




Ted Weick  
Unit Head – Air and Climate  
BC Ministry of Environment

# TRANSITIONING B.C.'S $PM_{2.5}$ MONITORING NETWORK TO EPA FEM CLASS III SENSORS

Air & Waste Management Association, ON  
October 2011



# Outline

- Quick overview of BC network operation and structure
  - Recent history with network upgrades
  - Ministry direction
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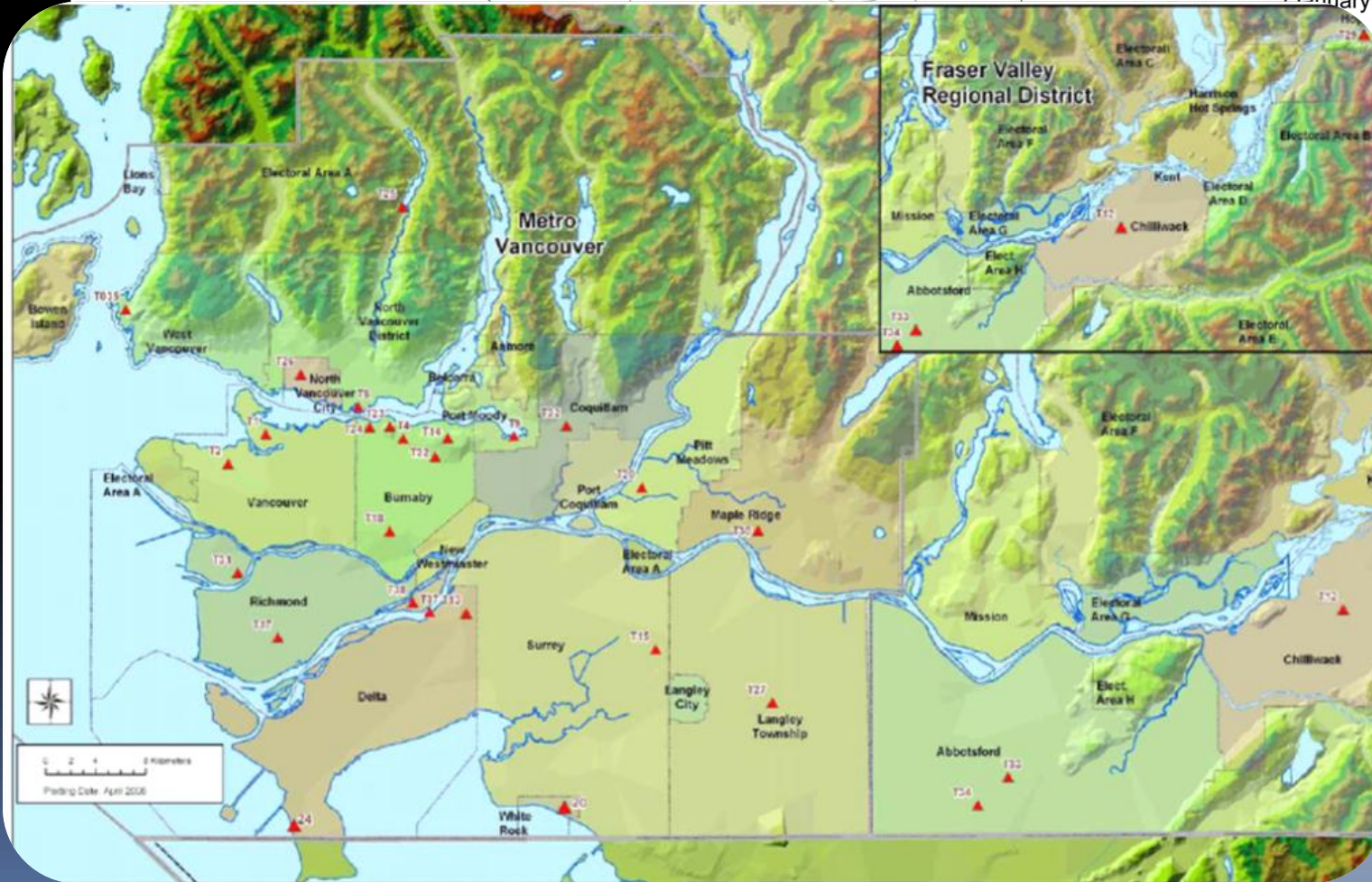
# Air Quality Monitoring in BC

- 154 sites
  - 39 (3) discrete
  - 115 (56) continuous – 58 (24) with PM
- Supported by
  - 8 Regionally based Air Technicians
  - Permittee Resources
  - 1 Network Coordinator
  - 1 Technical Specialist
  - 3 Data/Systems specialists
  - Audit Team

# Air Quality Monitoring in BC

## Active Air Quality Monitoring Sites in BC

(January 2011)



Monitoring sites for PM2.5 and PM10

# Network Upgrades

- 2009
  - Deployment of Envista FW Technology to key Ministry sites
  - Integration of Envista Suite of software for data support/reporting into core data repository
  - Implementation of new technology due to discontinued TEOM production lines
    - 1405 FDMS, BAM 1020, Grimm 180 and 365, SHARP 5030 and 5014i

# Network Upgrades

- 2009
  - Implement Envista Suite
  - Implement New PM technology
- 2010
  - Experienced difficulties with some technologies
  - Continued deployment and uptake on new technologies
    - Training, Uptake, Training
  - Initial data analysis comparing FEM Class III sensors with TEOM/Partisols

# Network Upgrades

- 2009
  - Implement Envista Suite
  - Implement New PM technology
- 2010
  - Technological difficulties
    - Pulled 1405 FDMS Units from field
  - Continued deployment and uptake
  - Data analysis
    - Typically new generation continuous monitors read higher than Partisols/TEOMs
    - Beta Attenuation technologies appeared more reliable

# Network Upgrades

- 2009
  - Implement Envista Suite
  - Implement New PM technology
  
- 2010
  - Technological difficulties
  - Continued deployment and uptake
  - Data analysis
  - **Decision Point:**
    - Implement Beta Attenuation technology
    - Continue to test other technologies in controlled fashion.



# Network Upgrades

## □ 2010

- Continued deployment and uptake
- Technological difficulties
- Data analysis
- Decision – Beta Attenuation technology

## □ 2011

- Air Meteorologist Meeting (March)

### Recommendations:

- Ministry  $PM_{2.5}$  □ FEM Class III Sensors – end of 2012
- Remove duplication in Continuous PM monitoring at Ministry Core Sites\*
- \*or after four seasons of co-located monitoring

# Network Upgrades

## □ 2010

- Continued deployment and uptake
- Technological difficulties
- Data analysis
- Decision – Beta Attenuation technology

## □ 2011

- Air Meteorologist Meeting (March)

### Recommendations:

- Ministry PM<sub>2.5</sub> □ FEM Class III Sensors – end of 2012
- Remove duplication in Continuous PM monitoring at Ministry Core Sites
- Permittee PM<sub>2.5</sub> □ FEM Class III Sensors in 2013

## PM as measured by new generation of analysers:

- typically higher than the Partisols/TEOM
  - Partisols are not necessarily run as outlined under US EPA
  - TEOM known to measure lower than actual.
- 24hr cycle run different than US EPA Reference Method
- Filters are not retrieved or stored within the tight timelines – volatiles likely lost.
- Duncan – **Good Agreement**
  - Timely filter changes
  - Sample refrigeration
- Squamish – **reasonable agreement**
  - Near timely filter changes
  - low number of combustion sources
- Vanderhoof – **poor agreement**
  - Less timely filter retrieval
  - High number of combustion sources – more volatiles

# Network Upgrades

- 2010
  - Continued deployment and uptake
  - Technological difficulties
  - Data analysis
  - Decision – Beta Attenuation technology
  
- 2011
  - Air Meteorologist Meeting (March)
    - Ministry : FEM Class III Sensors : 2012
    - Permittee : FEM Class III Sensors : 2013
  - Decision has impacts on:

Air Quality Advisories

Data Quality Objectives

AQHI

CAAQS

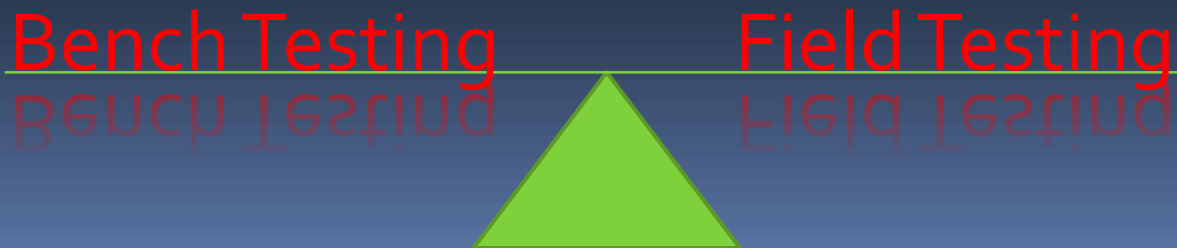
Air Shed Management

# Where are we now?

- 2011
  - Most of Ministry operated sites are outfitted with new technology
    - SHARP 5030 or 5014i
    - BAM 1020
    - GRIMM 180 for special studies.
  - Permittees are starting to implement new technologies
    - 1405 FDMS
    - BAM 1020S

# The BC Experience – Lessons Learned

- Use the data
  - Compare new and old technology to understand the differences in operational information.
- Understand the differences between **“Field Tested”** and **“In The Field”**
  - Many problems did not come up until new units were installed.
- Co-locate with existing known technology
  - Remove known technology when **and if** appropriate.
- Strike a balance between:





[ted.weick@gov.bc.ca](mailto:ted.weick@gov.bc.ca)

**QUESTIONS?**