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International Air Quality Advisory Board

Progress Report Seventeen
to the International Joint Commission

Airshed of the Great Lakes

April 1994
Cover Figure. Lines of the median locations of air parcel starting points one to five days prior to arrival in the Great Lakes region. The 3-day line indicates that half the time the air in the Great Lakes region would have originated 3 days earlier within that line and half the time beyond it.
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TO THE

INTERNATIONAL JOINT COMMISSION

BY THE

INTERNATIONAL AIR QUALITY ADVISORY BOARD

FOR CONSIDERATION IN THE

ANNUAL MEETING

April 1941
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1. DETROIT-WINDSOR/PORT HURON-SARNIA

a. **Proposed Spring 1994 Environmental Workshop**

On February 10, L. Machta sent invitations to 14 scientists to participate in a spring 1994 workshop exploring environmental concerns in the Detroit-Windsor/Port Huron-Sarnia region. These were sent to U.S. proposed attendees; a follow-up letter was expected to be sent out to Canadian proposed attendees (whose names were being solicited).

As already reported indirectly to the Commissioners, the response to the invitation was so negative that L. Machta suggested that the IAQAB reconsider its approach to the workshop. This reassessment is in progress; the views of the Commission will be sought at the spring 1994 meeting of the Commission in Washington, D.C.

b. **Trends in Air Quality in Canada**

As a result of the reorganization of the Ministry of Ontario for Environment and Energy, the report on monitoring in Windsor-Detroit has been delayed to an April 1994 target release date. The report promises to be controversial.

c. **Update on U.S. Activities in the Detroit-Windsor and Port Huron-Sarnia Areas**

c.1. **Regulatory Program Activities**

The State of the Lakes Ecosystem Conference (SOLEC) is scheduled for October 26-28, 1994 in Dearborn, Michigan. It is billed as a major step toward getting the U.S. and Canada to conduct regular broad base assessments of the ecological status of the Great Lakes, (see clipping service item 2).

Region V and Michigan are continuing the development of a Southeast Michigan Initiative which will be a multimedia program to monitor, assess, regulate, enforce, and remediate toxic air and water emissions in the connecting waterbasins between Lakes Huron and Erie.

Michigan has submitted an ozone "redesignation request" to Region V to reclassify the Detroit area as an ozone attainment area. Detroit has had no violations in the last three years. They have also submitted "contingency measures" for actions Detroit would take if the request was denied or whenever excursions to non-attainment levels occurred.

The Greater Detroit Resource Incinerator is still operating and has not drawn public attention recently. It is not one of those with "hot ESPs" (Electro-Static Precipitation) which produce and release dioxins like the one in Columbus, Ohio.

The results of the ozone field testing conducted under the Southeast Michigan Ozone Study are to be used to develop urban air models for the Detroit area. The results of the
modelling efforts will be used to identify problem ozone sources and target control actions. Industry, including General Motors (GM), is actively involved.

The Laforté cement kiln in Alpena, Mich., on Thunder Bay is perceived by citizens in the area to be a threat to public health and water quality. Heavy metals, including lead, are being emitted from this facility.

DOW Chemical in Midland, Mich., is still trying to get a permit to burn dioxin-contaminated wastes on-site. Test burns are scheduled for this summer.

The U.S. EPA is developing Lakewide Management Plans (LaMPs) for all Lakes to look at all beneficial use impairments. A component of each Plan will focus on critical pollutants, i.e. identify them, track down sources, and develop control actions. It is just getting started in Lake Erie and will include the Detroit and St. Claire Rivers. The impact of nutrients on Lake Erie may also be studied.

c.2. Monitoring Activities

The five Master Stations, one remotely located station on each lake, are all monitoring PCBs, PAHs, pesticides, and trace metals. Integrated analyses of the data are expected this spring (part of the International Atmospheric Deposition Network, i.e., IADN).

Lake Michigan Mass Balance Program is monitoring for PCBs, atrazine, and mercury (total) in air, open lake, tributaries, sediments, and biota to develop an understanding of the fate of these contaminants in the food chain. GLNPO (Great Lakes National Program Office) will be looking to Canada for help in monitoring the Canadian waters when the study is expanded to the entire Great Lakes basin.

Mercury will get more attention when a report on this metal, mandated under the Clean Air Act (CAA), is delivered to Congress this fall. Monitoring data are showing that much of the mercury load to the Great Lakes is coming from the air and also that methylation is occurring in incineration stacks (some of these data come from the five locations of the Lake Superior Stack Mercury Testing Program).

ORD (Office of Research and Development) of the U.S. EPA and the Great Lakes Protection Fund are jointly funding a ten-site network of monitoring stations (five of them are also IADN sites) to study mercury in the Great Lakes. The work is being done by University of Michigan.

Sources of air toxics are being compiled in the Great Lakes Toxics Emissions Inventory. A pilot study in the Chicago/Gary end of Lake Michigan has been initiated.
2. **LAKE SUPERIOR**

a. **A Recent Mass Balance Estimate of PCB's for Lake Superior**

Steve Eisenreich of the University of Minnesota became the recipient of the American Chemical Society 1994 Award for Creative Advances in Science and Technology. Environmental Science and Technology, an environmental journal, allotted three pages to this event and described unpublished work by Prof. Eisenreich and his students dealing with the mass balance of PCBs in Lake Superior. PCBs, it is noted, serve as a marker for other pollutants. The paper argues that the PCBs are gradually volatilizing from the lake to the atmosphere. The PCBs seem to stay in the lake for only two or three years. The main source of PCBs to the lake is from the atmosphere contributing some 157 kg per year. The current volatilization from the lake surface is more than ten times the atmospheric input, 1900 kg per year. These amounts are larger than riverine inputs and outputs which are about 100 kg per year (110 entering from rivers and 60 leaving). Eisenreich estimates there are about 10,000 kg of PCBs in the Lake Superior waters and 4,900 kg of PCBs in the sediments.

The accumulated amount of PCBs in the waters has decreased but Eisenreich says that the atmospheric loading has not decreased since about 1970. This is because there is a reservoir of PCBs over land which continues to interact with the atmosphere. Thus, the air remains a new source of PCBs pollution to the Great Lakes even though the PCBs may have been banned from new man-made production. US EPA estimates that about 70,000 tonnes of PCBs have been released directly into the environment and that there are 130,000 tonnes in essentially unregulated landfills and dumps.

3. **GULF OF MAINE**

In early February 1994, Dr. Harry McAdie of H.G. McAdie Associates, Toronto, began information gathering for the intended mass balancing of toxic inputs to the Gulf of Maine Watershed. Dr. McAdie is working on this project with Robert Hughes of the New Brunswick Department of the Environment (Air Quality Section). A number of consultations have taken place with scientists who have been involved with similar work in the Great Lakes region since the mid-1980's.

Tentative domain boundaries have been established and land and water areas determined. Relevant reports and maps are being assembled and reviewed. Dr. McAdie has finished a first draft of a report on a "Framework and Information Needs" for a mass balance for the Gulf of Maine. The first report will be delivered by 31 March 1994. A copy will be forwarded to the Commission after review by the IAQAB.

Estimation of fluxes and performing, if possible, the mass balance, are projected to take until the end of May, culminating in a workshop at which the findings will be critiqued and recommendations made.
4. MERCURY

Mercury emissions from powerplants are not yet regulated in the U.S. or in Canada. However, the likelihood of future regulations points to the need for power-generating industry to understand the formation, exposure, environmental hazard and control of mercury emissions now.

Mercury emissions occur from a variety of natural and manmade sources. Recent studies estimate that about 30% of all manmade emissions of mercury come from coal- and oil-fired powerplants.

There is growing scientific evidence that atmospheric deposition of mercury is the source of contamination at sites far removed from emission sources. Some remote Minnesota lakes, for example, have shown particularly high mercury concentrations, as have the Great Lakes and numerous other lakes. Mercury contamination of lakes takes on particular concern, as 90% of the mercury intake of the total U.S. population can be traced to food consumption, especially fish.

Coal-fired utilities in the United States account for over one hundred and five tonnes/yr of mercury emission, according to the EPA interim report on National Emissions Inventory of Mercury and Mercury Compounds. A 500 MWe coal-fired electric generating facility burning coal will emit on the order of 300 kg/yr of mercury if no equipment to control mercury is installed.

Of the many studies on mercury emission underway, two were specifically required by the Clean Air Act Amendments (CAAA) of 1990. EPA has been charged with investigating emissions from electric utility steam generating units, municipal waste combustion units and other sources, while the National Institute of Environmental Health Sciences has been directed to study the threshold level of mercury exposure to protect human health. These studies will be considered by the EPA to determine if additional regulations are required. Already, mercury control regulations have been proposed for municipal solid waste (MSW) incineration facilities.

Mercury is one of the 189 hazardous air pollutants (HAPs) specifically listed in the CAAA. In coal, mercury is present mainly as the sulfide (HgS), while in refuse, elemental mercury and mercuric oxide are dominant species. Under the high temperatures resulting from combustion, mercury will vaporize. As the combustion gas cools other chemical reactions can affect the ultimate form of mercury.

Mercury removal efficiencies of between 50-90% can be achieved by the use of adsorption. Adsorption can be either a physical or chemical process. In chemical adsorption, mercury compounds in the vapour state react with an active species on the surface of the absorbent forming an amalgam or inorganic mercury compounds. In physical adsorption, mercury vapour adheres to the surface of the adsorbent.
Promising new control systems are based on the use of activated carbon, carbon/lime, activated coke, sodium sulfide, wet scrubbing and fixed sorbent beds; technologies which are comparable to with those used for reducing sulfur emissions.

Considerable research is focusing on effective mercury control as a result of the growing evidence of atmospheric deposition as the source of high concentrations of mercury in land and water far removed from emission sources. Future mercury control regulations for coal-burning power plants are inevitable, given the environmental and health concern and that requirements have been placed on waste incinerators already. Such regulations must ensure that mercury removed from stack gases is not released into other media.

The technologies to abate mercury are comparable with requirements for acid rain causing air pollutants. Power plants are required to control acid rain causing pollutants in 1999.

The International Air Quality Advisory Board recommends that the Parties give serious attention to the need to control emissions of mercury from power-generating facilities.

5. **HAZARDOUS WASTE INCINERATION**

In the last report, the IAQAB provided an introduction to the hazardous waste incineration debate and indicated that it would provide future reports on the issue. This section briefly describes regulations, management practices, provides information on amount of wastes and number of incinerators in the U.S. and Canada. Recycling of used tires as an alternative to waste disposal and incineration is also discussed.

a. **Nature of Environmental Concern**

With the pulp and paper industry moving to non-chlorine based processes, hazardous and municipal waste incinerators will become the dominant source of chlorinated organic releases to the environment.

As noted in the International Joint Commission's Seventh Biennial Report on Great Lakes Water Quality there is mounting evidence to reinforce concerns about the effects of chlorinated organics and other persistent toxic substances. Substances which are dispersed through the air include hexachlorobenzene, PCBs, dioxins, furans, and PAHs. Long-term exposure of fish, wildlife and humans to chlorinated organics and other persistent toxic substances has been linked to reproductive, metabolic, neurological and behavioural abnormalities; to immunity suppression leading to susceptibility to infections and other life-threatening problems; and to increasing levels of breast and other cancers. Available evidence also points to long-term reproductive and intergenerational effects.
b. Background Facts and Figures for Canada

Municipal and hazardous waste incinerators are regulated by the provincial governments. The Canadian Council of Ministers of the Environment has developed guidelines for waste management methods, including incineration. These represent minimum standards that are used by the provinces to develop regulations. Most provinces have regulations for the management of waste.

There are 18 large operational municipal incineration facilities in Canada. The majority of these plants are located in Ontario, Quebec and British Columbia. Most facilities are equipped to control air pollution.

Environment Canada's current estimates of total dioxin and furan emissions from all Canadian incinerators range widely (depending on the assumptions used) from 20 grams per year, if all incinerators were operating with Best Available Practicable Technology, to 6000 grams per year, if all were old and poorly managed. In the only study which has quantified hexachlorobenzene emissions from incinerators, Environment Canada estimated that a mass burner system incinerator in Quebec City produced hexachlorobenzene emissions of less than 1 kilogram per year.

There are relatively few hazardous waste incinerators in Canada because of the difficulty with public acceptance of this waste processing method and the siting of facilities.

The Swan Hills' Special Waste Treatment Centre in southern Alberta burns organic solids and liquids. The Centre has two rocking kiln incinerators which burn approximately 10,000 tonnes (metric) per year and a rotary kiln incinerator which burns approximately 8,000 tonnes per year. A proposed new rotary kiln will burn an additional 40,000 tonnes per year.

The Laidlaw Environmental Services facility in Sarnia, Ontario incinerates approximately 43,000 tonnes per year of organics solids and liquids and some inorganics. Laidlaw's Ville Mercier Facility burns 40,000 tonnes per year of hazardous waste.

The Ontario Waste Management Corporation's proposed waste treatment centre is expected to include a rotary kiln to incinerate 30,000 - 60,000 tonnes per year of hazardous liquids, solids and sludges.

c. Background Facts and Figures for the United States

About 5 million tonnes of liquid, semi-solid, and solid hazardous waste are burned each year in hazardous waste incinerators, boilers and industrial furnaces (BIFs). In everyday terms, these 5 million tonnes would fill up a line of trucks stretching from Washington, DC to Los Angeles, over 2400 miles. About 90% of the hazardous wastes combusted today are generated by 10 industrial categories, which comprise major segments of American industry; for example, petroleum refineries, agricultural chemical manufacturers, and organic and
inorganic chemical plants. Common types of wastes being combusted are spent solvents, distillation residuals, and impure organic chemicals and products.

In the United States, EPA developed incinerator regulations adopted under the Resource Conservation and Recovery Act (RCRA) in 1981. In 1988, EPA added controls for emissions of metals, products of incomplete combustion, and hydrochloric acid (HCl) into new incinerator permits on a case-by-case basis. Currently, there are 184 hazardous waste incinerators in the United States, 139 of which can operate under final permits and another 15 of which are operating in interim status pending final resolution of the appeals on their permits. Another 30 incinerator units are on a permitting track, but only 4 of these are built and operating in interim status. There are 19 commercial incinerators in the United States, 15 of which are in operation today.

Major types of boilers and industrial furnaces that burn hazardous waste include cement kilns, lightweight aggregate kilns, and industrial and utility boilers. Currently, there are 171 BIFs, of which some 35 are commercial facilities accepting wastes from other generators. In the United States, BIFs are subject to comprehensive EPA regulations that were adopted in 1990. Among other key features, these regulations contain controls on metals, products of incomplete combustion, and HCl being emitted from BIF facilities. At the present time, these controls are imposed as interim status standards. No BIFs have yet received final permits although a number of permit applications have been filed recently.

d. **U.S Action Being Taken**

Under the process for pursuing a national strategy, the U.S. EPA and the States are partners and co-regulators of the generation, transportation, treatment, storage, and disposal of hazardous waste. The role of hazardous waste combustion in the hazardous waste management system must be undertaken as a joint federal and state effort. To that end, an EPA-State Committee is being formed to further develop the national strategy. The initial charge to this Committee includes focusing on aggressive source reduction measures, improvements to technical and permitting standards, facilitation of alternative treatment technologies, and developing a better scientific foundation for decision making. EPA is emphasizing aggressive use of source reduction as the first and primary goal to be pursued with respect to the generation of combustible wastes. However, EPA will immediately pursue a number of actions to ensure that existing combustion facilities are operated safely and without unacceptable risks to human health and the environment while the discussions on the source reduction and the national waste management strategy are taking place. Effective immediately, a series of actions must be taken in connection with making permit decisions on incinerators and BIFs. These actions include:

- aggressive use of waste minimization measures as part of permitting and enforcement efforts involving generators of combustible waste as well as incinerators and BIFs;
ensuring that a comprehensive risk assessment, including indirect exposures, is conducted at each facility site;

- use of omnibus permit authority to include dioxin/furan emission limits and a stringent particulate matter standard in new permits where necessary to protect human health and the environment;

- providing for earlier and more effective public participation, and giving low management priority to permitting any new incinerator and BIF capacity over the next 18 months unless the new facilities would replace and be a significant improvement over existing capacity.

This directive also targets incinerators and BIFs for enhanced inspection and enforcement efforts regarding compliance with regulations and facility permits. These activities will also include use of waste minimization requirements as part of compliance actions. With respect to source reduction, EPA is also issuing interim guidelines on the elements of a sound waste minimization program. Concurrently, EPA is issuing a draft combustion strategy as a starting point for discussion on source reduction and waste combustion.

All of the above efforts are designed to create a comprehensive national waste management strategy designed to fully protect human health and the environment. This will be achieved through aggressive source reduction, enhanced controls on existing combustion facilities, and public participation in permitting and source reduction efforts.

e. **Used Tires - Recycling is an Alternative**

Scrap tire piles have become a serious environmental hazard in the United States and Canada. The February 1990 fire at the tire dump in Hagersville, Ontario, drew attention in Canada to the environmental hazards of used tires. Similar incidents have occurred in the United States.

When stored in large quantities used tires present a potential fire hazard; water that collects in the tires is a breeding ground for insects and when they are buried whole the frost action in the colder regions of North America brings them back to the surface. Burying them, either shredded or whole, takes up space and shortens the life-expectancy of the landfill, since used tires do not degrade.

Incineration or combustion for energy recovery has often been considered as a possible disposal option, but the pollution control requirements are often prohibitive in cost and/or performance.

There are a number of potential applications for used tires ranging from use in asphaltic cement or in roadbeds through to using the material in blasting mats and livestock mats or breaking the material down into its components (crumb rubber, carbon black, etc.).
of the reasons that tire recovery and recycling do not take place to any great extent, and hence the reason that the environmental hazards associated with tires continue to exist, is that the cost for managing a used tire in a responsible manner, i.e. recovering and recycling it, exceeds the value of the recyclable materials. As a consequence, used tires end up at dumps and landfills or are stock-piled in the hope that they will someday become profitable.

Over the years there have been numerous proposals from private sector proponents for managing used tires. Two recent proposals in the Atlantic Region of Canada include the construction of a crumb rubber plant and the construction of an asphaltic plant. Most of the private sector proposals share two common traits; first, the small volumes in the Atlantic Region create difficulties in achieving economies of scale, and second but more important, none are commercially viable without ongoing subsidization. They are basically selling a service - managing used tires - to the provincial governments.

In the United States, Congress passed the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) which included a provision that requires states to use recycled materials, including crumb rubber from scrap tires, in highway construction projects built with federal assistance.

The states have been experimenting with the use of recycled tire rubber as a binder in asphalt pavement. The states of California, Arizona and Florida, and several European countries have achieved exceptional performance with the use of crumb rubber modifiers under nearly every climatic road condition. California anticipates using over one million tonnes of asphalt rubber hot mix in 1994 in all road projects, not just federally funded ones.

Environmentalists believe that Section 1038 of ISTEA is a win-win situation for state and local governments because it improves roads and leads to recycling of used tires. It requires that all states meet a minimum utilization requirement for recycled rubber in asphalt pavements. Beginning in January 1994, five percent of each state's federally funded asphalt pavement projects must use crumb rubber derived from scrap tires. This requirement increases by five percent each year until fully implemented in 1997, reaching a twenty percent minimum requirement.

Some Members of Congress oppose the statute and, with the help of special interest groups, may attempt to modify Section 1038 during consideration of the National Highway System early this year.

While crumb rubber modified asphalt is on average thirty percent more expensive per tonne of hot mix than conventional hot mix asphalt, the American Association of State Highway and Transportation Official's Guide for design of Pavement Structures stresses that all costs occurring during the life of a pavement be included in economic evaluation, not just material costs. Asphalt-rubber is expected to provide life cycle cost effectiveness. Local governments and tire dealers will be the beneficiaries by avoiding land-filling or incineration clean up costs associated with scrap tires. Asphalt rubber and other crumb rubber modifier
processes are being increasingly used by states, because they are believed to be cost effective.

Regarding workers' health and safety, EPA and the U.S. Department of Transportation conducted an extensive analysis of the existing data related to emissions from crumb rubber modifiers. This includes substantial data set that was developed through nearly 20 years of European experiences with these processes as well as data from research on emissions from crumb rubber modifiers conducted in Florida, California, Canada and the Netherlands. None of these data suggest that these processes produce harmful emissions.

The argument against recyclability of crumb rubber modified asphalt pavement, therefore, appears to be a "red herring." There is substantial evidence that crumb rubber modified pavements can be fully recycled and there is no evidence to the contrary.

In the Atlantic region of Canada, a Special Wastes Committee studied the used tire problem and reported in 1993 that government should not assume the responsibility for managing used tires. Rather it should adopt the principle of "product stewardship". This means that the industry that produces the tires assumes responsibility for managing them throughout their life-cycle. The cost for managing the used tire becomes "internalized". The cost for waste management gets treated in the same manner as the cost for raw materials, labour and capital that go into making the tire. All costs are borne by industry which in turn passes them on to the consumer of the tires.

6. AUTOMOBILE EMISSIONS

a. Update on MTBE

Last November, the U.S. Environmental Protection Agency (EPA) released it's report entitled Assessment of the Potential Health Risks of Gasoline Oxygenated with Methyl Tertiary Butyl Ether (MTBE). In the report EPA concluded that "healthy" members of the public are unlikely to experience symptoms of interest (e.g. headaches) after a 1-hour exposure to MTBE under temperate conditions and concentrations (5 or 6 mg/m³) that are higher than those commonly encountered. The exception is when people refuel their cars. During this activity, the individual may be exposed to substantially higher concentrations of MTBE than to those which the study evaluated.

The study was conducted by EPA in response to health concerns raised in Fairbanks and Anchorage, Alaska. The communities of Fairbanks and Anchorage; Stamford, Connecticut; and Albany, New York were included in the study. These former two areas are using this gasoline additive to help abate unhealthy levels of carbon monoxide (CO) caused by motor vehicles. The latter two areas, which do not use MTBE, served as a control. "Although the strong odour of MTBE may lead one to think that very high concentrations of it is in the air, this is not necessarily the case." This and other studies indicate that healthy members
of the general population exposed to MTBE under relatively temperate conditions do not experience health symptoms of concern. However, there appears to be a subgroup of the general population which may be sensitive to MTBE. More research is planned in this area.

Based on EPA's analysis, the highest average MTBE concentrations are found in garage service bays, second only to levels recorded at gas stations. The analysis assumes that a gasoline fill-up scenario, although brief, would result in the highest acute exposure concentrations. The highest human exposure is expected when an individual is near evaporative emissions. Therefore, according to EPA, exposure would be greatest when an individual is handling gasoline. The report also found that inside older model automobiles, MTBE levels are higher due to vehicle design and wear than in newer models. EPA adds that it is difficult to estimate MTBE concentrations during the non-oxygenated fuel season because the oxygenate is used at varying percentages in premium and regular gasolines.

EPA also notes that, the data suggest that a tentative classification of MTBE as a possible human carcinogen is supportable. Reformulated gasoline is rated a probable human carcinogen. The agency acknowledges that quantitative risk-benefit comparisons of carbon monoxide and MTBE would provide valuable information, but that the data are too limited for comparative risk estimates. EPA adds that it will be investigating the effects of low temperatures on emissions from vehicles using MTBE.

The report indicates that using oxygenated gasoline, particularly with the additive methyl tertiary butyl ether or MTBE, produced fewer exceedances of the carbon monoxide standard and that overall, the program has proved to be a success in reducing emissions in the thirty-nine carbon monoxide non-attainment areas where oxygenated fuel is required. EPA reports that nationwide, carbon monoxide exceedances in all non-attainment areas decreased by 80% on average with the use of oxygenated fuel.

b. Low Emission Vehicles

The Ozone Transport Commission (OTC) voted on February 1, 1994 by a vote of nine to four, to make a formal recommendation to EPA under Section 184(c) of the Clean Air Act that it adopts the more stringent California Low Emission Vehicle (LEV) standards in the Ozone Transport Region (OTR). The OTR was established under the 1990 Clean Air Act and is comprised of the states of Connecticut, Delaware, Maine, Massachusetts, Maryland, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont, in addition to the District of Columbia and northern Virginia.

The OTC is recommending adoption of the California standards because of a pervasive ozone nonattainment problem in the region and the need for less polluting motor vehicles. Analysis has shown that the pollution reductions which will occur from the Clean Air Act will be insufficient for states within the region to meet their air quality goals. This may also be true for the Great Lakes Region.
Under the Clean Air Act, once the OTC recommendation is transmitted to EPA, the agency must seek public comment and review of the recommendation. Within nine months it must approve or not approve the recommendation, or propose an equally effective alternative.

The OTC recommendation to EPA calls for a LEV program applicable to all 1999 and subsequent model year passenger cars and light-duty trucks. The OTC LEV program consists of five categories of vehicles - California Tier I vehicles, transitional LEVs, LEVs, Ultra-LEVs and Zero Emission Vehicles; manufacturers may choose any combination of vehicles certified to these standards, to meet a prescribed fleet emissions average standard in the OTR.

The implementation date for this program is January 1, 1996, although states are not precluded from implementing the program earlier. The program does not require the adoption of California reformulated gasoline standards by any jurisdiction within the OTR.

7. EPA REVIEWS THE OZONE STANDARD

EPA plans to conduct a thorough review of the air quality criteria for ozone and other photochemical oxidants as soon as possible and to complete its review of the National Ambient Air Quality Standard (NAAQS) for ozone on an expedited basis. The last formal review was performed in 1989.

EPA announced its intention not to revise the ozone NAAQS in March 1993. Subsequently it acknowledged that a substantial number of new studies on the health and environmental effects of ozone had been completed since the 1989 review. EPA now is indicating it will adhere to a strict review schedule and has stated that it will deny any requests for extensions of the public comment periods.

EPA has adopted a number of measures designed to facilitate the review of the ozone NAAQS. These include (1) conducting review and revision of the criteria document and developing of the staff paper in a concurrent fashion; (2) adhering to strict schedules for external review; (3) establishing a highly-expedited review process; and (4) reducing the volume of information included in the revised criteria document by focusing on newer studies and setting a date by which new studies will be excluded from the review. The targeted completion date for the criteria document and staff paper is mid-1995, with proposal of changes to the ozone NAAQS, if appropriate, in mid-1996, and promulgation in mid-1997.

EPA emphasizes that in the interim it will continue to work with state and local air agencies to implement emission control strategies required by the Clean Air Act to meet the existing ozone standard. EPA is also examining the ramifications of changes to the standard on current control requirements. Where appropriate it will consider new rules and added controls for meeting a revised (lower) standard. The examination includes a review of
options to ensure a smooth transition for implementation of any new ozone NAAQS in the event a decision is made to revise the current standard. While EPA has indicated that it plans to review and revise the Air Quality Criteria for Ozone and Other Photochemical Oxidants (Criteria Document), the agency has not fully committed to revising the ozone standard.

As stated in Progress Report 16, the IAQAB recommends that the Commission encourage the governments under the Air Quality Accord to enter into discussions for a joint U.S.-Canada standard as the U.S. begins its next review of the ozone standard.

8. MONITORING & RESEARCH TO DETERMINE LEVELS OF AIR POLLUTION & EFFECTS IN PROTECTED AREAS IN THE TRANSBOUNDARY REGION

In the United States Federal Land Managers (FLMs), the National Park Service (NPS), the USDA-Forest Service (USFS), and the Fish and Wildlife Service (FWS), are responsible for monitoring air pollutants and protecting air quality related values (AQRVs) from effects of air pollutants on Federal lands designated as Class 1 under the Clean Air Act Amendments of 1988 (CAA). Other Federal agencies, such as the Environmental Protection Agency (EPA), the U.S. Geological Survey (USGS), and the National Oceanic and Atmospheric Administration (NOAA) have conducted air resource and ecosystem monitoring in some parks and preserves. This survey of current monitoring efforts will focus on Federal Programs that are long-term and conducted specifically to characterize air quality and AQRVs. These monitoring programs focus on gaseous pollutants, such as ozone and sulfur dioxide, deposition, visibility and visibility-reducing particles, and certain resources, such as surface-water quality and forests. Although not specifically described here, there are air and AQRV monitoring programs in the transboundary region run by state and local agencies, non-profit organizations (such as the Appalachian Mountain Club) and industry groups.

In Canada a partnership of provincial government researchers, federal government researchers, and industry sponsors monitoring networks to collect air quality, deposition, and ecosystem health information in protected areas. Those agencies most active in planning and implementation of integrated ecological monitoring in protected areas are Parks Canada (CPS) and Environment Canada. A program has been established within the Federal Government to set up ecological monitoring programs in all national park units, and to establish Ecological Science Centres across the country.

Visibility, Air Quality and Deposition Monitoring

1. U.S. efforts to monitor air quality include the following programs:

IMPROVE Network. This "Interagency Monitoring of Protected Visual Environments" includes a consortium of FLMs and other sponsors, including NPS, USFS, FWS, Bureau of Land Management, Environmental Protection Agency, and state organizations such as
Northeastern States for Coordinated Air Use Management and the Western States Air Resources Council. At IMPROVE sites (see Figure 1) monitoring equipment include a transmissometer (to measure light attenuation) and a series of particle samplers to allow agencies to identify the type of visibility-reducing particles in air. Many of these sites are also outfitted with cameras to detect changes in our ability to see standard landmarks. This is the most widespread air monitoring network in protected areas of the U.S. (30 Class 1 areas).

**NADP/NDDN.** The National Atmospheric Deposition Program (NADP) is an interagency effort to monitor wet deposition at 200 sites in the U.S. (see Figure 2). These sites are "rural" and siting criteria require them to be located outside the influence of urban air pollution. The NPS maintains 28 NADP sites in park units; there are a number of NADP sites located just outside of USFS wilderness areas and on FWS refuges. The National Dry Deposition Network (NDDN) was set up by the EPA to monitor gases, aerosols, and particles (see Figure 3). This is a much sparser network, with sites in some parks, such as Chiricahua, Glacier, Grand Canyon, and Shenandoah NPs.

**Ozone Monitoring Networks.** To monitor ozone stress in remote areas where vegetation has shown foliar injury, the NPS, USFS, and some states have set up Dasibi samplers in parks and adjacent to wilderness areas (see Figure 4 for NPS sites). To complement this network the NPS is experimenting with the use of passive ozone monitors to allow for measurements of integrated dose during the summer ozone period at sites that do not have line power.

2. Canadian air monitoring networks that collect data in protected areas include:

**Atmospheric Environment Service (AES).** This federal agency, part of Environment Canada, is active in maintaining air quality and deposition sites, including some located in national and provincial parks. They operate the Canadian Air and Precipitation Monitoring Program (CAPMoN).

**Forestry Canada.** This agency operates some monitoring sites in national parks to measure pollutants in fog water.

**LRTAP.** Long-Range Transport of Airborne Pollutants program was organized by federal agencies: AES, Department of Fisheries and Oceans, Forestry, Health and Welfare and Agriculture, as well as provincial governments. There are a number of LRTAP sites in Eastern Canada carrying out monitoring and research on acid deposition and its impacts. These sites will become part of the National Ecological Monitoring Network.

3. Regional Air Quality Studies: In the transboundary region there have been some cooperative studies to characterize air pollutant concentrations and transport. Two such studies are outlined below.
(a) PREVENT/REVEAL. The NPS-Air Quality Division sponsored a visibility study in the Pacific Northwest during the summer of 1990, called the "Pacific Northwest Regional Visibility Experiment using Natural Tracers" (PREVENT). The study was designed to apportion summertime haze constituents originating in the northwestern U.S. and southwestern Canada, with a focus on Mt. Rainier and North Cascades NP. During summer 1992 the British Columbia provincial government sponsored a visibility field study in the Fraser Valley, called "Regional Visibility Experimental Assessment in the Lower Fraser River Valley" (REVEAL).

(b) Gulf of Maine Oxidant Study (GOMOS). This regional air quality study includes international cooperators, with NOAA taking the lead in coordinating the 1993 and 1995 field studies to determine the precursor emissions, formation, and transport of tropospheric ozone in the Gulf of Maine region. Acadia National Park in Maine is one of the instrumented sites used during the 1993 GOMOS field campaign.

Ecosystem and Bioindicator Monitoring

1. U.S. programs to monitor the status and trends in sensitive ecosystems, species or biological communities include:

EPA/EMAP. Currently, the EPA has embarked on the most ambitious effort in the U.S. to characterize the status and trends in ecological resources through the Environmental Monitoring and Assessment Program (EMAP). Both EMAP-Surface Waters and EMAP Forests (co-sponsored by the USFS through the Forest Health Monitoring Program) have established monitoring sites in the northeastern U.S. using a hexagon-based grid system. The EPA also sponsors the TIME (Temporally Integrated Monitoring of Ecosystems) program to assess the changes through time of watersheds selected as a subset of EMAP sampling sites.

Ozone Effects Research. Researchers from the EPA, NPS, USFS, National Biological Survey (NBS), Tennessee Valley Authority and other industry groups have conducted both field surveys and experimental fumigation of plant species to determine the effects of oxidant air pollution on vegetation condition and growth. Much of this work is associated with the responsibility of the EPA to set a Federal ozone standard to protect both human health and vegetation.

USFS/ARM Program. As part of the national Air Resource Management (ARM) program, the USFS carries out a decentralized program in Class 1 wilderness areas to monitor and survey indicators, such as surface-water chemistry, hardwoods sensitive to ozone injury, and lichen species known to bioaccumulate metals and organic pollutants.

FWS-NBS/BEST Program. The U.S. Fish and Wildlife Service, now in concert with the National Biological Survey, is developing a comprehensive "Biological Evaluation of Status and Trends" (BEST) network for wildlife refuges. This program, when fully implemented,
will measure both criteria air pollutants and toxic air contaminants and their bioaccumulation/effects on fish and wildfowl on the refuges.

**USGS/NAWQA Program.** The USGS has organized a river basin monitoring effort (National Water Quality Assessment) in 22 areas of the U.S. using bioindicators, such as benthic insects to assess the health of surface waters. Although this program is not specifically designed to assess air pollutant effects on waters, bioindicator monitoring at some headwater sites will allow for such an assessment.

2. Canada ecosystem monitoring has been carried out since the 1970s, much of it centered around the regional impacts of acid deposition on forests, fisheries, and water quality. These sites of "integrated monitoring and research" have been located primarily in the eastern part of the country. In January 1994 Parks Canada convened a workshop to plan for an ecological monitoring system that would operate in all national parks. This plan would be coordinated with Environment Canada's program to set up an ecological science centre (ESC) network that would include many of the Canadian parks and would have sites across Canada. This ecological monitoring would include physical, cultural, and biological resources.

**LRTAP-Quebec Network.** This network of sixty-four headwater lakes in southern Quebec has operated since 1983 to monitor the acidity of surface waters that may be affected by acid deposition.

**Environment Canada/Centre for Inland Waters.** This agency has reported on surface water quality data for more than 8500 lakes located in Ontario, Quebec and the Atlantic provinces. These data were collected as part of the acid rain program by both federal and provincial scientists.

**Parks Canada.** Parks with well-developed ecological monitoring programs include Kejimkujik (Nova Scotia), La Mauricie (Quebec) and Fundy (New Brunswick). Data from these and other national parks studies are compiled in the "State-of-the-Parks" reports.

3. Ecosystem monitoring approaches common to both Canada and the U.S. include:

**Long-Term Ecosystem Studies.** On both sides of the border researchers have set up intensive watershed ecosystem studies to investigate how air pollutants and deposition affects ecosystems and bioindicators. Excellent examples of these site-specific ecosystem monitoring efforts can be found in the Turkey Lakes watershed in Ontario, Lac Laflamme watershed in Quebec, Kejimkujik research site in Nova Scotia, Bear Brook watershed in Maine, and the Hubbard Brook Ecosystem Study in New Hampshire. Some of these sites are in protected areas, while others are in managed areas where manipulative experiments are possible. Most of these sites are instrumented to measure air pollutants, especially acid deposition, and meteorological variables.
**International Biosphere Reserve Program.** The Man And the Biosphere (MAB) program, coordinated through UNESCO, includes regional reserves in transboundary areas. Biomonitoring in these areas is coordinated by MAB, with funding generally provided by regional/national agencies. For example, the Glacier area biosphere reserves include Glacier National Park, Montana, Coram Experimental Forest, and the Waterton Lakes National Park, Alberta. Each of these MAB reserves has separately developed monitoring and preservation plans in concert with adjoining land owners, but have not developed a regional program to link all three. In March 1994 the Cascades International Alliance, a consortium of public and private organizations in the U.S. and Canada held a workshop to consider ecosystem preservation strategies in the Pacific Northwest. They would like to create a regional preserve in the greater North Cascades ecosystem to include such protected areas as North Cascades NP, Ross Lake and Lake Chelan National Recreation Areas, Mt. Baker-Snoqualmie, Okanogan, and Wenatchee National Forests, Manning and Cathedral Provincial Parks in B.C. and Skagit and Cascade Provincial Recreation Areas.

9. **OTHER TRANSBORDER ISSUES**

**EPA REGION I - New England States**

**Ozone.** Elevated levels and transboundary transport of ozone is an important issue - from the Northeastern states to the Maritime provinces and the Windsor-Quebec corridor in Canada and from the Windsor-Quebec corridor into the North Eastern states. Under the New England States for Coordinated Air Use Management (NESCAUM), the U.S. and Canada are working to establish quality assurance for monitoring ozone, e.g. standard protocols, station site visits and comparability of data.

The North Atlantic Regional Experiments (NARE), a brainchild of NESCAUM, sponsors a network of monitoring stations along the border. This program also has a stratospheric ozone component, in which NO\textsubscript{x} transport into the Arctic stratosphere is monitored. The Atlantic Region Oxidants Workgroup, chaired by Canada, is involved in monitoring and modelling efforts.

**VOCs.** The two countries are coordinating real-time measurements of volatile organic carbons (VOC) in air craft flights over the region. Interestingly, these measurements are showing levels twice as high as ground-level measurements.

**Hg.** Transboundary movement of mercury (Hg) and its mobilization by acid rain is a growing problem and is being studied under the Great Waters Initiative.

**UV-B.** Vermont and Maine are a part of the ultra violet (UV) monitoring Network which is working toward bilaterally coordinated UV-B measurements.
EPA REGION VIII - Montana, Idaho (Border States)

Louisiana Pacific is one of the largest lumber firms in the U.S. Region VIII levied an $11.1M fine on fourteen of its processing facilities for permit violations. It was the second largest civil fine ever levied under U.S. federal environmental law. Canada is concerned about L-P's announcement that it plans to build a wafer board plant in northern Manitoba.

Long-range transport of chlorinated hydrocarbons from the Mississippi draftway is becoming an issue in Canada.

EPA REGION X - Washington (Border State)

Cominco smelter on the Columbia River at Trail, British Columbia, is alleged to be causing air and water quality problems in downstream U.S. towns. According to Region X, the U.S. has effectively dealt with problem pulp and paper plants and dioxin-emitting incinerators on its side of the Northwest U.S./Canada border.

Also, Canada has a growing concern for ground-level ozone in the Seattle area which is being addressed by the U.S./Canada Air Quality Committee, (see below).

U.S./Canada Air Quality Agreement

The implementation of the Agreement is going smoothly. Both countries will start notifying each other of any major air pollution problems along the border. Canada has a growing concern for drift of ground-level ozone from U.S. to Canada, especially in the Windsor/Quebec corridor and Seattle/Vancouver area. Although the current U.S. standard for ozone is higher than Canada's (0.12 ppm vs. 0.08 ppm, respectively), the EPA Administrator has committed to a review of the U.S. standard with a final decision scheduled for 1997. The U.S. is also implementing a very ambitious CAA, which includes reductions in NOx from cars, electric utility plants, and new NOx RACTs (Readily Available Control Technologies) from other sources.

On 23 February 1994, the B.C. Minister of the Environment announced that British Columbia was adopting the California Standards for automobiles.

Dioxin Emissions from Salty Wood Waste Combustion

Based on preliminary data from stack testing of a wood waste fired power boiler at a pulp mill on Vancouver Island in British Columbia, dioxin and furan emissions are higher than current guidelines for municipal solid waste combustors, published by the Canadian Council of Ministers of the Environment (CCME).

Simultaneous stack testing and process stream analysis of the power boiler covered three test conditions: (1) no sludge added to the hog fuel; (2) hog fuel burned with pulp mill
wastewater sludge added at 10% of hog fuel input; and (3) hog fuel burned with sludge at a rate of 20% of hog fuel.

Dioxin/furan emissions decreased with increasing sludge feed indicating that these compounds are formed during combustion and are not associated with the trace concentrations of dioxins/furans contained in the sludge. Similar results are anticipated at other coastal power boilers that burn salty hog fuel derived from salt water transported logs, although other boilers in B.C. have not been tested. A draft report summarizing the study was scheduled to be reviewed in January.

A health risk assessment of the dioxin/furan emissions from the plant was scheduled to be completed late January.

Environment Canada officials feel that the B.C. Ministry of the Environment, Lands and Parks, should require the B.C. pulp sector to begin testing all coastal power boilers to document dioxin/furan emissions and develop a mitigation and regulatory plan.

Current Use Pesticides

Current use pesticides continue to be a major concern. Elements of a government program to deal with this issue are emerging but issues of proprietary secrecy, registration review process and assessment of amounts released into the environment continue to limit progress towards action.

Mass Balance

Although a number of measurement programs are producing data on the levels and trends of toxic chemicals in the air, water, and ecosystem, assembling these data remains at the simplest level. Mass balance models are used to quickly assess the loadings to the lakes on an ongoing basis and the next Binational Mass Balance Workshop will be held June 3, 4 in Windsor. There are a number of more sophisticated models either developed for other applications or under development for application on the Great Lakes. It would be useful to further integrate these activities with a view to developing models that could assess ecosystem impacts. Better integration of environmental data bases is also required.
### IMPROVE SITES

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### SITE NAME KEY

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NPS AND NDDN OZONE MONITORING SITES

FIGURE 3
APPENDIX A: CLIPPING SERVICE

1. **Summary of 1992 Report to Congress of the National Acid Precipitation Assessment Program (NAPAP)**

This is the first biennial report required by the Clean Air Act Amendments of 1990, prepared by the NAPAP office, under Dr. Derek Winstanley, Director. It is an update of the twenty-seven NAPAP State of Science and Technology Reports, published in 1990 at the close of the first 10-year NAPAP program.

The report outlines progress of the Acid Deposition Control Program to achieve a 10-million-ton reduction of sulfur dioxide emissions below 1980 levels. It is noted that this control program is the "cornerstone" of the 1991 United States/Canada Air Quality Agreement and is likely to result in significant benefits to both countries in terms of control of acid deposition and its effects.

There are a number of major technical findings listed:

(1) Estimated emissions of SO$_x$ have declined about 10% between 1980 and 1990. Estimated NO$_x$ emission declined about 6% during that period. An analysis of precipitation chemistry data at National Atmospheric Deposition Program sites showed a downward trend in sulfate concentrations at 26 of 33 sites in the network. However, only 9 of 33 sites (out of a total of 200 sites nationwide) showed a significant decline in rainfall acidity over the 11 year period from 1980 to 1991.

(2) On a regional basis the rank order of significance of pollutants detrimental to forest health are: ozone, acid deposition, SO$_x$, and NO$_x$. Acidic deposition is firmly implicated in the decline at high-elevations of red spruce in the northeast. Condition of sugar maples in the northeastern U.S. and eastern Canada is improving, with little correlation between tree health and deposition chemistry. There is evidence of changes in the chemistry of forested ecosystems south of the Great Lakes as a result of acidic deposition.

(3) Monitored surface waters of the northeast and upper midwest show no change in acidity since the 1980s, with some aquatic systems showing increases in nitrate and decreases in sulfate during that period. In some regions, like the Catskills of New York, there is evidence that nitrate deposition is leading to "nitrogen saturation" of watersheds. Episodic acidification of surface waters has been documented in many different regions of the U.S. There needs to be more field monitoring to determine to what degree these changes are deposition-related.

(4) Wet and dry deposition of acidic compounds account for 31-78% of the dissolution of galvanized steel and copper when exposed outdoors.
Copies of the report are available from NAPAP, 722 Jackson Place, NW, Washington, D.C. 20503, (202) 296-1002. It should be noted that Derek Winstanley recently resigned as Director of NAPAP.

2. Status of Preparations for the State-of-the-Lakes Ecosystem Conference (SOLEC)

Preparation for SOLEC is proceeding well. The conference is scheduled for October 26-28, 1994 in Dearborn Michigan. Four hundred key decision makers from government, industry and various non-governmental interest groups will be invited. This interactive conference will focus on assessing the State-of-the-Great Lakes Ecosystem against a set of broad, and fairly simple indicators. The purpose of the conference is to let the attendees:

- consider the status of the ecosystem as presented by the Parties;
- support or refute individual conclusions about the status, present additional information pertinent to the topic, and to identify information gaps;
- identify the information decision-makers need to strengthen management and decision-making in the basin; and
- provide an action agenda for governments, leading up to the next biennial conference.

A series of "cluster papers" concerning aquatic communities; human health; contaminants; nutrients; habitat; society and economics have been prepared.

From these papers, compiled from existing information, an integrated paper will be produced, summarizing the information in all the papers, and drawing conclusions about the state of the ecosystem. A first draft is expected by the end of January. This paper along with the cluster papers will be mailed out to invitees well in advance of the conference. The conference format will consist of plenary sessions together with breakout sessions on specific topics related to the cluster papers.

The conference organizers are currently discussing with the Great Lakes Commission, the feasibility of having a signing ceremony for the Great Lakes Ecosystem Charter, on the evening preceding the conference opening.

Signateurs of the Charter would be by senior representatives of organizations subscribing to the Great Lakes Ecosystem Charter. The Charter being developed under the leadership of the Great Lakes Commission, encompasses a collective vision for the Great Lakes drawn from all the major agencies and jurisdictions in the basin.

The Charter consists of broadly worded statements that are consistent with the mission of most, if not all, agencies. The Charter is a natural complement to the SOLEC.
3. **U.S. Auto Industry Requests Alternative to California Emission Standards in the NE**

   The U.S. auto industry has approached the U.S. Environmental Protection Agency about forcing the Northeastern states to drop plans to require electric cars to be sold in this Ozone Transport Region. Industry has offered to accelerate development of alternative-fuelled vehicles (fuelled by natural gas and methanol) in return for not being subject to stringent California auto emission standards in the northeast.

4. **Regional Visibility Experimental Assessment in the Lower Fraser River Valley (REVEAL)**

   During summer 1993 a comprehensive air quality monitoring program to assess visual range was carried out in the Fraser Valley, BC, using aerosol samplers, a transmissometer, nephelometers, cameras and an array of air quality monitors. For more information contact Steve Sakiyama at 604-387-9942.

5. **NAFTA Environmental Agreement Calls for Trinational Council**

   One of the supplemental agreements to the North American Free Trade Agreement created an environmental council, comprised of cabinet-level representative from Mexico, Canada and the United States. The council would have a mandate to consider the conservation and protection of species and their habitat, as well as to protect special natural areas. The Council for Environmental Cooperation (CEC) may initially get involved in negotiations to control emissions from the Mexican power plant, known as Carbon II, located 13 miles from the border with Texas. The U.S. National Park Service and the Environmental Protection Agency have expressed concern about the impact of sulfur dioxide emissions on the visibility in Big Bend National Park.

6. **Lake Superior Binational Program (LSBP) and Parks Canada Host a Protected Areas Workshop**

   These organizations sponsored a workshop in Thunder Bay, Ontario on November 11-12, 1993 to assemble regional managers, natural resource specialists, and program managers to improve the scientific basis for ecosystem management in the Lake Superior Basin. The group recommended that the LSBP develop a basinwide data base and Geographic Information System.


   The Air Quality Division of the Minnesota Pollution Control Agency issued the "1992 Compliance Report: Minnesota Wet Sulfate Deposition Standard" reporting on monitoring of wet deposition throughout the state. The wet sulfate standard of 11 kilograms per hectare per 52 weeks was exceeded at six of the twelve monitoring sites. However, an analysis of wet sulfate concentration within the upper Great Lakes region showed that
sulfate concentration is decreasing by 2.4% - 5.6% annually, in response to decreases in sulfur dioxide emissions in the U.S. and Canada.

8. **Lake Michigan Group Recommends Control of Volatile Organic Compounds (VOC) to Reduce Ozone**

The Lake Michigan Air Directors Consortium reported on research that points to the need to control VOCs, rather than nitrogen oxides, to reduce ozone pollution in the area including Illinois, Indiana, Michigan and Wisconsin. Since 1990 the group has collected data and developed models that predict the formation of ozone in the lower atmosphere. This information is being used to develop compliance plans under the Clean Air Act.

9. **Protection of Stratospheric Ozone - Final Rule**

EPA issued a final rule regarding the phase-out of ozone-depleting chemicals. This action is in response to several petitions and comments submitted by environmental organizations and industrial groups seeking an accelerated phase-out of ozone-depleting substances. The Clean Air Act justifies such an action if EPA determines a faster schedule is environmentally desirable and technically and economically feasible. The new schedule is also in response to decisions recently adopted by the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer. (This organization is made up of over 125 member nations including the United States.) The rule accelerates the phase-out of the production and consumption of controlled ozone-depleting substances. These substances include chlorofluorocarbons (CFCs), halons, carbon tetrachloride, methyl chloroform, and hydrochlorofluorocarbons (HCFCs). EPA is also adding methyl bromide and hydrobromofluorocarbons (HBFCs) to this list. The rule requires a complete phase-out of the production and consumption of all of these materials between January 1, 1994 and January 1, 1996. The final schedule allows production and consumption of CFCs, carbon tetrachloride, and methyl chloroform in 1994 and 1995 at specified percentages based on a company's production and/or consumption in an earlier baseline year. For certain CFCs the baseline year is 1986, while for the remaining CFCs, carbon tetrachloride, and methyl chloroform the baseline is 1989. The rule places a freeze on the production and consumption of methyl bromide and HBFCs at 1991 baseline levels beginning January 1, 1994. Further, the rule requires a complete phase-out for HBFCs beginning January 1, 1996, and for methyl bromide beginning January 1, 2001. As established by the rule, the phase-out of production and consumption of Class II substances will begin in the year 2003 with an earlier phase-out schedule for those HCFCs with a higher ozone-depleting potential. The rule became effective January 1, 1994.

10. **Air Emission Standards for VOCs from Tanks and Impoundments at TSD Facilities**

EPA has proposed standards for emissions of volatile organics from tanks and impoundments at hazardous waste TSD facilities. The standards would require that organic emission controls be installed and operated on tanks, surface impoundments, containers, and
certain miscellaneous units if any hazardous waste having a volatile organic concentration equal to or greater than 500 ppm by weight is placed in the unit. The final rule is due in March 1994 and would become effective six months after promulgation.

11. **U.S. New Source Review Issues Discussed by Air Advisory Subcommittee**

The EPA National Air Advisory Committee has assembled working subcommittees of U.S. Federal Land Managers, environmentalists, state regulatory officials, and industry representatives to discuss reform of the New Source Review Process, which was required by the Clean Air Act to protect air quality related values in Class 1 ("clean air") areas in parks, wilderness, and refuges. Some of the issues being discussed include: creation of an AQRV data base for all Class 1 areas, clean up of emissions sources within the parks (especially vehicles), pre-and post-construction monitoring of new sources, and the use of offsets to allow for new stationary source construction. Subcommittee reports were due to the EPA in March.

12. **Toxicological Profiles**

The Agency for Toxic Substances and Disease Registry (ATSDR) announced the availability of 11 draft toxicological profiles of priority hazardous substances under Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Comments were due in February 1994.


The U.S. EPA proposes to designate as hazardous substances 52 air pollutants recently added to Sect. 112 of the Clean Air Act Amendments of 1990. A final rule is due in September of 1994.

14. **Addition of Air Toxics to Toxic Release Inventory**

EPA will propose to add 17 chemicals to the list of toxic chemicals subject to reporting requirements under EPCRA (Emergency Planning and Community Right to know Act). Sixteen were designated hazardous air pollutants under the CAA Amendments of 1990; the seventeenth is extremely toxic to aquatic organisms.

15. **Canadian Environmental Protection Act (CEPA).**

CEPA requires that the Ministers of the Environment and Health compile a list of those substances that need to be assessed, on a priority basis, in terms of their environmental and human effects. The assessments of the first 44 substances (commercial chemicals, industrial effluents, and emissions) on this list have been completed and the results were made public in February 1994. Twenty-five of the substances assessed were judged to be "toxic" according
to the definition of "toxic" in CEPA. CEPA considers each substance in the context of its likely use and exposure. Each assessment considered not only the ability of a substance to cause adverse effects to different organisms, but also whether it was present in the Canadian environment in high enough concentrations to cause harm.

The list of 25 "toxic" substances includes a number air pollutants: benzene, benzidine, 1,3 dichlorobenzidine, 1,2 dichloroethane, dichloromethane, hexachlorobenzene, arsenic, cadmium, chromium, fluoride, nickel, refractory ceramic fibres, PAHs, tetrachloroethylene, trichloroethylene, dioxins, and furans.

For all substances found "toxic" under CEPA, the federal government will develop action plans with options for reducing exposure. The provinces, industry, environmental groups and other affected stakeholders will be involved in developing these action plans.

16. **NAAQS - Sulfur Oxides**

EPA proposes to retain the existing National Ambient Air Quality Standard for sulfur oxides. Adding an alternative 1-hour primary standard of 0.4 ppm to replace the 3-hour standard (0.5 ppm) is also being considered. EPA also proposes to revise the significant harm levels, the Pollutant Standards Index for SO₂, and certain monitoring and reporting requirements. EPA announces its final decision not to revise the secondary standards for sulfur oxides. EPA still needs to issue a final decision regarding whether or not to revise the primary standards. The final decision on secondary standards became effective in 1993. Action on the final rule regarding primary standards is due in May 1994.

17. **Chromium Industrial Cooling Towers**

Chromium compounds are listed as hazardous air pollutants in the Clean Air Act Amendments of 1990. Industrial process cooling towers that use a chromate-based water treatment program have been identified as potentially significant sources of chromium air emissions, and EPA now proposes standards to control them. A final rule is due in July 1994.

18. **Hazardous Organics**

EPA proposes to control emissions of hazardous organic chemicals from storage tanks, process vents, equipment leaks, transfer operations, and wastewater treatment in synthetic organic chemicals manufacturing plants. A final rule is due in April of 1994.

The Canadian Council of Ministers of the Environment (CCME) published national codes of practice for control of VOC emissions from chemical plants and for control of fugitive VOC emissions from chemical plants and petroleum refineries.
19. **Organic Solvent Degreasing**

EPA proposes to regulate the emissions of certain organic hazardous air pollutants from new and existing halogenated solvent cleaning machines under Sect. 112 of the Clean Air Act. A final rule is due in November of 1994.

In Canada a CCME environmental code for commercial/industrial degreasing operations is near completion and is expected to be published in 1994.

20. **NSPS - Medical Waste Incineration**

EPA will propose new source performance standards (NSPS) and emission guidelines for existing medical waste incinerators to reflect the maximum degree of reductions in emissions that have been demonstrated for new units. A final rule is due in 1995.

21. **Medical Waste and Municipal Solid Waste Incinerators - Citizens Suit**

EPA gives notice of a proposed consent order in the following cases: National Resource Defense Council vs. EPA and Sierra Club vs. EPA. These citizen suits allege that EPA failed to meet mandatory deadlines requiring EPA to issue standards of performance for municipal solid waste and medical waste incinerators. Comments were due to EPA by the end of January 1994.

22. **General Provisions for Major and Area Sources of Air Toxics**

EPA proposes general provisions which codify procedures and criteria to implement emission standards for stationary sources that emit one or more of the 189 substances listed as Hazardous Air Pollutants in the 1990 Clean Air Amendments. The general provisions eliminate the need to repeat general information and requirements within the standards. A final rule was due in March 1994.

23. **NOx and Smoke Emissions from Non-road Compression Ignition Engines**

EPA proposes standards for nitrogen oxide (NOx) and smoke emissions from new non-road compression-ignition engines greater than or equal to 50 horsepower with exclusion for certain types of engines. A final rule is due in May of 1994.

24. **Stratospheric Ozone - Chemical Product Ban**

EPA recently banned the sale or distribution of products containing ozone-depleting chemicals that are determined to be nonessential. Specific consumer products listed in the Clean Air Act include party streamers, lens cleaners, and noise horns.
25. **Crashworthiness Protection Requirements for Tank Car Tanks**

RSPA proposes revisions to existing regulations to improve the crashworthiness of tank cars and restrict the continued use in hazardous materials service of tank cars that no longer meet current safety requirements. The revisions pertain to operational changes, design modifications, and retrofitting requirements. Comments were due to EPA in February 1994.

26. **Microbial Products (Biotechnology)**

EPA will propose a new definition of "small quantities solely for research and development" and reporting requirements for persons who are using microorganisms. The proposed rule will contain mechanisms for exemption as well as actual proposed exemptions, guidance on how the Toxic Substances Control Act Inventory will be used, and EPA's approach to R&D with biotechnology organisms. The final rule is due in 1995.