IMPROVE Steering Committee Meeting Summary
October 26-27, 2011
University of Maryland – Center for Environmental Science
Appalachian Laboratory; Frostburg, MD
Final version 11/18/2011

Overview

The Steering Committee met at the University of Maryland Center for Environmental Science in Frostburg, MD, on October 26-27, 2011. The location is home to the Frostburg Reservoir (Big Piney) IMPROVE Protocol site, sponsored by MARAMA. A copy of the agenda and meeting participants is attached.

Major topics included:

- Aerosol, optical, and scene operation update
- Ion, carbon, and XRF analysis update
- Field and Laboratory audits
- Laboratory analytical and sample handling changes
- XRF reanalysis report
- Carbon artifact committee recommendations
- FTIR analysis of organic matter
- IMPROVE trends analysis and report
- Canada visibility issues and assessments

The following summarizes meeting discussions in greater detail as shown in the agenda.

October 26

Welcome, introductions, and agenda review

The meeting began with a welcome from the MARAMA IMPROVE Steering Committee representative, David Krask. He informed the group about the monitoring site and university connection, and presented an ozone transport video prepared by the state of Maryland. A Maryland ozone episode was shown to coincide with air masses transported from the Ohio River Valley; ozone sondes operate at approximately five locations in the state and measure daily changes in ozone levels. Westerly winds play an important role in surface ozone concentrations in the state.

Network Review

Aerosol monitoring

Five EPA sites were decommissioned in early 2011 (Sikes, LA; Cadiz, KY; Livonia, IN; M.K. Goddard, PA; and Arendtsville, PA) and the Sac and Fox, KS, site was decommissioned in June 2011. The New York urban site had been decommissioned in 2010. Columbia River Gorge (COGO) is to be decommissioned in November 2011. The Makah Tribal site was relocated to atop a hill at the request of the Tribe. Two sites began monitoring operations -- Barrier Lake, near Banff, Alberta, at the University of

Calgary Research Station (January 2011) and Londonderry, NH (November 2010). Detroit, Pittsburgh, and Atlanta continue to sample carbon only.

Sample recovery rates for the entire network (Module A) for 2010 are: Q1=95%, Q2= 95%, Q3=94%, Q4=94%, and annual=95% (up from 94% last year). Sample recovery rates for the entire network (all modules) for 2010 are: Q1=94%, Q2=94%, Q3=92%, Q4=93%, and annual=93% (up from 91% last year). Sample loss rate for 2010 is 7%, due to the typical reasons such as equipment problems, operator no-shows, and power problems. The following nine sites failed Regional Haze Rule (RHR) requirements for the year:

- Gates of the Mountains, MT
- Great Gulf, NH
- Simeonof, AK
- Makah, WA
- Sawtooth, ID
- Washington, DC
- Zion Canyon, UT
- Columbia River Gorge West, OR
- Thunder Basin, WY

These nine sites improved operations in 2011 after discussions between University of California-Davis (UCD) staff and operators, and when necessary operators' supervisors. UCD implemented one remedy earlier this year; they provided operators with an example, completed logsheet, allowing operators to see what sort of values to expect while performing instrument checks.

UCD receives samples from each site every three weeks and lab staff telephone site operators weekly when necessary to troubleshoot problems. Site sponsors, however, are not receiving notification of problems and many times they are unaware that a site is not performing well. UCD is developing a monthly log to be forwarded to site sponsors, which will contain site information, observed problems, and recommendations/resolution.

➔**Action Item:** Nicole Hyslop will send a mockup of an example network status report containing problem logs to the steering committee within a few months.

The South Korea Ministry of Environment is interested in operating an IMPROVE Protocol site. Chuck McDade (UCD), and Jeff Collette and Taehyoung Lee (Colorado State University) traveled to the proposed site on Baengnyeong Island earlier this year. The rural island, which houses an Atmospheric Research Center, is approximately 200 km west of Seoul and 12 km off the North Korean coast. South Korea is in the path of airmass transport from China, and monitors air quality at this research center as well as in urban areas of the country. Instrumentation at the atmospheric laboratory includes samplers that monitor PM_{10}, $PM_{2.5}$, and PM_1, TEOMs, MOUDIs, semicontinuous aerosol monitors, ICP-MS, gaseous pollutant monitors, and a weather station. The IMPROVE modules will be mounted on the laboratory's rooftop alongside several of these other instruments. Filters will be shipped via UPS to the port city of Incheon, and from there will be shipped via ferry to the island and laboratory. UCD hopes to secure a contract for installation and operation of the aerosol sampler in December 2011 or January 2012.

Field audits were performed at 46 monitoring sites in 2010; 6 of these sites failed their flowrate audits (flowrate differences between the site sampler and audit sampler exceeded 10%). Of the six failed sites, three were resolved quickly by replacing equipment (San Gorgonio, Mohawk Mountain, and Phoenix). UCD detected no problem

with the remaining three failed sites (Addison Pinnacle, Queen Valley, and Washington) once follow-up checks were performed. No exceedances have been reported yet in 2011.

UCD obtained a new contract in Summer 2011; 75% of it covers routine network operation, while a cooperative agreement covers research, the remaining 25% of work. The laboratory has seen several changes and upgrades this year, including new laboratory facilities, new Mettler balances and calibration protocols, and a new hierarchical management system. Krystyna Trzepla-Nabaglo manages laboratory operations and Jose Mojica manages field operations. Next year the laboratory plans to receive new field management software, new laboratory management software, and new controller hardware and software. They are also looking to improve PM_{10} flowrate measurement and to add lasers with additional wavelengths to the HIPS system. Upgrades scheduled for 2013 include updating the temperature/humidity control for the weighing room, developing an automated weighing system, and adding new data validation software. Research to address the $PM_{2.5}$ cyclone cutpoint irregularities will continue through 2012 and 2013.

A large proportion of site problems are due to controller problems (such as interference) or pump failure. UCD is looking into remote access controllers to better and more quickly identify problems, and using a combined manifold pump to operate all modules. Staff have also developed a barcoded identification to track Teflon filters. The barcodes are etched into the filter support ring without ink; the additional cost to UCD is $1 per filter.

Optical and Scene monitoring

In 2011 the rural optical network includes 1 transmissometer, 23 nephelometers, and 81 webcameras. NGN-2a nephelometers operate with incandescent bulbs, which are no longer commercially available. The instruments in various networks are currently undergoing a retrofit with LED lamps; the Arizona network instruments have already made this change. LEDs have been found to be more stable than the incandescent lamps and rarely require site operators to change them. A field study found good agreement between Bsp measurements from the NGN-2 and NGN-LED nephs. The Grand Canyon transmissometer has also been retrofitted with an LED as these lamps show less drifting of the light source.

All Standard Operating Procedures (SOPs) are reviewed annually and a Quality Assurance Project Plan (QAPP) and Quality Management Plan (QMP) for the optical networks are in development. ARS obtained a new contract this summer to operate optical and scene networks for 3 years. Nephelometer data are delivered to CIRA within 90 days and transmissometer data are delivered annually. The NPS added three new Webcameras to its scene network: Shenandoah, Hawaii Volcanoes, and Grand Teton NPs. The network also received upgrades to the camera models used and the systems' controlling software. Air quality "apps" for mobile phones are also in development, showing data and time-lapse videos of scenes, as well as developing tools to support technicians while on site maintenance visits. Web site visits to the National Park Service Webcameras are increasing every month, with almost 25 million images viewed in 2010. ARS is also developing an Urban Haze Image Views application, which adds clouds to scenic images having no mountains in view, and allows the user to select from various visual air quality levels.

Quality assurance field audits

During 2009-2010, the IMPROVE network realized good audit coverage in Arizona, Colorado, Nebraska, Missouri, Iowa, Maryland, and the Northeast and Southeast. Areas that need improvement are Washington, Oregon, California, New Mexico, Idaho, Montana, Utah, North Dakota, South Dakota, Oklahoma, and Alaska. These areas generally lack in adequate audit coverage due to staffing having too heavy a workload and or having an inadequate budget.

The network's goal is to have 25% of the sites audited annually. In 2010 we performed 33 audits (35 in 2009). The procedure for providing auditors with proper site coefficients is "ragged" but has improved in 2011. Ongoing training actions include proper filter handling, using correct coefficients and forms, reviewing equations for pressure and temperature, moving the training responsibility to the regions, developing a training video, developing a Quality Assurance Web page, moving toward interpretation of audit data, and developing a methodology for remotely challenging the IMPROVE data storage card.

Laboratory Review & Methods Development

Carbon analysis

Desert Research Institute (DRI) operates 24-hours/day 6-7 days/week, with 5 staff. Filters are analyzed approximately 17 days after receipt from the field, and approximately 800 samples per month and 22,000 samples per year are analyzed for the IMPROVE Program. DRI obtained a new contract with the National Park Service in April 2011.

Recent study shows that absolute laser reflectance highly correlates with EC_R measurements. SOPs are undergoing revision and will be completed by December 2011. Carbon standards are verified with the TOC analyzer; study shows that the daily and quarterly auto-calibration of the analytical instruments is within ± 5%.Low levels of organic carbon (OC) and elemental carbon (EC) have been found on pre-fired quartz filters. Amounts are within "acceptable" range.

DRI teamed with a national laboratory in Germany for an analysis study that integrated the Model 2001DRI analyzer with Germany's Photoionization Time-of-Flight mass spectrometer, which allowed for identification of compounds in each thermal fraction. Comparison showed that H/C vs O/C molar rations varies by source; and DRI is looking into developing this system into a next generation carbon analysis system. They are also trying to move from single to multiple wavelengths to obtain more information from samples (EC absorption efficiency varies by wavelength and source). Future plans at DRI include: 1) testing known source samples for carbon, hydrogen, nitrogen, sulfur, and oxygen; 2) improving our understanding of compounds evolved at each temperature fraction; 3) examining EC absorption efficiencies as a function of wavelength on vegetative burning samples; and 4) determining the practicality of enhancing information from IMPROVE samples in light of the need to maintain long term trend information.

Ion analysis

RTI International obtained a new contract with the NPS in March 2011. The lab analyzes ion masses on nylon filters, prepares impregnated filters for SO_2 collection, and prepares and analyzes phosphorous acid-impregnated cellulose filters for ammonia and methylamine collection in support of the reduced nitrogen (NH_x) study. Approximately 20,000 nylon filters are analyzed annually for the IMPROVE network.

In the NH_x pilot study that was conducted in 2010, examination of the ion chromatograms revealed an unknown peak in some samples that precluded the quantification of the ammonium ion. The peak was identified as methylamine, and was determined to be a sampling artifact, most likely through reaction of NH_4^++ formaldehyde. As a result of this finding, new cassettes were prepared using a plastic that is not reactive with acid, and the 2011 field season started at 9 sites across the network in April or June. Analyses performed to date have shown that field blanks generally are below 2µg NH_4^+/filter but show a slight increase over time. Cellulose filter field blank NH_4^+ concentrations show a step function decrease in September of 2011, maybe due to a different batch of filters. No methylamine has been detected to date.

RTI recently purchased a new glove box to be used for the reduced nitrogen study to store and extract the phosphorous acid-coated cellulose filters in an ammonia-free atmosphere.

In a special study, RTI performed ion chromatographic analyses on reference filters that UC-Davis had loaded with sodium chloride or ammonium sulfate in a chamber that they built for that purpose. Agreement was excellent between the loadings determined by RTI using IC and the loadings determined gravimetrically by UC-Davis. The presence of nitrite and nitrate ions in the ion chromatograms, however, is puzzling. A possible explanation is that it the nitrite and nitrate are on the blank Teflon filters and they are removed in the extraction procedure when ethanol is used to pre-wet the filters. Replicate filters loaded in the chamber will be used by UC Davis to calibrate their new XRF instruments.

RTI has set up an IC system that is dedicated to levoglucosan analysis. Samples from the time period around the fire at the Chiricahua National Monument, AZ, IMPROVE site on June 8, 2011 were analyzed for both levoglucosan and potassium as wood smoke markers. A large levoglucosan peak was observed in the chromatogram for the June 11 filter.

Dr. Prakash Doraiswamy is joining RTI staff in November, and an AWMA meeting in April 2012 will be held at Research Triangle Park; attendees are welcome to visit RTI during that time.

UCD analytical and sample handling changes

UCD generates carefully characterized reference materials on Teflon filters. Analysis shows excellent calibration can be attained by comparing gravimetric mass on reference filter to XRF mass for sulfur, chlorine, and sodium. This technique can make the XRF measurements independent of the assumed filter area. These reference materials will be used in the calibration of the new XRF instruments

Data Advisories #10 and #11 highlight the issues with XRF reported Si and Al measurements when high S/Fe ratios are reported for the sample..= Silicon and aluminum are light elements with small peaks on the low energy tail of the S peak in an XRF spectrum which makes them difficult to measure by XRF. Using the UC Davis aerosol generation system, dry ammonium sulfate was added to a set of samples to produce the sulfur/iron ratios observed in the network. Analyses using the CU2 XRF at UCD and the PANalytics XRF at DRI, show that reported iron is stable with respect to the addition of sulfur, while reported silicon increases (CU2) or decreases (PAN) with increasing sulfur/iron ratios. Both the CU2 and Pan systems showed mixed results for AL, with increasing S/Fe ratios causing greater variability in reported Al. IMPROVE CU2 XRF samples with sulfur/iron <10 are unaffected by sulfur. Samples with sulfur/iron >75 and silicon/iron >6 show: 1) silicon is likely overreported by ≥ 2, 2) Al is overreported by >50% or erroneously reported as below minimum detectible limit (MDL), and 3) samples with 10<sulfur/iron<75 show that silicon mass is overreported by up to 60% and aluminum may have errors up to 50%.

As an investigation of the long-term consistency of the elemental measurements, UCD has reanalyzed all the module A filters from Great Smoky Mountains from 1994 through 2009 using the current XRF system. The reanalysis shows good agreement with the original values in S, K, Ca, Fe, Zn and Se, but relatively poor precision in some eras for others, including Na, Al, Si, Cr, Ni, As, Rb, and Zr. The now familiar message to data analysts is to be wary of species with concentrations near the mdls. Mount Rainier, and Point Reyes have also been reanalyzed for the same time period, results pending. Data advisories posted on the IMPROVE Web site show specific examples of observed changes in measurements.

Laboratory intercomparisons & issues

Intercomparison among six laboratories (California Air Resources Board, DRI, RTI, South Coast Air Quality Management District, EPA-National Air and Radiation Environmental Laboratory (NAREL), and Oregon Department of Environmental Quality) resulted in no surprises for XRF analysis of 10 elements using 47mm and 25mm filters. Laboratory intercomparisons of a carbon event, showed modest differences in carbon fractions measured at the participating labs. Final reports of this intercomparison study are available on http://www.epa.gov/ttn/amtic/pmspec.html.

NAREL performs onsite laboratory audits every three years; the audits consist of staff review, raw data examination, and analytical procedure checks.

UC Davis Operational Changes

PANanalytical Epsilon 5 XRF method development and testing began in January 2011. Objectives are to measure elements with equivalent detection limits and precision as the existing XRF systems, perform the analysis in less than 40 minutes, and incorporate locally generated standards in the calibrations. UCD staff are developing an analytical protocol to optimize the use of different x-ray targets to get the best measurements of the most important elements.

IMPROVE/CSN carbon artifact committee recommendations
Since May 2007 the two networks, IMPROVE and EPA's Chemical Speciation Network (CSN) have operated similar samplers, and perform the same analysis at DRI using IMPROVE_A protocols. The networks differ in their treatment of artifacts. While IMPROVE subtracts monthly median backup filters, CSN uses no artifact correction in its analysis. It is desirable to have both networks using the same correction, so the IMPROVE and CSN Artifact Adjustment Committee has been working on the recommendation. Primarily being considered are continuing to subtract monthly median back up filter values and subtracting monthly mean field blanks. Calculations would be done separately using network specific values. Consideration of a number of analyses points to subtracting monthly median field blank values as the best combination to decrease additive artifacts without including a multiplicative factor. This technique could be applied to historical data as well as future data. The Artifact Committee is still considering some details and will report to the full Steering Committee with intent to finalize a recommendation by early 2012.

October 27

FTIR analysis of particulate organic on Teflon filters
FTIR (Fourier Transform Infra-Red) analysis is a promising method for checking the consistency between Teflon and quartz channels (identifying filter handling problems and instances of filter swapping) and for measuring organic matter on samples. Advantages to FTIR are: it is a non-destructive method of analysis, it quantifies organic functional groups, it can provide consistency checks for organic mass on Teflon and quartz filters, and can be used to calculate organic matter/organic carbon for each sample. Limitations to FTIR are: it is not organic compound-specific, and no one has quantified graphitic carbon in particulate matter. Interference is caused by ammonium ion and the Teflon material itself. Questions addressed by analysis below include: can the interferants be identified, and does analysis provide reasonable results for organic carbon?

UCD analyzed 136 IMPROVE Teflon filters and 10 field blanks from three sites (Olympic National Park, WA; Proctor Maple Research Facility, VT; and St. Marks, FL) in 2010. The FTIR calibration has not been developed and the results presented were based on measuring the areas of peaks of known functional groups and using the area as a proxy for mass. Two methods can be used to remove the interference of ammonium., subtracting a scaled ammonium sulfate spectra and included it in the calibration. For Teflon, the interference region was excluded from the analysis. The results of the analysis showed that FTIR was comparable to PESA for estimating OC mass from a Teflon filter and could be replace PESA for checking consistency between the Teflon and quartz channels and that FTIR shows promise for being able to measure OM and the OM/OC ratio on IMPROVE samples. Future plans include creating more standards, evaluating/testing algorithms, determining if the pre-scan provides useful information, and analyzing samples to determine the impact of XRF on organic carbon. Longer-term plans are to continue calibration method development, develop a low-cost autosampler for the standards, test the calibration method, and continue to analyze

samples (comparing to PESA and TOR). FTIR routine analysis costs are estimated to be less than or is equal to PESA.

Data Processing, Distribution, and Quality

IMPROVE data analysis
The IMPROVE V Trends report has been finalized.
http://vista.cira.colostate.edu/improve/Publications/Reports/2011/2011.htm

Highlights presented include spatially averaged and site specific seasonal and annual graphics for several species. Seasonality of sulfate has changed since 2000 with a shift towards highest sulfate observations occurring in the spring in the North Western quarter of the continental US. Reasons for the shift are not clear. Monthly fine soil values are seen to be increasing at some Southwest sites in March and April. Sulfate is shown to episodically correlate very well with Fe across broad areas of the West and Northeast, especially in May of 2006 and 2007. Preliminary 2010 sulfate concentrations are "significantly low" compared to previous years. Back trajectory analysis of winter Midwestern sulfate episodes indicates transport from Canada though the pollutants may have originated elsewhere.

Other Topics

Environment Canada visibility issues and assessments
Canada has a national particulate standard for $PM_{2.5}$ (24-hour average < 30 $\mu g/m^3$) but has no visibility standard in place. There is a Canada-US Air Quality Accord, developed in 1991; Annex 1 of the Accord recognizes "the importance of preventing significant air quality deterioration and protecting visibility, particularly for international parks, national, state, and provincial parks, and designated wilderness areas". Visibility monitoring is being conducted at Barrier Lake, AB; Wolfville, NS; Egbert, ON; and Lower Fraser Valley, BC.

The Barrier Lake site monitors visibility in the Rocky Mountain region, a scenically important region of the country. The site monitors with an IMPROVE aerosol sampler, an Optec NGN-2a LED nephelometer, meteorology sensors (AT, RH, WS, WD) and operates a Webcamera at the nearby University of Calgary. Temperatures at the site range from +50° to -30°Celsius.

The Wolfville site began operations in September 2011 at Acadia University. It is equipped with an NGN-21 nephelometer, meteorology sensors (AT, RH, WS, WD) and a Webcamera. The Egbert site speciation comparison site has operated since 2005. It compares IMPROVE and CAPMon [Canada Air and Precipitation Monitoring] measurements. The site's nephelometer was discontinued in 2010.

Near Vancouver, The Lower Fraser Valley Visibility Management Pilot Project is underway. The Lower Fraser Valley is a place where a high value of visibility protection is afforded due to the scenic nature of the valley. Formed in 2006, the British Columbia Visibility Coordinating Committee (BCVCC) consisting of federal, regional, and provincial agencies, manages this project and provides direction to reduce impacts on

visibility. Eight monitoring sites operate in the Lower Fraser Valley in 2011. Images showing the range of visibility taken from Webcameras in the valley are posted on the Internet. Organic carbon is by far the most significant contributor (~40%) to visibility impairment, with nitrates and elemental carbon also contributing at ~20% each. The BCVCC is developing a visibility goal and an index, to in turn, develop a public perception goal/standard for visibility in the valley. Previous perception studies were performed in the mid-1990s and a new perception study was undertaken in 2011, using nearly the same methodologies but with new scenes and a larger dataset. Study participants viewed slides and rated their visual air quality on a 7-point scale. The visual air quality index correlated very well with deciview values of the scenes (r^2 = 0.9073). The study found that subjects were less tolerant of poor air quality now compared to 1999. The BCVCC will use these study results to finalize a visual air quality index and goal for the valley. A business case is being made demonstrating the value of clean air for economic, health, and cultural/spiritual reasons.

Canada also operates an urban National Air Pollution Surveillance (NAPS) $PM_{2.5}$ speciation network. A Web site for air quality was developed in 2010 (www.clearairbc.ca) which features live photographs and good-fair-poor visibility days. The Web site is scheduled to be updated in 2012 to include a visibility index and real-time images.

Budget analysis

All NPS monitoring and analysis contracts were renegotiated in 2011 with a new, itemized budget structure. The cost to operate and analyze a monitoring site is currently $35,000. If the number of sites are reduced to reduce costs, the cost per site increases (the cost to operate just the 110 IMPROVE sites is ~$45,000 per site). Through discussion, it was suggested that IMPROVE make an effort to show the public the importance of the program and what services it provides (link the value of reducing particulate matter to saving human life). IMPROVE probably operates a more cost-efficient program than either CASTNET or CSN. We will wait and see what happens with the federal budgets in the coming months.

Steering Committee Chair nomination and selection

The current Committee Chair nominated the USFS representative, Scott Copeland as the next Chair. The motion was seconded by the BLM and a unanimous vote following elected Copeland.

Newsletter and calendar

The newsletter costs ~$3,000 per issue to produce and the NPS has directed ARS to discontinue hardcopy and have total electronic distribution. The general consensus agreed. UCD will print hardcopies to be sent to the operators in the filter boxes. The next issue of the newsletter will have a bold statement on Page 1 asking recipients to provide their e-mail addresses to continue receiving the newsletter (full color .pdf format) or be taken off the distribution list entirely.

Next meeting: Location & timing

Some attendees expressed they have limited travel budgets next year and will not be able to attend an IMPROVE Steering Committee meeting. Telephone conferencing is an option, yet it is expensive, noisy, and too distractive for listeners. Also, a face-to-face meeting is highly important, especially for impromptu, informal conversations. Those who cannot travel next year please inform the new Chair, Scott Copeland. It was also agreed upon to hold a one-day pre-meeting technical workshop, as these are extremely worthwhile. An AWMA Visibility Conference will be held in Whitefish, MT (Glacier NP) in September 2012; however, it was decided to not hold the IMPROVE meeting at that time. After discussion, most meeting attendees proposed to meet in Grand Canyon NP, AZ or Lake Tahoe (Bliss SP), NV next year, and meet in the Midwest the following year, at Voyageurs NP, MN or Boundary Waters Canoe Area W, MN.

- ➔ **Action Item:** The NPS will check the availability and cost of meeting at the Albright Center at Grand Canyon.
- ➔ **Action Item:** UCD will check the availability and cost of meeting in the Lake Tahoe area.

Other

The Lye Brook, VT, monitoring site needs to be relocated. The USFS pays for rental of the land and has received notice the rental fees will make continued monitoring at the existing location unfeasible. A new monitoring location has been selected across the valley at a ski area and the existing operator can continue to service the new location. The USFS feels collocated monitoring should be done at both the current and the new location for a period of time to determine representativeness of the new location compared to the old. IMPROVE will operate the two sites for roughly 9 months, if possible.

Meeting adjourned.

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Time	Topic	Discussion Leader
	Wednesday, October 26	
8:00am	Welcome	David Krask
8:15am	Introductions and agenda review	Marc Pitchford
	Network Review	
8:30am	Aerosol monitoring	Chuck McDade
9:30am	Optical & scene monitoring	John Molenar
10:00am	Break	
10:15am	Quality assurance – field audits and auditor training	Dennis Crumpler/ Jeff Lantz
	Laboratory Review & Methods Development	
10:45am	Carbon analysis	Judy Chow
11:15am	Ion analysis	Eva Hardison
11:45am	Lunch	
1:00pm	UCD analytical and sample handling changes	UCD tag team
2:00pm	Laboratory intercomparisons and issues	Jewel Smiley
2:30pm	Aerosol chamber and standards	Ann Dillner
3:00pm	Break	
3:15pm	HIPS recalibration	Warren White
3:45pm	IMPROVE/CSN carbon artifact committee recommendations	Ann Dillner
	Monitoring Site Visit	
4:15pm	Carpool to the monitoring site – site tour leader: Mark Castro	
5:30pm	Adjourn for the day (group dinner for those interested)	
	Thursday October 27	
8:00am	FTIR analysis of particulate organic on Teflon filters	Ann Dillner
	Data Processing, Distribution, and Quality	
8:30am	Multi-year XRF reanalysis progress report	Warren White
9:00am	IMPROVE data analysis	Jenny Hand
10:00am	Break	
	Other Topics	
10:15am	Canada visibility issues and assessments	Keith Jones
10:45am	Budget analysis	John Vimont
11:00am	Steering Committee Chair nomination and selection	Marc Pitchford
11:30am	Newsletter and calendar	Gloria Mercer
11:45am	Next meeting: location & timing	Marc Pitchford
Noon	Meeting adjourned	

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Tad Aburn	Maryland Dept. of Envir't	410-537-3255	gaburn@mde.state.md.us
Judith Chow	DRI	775-674-7055	judy.chow@dri.edu
Scott Copeland	USDA FS-CIRA/CSU	307-332-9737	copeland@cira.colostate.edu
Dennis Crumpler	US EPA	919-541-0871	crumpler.dennis@epa.gov
Ann Dillner	UC Davis	530-902-6273	amdillner@ucdavis.edu
Neil Frank	US EPA	919-541-5560	frank.neil@epa.gov
Mark Green	DRI	775-624-8455	green@dri.edu
Jenny Hand	CSU	970-491-3699	hand@cira.colostate.edu
David Hardison	RTI International	919-541-5922	davidh@rti.org
Eva Hardison	RTI International	919-541-5926	eva@rti.org
Loretta Hyden	US EPA	215-814-2113	hyden.loretta@epa.gov
Nicole Hyslop	UC Davis	530-754-8979	nmhyslop@ucdavis.edu
Keith Jones	Environment Canada	604-664-9123	keith.jones@ec.gc.ca
David Krask	MD/MARAMA	410-537-3756	dkrask@mde.state.md.us
William Malm	CIRA/CSU	970-491-8292	malm@cira.colostate.edu
Dave Maxwell	BLM	303-236-0489	dmaxwell@blm.gov
Chuck McDade	UC Davis	530-752-7119	cemcdade@ucdavis.edu
Gloria Mercer	ARS	970-484-7941	gmercer@air-resource.com
John Molenar	ARS	970-484-7941	jmolenar@air-resource.com
Marc Pitchford	NOAA	702-862-5432	marcp@dri.edu
Rich Poirot	VT/NESCAUM	802-241-3807	rich.poirot@state.vt.us
Joann Rice	EPA	919-541-3372	rice.joann@epa.gov
Sandra Silva	FWS	303-914-3801	sandra_v_silva@fws.gov
Chris St. Germain	US EPA Region 1	617-918-8384	stgermain.chris@epa.gov
Mark Tigges	ARS	970-484-7941	mtigges@air-resource.com
Christian Kirk	ARS	970-484-7941	ckirk@air-resource.com
Laurie Trinca	US EPA	919-541-0520	trinca.laurie@epa.gov
John Vimont	NPS	303-969-2808	john_vimont@nps.gov
John Watson	DRI	775-674-7046	john.watson@dri.edu
Jill Webster	FWS	303-914-3804	jill_webster@fws.gov
Warren White	UC Davis	530-752-1213	whwhite@ucdavis.edu
Susan Wierman	MARAMA	443-901-1882	swierman@marama.org