

COMPILATION OF ANNUAL EMISSION INVENTORIES IN CANADA FOR CRITERIA AIR CONTAMINANTS

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**14th Annual Emission Inventory Conference,
Las Vegas, Nevada, April 12-14, 2005**

OVERVIEW OF THE PRESENTATION

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



Environment Canada
Environnement Canada

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 (NO_x)
 - 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 ≥ 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 SO₂ 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

OWNERS PARTNERSHIP

- 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

The screenshot shows the 'Reports' section of the Environment Canada web application. At the top, there are navigation links for 'Français', 'Contact Us', 'Help', 'Search', and 'Canada Site'. Below these are links for 'About', 'Program Contacts', 'Program Materials', 'FAQ', and 'Site Map'. The main content area is titled 'Home > Reports' and contains a help box with instructions on how to create, edit, and manage reports. Below the help box is a 'Reports List' table with columns for ID, Company Name, Facility Name, Province Code, City/District, Report Name, Status, Errors, and Submittal Date. The table shows one report entry for 'Company ABC' in 'QC' province, 'Gatineau' city, with a report name of 'Inventory 2004'. The interface includes various action buttons like 'Add', 'Delete', 'Change Programs', 'Check Errors', 'Generate SoC', 'Submit Reports', 'Export', 'Clone', 'Update', and 'Prefill'. A filter section allows users to filter reports by 'Facility Name'.

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



The screenshot displays the Environment Canada web application interface. At the top, there are logos for Environment Canada and Canada, along with navigation links for Français, Contact Us, Help, Search, and Canada Site. Below these are links for About, Program Contacts, Program Materials, FAQ, and Site Map. The main content area shows a breadcrumb trail: Home > Reports > Check Errors. A sidebar on the left contains a navigation menu with options: Home, Reports, Facilities, Import Data, Default Contacts, User Profile, Permissions, Help, and Logout CompanyABC. The main content area displays a window titled "[Report Errors]" with buttons for Save, Close, Open in a New Window, and Print. The window content shows the "Inventory 2004 Report" validated at 2005-04-01 15:40:13 for "Company ABC, Company ABC, Gatineau, QC". Under the heading "Facility Information Errors", there is a list of errors: "Contacts, The Certifying Official is mandatory.", "Contacts, The Technical Contact information is mandatory.", "The Federal Business Number is mandatory.", "Reports > Facility Identification > Activities, You must select one of the activities in which the facility was engaged , or select 'none of the above'.", "Reports > Facility Identification > Activities, Number of Employees is mandatory.", and "Reports > Facility Identification > Activities, You must select one of the activities in which the facility was used for, or select 'none of the above'.". Below the errors, there are two sections: "Volatile Organic Compounds (VOCs) [CAS Number: NA - M16]" and "Oxides of nitrogen (expressed as NO2) [CAS Number: 11104-93-1]", both indicating "Substance report contains no errors." At the bottom of the window, there are buttons for Save, Close, Open in a New Window, and Print.



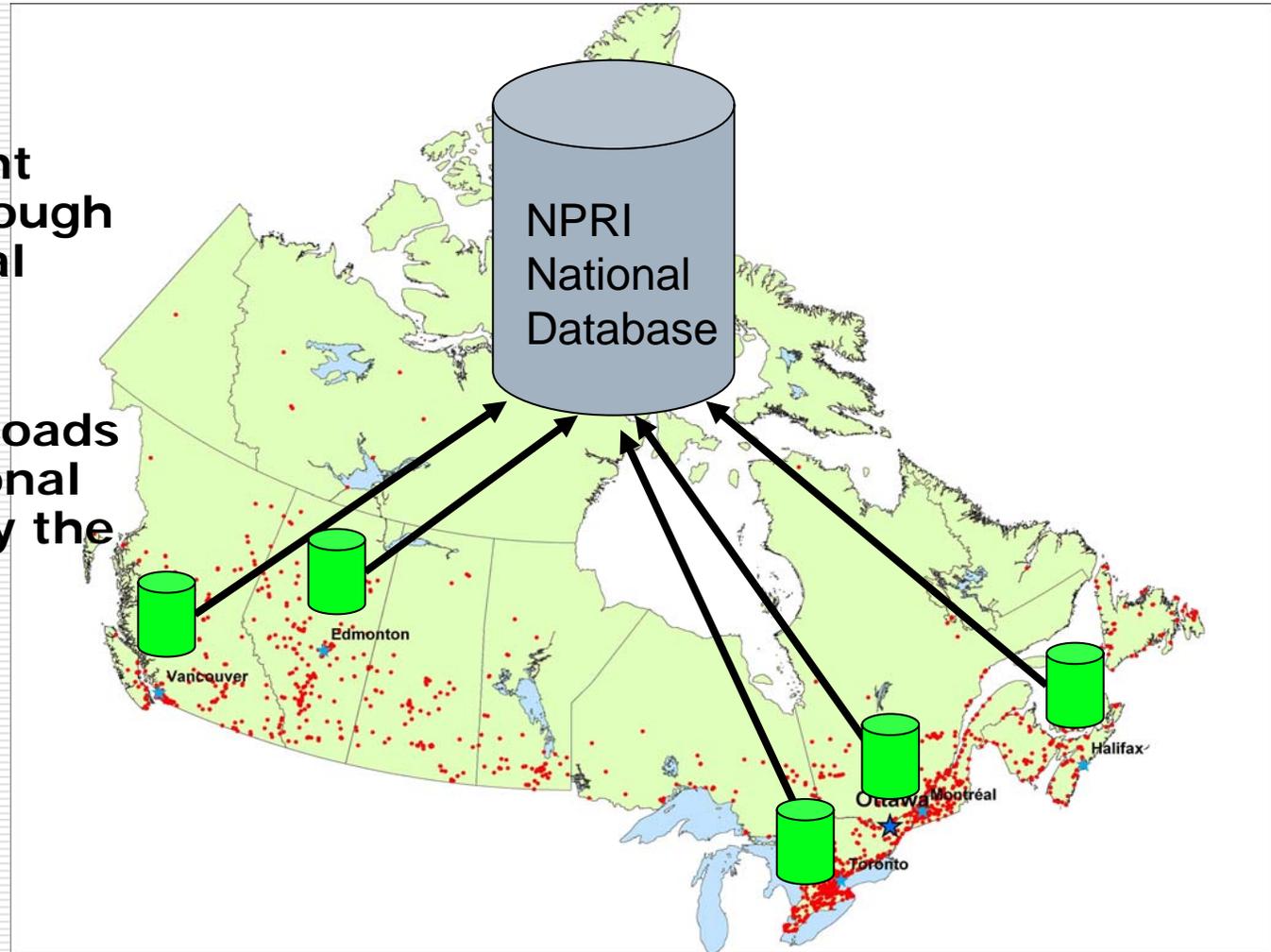
BENEFITS OF OWNERS

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

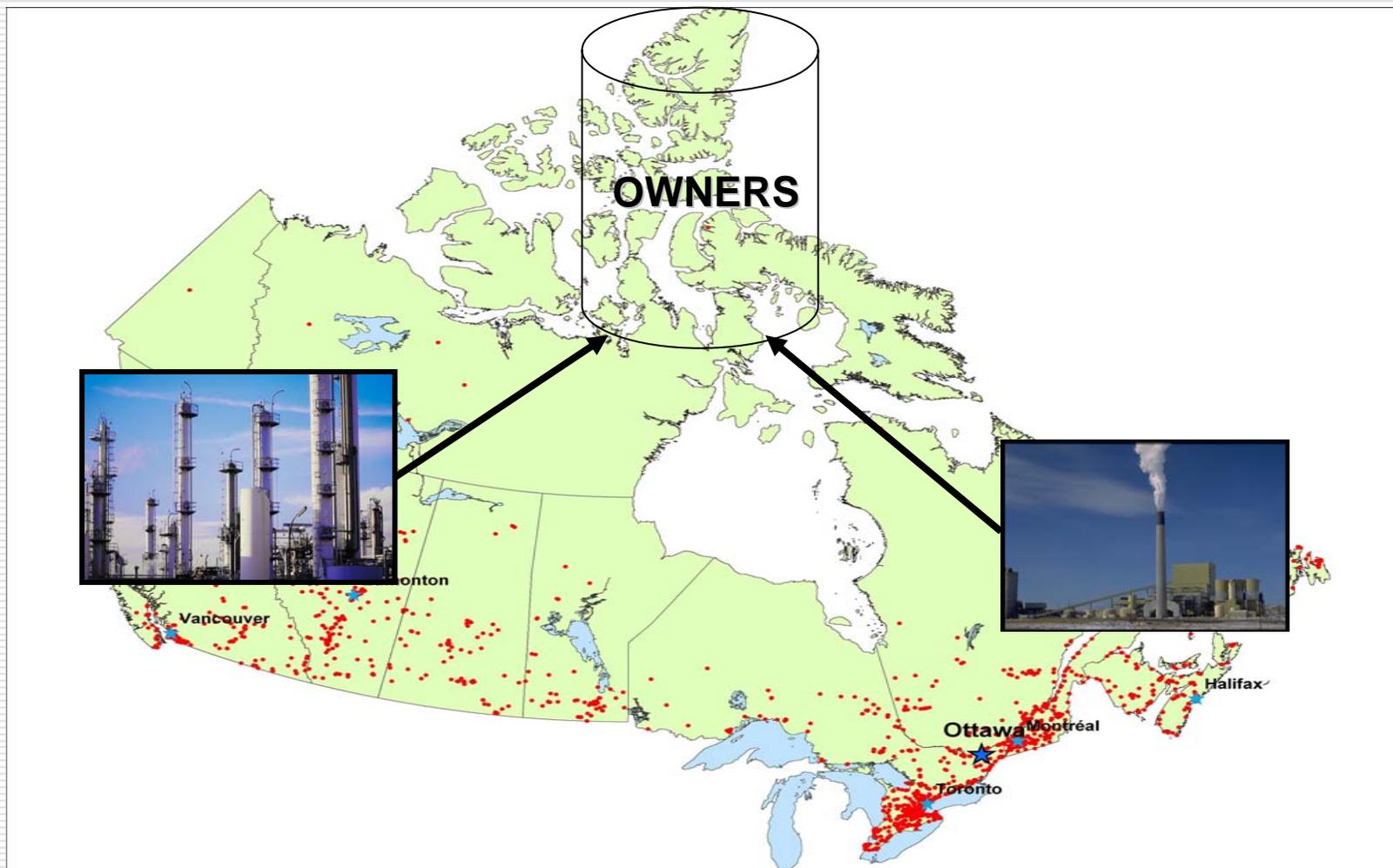
- Expecting other government and private sector organisations to join OWNERS in the future

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



Environment Canada
Environnement Canada

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 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

