

OVERVIEW OF LABORATORY CAPABILITIES

AB 617 Technical Advisory Group #1

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Laboratory Manager

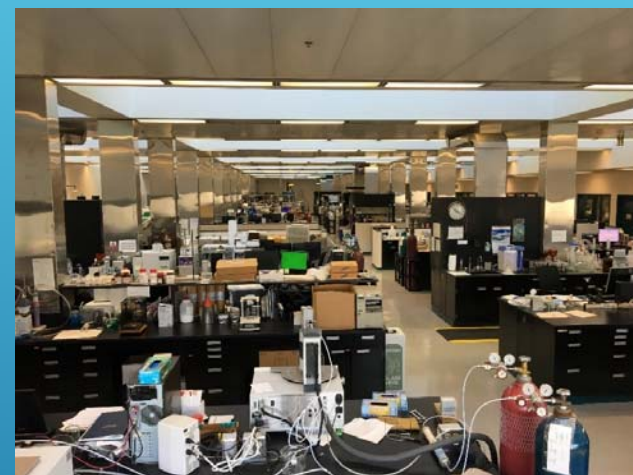
GENERAL OVERVIEW

- ▶ 47 Staff (Chemists, Technicians, Administrative, Temp Staff and Students)
- ▶ ~50 Scientific Instruments

- ▶ 3 large groups (soon to be 4)
 1. Aerosol Analysis
 2. Ambient VOC/Toxics Analysis
 3. Compliance Sample Analysis
 4. Advanced Spectrometry

- ▶ Summary of Programs
 - ▶ EPA- PM2.5, PAMS, NATTS, CSN
 - ▶ Compliance – SCAQMD Rules (e.g. Architectural Coatings, Asbestos)
 - ▶ Special Studies – (MATES-V, Local Community Toxics Monitoring)

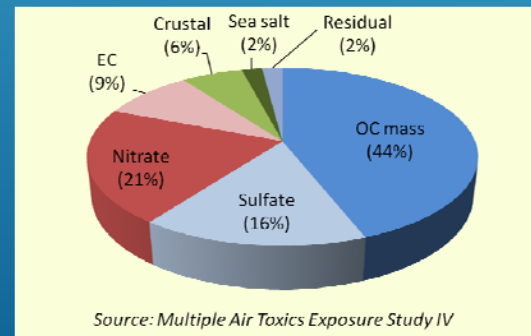
- ▶ 18,037 samples analyzed last year
 - ▶ 37,694 separate analysis



PARTICULATES

Particulates Integrated Filter Samples (total Suspended Particles, PM10, PM2.5)

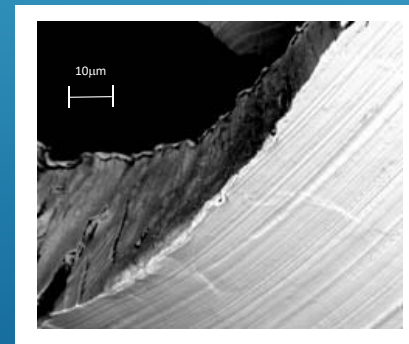
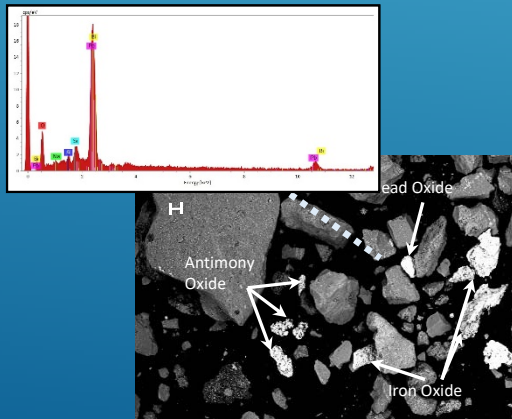
- ▶ Mass by Gravimetric Analysis
- ▶ PM Components
 - ▶ Metals using ICP-MS and XRF
 - ▶ Hexavalent Chromium using colorimetric Ion Chromatography
 - ▶ Elemental and Organic Carbon using Thermal Desorption
 - ▶ Sulfates, Nitrates, Salts using Ion Chromatography
 - ▶ Wood Smoke (levoglucosan) using Gas Chromatography Mass Spectrometry



PARTICULATE DEPOSITION

Analysis of unknown particulate matter (e.g. fallout, glass plates)

- ▶ Metals using Inductively Coupled Plasma-Mass Spec and/or X-Ray Fluorescence
- ▶ Crystalline Silica using X-Ray Diffraction
- ▶ Asbestos and morphology using polarized light microscopy
- ▶ Morphology, particulate size, and general composition using Scanning Electron Microscope with Energy Dispersive XRF.



ICP-MS METALS

Silver	Copper	Zirconium	Rubidium
Barium	Lanthanum	Chromium	Antimony
Beryllium	Magnesium	Iron	Tin
Calcium	Manganese	Potassium	Strontium
Cadmium	Molybdenum	Nickel	Titanium
Cerium	Sodium	Vanadium	Thallium
Cobalt	Nickel	Arsenic	Uranium
Cesium	Lead	Selenium	Zinc

Hexavalent Chromium Sampling and Analysis

Preparation

1 week filters + solutions

Solution Preparation

- Diphenylcarbozide
- Sodium Bicarbonate
- Eluent
- Nitric Acid

Filter Preparation

- Acid wash filters and cassettes
- Rinse in water, dry, pH check
- Soak in sodium bicarbonate, dry
- Store in freezer

QA/QC

- 10 filters extract and analyzed
- Analysis must be < 20ppt
- 2 failures result in bad batch

Filters for Sampling

- Filters placed into cassettes
- Lab IDs are assigned
- Chain of Custody filled out
- Stored in bag in freezer for pickup

Sampling

1 sample day - 31 hrs

Sampler Placement

- Charged overnight
- Lab pickup of filters and CoC
- Transport to sampling locations
- Prep sampler with filter, set timer
- Fill out CoC
- Sampler placed

Sampler Retrieval

- Filter removed and inspected
- Air volume recorded CoC
- Sample stored and chilled
- Transport to lab
- Samples and CoC hand off to chemist
- Samples entered into LIMS

QA/QC

- Monthly flow checks
- Maintenance
- Cleaning

Analysis and Reporting

12 samples - 19 hrs

Sample Preparation

- Samples reviewed for tears, holes
- Invalidated samples noted
- Samples placed into vials and sonicated
- QC samples prepped
- Samples transferred to injection vials
- Vials placed into instrument

Analysis

- Instrument Calibration 1x per week
- Batch run entered into instrument
- Samples analyzed in duplicate
- Dilute and reanalyze high level samples
- Check QC runs

Data Review and Submission

- Review integration of each run
- Data imported into LIMS
- Paperwork checked
- Peer review of analysis/data
- Senior Chemist review
- Report to Lab Manager

GAS SAMPLES

- ▶ VOCs including toxics and unknowns Gas Chromatography – Mass Spectrometry
- ▶ VOCs - Gas Chromatography
- ▶ Carbon monoxide, Carbon Dioxide, Methane – Total Carbon Analysis
- ▶ Sulphur- Sulphur Chemiluminescence
- ▶ Carbonyls – Ultra High Pressure Liquid Chromatography



VOC LIST (TO-15)

1,1,1-Trichloroethane	Benzene	Hexachloro-1,3-butadiene	Trichlorofluoromethane (Freon 11)	2-Butanone (MEK) (FID)	Dichlorotetrafluoroethane (Freon 114) (FID)	Toluene (FID)
1,1,2,2-Tetrachloroethane	Benzyl chloride	Isopropanol	Trichlorotrifluoroethane (Freon 113)	2-Hexanone (MBK) (FID)	Ethanol (FID)	trans-1,2-Dichloroethylene (FID)
1,1,2-Trichloroethane	Bromodichloromethane	m+p-Xylene	Vinyl acetate	2-Propenal (FID)	Ethyl Acetate (FID)	trans-1,3-Dichloropropene (FID)
1,1-Dichloroethane	Bromoform	Methyl Isobutyl Ketone (MIBK)	Vinyl chloride	Acetone (FID)	Ethylbenzene (FID)	Trichloroethylene (FID)
1,1-Dichloroethylene	Bromomethane	Methyl Methacrylate	1,1,1-Trichloroethane (FID)	Benzene (FID)	Hexachloro-1,3-butadiene (FID)	Trichlorofluoromethane (Freon 11) (FID)
1,2,4-Trichlorobenzene	Carbon disulfide	Methyl tert-Butyl Ether (MTBE)	1,1,2,2-Tetrachloroethane (FID)	Benzyl Chloride (FID)	Isopropanol (FID)	Trichlorotrifluoroethane (Freon 113) (FID)
1,2,4-Trimethylbenzene	Carbon Tetrachloride	Methylene Chloride	1,1,2-Trichloroethane (FID)	Bromodichloromethane (FID)	m+p-Xylene (FID)	Vinyl Acetate (FID)
1,2-Dibromoethane	Chlorobenzene	Naphthalene	1,1-Dichloroethane (FID)	Bromoform (FID)	Methyl Isobutyl Ketone (MIBK) (FID)	Vinyl Chloride (FID)
1,2-Dichlorobenzene	Chloroethane	n-Heptane	1,1-Dichloroethylene (FID)	Bromomethane (FID)	Methyl Methacrylate (FID)	
1,2-Dichloroethane	Chloroform	n-Hexane	1,2,4-Trichlorobenzene (FID)	Carbon Disulfide (FID)	Methyl tert-Butyl Ether (MTBE) (FID)	
1,2-Dichloropropane	Chloromethane	o-Xylene	1,2,4-Trimethylbenzene (FID)	Carbon Tetrachloride (FID)	Methylene Chloride (FID)	
1,3,5-Trimethylbenzene	cis-1,2-Dichloroethylene	p-Ethyltoluene	1,2-Dibromoethane (FID)	Chlorobenzene (FID)	Naphthalene (FID)	
1,3-Butadiene	cis-1,3-Dichloropropene	Propylene	1,2-Dichlorobenzene (FID)	Chloroethane (FID)	n-Heptane (FID)	
1,3-Dichlorobenzene	Cyclohexane	Styrene	1,2-Dichloroethane (FID)	Chloroform (FID)	n-Hexane (FID)	
1,4-Dichlorobenzene	Dibromochloromethane	Tetrachloroethylene	1,2-Dichloropropane (FID)	Chloromethane (FID)	o-Xylene (FID)	
1,4-Dioxane	Dichlorodifluoromethane (Freon 12)	Tetrahydrofuran	1,3,5-Trimethylbenzene (FID)	cis-1,2-Dichloroethylene (FID)	p-Ethyltoluene (FID)	
2-Butanone (MEK)	Dichlorotetrafluoroethane (Freon 114)	Toluene	1,3-Butadiene (FID)	cis-1,3-Dichloropropene (FID)	Propylene (FID)	
2-Hexanone (MBK)	Ethanol	trans-1,2-Dichloroethylene	1,3-Dichlorobenzene (FID)	Cyclohexane (FID)	Styrene (FID)	
2-Propenal	Ethyl Acetate	trans-1,3-Dichloropropene	1,4-Dichlorobenzene (FID)	Dibromochloromethane (FID)	Tetrachloroethylene (FID)	
Acetone	Ethylbenzene	Trichloroethylene	1,4-Dioxane (FID)	Dichlorodifluoromethane (Freon 12) (FID)	Tetrahydrofuran (FID)	

QUESTIONS

