems in vehicles. However, this fuel must also meet a minimum oxygen content under Federal regulation. While CaRFG2 has significant air quality enhancements over conventional gasoline, the State claims that the additional oxygenate mandated by the federal requirement has no beneficial effect.

The rigid specification for an oxygen (O<sub>2</sub>) content, established some years ago, does not recognize the many advancements in engine and emissions abatement technology. The vehicles which derive the most benefit from the high O<sub>2</sub> content are older carburetor equipped ones. Newer fuel injected vehicles with more sophisticated oxygen sensors and feedback computers do not benefit from the level of O<sub>2</sub> Congress has required.

Several oil companies are offering MTBE-free fuel in parts of the state, such as the San Francisco region, which meet federal clean air requirements. The refining industry believes it can switch to non-oxygenate fuels within a mandated three year period.

Currently an EPA panel is weighing the air quality benefits of MTBE against the possible human health risks. This advisory panel draws representation from government, industry, and academia, including the Northeast States for Coordinated Air Use Management, California Air Resources Board, Natural Resources Defense Council, Department of Energy, American Lung Association, American Petroleum Institute, and numerous other organizations. Their findings should be made public in mid-1999.

One alternative to the use of MTBE is ethanol; however, it increases the Reid vapour pressure (RVP), and reformulated gasoline using ethanol exceeds the EPA summertime restrictions on volatility. Inability to meet this RVP requirement has thus severely limited the usefulness of gasoline containing ethanol.

### **Comment: Methyl Tertiary Butyl Ether (MTBE)**

The current United States Environmental Protection Agency (USEPA) Advisory Panel should provide some definitive findings on the impact of MTBE, a gasoline additive used to ameliorate air quality. However, in the interim, the continuing fouling of public water supplies is unacceptable. If agencies are not able to mount effective spill and leak prevention for both above ground and underground sources, it is likely that the usage of MTBE as a gasoline additive will be systematically reduced and largely eliminated throughout both nations.