Technical Design of CEMS Monitoring for Particulate Matter

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Gujarat Pollution Control Board

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Achievements: Design of Continuous Emissions Monitoring System

- Under CPCB leadership, design of a monitoring protocol that will both enhance present regulation and support ETS.
  - Use of CEM to calculate particulate emissions load (i.e., mass)
  - Builds on and exceeds monitoring protocols in use in other trading regimes

Sound basis for ETS

- Peer reviewed by a range of experts and tested in the field
- Through smart design and work with vendors, driven cost down from Rs. 20 lakh to Rs. 5 lakh (GBP 5k) per unit

CEMS Specifications

- Comprehensive CEMS specifications developed by the Technical Committee and to be published by CPCB that guide industry in selection, installation, and maintenance of CEMS monitoring equipment

- Peer reviews of CEMS specifications conducted by numerous experts:
  - **On specifications document:** "*As the basis for a pilot project this document forms a sound starting point and the learning and data from the wider rollout of CEMS will provide opportunities to refine and modify procedures as needed.*" – Alan Leonard, UK CEMS expert and contributor to MCERTS standards
  - **On monitoring as basis for trading: "***Overall the emissions [monitoring] regime, borrowing heavily from U.S. EPA and other standards, appears to be a sound basis for emissions trading..*" – Professor Richard Schmalensee, MIT
  - **On CEMS accuracy: "***averaging of individual measurements over time is one of the many important dimensions of the implementation of particulate matter (PM) monitoring systems ... random errors that appear when using mass flow measurements (e.g., triboelectric techniques) or a combination of concentration and mass flow measurements will average out in the long run to produce the true average mass flow value.*" – Professor Laura Anadon, Harvard University

Implementation: Monitoring Framework

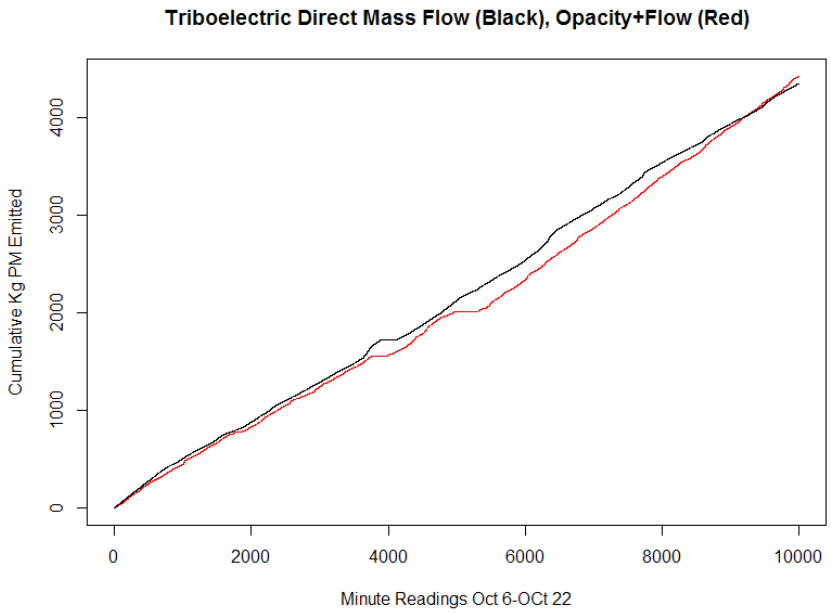
- Developed accuracy standards for measurement of PM mass flow
  - Joint work by technical committee of CPCB and SPCB and JPAL, with input from expert consultants
  - Main constraint is expertise in calibration and data quality

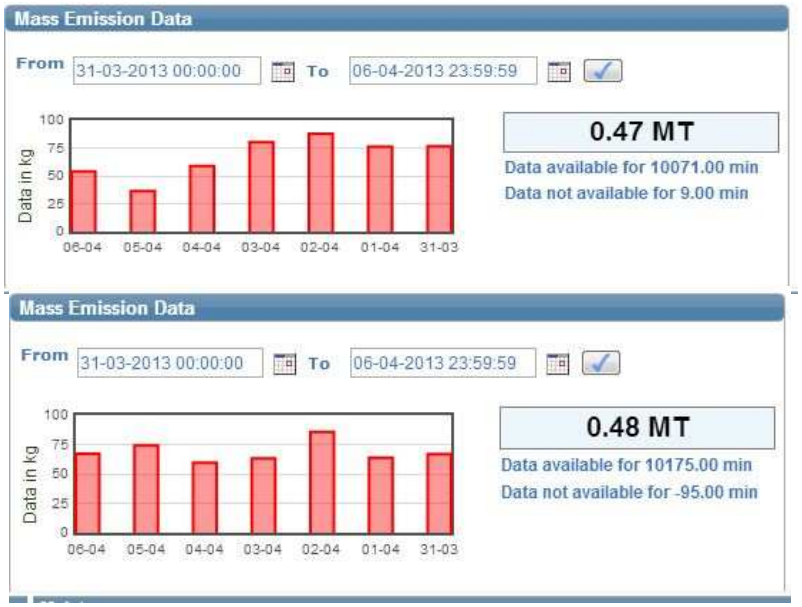
- Developed and field tested architecture for secure transmission of PM emissions data from industry sites to regulator servers – Data Acquisition and Handling System (DAHS)

Data Acquisition and Handling System

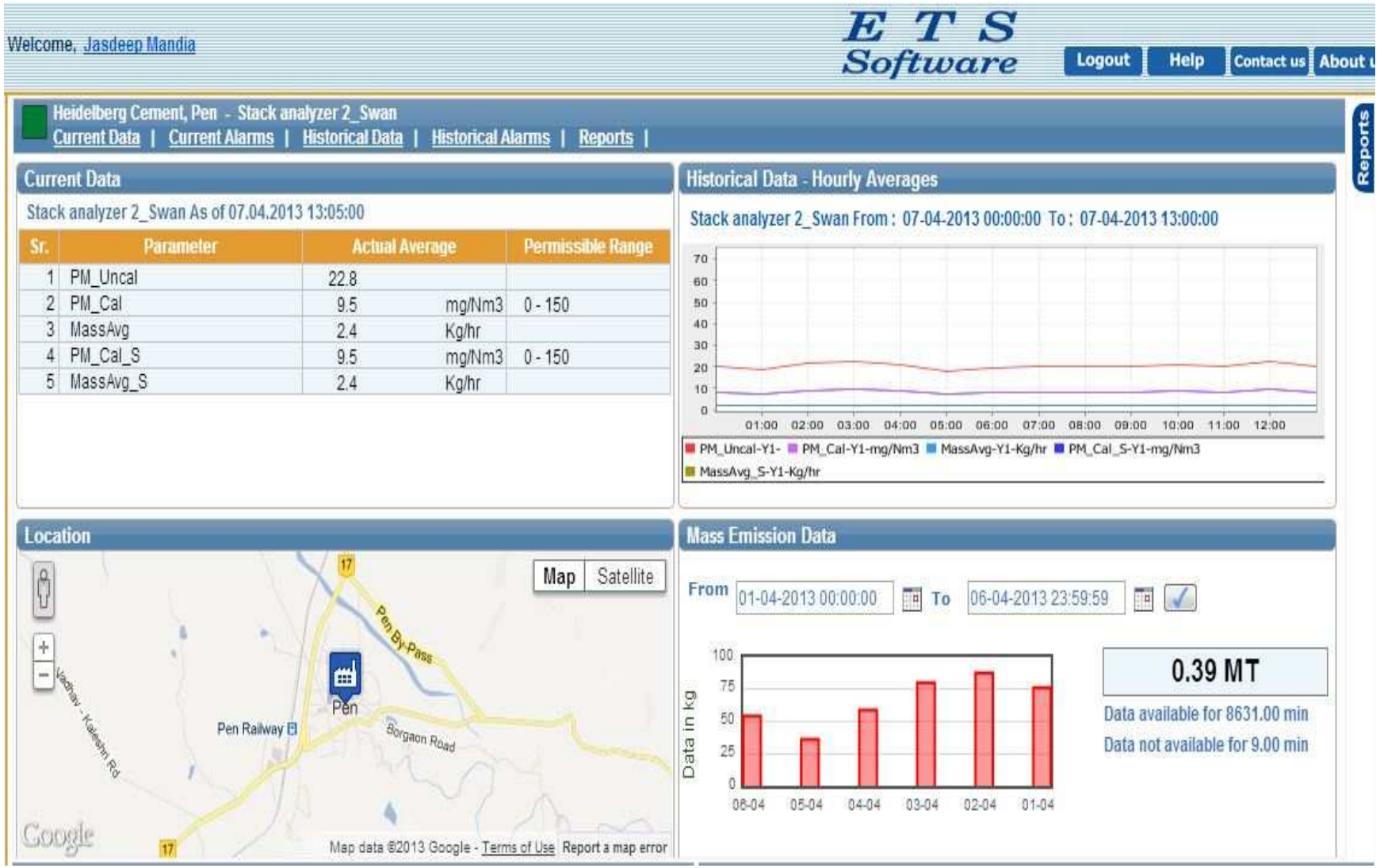
- Data Acquisition and Handling System (DAHS) being designed to allow secure data transfer between industry sites and SPCB servers

Figure 2: Real-time mass flow readings from devices installed at Maharashtra industry site





Implementation: Monitoring Framework



Capacity Building for Implementation

CII Workshop, New Delhi – March 2013

MPCB Workshop on ETS, Dombivali – April 2013

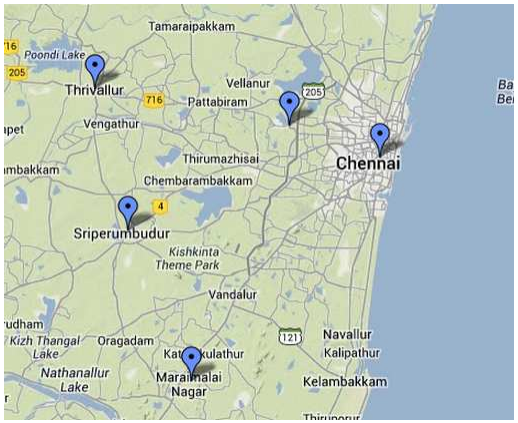

GPCB Workshop on ETS hosted at South Gujarat Textile Processors Association, Surat – March 2013


MPCB Workshop on ETS, Aurangabad – April 2013


Industry site visit to view CEMS equipment

Next Steps: CEMS Installation and Rollout

- Implementation of CEMS includes installation in all 1000+ pilot industries and connection to Data Acquisition and Handling Centres (DAHCs) at each SPCB



<u>Gujarat</u>
Pilot Area(s): Surat

<u>Maharashtra</u>
Pilot Area(s): Dombivali, Aurangabad+Jalna, Chandrapur

<u>Tamil Nadu</u>
Pilot Area(s): Chennai, Ambattur, Maraimalai, Sriperumpudur, Tiruvallur

The Path Forward