

Characterization of Airborne Emissions from Nanoscale Operations – Learning's and Approaches to Consider

**National Nanotechnology Initiative
Nanomaterials & the Environment and Instrumentation,
Metrology, and Analytical Methods
October 6 – 7, 2009**

**Panel 8: Developing methods to determine exposure routes
October 7, 2009**



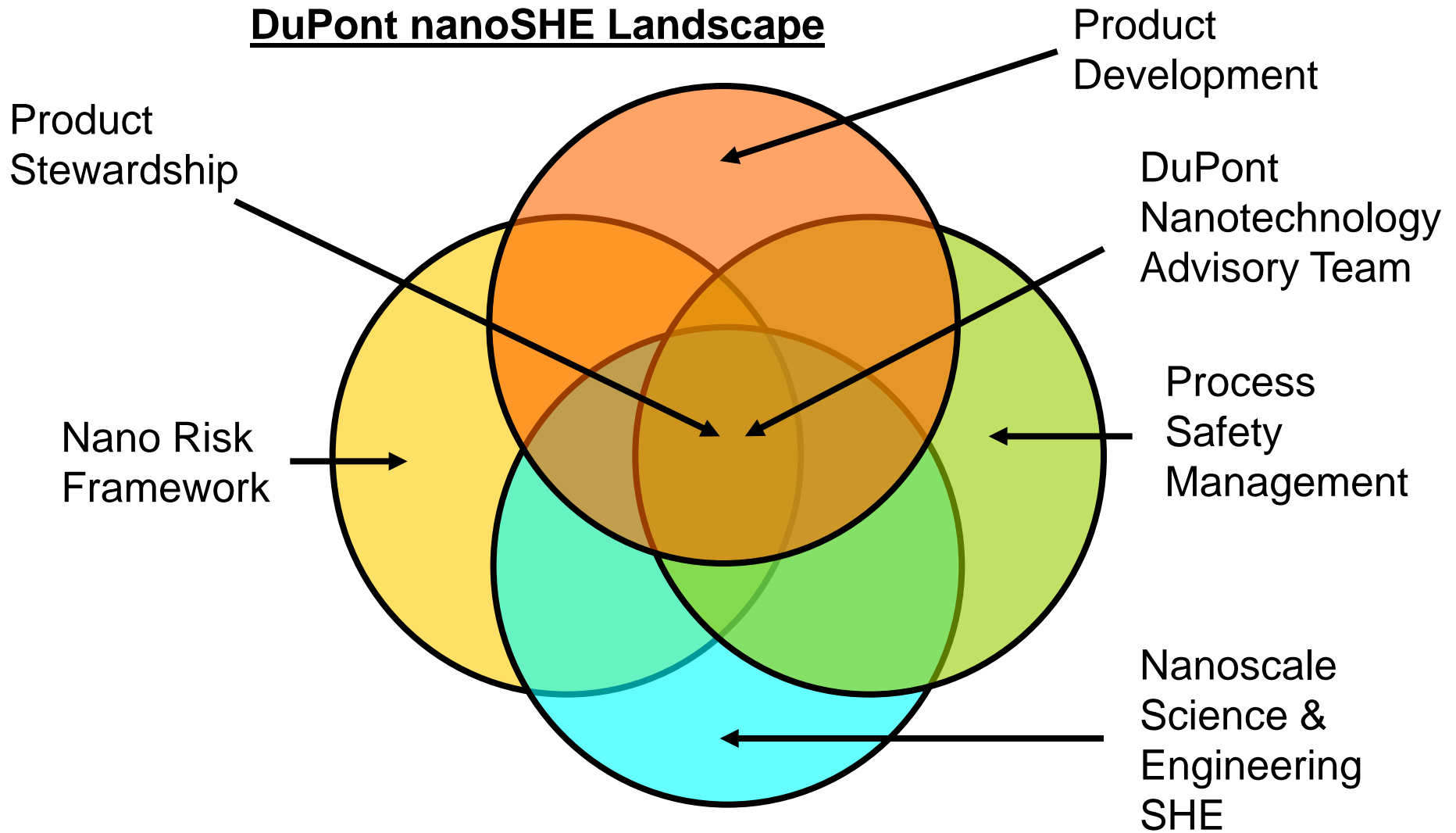
The miracles of science™

Keith Swain

Nanomaterials and the Environment

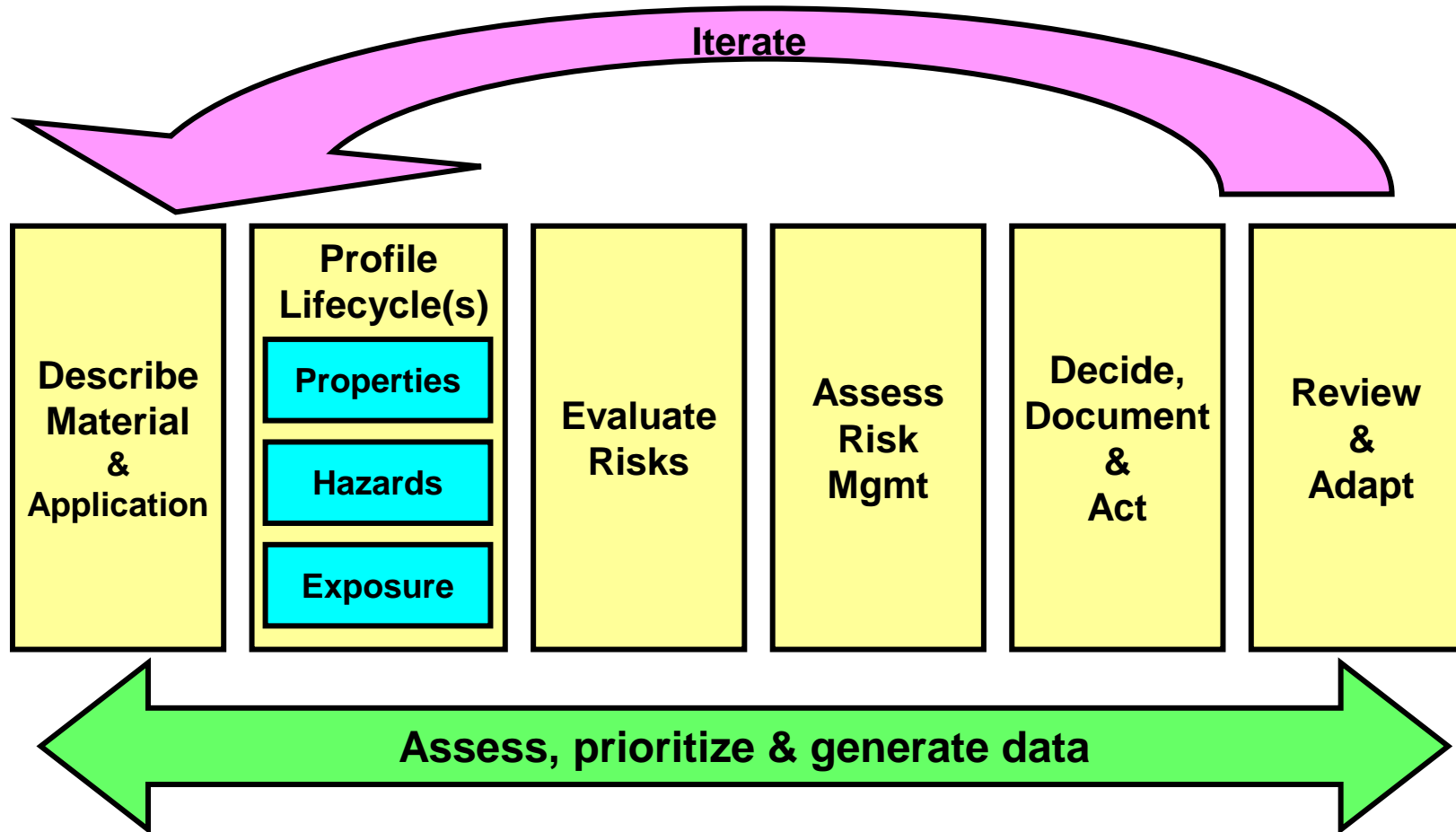
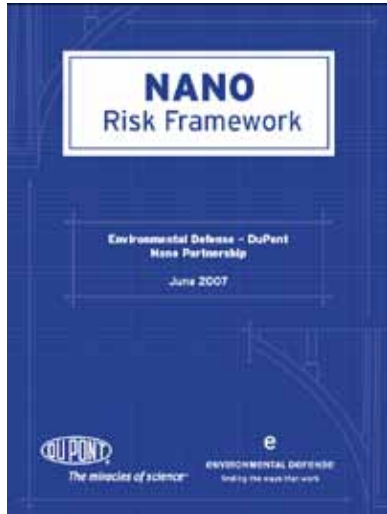
Research Need: Understand environmental exposures through identification of principal sources of exposure and exposure routes

DuPont nanoSHE Landscape



Nanomaterials and the Environment

Research Need: Understand environmental exposures through identification of principal sources of exposure and exposure routes



Nanomaterials and the Environment: Methods to detect nanomaterials and Identification of principal sources of exposure and exposure routes



\$225M +

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200#'s+

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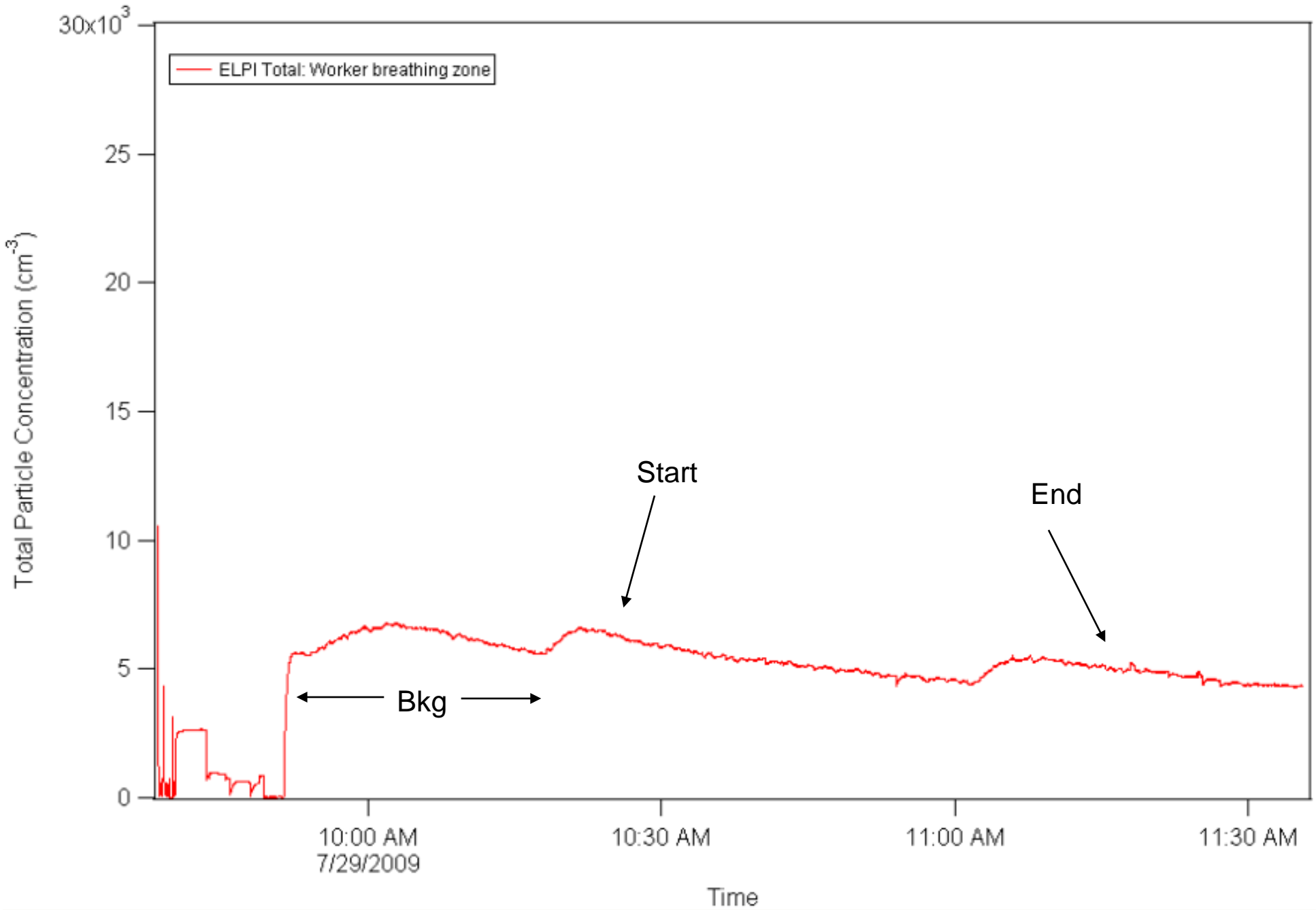
- Exposure Assessment Guidance
- NIOSH Nanotechnology Exposure Assessment Technique (NEAT)
 - OECD – Emission Assessment, Monograph #11
 - ISO/TR 27628 Inhalation Exposure Characterization and Assessment

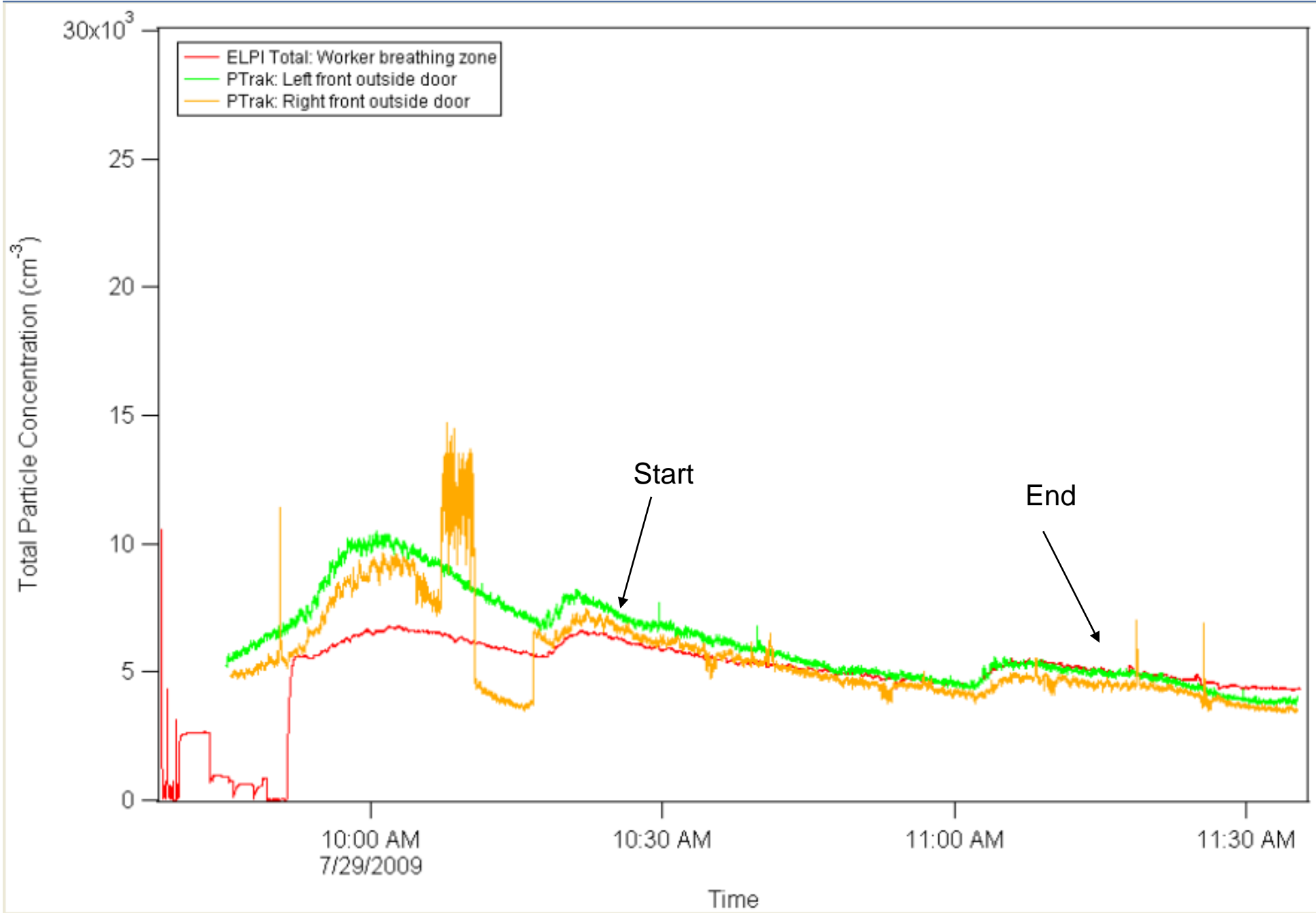
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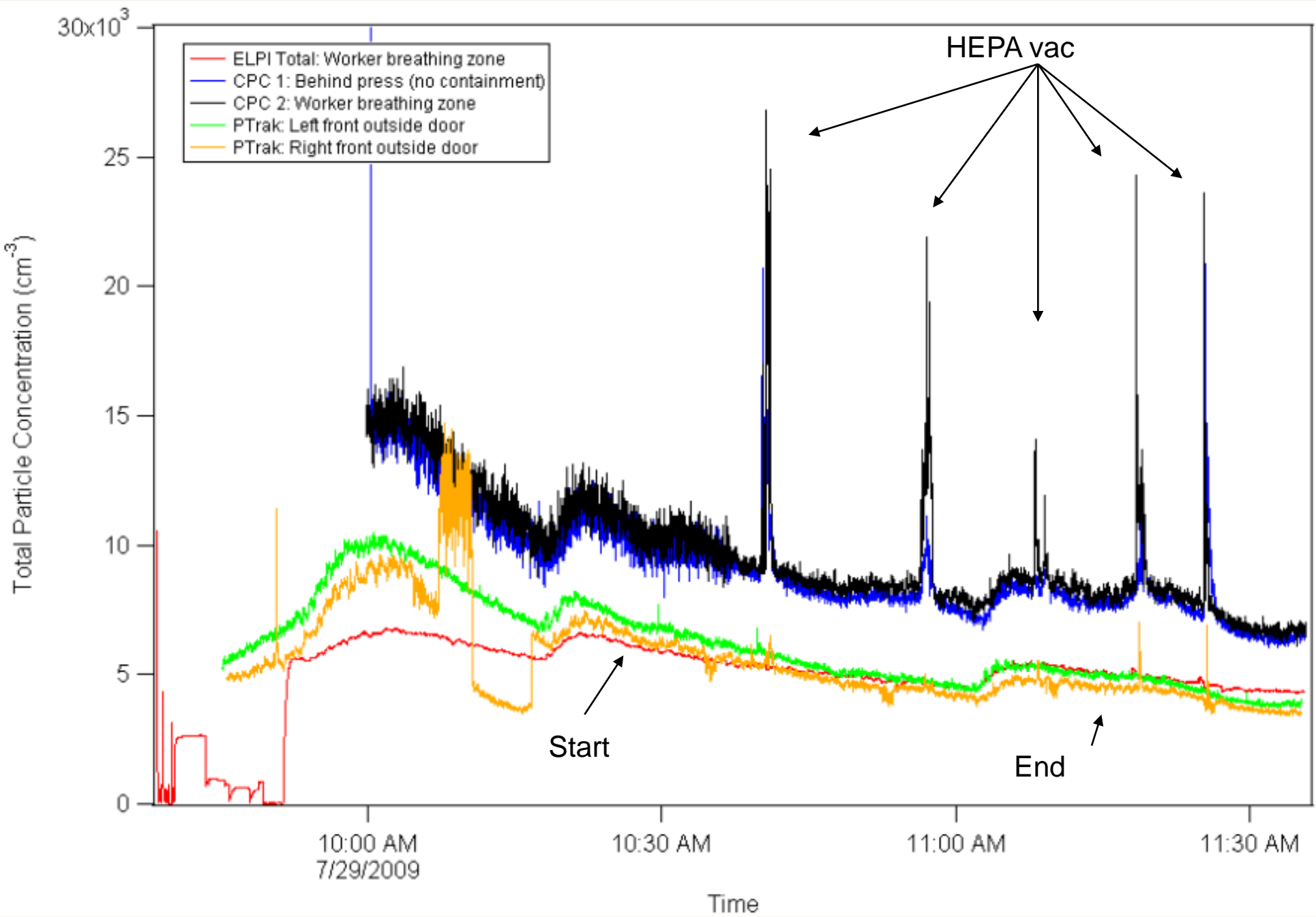


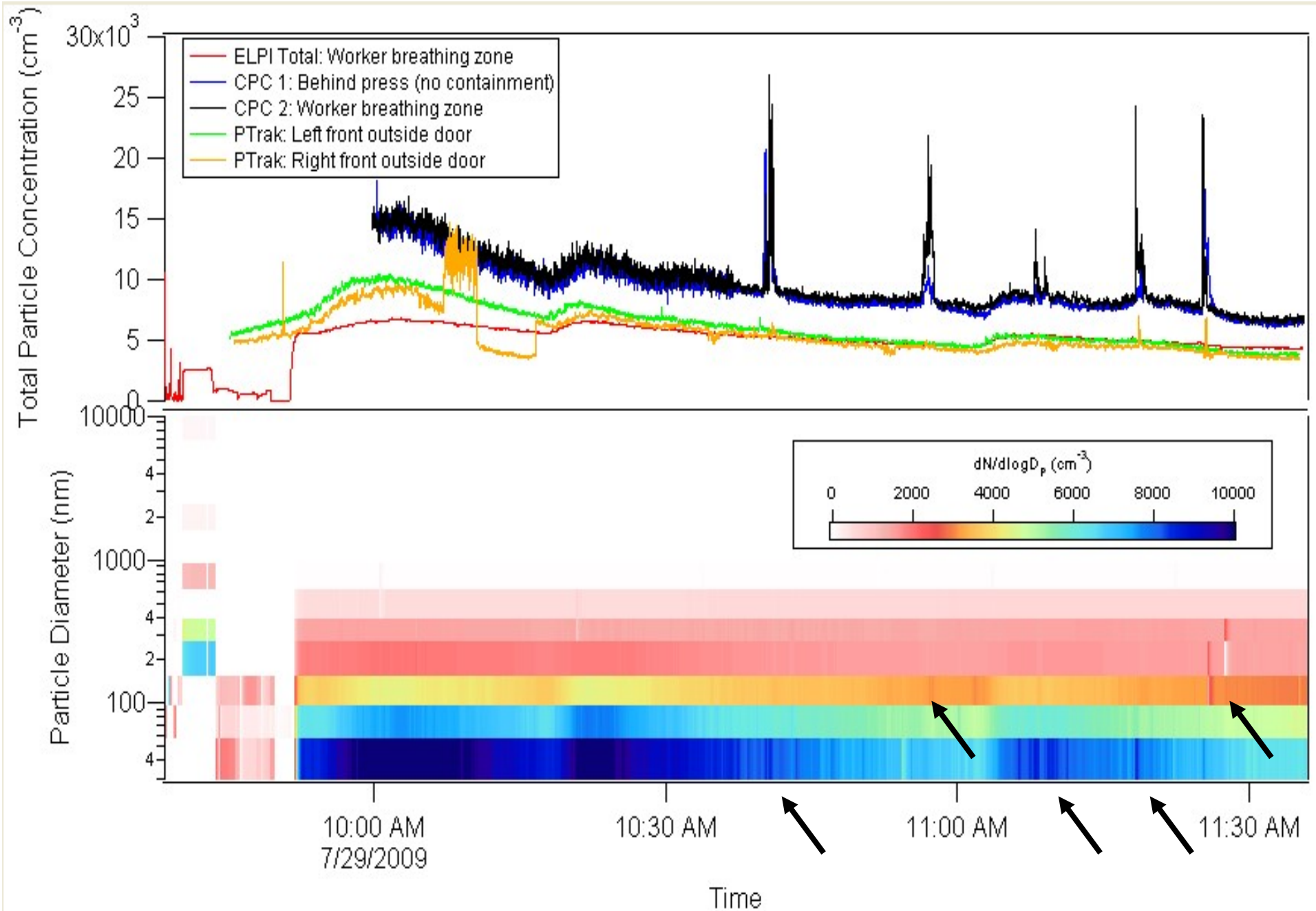
Nanomaterials and the Environment: Identification of principal sources of exposure and exposure routes from handling nanoscale material

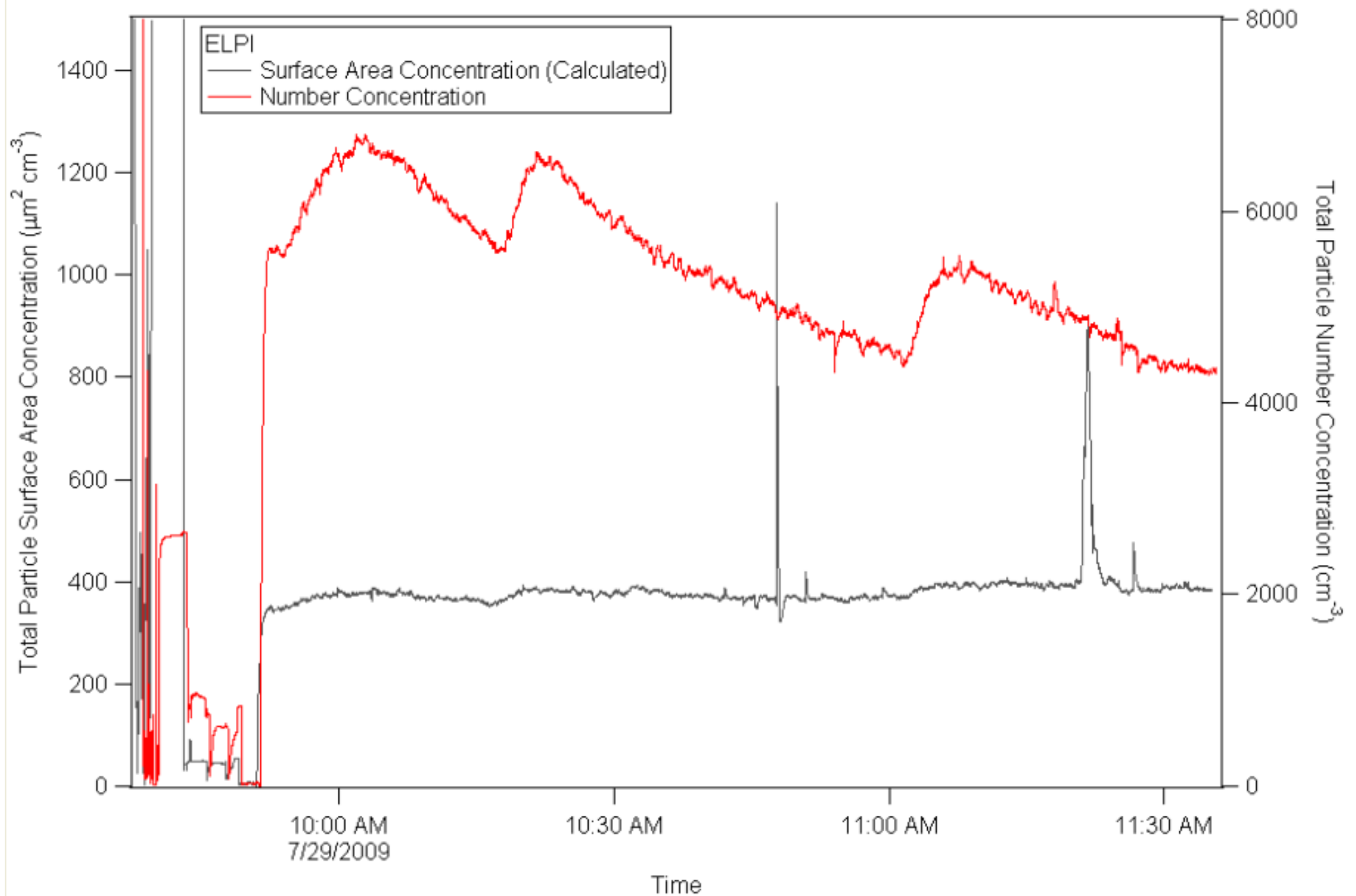


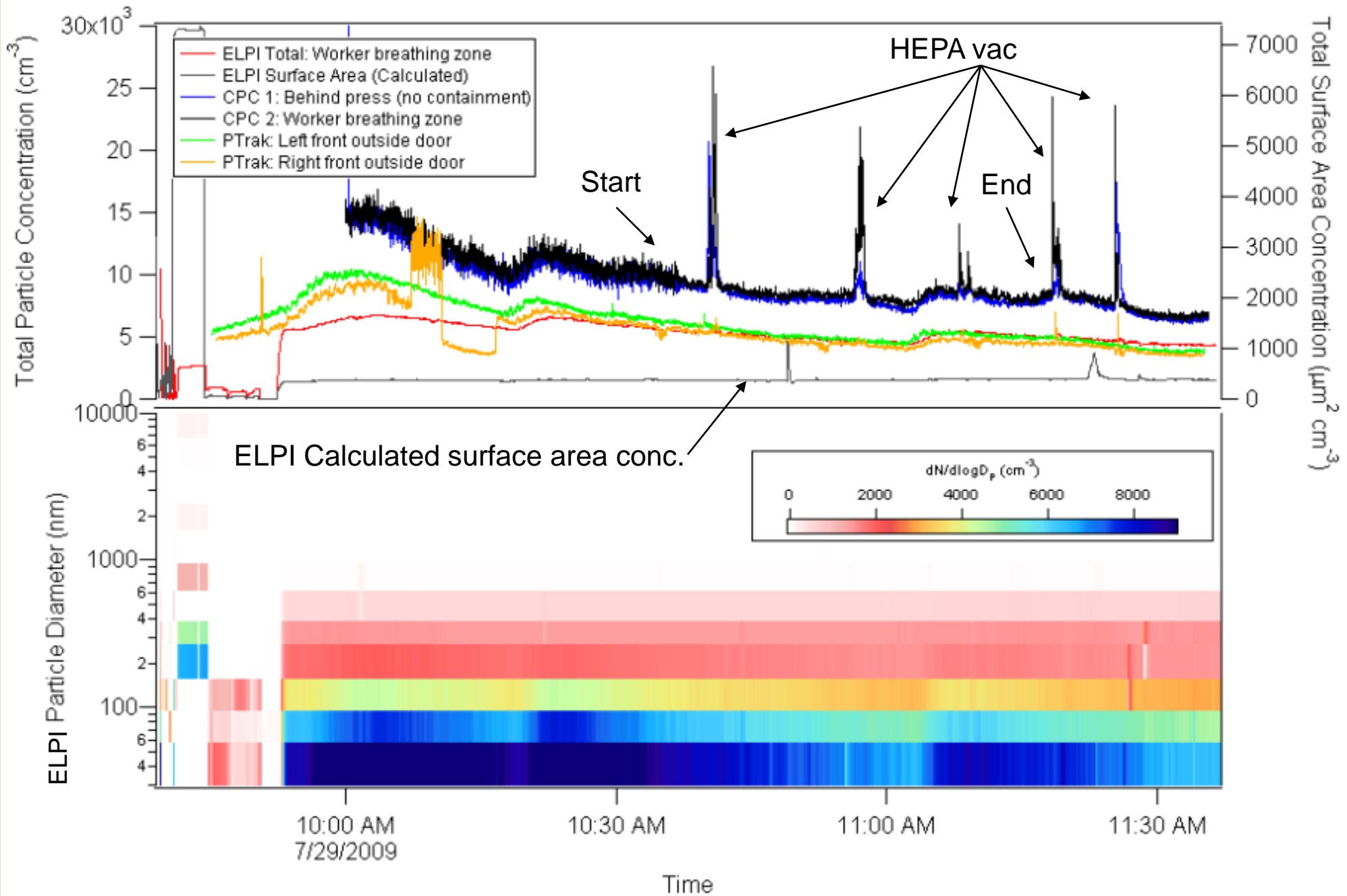


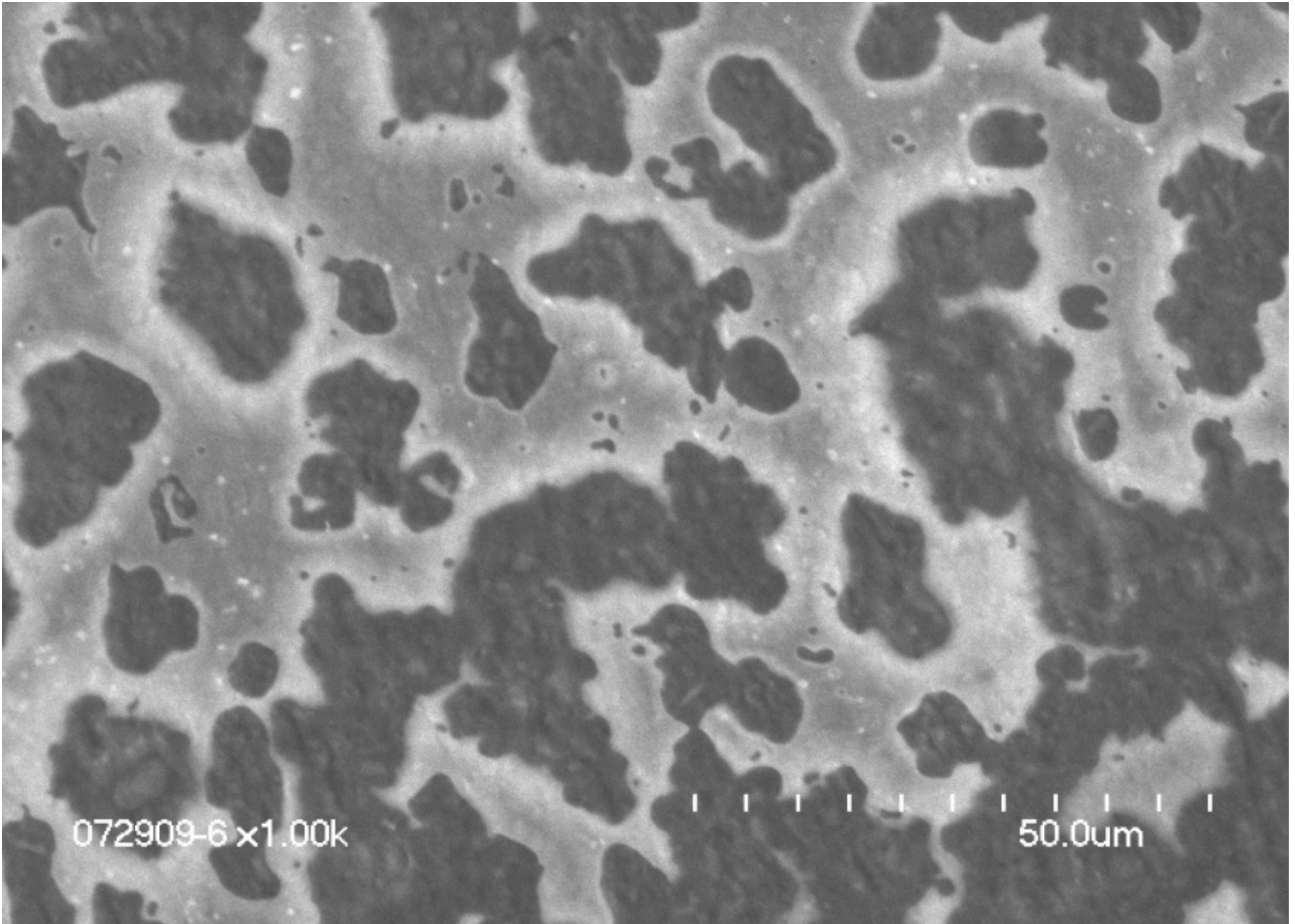












SEM/EDAX of ELPI Stage 6 (previous slide)

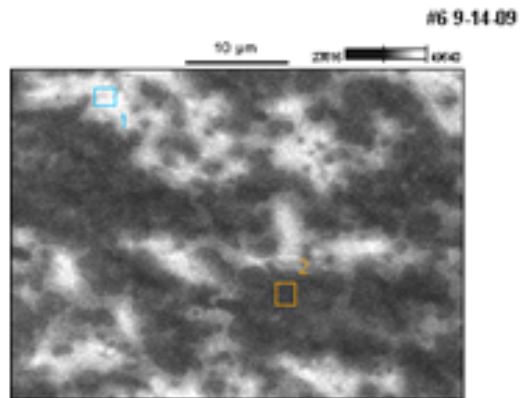


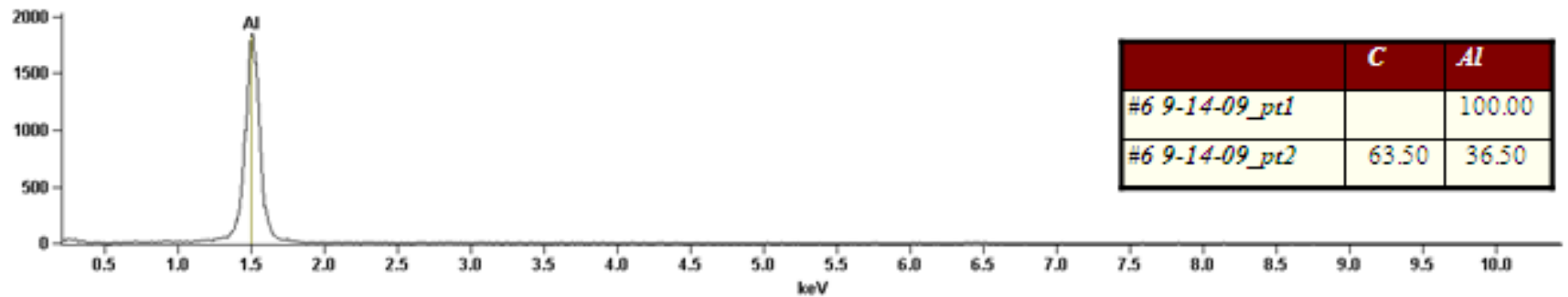
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Magnification: 3000

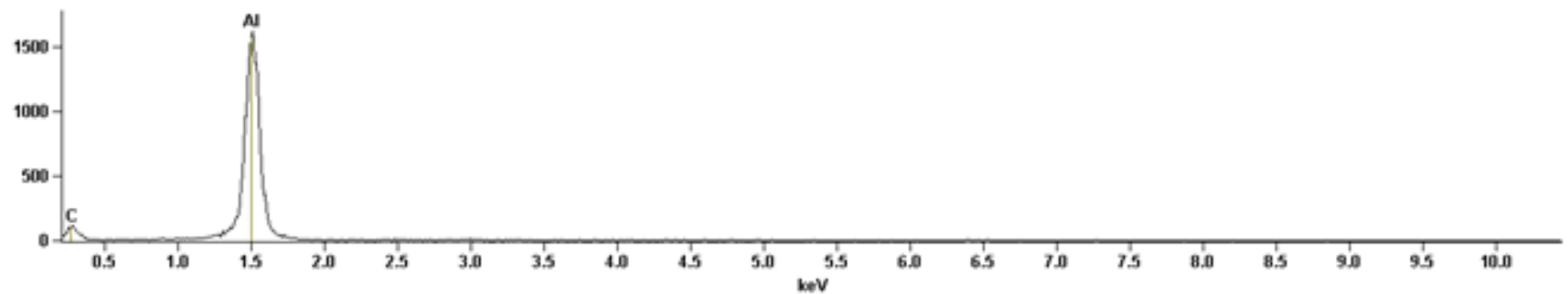
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Full scale counts: 1618

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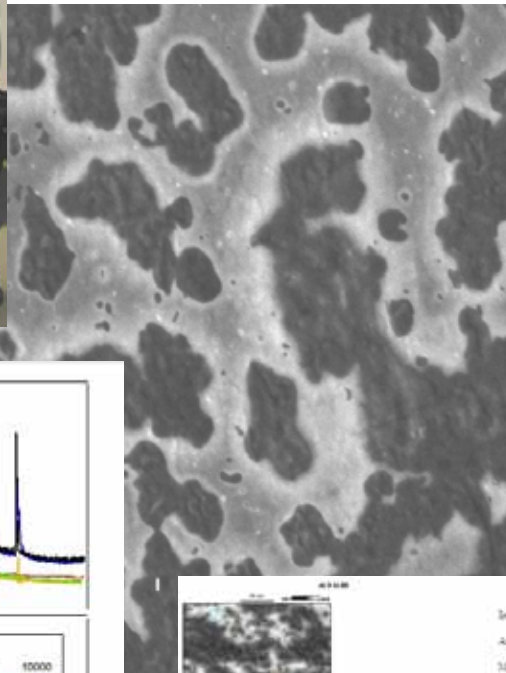


Risk Management

Facilities & Engineering Control

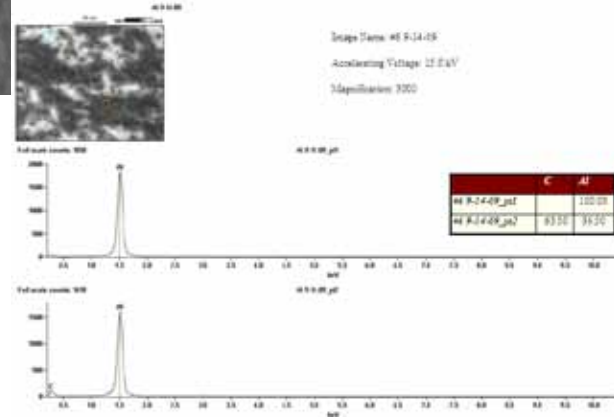
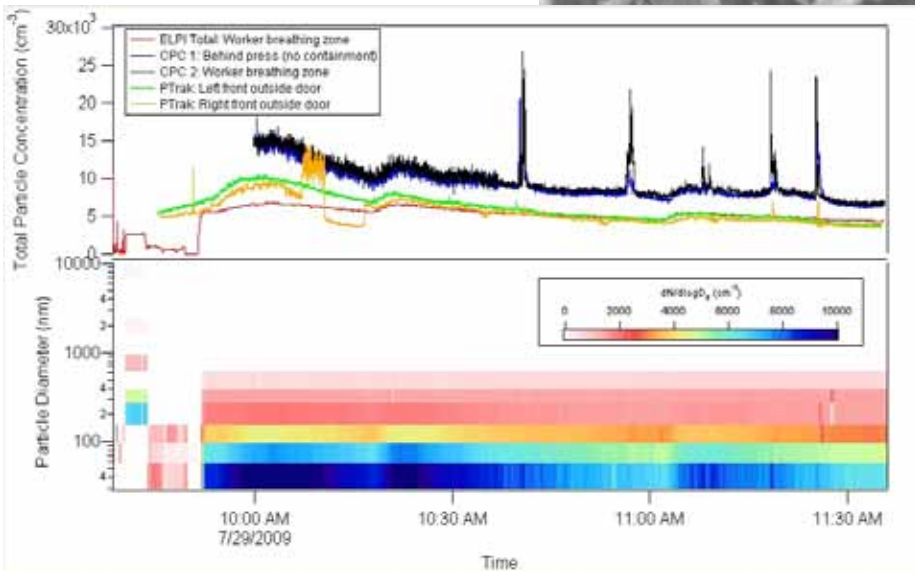
Healthful workplace

Regulatory Compliance



: Occupational Exposure Level

?



Approaches to Consider – Going forward

NNI

- Synergy and Funding: Environmental is inclusive and includes workplace Safety and Occupational Health. Need major funding to be directed to Instrument, Metrology, and Analytical Methods and Human and Environmental Exposure Assessments for workplace exposure – detection, collection and analysis.
- Outreach: Need to ensure products/results of EHS research projects are timely shared (pushed) to the target groups who need knowledge and solutions. e.g. NIOSH web site (++).

Instrument, Metrology and Analytical Methods

- Exposure Assessment Capabilities: Industrial hygiene air samplers are needed now, that are effective, reliable, personal/portable, real time, easy to analyze and maintain, affordable to conduct life cycle exposure assessments. Hazards data is invaluable for the risk management equation yet long term in results. Engage instrument manufacturers to bring IH samplers to market.
- Science: IMA methods that have been developed and validated for nanoscale objects and different material matrices.

Human and Environmental Exposure

- Exposure Assessment Effectiveness: Field demonstrate performance of instruments and methods. Push communication of specific instruments/assessment and methods to users.

Pioneers

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Keith Warrington

Ben Fuchs

Cathie Barton

Suzanne Veith

John Gannon

Terry Medley

Craig Auen

Thanks for listening

