COMPILATION OF ANNUAL EMISSION INVENTORIES IN CANADA FOR CRITERIA AIR CONTAMINANTS

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OVERVIEW OF THE PRESENTATION

Describe the approach taken by Environment Canada to compile more accurate and timely emission inventories (“better and faster”).
POLLUTION DATA BRANCH

- Center within Environment Canada and the federal government responsible for identifying, analyzing, and quantifying sources and sinks of pollutants affecting human health and the environment

  - Collect information
  - Develop emission estimation methodologies
  - Compile emission inventories and projections
  - Analyze emission trends and projections
  - Publish and disseminate the information
REQUIREMENTS FOR EMISSION INVENTORIES AND PROJECTIONS

- Track progress of current emission reduction programs and initiatives, and evaluate the needs for adjustments
- Scientific assessment and understanding of the air pollution problems
- Inform the public about the releases in their communities, and enable them to take action to protect the environment
- Fulfill the reporting requirements of domestic programs and international protocols and agreements
EI COMPILATION BACKGROUND

- Comprehensive emission inventories of Criteria Air Contaminants (CAC) have been compiled on a five year cycle since the 70’s
  - Joint collaboration with provincial/territorial/regional governments
  - Major point source information collected by the provinces/territories through a mixture of voluntary and mandatory data collection mechanisms (regulations, permit fees)
  - National EI also included the estimation for small point sources, and all other non-point source emissions (area, mobile, natural sources)

- EC roles is to:
  - Integrate all of this information into a national database
  - Review the information to ensure consistency and the completeness of the national EI
DOMESTIC PROGRAMS AND INTERNATIONAL PROTOCOLS/AGREEMENTS

☐ Requirements for detailed and annual emission inventories and projections

- Canada-Wide Air Quality Standards for PM$_{2.5}$ and Ozone
- Canada-Wide Acid Rain Strategy
- Canada-United States Air Quality Agreements (Ozone Annex)
- Various protocols under the Long Range Transport of Air Pollutants (LRTAP) Convention of the United-Nations Economic Commission for Europe
REQUIREMENT FOR CHANGES

☐ Move from a 5 year cycle to compile the emission inventory to an annual one

☐ Change includes
  ■ Centralized approach to the collection of point source information
  ■ Enhanced electronic reporting system
CENTRALIZED APPROACH TO THE COLLECTION OF POINT SOURCE INFORMATION

- Using the authority of the Canadian Environmental Protection Act (CEPA99)

- Canadian industries are required (since 2002) to report annually their emissions of Criteria Air Contaminants
  - Particulate Matter (TPM, PM10, PM2.5)
  - Sulphur Dioxide (SO2)
  - Nitrogen Oxides (NOx)
  - Volatile Organic Compounds (VOC)
  - Carbon Monoxide (CO)
NATIONAL POLLUTANT RELEASE INVENTORY (NPRI)

The information is collected through the NPRI

- Canada’s Pollutant Release and Transfer Register (PRTR) program
- Mandatory collection of multi-media releases for more than 323 substances including CAC’s
- Publicly accessible inventory information
FACILITY INFORMATION COLLECTED THROUGH THE NPRI (SINCE 2002)

- 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 $\geq 50$ m meters, and exceeding the emission threshold quantities

- Basis of the emission estimates (mass balance, measurements, etc)
- Temporal variations (monthly, weekly, daily profiles)
- Pollution prevention activities
- Anticipated releases for the next 5 years
NPRI REPORTING REQUIREMENTS SINCE 2003

- Removal of the reporting exemption for the upstream oil & gas industry

- Requirement for mandatory reporting of VOC species
  - Addition of ~60 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 from industrial sources
    - 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
CENTRALIZED APPROACH TO THE COLLECTION OF POINT SOURCE INFORMATION

- Some benefits of collecting the industrial source emissions by Environment Canada
  - Reduced the time to access and process this information
  - Reduced the time to compile the national emissions inventory by approximately one year

- Change in the role of the provinces and territories
  - Provide assistance in the review and validation of the point source data
  - Improvement of the emission inventories (area, mobile, natural sources)
  - Assist in the development of the comprehensive emission inventories
2003 NPRI POINT SOURCE STATISTICS

- 6,670 facilities reported CAC
- 17,252 reports for CAC and VOC Species
- Emission coverage
  - ~82% of the SO$_2$ emissions
  - ~33% of the NO$_x$ emissions
  - ~10% of the VOC emissions
  - ~7% of PM2.5 emissions
  - ~1% of PM10 emissions

- Number of reporters are likely to increase in the future
  - Removal other reporting exemptions
  - Implementation of an enhanced data verification and compliance promotion program
NPRI SUPPORT TO INDUSTRIES

- Help desk
- Training sessions
  - Conducted across the country
  - Inform and educate the reporters on the reporting requirements
  - Provide information on the available guidance documents
  - Emission estimation tools that can be downloaded from the NPRI web site
  - Case studies and calculation spreadsheets (selected industries, emission sources, pollutants)
Enhanced Electronic Reporting System

- More than 90% of industries report to the NPRI electronically.

- In March of 2005 Environment Canada launched a **One Window for Environmental Reporting System (OWNERS)**
  - New web based infrastructure to streamline the environmental reporting by the industry to various federal, provincial, regional, and private sector organisations.
  - Creating efficiencies for both governments and industry.

Environment Canada
Environnement Canada
For the 2004 reporting year OWNERS will collect information for the NPRI and for other organisations such as:

- **Ontario Ministry of the Environment**
  - Airborne Contaminant Discharge Monitoring and Reporting Regulation (O. Reg. 127/1)

- **Alberta Environment**
  - Air Monitoring Directive

- **Greater Vancouver Regional District (GVRD)**
  - Air Quality Management Bylaw 937

- **Canadian Chemical Producers’ Association**
  - National Emissions Reduction Masterplan (NERM)
OWNERS KEY FEATURES

- Secure web based application
- Intuitive interface
- Screen sensitive help
- Can pre-fill previous year data using system access codes
OWNERS KEY FEATURES

- Can import and export facility data using an XML Schema
- Validation of data fields during data entry, reducing the need for manual verification
- Require reports to be error free before a Statement of Certification is issued and the reports are accepted
BENEFITS OF OWNERS

- Major improvement for the collection and processing of point source information
  - Also available as a stand alone desktop application

- Expecting other government and private sector organisations to join OWNERS in the future
NPRI Database (from 1994 to 2003)

- Industry reported to Environment Canada through five regional databases
- Regular uploads to the national database by the regions
NEW OWNERS Database
BENEFITS OF THE NEW APPROACH

- A uniform data collection process across the country through the NPRI
- Removal of the data confidentiality restrictions for point source emissions
- Improved timeliness for the compilation and the validation of the point source emissions for the NEI
- Reduced requirements for the manual verification of the emission reports for errors and inconsistencies
BENEFITS OF THE NEW APPROACH

- Improved accuracy of the point source emission estimates provided by selected industrial sectors (based on source measurements)
- Generation of new VOC speciation profiles for selected industries (based on measurements)
- Improved timeliness for the dissemination of the point source emissions on the web
- Improved timeliness for the compilation and the dissemination of the national emissions inventory
FUTURE DIRECTION

- Further improvement to the accuracy of the point source emission estimates
- Improvement of OWNERS look and feel
- Integration of emission calculations and VOC speciation tools in OWNERS
- Development of new guidance documents in collaboration with industries and industrial associations
- Collection of process level data to assess the completeness and accuracy of the emission reports
- Implementation of an enhanced data verification program
- Develop data interchange links between OWNERS and the national emissions inventory database
NATIONAL EMISSIONS INVENTORY STATUS

- 2002 NEI being compiled
  - Expecting publication during the summer of 2005

- 2003 and 2004 NEI
  - Drafts versions to be released during the 1st quarter of 2006
  - Final versions released during the 2nd quarter of 2006
FUTURE DIRECTION FOR THE NEI

- Releases of draft and final versions of the NEI during the 1st and 2nd quarter of every year respectively

- Making the annual NEI accessible to the users within 1.5 year lag time