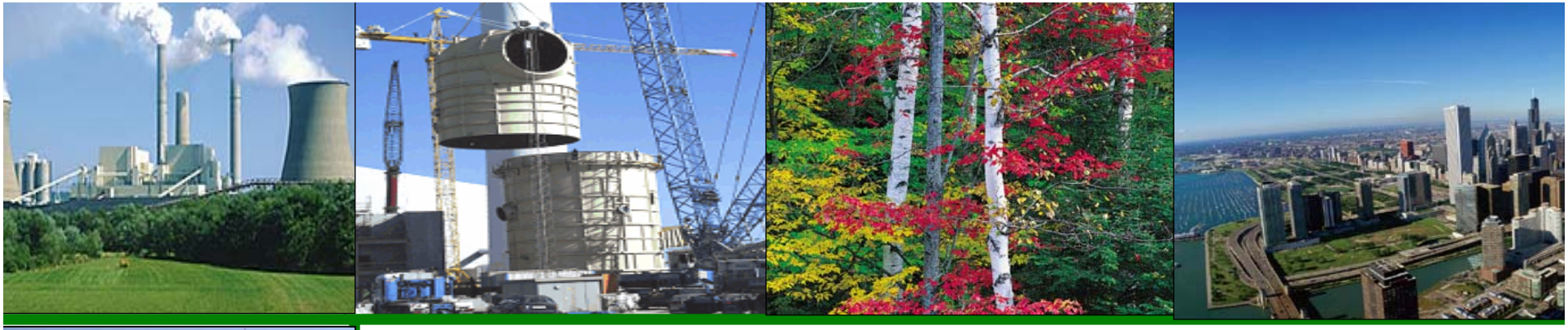


Program Implementation: Emissions Monitoring, Reporting and Verification

Presentation for
Centro de Estudios Públicos
by
U.S. Environmental Protection Agency
Office of Air and Radiation

September, 2006

CLEAN AIR MARKET PROGRAMS

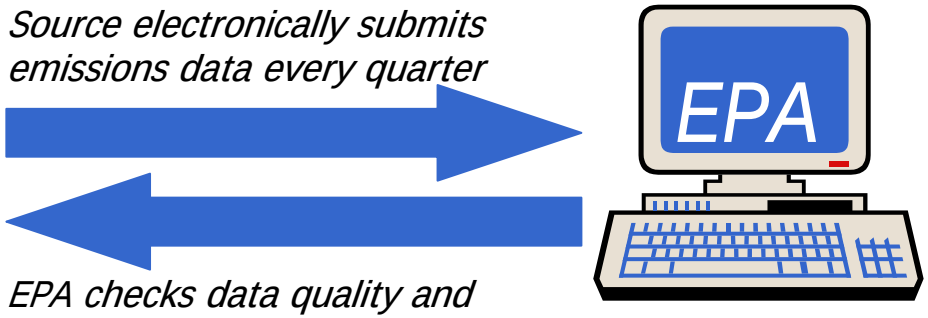
UNITED STATES • ENVIRONMENTAL PROTECTION AGENCY •

General EPA Monitoring Program

- EPA specifies measurement and quality assurance requirements (i.e. how to monitor)
- Sources install and maintain measurement equipment
- Sources perform frequent quality assurance testing
- Sources measure and report emissions
- EPA/States perform electronic and on-site audits and observe monitoring testing
- Built-in regulatory incentives for good quality:
  - Substitution methods for monitor missing data periods
  - Quality assurance testing frequency based on monitor performance

Electronic Reporting and Feedback

Source electronically submits emissions data every quarter



EPA checks data quality and provides automated feedback to source

	Reporting Period or Quarterly	Cumulative Annual or Cumulative Ozone Season	EPA Accepted
SO2	2633.4	5629.1	2633.4
CO2	230774.0	601228.0	230774.0
Heat Input	2249279.0	5013635.0	2249279.0
NOx Rate	0.3	0.3	0.3

Monitoring Data Collected by EPA

- Emissions Data
  - Acid Rain Program
    - SO_2 mass, CO_2 mass, NO_X emission rate (lb/mmbtu), heat input
  - NO_X Budget Trading Program
    - NO_X mass, heat input
- Hourly operating parameters
  - Operating time, gross electrical load or steam load
- Quality assurance (QA) tests performed and results
- Other unit information
  - Source category (electric utility, cogeneration, industrial boiler, etc.), unit type (wall-fired boiler, combustion turbine, etc.), installed pollution control equipment, fuel types combusted, monitoring methodologies and monitoring equipment

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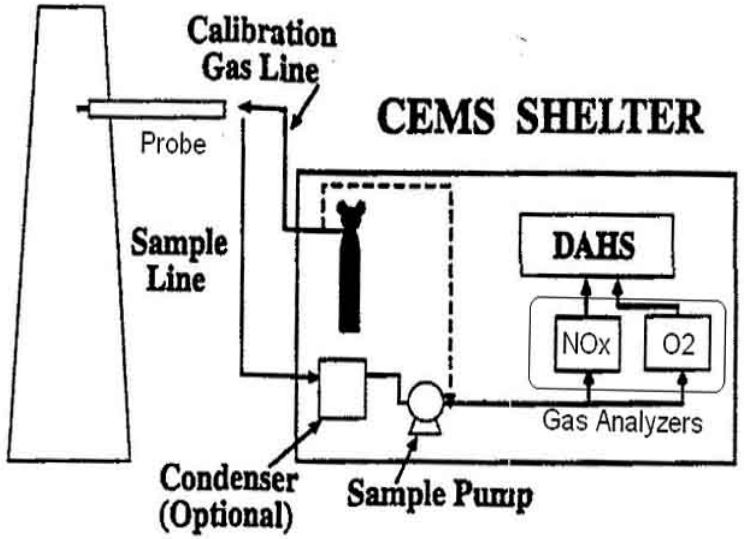
How Data is Collected by EPA

- Continuous emission monitoring systems (CEMS)
  - Direct measurement of SO_2, CO_2, and NO_X emissions at stack exit
  - Measurement of heat input from stack flow and diluent (CO_2, or O_2) measurements at stack exit
- Fuel flow monitoring
  - Fuel flow meter and fuel analysis for the sulfur, carbon and heat content of the fuel
    - Used to estimate emissions for SO_2, CO_2, and Heat Input from fuel input
- Load based NO_X correlation curves
  - Uses fuel flow monitoring for gas and oil to obtain heat input
    - NO_X emission rate testing is performed to create a NO_X Correlation Curve of NO_X Emission Rates
    - Emissions are estimated by interpolating off the correlation curve
- Low Mass Emission Units (LME)
  - Uses a default emission factor and heat input
    - Gas and Oil fired units only with low SO_2 or NO_X emissions

CEMS Principles

- Representative sample of the flue gas is continuously withdrawn from the stack, transported to a CEMS shelter and analyzed
- Typical components of a CEM system
  - Probe
  - Sample lines
  - Filters
  - Moisture removal system or a dilution probe
  - Pump
  - Analyzer



Substitute Data for CEMS

- There are 4 "tiers" of Substitute Data for CEMS
- The Substitute Data "tiers" are based on the Percent Monitor Availability (PMA)
- As the PMA lowers the required Substitute Data value becomes more conservative
  - Designed to encourage high PMA (complete data record)
  - PMA typically exceed 98%
- Less than one percent (0.68%) of hourly SO_2 data is substitute data
  - 76% is Hour Before/Hour After Average (not conservative)
  - Only 3% is Maximum Potential (most conservative) which is less than 0.02% of all SO_2 data reported using CEMS.

Quality Assurance Tests for CEMS

- Initial certification tests
- Re-certification tests
- Quality assurance tests
- Data verification tests (MDC, TTFA)

- Relative Accuracy Test Audit (RATA)
  - Stack test compares monitor to reference method
- Bias Test (uses RATA data)
  - Ensures monitor is not reading consistently low
- Quarterly linearity check
  - Tests monitor with 3 known reference gases
- Daily calibration error test
  - To detect monitor "drift"

CLEAN AIR MARKET PROGRAMS

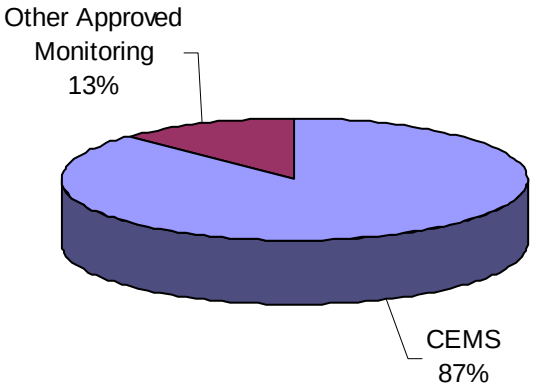
Non-CEMS Quality Assurance Tests

- Initial certification tests
- Re-certification tests
- Quality assurance tests
- Data verification tests (MDC, TTFA)

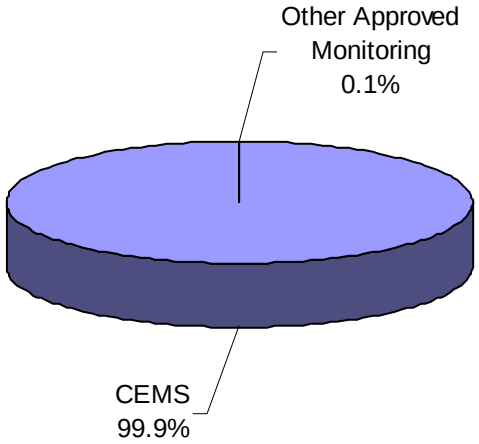
- Fuel flow meter checks
  - Stack test compares monitor to reference method
- Periodic stack testing
  - Ensures default values are representative and that unit is eligible for non-CEMS monitoring methodology

Monitoring Methodologies
NO_X Monitoring

NOx Methodology by # of Units



NOx Methodology by Tons of Emissions

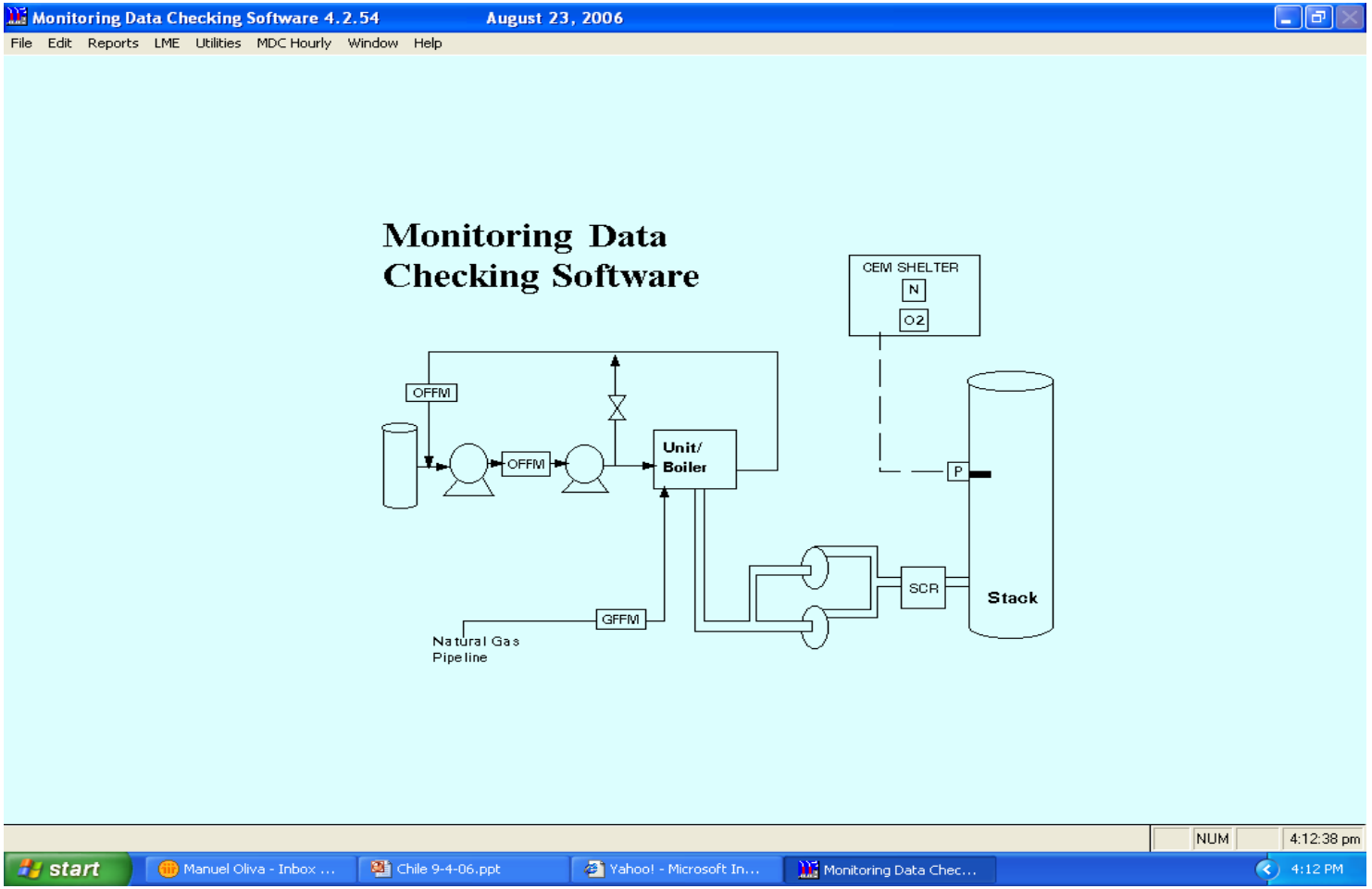


- For monitoring NO_X, 87% of the units use CEMS. These units account for 99.9% of the emissions.
- 13% of the units use approved alternative monitoring for NO_X. These units account for less than 0.1% of the total NO_X emissions.

EPA Audit Process

- Sources
  - Conduct quality assurance/quality control (QA/QC) tests
  - Generate an Electronic Data Report (EDR)
  - Perform self-checks by running the EDR through auditing software and correcting the errors
  - Submits the EDR to the Emissions Tracking System (ETS)
- EPA
  - Perform a series of formatting & calculation checks
    - Accept or reject EDR and send automatic feedback to source
  - Perform E-Audit of EDR data
    - Check data to ensure that the correct emissions data and QA test data is submitted specific to each source
    - Send automatic feedback accepting EDR or requesting re-submittal
  - Perform field audits

EPA Monitor Data Checking Software (MDC)



EPA Monitor Data Checking Software (MDC)

MDC Hourly Checking Software — (ORIS Code 47), Unit ID 5, Year: 2004 Quarter: 1,2 - [QA Sta]

File | Review Quarterly Report | Reports | Utilities | Window | Help

ORIS Code: 47 | Plant Name: | State: | Unit/Stack ID: 5

SO2 System | NOX System | CO2 System | FLOW System | HI Diluent System

Date	Hour	System ID	RATA Status	NOX Component ID	NOX Component Type	NOX Component Linearity Status	Diluent Component ID	Diluent Component Type	Diluent Component Linearity Status
05/12/04	14	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/12/04	15	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/12/04	16	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/12/04	17	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/12/04	18	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/12/04	19	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/12/04	20	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/12/04	21	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/12/04	22	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/12/04	23	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/13/04	00	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/13/04	01	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/13/04	02	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/13/04	03	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/13/04	04	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/13/04	05	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/13/04	06	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/13/04	07	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/13/04	08	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/13/04	09	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC
05/13/04	10	200	OOC-No Prior Check and No RT 556	122	NOXA	IC	123	CO2	IC

Totals for All Hours		Totals for Filtered Hours	Current Filter
Total Hours:	1834	No Filter	No Filter
Total In-Control Hours:	0		
Total Out-of-Control Hours:	1834		
Total Invalid Hours:	0		

Yahoo! - Microsoft Internet Explorer

start | Manuel Oliva - Inbox ... | Chile 9-4-06.ppt | Yahoo! - Microsoft In... | Monitoring Data Chec... | MDC Hourly Checking... | 4:10 PM

CLEAN AIR MARKET PROGRAMS

Implementation of Program
EPA Analysts

- Answer daily source phone call, e-mails and letters
  - Source questions about monitoring equipment and requirements, QA test procedures and requirements, and rule interpretation
  - Local regulatory agency office or other group questions
- Evaluate quality of data for sources in region
  - Send sources audit feedback and respond to questions about feedback
- Conduct periodic field audits at sources
- Work with other analysts to develop policy and issue policy guidance
- Work with other analysts to amend and update rules
- Evaluate and respond to petitions from sources
- Prepare technical reports and papers on program performance and future programs

Petitions to the Rule

- EPA allows the source representative to petition the Administrator requesting an alternative to any requirement in the rule
- Petitions have been made to EPA for the following:
  - Process or fuel not in rules (i.e. tire derived fuels)
  - Source fails to conduct or fails a quality assurance test and wants data to be deemed quality assured or an alternative to the substitute data required by the rule
  - Source requests to use alternative monitoring method (i.e. PEMS, fuel flow monitoring, etc.)
  - Source requests to use alternative quality assurance tests or methods for required tests
  - Other special considerations

Petition Process

- Source submits petition in writing to EPA
  - Petition contains reason for request, specific request and any technical data, engineering analysis, or data to support request
- EPA evaluates petition
  - EPA analyst will communicate regularly with source to request additional data, understand petition and provide guidance
  - EPA analyst evaluates technical merit
  - EPA analyst with help of legal counsel evaluate legal implications
- EPA issues a petition response
  - Although petition response can be appealed, no source has appealed a petition

Summary

- Implementation of a successful monitoring program relies on:
  - Regulatory Agency
    - Clear and consistent regulations
    - Guidance for industry and other regulatory agencies
    - Open dialogue with industry and public
    - Consistent and Transparent Monitoring Rules and Methods
    - Quality assurance / quality control procedures
    - Trained staff and auditors
  - Industry
    - Open dialogue in program development
    - Program ownership
    - Full compliance with quality assurance / quality control requirements
    - Dedicated and trained staff