

Emission Inventory Needs and Enhancements Planned for Canada

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Requirements for Emissions inventories

- Accurate, timely, transparent, consistent, comparable, complete, and available to the users and the public
- Track the progress of current emission reduction programs and initiatives, and evaluate the needs for adjustments
- Support the scientific assessment of the air pollution problems



Requirements for Emissions inventories

- Support the reporting requirements of domestic and international protocols and agreements
- Inform the public about the releases in their communities, and enable them to take action to protect the environment
- Integral to the attainment of emission reduction goals, and for the success of air quality management programs



Programs Supported By The Emission Inventories

■ Domestic Programs

- ◆ Canadian Clean Agenda
 - ✓ Launched in May 2000
 - ✓ Goal to improve the air quality of Canadians
 - ✓ Includes various initiatives to reduce emissions from various sources (transportation, industries)
 - ✓ PM10, SO₂, NO_x, VOC, NH₃, O₃ have be declared toxic under the Canadian Environmental Protection Act
- ◆ Ambient Air Quality Standards For PM, Ozone, benzene, mercury, dioxins & furans
- ◆ Canada-Wide Acid Rain Strategy



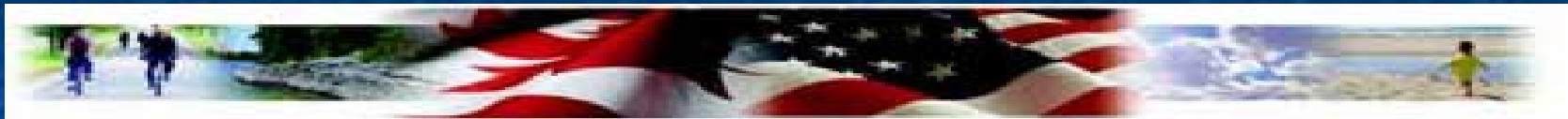
Programs Supported By The Emission Inventories

■ International Programs

- ◆ United-Nations Protocols
 - ◆ SO₂, NO_x, VOC
 - ◆ Heavy Metals (**Mercury, Lead, Cadmium**)
 - ◆ Persistent Organic Pollutants (**Dioxins & Furans, HCB, Short Chain Chlorinated Paraffin, PAHs, etc.**)
 - ◆ Framework Convention on Climate Change (Greenhouse Gases)
- ◆ Canada - United States Air Quality Agreement



Canada – United States Air Quality Agreement



- ◆ Signed in 1991
- ◆ Contained Two annexes
 1. **Acid Rain:** commitment from both nations to reduce SO₂, and NO_x emissions
 2. **Scientific and Technical Activities and Economic Research:**
 - Agreement to coordinate air pollution monitoring networks
 - Use compatible formats and methods for monitoring and reporting
 - Cooperate and exchange information about the causes and effects of air pollution and the use of market-based programs, such as the U.S. Acid Rain Program, to address air pollution issues



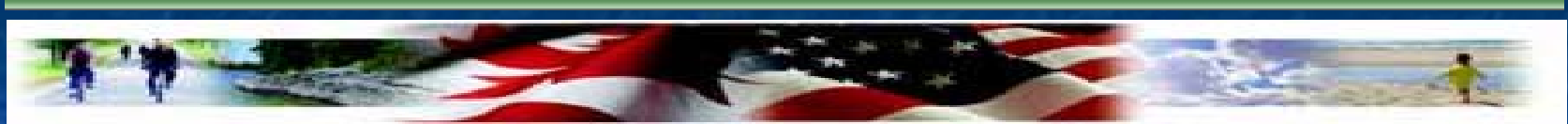
Canada – US Air Quality Agreement



- ◆ Addition of an Ozone Annex in December 2000
 - ◆ Commits the two nations to reduce their emissions of NOx and VOC emissions
- ◆ Launch of air quality projects under the *Border Air Quality Strategy*, June 2003
 - ◆ Increase the cooperation to reduce cross-border air pollution by undertaking three major pilot projects that enable greater opportunities for coordinated air quality management



Canada – US Air Quality Agreement



Pilots Projects Under The Border Air Quality Strategy

- ◆ The Georgia Basin/Puget Sound International Airshed Strategy (British Columbia and northwestern Washington State)
- ◆ The Great Lakes Basin Airshed Management Framework (Southeastern Michigan and southwestern Ontario)
- ◆ Joint study to explore the feasibility of emissions trading for NO_x and SO₂



Importance of Emission Inventories

Environment Canada understands the importance of having

Accurate, timely, transparent, consistent, comparable, complete, and publicly accessible emission inventories

Increase the funding available to the development and the improvement of emission inventories



Emissions Inventory Compilation In Canada

- ◆ Comprehensive emission inventories of criteria air pollutants were previously compiled on a five year cycle

- ◆ Joint collaboration with provincial/territorial governments

- ◆ Major point source information collected by the provinces/territories through a mixture of voluntary and mandatory data collection mechanisms

- ◆ Also included the estimation for small point sources, and all other non-point source emissions (area, mobile, biogenic, etc)

- ◆ Currently finalizing the compilation of the 2000 emissions inventory (fall 2003)

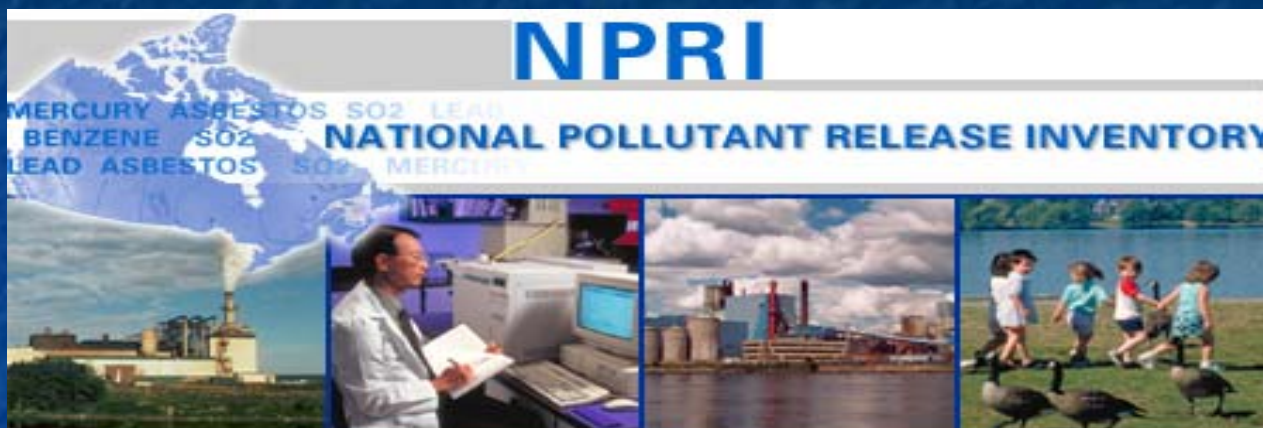


New Inventory Compilation Process in Place

- ◆ Mandatory reporting of Particulate Matter (TPM, PM10, PM2.5), Sulphur Oxides (SOx), Nitrogen Oxides (NOx), Volatile Organic Compounds (VOCs), Carbon Monoxide, (CO) required for industries that meet the reporting requirements for these pollutants
- ◆ The information is reported to Environment Canada through the National Pollutant Release Inventory (NPRI) every year
- ◆ **Annual compilation of the comprehensive emissions inventories, starting in 2002**



National Pollutant Release Inventory (NPRI)



- ◆ Canada's Pollutant Release and Transfer Register (PRTR) program
- ◆ Mandatory collection of multi-media releases for more than 323 substances including CAC's
- ◆ Electronic reporting used by most industries
- ◆ Publicly accessible inventory information



NPRI Facility Information Collected

- ◆ Facility identification (location, contacts)
- ◆ Total CAC emissions by facility
 - ◆ stack or other point releases, storage or handling, fugitive, spills or other non-point releases
- ◆ Emissions and stack parameters (height, diameter, exit temperature, flow rate) for stacks ≥ 50 meters, and exceeding the emission threshold quantities
- ◆ Calculation methods
- ◆ Temporal Variations
- ◆ Anticipated release in the next 3 years
- ◆ Pollution Prevention Activities, etc.



New NPRI Reporting Requirements For 2003

Mandatory reporting of VOC Species

- Addition of ~60 new VOC substances (individual substances, isomer grouping, and mixtures)
- ~110 VOC species were already reported to the NPRI
- 170 species account for more than 80% of the National VOC emissions

- Species were selected based on their Ozone and PM forming potentials
 - Specie Mass
 - Specie molar reactivity - Ozone formation
 - Specie molar solubility and condensability - PM formation

- **This new information can potentially provide updates to the old VOC speciation profiles currently in use**



Future NPRI Reporting Requirements

- **Mandatory reporting of PM species**
 - Stakeholder consultations have been initiated
 - Air quality models require a breakdown of PM species:
 - Organic Carbon, Elemental Carbon, Nitrate, Sulphate, Sea Salt, Ammonium, and Crustal material
 - Also require filterable and condensable PM emissions (only filterable PM is currently reported)



Future Requirements - PM Speciation

- Many issues to consider and resolve with PM
 - Speciation profiles available are very limited and old
 - Current condensable PM measurement methods generate inconsistent results
 - No method available to measure filterable and condensable PM in a single sample train
 - Size speciation of PM in humid stacks is currently difficult
 - Inconsistencies in the emission factors available (not all include filterable and condensable fractions) creating greater uncertainty in the reported data
- There is a need for a standard measurement method for filterable and condensable PM emissions (efforts in Canada and US to develop a standard method)



Current Situation

- ◆ Many improvements to the Canadian emission inventories over the past years
 - ◆ Consistent and timely data collection program across the country (NPRI)
 - ◆ Addition of new sectors and emission sources
 - ◆ Conducted surveys, source measurements to improve the estimates
 - ◆ Improved the temporal variations and spatial allocations

Many areas where more research, measurements, emission factors, and improved methodologies are required

Current Approach

- ◆ Working with industrial associations to improve emission estimates through
 - ◆ Development of guidance documents to estimate the emissions
 - ◆ Emission measurements
 - ◆ Technical studies
- ◆ Expanding this approach to more industries in the near future



On-going Inventory Improvement Activities

- ◆ Improvement of the mobile emissions
 - ◆ Development of Canadian versions of the US-EPA Mobile 6 and the Non-Road Model
 - ◆ Need to improve vehicle population, vehicle use statistics, spatial allocation
 - ◆ Need to improve the Models to the account for the Canadian fleet and driving conditions



Future Inventory Improvement Activities

- ◆ Paved and unpaved road dust
 - ◆ Large uncertainty in these emission estimates
 - ◆ Need to improve the estimates and the spatial allocation of these emissions



Future Inventory Improvement Activities

- ◆ NH₃ and PM emissions from agricultural activities
- ◆ Development of emission factors from
 - ◆ Animal feedlot operations
 - ◆ Different types of animals and enclosures
 - ◆ Agricultural practices, climate, soil types
 - ◆ Fertilizer application
 - ◆ Land tilling operations
 - ◆ Wind Erosion



Future Inventory Improvement Activities

- ◆ Development and adoption of new tools and techniques to improve the compilation of emission inventories (data management, electronic reporting, models, GIS, measurement methods)
- ◆ Validation of the emission inventories and the assessment of the uncertainties
- ◆ Development of speciation profiles for VOC and PM
- ◆ Development of a standard method to measure filterable and condensable PM



NARSTO Workshop

- ◆ *Accurate emission inventories are essential for sound decision making*
- ◆ Looking forward to the papers and posters presented during the workshop
- ◆ Breakout session priorities and recommendations, which will allow Canada to identify and prioritize additional research for the coming years

