International Air Quality Advisory Board. Progress Report to the International Joint Commission. 20, October 1995

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EXECUTIVE SUMMARY

This Board report is divided into two segments: one containing issues for which the Board has developed specific recommendations and a second which provides updated information on ongoing Board activities.

As anticipated, following redesignation by the U.S.EPA of Southeast Michigan (Metro Detroit and environs) as being in attainment with the U.S. 124 ppb national ambient air standard for ozone, this standard was exceeded on several occasions during the summer of 1995. In response, limited control options are now being considered; any further excessive values in 1996 could void the redesignation and lead to more stringent controls. Given that the applicable measure in adjacent parts of Ontario is 82 ppb, the Board notes the need for a binational transboundary study by Governments to determine the transboundary implications of implementing contingency control measures in response to these elevated levels.

With regard to visibility standards, the Board reviews current developments in the Western portion of the transboundary region, some of which will be discussed further at the Board’s Pacific Transboundary Workshop. It recommends that the established British Columbia Visibility Task Force be augmented with representation from agencies in the United States.

The Board provides a brief overview of the Windsor Air Quality Study, noting its integration of indoor and outdoor exposures in its consideration of risk, and recommends that similar integrated studies be performed in other urban areas along or adjacent to the boundary.

At the Commission’s request, the Board reviewed a summation of transboundary impacts of industrial inputs in the vicinity of Trail, British Columbia. It noted that several of the issues raised were outside the Board’s expertise; however, a clear need for further investigation was evident. It recommended that the Commission form a committee with appropriate expertise, including Air Board members, to further review and advise on the nature and source of the observed impacts.

The Air Toxics in the Great Lakes Basin Workshop, hosted by the Board at the Commission Biennial Meeting in Duluth MN, is briefly summarized. The hosting of future similar events is recommended.

The Board also provides an overview of ongoing issues and activities including its first successful public meeting, recent developments in the consideration of nitrogen deposition and related effects, and international activities to address persistent organic pollutants and heavy metals. Further tracking and interaction with this latter activity may form part of the Board’s efforts under the Commission 1995/97 Priorities.

The final report on the Board’s Gulf of Maine Mass Balance activity is also briefly reviewed. The report concludes with an overview of salient developments in both countries.
1.0 DEVELOPMENTS ON THE OZONE ISSUE

Update on Southeast Michigan Ozone Levels

Background

In the summer of 1994, the Board advised the Commission of its concerns with the proposal by the State of Michigan to have the U. S. Environmental Protection Agency redesignate the Southeast Michigan region from 'nonattainment' of the national ambient air quality standard for ozone, to the status of 'attainment'. Under the U.S. Clean Air Act, an area can be designated 'attainment' if the applicable standard is not expected to be exceeded more than once per year.

The Board's assessment of historical data concluded that there was a high likelihood that compliance with the U.S. standard would not be maintained in the region, and also that the request to redesignate the area was being considered without specific regard to the international impact of the proposed action. Further the Board reported that the Canadian Federal objective for ozone, which is also the standard in the Province of Ontario, would continue to be exceeded in the adjacent transboundary area.

The human health protection standard for ozone differs in the two countries. In the United States the national and the State of Michigan standard is 0.12 parts per million. This standard is 'attained' when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 parts per million is 1 or less. The Canadian Federal objective, and the standard adopted by the Province of Ontario, is 82 parts per billion (.082 parts per million). This standard is stated as 'not to be exceeded'.

Notwithstanding the Commission's letter expressing these concerns, the U. S. Environmental Protection Agency granted the State of Michigan's request, and redesignated the area to 'attainment' for ozone.

Summer 1995 Data

During this past summer, elevated levels of ozone were measured in Southeast Michigan above the 0.12 standard. On July 31, 1995, monitors in Detroit exceeded the standard and monitors in Algonac and New Haven recorded levels of 0.157 ppm and 0.140 ppm respectively. The location of the Algonac monitor is adjacent to the international boundary. Readings from this monitor exceed the U.S./Michigan standard by 30% and the Canadian objective/Ontario standard by nearly 100%.

In the redesignation of the area to 'attainment', the State of Michigan was required to have a set of 'contingency measures' already adopted in their State Implementation Plan (SIP) should a violation of the standard occur in the future. While quality assurance to validate the summer 1995 data is ongoing, if confirmed, the data would demonstrate that a violation of standard did occur and would trigger the implementation of one of the contingency control measures contained in the SIP.
The contingency measures identified in the Michigan State Implementation Plan are:

- expanding the current auto emission testing and repair program to other parts of the state
- increasing the stringency of the existing auto emission testing and repair program
- enhancement of most of the requirements to control gasoline fumes at service stations
- requiring the use of less volatile, low vapour pressure, gasoline
- requiring the use of a less polluting gasoline
- applying other non-automotive control options which include improved vapour capture at commercial and industrial sites, solvent substitution at these sites, and reduction in nitrogen oxide emissions from coal fired power plants.

The control measure which appears to be favored by the State of Michigan is the reduction of hydrocarbon emissions through further limitations on the volatility of gasoline (i.e., setting a limit on a property of gasoline known as Reid Vapor Pressure (RVP) at 54 kiloPascals (kPa), or 7.8 pounds per square inch).

Adequacy of the United States Ozone Standard

In the matter of whether additional air pollution control requirements are needed in Southeast Michigan to attain and maintain levels at or below the current U.S./Michigan ozone health standard, the U. S. Environmental Protection Agency (EPA) is currently conducting a formal review of the adequacy of the prevailing standard in protecting public health.

A technical review of the standard is approaching completion and an EPA staff paper has been prepared for the Administrator outlining a number of options. Among the options is the replacement of the current standard with an eight hour average standard with a concentration limit of between 70 and 90 parts per billion. Changes to the number of allowable exceedances to between one and five times per year over a three year period are also under consideration. An alternate option would be one based on the second highest daily ozone concentration experienced on an annual basis, averaged over three years.

A new secondary standard for ozone for the protection of commercial crops and other vegetation, which could be more stringent than the above options, is also described in the staff paper. The belief is that a large part of the country may not meet such a standard.

The EPA's Clean Air Act Science Advisory Committee is scheduled to consider these options this fall, with the Administrator committed to a decision on a standard by the Spring of 1996.
Board Comment

Any decision to reduce hydrocarbons as a result of a violation of the ozone standard has transboundary implications. Environmental levels of ozone result from a chemical reaction in the atmosphere between emissions of hydrocarbons and emissions of nitrogen oxide in the presence of sunlight. Because of the time for this reaction to take place and the proximity of the sources of the emissions to the border, any control decision has transboundary implication.

The reduction of hydrocarbon emissions would be beneficial toward reductions of concentrations of hydrocarbons in the environment, and certain toxic air pollutants. However, because of the chemistry of ozone formation, the reduction of hydrocarbon, without reduction of nitrogen oxides, would have the 'urban plume' arriving at the border with an increased ratio of hydrocarbons to nitrogen oxides (an important factor in ozone formation). This has the potential to increasing ozone in downwind areas as it would react with downwind emissions, under certain meteorological conditions, possibly frustrating air pollution control strategies in Ontario.

The Board will continue to track this issue and anticipates an opportunity to review ozone data from Ontario monitoring stations for the same time period to further determine the extent of the transboundary impact.

Recommendation: The International Air Quality Advisory Board recommends that the International Joint Commission request from Governments an air quality analysis of the transboundary implications of implementing contingency control measures in response to elevated ozone levels in Southeast Michigan, the results of such analysis to be reported to the Commission prior to the implementation of any such control measure.
2.0 INTEGRATED URBAN AIR QUALITY RESEARCH: WINDSOR AIR QUALITY STUDY

Concept

The concept of investigative urban airshed studies to characterize chronic toxic pollutants in Ontario emerged in the late 1980s. There was a growing concern in the province over the health impacts of airborne toxics, particularly those persistent, hazardous substances which potentially produce a broad spectrum of undesirable health effects during prolonged exposure. Information from toxics assessment programs such as the U.S. National Toxic Release Inventory indicated that more than a million tons of toxic substances were escaping to the atmosphere in the U.S. every year. Risk assessment analyses for airborne toxics had been carried out in many American cities similar in size and industrial nature to Ontario urban communities.

To address these concerns, the Ontario Ministry of Environment and Energy (OMEE) decided to embark on an intensive airborne toxics study in a specific Ontario city. The "cities study" concept is intended to assess the health implications of airborne toxic chemicals and, in a public consultation process, provide input for abatement strategy development. The ultimate aim of the study is to decrease the exposure of residents to airborne toxic chemicals.

Windsor was chosen as the site for the study for a number of reasons. The city's air quality had been documented as far back as the 1940s, and routine monitoring for various air pollutants in the Windsor airshed had been ongoing for more than two decades when the study began. Apprehension over airborne toxics in Windsor had intensified in late 1986 with the construction of the Greater Detroit Resource Recovery Authority (GDRRA) municipal waste incinerator in Detroit, which was expected to be a significant source of mercury and other emissions. The cause for concern was magnified since the city is located in the prevailing downwind direction of not only the GDRRA incinerator, but also the Detroit-based integrated steel mills.

In addition, the 1990 report of the International Joint Commission's Air Quality Advisory Board on the Detroit/Windsor - Port Huron/Sarnia Corridor concluded that there was sufficient information to indicate a significant public health issue in the targeted airshed, requiring additional abatement and remedial measures. The Report also recommended that a comprehensive air toxics monitoring program be developed and implemented in the region.

Execution

Ten substances were targeted for in-depth modelling and health effects investigation because of their potential for health risk, bioaccumulation, persistence, and toxicity. They included cadmium, chromium(VI), mercury, benzene, 1,3-butadiene, carbon tetrachloride, 1,4-dichlorobenzene, formaldehyde, benzo(a)pyrene, dioxins and furans.

The OMEE scientific effort comprised data collection (emissions, ambient air monitoring, personal exposure, soil and agricultural crop) and the use of certain scientific tools (mathematical modelling and risk analysis) to characterize the airborne toxics situation.
in Windsor. Mathematical model-based source apportionments and health effects assessments were carried out utilizing the emissions and monitoring data collected along with health risk information. Field investigations were carried out during the period June 1991 through March 1993.

The second part of the study is the development of recommended remedial measures by the Windsor Air Quality Committee. The Committee is a multi-stakeholder forum with representation from governments (MOEE, Environment Canada and the City of Windsor), the Windsor-Essex Health Unit, local environmental interest groups and industry, academia and the Southeast Michigan Council of Governments.

Findings

The six pollutants of higher cancer and non-cancer health risks in Windsor were determined to be cadmium, chromium, benzo(a)pyrene, benzene, 1,3-butadiene, and formaldehyde. Major sources of these pollutants were determined to be motor vehicle manufacturing, steel mills and coke ovens, mobile sources (largely automobiles), utilities and other fuel combustion, and other point and area sources.

In general, inhalation was determined to be a more significant pathway than the ingestion and dermal pathways in terms of contributing to health risks for the target compounds investigated.

Risks from direct outdoor air exposure, given in Figure 1, were ascertained to be appreciably less than those from indoor air exposure. Smoking (including secondhand smoke) and emissions from household/office materials contribute significantly to the risk in indoor environments.

Next Steps

The original concept allowed for the establishment of a multi-stakeholder committee with representation from the local community. This approach was designed to sensitize both the local community and the relevant industry as to what was necessary and possible. The committee is currently working towards implementing the recommendations.

On a longer term basis the applicability of the lessons of the study are being considered for other communities and the scope is being broadened to include all pathways.

Recommendation: the approach of the Windsor Air Quality Study, integrating both indoor and outdoor air quality measurements and consideration of related effects of both, should be undertaken in other urban centres within the transboundary region.
FIGURE 1: TOTAL RISK ASSOCIATED WITH OUTDOOR AIR QUALITY IN WINDSOR
A Comparison with Other Urban Areas

- U.S. Urban Air Toxics Study (Several Cities)
- Transboundary Study Detroit/Windsor Area (U.S. EPA)
- South-East Chicago Study
- Windsor Typical Personal Exposure
- Windsor Outdoor Air Quality

Risk

$1 \times 10^{-5}$

$1 \times 10^{-4}$

$1 \times 10^{-3}$

$1 \times 10^{-2}$
3.0 PRELIMINARY OVERVIEW OF IMPAIRMENTS AND IMPACTS IN THE VICINITY OF THE TRAIL SMELTER

In the Spring of 1995, the Chairs of the Board received correspondence and a package of materials from two concerned U.S. citizens, Mr. R. Jackson and Mr. F. Ossiander outlining and elaborating their concerns regarding the deleterious transboundary impact of operations in the vicinity of Trail, British Columbia (principally the Trail Smelter). At the request of the Commission, the Board requested a preliminary review of these and other relevant materials by support staff; the output of this review is summarized below.

Background

In 1896, the Consolidated Mining and Smelting Company Ltd. (Cominco) commenced operations in Trail, British Columbia. This lead-zinc smelter, which remains the largest of its type in the world, is located approximately 17.5 kilometers (eleven miles) from the Washington/British Columbia border on the Columbia River. A map of the area is attached (Figure 2).

Historical records document significant damage, beginning in 1925, to Washington state forests and agricultural lands due to sulphur dioxide ($SO_2$) emissions from the Trail facility. This long range transport was a result of the installation of 125 m (409 ft) emission stacks intended to alleviate the impact on nearby regions of the province. During 1930, prevailing winds transported approximately 10 000 tons of sulphur into Washington per month.

The first formal complaint of property damage by a Washington farmer was lodged in 1926, and was soon followed by an onslaught of similar allegations. Cominco officials, after investigating and validating the claims, negotiated monetary settlements with the complainants. Recognizing that continued damage was likely and must be addressed, U.S. officials suggested to Canadian representatives that the matter be referred to International Joint Commission pursuant to Article IX of the Boundary Waters Treaty of 1909. This recommendation was agreed upon by the governments on August 7, 1928.

In its review under this reference, the IJC focussed its attention on two issues: i) a determination of the extent to which property in Washington had been damaged by fumes from the Trail operation and ii) the amount of indemnity appropriate to compensate U.S. interests in Washington state. Hearings were held in Northport, WA, Washington, D.C., and Nelson, B.C. between October 1928 and February 1930. On February 28, 1931, a unanimous report was rendered by the IJC which awarded total compensation of $350 000 for injury up to January 1, 1932. After that time, alterations in processes at Cominco were to lead to the reduction, if not cessation, in injury from fumes.

The anticipated process changes were made at the Trail plant; however in February 1933, the U.S. government reported that damage was still occurring and conditions remained unsatisfactory. Subsequently, the United States formally rejected the IJC conclusion and expressed an interest in adopting a treaty to modify the IJC's recommendations to include the
FIGURE 2: MAP OF TRAIL VICINITY, BRITISH COLUMBIA
establishment of special agencies to assess accruing damage payments and to ensure the progressive reduction of the smelter's sulphur dioxide emissions until injury in Washington counties was completely eliminated. Although Canadian officials cautioned against the rejection of the recommendations made by the IJC, which had been the result of a process requested by the U.S. government, both governments ultimately endorsed an agreement which conferred extensive powers on an arbitral tribunal. This tribunal was charged with determining the necessity and type of fume controls and setting an appropriate indemnity for damage occurring since January 1, 1932.

Following hearings throughout 1937, the tribunal issued a preliminary recommendation on the question of whether damage had occurred in the state of Washington since January 1932 and what compensation was appropriate. It was not until March 11, 1941 that a final report concluded that Canada was "responsible in international law for the conduct of the Trail smelter" and subsequently awarded the claimants an additional $78,000 in compensationary fees. The tribunal allowed claims of injury done to both cleared and uncleared lands; however it disallowed claims of injury to livestock, property, business enterprises, wrongdone measured by cost of investigation, and interest on the previous award of $350,000. Further, the tribunal established a regime which restricted emissions from the smelter whenever adverse atmospheric conditions prevailed or sulphur dioxide concentrations in Washington state reached excessive levels. It was felt by the tribunal that this would remove the possibility of future damage; however they ruled that "an indemnity shall be paid in the event of future damage".

Current Circumstances

In assembling a preliminary assessment of the current circumstances in the Columbia River valley transboundary area, a review of material forwarded to the International Air Quality Advisory Board by Messrs. Bob Jackman and Frank Ossiander of Washington State was supplemented by conversations with state, provincial and federal authorities. Scrutiny of the assembled information suggests that the impact of Cominco's Trail Smelter was not entirely addressed in the 1941 tribunal decision. Limited in part by available technology, both the IJC and arbitral tribunal ruled only on the incidence of injury due to sulphur dioxide atmospheric emissions. Modern analytical techniques, however, have allowed the detection of metals, particularly lead, cadmium, chromium, zinc, copper, manganese, mercury and phosphorus, antimony, strontium, and organic contaminants such as dioxins and furans (these latter are most likely from the Celgar Pulp Company located upstream from Cominco in B.C.) in the Trail/Roosevelt corridor. Although modernizations at both the Cominco and Celgar facilities have reduced some contaminants to below-detection limits, continued releases and historical sinks remain an ongoing source of concern according to reviewed agency documents.

Uncertainty regarding the extent of contamination and the ultimate impact on the health of biota, including humans, prompted Mr. Jackman and Ossiander to call for the IJC to intervene, and oversee a comprehensive study of the Trail/Roosevelt corridor.

In order to place the most recent information on the impacts occurring in the Trail/Roosevelt corridor in a context the Commission is familiar with, available data were
screened using guidelines developed for designation of an "Area of Concern" in the Great Lakes Basin. Salient criteria, based on the attached list of use impairments, are reviewed below.

**Restrictions on Fish and Wildlife Consumption**

Dioxin, furan and mercury contamination in native fish populations remains of concern in the Trail-Roosevelt corridor. A consumption advisory due to dioxin contamination of whitefish (both mountain and lake) in British Columbia was lifted only in February of this year. Although reviewed earlier this year, the mercury advisory for walleye in the B.C. portion of the Columbia River was not lifted. No fish consumption advisory is presently in effect in Washington, although a guideline for consumption due to dioxins has been issued and residents are encouraged to limit their consumption of local fish. It is the opinion of Washington State Department of Health that the origin of the dioxins found in Lake Roosevelt is the Celgar Pulp Mill in B.C. Historical evidence, particularly in Lake Roosevelt, which is considered to be the ultimate sink for Trail metal emissions, indicates the presence of elevated levels of zinc, copper, lead and cadmium in whole fish, although none exceeded U.S. Fish and Wildlife Service guidelines.

**Degraded Fish and Wildlife Populations**

No monitoring information for fish populations within the Trail-Roosevelt corridor has been received. Sediment toxicity analyses conducted by Fisheries and Oceans Canada indicate that Cominco slag was deleterious to rainbow trout test specimens. Mortality, due both to direct toxicity and physical damage to soft tissues, was detected, particularly when sufficient time elapsed to allow the leaching of copper and zinc from the slag. Due to unique lifestyles, specifically between benthic versus pelagic or piscivorous feeders, and species with well-defined home ranges versus nomadic populations, exposure dynamics can have a significant impact on the resultant toxicity in the natural setting.

**Fish Tumors or Other Deformities**

A study conducted under the Columbia River Integrated Environmental Monitoring Program (CRIEMP, a Canadian study group including staff from Celgar Pulp Company, Cominco Ltd, B.C. Hydro, B.C. Environment - Lands and Parks, Environment Canada, Fisheries and Oceans Canada, the City of Trail, the City of Castlegar and R.L. & L. Environmental Services Ltd.) stated that, for the 1991-1993 period, 50% of surveyed mountain whitefish showed the presence of abnormalities such as lesions, tumours, fin damage, fungal infections, parasites and abnormal bacteria. These effects were not ascribed to any particular stressing agent.

**Degradation of Benthos**

Fisheries and Oceans Canada bioassays found slag from Trail to be acutely toxic to both an epibenthic and benthic invertebrate species. Similarly, the CRIEMP study indicated that laboratory tests found slag to have a toxic effect on invertebrates, although the same species were found in the Columbia River in regions with a similar composition to the
simulated laboratory tests. Caddisflies were found to accumulate dioxins, lead and antimony, while freshwater mussel species accumulated lead and copper. The incidence of deformities or physiological signs of stress was not investigated.

_Eutrophication or Undesirable Algae_

A species of blanketing moss was detected "extensively and almost exclusively downstream of Cominco". It is anticipated that the full CRIEMP technical report will clarify the nature and identity of this "moss".

_Degradation of Phytoplankton and Zooplankton Populations_

Bioassays conducted by the Fisheries and Oceans Canada involving a prominent phytoplankton and zooplankton species found that slag downstream from Cominco was acutely toxic. Population surveys conducted during the CRIEMP study found that the invertebrate population downstream from Cominco appeared to be different from similar upstream areas. The stresses placed on the invertebrate community may also be related to the changes in the fish populations which have occurred in recent years.

_Loss of Fish and Wildlife Habitat_

The physical characteristics of the Cominco slag, particularly its small size and sharpness, may yield benthic habitats inhospitable to many fish species. Fisheries and Oceans Canada bioassays found significant physical damage to fish soft tissues upon contact with slag. Effective July 1, 1995, over 99% of Cominco's effluent slag content, which would normally have been discharged into the river, has been diverted to other areas of the waste stream. Although awaiting documented confirmation of the slag dispersal in the Columbia River, contact with Washington State Department of Ecology indicates that slag may completely cover the river bottom in areas miles below the B.C./Washington border, and may also have collected in significant quantities on shorelines. Due to the toxic nature of the slag, these residual deposits have been identified as a concern by the agencies.

"Use Impairments" which have not been conclusively eliminated from consideration in the available literature include _Tainting of Fish and Wildlife Flavor, Bird or Animal Deformities or Reproductive Problems, Restrictions on Dredging Activities, Beach Closings, Degradation of Aesthetics, and Added Costs to Agriculture or Industry_. The only impairment which has been conclusively rejected is _Restrictions on Drinking Water Consumption or Taste and Odor Problems_.

In addition to the Area of Concern listing criteria, the evidence reviewed shows that air quality and human health concerns have been associated with emissions from the Cominco facility.

A 1994 particulate air study conducted by the Washington State Department of Health (DOH) found ambient concentrations of arsenic and cadmium to be at levels which exceeded air quality guidelines, and therefore were considered to be health risks. Lead concentrations, although below the national atmospheric air quality standard, continue to be of concern.
Given that studies have linked cadmium to renal toxicity and arsenic to increased lung cancer rates, as a precautionary measure, the DOH advised scrubbing all homegrown fruits and vegetables, washing hands prior to eating, and restricting toddler access to bare soil. The technical results from the DOH study, as well as one conducted by the Washington State Department of Ecology, are forthcoming. As well, atmospheric metals data are en route from the B.C. Ministry of Environment. It appears that SO₂ emissions continue to be a concern, particularly in Washington, and further data from B.C. Environment monitoring studies have been requested.

Washington State counties directly adjacent to the Columbia River currently exhibit significantly higher rates of ulcerative colitis and Crohn's disease than do other counties within the state. The Washington State Department of Health has indicated that it believes environmental contamination may contribute to the increased incidence, and that this phenomenon warrants further investigation; however, they do not have the required funding to pursue the investigation. Although currently incomplete, public interest has also driven Washington DOH research in the areas of cancer mortality in the Columbia River corridor and the possible link between hypo/hyperthyroidism and goiter and the presence of cobalt in food and water.

Studies are also being conducted to monitor manganese levels in blood and urine samples as well as blood lead levels in local children. A 1989 study of blood levels in Trail children found, that although levels had dropped from 22.4 micrograms per deciliter (µg/dl) in 1975 to 13.8 µg/dl, 39.4% of children aged 2-5 yrs had blood lead levels which exceeded the U.S. EPA's "level of no concern" (15 µg/dl). The Trail Community Lead Task Force, which includes members from B.C. Environment, B.C. Ministry of Health, Cominco Ltd, the City of Trail, the United Steelworkers of America, the Village of Warfield, regional government, environmental groups, and citizens, was struck in June 1990 to continue monitoring efforts and propose a remedial plan of action. Similar work is ongoing in Washington State and results from their blood lead investigations are forthcoming. Unsubstantiated claims made by local Washington residents also suggest a link between contaminants and increased rates of emphysema (particularly in non-smoking individuals) as well as various neuropathological conditions.

Correspondence

Information has been received from B.C. Environment, Washington State Department of Health, the Trail Community Lead Task Force, and the Washington State Department of Ecology and will subsequently be reviewed. In addition, information is forthcoming from the Water Research Center (Washington), and the U.S. EPA Region 10.

Staff Findings Reported to the Air Board

1. Since the Commission's involvement under a Reference from the Governments in investigating the transboundary impact of the Trail Smelter concluded in 1931, probes of the impact of this facility have continued to this day.
2. These examinations have determined significant deleterious transboundary impacts of air and waterborne contaminants from the Cominco Smelter and the Celgar pulp and paper mill in the vicinity of the Columbia River valley.

3. A preliminary and partial review of available literature suggests that current impacts include, but may not be limited to, elevated concentrations of lead, cadmium and arsenic in ambient air, requiring further investigation of possible human health impacts. In the watershed, dioxin concentrations in fish have resulted in a consumption advisory that has been lifted only recently; toxicity to fish and damage to the food chain has also occurred.

4. Using the list of Use Impairments developed by the Commission for use in the Great Lakes basin as a screening device, there is a basis for further consideration of the extent and nature of the transboundary impacts evident in the area.

5. Several multiagency studies are underway at the moment, although formal and robust transboundary linkages within and among these studies were not apparent.

6. In order to make a comprehensive assessment of the environmental impacts in this region, factors in addition to air quality measurements and effects must be addressed.

Recommendation: Based on its review of this preliminary assessment, the Board recommends that the Commission appoint a small ad hoc group, including Board members and additional water quality expertise, to further appraise the available literature and to develop recommendations for action by the Commission.
FIGURE 3: IADN MONITORING SITES

TABLE 1: GLQWQA CRITICAL POLLUTANTS AND THOSE MONITORED BY IADN

| Mercury (vapor and solid) |
| 2,3,7,8 TCDD* |
| 2,3,7,8 TCDF* |
| B(a)P (and other PAHs) |
| DDT (includes DDE) |
| Dieldrin |
| HCB |
| Alkalated lead |
| mirex* |
| PCBs |
| Toxaphene |

*needs development work
the deposition of materials through wet (e.g., rain, snow) and dry pathways appears to be nearly equivalent, although uncertainties are larger for dry deposition estimates.

No mercury deposition data from the IADN network was presented. IADN was established prior to the advent of reliable, routine mercury analytical measurements; thus mercury is not included in the IADN measurement suite. However, preliminary data show average mercury vapour concentrations around 2.0 nanograms per cubic meter (ng/m3). Particulate mercury data are higher and more variable.

Drs. Joel Baker and Terry Bidleman continued the discussion of chemical measurements in the Great Lakes Basin and surrounding regions. While there was some additional discussion of the IADN results, much of the information concerned measurements near urban centres and measurements for other areas of North America.

Dr. Baker indicated that PCBs had been studied in southern Lake Michigan through a number of research cruises on the lake. Lake Michigan was determined to be typically a source of PCBs to the atmosphere in summer months, where revolatilization of previously deposited materials becomes important. The lake is frequently a sink for PCBs in the winter. Measurements indicated that the Chicago metropolitan area is a strong source of PAHs during summer months (frequent south winds) but that PAH levels during colder months (frequent north winds) are near background levels even over the southern end of the lake. Dr. Baker concluded that urban areas have a strong influence on regional deposition.

Dr. Bidleman implicated other countries and distant areas of the United States as sources of Great Lakes toxics, primarily through a process referred to as "grasshoppering". During this process, materials may move through the atmosphere from contaminated soils, be deposited, revolatilize, and move on to another location. Because many of the air toxics are quite stable over long periods of times (or in cases such as DDT where the daughter products are also very stable) large areas of the continent may become contaminated over extended periods of time. The magnitude of the grasshoppering effect was explained in terms of gas exchange between air and water bodies, a process that is highly dependent on the relative solubility of toxic material in air and water.

Dr. Bidleman has specialized in toxaphene research. It is a pesticide formerly used in large quantities in the cotton belt of the United States, which was banned in North America in the mid-1980s but is still in use in other parts of the globe, including Mexico. Toxaphene is the most abundant pesticide found in Arctic biota and is also found in Lake Superior fish. During the summer of 1993 the Arctic exhibited concentrations in the 4-7 pg/m³ range, the Great Lakes showed concentrations approximately an order of magnitude higher, and the cotton belt was still showing concentrations in excess of 200 pg/m³.

Modelling

Dr. Ann McMillan continued the session with the first modelling discussion. She opened the talk with a graphic simulation of atmospheric transport of sulfate from Mt.
Pinatubo for the two week period after the eruption. The graphic made it clear that the atmosphere knows no boundaries.

Dr. McMillan presented evidence of a pesticide emission model developed by Batelle Laboratories and the United Nations. The model has been validated and the gross diurnal variation of pesticides is being captured. Evidence of daily Lindane fluxes from a field was noted, and modelled estimates of various current use pesticides emitted into the atmosphere (including atrazine) were shown.

Dr. McMillan concluded with the statement that the atmosphere is a major pathway and that control actions may require years to become effective. Sources affecting the Great Lakes Basin range in scale from local to global, making it necessary to carefully define modelling requirements and to incorporate them within existing programs. Ecosystem modelling could provide integration of information across disciplines.

Dr. Robin Dennis continued the modelling discussion with a review of the Regional Acid Deposition Model and the methodology used to determine the atmospheric region of influence for a particular waterbody. Much of the discussion was put into the context of an earlier study for the Chesapeake Bay, where it was clearly shown that source regions of sulfur and nitrogen compounds from such distant areas as the Ohio Valley and the Carolinas contribute significant quantities of anthropogenically emitted materials to the waters of the Bay. Dr. Dennis also showed that some nearby source regions (e.g., the New York metropolitan area for Chesapeake Bay) may have little influence on a given receptor area. It is crucial to incorporate the meteorological influences when trying to understand deposition to a region.

Dr. Dennis noted that the RADM lifetime estimate for SO\textsubscript{2} in the atmosphere was once estimated as 4 days; more recent values, accounting for cloud influences, are 1.2 to 1.8 days. The RADM nitrate range may be too short; the model transformations may be too rapid. According to the model, much of Canada is dominated by physical deposition processes rather than atmospheric chemistry.

Dr. Dennis showed model evidence that the region of influence for sulfur and nitrogen emissions is approximately 5 times larger than the Chesapeake Bay watershed. Particles have a range of 1,000 to 2,000 kms and a residence time in the atmosphere that is two to four times longer than anthropogenic gases. Model output suggests that the 2 day region of influence for particulate transport to the Great Lakes region should be skewed to the south, as far away as Texas. Dr. Dennis indicated that he is working on a particle model and that in the future he may be able to define a particle influenced airshed.

Emissions Estimates

Dr. James Sutherland ended the formal part of the session with a discussion of emission trends in the United States. He defined common source categories such as area sources (residential wood heaters, dry cleaners), mobile sources (on and off road) and point sources (power plants, smelters). He reviewed the "criteria pollutants" such as ozone (O\textsubscript{3}), oxide of nitrogen (NO\textsubscript{x}), sulfur dioxide (SO\textsubscript{2}), fine particulate matter (PM\textsubscript{10}). Lead, Volatile
Organic Compounds (VOCs) and Hazardous Atmospheric Pollutants (the list of 189 chemicals listed in the SARA Toxics Resource Inventory list). The EPA is developing a National Toxics Database which will include work from the Great Waters Program of which the Great Lakes is part. Dr. Sutherland gave numerous trend illustrations from the existing databases; of special note were the steep declines of carbon monoxide and lead emissions, and for the total of the top ten most important Hazardous Air Pollutants (HAPs).

Dr. Sutherland closed his presentation with a note that he is working with the Great Lakes Regional Air Pollutant Inventory Development System (RAPIDS) in attempting to coordinate a national effort based on this work. The Regional Air Pollutant Inventory Development System is seen as a possible model for the whole country.

Workshop Summary and Conclusion

Dr. Keith Puckett provided a brief conclusion to the session and opened the floor to questions. The material below is a summary of the questions and statements made both during and following the formal presentation.

A question was raised regarding the use of used motor oil as a heating fuel in upper Michigan. It was noted that used motor oil is a source of lead and other hazardous materials to the atmosphere. The person was referred to the Michigan Department of Natural Resources to learn more about the permit status of this practice.

Another individual asked about the observation of elevated levels of arsenic during certain meteorological conditions at the IADN stations. Dr. Hoff replied that receptor modelling was used to identify a number of large sources some distance from the Great Lakes Basin.

A comment was made about the lack of information on mercury modelling and sources. Disappointment was expressed that more information was not presented. Information from a number of mercury studies is just beginning to emerge. Dr. Eric Ginsburg of the EPA Great Waters Program indicated that he would provide mercury information in the near future. Dr. Hoff also agreed to provide mercury data.

The use of back trajectories to track storm events was queried. As with receptor modelling, it was suggested that additional information should be provided to the public by the Air Board at any similar future events.

Another individual asked if 90% of the loadings to the Great Lakes come via the air pathways why do we tend to focus so much on the other 10%? Dr. Hoff noted that this is somewhat true only for Lake Superior, and is frequently due to volatilization, not to deposition of new materials.

Information was requested regarding the loadings to the Great Lakes from the specific sources (e.g., incinerators). Dr. McMillan replied that additional speciation is not possible without a more comprehensive emission inventory.
The ability to determine transport to the waters of the Great Lakes via runoff or other mechanisms following initial deposition to land surfaces was queried. The "retention" issue is under study by a number of research groups, but reports to date are limited.

Dr. Mark Cohen asked about the importance of adsorption of toxic gases to particles. Panel members answered that this mechanism is crucial in understanding PCBs, but not so important in understanding some other organic compounds. Speciation between dissolved, colloidal and solid particles is an ongoing study.

Dr. Cohen also indicated the need for dioxin measurements in the IADN network. A Greenpeace representative raised the question of the finding of toxaphene-like substances being generated from pulp mills. Dr. Terry Bidleman agreed to investigate this question further.

The session provided those in attendance a better understanding of current efforts to determine deposition to the Great Lakes and gave guidance to available experts as to other areas of interest to the public, regulating and regulated community.

Recommendation: In view of the high level of interest by participants and the opportunity to attract acknowledged continental experts in the air quality field, such events should be supported and enhanced in future Commission functions.
5.0 DEVELOPMENTS IN VISIBILITY PROTECTION PROGRAMS
IN THE TRANSBOUNDARY REGION

Previous articles in the International Air Quality Advisory Board’s (IAQAB) semi-annual reports have dealt with the issue of protection of visual air quality or visibility, particularly in parks, wilderness areas, and protected areas in Canada and the United States. The 1991 United States-Canada Air Quality Agreement specifically addresses this issue in Annex 1, part 4 on "prevention of air quality deterioration, and visibility protection". A visibility protection policy is important for natural aesthetics and for the protection of human and ecosystem health since particles that affect visual air quality contribute to dry deposition of deleterious compounds to lakes, forests, and soils, and can also negatively affect human lung function.

Regarding further progress in protection of this air quality resource, the Board noted the issuance of a "Final Report of the British Columbia Visibility Task Force" in November 1994, authored by Peter Reid of B.C. Ministry of Environment, Lands and Parks, Coordinator of the Task Force. This group was formed in 1993 to develop a strategy for protecting visual air quality in the province. Members included representatives of B.C. Environment and Parks, Parks Canada, B.C. Ministry of Forests, Ministry of Tourism, Environment Canada, and the Greater Vancouver Regional District.

As part of their activities the Task Force members prepared an issue paper, held an international workshop, achieved representation on the Interagency Monitoring of Protected Visual Environments (IMPROVE) committee (involved in safeguarding protected area visibility in the U.S. and Canada); and helped plan for the B.C. Environment’s addition of the 1993 REVEAL study (Regional Visibility Experimental Assessment in the Lower Fraser Valley) to the Lower Fraser Valley Study.

In their report the Task Force recommends that visibility protection be declared a goal of the provincial government. Action items recommended in the Task Force Report include:

- establish a Visibility Management Steering Group,
- promulgate the B.C. Visual Air Quality Goal,
- form a workshop on managing related natural and anthropogenic emissions,
- adopt the IMPROVE protocol for all visibility monitoring in British Columbia.

1 The IMPROVE protocol includes three types of visibility monitoring at a single site: 1) scene monitoring using still photographs to determine loss of visual range; 2) optical monitoring to determine light extinction and scattering; and 3) particle monitoring using filter packs to identify the size, range and chemical composition of the particle responsible for visibility degradation.
- adopt the deciview\(^2\) as the standard visual index for the province, and
- develop a ministerial public information plan.

Further progress in the province toward visibility protection will be a part of the "Workshop on Air Quality Issues in the Pacific Transboundary Region", to be convened by the International Joint Commission and the IAQAB in November 1995 in Vancouver, British Columbia.

Mr. Peter Reid, author of the B.C. Visibility Report, will present an update of this information, along with a discussion of the impacts of prescribed fire on visibility in the transboundary region. Ms. Kristi Gebhart, U.S. National Park Service, is to present additional information on the status of visibility in the British Columbia-State of Washington border region at this workshop.

\(^2\) Deciview is a visibility index developed by the U.S. Environmental Protection Agency which reflects perceived visual changes. For example, a one deciview change represents a change in scenic quality that would be noticed by most people. A deciview of zero equals clear air, while deciviews greater than zero depict proportionally increased visibility impairment.
6.0 IAQAB PUBLIC MEETING

A first public meeting was convened by the IAQAB with the assistance of the Ontario Ministry of the Environment in Toronto on July 25, 1995. Approximately 55 persons attended, exclusive of the members of the Board and Commission. Attendees included federal and provincial government officials, city officials, members of the Remedial Action Plan (RAP) and Public Advisory Committee teams, as well as the general public and environmental activists.

A 15 minute overview of the Board’s role as well as some of its past and current activities was presented prior to opening the meeting to questions and comments. Approximately 18 individuals addressed the Board, some with one question or concern, others raising a number of issues.

Although many of the issues raised were not within the scope of the Board’s mandate, several were and a number are already on the Board’s agenda.

Several of the questions dealt with the operations of the Board, including one regarding the Board mandate and its influence on regulations/policies of governments and on the reduction of pollution. The Board budget and limitations associated with it, particularly its ability to fund independent studies, was queried and the Board and Commission were encouraged to broaden participation by gender and ethnicity.

The Board was asked about its priorities, its assessment of the greatest risks to the public, its involvement in any aspects of the North American Free Trade Agreement, and any role it might have in the development of emission permits and allowances trading.

The Board was encouraged to advise governments of the need for attendance of individuals and NGOs at workshops and meetings and the need for funds to support such attendance. The Board was also asked about how jurisdictions intended to honour the Boundary Waters Treaty in the St. Clair River RAP.

Several questions dealt with sources of air pollution, including one on the influence of the air pathway on the pollution of water bodies. The Board’s effort on fine particulate was reviewed and the significance of auto emissions and associated octane additive usage, and justifications for auto inspection and maintenance programs were also queried. In considering zero emission vehicles, a need to look at all aspects of the technology, including the source of power and its generation, was identified. The effect of aircraft operations, particularly the release of fuel from commercial aircraft over Lake Ontario, was also noted. It was recommended that the Board consider the effect of air pollution on the 15% of the population that is environmentally sensitive.

Hazardous waste incineration, incineration of sewage sludge and municipal solid waste incineration and associated releases of chlorinated organics were also recommended to the Board as areas needing further focus.
The Board was encouraged to review the "economic harm" from air pollution and was told that implementation of air and water pollution control programs was lacking and practical suggestions for governments to act upon were needed. The need for improved programs for public awareness and education was also noted.

There appeared to be a general appreciation of the opportunity to meet with the IAQAB and to participate in a forum where air pollution issues could be discussed.
7.0 RECENT DEVELOPMENTS ON THE ISSUE OF NITROGEN DEPOSITION AND EFFECTS ON ECOSYSTEMS

In February 1995 the U.S. Environmental Protection Agency issued a draft report to Congress titled: "Acid Deposition Standard Feasibility Study". This report was mandated by the U.S. Clean Air Act Amendments (CAAA) of 1990, to determine the feasibility and effectiveness of developing deposition standards that would protect sensitive aquatic and terrestrial ecosystems from acidic deposition, including nitrogen and sulfur compounds. The authors of the report used models to estimate the effect of the sulfur and nitrogen oxide emission reductions required by the CAAA on surface waters and forests in North America.

One of the significant conclusions of the report was the significance of nitrogen compounds in wet and dry deposition in the acidification of both aquatic and terrestrial ecosystems. However, the current and projected ecological consequences of increasing nitrogen inputs are poorly known at this time. The models used in this EPA study were not able to estimate the time required for a sensitive ecosystem to reach "nitrogen saturation".

The focus of the EPA's analysis is on the impact of acid deposition on surface waters in the mid-Appalachians, the Adirondacks, and the southern Blue Ridge Mountains in the eastern U.S. There were insufficient data on western North American ecosystems to model possible impacts of increased nitrogen inputs there. However, some researchers in the Rocky Mountains assert that nitrogen saturation is already occurring in the Front Range of Colorado. Because of the number of significant concerns surrounding this report, the authors were requested to collect additional information, update their references to include recent journal publications, and then issue a final version of the report in October 1995.

Background information on the issue of nitrogen deposition and its possible effects on natural systems is summarized in the following sections.

Nitrogen deposition issue:

Initial research into acid precipitation was concerned with hydrogen ion (acids) and sulfate in wet and dry deposition. Inputs of these chemical species cause negative effects on surface waters and soils in sensitive systems identified in North America, primarily in the eastern regions of the U.S. and Canada characterized by granitic bedrock geology, thin soil cover, and low acid-neutralizing capacity surface waters. However, we now know that there are other important chemical constituents in precipitation that are increasing due to anthropogenic activity: mainly nitrate and ammonium. Deposition of excess nitrogen to marine, terrestrial, and fresh water ecosystems can result in: (1) fertilization or eutrophication, and (2) episodic acidification of streams and lakes.

Nitrate in deposition can come from both natural and man-made sources. Nitrogen oxides, formed during combustion in fossil fuel fired electrical generating plants, industrial facilities, and vehicles, is a major source of nitrates in the atmosphere. Ammonium in deposition originates as emissions of ammonia gas from feedlots, agricultural fields, wetlands,
and fertilizer production operations. The role of ammonium in acidification and nitrogen saturation of ecosystems has been largely ignored in discussions of pollutant impacts in the eastern U.S. However, in western locations, such as the Sierra Nevada and the Colorado Rockies, nitrate and ammonium in wet deposition are present in equal amounts. The reaction of nitric acid with ammonia gas emitted from feedlots and fertilized fields results in ammonium nitrate particles, which can be carried long distances before being deposited in remote watersheds. When this buffered compound reaches soils and surface waters, the ammonium is preferentially taken up by biota, thus generating acidity. It is possible for ammonium nitrate transformation and transport to deliver nitrogen species to parks and wilderness areas in some regions of the country, such as the Sierra Nevada and the Front Range of Colorado, depending on the pattern of local ammonia emissions relative to the supply of nitric acid vapor.

Ecological effects of nitrogen deposition:

1) Forests, tundra, and freshwaters:

Deposition of nitrogen compounds and related effects on natural ecosystems are now been investigated in a number of protected areas throughout the U.S. Nitrogen cycles in terrestrial and aquatic systems are complex and may be influenced by a number of interacting natural and anthropogenic processes. Also, nitrogen inputs to systems may be beneficial to some and harmful to others.

Evidence for "nitrogen saturation" (or a supply of nitrogen in excess of that which can be used by biological systems) comes from work in the northeastern U.S. and is suggested by research conducted at several tundra ecosystem sites in the Front Range of Colorado. In streams monitored in the northeastern U.S. and in the Mid-Appalachian highlands, nitrate is now observed at high concentrations during both storm episodes and during baseflow periods, indicating that the supply of nitrogen has exceeded the capacity of the soils and vegetation to absorb it. There are a number of explanations for this nitrogen "leakage", including the maturation of forests, effects of insect infestation, and excess nitrogen supply in deposition. Recent investigations in Shenandoah National Park, Virginia, have attempted to distinguish the effects of nitrogen flux to upland systems due to deposition from that associated with nitrogen cycle disruption due to an outbreak of gypsy moth. At these affected watersheds the export of nitrogen via stream water has resulted in increased frequency of acidic episodes, with resulting effects on native fish species.

There is evidence that nitrogen deposition in rain, snow, and dry matter has caused small, chronic losses of ANC (Acid Neutralizing Capacity) in high-elevation lakes in the West. The EPA's Western Lake Survey detected measurable amounts of nitrate in lakes found in northwestern Wyoming and the Colorado Rockies (especially in Front Range locations). These concentrations indicate that these high elevation watersheds have little remaining capacity to absorb nitrogen in deposition.
2) Estuaries and coastal waters

The Environmental Protection Agency’s May 1994 report on "Deposition of Air Pollutants to the Great Waters" contains a discussion of the effects of atmospheric nitrogen deposition on estuarine resources, especially the Chesapeake Bay, on the east coast of the United States. Nitrogen inputs from the atmosphere fall directly to the surface of the Bay and on its large watershed area, resulting in increasing concentrations of this "limiting nutrient" to the Bay. Increasing nitrogen inputs to estuaries can result in eutrophication, a process that accelerates the production of organic material. These blooms in algal populations and submerged vegetation can lead to toxic responses in filter-feeding organisms, such as oysters and mussels, and oxygen depletion and fish kills.

Another marine resource that can be affected by nitrogen inputs is near-coastal waters, such as the Baltic and North Seas in Europe, and the U.S. and Canadian Atlantic coastal regions. There is information now appearing in the scientific literature that points to atmospheric nitrogen, both in the organic and inorganic form, as a stimulant to algal growth in these environments. This coastal eutrophication can result in oxygen depletion and loss of fisheries and recreational resources in affected waters.
International activity to manage Persistent Organic Pollutants (POPs) is underway on several geographic scales which could be summarized as follows:

- **Canada/U.S. (Binational)**
  - implementation of Annex 15, Great Lakes Water Quality Agreement
  - preparation of Canada/U.S. Binational Virtual Elimination Strategy
- **North American (Continental)**
  - implementation of commitments in NAFTA Commission on Environmental Cooperation (CES) Resolution on the Safe Management of Chemicals
- **UN Economic Commission for Europe (ECE) (Intercontinental)**
  - commencement of negotiation of a POP Protocol under the ECE Convention on Long-Range Transboundary Air Pollution (LRTAP)
- **Global**
  - preparation of a global strategy under the United Nations Environmental Program (UNEP)
  - Global Programme of Action under UNCED Agenda 21 program on Land-Based Sources of Marine Pollution (LBSMP)
  - exploration of opportunities to manage POPs in developing countries in followup to the Vancouver Experts meeting on POPs in June 1955 and under the banner of the UN Commission on Sustainable Development (CSD)

The magnitude of this activity demonstrates the concern over these persistent organic compounds both regionally and globally.

The status of activities in each of the above areas is summarized below.

**Canada/U.S. Binational**

(a) **Implementation of Annex 15, Great Lakes Water Quality Agreement (GLWQA)**

Annex 15 of the GLWQA is entitled "Airborne Toxic Substances". It contains provisions relating to monitoring and scientific efforts to identify persistent toxic substances (PTSs) of concern from an air pathways perspective. It also contains a commitment by both nations to reduce and eliminate those PTSs contributing to deterioration of Great Lakes water quality from sources anywhere in Canada or the continental United States, with a commitment to consult with other nations on identified sources outside of Canada and the United States. Action, reporting and accountability on this latter initiative could be improved. Eight years after negotiation of Annex 15, there exists no good overview of progress on "reducing and eliminating" PTSs of concern. Progress, or lack thereof, has not been brought to public attention.

The Binational Virtual Elimination Strategy described below is intended to accelerate action on the emission reduction commitments in Annex 15. Also, the IAQAB has initiated a
project under the IJC proposed 1995/97 Priorities to assess progress on these commitments to the Commission.

(b) Preparation of Binational Virtual Elimination Strategy for Persistent Toxic Substances Affecting the Great Lakes

At their meeting in February 1995, President Clinton and Prime Minister Chretien agreed that a strategy would be developed by February 1996 to address the most persistent toxic substances in the Great Lakes environment. A draft strategy was prepared and underwent public consultation at a workshop in Windsor, Ontario in August 1995. A second draft is expected by November 1995, and completion of the strategy is anticipated possibly prior to a Prime Minister/Presidential meeting in 1996.

As shown in the following table (Table 2), the draft strategy contains Level I and Level II lists of PTSs targeted for reduction or elimination.

The draft strategy also contains specific quantified targets for reduction in emissions for some substances on the Level I list. Reductions within the Great Lakes basin are expected to be achieved through the current Lakewide Management Plans (LaMPs). Since the LaMPs already exist or are being established under another mechanism, the focus of the strategy is to deal with sources of PTSs outside the basin in Canada or the continental United States.

**North American Continental**

On October 14, 1995, Environment Ministers/Administrators from Canada, United States and Mexico, under the auspices of the NAFTA Commission on Environmental Cooperation, are expected to sign a Resolution on the Safe Management of Chemicals. The Resolution calls for the establishment of a trilateral Steering Committee to initiate action on reduction of PTSs beginning with the following substances:

<table>
<thead>
<tr>
<th>Pesticides</th>
<th>Contaminants/Byproducts</th>
<th>Commercial Chemicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>hexachlorobenzene</td>
<td>dioxins</td>
<td>PCBs</td>
</tr>
<tr>
<td>toxaphene</td>
<td>furans</td>
<td></td>
</tr>
<tr>
<td>chlordane</td>
<td>certain heavy metals</td>
<td></td>
</tr>
<tr>
<td>aldrin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dieldrin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DDT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mirex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>endrin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>heptachlor</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 2: Level I and Level II Lists: Binational Virtual Elimination Strategy for Persistent Toxics Affecting the Great Lakes

<table>
<thead>
<tr>
<th>PESTICIDES</th>
<th>CONTAMINANTS/ BYPRODUCTS</th>
<th>COMMERCIAL CHEMICALS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LEVEL I</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hexachlorobenzene</td>
<td>benzo(a)pyrene (B(a)P)</td>
<td>PCBs</td>
</tr>
<tr>
<td>toxaphene</td>
<td>2,3,7,8-tetrachlorodibenzo-furan</td>
<td>alkyl-lead</td>
</tr>
<tr>
<td>chlordane</td>
<td>2,3,7,8-tetrachlorodibenzo-p-dioxin</td>
<td></td>
</tr>
<tr>
<td>aldrin/dieldrin</td>
<td>mercury</td>
<td></td>
</tr>
<tr>
<td>DDT (+DDD+DDE)</td>
<td>octachlorostyrene</td>
<td></td>
</tr>
<tr>
<td><strong>LEVEL II</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>endrin</td>
<td>cadmium</td>
<td>pentachlorophenol</td>
</tr>
<tr>
<td>heptachlor</td>
<td>PAHs as a group, including:</td>
<td>pentachlorobenzene</td>
</tr>
<tr>
<td>(+hexachlorocyclohexane)</td>
<td>- benz(a)anthracene</td>
<td>1,4-dichlorobenzene</td>
</tr>
<tr>
<td>hexachlorocyclohexane</td>
<td>- benzo(g,h,i)perylene</td>
<td>3,3’-dichlorobenzidine</td>
</tr>
<tr>
<td>(including alpha, beta, delta, gamma, lindane)</td>
<td>- perylene</td>
<td>4,4’methylenebis</td>
</tr>
<tr>
<td>tributyl tin</td>
<td>hexachlorobutadine</td>
<td>tetrachlorobenzene</td>
</tr>
<tr>
<td>methoxychlor</td>
<td>(+hexachloro -1,3- butadiene)</td>
<td>(1,2,3,4 &amp; 1,2,3,5)</td>
</tr>
<tr>
<td></td>
<td>anthracene</td>
<td></td>
</tr>
<tr>
<td></td>
<td>dinitropyrene</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4-bromophenyl phenyl ether</td>
<td></td>
</tr>
</tbody>
</table>
The POPs are also identified in the May 1995 UNEP Governing Council Decision on preparation of a global strategy for managing POPs (described later in this section) plus the three heavy metals targetted for action in a possible UN ECE protocol (also described later in this section).

UN Economic Commission for Europe (ECE) Intercontinental

At its meeting of August 28-31, 1995, the Working Group on Strategies, the negotiating body for the LRTAP Convention, recommended to the Executive Body for the Convention that negotiations begin in parallel in early 1996 on both POP and heavy metals protocols. The Executive Body meets November 28 - December 1, 1995 in Geneva to consider this recommendation. On the assumption that the Executive Body will endorse the recommendation, Canada and Germany, who co-chaired Prepratory Working Groups on POPs and HMs respectively during the past year, have scheduled a planning meeting in Berlin on December 4-5, 1995 immediately following the Executive Body meeting. The first formal negotiating session on both protocols would take place in Geneva on February 13-19, 1996.

The Preparatory Working Group prepared the following preliminary list of POPs for consideration by the Parties in commencing negotiation of a POP Protocol.

Table 3: UN Commission for Europe Preliminary PCPs List

<table>
<thead>
<tr>
<th>PESTICIDES</th>
<th>CONTAMINANTS/ BYPRODUCTS</th>
<th>COMMERCIAL CHEMICALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>hexachlorobenzene</td>
<td>PAHs</td>
<td>PCBs</td>
</tr>
<tr>
<td>toxaphene</td>
<td>dioxins</td>
<td>hexabromobiphenyl</td>
</tr>
<tr>
<td>chlordane</td>
<td>furans</td>
<td>pentachlorophenol</td>
</tr>
<tr>
<td>aldrin</td>
<td>[short chain (c10-c13) chlorinated paraffins]</td>
<td></td>
</tr>
<tr>
<td>DDT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mirex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dieldrin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>endrin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[lindane]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Square bracketted substances are those for which risk assessment work is still in progress. Existence of an internationally acceptable risk assessment is proposed as a prerequisite for selecting substances for inclusion in the protocol.
The Preparatory Working Group on HMs concluded that an HM Protocol should focus initially on three heavy metals, mercury, cadmium and lead, with provision to add others in the future.

Global

(a) Global Strategy for POPs under United Nationals Environmental Program (UNEP)

In May 1995, the UNEP Governing Council adopted a Decision to have a global strategy for managing POPs prepared in time for its next meeting in early 1997. It identified the Intergovernmental Forum on Chemical Safety (IFCS) as the international body to prepare the global strategy. As background for the Global strategy, the IFCS together with the World Health Organization (WHO), has completed a contract on the development of profiles for the following POPs:

Table 4: U.N. Environmental Program (UNEP) POPs List

<table>
<thead>
<tr>
<th>PESTICIDES</th>
<th>CONTAMINANTS/ BYPRODUCTS</th>
<th>COMMERCIAL CHEMICALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>hexachlorobenzene</td>
<td>dioxins</td>
<td>PCBs</td>
</tr>
<tr>
<td>toxaphene</td>
<td>furans</td>
<td></td>
</tr>
<tr>
<td>chlordane</td>
<td></td>
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<td>heptachlor</td>
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</table>

This work will be presented to the Washington Conference on Land-Based Sources of Marine Pollution (see description below).

As a next step towards a global strategy, Canada has been asked to prepare a theme paper for presentation to the IFCS at its meeting in Canberra, Australia in March 1996.

(b) Global Programmes of Action for POPs and HMs under Agenda 21 Programme on Land-Based Sources of Marine Pollution (LBSMP)

At the Washington Conference on LBSMP scheduled for October 23 - November 3, 1995, nations are expected to adopt Global Programmes of Action on POPs and HMs. The
proposed Global Programme of Action on POPs recognizes the UNEP/IFCS global strategy on POPs described above as the core program for managing POPs globally. However, it also contains other provisions such as a commitment to development of national plans for managing POPs and the establishment of a POP Information Clearing House. The proposed Global Programme of Action on HMs does not contain a global strategy per se but does contain commitments to national plans and a Clearing House.

(c) Followup to the June 1995 Vancouver Experts Meeting on POPs under UN CSD

The purpose of the Vancouver experts meeting was to examine concerns and management opportunities for POPs in the developing world. Discussions are underway with the Republic of the Philippines, which co-hosted the Vancouver meeting with Canada, on a possible second meeting in the Philippines in the Spring of 1996. Information and proposals from these meetings will be helpful to the IFCS in preparing the global strategy on POPs for UNEP. The UN CSD will expect a report at its Spring 1996 meeting on progress towards global action on POPs.

Figure 4 attempts to summarize the international activities on POPs at the continental, intercontinental and global scales. The POP lists being considered under various international activities show considerable commonality. It is extremely important that the linkages between these activities be recognized and that a consistent approach be maintained to ensure that nations are not making different kinds of commitments in different international agreements. Commitments that evolve in the UN ECE protocols may lead the way in this regard. The current work of the IAQAB in assessing sources and pathways of persistent toxic substances to the Great Lakes and in evaluating progress in reducing PTS emissions, if undertaken, will be observed closely by both Canada and the United States as they negotiate positions in various international fora.
FIGURE 4: STRUCTURE FOR THE GLOBAL MANAGEMENT OF PERSISTENT ORGANIC POLLUTANTS (POPs)

Global Process

UNEP
Governing Council
(U.N. Environment Program)
May 1995 Decision on POPs

IFCS
(Intergovernmental Forum on Chemical Safety)
Ad Hoc Working Group

IOMC
(International Organization for the Sound Management of Chemicals)
WHO, UNEP, ILO, FAO, UNIDO, OECD

IPCS
International Programme on Chemical Safety
WHO, UNEP, ILO

IFCS
Considers Recommendations from Washington Mtg. Ad Hoc Work Group

UNEP
Governing Council
(U.N. Environment Program)
Consideration of IPCS Recommendations January 1997

Regional Agreement

Washington Inter-Governmental Meeting on Marine Pollution
(80-100 Governments Represented Oct. 23-Nov. 3)

Information

U.N. ECE -- LRTAP
(U.N. Economic Commission for Europe - Long Range Trans-Boundary Air Pollution)

Produces

Works with

Works with

Considers Recommendations from Washington Mtg. Ad Hoc Work Group

Considered By

35-
9.0 UPDATE ON THE GULF OF MAINE

At the June meeting of the New England Governors and the Eastern Canadian Premiers two resolutions were passed to highlight the importance of the Gulf of Maine ecosystem, and actions necessary to preserve and sustain this unique marine environment.

The concern for pollution threats to the Gulf are shared by many. The International Air Quality Advisory Board (IAQAB) of the International Joint Commission (IJC) has completed work and released the results of a study analyzing the degree to which atmosphere pollutants contaminate the Gulf of Maine. This report culminates a year long effort of Canadian and U.S. scientists to construct a "mass balance" model of all the various pathways for pollution into and out of the Gulf of Maine (see Figure 5).

This comprehensive approach to tracking the origin and fate of contaminants identifies the relative importance of each potential pathway for pollution. The IAQAB report considered thirteen persistence toxic substances, including of Metals, Industrial Organics and Pesticides, and is based upon the best available data in the region.

Figure 5: Cadmium Mass Balance Model - Gulf of Maine

The scientists found that;
* Only sufficient information exists to do a complete analysis for the pollutant cadmium; for this pollutant, 14% of the total input to the Gulf of Maine is estimated to be deposited from contaminants in the atmosphere;
* For lead, sufficient information is available to estimated that roughly one quarter of the lead input to the Gulf of Maine is from deposition of airborne contaminants;
* There is not enough information available to do a complete analysis for the other contaminants of concern (see Table 5).
Table 5: Summary of Concentration Data Gaps for the Gulf of Maine Mass Balance

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<th>Parameter</th>
<th>Pollutant</th>
<th>As</th>
<th>Cd</th>
<th>Pb</th>
<th>Hg</th>
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<th>HCB</th>
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Canadian Overview - Selected Issues

1. Canadian Stratospheric Ozone Layer Protection Programs

   In the past year, several actions and initiatives were taken by the Canadian government to protect stratospheric ozone through control of ozone-deleting substances. These include:

   - Amendments to the federal Ozone-Depleting Substances Regulations which require a freeze on methyl bromide consumption and a 25 percent reduction by 1998 were published on December 14, 1994.

   - The Environment Canada Code of Practice for recovery, recycling and reclamation of CFCs is being revised to cover hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs) and reflect new practices in the industry.

   - Proposed changes to the Ozone-Depleting Substances Regulations to incorporate HCFC consumption controls were published on September 2, 1995.

   - A draft Code of Practice for halon management was made public by Environment Canada in May 1995.

   - Nine provinces have regulations that make recovery and recycling of ozone-depleting substances mandatory and prohibit deliberate venting of these substances. The tenth province and the Yukon Territory issued draft regulations in 1995.

2. The Report of the 1994 Eastern Canada Acid Rain Control Program

   The report evaluates the progress made by the seven easternmost provinces to meet the 1994 targets in the Eastern Canada Acid Rain Control Program to cap sulphur dioxide (SO₂) emissions. All the provinces successfully met their individual SO₂ targets in 1994. Collectively they emitted 1,698 kilotonnes of SO₂, which was below the 2,300 kilotonnes cap, and a 56% reduction from 1980 levels. Smelters accounted for 50 percent of SO₂ emissions in eastern Canada in 1994, and fossil fuelled-power plants accounted for 20 percent.

3. Acid Rain: Results from the Quebec Lake Survey

   Results from the survey of 58 headwater lakes showed that, although there was a decrease in lakewater sulphate concentrations in 1993, there was an increase in the number of lakes that were considered to be acidic as compared to 1992. These lakes are situated mainly to the east of Montreal. From 1985 to 1993, 24 percent of the lakes under study showed increases in alkalinity and/or pH while the same percentage of lakes still show signs of
acidification (mainly east of Montreal). The remainder of the lakes are stable in terms of acidity.

4. Release of the federal Toxic Substances Management Policy

A new federal policy to manage toxic substances was released in June 1995. The policy has two main objectives: to virtually eliminate from the environment toxic substances which are predominantly the result of human activity and which are persistent and bioaccumulative (Track 1 substances); and to prevent or minimize the release into the environment of other toxic substances and substances of concern through life-cycle management strategies (Track 2 substances).

A substance will be considered toxic if it either conforms, or is equivalent to, the definition of "toxic" found in Section 11 of the Canadian Environmental Protection Act. Details about persistence and bioaccumulation criteria, their numeric values, how they were established and how they will be applied are contained in a document titled Toxic Substances Management Policy: Persistence and Bioaccumulation Criteria. A substance will be considered for systematic assessment if federal, provincial or international programs, or members of the Canadian public, have identified it as potentially harmful to the environment or human health.

The policy will serve as the basis for the federal government’s position on toxic substances management in discussions with the provinces and the world community.

5. Releases of Pollution Prevention - A Federal Strategy for Action

The strategy focuses on 5 goals: institutionalizing pollution prevention across all federal government activities; fostering a national pollution prevention effort; achieving a climate in which pollution prevention becomes a major consideration in private sector activities; providing access to the information and tools necessary to implement pollution prevention practices; and participating in international pollution prevention initiatives.

The strategy recognizes that shared responsibilities and actions and a common vision of pollution prevention are crucial to its success. Broad actions are identified within the federal government, and with other orders of government, the private sector, individual Canadians, and the international community.

6. Canada’s First Ecowatch Centre Opens

The dome that housed the American Pavilion at Expo ’67 in Montreal opened in June as the new Biosphere, headquarters of an extensive Ecowatch Network. The Biosphere has been established jointly by Environment Canada and the City of Montreal as a tool to safeguard the Saint Lawrence River, the Great Lakes, and water quality in general. As Canada’s first Ecowatch Centre, its purpose is to encourage the exchange and dissemination of information about water and the St. Lawrence - Great Lake ecosystem. The Network extends across the St. Lawrence - Great Lakes territory on both sides of the border.
7. Release of the first National Pollutants Release Inventory

The first National Pollutant Release Inventory (NPRI) summary report has been published by Environment Canada. Similar to the U.S. Toxics Release Inventory (TRI) the NPRI covers on-site releases to air, water and land as well as waste transfers off-site in 1993. It is to be used to identify priorities for government regulatory and other initiatives, to encourage voluntary measures to reduce releases and to facilitate tracking. The NPRI is seen as a key step towards increasing public awareness of the nature and quantity of releases as well as industries’ awareness of their practices. Last year’s inventory will be completed toward the end of 1995.

8. Report of the first Accelerated Reduction/Elimination of Toxics (ARET) Program

Since the ARET challenge was issued in the spring of 1994, more than 200 companies and governments have responded to the voluntary initiative. The responses of 138 firms and seven government departments are the subject of the first summary report of the ARET program, released in March by the ARET stakeholder committee.

ARET seeks the virtual elimination of emissions of 14 persistent, bioaccumulative and toxic substances and substance groups over the long term, with a 90% reduction goal by the year 2000. For 87 less hazardous substances, it seeks emissions reductions to levels insufficient to cause harm, with a short-term reduction goal of 50% by the year 2000.

The summary reports that participants have reduced ARET emissions by 10,300 tonnes since 1988 and are committed to reductions of another 8,500 tonnes by the year 2000. This represents an overall emissions reduction of 67%-72% for A-1 high priority list substances and 67% for the others.

9. Environment Minister Acts on Two Toxic Substances

In July the Minister of the Environment announced her intention to ban the use of lead shot for hunting migratory birds and to accelerate action on regulations to limit benzene releases into the environment.

Banning lead shot used for hunting migratory birds will be phased in, starting with national wildlife areas in 1996 and then across Canada in 1997. The ban is backed by a comprehensive scientific study that shows that waterfowl are being poisoned by ingesting lead shot. The ban will be established under the Migratory Birds Convention Act.

The Minister also called for accelerated action on regulating benzene which will give Canada the best national fuel standards in the world for this substance. Benzene, a known carcinogen, was found toxic under the Canadian Environmental Protection Act (CEPA). The proposed regulations would limit benzene in gasoline to a maximum of one percent by volume. The regulations would also limit any increase in the amount of aromatics in gasoline, another significant source of benzene. Emissions of benzene from natural gas dehydrators, another important source, will also be controlled.
10. New Regulations in Nova Scotia

The Nova Scotia government recently passed a number of regulations under the Nova Scotia Environment Act that included regulations governing activities designation, air quality, approvals procedures, asbestos waste management, dangerous goods management, emergency spills, environmental assessments, ozone layer protection, PCB management, pesticides, petroleum storage, sulfide bearing material disposal, used oil, water and wastewater facilities, and well construction.

11. Debate Rages Over Alberta’s Special Places 2000

Alberta recently released another version of the 'Natural Heritage Policy - Special Places 2000', including a long-awaited process to identify and preserve special parts of Alberta's natural landscape.

The Special Places 2000 project has been in development for three years. A 1993 report, based on widespread public discussion, proposed that an extensive network of wilderness and natural areas in Alberta be designated as special places to be protected from commercial development. No action was taken on the report for over a year.

The matter came to a head in late 1994 when Amoco Canada Petroleum Company applied for permission to drill in the ecologically sensitive Whaleback region of southwestern Alberta. The Energy Resources Conservation Board rejected the application because of the pending provincial policy, which might designate this area as a special place.

Environmental groups have sharply criticized the 1995 version of the Natural Heritage Policy. In this version, a "special place" can be nominated by any Albertan, but the Environmental Protection Minister and Cabinet have the power to stop the designation process or amend it. They accuse the government of seeking public input on the initial policy, but only listening to industry for the implementation.

U.S. Overview - Selected Issues

1. Emissions of Air Toxics Reduced

EPA made public its toxic release inventory for 1993, showing air emissions of the contaminants tracked under its Toxics Reduction Inventory had dropped 11% to 1.7 billion pounds since the previous year. The drop is attributed mostly to cuts in ammonia and various solvents, including those involved in stratospheric ozone depletion. The 1993 total suggests greater than one third reduction since 1988.

2. Dioxin Update

In addition to the estimates of dioxin emitted from North American sources and deposited in the Great Lakes, prepared by Barry Commoner and Mark Cohen of Queens
College, City University of New York and first tabled at the IJC Science Advisory Board Workshop "A Workshop on the Transition to Virtual Elimination: Dioxins and Furans as a Case Study" held in Ann Arbor, MI in March 1995, a separate study published by Andrew Meharg and Daniel Osborn in the journal Nature suggests that discrepancies in environmental budgets of dioxin-like compounds may be explained by emissions from accidents involving chlorinated organic chemicals. This source may have important implications for emission inventories.

3. Sulfur Oxides

EPA proposed no revisions to the current 24-hour and annual primary National Ambient Air Quality Standard for sulfur dioxide under the Clean Air Act, but also solicited comment on the need to adopt alternative regulatory measures to address short-term peak exposures to $\text{SO}_2$. EPA is concerned that a segment of the asthmatic population may be at increased health risk while exercising. A final rule will become effective in the Spring of 1996.

4. NSPS for Nitrogen Oxide Emissions from Electric Utility Steam Generating Units

EPA will propose to revise existing new source performance standards (NSPS) for nitrogen oxide emissions from fossil-fuel fired steam generating units, including electric utility units, to reflect improvements in methods for the reduction of NOx emissions. The final rule becomes effective in December, 1996.

5. Nitrogen Dioxide

EPA announced the availability of an external review draft of a revised air quality criteria document of nitrogen oxides prepared by the Environmental Criteria and Assessment Office (ECAO). The Agency will revise the standard if needed to protect the public health and welfare. Final review of the criteria document has been completed. The final rule becomes effective by October 1996.

6. New Municipal Waste Combustors

EPA proposed New Source Performance Standards and emission guidelines to regulate emissions from new and existing municipal waste combustor units with aggregate plant capacity above 35 megagrams (Mg) per day. The final rule is effective as of September, 1995.

7. Medical Waste Incineration

EPA proposed new source performance standards and emission guidelines for existing medical waste incineration sources to reflect the maximum degree of reductions in emissions that have been demonstrated for new units. The final rule becomes effective in April, 1996.
8. **Radionuclide Major Source Definition**

EPA defines a major source as any source that emits 10 tons or more per year of any hazardous air pollutant (HAP) or 25 tons or more per year of any combination of HAPs. The ton quantities are inappropriate for radionuclides, as very small emissions of radionuclides may be extremely hazardous. EPA will, thus, establish different criteria for radionuclides. No action will be taken before May 1996.


On March 30, 1992, the Organization for Economic Cooperation and Development (OECD) adopted the Final Decision on the Control of Transfrontier Movements of Wastes Destined for Recovery Operations. This decision establishes a graduated system of procedural controls for the export and import of wastes for recovery depending on whether a waste is included in the green, amber, or red lists. EPA codified this legally binding decision in a Resource Conservation and Recovery Act final rule which became effective in August, 1995.


The Draft Strategy for Combustion Hazardous Waste commits EPA to upgrade its technical standards for burning hazardous waste in incinerators, boilers, and industrial furnaces. These standards would be applicable during the construction and operation of these combustion facilities. Various final rules becomes effective in December of 1996 and 1998.

11. **Standards for Management and Use of Slag Residues**

EPA proposed to allow residues ("slags") generated from the treatment of pollution control dusts resulting from scrap metal high temperature metal recovery (HTMR) processes to be used as a product in road construction and as an anti-skid/deicing material on road surfaces. The final rule is on hold; no action will be taken before May 1996.

12. **Toxic Release Inventory - Expanded Facilities List**

EPA is considering an expanded list of facilities required to submit information for the Toxic Release Inventory. EPA will selectively propose groupings of industries to be added. The Notice of Proposed Rule-Making is due in December, 1995.

13. **Toxic Chemical Release Reporting - Acetone**

In response to a petition, EPA deleted acetone from the list of toxic chemicals subject to reporting. The final rule became effective 16 June 1995.

14. **Mandatory Pollution Prevention Reporting**

EPA proposed to make mandatory the reporting of source reduction and recycling information in the Toxic Chemical Release Inventory (TRI) reports, including the quantity of...
a chemical entering any wastestream, released, recycled, or treated at a facility, and a production ratio or activity index for the reported chemical. The final rule becomes effective in December, 1995.

15. Universal Waste Rule

EPA issued a final rule streamlining universal waste management regulations for three types of widely generated wastes: hazardous waste batteries, hazardous waste pesticides and hazardous waste thermostats. The regulations are structured in four parts: small quantity handlers of universal waste (SQHUWs), large quantity handlers of universal waste (LQHUWs), transporters, and destination facilities. SQHUWs are defined as handlers of universal waste accumulating less than 5,000 kilograms, while LQHUWs accumulate greater than 5,000 kilograms. The requirements for both SQHUWs and LQHUWs are largely similar. Both are prohibited from disposing, diluting, and, except in certain circumstances, treating universal wastes. Both are also subject to packaging/labeling/marking requirements and required to take immediate action to respond to releases. The maximum time over which universal wastes can be accumulated is one year.

16. Emergency Planning Licensing Requirements for Independent Spent Fuel Storage Facilities (ISFSI) and Monitored Retrievable Storage Facilities (MRS)

The Nuclear Regulatory Commission (NRC) issued a final rule amending the emergency planning licensing requirements for Independent Spent Fuel Storage Facilities (ISFSI) and Monitored Retrievable Storage Facilities (MRS) under the Nuclear Waste Policy Act of 1982. This rule requires applicants for an ISFSI or MRS license to submit an Emergency Plan containing onsite emergency planning arrangements with provisions for offsite emergency response, including coordination and communication with offsite authorities and the public. By ensuring that public and local authorities will be notified in the event of an accident, the Commission established a prudent emergency preparedness mechanism necessitated by its "defense-in-depth" accident philosophy.

This rule requires that Emergency Plans contain a commitment to and a brief description of the means to promptly notify offsite response organizations, request offsite assistance, and inform the NRC Operations Center of emergencies. Such a system must be designed to operate despite the unavailability of some facility personnel, resources, and equipment. Additionally, Emergency Plans must include provisions for conducting semiannual communication checks with offsite response organizations and biennial onsite exercises to test responses to simulated emergencies, and licensees must critique all such exercises. Finally, licensees must allow the offsite response organizations 60 days to comment on a proposed Emergency Plan before that plan is submitted to the NRC. Licensees must submit to the NRC all comments received from offsite response organizations along with their Emergency Plan. This rule becomes effective September 20, 1995.
17. Air Emission Standards for VOCs from Tanks and Impoundments at Transfer, Storage, and Disposal (TSD) Facilities

EPA issued air emission standards for emissions of volatile organics from tanks and impoundments at hazardous waste TSD facilities. The standards require 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. This rule becomes effective December 6, 1995.

18. Ash from Municipal Solid Waste Combustion

A recent Supreme Court decision held that ash generated by municipal waste-to-energy facilities burning household wastes is not exempt from regulation as hazardous waste. EPA announced that it considers this ash to be newly identified waste which must be tested by the generator to determine whether it is hazardous, and issued draft guidance on this issue. EPA will promulgate ash-specific restrictions by July of 1995.

19. Waste Minimization Program for Hazardous Waste Generators

EPA published interim final guidance to assist hazardous waste generators and owners/operators of hazardous waste in complying with waste minimization certification programs and multi-media requirements.

20. Modification of the Hazardous Waste Program - Mercury-Containing Lamps

EPA proposed two alternative approaches for the management of mercury-containing lamps under the Resource Conservation and Recovery Act: (1) exclude from regulation as hazardous provided they are disposed of in permitted municipal landfills or managed in permitted mercury reclamation facilities, or (2) add mercury lamps to EPA's universal waste proposal rule. The final rule is on hold; no action will be taken before May, 1996.


EPA proposed standards requiring Maximum Achievable Control Technology to limit emissions of volatile organic compounds and hazardous air pollutants from new and existing marine tank vessel loading and unloading operations. The final rule became effective in August, 1995.

22. VOC Emissions from Wastewater

23. Wood Furniture Manufacturing Operations

   EPA proposed to limit emissions of hazardous air pollutants (HAPs) from existing and
new wood furniture manufacturing operations located at major sources. A final rule becomes

24. Emissions from Printing and Publishing Industry

   EPA proposed standards to reduce emissions of hazardous air pollutants (HAPs) from
printing operations that are major sources of HAP emissions. A final rule becomes effective
March, 1996.

25. Import and Export of Radioactive Waste

   The Nuclear Regulatory Commission proposed to amend its licensing requirements
regarding the import and export of radioactive wastes to conform U.S. policies to the
international voluntary Code of Practice to guide nations in the development and
harmonization of policies and laws on the international transboundary movement of

26. PCBs Disposal Amendments

   EPA proposed several amendments to its regulations to address (1) alternative disposal
methods to those currently permitted which do not pose an unreasonable risk of injury to
human health and the environment, (2) classes of PCBs not contemplated by the disposal
regulations, and (3) regulatory requirements for existing classes of PCBs and PCB items. A
final rule becomes effective December, 1996.

27. Hazardous Air Pollutants Multi-Chemical Endpoint Test Rule

   In support of program and activities under the CAA, EPA will propose a
multi-chemical endpoint test rule that will require the testing of many chemicals for a specific
effect or endpoint. This type of rule is an alternative to single chemical rules which require
testing of one chemical for many effects. A Notice of Proposed Rule-Making was issued in