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Canadian QA/QC Procedures For Industrial Emissions

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Canadian Emissions Inventory Program

- ◆ Collection of industrial releases through the Canadian PRTR program called the National Pollutant Release Inventory (NPRI)
- ◆ The NPRI collects information for more than 323 substances for all media, including the Criteria Air Contaminants (since 2002)
 - ◆ Particulate Matter (TPM, PM10, PM2.5)
 - ◆ Sulphur Oxides (SOx)
 - ◆ Nitrogen Oxides (NOx)
 - ◆ Volatile Organic Compounds (VOCs)
 - ◆ Carbon Monoxide, (CO)
 - ◆ Ammonia (NH3)



Canadian Emissions Inventory Program

- ◆ The NPRI provides Canadian industries with a “single-window” for reporting their environmental releases
- ◆ Data collected through the legal mandate of the Canadian Environmental Protection Act
- ◆ This a more centralized data collection process for key air pollutants
- ◆ Previously the provinces were responsible for the collection of the industrial emissions (through mandatory and voluntary mechanisms)
- ◆ The provinces now assist Environment Canada in the validation and improvement of the emission inventories



Emissions Inventory Program

- ◆ Reporting is mandatory and the data is required by June 1st every year
- ◆ ~7,500 industrial facilities report their releases to the NPRI
- ◆ The information is reported electronically
 - ◆ Reporting software
 - ◆ Web transmission
- ◆ Industrial emissions are supplemented with other emission estimates (area, mobile, open, biogenic sources) to ensure the comprehensiveness of the emissions inventory



Facility Information Collected

- ◆ Facility identification (location, contacts)
- ◆ Total CAC emissions by facility
 - ◆ Releases by stack, 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
- ◆ Calculation methods
- ◆ Temporal Variations
- ◆ Anticipated releases in the next 3 years
- ◆ Pollution Prevention Activities, etc.



Reporting of VOC Species required since 2003

- ◆ Reporting is required for 170 VOC substances
 - ◆ individual compounds, isomer grouping, and mixtures
- ◆ These species account for more than 80% of the National VOC emissions
- ◆ VOC 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



QA/QC Of Industrial Releases

- ◆ QC is performed on a number required data fields in the reporting software (facility information, industrial classification, etc.)
- ◆ More in-depth QC checks are performed once the data is transferred into the national database
 - ◆ Comparison of reported releases with previous year releases
 - ◆ Identify facilities with % changes greater than 10% or 20%, depending on the substance
 - ◆ Examine minimum and maximum values reported for selected pollutants (dioxins & furans, HCB, Mercury)
 - ◆ Review estimation codes and reported comments for facilities reporting large releases



Quality Control of Industrial Emissions

- ◆ Identify facilities that:
 - ◆ reported releases for a substance in the previous year and not in the current year
 - ◆ reported releases in the previous year and that did not report in the current year
 - ◆ the reported emissions are equal to last year emissions
 - ◆ the sum of PM10 & PM2.5 is greater than TPM
 - ◆ did not report all 3 PM fractions (PM10, PM2.5, TPM)
 - ◆ reported VOC emissions but not the individual species
 - ◆ the sum of the VOC species is greater than the reported thresholds for VOC's but VOC releases reported
 - ◆ the sum of the individual VOC species emissions is greater than the total VOC emissions



Quality Control of Industrial Emissions

- ◆ Verification if the industrial classification is different from the previous year
- ◆ Examine the reporters that reported in the current year but not in the previous year
- ◆ Generate list of top 50 polluters for each substance and industrial sector and compare to the previous year's top 50 list (national, regional level)
- ◆ Compare reported CAC emissions with other emissions data and emission inventories compiled by the federal, provincial, and regional governments
(performed in collaboration with the provincial governments)



Quality Control of Industrial Emissions

- ◆ Comparison of facility emissions with similar U.S. facilities
- ◆ Facilities are contacted by phone, mail, e-mail depending on the type of problem and the additional information requested
- ◆ ~1000 facilities have been contacted as part of the 2003 QC process
 - ◆ Obtain more detail information on production and material consumed
 - ◆ Review estimation methods
 - ◆ Verify that all the emission sources were included in the calculations
 - ◆ Verify the use of the latest and appropriate methodology and emission factors

Approach To Data Quality Improvement

- ◆ Preparation of sector specific guidance documents
 - ◆ Focus on sectors that do not have industry association guidance documents - e.g. Cement and Grain Industries
- ◆ Guidance document include information on
 - ◆ Emission sources
 - ◆ Estimation methods
 - ◆ Case Studies with simple step by step examples of calculations
 - ◆ Identify other reference documents
- ◆ Development of calculation tools (CAC calculation/VOC speciation)
- ◆ Calculation spreadsheets (for specific emission sources and pollutants)

Approach To Data Quality Improvement

- ◆ Technical Help Desk available for reporters
- ◆ Information sessions are organized across the country
 - ◆ inform reporters about the reporting requirements
 - ◆ Provide training on the reporting software and calculation tools
 - ◆ Assist facilities in estimating emissions (~25 sessions/year)
- ◆ Collaborate with industrial associations on the development and improvement of their estimation guides/codes of practice



Approach To Data Quality Improvement

- ◆ Public access to the facility emissions through the web and various reports has fostered emission measurements for selected industries
- ◆ Environment Canada also co-funds emission measurements to improve the emission estimates, and develop VOC speciation profiles
- ◆ Comparison of emissions and air quality measurements for selected regions and feedback obtained from air quality modelers allows Environment Canada to focus its efforts to improve the emission estimates for selected emission sources through technical studies and measurements

Next Steps For The QA/QC Process

- ◆ Continue the annual desktop reviews
- ◆ Modify the NPRI reporting criteria to require facilities to report process level statistics, emissions, and speciation of PM emissions
- ◆ Will allow Environment Canada to perform the QA/QC in a more timely fashion
- ◆ Initiate on-site facility inspections
 - ◆ Legal technicalities to resolve
 - ◆ Requires enforcement officer/inspector and technical expert
 - ◆ Review purchasing records
 - ◆ Review material safety data sheet
 - ◆ Review inventory records (raw materials, products, etc.)
 - ◆ Assess how representative is the measurement data used
 - ◆ Identification of non compliance with program requirements
 - ◆ Provide recommendation for estimation improvements