The Brake Pad Partnership (BPP) Steering Committee held a teleconference meeting on July 8th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick, Sustainable Conservation, Project Manager, Facilitator
- Mark Schlautman, Clemson University (project technical advisor)
- Pat Thesier, Sumitomo Electric Automotive, Inc. and lead representative of the Brake Manufacturer’s Council Product Environmental Committee (BMC/PEC)
- Rodger Dabish (TMD Friction)
- Michael Endicott (Sierra Club)
- Jim Pendergast, U.S. EPA
- Kelly Moran, TDC Environmental

Jim Trainor (brake manufacturer representative and technical consultant) and Tim Merkel (formerly of Federal-Mogul Corporation) were unable to participate in the teleconference.

The following items were discussed:

**Possible collaboration with Ford Motor Company researchers.** Last month, BMC representatives met with the Ford Motor Company researchers who recently published a paper about vehicle brake wear debris. They learned that Ford is pursuing research on vehicle brake wear debris to estimate particulate air emissions from vehicles for their air emissions compliance program. Ford has completed additional brake wear debris research and is about to publish a new paper on brake wear debris. A copy of a pre-print of the new Ford paper will be circulated to the Steering Committee for review and discussion on the next teleconference.

According to the BMC members who have discussed the research with Ford, researchers found that the MOUDI method was a good way to measure particle size diameter. This is good news, as MOUDI is the method that the BPP has been considering using for its measurements. Since the last meeting, Professor Schlautman spoke with colleagues who recommend the MOUDI technique and say that it should be feasible within the BPP’s schedule and budget.

Ford’s legal department has requested that its researchers keep the BPP at arm’s length to avoid potential liability for Ford Motor Company (this extremely conservative approach to corporate research is not unusual). This means that Ford staff will probably not be able to play an official role in the BPP nor will they be able to collaborate formally with our research program. Ford scientists should, however, be able to assist the BPP team.
informally, e.g., by answering questions regarding the details of making MOUDI measurements of particle size distributions. Such informal scientific consultations could be invaluable for the BPP.

**Composite brake wear debris sample development.** The BMC/PEC has established a subcommittee to develop a specific plan of action for generating a composite sample of vehicle wear debris. The full BMC/PEC will review the proposal in August. The BPP would like to obtain a sample of composite wear debris this fall, as preliminary characterization of a composite sample is on the critical path for the Action Plan implementation schedule.

**Air deposition modeling request for proposal (RFP).** Sustainable Conservation and the San Francisco Estuary Project are working to complete the BPP’s first RFP, for air deposition modeling (the RFP scope of work was approved by the Steering Committee last month). This is a time-critical task as the RFP will need to be issued by early August in order to ensure that contractor interviews can be conducted in conjunction with the BPP’s Steering Committee meeting in late September.

**BPP Action Plan workplan schedule.** Sustainable Conservation’s top priority for the BPP is to develop a schedule for implementing the Action Plan. This schedule is essential to determine the time critical actions for the next several years and to identify the due dates for work products to be provided from one contractor to another. The State Water Resources Control Board has delayed the availability of grant funds to October 1, 2003. The grant conclusion date remains unchanged at February 28, 2006. This very significant compression of the proposed 3-year schedule is of great concern to the Steering Committee, as it will require a very high level of activity to stay on track.

**Budget.** Sustainable Conservation continues to put a good deal of effort into fundraising, as the current budget crisis has not been alleviated—and the BPP has yet to obtain funds to cover the $100,000 shortfall from the Proposition 13 grant.

**Anticipated Next Steps**

The Steering Committee continues to focus on assembling the resources and technical team to implement its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- July 17, special teleconference meeting on project schedule, air deposition modeling request for proposal, and pre-print of Ford paper
- August 19, teleconference meeting
- September 4, teleconference meeting
- September 24-25, two-day in-person meeting, San Francisco Bay area
- October 7, teleconference meeting
- November 4, teleconference meeting
- December 9, teleconference meeting
Agenda Distributed by Sustainable Conservation via e-mail

TELECONFERENCE
Tuesday, July 8, 2003, 11:00 a.m. - noon PDT
Dial: 866-279-1566
Meeting Number: *4762806*
[NOTE: You must dial the *'s at the beginning and end of the meeting number.]

DRAFT Agenda

1. Agenda review and anything new? (5 minutes)
   - anyone else?

2. Update from Rodger regarding additional conversations with Paul Saunders at Ford
   (10 minutes)

3. Updates on aerodynamic particle size measurement action items (20 minutes)
   - Information from MicroMeritics (Jim T.)

4. Review of schedule, tasks and assignments -- Sarah

5. Anything else?
The Brake Pad Partnership (BPP) Steering Committee held a special teleconference meeting to deal with urgent project issues on July 17th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Mark Schlautman (Clemson University, project technical advisor)
- Jim Trainor (brake manufacturer representative and technical consultant)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Michael Endicott (Sierra Club)
- Jim Pendergast (U.S. EPA)
- Kelly Moran (TDC Environmental)
- Rodger Dabish (TMD Friction) and Pat Thesier (Sumitomo Electric Automotive, Inc. and lead representative of the Brake Manufacturer's Council Product Environmental Committee [BMC/PEC]) were unable to participate in the teleconference.

The following items were discussed:

**Air Deposition Modeling Request for Proposal (RFP).** The Steering Committee discussed a few additional changes in the draft RFP circulated by Sustainable Conservation and the San Francisco Estuary Project (SFEP). The Steering Committee approved the RFP and bidders list. The RFP will be released by August 1, with proposals due September 1. The Steering Committee will interview top bidders during its September 24-25 in-person meeting. If there is any firm that you’d like to make sure is on the bidders list, please contact Marcia Brockbank at SFEP by August 1.

**BPP Action Plan Workplan Schedule.** Sustainable Conservation presented the basic elements of the schedule and the schedule format for Steering Committee discussion. This preliminary schedule information shows that a higher level of activity is necessary to respond to the compressed schedule required by the State Water Resources Control Board for expenditure of grant funds. By August, Sustainable Conservation should have a complete schedule in draft form for Steering Committee review. The next steps will be for the Steering Committee to identify and tackle near-term critical path items.
Ford Motor Company Research Paper on Brake Wear Debris. BMC members obtained an advance copy of a research paper by Ford Motor Company staff evaluating the air transport characteristics of vehicle brake wear debris.\(^1\) Professor Schlautman and Steering Committee members agreed that the scientific methods used in the Ford work appear to be very good, except for minor problems with brake wear debris density calculations. The information in this paper may be able to substitute for some measurements that the BPP was planning to conduct on brake wear debris, but may not eliminate the need for testing. Since BMC members have the most expertise in this topic area, the Steering Committee asked BMC members to consult with Ford and make recommendation as to whether Ford data are appropriate for use in BPP air deposition modeling.

New BPP Web Site. Sustainable Conservation has updated its web site, creating a special section for the BPP that has good deal of project information. BPP documents are now readily available online at http://www.suscon.org/brakepad/index.asp. The technical reference library will remain at http://www.tdeenvironmental.com/brake/ for the time being.

Anticipated Next Steps
The Steering Committee continues to focus on assembling the resources and technical team to implement its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- August 19, teleconference meeting
- September 4, teleconference meeting
- September 24-25, two-day in-person meeting, San Francisco Bay area
- October 7, teleconference meeting
- November 4, teleconference meeting
- December 9, teleconference meeting

Agenda Distributed by Sustainable Conservation via e-mail

TELECONFERENCE
Thursday, July 17, 2003, 9:00 -10:00 a.m. PDT
Dial: 866-279-1566
Meeting Number: *4762806*
[NOTE: You must dial the *'s at the beginning and end of the meeting number.]

DRAFT Agenda

1. Agenda review and anything new? (5 minutes)

2. Review and approval of the air deposition modeling RFP (10 minutes)
   - see attached Word file

3. Review and discussion of the draft schedule of tasks (20 minutes)
   - see attached Excel file (note it includes three worksheets)

4. Review and discussion of the new Ford paper. (25 minutes)
   - see attached Adobe Acrobat file

5. Anything else?
The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on August 19th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Mark Schlautman (Clemson University, project technical advisor)
- Pat Thesier (Sumitomo Electric Automotive, Inc. and lead representative of the Brake Manufacturer’s Council Product Environmental Committee [BMC/PEC])
- Rodger Dabish (TMD Friction)
- Jim Trainor (brake manufacturer representative and technical consultant)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Michael Endicott (Sierra Club)
- Jim Pendergast (U.S. EPA)
- Kelly Moran (TDC Environmental)

The following items were discussed (some items on the agenda were omitted for lack of time):

**Brake Wear Debris Physical Characterization Request for Qualification (RFQ).** The BPP plans to issue an RFQ for conducting physical characterization of brake wear debris to support air deposition modeling work. The primary task would be to measure particle aerodynamic diameter, probably with a MOUDI device in line with brake wear debris generation from representative brake pad(s) (see previous teleconference meeting notes for details). The Steering Committee reviewed and discussed a draft RFQ prepared by Sustainable Conservation. Sustainable Conservation will revise the draft RFQ with the intent of obtaining Steering Committee approval to issue the RFQ in early September. If there is any entity (consultant or University) that you’d like to make sure is on the bidders list for this RFQ please give me their contact information by September 4th.

**University of Delaware Data Request.** A student affiliated with Professor Herb Allen’s group contacted Professor Schlautman to obtain information on brake wear debris. BMC representatives expressed concern about how BMC-generated data might be used by this researcher, as Professor Allen and his colleagues have a long record of exploring the environmental impacts of metals in surface waters. Professor Schlautman and Jim Pendergast (both of whom have prior relationships with Professor Allen) will provide the student with publicly available information from the BPP and will seek to learn more about the research being conducted.
Composite Brake Wear Debris Sample Development. The BPP would like to obtain a sample of composite wear debris this fall, as preliminary chemical and physical characterization of a composite brake wear debris sample is on the critical path for the Action Plan implementation schedule. The BMC/PEC has developed a draft plan of action for generating a composite sample of vehicle wear debris. The plan involves collecting samples of pad material from the most common copper-containing brake pads (the same “top 20” brake pads included in the copper use reporting program) and generating wear debris individually from each pad. Material would then be combined into one sample, with the weight fraction of wear debris from individual brake pads in the composite sample measured so as to be proportional to each pad’s market share. Separate samples of wear debris from each pad would be retained for possible individual testing and to allow exploration of the potential relationship between the chemical form of copper in the pad and chemical and physical properties of copper in brake wear debris.

In general, the procedure seems to be designed to create a good representative sample of copper-containing brake wear debris, as it would include debris from 40% of original equipment light-duty vehicle brake pads (these are believed to contain most of the copper in brakes on U.S. roads). The main issues from our viewpoint are:

- **Schedule.** The procedure could take a long time to complete because it relies on interactions between the BMC, individual manufacturers, and a contract laboratory. Timing is critical because of the timing of grant funding for the Action Plan.

- **Ability to obtain representative measurement of aerodynamic particle size diameter.** Because many samples of wear debris would be generated separately, the procedure could complicate plans for on-line measurements of wear debris aerodynamic particle size diameter.

The Steering Committee will discuss this procedure further on September 4th.

**Anticipated Next Steps**

The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- September 4, teleconference meeting
- September 24-25, two-day in-person meeting, San Francisco Bay area
- October 7, teleconference meeting
- November 4, teleconference meeting
- December 9, teleconference meeting
Agenda Distributed by Sustainable Conservation via e-mail

TELECONFERENCE
Tuesday, August 19, 11:00 a.m. to noon, PDT
Dial: 866-279-1566
Meeting Number: *4762806*
[NOTE: You must dial the *'s at the beginning and end of the meeting number.]

DRAFT Agenda

1. Agenda review and anything new? (10 minutes)
   - Kim's promotion, and introducing Corinne Eding
   - SusCon funding update ... (see attached excel file)
   - anything else?

2. Copper Use Monitoring Program QC (see attachment) (10 minutes)
   - Summary of document
   - Comments/Questions?

3. Air Deposition Modeling RFP (3 minutes)
   - status and identification of review team members

4. Update on other critical path contracting tasks (3 minutes)
   - SusCon contract
   - Characterization - air
   - Water quality monitoring
   - Air deposition monitoring

5. Update on effort to develop a method for generating a representative sample of wear debris (5-10 minutes)

6. Review and discussion of draft RFP for aerodynamic particle size diameter measurement (20 min)
   - see attached document and focus on pages 5-8

7. Anything else?
The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on September 4th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Mark Schlautman (Clemson University, project technical advisor)
- Pat Thesier (Sumitomo Electric Automotive, Inc. and lead representative of the Brake Manufacturer's Council Product Environmental Committee [BMC/PEC])
- Rodger Dabish (TMD Friction)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Jim Pendergast (U.S. EPA)
- Kelly Moran (TDC Environmental)
- Michael Endicott (Sierra Club) was unable to participate in the teleconference.

Jim Trainor. The agenda was abandoned because Steering Committee member Jim Trainor (brake manufacturer representative and technical consultant) passed away yesterday. He has been a leader of the brake industry participation in the BPP since its inception in the mid-1990s. Jim’s insight and sharp thinking will be greatly missed.

Air Deposition Modeling. Proposals have been received. The Steering Committee agreed that the proposal review team will consist of Richard Looker and Marcia Brockbank (who must be on the review team for all contractors), Mark Schlautman (because he is the project technical advisor), and representatives of the various BPP constituencies: Jim Pendergast, Michael Endicott, Kelly Moran, and Pat Thesier.

Teleconference Rescheduled. The remaining work portion of the meeting was rescheduled to September 15th.

Anticipated Next Steps

The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- September 15, teleconference meeting
- September 24-25, two-day in-person meeting, San Francisco Bay area
- October 7, teleconference meeting
- November 4, teleconference meeting
- December 9, teleconference meeting
Agenda Distributed by Sustainable Conservation via e-mail

TELECONFERENCE
Thursday September 4, 9:00 to 10:00 a.m., PDT
Dial: 866-279-1566
Meeting Number: *4762806*

DRAFT Agenda

1. Agenda review and anything new? (10 minutes)

2. Air Deposition Modeling RFP (3 minutes)
   - status and identification of review team members

3. Update and discussion of schedule (15 minutes)
   - see attached Word documents sized for legal paper

4. Identification of objectives and topics for September 24-25 meeting
   - see attached Word document (15 minutes)

5. Discussion of proposal for generating a representative sample of wear debris (15 minutes)

6. Anything else?
The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on September 15th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Mark Schlautman (Clemson University, project technical advisor)
- Pat Thesier (ADVICS North America, Inc. and lead representative of the Brake Manufacturer's Council Product Environmental Committee [BMC/PEC])
- Rodger Dabish (TMD Friction)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Jim Pendergast (U.S. EPA)
- Kelly Moran (TDC Environmental)

Michael Endicott (Sierra Club) was unable to participate in the teleconference.

The following items were discussed:

**Action Plan/Proposition 13 Grant Project Schedule.** The Steering Committee is working to identify how the project must be modified to meet the compressed schedule required by the State Water Resources Control Board in its delayed funding of the project’s Proposition 13 grant. The Steering Committee reviewed and discussed a draft schedule prepared by Sustainable Conservation. Members identified additional information needed and discussed possible schedule presentation methods to facilitate Steering Committee decision-making. The schedule—and associated critical decisions about the project work plan—will be a focus of the upcoming in-person meeting.

**Representative Sample of Brake Wear Debris.** The BMC reviewed a proposed procedure for obtaining a representative sample of copper-containing brake wear debris. The plan, while ideal in many aspects, will take too long to work with the compressed project schedule. The BMC and the Steering Committee will continue discussions on this topic.

**Brake Wear Debris Characterization.** Clemson University has completed the third phase of the preliminary characterization of brake wear debris from one copper-containing brake pad. Professor Schlautman has submitted a paper on this work to the journal *Science of the Total Environment*. His report to BASMAA and Palo Alto (which funded this work) will be prepared soon.
September In-Person Steering Committee Meeting. The Steering Committee discussed and agreed on the priorities for the September in-person meeting and reviewed and modified a draft agenda prepared by Sustainable Conservation.

**Anticipated Next Steps**

The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- September 24-25, two-day in-person meeting, San Francisco Bay area
- October 7, teleconference meeting
- November 4, teleconference meeting
- December 9, teleconference meeting
**DRAFT Agenda**

1. Agenda review and anything new? (5 minutes)

2. Review of draft agenda for the September 24-25 Steering Committee meeting (20 minutes)
   - see attached Word document

3. Update and discussion of schedule (10 minutes)
   - see attached Word documents sized for legal paper (One is six pages and more legible, the other is one page and shows the connections between task numbers 222 through 417.)
   - Please note, I've updated this in response to Kelly's concerns about the time estimates in the earlier version. We are now running 16 months behind schedule.

4. Discussion of proposal for generating a representative sample of wear debris (15 minutes)
   - see attached Word document

5. Questions or comments on Mark's most recent JEM submittal? (10 minutes)
   - see attached pdf document

6. Anything else?
The Brake Pad Partnership (BPP) Steering Committee met in person in San Francisco on September 24th and 25th. A copy of the meeting agenda is attached. This memorandum summarizes the major items of discussion and important outcomes of the Steering Committee meetings. The purposes of the Steering Committee meetings were:

- To assess the critical path for conducting the Proposition 13 work and assure schedule that meets the grant deadline.
- To interview Air Deposition Modeling contractors and select one.
- To solidify approach to the development of a representative sample of wear debris and aerodynamic particle size diameter measurement.
- To refine approach to the determination of the source term and identify next steps.
- To understand the extrapolation approach and resolve watershed modeling approach.
- To approve sole source contracts for water quality monitoring, air deposition monitoring, and Sustainable Conservation’s role.

The following people participated in the Steering Committee meetings:
- Sarah Connick, Sustainable Conservation, Project Manager, Facilitator,
- Mark Schlautman, Clemson University, project technical advisor,
- Pat Thesier, ADVICS North America, Inc. and lead representative of the Brake Manufacturers’ Council Product Environmental Committee (BMC/PEC)
- Rodger Dabish, TMD Friction
- Michael Endicott, Sierra Club
- Kelly Moran, TDC Environmental
- Jim Pendergast, U.S. EPA

Many others assisted the Steering Committee by participating in part of the meeting, including Paula Trigueros from the San Francisco Estuay Project (BPP Proposition 13 grant manager), Richard Looker from the San Francisco Bay Regional Water Quality Control Board, Jim Carleton from U.S. EPA (watershed modeler), Jim Scanlin from the Alameda County Clean Water Program (which will conduct additional water quality monitoring of the study watershed), Don Yee of the San Francisco Estuary Institute (which will conduct air deposition monitoring in the study watershed), Terry Cooke from URS (which will conduct Bay modeling), and potential air deposition modeling contractors from AER and Environ. Steering Committee member Tim Merkel (formerly of Federal-Mogul Corporation) was unable to participate in the meetings.
Action Plan Implementation

The BPP is moving into high gear with the imminent arrival of the Proposition 13 grant funds and the shrinking of the 3 year workplan into a two-year implementation period. The project is complex—the flowchart below illustrates the relationship of the various elements of the Action Plan. A summary of the status of the each element of the BPP Action Plan is attached.

At the meeting the Steering Committee made the following decisions relevant to the project elements:

- **Air Deposition Modeling.** The BPP received two proposals, judged both potential contractors highly qualified, and interviewed both teams. One contractor’s approach was outstanding in its design to meet the needs of the Steering Committee, the project, and Partnership stakeholders. The Steering Committee selected this contractor (I will inform you of the selection as soon as the contractors are notified).

- **Air Deposition Monitoring.** The Steering Committee approved the scope of work for a contract with SFEI, which SFEP will complete as soon as the grant contract from the state is received.

- **Watershed Modeling.** The Steering Committee is seriously considering substituting U.S. EPA pro-bono BASINS modeling (see below) for the planned SWMM modeling of the Castro Valley watershed. This would free up sufficient funds to fully fund the Bay modeling task, with $5,000 left over to assign to the two other unfunded tasks. Other than checking in with stakeholders, the primary outstanding question is whether BASINS will be able to provide adequate time resolution on the data to be input into the Bay model. U.S. EPA and URS will consult on this question.

- **Watershed Monitoring.** The Steering Committee approved the scope of work for a contract with Alameda County to conduct extra copper modeling in Castro Valley for
use in watershed modeling. SFEP will complete the contracting process as soon as the grant contract from the state is received.

- **Bay Modeling.** The Steering Committee would like to get URS under contract by this winter, to allow for consultation with the Bay Modeling team to determine if and how various technical decisions might affect the Bay modeling. Full funding is currently not available for this task, an issue that will need to be dealt with in the contracting process (unless funds are reallocated to this task from the watershed model task).

- **Representative Sample of Brake Wear Debris.** To understand the environmental fate and transport of copper in brake wear debris, it will be necessary to have a representative sample of copper-containing brake wear debris. The BMC has proposed two different methods for obtaining such a sample, one of which should be feasible in the next few months (which would meet project schedule requirements). The methods both include checks that should ensure that all types of copper-containing brake pads would be represented in the sample and that the most common materials would be included. Industry representatives indicated that they would seek final approval of the modified procedure from the BMC/PEC and would initiate it if they obtain approval. They will also seek BMC funding for the wear debris generation (estimated cost is less than $10,000 if the done by Link Engineering, the only contract dynamometer laboratory that is currently set up to run the BMC wear debris generation procedure). If this request is not successful, I expect that the Steering Committee would approve use of funds from the Chemical Characterization task for this purpose.

- **Chemical Characterization of Brake Wear Debris.** The Steering Committee decided that a critical element in decision-making for the approach to the project will be knowing whether copper in brake wear debris behaves like other copper in the environment. Clemson University test results from one brake pad (see below) suggest that this might be the case; however, this testing needs to be repeated with a representative sample of brake wear debris. The Steering Committee directed Sustainable Conservation to work with Clemson on the scope and budget of a possible sole-source contract to complete testing on a representative wear debris sample. Remaining funds on this task will be held pending the results of this preliminary testing.

- **Physical Characterization of Brake Wear Debris.** The Steering Committee approved the scope of work for a request for qualifications to conduct aerodynamic particle size diameter measurements and other characterization of brake wear debris to assist with the air deposition modeling. The RFQ will be issued in a few weeks. The Steering Committee is not entirely certain that it will be necessary to make aerodynamic diameter measurements, as it is currently not clear whether available data from recent industry papers (particularly a paper from Ford Research, published in September in *Environmental Science & Technology*) might be sufficient. If such measurements are needed, they would have to be made at a laboratory capable of setting up the test (Link Engineering is probably the only such lab that could set it up cost effectively) and would need to use brake pad material collected for the generation of the representative sample of copper-containing wear debris. The Steering Committee will ask the air deposition modeler to do some preliminary modeling to assess the
uncertainty inherent in the available data and recommend whether additional measurements are technically worthwhile.

- **Copper Load.** The Steering Committee added this previously discussed but omitted task to its workplan. The Steering Committee will need to identify a funding source for this work (which will probably cost $15,000 to 50,000). The task has two elements: (1) estimate copper load from vehicle brake pads to the Castro Valley watershed, and (2) estimate copper load from other sources to the Castro Valley watershed. Industry members outlined an approach to the first element that has some holes but seems generally technically appropriate. The industry representatives said that they could not perform or fund this work because it would be perceived as too politically charged by the industry. The second element is basically an update on copper source studies conducted in the 1990s in the South Bay; Richard Looker and I agreed to explore whether any of the other copper-related activities currently in progress in the Bay area might provide the information needed.

- **Manage the BPP and the Scientific Advisory Team.** The Steering Committee approved the approach to scope of work for the Sustainable Conservation contract with SFEP, but noted several issues that will need to be worked out before the contract is finalized. The primary issue is the need for SFEP and Sustainable Conservation to work out clearly the role of each organization in managing the grant-funded work. (The Scientific Advisory Team is discussed further below).

**Project Schedule.** I anticipate some significant difficulties working out the project schedule—this is a near-term focus for me, as it will be essential to resolve soon to prevent significant problems in the next two years.

- **Schedule for project elements not established.** We do not yet have a working schedule for the entire project. Once we have a working schedule, the Steering Committee anticipates having to make some significant compromises in order to complete the project in the shortened period required by the SWRCB contract.

- **Work start date uncertain.** Funds from the Proposition 13 grant are pending, but the San Francisco Estuary Project (SFEP) has yet to receive the contract from the state. SFEP cannot sign contracts and release funds until the contract arrives.

- **Timely decision process needed.** While BASMAA has organized in a manner that allows me to obtain timely feedback on critical decisions, the brake manufacturers do not have a group decision-making process set up to provide timely responses to BPP needs. The industry members of the Steering Committee are working on this issue. They have made significant improvements in the last year, but have a more to do.

**Scientific Advisory Team**

The Steering Committee discussed possible frameworks for working with the Scientific Advisory Team. The available budget is not sufficient to allow the type of arrangement that was used for the lower South San Francisco Bay Copper/Nickel TMDL workgroup to be adopted by the BPP. The BPP needs several different types of expertise (air, watershed, Bay), and therefore a larger number of advisors if we are to have a diversity of opinions on each topic.

One possible approach that the Steering Committee is considering is to work with one or two additional long-term scientific advisors (in addition to Professor Schlautman),
supplemented by advisors for air, watershed, and Bay modeling who would be asked for limited task-specific assistance (e.g., to review workplans and draft reports and send comments via e-mail). Because the framework remains unclear, the BPP has not been able to produce the one page “Scientific Advisor Job Description” requested by BASMAA and other stakeholders.

In its meetings, the Steering Committee is having a difficult time discussing the advisory framework as differentiated from actual potential advisors. Because of this problem—and the possibility that some advisors may be able to assist the BPP without BPP funding (thus stretching our dollars)—it may be easier to identify potential advisors for each project element and then determine what roles they can play given the available budget.

**Clemson Copper Extraction Results**

Clemson has completed its BASMAA-funded testing of the extractability of copper in brake wear debris. A one-page summary of the results is attached. Professor Schlautman has submitted a paper based on these results to the journal *Science of the Total Environment*.

Please remember that these data are for only one copper-containing brake pad—it is not known if they are representative of typical copper-containing brake wear debris. If the data are representative, it would be appropriate to conclude that the environmental behavior of copper in brake wear debris is similar to the environmental behavior of copper from other sources. As mentioned above, the BPP plans testing of a representative sample to find out if the results are anomalous or representative.

**U.S. EPA BASINS Modeling of South San Francisco Bay**

As an in-kind contribution to the BPP, U.S. EPA is developing a model to scale up copper runoff estimates from Castro Valley to estimates for the entire Bay using the newest version of U.S. EPA’s BASINS model. When the U.S. EPA modeler (Jim Carleton) set up the model, he started with detailed modeling of the Castro Valley watershed. This is fortuitous, as the model fit well with real data from Castro Valley and therefore may be able to serve as a substitute for planned SWMM modeling (see above).

Jim Carleton presented a status report to the Steering Committee. One of the most interesting results—based on very limited data—is that modeling results for watershed runoff of copper are consistent with a 40 to 60% increase in copper between 1996 and 2000. This is on the surface consistent with the increase in copper use in vehicle brakes (copper use in vehicle brakes increased by 40 percent between 1998 and 2000 and some increase probably occurred between 1996 and 1998). The results are based on very limited data and are quite preliminary, so I ask that everyone exercise great caution in interpreting this information. More copper monitoring data this winter from any Bay Area urban runoff program (for creeks that were monitored prior to 1996) would be very helpful to U.S. EPA in assessing the meaning of their very preliminary findings.

**Other Items**

- **Copper Use Report Delayed.** The BMC has not yet completed the annual copper use report for 2003, which was due to the BPP this summer. Industry representatives assured the Steering Committee that the delay was due to internal

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1 He gave the same report to the Copper/Nickel Coordinating Committee on Friday September 26th.
management issues at the BMC, not to any lack of reporting by brake pad manufacturers. The BMC hopes to deliver the report to the BPP by October 15. The Steering Committee will incorporate the new data into its own annual report, which will also include new information describing quality assurance/quality control procedures for the reporting process.

- **Industry Representative Leaving.** The leader of the brake manufacturer participation in the BPP, Pat Thesier, will be leaving his job early in 2004. Given other recent losses, this transition may be disruptive for the BPP.

- **Sustainable Conservation Budget Status Update.** While the Proposition 13 grant will cover part of Sustainable Conservation’s cost in managing the BPP, Sustainable Conservation estimates it needs to raise about another $150,000 over the next 3 years to support its management of the BPP and the project Technical Advisor (Professor Mark Schlautman). If you are aware of other possible funding sources, please notify Sarah Connick (SConnick@suscon.org).

- **Stakeholder Communications Plan.** Discussion of the BPP communications plan was postponed as the Steering Committee judged it less time-critical than other items.

**Anticipated Next Steps**

A great deal of action will be needed in the next few months for the Steering Committee to get the Action Plan work on course, fully funded, and to meet the aggressive schedule required by the grant funding. The Steering Committee doubled the number of planned teleconference meetings for the rest of 2003 to respond to work needs. The upcoming Steering Committee meeting schedule is as follows:

- October 13, teleconference meeting
- November 4, teleconference meeting
- November 19, teleconference meeting
- December 3, teleconference meeting
- December 9, teleconference meeting
- January (dates TBD), in-person meeting, San Francisco

Sustainable Conservation is in the process of scheduling teleconference meetings for dates after December 9th.
BRAKE PAD PARTNERSHIP

Steering Committee Meeting

Wednesday, September 24, 2003
8:30 a.m. to 5:00 p.m.

Thursday, September 25, 2003
8:30 a.m. to 5:00 p.m.

Sustainable Conservation
121 Second Street, Sixth Floor
San Francisco, CA 94105
Phone: 415-977-0380

AGENDA

MEETING OBJECTIVES

➢ Assess the critical path for conducting the Proposition 13 work and assure schedule that meets the grant deadline.
➢ Interview Air Deposition Modeling contractors and select one.
➢ Solidify approach to the development of a representative sample of wear debris and aerodynamic particle size diameter measurement.
➢ Refine approach to the determination of the source term and identify next steps.
➢ Understand the extrapolation approach and resolve watershed modeling approach.
➢ Approve sole source contracts for water quality monitoring, air deposition monitoring, and Sustainable Conservation’s role.

Wednesday, September 24, 2003

8:00 a.m. Meeting room open, and bagels, coffee, and tea available
➢ Complete lunch order forms

8:30 a.m. Meeting Begins
➢ Agenda review
➢ Announcements of any new developments affecting the partnership

8:45 a.m. Partnership Business
➢ Update on Proposition 13 contracting with the state
➢ Report from Sustainable Conservation regarding funding
   o For SusCon, Mark, and closing the $100,000 gap in study funding
➢ Review of Copper Use Monitoring QA/QC document and discussion regarding next steps
➢ Other items?
Guests present: Jim Carleton (USEPA), Richard Looker (SFB RWQCB), and Paula Trigueros (SFEP).

9:30 a.m.  **Project Scheduling**
- Review of scheduling estimates and critical path
- Identification of opportunities for achieving scheduling efficiencies

11:00 a.m.  **Wear Debris Generation and Aerodynamic Particle Size Characterization**
- Review of proposed approach
- Discussion of timing
- What are the key things we need to nail down here?
- Approval of the RFQ for release

12:00 noon  Lunch

12:45 p.m.  **Source Term Approach**
- Review of steps taken so far
- Identification of possible approaches and discussion of pros and Conservation
- Development of next steps

Air Deposition Modeling Contractor Interview and Selection Process

Additional guests present: Invited contractors from ENVIRON and AER (for specified interviews).

2:00 p.m.  Review of selection process, interview procedures, and interview questions
2:35 p.m.  Interview with consultants from ENVIRON
3:20 p.m.  Break
3:35 p.m.  Interview with consultants from AER
4:20 p.m.  Break
4:30 p.m.  Compilation of interviewer ratings and contractor selection
5:00 p.m.  Adjourn.
6:00 p.m.  Steering Committee dinner at restaurant to be announced.

Thursday, September 25, 2003

Guests present: Louis Armstrong or Terry Cooke (URS), Jim Carleton (USEPA), Jim Scanlin (ACCWP), Paula Trigueros (SFEP), and Don Yee (SFEI).

8:00 a.m.  Meeting room open, and bagels, coffee, and tea available
Complete lunch order forms

8:30 a.m.  **Update on Watershed Modeling Extrapolation Effort**
- Presentation from Jim Carleton of U.S. EPA
- Discussion of extrapolation approach
- Discussion of implications for the BPP watershed modeling approach

10:00 a.m.  Break

10:15 a.m.  **Review and Discussion of Draft Water Quality Monitoring Contract**
Short presentation from Jim Scanlin of the Alameda Countywide Clean Water Program
Identification of any modifications needed for contract approval
11:00 a.m. Review and Discussion of Draft Air Deposition Monitoring Contract
Short presentation from Don Yee of the San Francisco Estuary Institute (tentative)
Identification of any modifications needed for contract approval
11:30 a.m. Review and Discussion of Draft Contract for Sustainable Conservation
Short presentation from Sarah Connick of Sustainable Conservation
Identification of any modifications needed for contract approval
12:00 noon Lunch
1:00 p.m. Revisiting of topics held over from earlier in the meeting
Project Scheduling
Wear Debris Generation and Aerodynamic Particle Size Characterization
Source Term Approach
2:00 p.m. Scientific Advisory Team
Review of draft SAT Framework
Review of possible SAT members
Discussion of usage
3:15 p.m. Break
3:30 p.m. Stakeholder Communications Plan
Review of draft Stakeholder Communications Plan
Discussion and identification of needed modifications
4:30 p.m. Review of Accomplishments, Action Items, and Next Steps
5:00 p.m. Adjourn
<table>
<thead>
<tr>
<th>Task</th>
<th>Contractor</th>
<th>Budget</th>
<th>Status (09/03)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmospheric deposition modeling. Use atmospheric dispersion modeling methods to estimate deposition of copper from brake wear debris in Castro Valley. Consider resuspension of material initially deposited on roads.</td>
<td>Interviewed AER and Environ; will select one firm</td>
<td>$75,000</td>
<td>Contractor selected (but not yet notified)</td>
</tr>
<tr>
<td>Watershed modeling. Modify Alameda-SWMM (Castro Valley Creek) to address watershed runoff of copper in brake wear debris, using input from air quality model. U.S. EPA (Jim Carleton) is setting up BASINS model for the Bay (from Suisun Bay to the lower South Bay).</td>
<td>May cut SWMM model due to funds shortfall</td>
<td>$40,000 (estimated $75,000)</td>
<td>Exploring using U.S. EPA BASINS model only</td>
</tr>
<tr>
<td>Bay modeling. Use a combination of hydrodynamic (e.g., MIKE21 model set up for Bay by URS under contract to City of SF [Airport]) and compartment (e.g., WASP) models to address both short-term and long-term behavior of this copper in San Francisco Bay.</td>
<td>URS</td>
<td>$90,000 (estimated $125,000)</td>
<td>May shift funds from watershed modeling to this task</td>
</tr>
<tr>
<td>Chemical characterization of brake wear debris. Obtain data to better estimate fate of copper in wear debris in urban runoff, data for build-up/washoff functions, and sediment adsorption/desorption analyses. May use part of funds for Clemson to follow up copper extraction work funded by Palo Alto &amp; BASMAA.</td>
<td>Will issue RFP</td>
<td>$100,000</td>
<td>Need representative brake wear debris sample</td>
</tr>
<tr>
<td>Physical characterization of brake wear debris. Obtain reliable measurement of the aerodynamic diameter of wear debris particles; possibly conduct other measurements to assist with validation of atmospheric deposition modeling.</td>
<td>Will issue RFP in October</td>
<td>$40,000</td>
<td>Need representative brake wear debris sample</td>
</tr>
<tr>
<td>Ambient Water Quality monitoring. Conduct enhanced monitoring of copper in stormwater in the Castro Valley watershed in winter 2003/04.</td>
<td>ACCWP</td>
<td>$30,000</td>
<td>Processing contract</td>
</tr>
<tr>
<td>Air Deposition monitoring. Collect near-source copper deposition data in study watershed for air dispersion model calibration in 2004.</td>
<td>SFEI</td>
<td>$50,000</td>
<td>Processing contract</td>
</tr>
<tr>
<td>Representative Sample of Brake Wear Debris. Generate a representative sample of copper-containing wear debris for tests.</td>
<td>Link Engineering (dyno lab)</td>
<td>$0 (not in grant)</td>
<td>Working with BMC</td>
</tr>
<tr>
<td>Copper load. Estimate copper releases from brakes and other sources into Castro Valley watershed.</td>
<td>??</td>
<td>$0 (not in grant)</td>
<td>Working on way to fund task</td>
</tr>
<tr>
<td>Manage the BPP and the Scientific Advisory Team. Facilitate stakeholders dialogue and decision making, provide resources necessary for collaborative problem solving, staff BPP Steering Committee, ensure implementation of final outcome based on study results, and communicate with stakeholders and scientists. Retain independent experts to advise and guide the development and implementation of the study.</td>
<td>Sustainable Conservation</td>
<td>$180,000 ($30,000 for scientific advisory team)</td>
<td>Processing contract</td>
</tr>
<tr>
<td>Project Management. Contract management, publication development, and website support. Includes ABAG 10% overhead.</td>
<td>San Francisco Estuary Project</td>
<td>$100,000</td>
<td>Funds available 10/03</td>
</tr>
</tbody>
</table>
Brake Pad Wear Debris Copper Extraction Test Summary

- **High-quality experimental procedures were used.** Clemson University developed a rapid, quantitative standard operating procedure for determining the total concentration of copper in wear debris from disc brakes. Clemson used standard extract test methods and some modified methods to measure the ability of copper in brake pad wear debris to leach out in the environment.

- **Wear debris from only one copper-containing brake pad was tested.** There are several different chemical forms of copper used in brake pad formulations. The Brake Pad Partnership plans to repeat these tests with wear debris from a representative composite sample of copper-containing brake pads to determine if these results are representative of all copper-containing brake pads.

- **If the results from this one brake pad are typical, copper from vehicle brake pads probably behaves in the environment like copper from other environmental copper sources.** Test results (see table below) show that a substantial fraction of copper in the tested brake wear debris can be mobilized in the environment. In the long term, most of the copper can probably be mobilized from brake pad wear debris that remains exposed to water flows.

- **Copper solubility in brake wear debris is probably due to the high surface area of brake pad wear debris and the chemical form of the copper in the wear debris.** Brake wear debris has a much higher specific surface area (31 m²/g) than the standard copper-containing minerals tested (< 1.5 m²/g).

### Brake Pad Wear Debris Copper Leaching Test Results

(Extracting Solution from one Copper-Containing Brake Pad; 48-Hour Extractions)

<table>
<thead>
<tr>
<th>Extracting Solution</th>
<th>Copper fraction leached (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal Hazardous Waste Classification Test (Toxicity Characteristic Leaching Procedure)</td>
<td>92% (± 7%)</td>
</tr>
<tr>
<td>California Hazardous Waste Classification Test (Waste Extraction Test*)</td>
<td>102% (± 8%)</td>
</tr>
<tr>
<td>U.S. EPA Synthetic Precipitation Leaching Procedure</td>
<td>13.2% (± 0.5%)</td>
</tr>
<tr>
<td>Deionized distilled water</td>
<td>18.2% (± 1.7%)</td>
</tr>
<tr>
<td>Synthetic rainwater (Chemical composition of Los Angeles rain)</td>
<td>40% (± 1.7%)</td>
</tr>
<tr>
<td>Water with humic acids** (Standard soil humic acids)</td>
<td>22.7% (± 0.3%)</td>
</tr>
<tr>
<td>Water with humic acids* (Standard river humic acids)</td>
<td>23.9% (± 0.8%)</td>
</tr>
</tbody>
</table>

*Test used for compliance with the California Soluble Threshold Limit Concentration (STLC).

**Humic acids—natural acids found in soils and plants—are commonly found in urban runoff and creeks.
1. Agenda review—any changes?

2. Schedule/management issues—overview (see Grant Contracting Status Summary)

3. New technical information—overview (see Copper Extraction Test Summary)

4. Watershed model selection
   - SWMM vs. BASINS
   - Implications for Bay modeling

5. Estimate of copper releases from brakes and other sources into watershed
   - Non-brake sources
   - Brakes (OE and other types of pads)
   - What is the best source for value for total annual copper load to Bay?

6. Scientific advisory team
   - Process for working with SAT
   - Possible Membership: Thomas Young, U.C. Davis; Ken Schiff, SCCWRP; Lester McKee, SFEI; Mark Jacobson, Stanford; members of SFO NOAA Science Panel (see Science Panel on Runways in SF Bay)

7. Stakeholder Communications Plan—desired elements?

8. BASMAA desired level of involvement in BPP technical work
   - Contractor workplans
   - Interim reports
   - Draft technical reports
   - How long will BASMAA members need for reviews (# weeks)?
The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on October 13th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Mark Schlautman (Clemson University, project technical advisor)
- Michael Endicott (Sierra Club)
- Kelly Moran (TDC Environmental)
- Pat Thesier (ADVICS North America, Inc. and lead representative of the Brake Manufacturer's Council Product Environmental Committee [BMC/PEC]); Rodger Dabish (TMD Friction); Tim Merkel (formerly of Federal-Mogul Corporation); and Jim Pendergast (U.S. EPA) were unable to participate in the teleconference.

Due to the low participation in the meeting, participants simply received the following updates:

**Action Plan/Proposition 13 Grant Contract.** ABAG (San Francisco Estuary Project’s fiscal agent) has not yet received the contract for the Brake Pad Partnership Proposition 13 grant. ABAG needs to see the contract language before it can complete contract negotiations for grant-funded work. The contract will have to be sent back to the state for final state signatures (which can take a few days or a few weeks). Only upon receipt of the fully executed contract can ABAG sign contracts to start the grant-funded work.

**Request for Qualifications Issued.** The request for qualifications for characterization of airborne brake wear debris was issued last week. Proposals are due November 6th.

**Anticipated Next Steps**

The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- November 4, teleconference meeting
- November 19, teleconference meeting
- December 3, teleconference meeting
- December 9, teleconference meeting
- January (dates TBD), in-person meeting, San Francisco

Sustainable Conservation is in the process of scheduling teleconference meetings for dates after December 9th.
DRAFT Agenda

1. Agenda review and anything new? (5 minutes)

2. Review of follow up items from September 24-25 Steering Committee meeting
   - P13 contracting status (update)
   - Drafting the revised Cu Use Monitoring Report (volunteer)
   - Source term estimation approach (brief update from Jim P. and Rodger)
   - Interface between watershed and bay model given new information on time steps (discussion)
   - Additional items?

3. Anything else?
MEMO

TO: Geoff Brosseau                      DATE: November 5, 2003
FROM: Kelly D. Moran                   PROJECT: 16
SUBJECT: Brake Pad Partnership Conference Call—November 4, 2003

The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on September 15th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Mark Schlautman (Clemson University, project technical advisor)
- Pat Thesi (ADVICS North America, Inc. and lead representative of the Brake Manufacturer's Council Product Environmental Committee [BMC/PEC])
- Rodger Dabish (TMD Friction)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Michael Endicott (Sierra Club)
- Jim Carleton (U.S. EPA)
- Kelly Moran (TDC Environmental)

Jim Pendergast (U.S. EPA) was unable to participate in the teleconference.

The following important items were discussed:

**Brake Pad Copper Use Monitoring Program.** The brake manufacturers verbally reported to the Steering Committee that brake pad copper use increased significantly in model year 2002. The manufacturer representatives on the Steering Committees are looking into the calculation methods and other issues to explain why the reported values showed such a large increase. Because manufacturers anticipate that we will have a lot of questions about this data, they are preparing a cover letter to explain the reasons they can identify for the copper use increase. I will forward a summary of the data and the manufacturer’s explanation when I receive it (which I hope will be next week).

As it did in prior years, the BPP will create a short report presenting the copper use data back to the first reporting year (1998). This year’s report will also include a description of the quality assurance methods the BMC uses in assembling the data. Sustainable Conservation will distribute the report upon Steering Committee approval (anticipated on Nov. 19th).

**Proposition 13 Grant Contracting Update.** The San Francisco Estuary Project has finally received and signed the grant contract. Once the state signs the contract (in about 2 weeks), the grant will finally be in place. The contract schedule will not be extended by the state’s delays (it has been more than 1 year since the State Water Resources Control Board awarded the grant). A contracting update from SFEP is attached.
Sustainable Conservation will be contacting Alameda County to ensure that it will be able to continue with the planned water quality monitoring this winter, as this monitoring is essential to the project schedule.

Estimating Copper Releases from Brake Pads. Discussion of this item (the “source term estimation approach”) was postponed because U.S. EPA and brake manufacturers have not yet created a proposal for Steering Committee discussion.

**Anticipated Next Steps**

The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- November 19, teleconference meeting
- December 3, teleconference meeting
- December 9, teleconference meeting
- January (dates TBD), in-person meeting, San Francisco

Sustainable Conservation is in the process of scheduling teleconference meetings for dates after December 9th.
Agenda Distributed by Sustainable Conservation via e-mail

TELECONFERENCE
Tuesday, November 4, 11:00 to noon, PST
Dial: 866-279-1566
Meeting Number: *4762806*

DRAFT Agenda

1. Agenda review and anything new? (5 minutes)

2. Copper Use Monitoring Program (15 minutes)
   - Data for Model Year 2002 (Pat & Rodger)
   - Report update and schedule for release (Michael and Sarah)

3. Proposition 13 Contracting Update (Sarah) (2 minutes)
   see attached memorandum from Marcia Brockbank

4. Update on the development of the representative sample of wear debris (Pat & Rodger) (5 minutes)

5. Volunteer needed to draft the scope of work for wear debris characterization studies on the representative sample (i.e., the density and leaching experiments) (3 minutes)

6. Review of proposed Source Term Estimation Approach (Jim P. and Rodger) (20 minutes)

7. Update on possible Clean Estuary Program effort to quantify other sources of copper (Kelly) (3 minutes)

8. Plan for conference call with Terry Cook, Jim P., Jim C., and whomever else wants to join to discuss the interface between the bay and watershed models. (3 minutes)
   (See attached note from Terry via Kelly)

9. Anything else?
October 19, 2003

To: Sarah Connick, Sustainable Conservation

From: Marcia Brockbank, SFEP/ABAG

RE: Status on Contract Management for the Brake Pad Partnership

I am providing a status report on contract administration for the BPP. If you have any questions about any of the information below, please let me know. I can be reached by phone at 510-622-2325 or by email at mlb@rb2.swrcb.ca.gov.

1. **Master contract between ABAG/SFEP and the State Water Board:** no contract. As of 10/17/03 we were told it is still being reviewed with no date for when we might see it. Our best guess is that we will have a signed contract in the next 3-4 weeks. We are proceeding with competitive bid processes and other contract negotiations; however not having a master contract slows the process because we need to see it to make sure we are including necessary language in our subcontracts.

2. **Sole Source Subcontracts:** all subcontracts must be submitted to the State Board for approval prior to award. The scopes of work for three of the sole source subcontracts are well underway. As soon as we receive the master contract, all subcontracts will be reviewed, revised as necessary and submitted to the State Board for approval as quickly as possible.
   a. **Sole Source Subcontracts for the San Francisco Estuary Institute and the Alameda County Flood Control and Water Conservation District (fiscal agent for the Alameda Countywide Clean Water Program).** Scopes of Work for SFEI and ACCWP have been developed and are in the process of being entered into the subcontract boiler-plate language. These three subcontracts will be sent to the consultants the week of 10/27 for review and negotiation.
   b. **Sole Source Subcontract between ABAG/SFEP and Sustainable Conservation:** contract has gone through several revisions and is close to being finalized; waiting to include necessary master contract language. Sarah Connick and SFEP staff have established a monthly schedule of communication and agreed on our respective roles for overseeing the BPP schedule and all subcontractor activities.
   c. **Sole Source Subcontract for URS.** ABAG is waiting for the scope of work from Sustainable Conservation and URS, at which time the scope will be entered into the subcontract boiler-plate language and sent to the consultants for review and negotiation.

3. **RFP for Air Deposition Modeling:** competitive process is completed. Required notice was sent to State Board for approval to award subcontract on 10/16. The two consultants interviewed have been notified informally (by phone call) that they were selected or not and will receive written confirmation upon our approval from the State Board to act (hope to have this the week of 10/20). A draft subcontract is complete and will be sent to AER the week of 10/27 for review and negotiation.

4. **RFQ for Characterization of Airborne Brake Wear Debris:** this RFQ was sent to 13 consultants/academics and is due 11/6.
The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on November 19th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Mark Schlautman (Clemson University, project technical advisor)
- Pat Thesier (ADVICS North America, Inc. and lead representative of the Brake Manufacturer’s Council Product Environmental Committee [BMC/PEC])
- Rodger Dabish (TMD Friction)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Jim Pendergast (U.S. EPA)
- Kelly Moran (TDC Environmental)

Terry Cooke (URS) and Jim Carleton (U.S. EPA) also joined the call for the discussion of watershed modeling. Michael Endicott (Sierra Club) was unable to participate in the teleconference.

The following important items were discussed:

**Contracting/Scheduling.** The San Francisco Estuary Project (SFEP) has signed the Proposition 13 grant contract from the state, but has yet to receive the fully executed contract. SFEP is proceeding with lining up subcontracts, but will not be able to sign them and start spending the money until the fully executed contract is returned.

Sustainable Conservation is attempting identify elements of the schedule that could be shortened. It prepared the attached memorandum, which was not discussed during the teleconference. *If any of the schedule reduction options are of concern to you, please let me know.*

**Watershed Modeling.** The Steering Committee again discussed and finally decided to eliminate use of the CV-SWMM watershed model, substituting free BASINS modeling from U.S. EPA. The Steering Committee decided to transfer the $50,000 set aside in its budget toward watershed modeling to the budget for Bay modeling (fully funding this task) and putting $10,000 in reserve for the many unfunded tasks.

**Bay Modeling.** The Steering Committee approved a simple scope of work for the contract with URS for Bay Modeling. Details will be finalized in a workplan to be prepared next summer. Moving this contract forward will allow the BPP Steering
Committee to begin consulting URS to help us understand the implications of our decisions on project elements that provide data to feed into the Bay model.

Chemical Characterization of Brake Wear Debris. The Steering Committee approved, in concept, issuance of a Request for Qualifications (RFQ) for brake wear debris chemical characterization. If you have suggestions for high-quality private or non-profit organization laboratories that are potential bidders on this project, please let me know, so that they can be added to the RFQ distribution list. The RFQ should be issued in early December.

Other agenda items. Remaining agenda items were not discussed for lack of time.

**Anticipated Next Steps**

The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- December 3, teleconference meeting
- December 9, teleconference meeting
- January 8, teleconference meeting
- January 15, teleconference meeting
- February 4-5, in-person meeting, San Francisco
- February 26, teleconference meeting
- March 11, teleconference meeting
- March 25, teleconference meeting
- April 8, teleconference meeting
- April 27, teleconference meeting
- May 6, teleconference meeting
- May 20, teleconference meeting
- June 10, teleconference meeting
- June 24, teleconference meeting
Agenda Distributed by Sustainable Conservation via e-mail

TELECONFERENCE
Wednesday, November 19, 8:00 to 9:00, PST
Dial: 866-279-1566  Meeting Number: *4762806*

DRAFT Agenda
1. Agenda review (1 minute)

2. Update on Contracting and Overview of Scheduling Issues from Sarah (2 min)
   - See attached document: "BPP Report from MLB 11-03"
   - See attached document: "Opportunities for Shortening Our Timeline"

3. Decision on Approach to Watershed Modeling (13 minutes)
   - Guests: Terry Cooke (URS) and Jim Carleton (USEPA)
   - See attached document: "HSPF_pros_and_cons 11-17-03"
   - Decision needed: Whether to use BASINS in lieu of CV-SWMM for modeling the Castro Valley watershed.

4. Review and approval of draft scope of work for Bay Modeling (URS subcontract) (3 min)
   - See attached document: "BPP-URS Draft Scope of Services 11-14-03"
   - Decision needed: Approval of scope of work

   - See attached document: "Simplified Budget"
   - Decision needed: Approval of reallocation of budget back to this task

5. Review of draft scope of work for Chemical & Physical Characterization of Brake Wear Debris (15 minutes)
   - See attached document: "Wear Debris Characterization Draft"
   - See pdf on adsorption and desorption testing sent separately
   - Identify modifications needed and who will make them

6. Review of University of Delaware Brake Wear Debris Characterization report (10 min)
   - See attached pdf file: "Sondhi et al. 2003"
   - Overview from Mark
   - Discussion

7. Copper Use Monitoring Program Report (10 minutes)
   - Draft report sent to steering committee members separately
   - Review and discussion
   - Identification of next steps

8. Update on the development of the representative sample of wear debris
   (Pat & Rodger) (5 min)
     - See last page of attachment: "Opportunities for Shortening Our Timeline"

9. Anything new? Anything else? (3 min)
KEY OPPORTUNITIES FOR SHORTENING OUR TIMELINE

Watershed Modeling and Extrapolation—Discussion to be Scheduled for November 19 Call

**Status:** We originally planned to model the Castro Valley watershed using CV-SWMM, and then use BASINS to extrapolate those results to the entire South San Francisco Bay watershed. We are now ready to make a decision to use BASINS to do the Castro Valley watershed modeling, which will result in cost savings and has the potential to result in a savings of up to four months in our schedule.

**Information needed:** We have gotten information from Jim Carleton of EPA and Terry Cooke of URS indicating that this approach makes sense and will work. On our November 19 conference call, Terry and Jim will present to us the pros and cons of using the BASINS only approach for us to assess and make a final decision.

**Decision needed:** Whether to use BASINS to conduct all the watershed modeling and extrapolation.

Air Deposition Monitoring—Discussion to be Scheduled for December 3 Conference Call

**Status:** We currently have planned to collect air deposition monitoring data over a 12-month period.

**Potential schedule problems and options for addressing them:** This is currently the most significant task on the critical path for our project. One option is to get the monitoring started as quickly as possible, which will require early consultations with the air deposition modeler. In addition, we could decide to shorten the monitoring period, which has some trade-offs.

**Information needed:** Requires consultation with the air deposition modeler and Don Yee for us to understand the trade-offs that would come with shortening the monitoring period. The initial assessment from Don Yee is as follows:

Sarah,

Yes we can compress the monitoring some, although by doing that we miss some of the seasonal change- September and October, November? won't be sampled at all... resumption of heavy traffic (school, etc) after the summer but before the rains.

Is it possible for the modeler(s) to do most everything in terms of development and refinement, and just plug in updated numbers last minute to run the model for the additional months? If there's no water data beyond summer, maybe it's not even a big deal because there's no other data to calibrate to, e.g if we have air data but no water data, regardless of how good or bad the model works that period we can't know.

We can always skip some of the months (e.g. the RMP airdep study didn't have money to run through to winter for organics), but then inevitably you get asked why didn't you do those months.

Don
**Decision needed:** How to shorten the duration of the air deposition monitoring period.

**Time for Work Plan Development and Draft Report Review**

**Status:** We currently have allocated three months for the development, review, and approval of all the contractors’ work plans and reports.

**Potential schedule problems and options for addressing them:** It may be possible to shorten the work plan development and report preparation and review timelines, however we need to be careful not to shortcut the review process.

In cases in which contractors’ tasks involve consultation with others, we could allow them to proceed with those consultations prior to final approval of the work plan. Specific tasks for which we might decide to do this include:

- **Consultations needed to develop SFEI’s air deposition monitoring sample locations and analysis plan.** Requires some sensitivity analyses by the air deposition modeler and consultation with the characterization of airborne wear debris contractor. The air deposition monitoring task is a key task along the critical path and getting it started as soon as possible will help with scheduling.

- **Consultations needed to determine additional wear debris characterization needs.** The air deposition, watershed, and bay modelers all need to identify additional wear debris parameters they will require, which may also require them to run some sensitivity analyses of their models. Expediting these consultations in advance of the finalization of the work plans could help expedite the actual characterization efforts and development of data needed to run the models.

**Information needed:** Feed back from specific contractors on time estimates for preparing work plans and reports, and ability to engage in consultations and sensitivity analyses prior to finalization of a work plan.

**Decision needed:** Can we proceed with the above consultations without finalized work plans from the contractors?

**Chemical Characterization of Representative Sample of Wear Debris**

**Status:** We are in the process of preparing an RFP for up to $100,000 to conduct physical and chemical characterization of the representative sample of wear debris, including the tests conducted on the wear debris from the single pad overseen by Jim Trainor along with the total copper measurement and leaching experiments conducted by Mark Schlautman, and possibly additional leaching experiments in other environmentally representative solutions. For the purposes of the bay model, we need to do some adsorption and desorption rate determination experiments. In addition there may be additional tests needed to provide inputs to the watershed and bay modeling efforts.

**Potential schedule problems and options for addressing them:** The primary concern around the characterization work will be keeping it on schedule. Some leaching experiments may require
more time than others. The current key strategy is to get the RFP finalized and released as soon as possible.

**Decisions needed:**
1. What in the draft needs to be modified, incorporated or removed?
2. To what extent do we want to conduct characterization tests on the airborne fraction?
3. How do we manage sharing the cost of wear debris generation?

**Generation of Representative Sample of Wear Debris**

**Status:** The PEC representatives are working to fast-track the generation of a representative sample of wear debris at the latest by March 31, 2004 (Pat’s retirement date).

**Potential schedule problems and options for addressing them:**

- **Size of sample to be generated.** We can determine what sample size is needed for the tests we already know we intend to perform, but will also need wear debris for additional tests needed for modeling purposes. One option is to generate only the amount we now know we will need, and generate more wear debris when we know exactly what tests we will be doing. Another option is to make a ballpark estimate of additional wear debris that would be needed for any additional tests to generate all of the material we expect to need at the same time. The latter option would be more cost efficient, and all the characterization data would be collected on the exact same sample, however, we might risk needing to generate more debris if our ballpark estimate is too low. Additional information on the cost of wear debris generation, and logistics involved in combining the individual wear debris samples into a composite sample may be helpful in evaluating these tradeoffs.

- **Allocation of costs for wear debris generation.** (need to determine the exact issue at hand here if there is one)

- **Coordination with aerodynamic particle size diameter measurements.** We should be on track to have the airborne brake wear debris characterization contractor in place in time to make the measurements in conjunction with the wear debris generation effort. These contractors will have to coordinate carefully with the wear debris generation contractor.

- **Collection of the airborne fraction for characterization purposes.** The existing Link system collects the airborne fraction on filters, from which it is not possible to extract the airborne fraction for characterization. The airborne brake wear debris characterization contractor will need to work with Link to incorporate an air particulate collection system, possibly a cyclone. One option for avoiding any delays associated with this task would be to skip it—i.e., do we need to run any of the same tests on the airborne fraction that we run on the nonairborne fraction? If so, do we need to run all of them?

- **Schedule slippage.** Schedule slippage happens. Options to prevent it include vigilance.
Develop and approve a method for generating a representative sample

** Determine the amount of wear debris needed for characterization efforts
Solicit data on form of copper used 40d  Not yet IN PROGRESS
Aggregate data on form of copper used 30d?
Determine materials to be tested 40d
Request and obtain properly sized samples 5d
Send materials to Link 35d?
Have aerodynamic particle size diameter contractor ready IN PROGRESS
Run individual wear debris tests 25d?
Determine appropriate approach for combining materials (do following determination of materials to be tested)
Combine individual samples to make representative sample

Provide representative wear debris characterization consultants 0d? 3/31/03

Decisions needed:
(1) How to proceed regarding uncertainties around amounts of wear debris needed?
(2) To what extent do we want to conduct characterization tests on the airborne fraction?
(3) How do we manage sharing the cost of wear debris generation?
The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on December 3rd. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Mark Schlautman (Clemson University, project technical advisor)
- Pat Thesier (ADVICS North America, Inc. and lead representative of the Brake Manufacturer's Council Product Environmental Committee [BMC/PEC])
- Rodger Dabish (TMD Friction)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Michael Endicott (Sierra Club)
- Jim Pendergast (U.S. EPA)
- Kelly Moran (TDC Environmental)

The following important items were discussed:

**Contracting/Scheduling.** The San Francisco Estuary Project still has not received the signed Proposition 13 grant contract from the state. All of the project subcontractors are willing to begin a few initial steps now, before receiving the signed contracts; however, full progress on our work will not proceed until contracts can be signed by all parties.

**Contract for Physical Characterization of Brake Wear Debris.** The Steering Committee discussed the one response received to the Request for Qualifications issued for this contract (from Clemson University). Although the response was imperfect, the team is well qualified, so the Steering Committee plans to select Clemson University and to work out remaining details in the scope of work for the contract. Assuming that the Steering Committee decides to proceed with aerodynamic diameter measurements of brake wear debris, proceeding with this contract will make it possible to conduct those measurements in conjunction with the generation of the composite sample of brake wear debris, which will probably be generated in March or April, 2004.

**Request for Qualifications (RFQ) for Chemical Characterization of Brake Wear Debris.** The Steering Committee continued previous discussions on the contents of this RFQ, which is still not ready for release. The Steering Committee did agree that proceeding on a task-order basis is appropriate, and that the only testing that we know for certain that we
want to conduct at this time is the high priority repeat of the extraction tests previously conducted by Clemson on the composite sample of brake wear debris (since previous test were on a sample from only one brake pad.)

Copper Development Association Sponsored Research on “Brake Wear Debris.” A group at the University of Delaware is looking at copper releases from vehicle brake pads, with funding from the Copper Development Association (CDA). They have released a preliminary report to the CDA (Sondhi, A.; Imhoff, P. T.; Dentel, S. K.; Allen, H. E., Strategies and Analytical Procedures for Assessing Copper Emissions from Brake Pads, prepared by the Department of Civil and Environmental Engineer, University of Delaware for the Copper Development Association, July 10, 2003). Professor Schlautman explained (and I agree) that the report reflects rather poor quality methodology (e.g., use of brake pad grindings and material brushed off the brake area on one used vehicle) and provides interpretations of the results that are not supported by the data. The authors ignored information provided by myself and other participants in the Brake Pad Partnership. It is likely that the purpose of this work is to compete with the work underway by the Brake Pad Partnership.

Composite Sample of Brake Wear Debris. Manufacturers plan to generate the composite sample of brake wear debris in the spring; their current target date is March 1, 2004.

Copper Use Report. The Steering Committee had an extensive discussion of the copper use report. The discussion will continue on the next teleconference. The primary topics under discussion are the meaning of this year’s data relative to previous years’ data given the non-reporting by one brake pad manufacturer, and the implications of the non-reporting and the resulting less robust data set for our overall process.

Anticipated Next Steps
The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- December 9, teleconference meeting
- January 8, teleconference meeting
- January 15, teleconference meeting
- February 4-5, in-person meeting, San Francisco
- February 26, teleconference meeting
- March 11, teleconference meeting
- March 25, teleconference meeting
- April 8, teleconference meeting
- April 27, teleconference meeting
- May 6, teleconference meeting
- May 20, teleconference meeting
- June 10, teleconference meeting
- June 24, teleconference meeting
TELECONFERENCE
Wednesday, December 3, 9:00 to 10:00, PST
Dial: 866-279-1566
Meeting Number: *4762806*

DRAFT Agenda

1. Agenda review and anything new? (3 min)
   - Update from Sarah on brake wear characterization work sponsored by the Health Effects Institute, an industry and EPA sponsored research consortium sponsored substantially by the motor vehicle industry
   - Anything else?

2. Brief summary of University of Delaware Brake Wear Debris Characterization report (5 min)
   - Summary from Mark
   - Questions and answers

3. Update on Contracting and Overview of Scheduling Issues from Sarah (2 min)
   - See attached document: "Opportunities for Shortening Our Timeline"

4. Revision of scope of work for Chemical & Physical Characterization of Brake Wear Debris RFQ (15 minutes)
   - See attached e-mail and document from Kelly
   - Decision needed: accept or reject proposed modifications

5. Copper Use Monitoring Program Report (15 minutes)
   - See attached draft with cover memo outlining issues
   - Review and discussion
   - Identification of next steps

6. Update on the development of the representative sample of wear debris (Pat & Rodger) (5 min)
   - See last page of attachment: "Opportunities for Shortening Our Timeline"

7. Steering Committee Input on a Request for Additional Clarification and Information from the Respondents to the RFQ on Characterization of Airborne Brake Wear Debris (15 minutes)
   - See information in separate e-mail

8. Anything else?
MEMO

TO: Geoff Brosseau

FROM: Kelly D. Moran

SUBJECT: Brake Pad Partnership Conference Call—December 9, 2003

DATE: December 9, 2003

PROJECT: 16

The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on December 9th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Mark Schlautman (Clemson University, project technical advisor)
- Pat Thesier (ADVICS North America, Inc. and lead representative of the Brake Manufacturer's Council Product Environmental Committee [BMC/PEC])
- Rodger Dabish (TMD Friction)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Michael Endicott (Sierra Club)
- Jim Pendergast (U.S. EPA)
- Kelly Moran (TDC Environmental)

Don Yee from SFEI joined the meeting for the air deposition monitoring schedule.

The following items were discussed:

Air Deposition Monitoring Schedule. The BPP is contracting with SFEI to conduct air deposition monitoring measurements in the Castro Valley watershed. This data will be the primary data source for calibrating and validating the air deposition model. The original monitoring concept involved collecting a fixed number of wet season and dry season samples (13 for each season) over a 12-month period to maximize the different conditions that were measured. With a full year of monitoring, the air deposition modeling work relying on this monitoring would not be completed until the summer of 2005. Given the compressed Proposition 13 grant contract timeline, the full year of air deposition monitoring that was originally planned is probably not feasible.

The Steering Committee discussed, but—on the basis of available information—was not able to come to a conclusion as to the appropriate monitoring time period. It appears that the most likely plan will be to do the following:

- monitor the part of wet season that can be monitored; this will be about half of the wet season, from mid-January through the end of the season; and
- to decide by April how many months of dry season monitoring will be conducted (could cut off as early as August 1 or as late as October 15th).
This would reduce the potential to measure various wet season conditions by about half, but (depending on the schedule for other elements) would reduce dry season monitoring somewhat less. The major issue appears to be the time period from August through early October, which typically has some of the warmest weather of the year and thus (depending on actual weather next year) may or may not be well represented by other dry deposition monitoring times. This will be discussed on a special teleconference set for next week.

Request for Qualifications (RFQ) for Chemical Characterization of Brake Wear Debris. The Steering Committee discussed the approach to the RFQ, generally agreeing that it should be a task-order type of agreement that would provide laboratory services, rather than a typical consulting contract with a workplan, draft, and final report. Sustainable Conservation and SFEP will redraft the RFQ to reflect the Steering Committee’s current understanding of the needed work, and the Steering Committee will discuss it next week.

Thank you to those BASMAA members who responded to my request for laboratories to put on the distribution list for this RFQ. I have provided a list of about 12 private and University laboratories (including the labs on the CEP contractors list) to Sustainable Conservation for the RFQ mailing list.

Remaining Agenda Items. Other items on the agenda, including the Copper Use Report, were not discussed due to lack of time. A third December teleconference was scheduled for December 15th.

Anticipated Next Steps

The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- December 15, special teleconference meeting
- January 8, teleconference meeting
- January 15, teleconference meeting
- February 4-5, in-person meeting, San Francisco
- February 26, teleconference meeting
- March 11, teleconference meeting
- March 25, teleconference meeting
- April 8, teleconference meeting
- April 27, teleconference meeting
- May 6, teleconference meeting
- May 20, teleconference meeting
- June 10, teleconference meeting
- June 24, teleconference meeting
DRAFT Agenda

1. Agenda review and anything new? (5 min)

2. Air deposition monitoring effort (20 minutes)-- Guest Don Yee
   - See attached document: "Opportunities for Shortening Our Timeline"
   - See attached document: "BPP Air Dep Coord Notes 11-21-03"
   - Decision needed: Decide on a duration for the air deposition monitoring effort

3. Copper Use Monitoring Program Report (20 minutes)
   - See draft with cover memo outlining issues sent separately
   - See summary of December 3 call sent separately
   - Review and discussion
   - Identification of next steps

4. Draft BPP Operating Procedures, including communications and Scientific Advisory Team (5 min)
   - Draft document to be sent in a separate e-mail

5. Approval of RFQ for Chemical Characterization of Wear Debris (5 minutes)
   - See information in separate e-mail

6. Anything else?
The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on December 15th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Pat Thesier (ADVICS North America, Inc. and lead representative of the Brake Manufacturer’s Council Product Environmental Committee [BMC/PEC])
- Rodger Dabish (TMD Friction)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Michael Endicott (Sierra Club)
- Jim Pendergast (U.S. EPA)
- Kelly Moran (TDC Environmental)

Mark Schlautman (Clemson University, project technical advisor) was unable to participate in the meeting.

The following items were discussed:

**Chemical Characterization of Wear Debris.** The Steering Committee approved issuance of the Request for Qualifications, which SFEP will distribute this week. I confirmed that the bidder’s list includes all the contacts recommended by BASMAA members.

**Copper Use Monitoring Program Report.** The BPP is working to produce its annual copper use report, based on the copper use information provided by the manufacturers. There are several loose ends that need resolution between Sustainable Conservation (which is drafting the annual report) and the brake manufacturers. One larger issue is the representativeness of this year’s data relative to previous year’s data (i.e., the validity of a copper use trend evaluation), given the fact that one BMC member did not report its copper use. The BMC representatives stated that the BPP should presume that the model year 2002 reported copper use is representative of the trend in copper use, because the report is based on the best available data. On the basis of colloquial information, the manufacturer representatives believe that the reported value would be somewhat lower if the non-reporting company had participated in reporting, but since the BMC cannot prove this, it prefers to stick with the available quantitative data. To help the report readers evaluate the error introduced by the change in manufacturer reporting, the manufacturer representatives will explore ways for the BPP to present relative uncertainty of this year’s number as compared to previous year’s numbers.
Draft BPP Operating Procedures. Sustainable Conservation has started to draft operating procedures for the BPP. These procedures will include a stakeholder communications plan and a plan for working with the Scientific Advisory Team.

**Anticipated Next Steps**

The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- January 8, teleconference meeting
- January 15, teleconference meeting
- February 4-5, in-person meeting, San Francisco
- February 26, teleconference meeting
- March 11, teleconference meeting
- March 25, teleconference meeting
- April 8, teleconference meeting
- April 27, teleconference meeting
- May 6, teleconference meeting
- May 20, teleconference meeting
- June 10, teleconference meeting
- June 24, teleconference meeting
TELECONFERENCE
Monday, December 15, 8:00 to 9:00 a.m., PST
Dial: 866-279-1566
Meeting Number: *4762806*

DRAFT Agenda

1. Agenda review and anything new? (5 min)

2. Approval of RFQ for Chemical Characterization of Wear Debris and Qualified Bidders List (5 minutes)
   - See attached documents

3. Copper Use Monitoring Program Report (30 minutes)
   - See draft with cover memo outlining issues sent separately
   - See summary of December 3 call sent separately
   - Review and discussion
   - Identification of next steps

4. Draft BPP Operating Procedures, including communications and Scientific Advisory Team (10 min)
   - See attached preliminary draft document

5. Anything else?
The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on January 8th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Mark Schlautman (Clemson University, project technical advisor)
- Pat Thesier (ADVICS North America, Inc. and lead representative of the Brake Manufacturer's Council Product Environmental Committee [BMC/PEC])
- Rodger Dabish (TMD Friction)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Michael Endicott (Sierra Club)
- Jim Carleton (U.S. EPA)
- Kelly Moran (TDC Environmental)

Jim Pendergast (U.S. EPA) was unable to participate in most of the meeting. Betty Pun (AER) and Richard Looker (Regional Water Quality Control Board) joined the meeting for the air deposition modeling items. Mark Phipps of Federal-Mogul Corporation (future steering committee member), joined the teleconference mid-way through the meeting.

The following items were discussed:

**Air Deposition Modeling Workplan.** The Steering Committee made comments and asked questions about the workplan. I provided BASMAA member comments along with my own in this discussion. AER’s Betty Pun gave very helpful responses to our questions and ideas. Sarah Connick will compile all the comments for AER, which will revise and finalize the workplan based on the comments. In general, the Steering Committee is quite satisfied with the approach AER has planned—it appears to provide the information we need and gives us good opportunity to test assumptions and to understand uncertainties inherent in the approach. Because the Scientific Advisory Team has not been set up, there will not be any peer review of this workplan (delaying workplan completion for such review would be a schedule problem).

**Aerodynamic particle size measurements.** AER prepared a memorandum summarizing the available data on aerodynamic particle sizes and their implications for air deposition modeling. The available data on brake wear debris particle size distribution have particle size distributions that, when modeled, would provide very different results (differing by
factors of 6 to 200). AER recommends new measurements to reduce the uncertainty in the particle size distribution information. The Steering Committee agreed with the AER recommendation and therefore directed Sustainable Conservation to proceed with contracting needed to obtain the particle size distribution measurements this spring. (A Request for Qualifications to conduct these measurements has already been distributed).

Copper Use Monitoring Program Report. Sustainable Conservation revised the draft report with additional information from Steering Committee members. With the Steering Committee’s approval, Sustainable Conservation will distribute this report to BPP stakeholders.

New BPP Steering Committee members from the BMC. Pat Thesier will be retiring this spring. His retirement—together with the loss of Jim Trainor—means that there will be two industry vacancies on the Steering Committee. These vacancies will be filled by Dr. Mark Phipps, Federal-Mogul Corporation Original Equipment Product Manager and Chris Shipley, Director of Research & Development from the brake parts division of Dana Corporation. The new members will officially join the Steering Committee around the time of the in-person meeting in early February. Pat will continue on the BPP Steering Committee until the end of March to help with the transition.

Anticipated Next Steps
The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- January 15, teleconference meeting
- February 4-5, in-person meeting, San Francisco
- February 26, teleconference meeting
- March 11, teleconference meeting
- March 25, teleconference meeting
- April 8, teleconference meeting
- April 27, teleconference meeting
- May 6, teleconference meeting
- May 20, teleconference meeting
- June 10, teleconference meeting
- June 24, teleconference meeting
Agenda Distributed by Sustainable Conservation via e-mail

TELECONFERENCE
Thursday, January 8, 11:00 a.m. to 12:00 noon, PST
Dial: 866-279-1566
Meeting Number: *4762806*

DRAFT Agenda

1. Introductions, agenda review and anything new? (5 min)

2. Review and discussion of AER's draft Air Deposition Modeling Work Plan (20 minutes)
   - Invited guests: Betty Pun (AER) and Richard Looker (SF Bay RWQCB)
   - See attached AER document containing Richard Looker's comments and e-mail with AER's questions

3. Review and discussion of AER's assessment of the need for additional measurements of wear debris aerodynamic particle size and identification of any other air transport related wear debris properties needing characterization (20 minutes)
   - See attached AER document

4. Copper Use Monitoring Program Report (15 minutes)
   - See draft sent separately

5. Anything else?
The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on January 15th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Rodger Dabish (TMD Friction)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Chris Shepley (Dana Corporation)
- Michael Endicott (Sierra Club)
- Jim Carleton (U.S. EPA)
- Kelly Moran (TDC Environmental)
- Pat Thesier (ADVICS North America, Inc. and lead representative of the Brake Manufacturer's Council Product Environmental Committee [BMC/PEC]), Jim Pendergast (U.S. EPA), Mark Phipps (Federal-Mogul Corporation), and Mark Schlautman (Clemson University, project technical advisor) were unable to participate in the meeting. Professor Christos Christoforou (Clemson University, Physical Characterization contractor) joined the meeting for the discussion of the physical characterization contract.

The following items were discussed:

**Planning for February In-Person Meeting.** The February Steering Committee meeting promises to have an intense schedule, with the following goals:

- Assess the critical path for conducting the Proposition 13 work and assure we have a schedule that meets the grant deadline.
- Interview (via teleconference) chemical characterization contractors and select one.
- Refine plans for determination of the approach to brake and other copper release estimates in the watershed and identify next steps.
- Integrate new industry members into the Steering Committee.
- Finalize Scientific Advisory Team procedures and work on selecting team members.
- Finalize written BPP operating procedures.
- Obtain updates from contractors.
Scope for Physical Characterization of Brake Wear Debris. The Steering Committee reviewed and approved (with minor changes) the scope of work for a contract with Clemson University to conduct various measurements in support of the air deposition modeling work (primarily aerodynamic diameter measurements of brake wear debris). In anticipation of the need to move quickly on a project workplan, the Steering Committee and Professor Christoforou discussed tradeoffs involved in various measurement methods (MOUDI or another method with fewer size cuts?) and chemical analysis methods for the airborne fractions of wear debris.

The remaining agenda items were minor or procedural in nature. Recent Steering Committee activities not discussed in detail on the conference call include:

- Review of draft Workplan and Quality Assurance Project Plan (QAPP) for air deposition monitoring (SFEI). Comments were due to Sustainable Conservation on January 15th. Other than sampling site selection (which is being coordinated between SFEI, AER, and Alameda County), there are no substantive issues. The workplan and QAPP are consistent with those used in the previous air deposition monitoring conducted in the San Francisco Bay area by SFEI.

- U.S. EPA publication and presentation of preliminary watershed model results. Jim Carleton plans to submit a paper describing the watershed modeling effort to the Journal of Hydrologic Processes. He also plans to present a paper at the American Water Resources Association conference in May 2004. (These papers describe the modeling work that he presented at the Cu/Ni Coordinating Committee in September.) I have circulated drafts of both papers; I’ll need to provide comments to him—incorporating any BASMAA input I receive—by Tuesday January 20th.

Anticipated Next Steps

The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- February 4-5, in-person meeting, San Francisco
- February 26, teleconference meeting
- March 11, teleconference meeting
- March 25, teleconference meeting
- April 8, teleconference meeting
- April 27, teleconference meeting
- May 6, teleconference meeting
- May 20, teleconference meeting
- June 10, teleconference meeting
- June 24, teleconference meeting
Agenda Distributed by Sustainable Conservation via e-mail

TELECONFERENCE
Thursday, January 15, 11:00 a.m. to 12:00 noon, PST
Dial: 866-279-1566
Meeting Number: *4762806*

DRAFT Agenda

1. Agenda review and anything new? (5 min)
   - Reminder: Please provide Jim Carleton feedback on his papers

2. Review and discussion of draft agenda for February 4-5 Steering Committee meeting (20 minutes)
   - See attached document
   - Agree on meeting objectives
   - Identify any additional topics that need to be covered
   - Approve draft agenda with changes discussed

3. Review and discussion of draft scope of work for Clemson team's aerodynamic particle size measurement work (10 minutes)
   - See attached document

4. Schedule for review of proposals for chemical characterization work (5 minutes)
   - Proposals are due to ABAG on January 24, Steering Committee review and responses will be needed the week of the 26th so that selected contractors can be interviewed at the February 4-5 Steering Committee meeting.

5. Any comments on draft memorandum summarizing Steering Committee comments on Air Deposition Modeling Draft Work Plan (10 minutes)
   - See attached document
   - Next steps

6. Estimating the contribution of copper in brake wear debris released to the watershed (7 minutes)
   - Game plan development

7. Brake Pad Partnership Draft Operating Plan (7 minutes)
   - See attached document (especially new material regarding SAT operations)
   - Comments and discussion in advance of February 4-5 meeting?

8. Anything else?
The Brake Pad Partnership (BPP) Steering Committee met in person in San Francisco on February 4th and 5th. A copy of the meeting agenda is attached. This memorandum summarizes the major items of discussion and important outcomes of the Steering Committee meetings. The purposes of the Steering Committee meetings were:

- To welcome new industry Steering Committee members and to get to know one another.
- To assess the critical path for conducting the Proposition 13 work and to assure a schedule that meets the grant deadline.
- To interview chemical characterization contractors and select one.
- To refine the approach to the estimation of copper releases onto watersheds and to identify next steps.
- To track progress on stormwater quality and air deposition monitoring.

The following people participated in the Steering Committee meetings:
- Sarah Connick, Sustainable Conservation, Project Manager, Facilitator,
- Pat Thesier, ADVICS North America, Inc. and lead representative of the Brake Manufacturers’ Council Product Environmental Committee (BMC/PEC)
- Mark Phipps, Federal Mogul
- Chris Shepley, Brake Parts, Inc. (a subsidiary of Dana Corporation)
- Kelly Moran, TDC Environmental
- Michael Endicott, Sierra Club

Steering Committee members Jim Pendergast (U.S. EPA), Rodger Dabish (TMD Friction), and Tim Merkel (formerly of Federal-Mogul Corporation) were unable to participate in the meetings. Due to obligations from his paying job, the Sierra Club representative (a volunteer) was only able to participate in about half of the meeting.

Many others assisted the Steering Committee by participating in part of the meeting, including Marcia Brockbank from the San Francisco Estuary Project (BPP Proposition 13 grant manager), Richard Looker from the San Francisco Bay Regional Water Quality Control Board (Regional Board), Jim Scanlin from the Alameda Countywide Clean Water Program (ACCWP, which is conducting additional water quality monitoring of the study watershed), and Don Yee of the San Francisco Estuary Institute (SFEI, which will conduct air deposition monitoring in the study watershed).
Action Plan Implementation

At the in-person meeting, the Steering Committee set in place the mechanisms for completing the Action Plan elements that had previously been unaddressed. The project is now “ready to roll” as soon as the State Water Resources Control Board (SWRCB) signs the grant contract. The attached grant contracting status summary provides an overview of the status of each task.

At the meeting the Steering Committee received information or made decisions regarding the following project elements:

- **Air Deposition Monitoring.** The Steering Committee reviewed the draft Sampling and Analysis Plan and the draft Quality Assurance Project Plan with SFEI. SFEI has prepared these documents and started some initial work without a contract. Possible monitoring locations were discussed in detail. Manufacturers are concerned about location near to BART, which may use copper in its brakes. Air deposition modeling contractor AER recommends a location near high-traffic areas (Highway 580 and Castro Valley Blvd.) and a location as remote as possible (e.g., high in the watershed). SFEI needs sites with power, access, and security. The lack of identified monitoring locations makes it possible that little or no wet season monitoring will occur this year.

- **Watershed Monitoring.** The Steering Committee received an update from Jim Scanlin, ACCWP, about efforts to conduct extra copper monitoring in Castro Valley for use in watershed modeling. Despite the lack of a contract, ACCWP has proceeded with the monitoring in recognition of the BPP’s tight schedule. Eight storm events were sampled in fall 2003; additional sampling will be conducted as possible until the end of the winter rainy season.

- **Representative Sample of Brake Wear Debris.** The BMC/PEC has agreed to fund the generation of a representative sample of copper-containing brake wear debris, using the wear debris generation procedures it previously developed in cooperation with the BPP. The BMC/PEC has developed a plan for collecting samples of the most common brake pad materials that will allow it to generate a relatively representative sample of copper-containing vehicle brake wear debris. The brake pad material selection process focuses on the pad materials used in the top 20 vehicles and accounts for the various types of copper-containing materials used in pads. Manufacturers explained that about five different copper-containing materials are used in pad formulation—and that pads often are formulated with more than one copper-containing material. Although the sample generation process may not provide a sample that matches the relative abundance of each copper source on the road, it will represent all of the types of copper-containing materials used in the most common formulations.1 Link Engineering, which ran the previous wear debris generation dynamometer runs, is currently collecting the copper-containing brake pad materials from manufacturers. The BMC agreed to arrange to coordinate the wear

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1 I believe that manufacturers intend to collect samples of wear debris from each type of copper-containing material to allow them to explore (separately) if different copper-containing brake pad materials have different environmental properties.
debris generation with aerodynamic diameter measurements planned by Clemson University as soon as March 1 (see below).

- **Chemical Characterization of Brake Wear Debris.** The Steering Committee interviewed and selected ToxScan to conduct any needed chemical characterization tests on vehicle brake wear debris. After the representative sample is generated, ToxScan’s first task will be to repeat the extraction tests Clemson University conducted on wear debris from one brake pad. Remaining funds for chemical characterization testing will be released on a task order basis. On the basis of ToxScan’s cost estimates, the Steering Committee decided that it would be acceptable to divert some funds from this task to fund a contractor to prepare estimates of brake and other copper loads in the study watershed (see below).

- **Physical Characterization of Brake Wear Debris.** Professor Christos Christoforou of Clemson University joined the meeting by teleconference to discuss the logistics and technical details of the plans for physical characterization of brake pad wear debris. Although the Clemson team hoped to conduct the measurements during Clemson’s spring break (early March), SWRCB grant contract delays may postpone activities. The BMC/PEC intends to delay generation of the representative wear debris sample to coordinate with Clemson, since coordinating wear debris generation and aerodynamic measurements will be substantially less expensive than conducting separate dynamometer runs.

- **Copper Load Estimates.** The Steering Committee decided to retain a contractor to conduct this work (which will probably cost $10,000 to $20,000), using funds previously allocated to chemical characterization. The task has two elements: (1) estimate copper load from vehicle brake pads to the Castro Valley watershed, and (2) estimate copper load from other sources to the Castro Valley watershed by adding any needed detail to the copper sources in urban stormwater update being prepared by the Clean Estuary Partnership.

- **Project Schedule.** The Steering Committee reviewed and discussed a project schedule prepared by Sustainable Conservation. After weighing the various options, the Steering Committee decided that the best available choice was to allow the schedule to extend a month or two beyond the current February 2006 end date in the grant contract. This extension made it possible to obtain Steering Committee agreement to use a technical document review process with realistic review time frames. This decision has some risks—the SWRCB has not been clear about the extension process (administrative approval is likely; however, there have been various claims, including statements that extensions would require authorization from the legislature). Michael Endicott, who is a legislative staffer (Senior Consultant to the Assembly Environmental Safety & Toxic Materials Committee) has promised to work on legislation if needed (he has already approached Cal-EPA Secretary Terry Tamminen about the BPP’s contract delays). Given the prevalence of lengthy contract delays for Proposition 13 grants, the BPP will not be the only project requiring an extension.
Draft Brake Pad Partnership Operating Plan

A copy of the final draft of a document called the Brake Pad Partnership Operating Plan is attached. This document combines several items of interest to BASMAA. The draft incorporates many comments made by BASMAA members regarding these topics, so I believe that you will find it satisfactory. Each of the main elements is reviewed below. The Steering Committee plans final approval of this plan in mid-March, so if you have any comments or concerns, please forward them to me by March 10th.

- **Stakeholder Communications** (pages 6-8) and **Written Materials Management** (page 13). The planned stakeholder communications and written materials management process ensures public notification and public availability of all of the BPP’s technical work products, as BASMAA has requested. It also includes plans to ensure that project updates and findings are broadly disseminated to stakeholder and scientific audiences. As soon as Proposition 13 grant contract funds are available, Sustainable Conservation intends to set up the planned Internet site. The stakeholder listserver (the planned primary route for public notification of the availability of BPP documents) has already been established (go to [http://www.topica.com/lists/BPP-list-serve/](http://www.topica.com/lists/BPP-list-serve/) to sign up). The procedures promote cooperative management of BPP-prepared documents and communication among project participants as BPP-related presentations and publications are prepared.

- **Scientific Advisory Team** (page 9). Given the budget and the wide range of technical topics to be covered in the Action Plan, the Steering Committee plans to work with two types of scientific advisors. The first is a “core advisor” (Professor Mark Schlautman and one additional person), who will work with the Steering Committee throughout the project. The second is a “technical review panel member” who will participate as a peer reviewer for one or more of the technical work products.

- **Technical Document Review Procedures** (pages 10-12). Using constructive input from BASMAA members, the Regional Board, and Clean South Bay, Sustainable Conservation drafted procedures for stakeholder and scientific advisory team review of the various technical reports that will be prepared as the Action Plan proceeds. The final draft review procedures include realistic review times and provide what I believe will be a workable process to develop charges for peer reviewers and to combine comments from peer reviewers and stakeholders to forward to the BPP's contractors.

- **Other Elements**. The final draft Operating Plan also includes definitions of BPP participant roles and responsibilities, detailed Steering Committee operating procedures, and specification of SFEP, Sustainable Conservation and Steering Committee roles in Proposition 13 grant contract management.

**Other Items**

- **Industry Representative Pat Thesier Retiring**. The leader of the brake manufacturer participation in the BPP, Pat Thesier, will be retiring in March. Given other recent losses, this transition is somewhat disruptive for the BPP. The BMC/PEC has introduced two new representatives to fill the holes left by recent
changes. Both new representatives are scientists involved in product formulation for leading manufacturers. Both are well-respected among the BMC/PEC. Both members appear to have the technical capability to be good additions to the Steering Committee. Bringing them up to speed is, however, requiring some time-consuming diversion of Steering Committee discussions so as to bring the new members up to speed.

- **Sustainable Conservation Budget Status Update.** Due to the lateness of the Proposition 13 grant contract, the project’s management needs to prepare for the accelerated grant, and a shortage of other funding for its work on the BPP, Sustainable Conservation lost $23,000 to $36,000 in 2003 on this project. The loss was made up with general and overhead funds from Sustainable Conservation—sorely taxing the resources of this small non-profit. The Executive Director of Sustainable Conservation, Ashley Boren, met with the Steering Committee regarding project financing and the need to continue to support Sustainable Conservation through the remainder of the project. While the Proposition 13 grant will cover part of Sustainable Conservation’s cost in managing the BPP, Sustainable Conservation estimates it needs to raise about another $150,000 over the next 3 years to support its management of the BPP and the Scientific Advisory Team. If you are aware of other possible funding sources, please notify Sarah Connick (SConnick@suscon.org).

- **Scientific Advisory Team.** The Steering Committee again reviewed a long list of possible advisors and peer reviewers for various project elements. Sustainable Conservation believes it now has sufficient information to begin contacting potential advisory team members to explore their interest and availability to work with the Brake Pad Partnership.

**Anticipated Next Steps**
The upcoming Steering Committee meeting schedule is as follows:

- March 4, teleconference meeting
- March 11, teleconference meeting
- March 25, teleconference meeting
- April 6, teleconference meeting
- April 27, teleconference meeting
- May 19-20, in-person meeting, San Francisco
- May 21, Stakeholder Conference, Oakland (State Building)
- June 10, teleconference meeting
- June 24, teleconference meeting
BRAKE PAD PARTNERSHIP

Steering Committee Meeting

Wednesday, February 4, 2004
8:30 a.m. to 5:00 p.m.

Thursday, February 5, 2004
8:30 a.m. to 5:00 p.m.

Sustainable Conservation
121 Second Street, Sixth Floor
San Francisco, CA  94105
Phone:  415-977-0380

AGENDA

MEETING OBJECTIVES

➢ Welcome new Steering Committee members and get to know one another.
➢ Assess the critical path for conducting the Proposition 13 work and assure schedule that meets the grant deadline.
➢ Interview chemical characterization contractors and select one.
➢ Refine approach to the determination of the source terms and identify next steps.
➢ Track progress on stormwater quality and air deposition monitoring.

SCHEDULE

Wednesday, February 4, 2003

8:00 a.m.  Meeting room open, and bagels, coffee, and tea available
➢ Complete lunch order forms

8:30 a.m.  Meeting Begins
➢ Brief introductions
➢ Agenda review
➢ In-depth introductions of new and old Steering Committee members

9:30 a.m.  Partnership Business
➢ Announcements of any new developments affecting the partnership
  o  BPP Intranet and List-Serve
➢ Report from Sustainable Conservation regarding funding
➢ Scheduling the May or June 2004 Stakeholder Conference
➢ Update on the development of the representative sample of wear debris
➢ Other items?

10:15 a.m.  Break

Guests invited:  Marcia Brockbank (SFEP/AGAG) Richard Looker (SFB RWQCB), Jim Scanlin (ACCWP) Paula Trigueros (SFEP/ABAG), and Don Yee (SFEI)

10:30 a.m.  BPP Technical Studies Schedule Review
- Update on BPP Proposition 13 Contracting
- Identification of critical path items and action items for assuring the schedule is met
- Review of next steps on each task area

**11:00 a.m. Discussion of Plan for Aerodynamic Particle Size Measurement**

*With Christos Christoforou by telephone*

- Instrument selection
- Chemical analyses
- Coordination with representative sample and Link

**12:00 noon** Lunch

**12:45 p.m. Air Deposition Monitoring Update**

*With Don Yee by telephone*

- Review and approval of the Sampling and Analysis Plan
- Siting of sampling stations
- Discussion of chemical analyses

**1:15 p.m. Stormwater Quality Monitoring Update**

*With Jim Scanlin*

- Review and discussion of the Sampling and Analysis Plan

**2:15 p.m. Break**

**2:30 p.m. Brake Pad Partnership Operating Plan**

- Review and discussion of BPP Draft Operating Plan
  - Purpose and Roles and Responsibilities
  - Communications
  - Scientific Advisory Team
  - Management of Written Materials
  - Contracts Management
- Identification of any revisions needed prior to finalization

**4:30 p.m. Chemical Characterization Contractor Interview and Selection Process**

- Review of selection process and interview procedures
- Finalization of interview questions

**5:00 p.m. Adjourn.**

**6:00 p.m. Steering Committee dinner at Harbor Village, 4 Embarcadero Center**
Thursday, February 5, 2004

8:00 a.m. Meeting room open, and bagels, coffee, and tea available
   ➢ Complete lunch order forms
8:30 a.m. **Review of Any Items from the Previous Day**
   ➢ Follow-up questions from orientation process
   ➢ Other items?
   **Guests invited:** Marcia Brockbank (SFEP/AGAG) Richard Looker (SFB RWQCB), and Paula Trigueros (SFEP/ABAG).

9:00 a.m. **Scientific Advisory Team Member Selection Process**
   ➢ Review of list of candidates
   ➢ Identification of potential new candidates
   ➢ Prioritization of individuals to invite to serve

10:00 a.m. Break

10:15 a.m. **Source Term Estimation Approach**
   *With Jim Pendergast to by conference call*
   ➢ What is needed for the models and how can we develop that information for:
     o Contributions from original equipment pads
     o Contributions from aftermarket pads
     o Contributions from motorcycles
     o Contributions from heavy duty vehicles
     o Contributions from nonbrake sources
   ➢ Development of next steps

12:15 p.m. Lunch

1:00 p.m. **Chemical Characterization Contractor Interview and Selection Process**
   ➢ Telephone interviews with selected contractors
     o Approximately ½ hour each followed by a 15 minute debrief
   ➢ Compilation of interviewer ratings and contractor selection

3:30 p.m. Break

3:45 p.m. **Revisiting of topics held over from earlier in the meeting**
   ➢
   ➢

4:30 p.m. **Review of Meeting Accomplishments, Action Items, and Next Steps**

5:00 p.m. Adjourn.
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<th>Task (Contractor)</th>
<th>Budget</th>
<th>Status (02/04)</th>
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<tr>
<td>Atmospheric deposition modeling (AER). Use atmospheric dispersion modeling methods to estimate deposition of copper from brake wear debris in Castro Valley. Consider resuspension of material initially deposited on roads.</td>
<td>$75,000</td>
<td>Workplan approved. Contractor setting up air deposition model.</td>
</tr>
<tr>
<td>Watershed modeling (U.S. EPA, Jim Carleton). Set up BASINS model for Castro Valley and for the Bay area (from Suisun Bay to the lower South Bay). The modeling work will be completed when the air dep. model is done.</td>
<td>$0</td>
<td>Model set up. Papers submitted to AWRA 2004 Conference and Journal of Hydrologic Processes.</td>
</tr>
<tr>
<td>Bay modeling (URS). Use a combination of hydrodynamic (e.g., MIKE21 model set up for Bay by URS under contract to City of SF [Airport]) and compartment (e.g., WASP) models to address both short-term and long-term behavior of this copper in San Francisco Bay.</td>
<td>$125,000</td>
<td>Workplan to be prepared when contract is signed.</td>
</tr>
<tr>
<td>Chemical characterization of brake wear debris (ToxScan). Obtain data to better estimate fate of copper in wear debris in urban runoff, data for build-up/washoff functions, and sediment adsorption/desorption analyses.</td>
<td>Up to $100,000</td>
<td>Task order contract established. First tasks is to repeat Clemson extraction tests on representative brake wear debris sample.</td>
</tr>
<tr>
<td>Physical characterization of brake wear debris (Clemson University). Obtain reliable measurement of the aerodynamic diameter of wear debris particles; possibly conduct other measurements to assist with validation of atmospheric deposition modeling.</td>
<td>$40,000</td>
<td>Drafting workplan. Plan to do measurements in conjunction with generation of representative brake wear debris sample in March (if state contract delays don’t preclude this).</td>
</tr>
<tr>
<td>Ambient Water Quality monitoring (ACCWP). Conduct enhanced monitoring of copper in stormwater in the Castro Valley watershed in winter 2003/04.</td>
<td>$30,000</td>
<td>Monitoring underway (8 storms sampled in Nov.-Dec.); due to SWRCB contracting delays SAP and QAPP not prepared prior to rainy season.</td>
</tr>
<tr>
<td>Air Deposition monitoring (SFEI). Collect near-source copper deposition data in study watershed for air dispersion model calibration in 2004.</td>
<td>$50,000</td>
<td>SAP and QAPP OK’d by Steering Committee; sampling to start soon. Monitoring time period cut short due to SWRCB contract delays.</td>
</tr>
<tr>
<td>Representative Sample of Brake Wear Debris. The BMC is paying Link Engineering (a dyno lab) to generate a representative sample of copper-containing wear debris for tests.</td>
<td>$0</td>
<td>Sample generation planned for March, 2004</td>
</tr>
<tr>
<td>Copper load (TBD). Estimate copper releases from brakes and other sources into Castro Valley watershed.</td>
<td>$TBD</td>
<td>Starting process to hire contractor. Funds will be shifted from chemical characterization task. Need copper load estimates by late summer 2004.</td>
</tr>
<tr>
<td>Manage the BPP and the Scientific Advisory Team (SAT) (Sustainable Conservation). Facilitate stakeholders dialogue and decision making, provide resources necessary for collaborative problem solving, staff BPP Steering Committee, ensure implementation of final outcome based on study results, and communicate with stakeholders and scientists. Retain independent experts to advise and guide the development and implementation of the study.</td>
<td>$180,000 ($30,000 for SAT)</td>
<td>Work underway. Listserver established. Working with Steering Committee to determine SAT procedures and select SAT. Stakeholder meeting planned for May 21, 2004.</td>
</tr>
<tr>
<td>Project Management (San Francisco Estuary Project). Contract management, publication development, and website support. Includes ABAG 10% overhead.</td>
<td>$90,000</td>
<td>Awaiting signed contract from State Water Board (none of the above contracts can be signed without SWRCB contract).</td>
</tr>
</tbody>
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Note: Budget total is $700,000, of which $10,000 are not currently allocated.
BRAKE PAD PARTNERSHIP

DRAFT Operating Plan

February 20, 2004
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BACKGROUND

The Brake Pad Partnership is a multi-stakeholder effort to understand the impacts on the environment that may arise from brake pad wear debris generated in the use of passenger vehicles. Working together, manufacturers, regulators, stormwater management agencies, and environmentalists are developing an approach for evaluating potential impacts on water quality, using copper in South San Francisco Bay as an example. Brake pad manufacturers have committed to adding this evaluation approach to their existing practices for designing products that are safe for the environment while still meeting the performance requirements demanded of these important safety-related products.

Funding and technical support for the Brake Pad Partnership comes from a variety of public and private sources, including a grant awarded for technical studies of the transport and fate of copper in brake wear debris in the environment from the State Water Resources Control Board (SWRCB) pursuant to the Costa-Machado Water Act of 2000 (Proposition 13) for the implementation of California’s Nonpoint Source Pollution Control Program.

PURPOSE OF THIS DOCUMENT

This document describes the operational procedures, processes, and policies used by the Brake Pad Partnership to carry out its work, including arrangements for collaborating, deliberating, conducting technical studies, obtaining expert scientific input and peer review, making decisions, and communicating with stakeholder communities and the interested public.
ROLES AND RESPONSIBILITIES

The Brake Pad Partnership is a voluntary collaborative effort involving multiple stakeholders. The four key stakeholder communities engaged in the Partnership are friction materials manufacturers, stormwater management agencies, water quality regulatory agencies, and environmental groups. The following describes the organization of the Partnership and the functional roles and responsibilities:

**Steering Committee**—The Brake Pad Partnership Steering Committee is responsible for overall technical and policy direction and decision making for the Partnership. The Steering Committee consists of representatives of the four major categories of stakeholder groups: friction materials manufacturers, stormwater management agencies, water quality regulatory agencies, and environmental groups. The Steering Committee makes decisions on a consensus basis.

**Steering Committee Representatives**—Individual representatives to the Steering Committee are responsible for representing their stakeholders’ interests in the Steering Committee’s deliberations and decision-making. This responsibility includes communicating information on Partnership deliberations and decisions to stakeholder constituents and obtaining feedback and input for the decision making process. Each of the four major categories of stakeholder groups has its own set of reporting and feedback structures for assuring adequate representation in the Partnership.

**Project Coordination and Technical Management**—The Brake Pad Partnership’s work is coordinated and facilitated by Sustainable Conservation, which is responsible for assisting the Steering Committee in structuring its deliberations and decision-making processes; coordinating with regard to project scheduling, tasks, milestones, and deliverables among the Steering Committee, Technical Consultants, Technical Advisor, Scientific Advisory Team, and the San Francisco Estuary Project; organizing and convening stakeholder workshops to facilitate interactive communication among Steering Committee members and the different stakeholder communities; developing and disseminating information about the Partnership and its progress broadly to the stakeholder communities and interested public.

**Project Contracting and Fiscal Management**—The Brake Pad Partnership has obtained $700,000 of Proposition 13 funding from the California State Water Resources Control Board (SWRCB) Coastal Nonpoint Source Grant Program to conduct the technical studies necessary to understand the transport and fate of copper from automobile brake pad wear debris in the environment. This grant was awarded to the Association of Bay Area Governments (ABAG) on behalf of the San Francisco Estuary Project (SFEP), which is serving as the Brake Pad Partnership’s fiscal agent for the purpose of this grant. SFEP/ABAG is responsible for contract and subcontract administration and management. The San Francisco Bay Regional Water Quality Control Board serves as the contract manager on behalf of the SWRCB. Sustainable Conservation is responsible for assisting SFEP/ABAG in subcontract management relating to technical content and reporting, including approval of invoices, and for assuring that the Steering Committee’s directions are carried out through the work of the subcontractors.

**Scientific Advisory Team**—The Brake Pad Partnership is forming a Scientific Advisory Team to provide independent scientific review of work plans and work products. The members of the Scientific Advisory Team will be selected by the Steering Committee for their expertise. Additional information on the Scientific Advisory Team is included in a separate section below. Scientific Advisory Team members will be reimbursed for their travel expenses and provided a stipend payment for their services.

**Technical Consultants**—The Brake Pad Partnership is issuing a series of subcontracts to technical consultants to carry out the Partnership’s technical investigations. In addition to conducting technical
work, these consultants are contracted to work with the Steering Committee in developing and refining the investigations and in interpreting the results, and to participate in stakeholder meetings to present their work and findings and assist members of the broader stakeholder communities in understanding them.

Appendix A contains an organizational chart showing the interrelationships among these entities.
STEERING COMMITTEE OPERATIONS

The Steering Committee accomplishes its work through scheduled meetings and conference calls, and the exchange of written materials. The Steering Committee makes decisions on a consensus basis. Steering Committee members serve at the pleasure of the stakeholder group(s) they represent. There is no fixed number of members on the Steering Committee; however, it is important that a balance of representation of the key stakeholder groups be maintained. The current Steering Committee membership is included in this document as Appendix B.

Attendance and Participation
Consistency and continuity in Steering Committee members’ participation in meetings, conference calls, e-mail dialogues, and review and comment of written materials are critical to the success of the Partnership. Steering Committee members should participate in all scheduled activities. If a Steering Committee member misses a meeting or conference call, it is his or her responsibility to find out what transpired in his or her absence.

Steering Committee members should have a designated backup who, in the event of a prolonged unplanned absence, can take over in a member’s place. Steering Committee members may not send substitute representatives to participate in their places if they are not able to attend a single call or meeting. Steering Committee members are responsible for keeping their backups fully informed so that the backup can participate fully in meetings if necessary.

Occasionally, a Steering Committee member may face a set of scheduling conflicts that would limit his or her participation over a finite period. In such cases, that member may determine that his or her back-up representative should participate with the Steering Committee in his or her place for a specific period of time. The back-up representative should have authority to fully participate in the meeting and technical knowledge comparable to that of the committee member on whose behalf he or she is acting.

Scheduled Calls and Meetings
The bulk of the Brake Pad Partnership Steering Committee’s work takes place through Steering Committee conference calls and meetings. The Brake Pad Partnership project coordinator is responsible for scheduling all Steering Committee conference calls and meetings, at times when Steering Committee members are available to participate. The Steering Committee meeting and conference call dates and times are usually scheduled well in advance, providing Steering Committee members ample advance notice. From time to time, the need arises to schedule a conference call quickly in order to respond to a particular issue. In such cases, every reasonable effort should be taken to make sure that all members are notified of the call and able to participate. In addition to calls and meetings, Steering Committee members are sometimes required to review and provide comment on written materials. In such cases, they must be allowed ample notification of the timeframe in which their input is required.

Preparation
All written materials for consideration by the Steering Committee at a scheduled meeting or conference call are to be distributed to Steering Committee members one week in advance if possible. In cases when material is not available one week in advance of a call or meeting, every effort will be made to provide Steering Committee members with advance notice that it is forthcoming and to distribute it to Steering Committee members as soon as possible. Steering Committee members are responsible for thoroughly reviewing pertinent information in advance of any scheduled conference call or meeting.
**Consensus Decision Making**

The Steering Committee’s deliberation and decision making process is carried out primarily through consensus building, a process of seeking agreement through interest-based dialogue. This process requires a good-faith effort on the part of all stakeholders to reach a mutual agreement among members of a group where all legitimate interests and concerns of individuals have been addressed to the satisfaction of the group. Consensus is achieved when all the stakeholders agree they can live with a proposed solution, even though it may not be their most preferred solution. For the purposes of the Brake Pad Partnership, representatives of all four major categories of key stakeholder groups must be in agreement that they can live with a decision in order for it to become effective.

**Operating Principles and Ground Rules**

Over the course of its work, the Brake Pad Partnership Steering Committee has adopted a set of operating principles and ground rules for facilitating its deliberation and decision making process. These principles and ground rules include:

- Engage in the process in good faith; be open and frank as possible about your interests and expectations.
- Strive for as much transparency as possible in your oral and written communications, and actions.
- In the event a stakeholder group is considering terminating its participation in the Brake Pad Partnership, the group’s representatives will alert the Steering Committee as soon as possible, and the Steering Committee will work to see if there is a way to meet that group’s interests and maintain the Partnership’s cooperative approach.
- Listen openly, carefully, and with suspended judgment. Hear one another’s ideas out.
- Do not interrupt one another. Do not talk over others.
- There is one conversation at the table at a time; do not engage in side conversations.
- If Steering Committee members need some time to caucus to share additional background information with newer members, they may call a “time out” to confer in private for a short period of time.
- Maintain respectfulness for one another, even when your views may differ.
- Recognizing that different people express things differently, be willing to go with the thrust of the discussions rather than picking apart how something is said.
- Speak up if you are worried or uncomfortable about the thrust of discussions or something said.
- Relate your concerns back to the underlying interests of the stakeholder group you represent.
- Ask, do not assume.
- Disclose bad news as soon as possible.
- Review agendas and materials in advance of conference calls and meetings. It’s important that everyone come to the meetings well prepared so we do not waste one another’s time.
COMMUNICATIONS

Clear and transparent communications among stakeholders and between stakeholders and their Steering Committee representatives are fundamental to the success of the Partnership. In addition, the Partnership’s work is of interest to the general public and is supported in part by public funding. This section is intended to make sure that the Partnership is operating in a clear and transparent manner, that all stakeholders are adequately informed of and engaged in key decisions, and that information on the Partnership’s work and progress is made available to the interested public.

Communications within the Steering Committee
Communications among Steering Committee members takes place primarily through discussion in facilitated meetings and conference calls, occurring at least monthly. All written materials for Steering Committee consideration are transmitted to all Steering Committee members. Whenever possible, electronic transmission of written materials is preferred. Sustainable Conservation is in the process of setting up an intranet for document sharing among Steering Committee members, the Steering Committee’s Technical Advisor, Scientific Advisory Team members, and the Technical Consultants.

Communications between Steering Committee Members and Their Stakeholders
Steering Committee members bear primary responsibility for communicating and consulting frequently with the stakeholder group(s) they represent. Steering Committee members are responsible for keeping their stakeholders abreast of the progress of the Brake Pad Partnership and aware of the challenges the Partnership faces; for seeking stakeholder guidance and concurrence on decisions and direction of the Partnership and its work; and for representing and conveying their stakeholders’ interests and concerns to the Steering Committee. Each of the four major categories of stakeholder groups has its own method for sharing information and deliberating on issues within their own stakeholder communities. Steering Committee members are responsible for engaging in those processes to solicit input and direction representative of their stakeholders’ interests.

Communications, Outreach, and Information Sharing with Stakeholder Groups and the Interested Public

Although Steering Committee members bear primary responsibility for communicating about the Partnership with the stakeholder group(s) they represent, the Partnership as a whole also conducts outreach and information sharing with stakeholder communities and the interested public. For example, periodically the Steering Committee engages with stakeholders through written updates and face-to-face meetings to provide stakeholders supplemental opportunities to learn about the work of the Brake Pad Partnership and the perspectives of other stakeholder communities. In addition, the Brake Pad Partnership, supported by Sustainable Conservation and the San Francisco Estuary Project, will seek to publicize its progress and the results of its work broadly to the interested and general publics and to other communities of interest. The following are the means by which the Brake Pad Partnership Steering Committee conducts outreach and information sharing with stakeholder communities and the interested public.

- **Quarterly Stakeholder Updates.** Sustainable Conservation is establishing a list-serve for the Brake Pad Partnership beginning with its existing stakeholder mailing list that includes names of more than 300 individuals who have requested information on the Brake Pad Partnership. This list-serve will be used to disseminate quarterly updates to stakeholders from the Steering Committee, beginning in January 2004. These updates will provide information progress on milestones, new developments, accomplishments and next steps, and upcoming events, and be written in layperson’s terms.
- **Event-based Stakeholder Updates.** Sustainable Conservation will provide event-based updates through the Partnership’s list-serve to keep stakeholders posted on important milestones, news, and events in a timely manner.

- **Technical Electronic Mail Discussions.** From time-to-time, a posting of new technical information, such as a draft report, on the Brake Pad Partnership’s web site may spark a technical electronic mail discussion among stakeholders using the Partnership’s list-serve. The Partnership encourages such discussions and the input they can provide to the project.

- **Stakeholder Conference and Technical Workshop.** The Brake Pad Partnership Steering Committee intends to hold two Stakeholder Conference and Technical Workshops while it is carrying out the technical studies supported by the SWRCB. The first is scheduled to occur in May or June of 2004. The purpose of these one-day sessions is to provide Bay Area stakeholder communities a management and technical update on progress, an opportunity to meet with and hear from technical consultants and members of the Scientific Advisory Team and to provide their own input and feedback to the Steering Committee, an opportunity to engage more deeply in the work of the Partnership, and to experience in-person the collaborative nature of the interactions with the Steering Committee as a whole.

- **Special Meetings with Individual Stakeholder Groups.** From time to time, it is important for the Steering Committee to reach out to stakeholder communities outside of the Bay Area. On these occasions, the Steering Committee may schedule one of its meetings in conjunction with a meeting of a stakeholder group to provide the opportunity for stakeholders to engage more deeply in the work of the Partnership, provide direct input and feedback to the Steering Committee, and to experience in-person the collaborative nature of the interactions with the Steering Committee as a whole.

- **Brake Pad Partnership Website.** Sustainable Conservation maintains a publicly accessible website that includes basic information on the Brake Pad Partnership. This site will be expanded from its current form to provide more detailed information, including regular updates, draft and final workplans, draft and final reports, and a schedule of activities and upcoming events. This site includes a link to the Technical Reference Library.

- **Technical Reference Library.** The Bay Area Stormwater Management Agencies Association (BASMAA), U.S. Environmental Protection Agency, and San Francisco Estuary Project supported the creation of a web-based technical reference library for the Brake Pad Partnership. Currently the operation of the internet site, and maintenance of and updates to the library are not funded. The website includes a listing of technical reports and articles relevant to the Brake Pad Partnership’s work. Hard copies of these materials are available through the EPA Region 9 Library.

- **Articles in Professional and Lay Publications.** The Brake Pad Partnership will seek to publish information about the Partnership and its work in professional and lay publications, with support from Sustainable Conservation and the San Francisco Estuary Project. The Partnership will encourage subcontractors to publish the results of their work in respected peer-reviewed scientific publications. It will also seek to publish articles about the Partnership and its work in publications having specialized audiences, such as the San Francisco Estuary Institute’s *ESTUARY*, the National Estuary Program’s *UPDATE*, the Coastal Conservancy’s *Coastlines*, and journals or newsletters widely read by those in the friction materials industry, stormwater management business, the water quality regulatory community, and by environmentalists. The level of technical detail in such articles will be tailored to match the audience of the publications. Sustainable Conservation will maintain a
list of such publications, and report on them as appropriate through quarterly and event-based reports.

- **Presentations and Participation in Professional and Lay Meetings.** Brake Pad Partnership representatives will seek to disseminate information about the Partnership and its work through participation and presentations at professional and lay conferences and meetings. For example, Sustainable Conservation will represent the Partnership at the biannual Copper Action Plan review meetings. The Partnership will encourage technical subcontractors to make presentations of their work at technical meetings in their fields. Sustainable Conservation will maintain a list of such presentations, and report on them as appropriate through quarterly and event-based reports.
SCIENTIFIC ADVISORY TEAM

The Brake Pad Partnership is forming a Scientific Advisory Team to provide independent scientific review of work plans and work products. The purpose of the Scientific Advisory Team is to ensure that key decisions and assumptions that go into the development, performance, and evaluation of the interlinked laboratory, monitoring, and modeling studies are technically sound. The role of the Scientific Advisory Committee will be to provide credible technical advice and guidance to the Steering Committee, stakeholders, and technical subcontractors. Scientific Advisory Team members will provide objective expert technical review at critical project milestones. Scientific Advisory Team members will receive a stipend and reimbursement for travel costs.

Scientific Advisory Team Membership
The Scientific Advisory Team will consist of a group of eight to ten members having relevant environmental science expertise. Two members will serve as the Team’s core advisors, participating in review efforts and providing input for decision making throughout the entire study process, lending continuity to the effort. The remaining six to eight members will participate primarily as technical peer reviewers on an as-needed basis providing in-depth review of materials relating specifically to their areas of specialized expertise. Thus, each technical document will be reviewed by two to four members of the Scientific Advisory Team. A detailed job description outlining these responsibilities will be developed and provided to the potential Scientific Advisory Team members when they are interviewed regarding their willingness to serve in this capacity.

The Steering Committee will select Scientific Advisory Team members based on their expertise, objectivity, ability to communicate scientific information effectively, and interest and availability to participate. Recommendations for members of the Scientific Advisory Team are being solicited from the stakeholder communities through the Steering Committee representatives. In addition, the technical subcontractors are being asked to recommend several reviewers in their fields to be considered as potential Scientific Advisory Team members.

Ongoing Responsibilities of the Scientific Advisory Team Core Advisors
The two members of the Scientific Advisory Team who will serve as core advisors will provide technical advice and input to the Steering Committee in its deliberations and to the wider stakeholder community through participation in the Stakeholder Conferences and teleconferences addressing the review of specific work products (see Technical Work Product Review Process below).

Scientific Advisory Team Role in Review of Technical Work Products
The Scientific Advisory Team core advisors and the appropriate technical review members will be tasked to review and comment on technical work products, specifically Work Plans and Draft Reports. For each item to be reviewed, the Steering Committee will develop a charge to the reviewers including specific questions based on stakeholder input. In some cases, Scientific Advisory Team technical review members may be invited to participate in additional meetings or teleconferences to provide additional insight on their review efforts.

A full description of the Technical Work Product Review Process is provided in the section below.
TECHNICAL WORK PRODUCT REVIEW PROCESS

The purpose of the technical work product review process is multifaceted. It is intended to provide:

- A scientific check and independent review to ensure that the approach and results of the Brake Pad Partnership’s work products are technically sound from a credible, objective, scientific point-of-view.
- A source of outside ideas that could further strengthen the technical work.
- Engagement, advice and guidance that can help build in-depth understanding and confidence in the technical studies on the part of the Steering Committee and the stakeholder communities.

The Brake Pad Partnership has developed two levels of review for technical work products. The draft reports resulting from the three environmental modeling tasks—air deposition modeling, watershed modeling, and bay modeling—will undergo a very intensive review process involving members of the Scientific Advisory Team, Steering Committee, and interested stakeholders. Draft Work Plans for all the tasks and draft reports for the laboratory and monitoring tasks, will undergo a somewhat less intensive review process in which stakeholders will still have the opportunity to participate.

Review Process for Environmental Modeling Draft Reports

The project schedule provides 11 weeks from the date of receipt for review of the Work Plans and Draft Reports associated with the environmental modeling tasks. The following is the process and schedule that will be used to obtain stakeholder input and Scientific Advisory Team review, and address follow-up questions. A schedule containing specific dates and deadlines will be prepared and made available in advance for each document to be reviewed.

- Development of a Draft Charge to Reviewers (1 month). One month prior to receiving a draft environmental modeling Work Plan or Report, the Brake Pad Partnership Steering Committee will begin drafting a charge to the reviewers.

- Initial Review by the Steering Committee and Stakeholders (1 week). Immediately upon receipt of a Draft Work Plan or Draft Report, Sustainable Conservation will review the material to make sure it is complete and in a form appropriate for electronic distribution. Sustainable Conservation will then circulate the document along with the draft charge to Steering Committee members and make both documents available to stakeholders from the Brake Pad Partnership website. A notice of availability of the documents and deadline for response will be sent to stakeholders on the Brake Pad Partnership’s list-serve. Steering Committee members and stakeholders will have one week to submit comments on the draft charge and any additional questions for the Scientific Advisory Team reviewers to Sustainable Conservation.

- Finalization of the Charge to Reviewers (1 week). Sustainable Conservation will circulate all the comments on the draft charge to reviewers and additional questions received to Steering Committee members. Sustainable Conservation will then incorporate the comments and questions into the draft charge to reviewers and circulate that to Steering Committee members and notify stakeholders of the availability of the material on the Brake Pad Partnership website using the Partnership’s list-serve. Stakeholders will have three days to provide comments on the draft charge to their Steering Committee representatives. A Steering Committee call will be held on the last day of this period for discussion, revision as necessary, and approval of the charge.
- **Stakeholder and Scientific Advisory Team Member Review (4 weeks).** Immediately upon approval of the charge, Sustainable Conservation will send it along with the document for review to the reviewers and notify stakeholders of the availability of the material on the Brake Pad Partnership website using the Partnership’s list-serve. Scientific Advisory Team reviewers will be given a week to familiarize themselves with the material and the questions in the charge. At the end of this week, Sustainable Conservation will convene a conference call among the reviewers to allow them to share their comments and thoughts and engage in discussion on the questions in the charge. Reviewers will have another three weeks to prepare and submit their written comments. A second conference call among the SAT reviewers may be scheduled following the submission of their written comments if they believe it will be helpful in preparing for further interactions with the Steering Committee, contractors, and stakeholders.

- **Follow-up on Stakeholders’ and Reviewers’ Responses and Comments (1.5 weeks).** Immediately upon receipt of stakeholders’ and reviewers’ comments and responses, Sustainable Conservation will forward them to Steering Committee members and notify stakeholders of their availability on the Brake Pad Partnership website using the Partnership’s list-serve. Steering Committee members and stakeholders will have one week to familiarize themselves with this material, at the end of which a teleconference or meeting will be held for discussion of the results of the review process among the stakeholders, the reviewers, the contractor, and the Steering Committee.

- **Preparation and Review of a Draft Summary of Comments (2 weeks).** Based on the conference call with the stakeholders, the reviewers, the contractor, and Steering Committee, Sustainable Conservation will prepare a draft summary of the reviewers’ comments and responses along with any additional comments that emerge from the discussion. Sustainable Conservation will circulate the draft summary to Steering Committee members and notify stakeholders of its availability on the Brake Pad Partnership website using the Partnership’s list-serve. Steering Committee members and stakeholders will have one week to familiarize themselves with this material, at the end of which Sustainable Conservation will convene a conference call among Steering Committee members and stakeholders to discuss the draft.

- **Finalization of the Summary of Comments (1.5 weeks).** Following the conference call discussion of the draft summary of comments, Sustainable Conservation will prepare a draft final summary of comments, which it will notify stakeholders of its availability on the Brake Pad Partnership website using the Partnership’s list-serve and circulate to Steering Committee members for approval. Steering Committee members and stakeholders will have two days to provide any further comments they might have on the final draft prior to final approval by the Steering Committee. After the summary is approved by the Steering Committee, Sustainable Conservation will forward it to the contractor for incorporation into the Final Report.

**Review Process for Draft Work Plans and Draft Reports for the Laboratory and Monitoring Tasks**

The project schedule provides five weeks for review of Work Plans and Draft Reports from the laboratory and monitoring tasks. The following is the process and schedule that will be used to obtain stakeholder input and Scientific Advisory Team review, and address follow-up questions. A schedule containing specific dates and deadlines will be prepared and made available in advance for each document to be reviewed.

- **Development of a Draft Charge to Reviewers (1 month).** One month prior to receiving a draft laboratory or monitoring Work Plan or Report, the Brake Pad Partnership Steering Committee will begin drafting a charge to the reviewers.
Initial review by the Steering Committee and Stakeholders (1 week). Immediately upon receipt of a Draft Work Plan or Draft Report, Sustainable Conservation will review the material to make sure it is complete and in a form appropriate for electronic distribution. Sustainable Conservation will then circulate the document along with the draft charge to Steering Committee members and make both documents available to stakeholders from the Brake Pad Partnership website. A notice of availability of the documents and deadline for response will be sent to stakeholders on the Brake Pad Partnership’s list-serve. Steering Committee members and stakeholders will have one week to submit comments on the draft charge and any additional questions for the Scientific Advisory Team reviewers to Sustainable Conservation.

Finalization of the Charge to Reviewers (1 week). The Steering Committee will have one week to finalize the charge to the reviewers. First, Sustainable Conservation will circulate all the comments on the draft charge and questions received to Steering Committee members. Sustainable Conservation will then incorporate the comments and questions into the draft charge to reviewers and circulate that to Steering Committee members and notify stakeholders of the availability of the material on the Brake Pad Partnership website using the Partnership’s list-serve. Stakeholders will have three days to provide comments on the draft charge to their Steering Committee representatives. A Steering Committee call will be held on the last day of this period for discussion, revision as necessary, and approval of the charge.

Stakeholder and Scientific Advisory Team Member Review (2 weeks). Immediately upon approval of the charge, Sustainable Conservation will send it along with the document for review to the reviewers and notify stakeholders of the availability of the material on the Brake Pad Partnership website using the Partnership’s list-serve. Stakeholders and reviewers will have two weeks in which to provide their comments and responses to the questions in the charge.

Follow-up on Reviewers’ Responses and Comments (1 week). Immediately upon receipt of stakeholders’ and reviewers’ comments and responses, Sustainable Conservation will forward them to Steering Committee members and notify stakeholders of their availability on the Brake Pad Partnership website using the Partnership’s list-serve. On the third or fourth day of this period, a teleconference or meeting will be held to discuss the results of the review process with stakeholders, the reviewer, the contractor, and the Steering Committee. Sustainable Conservation will compile the reviewers’ comments and responses along with any additional comments emerging from the discussion by teleconference or meeting and forward them to the contractor for incorporation into the final Work Plan or Report.
MANAGEMENT OF WRITTEN MATERIALS

The Brake Pad Partnership involves substantial amounts and types of written materials. By law, all of the written materials that are produced with public funding are in the public domain. The Brake Pad Partnership has developed the following policies for managing documents in the spirit of maintaining accuracy and transparency in its work and communications.

As the Partnership coordinator, Sustainable Conservation bears primary responsibility for document management. Whenever possible, documents will be handled in electronic format to speed transmission and reduce transmittal costs.

The following documents will be posted to the Brake Pad Partnership’s website routinely and notice of availability of such documents will be provided to stakeholders and the interested public via the Partnership’s list-serve on an event basis.

- Quarterly Stakeholder Updates, including information on recent accomplishments and next steps
- Stakeholder Conference and Technical Workshop materials
- Schedules of meetings and events, including technical review schedules
- Technical Consultants’ Draft and Final Work Plans
- Technical Consultants’ Draft and Final Reports
- Steering Committee charges to the Scientific Advisory Team technical reviewers
- Scientific Advisory Team Technical Review comments and the Steering Committee summary of comments on draft materials provided to the Technical Consultants
- Steering Committee Reports

The following documents are developed routinely in the course of the Steering Committee’s deliberations. Stakeholders interested in viewing such documents should contact their Steering Committee representative(s).

- Steering Committee conference call and meeting agendas
- Lists of action items resulting from Steering Committee conference calls and meetings
- Copies of Technical Consultants’ draft and final contracts

In addition to the above documents, individual Steering Committee members and the Brake Pad Partnership coordinator frequently prepare and handle other working documents in the course of the Steering Committee’s work, such as e-mail communications and draft summaries of discussion topics. These materials are often in a rough draft format and in the course of the Steering Committee’s deliberations become more refined, eventually resulting in a Steering Committee report or other type of work product that is disseminated widely. Stakeholders interested in viewing working documents should contact their Steering Committee representative(s).
CONTRACTS MANAGEMENT

The Association of Bay Area Governments (ABAG) on behalf of the San Francisco Estuary Project (SFEP) is serving as the Brake Pad Partnership’s fiscal agent for the purpose of administering the $700,000 of Proposition 13 funding from the California State Water Resources Control Board (SWRCB) Coastal Nonpoint Source Grant Program. The San Francisco Bay Regional Water Quality Control Board serves as the contract manager on behalf of the SWRCB.

SFEP/ABAG is responsible for contract and subcontract administration and management. Sustainable Conservation is responsible for assisting SFEP/ABAG in subcontract management relating to technical content and reporting, including approval of invoices, and for assuring that the Steering Committee’s directions are carried out through the work of the subcontractors.

The following outlines roles and responsibilities relating to management and administration of the master contract and subcontracts.

**Master Contract Management and Reporting**
SFEP/ABAG holds the master contract with the SWRCB and is responsible for meeting all of the contract obligations. Sustainable Conservation is responsible for assisting SFEP/ABAG in meeting the contract reporting and deliverable requirements. Sustainable Conservation will prepare and provide a quarterly project report that incorporates quarterly reports from each of the other subcontractors. Sustainable Conservation will also forward SFEP/ABAG copies of deliverables developed by Sustainable Conservation and/or the other contractors.

**Subcontracting**
SFEP/ABAG is responsible for entering into subcontracts on behalf of the Brake Pad Partnership in accordance with all applicable requirements of the SWRCB and SFEP/ABAG.

**Sole Source Contracting.** Sole source contracts will be let to Sustainable Conservation for project coordination and management, the San Francisco Estuary Institute for air deposition monitoring, the Alameda County Flood Control and Water Conservation District (on behalf of the Alameda Countywide Clean Water Program) for stormwater monitoring, and URS Corporation for bay modeling. All sole source contracts have been documented with the required justification. The Brake Pad Partnership Steering Committee must approve the Scope of Work for each sole source contract prior to execution of the contract.

**Competitive bid contracting.** Competitive bid contracts will be let for air deposition modeling, airborne brake wear debris characterization, and chemical characterization of brake wear debris. SFEP/ABAG is responsible for conducting the competitive bidding process in accordance with applicable SWRCB and SFEP/ABAG requirements. In the case of each competitive bidding process, the Statement of Work, Services, or Qualifications and list of qualified bidders must be approved by the Brake Pad Partnership Steering Committee prior to the release of the call for bids. In addition to the SWRCB contract manager, and a representative of ABAG, the selection committee shall consist of one representative of each stakeholder group drawn from the Brake Pad Partnership Steering Committee. Additional members of the Steering Committee may participate in the review and interview process on an informational basis.

**Draft and Final Work Plans and Reports.** Each of the technical subcontractors is required to prepare draft and final Work Plans and draft and final Reports. All draft Work Plans and Reports must go through a technical review process as described in the section above on Technical Work Product Review Process. Upon completion of the review, Sustainable Conservation will summarize all the comments for the subcontractor in a memorandum that requires approval of the Steering Committee prior to being
submitted to the subcontractor. Final Work Plans and Reports received from the subcontractors must include all requested changes as a condition of the Brake Pad Partnership’s acceptance of the final product.

*Invoice Management.* Technical subcontractors will submit their invoices directly to SFEP/ABAG, which will then circulate the invoices to the SWRCB contract manager and the Brake Pad Partnership coordinator and facilitator for approval. Upon receipt of these two approvals, SFEP/ABAG will process the invoices in accordance with all applicable SWRCB and SFEP/ABAG requirements.
APPENDIX A

BRAKE PAD PARTNERSHIP ORGANIZATION CHART

To be developed.
APPENDIX B

BRAKE PAD PARTNERSHIP STEERING COMMITTEE

Members:

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The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on March 4th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Pat Thesier (ADVICS North America, Inc. and lead representative of the Brake Manufacturer's Council Product Environmental Committee [BMC/PEC])
- Rodger Dabish (TMD Friction)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Chris Shepley (Dana Corporation)
- Michael Endicott (Sierra Club)
- Jim Pendergast (U.S. EPA)
- Kelly Moran (TDC Environmental)

Mark Phipps (Federal-Mogul Corporation) and Mark Schlautman (Clemson University, project technical advisor) were unable to participate in the meeting. Richard Looker (San Francisco Bay Regional Water Quality Control Board) joined the meeting for the discussion of the copper sources in urban stormwater information update report.

The following items were discussed:

**Brake Pad Load Estimate in Copper Sources in Urban Stormwater Runoff Update Report.**
In the three weeks since a conflict developed in regard to the idea of the Clean Estuary Partnership (CEP) preparing a brake copper load estimate, I am pleased to report that Partnership participants have made a great deal of progress to resolve the issues that surfaced. To allow the BPP time to resolve the conflict, the CEP delayed submittal of the Copper Sources in Urban Stormwater Runoff Update Report for four weeks (to March 19th).

The conflict centered on the quantitative estimate of copper derived from brake pads that will be part of the Copper Sources in Urban Stormwater Runoff Update Report. Because the BPP is preparing a detailed load estimate through its stakeholder process, brake pad manufacturers felt that a CEP estimate at this juncture would be premature and would be a subversion of the established BPP process for this calculation. Manufacturers also have the very reasonable fear that a new load estimate will subject them to additional negative publicity or regulatory threats.
Sustainable Conservation facilitated resolution of the conflict, which primarily occurred through off-line Steering Committee member telephone calls prior to the teleconference. Thanks in part to Richard Looker’s description of the Basin Planning process and need for copper load estimates, all Steering Committee members agreed that preparation of a brake pad load estimate was necessary. The Steering Committee also agreed that preparing a loading estimate with the BPP’s input was preferable to having an estimate developed separately.

With these agreements, the focus has shifted to the methodology of preparing the load estimate for the CEP. Using the literature assembled by the BPP, several methods for calculating a brake copper load estimate are possible. (I have reviewed the data sources with all Steering Committee members.) Although the BPP’s information—and specifically the copper use reports from Brake Manufacturers—is incomplete, it is the highest quality information available at this time. Unfortunately, the manufacturers fear that industry members will drop out of the BMC/PEC if the copper use report data is used in the CEP load estimate (one member already did drop out due to the fear that copper data would be used in load estimates). The manufacturers agreed to confer privately on this topic and provide feedback prior to the next Steering Committee teleconference on March 11.

Other Topics. The remaining agenda items were minor or procedural in nature.

**Anticipated Next Steps**

The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- March 11, teleconference meeting
- March 25, teleconference meeting
- April 6, teleconference meeting
- April 27, teleconference meeting
- May 19-20, in-person meeting, San Francisco
- May 21, Stakeholder Conference, Oakland (State Building)
- June 10, teleconference meeting
- June 24, teleconference meeting
DRAFT Agenda

1. Agenda review and anything new? (15 min)
   - Updated Call Schedule (see attachment)
   - Revised BPP Operating Plan (see attachment) -- please be prepared to approve this document on the March 25 call.
   - Brief update on MOUDI instrument and wear debris generation effort
   - Update on air deposition monitoring effort -- see attached e-mail from Don Yee
   - Proposed revised project schedule -- see attached Excel file (please look at both sheets 1 and 2)
   - Anything else?

2. Addressing the Issues Raised with the Preparation of the Draft Copper Sources in Urban Stormwater Runoff Report (20 minutes)
   - Background on the factors driving the creation of the report and anticipated outcomes -- Richard Looker See also the attached pdf file summary on page 2 of the CEP Technical Committee's approval of an extension for the report.
   - Discussion to understand what happened and Steering Committee members' views on how it relates to the BPP process. Please note, the BMC-PEC BPP Steering Committee members are preparing a document outlining their concerns and will distribute it to other Steering Committee members on Wednesday.
   - Identification of potential avenues for resolving the concerns raised and/or clarifying areas in which additional discussion is needed.

3. Anything else?
The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on March 11th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Mark Schlautman (Clemson University, project technical advisor)
- Pat Thesier (ADVICS North America, Inc. and lead representative of the Brake Manufacturer's Council Product Environmental Committee [BMC/PEC])
- Rodger Dabish (TMD Friction)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Chris Shepley (Dana Corporation)
- Mark Phipps (Federal-Mogul Corporation)
- Jim Pendergast (U.S. EPA) (first 10 minutes only)
- Kelly Moran (TDC Environmental)

Michael Endicott (Sierra Club) was unable to participate in the meeting.

The following items were discussed:

**Contract Update.** Sustainable Conservation reported that it has heard (but has not received confirmation) that the State Water Board has FINALLY signed the Proposition 13 grant contract.

**Brake Pad Load Estimate in Copper Sources in Urban Stormwater Runoff Update Report.** Prior to the teleconference, the manufacturer representatives conferred and then provided feedback on the draft brake pad copper load estimates. On the teleconference, the revisions were discussed and found acceptable to all Steering Committee members. Despite the flurry of activity, the final feedback was relatively minor, limited to helpful technical comments regarding the presentation of various elements of the calculation and inconsequential wordsmithing. The changes do not alter the numeric load estimate.

**Update on Generation of Representative Brake Wear Debris Sample.** The brake pad materials to generate the wear debris sample are in the process of being collected and the dynamometer lab is ready, however, generation of the representative sample will be delayed until it can be coordinated with the aerodynamic particle size diameter measurements (see below).

The BMC/PEC representative organizing this task verbally described the procedure for selecting the brake pad materials for the sample. This procedure will eventually be
written up for our full review. The process was as follows:

- The BMC/PEC surveyed its members to identify which copper-containing materials are used to formulate the most common brake pads (the ones covered by the annual copper use report). They found that brake pads are often formulated with multiple copper-containing ingredients (e.g., copper fiber, copper powder and copper sulfide).

- Upon reviewing the copper-containing ingredient data from the survey, the manufacturers found that one form of copper (which was not specified by the manufacturers) was most common—about 80% of the copper in copper-containing brake pads is this form of copper. On the basis of this finding and the relatively frequency of use of other copper-containing ingredients, the manufacturers decided to generate wear debris from brake pad materials containing the top 3 copper-containing forms of copper, which—if I correctly understand the industry verbal explanation—represent the forms of copper comprising more than 90% most of the copper in the most common brake pads. The most common copper-containing material excluded from this test represents less than 3% of the copper used in the most common brake pads.

- The sample will be composited on the basis of the mass fraction of that form of copper in the most common brake pads.

As the sample will not be perfectly representative, the Steering Committee has taken to calling it a “more representative” sample.

Manufacturers have agreed to fund enough wear debris generation to support the aerodynamic diameter measurements, to supply the first phase of extraction tests, and to provide materials for their own confidential extraction tests of each separate fraction (to allow them to understand the implications of selection of various copper-containing ingredients). They have not collected enough funds to continue generation for extra days to great a large supply of material for future chemical or physical characterization tests. Since the cost for this additional generation would not be great (probably significantly less than $10,000), the Steering Committee agreed to review cost options and consider funding additional wear debris generation at this time, recognizing that this would be substantially more cost-effective than a future, separate wear debris generation event.

**Aerodynamic Particle Size Measurements.** The contract with Clemson University to measure aerodynamic particle size diameter is not yet in place, which means that the testing cannot be conducted during Clemson’s spring break as planned. The Steering Committee decided that it would be best to pursue an orderly course with this project, which would involve preparing and distributing a workplan for review, followed by conducting the measurements at a later date (late spring or early summer). Sustainable Conservation will work with Clemson to develop a revised schedule for this task.

**Other Topics.** The remaining agenda items were minor or procedural in nature.

**Anticipated Next Steps**

The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- March 25, teleconference meeting
• April 6, teleconference meeting
• April 27, teleconference meeting
• May 19-20, in-person meeting, San Francisco
• May 21, Stakeholder Conference, Oakland (State Building)
• June 10, teleconference meeting
• June 24, teleconference meeting
Agenda Distributed by Sustainable Conservation via e-mail

Thursday, March 11, 11:00 a.m. to 12 noon, PST
Dial: 866-279-1566
Meeting Number: *4762806* (NOTE: You must dial the *s at the beginning and end of the meeting number.)

**D R A F T Agenda**

1. **Agenda review and anything new?** (15 min)
   - Contracts!

2. **Addressing the Issues Raised with the Preparation of the Draft Copper Sources in Urban Stormwater Runoff Report** (20 minutes)
   - Update from Rodger and Kelly on progress made since last week.
     (Revised draft attached.)
   - Clarification and discussion of any outstanding concerns.

3. **Update from Pat regarding Generating the Representative Sample** (10 minutes)
   - Status report
   - Exactly how much of the representative sample is needed for ToxScan to run its tests?

4. **Update from Mark Schlautman regarding the aerodynamic particle size diameter measurement** (20 minutes)
   - Review of plan and schedule for conducting the measurement, including equipment needs, contract status, and schedule for having a draft work plan.

5. **Additional Updates on Project Elements from Sarah** (5 minutes)
   - Plan for developing copper load estimates
   - Air deposition monitoring

6. **Anything else?**
The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on March 25th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Mark Schlautman (Clemson University, project technical advisor)
- Pat Thesier (ADVICS North America, Inc. and lead representative of the Brake Manufacturer's Council Product Environmental Committee [BMC/PEC])
- Rodger Dabish (TMD Friction)
- Chris Shepley (Dana Corporation)
- Michael Endicott (Sierra Club)
- Jim Pendergast (U.S. EPA)
- Kelly Moran (TDC Environmental)

Mark Phipps (Federal-Mogul Corporation) and Tim Merkel (formerly of Federal-Mogul Corporation) were unable to participate in the meeting. Don Yee, SFEI joined the meeting.

The following items were discussed:

**Contract Update.** The San Francisco Estuary Project has confirmed that it has received the signed Proposition 13 grant contract from the State Water Board. SFEP is now in the process of signing the contracts it had already negotiated for most project elements.

**Aerodynamic Particle Size Measurements.** The Steering Committee briefly discussed the draft workplan by Clemson University to measure aerodynamic particle size diameter of brake wear debris. While Steering Committee members had no technical comments, they agreed that this workplan should receive review according to the Partnership’s agreed upon technical document review procedures. After working out schedule and other administrative details with Clemson, Sustainable Conservation will identify technical peer reviewers and initiate the stakeholder and technical peer review of the workplan. Review should be completed in time to proceed with testing late this spring or early this summer, which fits well with the most recent project schedule.
**Generation of the “More Representative” Brake Wear Debris Sample.** All brake pad materials to be used are ready and at the dynamometer laboratory. The BMC will consider approval of the draft workplan at a meeting next week (which includes BMC approval to fund the wear debris generation). Upon approval, the BMC will circulate the workplan to the Steering Committee and Clemson for review and integration into the project.

Manufacturers announced that the BMC will contract with Clemson to conduct extraction tests on wear debris from each individual pad used to create the composite sample (ToxScan will be doing BPP-funded tests of the composite sample). These results will not be shared with the Steering Committee, as their purpose is to explore whether use of different copper forms offer future formulation alternatives for the industry. Since the Partnership has agreed to stay away from formulation details—other than their environmental impacts—the Steering Committee agreed that it was comfortable with confidential industry testing of its own samples. While everyone will be curious about the results, this arrangement is appropriate within the goals of the partnership.

Formulation is a touchy issue for manufacturers, so the Partnership is treating it as a “need to know” issue. Knowledge of formulation details is not necessary to meet the Partnership’s goal of understanding the overall potential release of copper from brake wear debris.

Since the BMC will be funding one of the project technical advisors for confidential work, the Steering Committee discussed the potential for conflict of interest, concluding that there were not any anticipated concerns. Sustainable Conservation will monitor to ensure that any potential conflicts of interest (or Steering Committee members concerns) are brought up and dealt with.

Manufacturers are obtaining a cost estimate for generation of additional brake wear debris (beyond the initial “more representative” sample and that needed to support aerodynamic diameter measurements by Clemson). On the basis of the cost estimate, the Steering Committee will consider whether to allocate some of its chemical characterization budget to fund additional wear debris generation at this time.

**Air Deposition Sampling.** The Steering Committee has substantial discomfort with the location and number of air deposition monitoring locations. A special teleconference meeting will be scheduled with a subcommittee and consultants next week to determine next steps. I am concerned that the locations selected by SFEI (Castro Valley Elementary School, 20185 San Miguel Avenue and Castro Valley Community Center, 18988 Lake Chabot Road) will not be sufficiently different from each other in terms of brake pad wear debris copper deposition to meet the goal of providing two meaningfully different data sets for use in validating the air deposition model.

SFEI initiated wet deposition sampling at the two locations in mid-March. No samples had been collected as of March 25, but rain later in the day on March 25 may have generated a sample. Given current weather forecasts, the potential to collect additional wet deposition samples this winter is probably limited.

**Other Topics.** The Steering Committee approved the *Brake Pad Partnership Operations Plan*, which includes the Stakeholder Communications Plans, Written Materials Management procedures, definition of Scientific Advisory Team roles, and Technical
Document Review Procedures. The draft incorporates many comments made by BASMAA members regarding these topics. Sustainable Conservation constructed the document carefully—I believe it will serve the Partnership well.

The planned discussion of contractor proposals to prepare the brake pad copper load estimate needed for air deposition and watershed modeling was deferred for lack of time.

This was Pat Thesier’s last teleconference prior to his retirement. He thanked the Steering Committee and stakeholders for our cooperativeness and professionalism over the years he has worked with us.

**Anticipated Next Steps**

The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- March 30 or 31, special teleconference on air deposition monitoring
- April 6, teleconference meeting
- April 27, teleconference meeting
- May 19-20, in-person meeting, San Francisco
- May 21, Stakeholder Conference, Oakland (State Building)
- June 10, teleconference meeting
- June 24, teleconference meeting
DRAFT Agenda

1. Agenda review and anything new? (5 min)

2. More Representative Sample Generation and Work Plan for Characterization of Airborne Brake Wear Debris (25 minutes)
   - Work Plan review process and initial discussion with Mark Schlautman and Christos Christoforou (see attached draft Work Plan)
   - Status of the materials for generating the more representative sample of brake wear debris from Pat
   - Discussion and decision regarding the amount of the representative sample to be generated

3. Update and Decisions Regarding the Duration of the Air Deposition Monitoring Effort (15 minutes)
   - Review of issues with Don Yee (see attached memorandum)
   - Steering Committee feedback for Don regarding supplemental sampling strategy, study duration, and chemical analyses

4. Review of Proposals for Assistance with Copper Loading Estimates from Brake Sources (15 minutes)
   - Review of the two proposals (sent separately on 3/18/04)
   - Identification of next steps

5. Anything else?
MEMO

For BASMAA Member Agency Internal Use Only

TO: Geoff Brosseau &
BPP Representation Work Group
DATE: March 30, 2004
FROM: Kelly D. Moran
PROJECT: 16
SUBJECT: Brake Pad Partnership Conference Call—March 30, 2004

The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on March 30th to discuss air deposition monitoring. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Mark Schlautman (Clemson University, project technical advisor
- Mark Phipps (Federal-Mogul Corporation)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Michael Endicott (Sierra Club)
- Jim Pendergast (U.S. EPA)
- Kelly Moran (TDC Environmental)

Rodger Dabish (TMD Friction and lead representative of the Brake Manufacturer's Council Product Environmental Committee [BMC/PEC]) and Chris Shepley (Dana Corporation) were unable to participate in the meeting. Don Yee (SFEI) and Betty Pun (AER) joined the meeting.

The air deposition sampling discussion covered the following topics:

**Background.** The Steering Committee has substantial discomfort with the location and number of air deposition monitoring locations. The purpose of the teleconference was to review the air deposition monitoring plan to resolve the issues:

- Are the sampling locations appropriate?
- Could emissions from BART brakes unduly influence sample results?
- Should we modify sampling methods from those previously used to allow for additional samples and to reduce sampling location selection constraints?

**Purpose.** The purpose of the air deposition monitoring is to check how well the air deposition model predicts real-world results (*i.e.*, to validate the model). The air deposition data will not be used directly in the watershed model—it will use the output of the air deposition model (there will not be sufficient air deposition data to make good use of them in the watershed modeling exercise). Brake manufacturers find the air deposition data particularly interesting because it is the most direct measurement of brake wear debris in the environment.
Monitoring Sites. For air deposition model validation purpose, the best air deposition monitoring sites would be sites with relatively different amounts of copper deposition. Literature reports of copper deposition near roads were summarized in U.S. EPA modeler Jim Carleton’s draft paper on the watershed model he set up for the Brake Pad Partnership. The literature shows a gradient of copper concentrations in surface soils, decreasing as one moves away from a road edge. The literature reports that the copper concentration drop off is most significant within about 20 meters of a road edge.

Betty Pun explained that the model validation would work best in areas outside of the immediate influence of the vehicle emissions plume, which may extend to the edge of the highway right of way. Locations outside this area (within 10 meters or so of a highway), but near the highway, would be preferred for model validation purposes.

In the Castro Valley watershed, the busiest road is Highway 580 (about 150,000 vehicles per day), followed by Castro Valley Blvd (tens of thousands of vehicles per day). Other streets are arterials, feeders, and local streets, which typically have hundreds to thousands of vehicles per day. Thus the main emissions location in the watershed would be Highway 580.

This leaves a relatively narrow band of terrain that would be preferred for the “near source” deposition sampling. Don Yee will again visit the area to explore possible sampling locations within 10 to 20 meters from highway 580. Other criteria for sampling locations include the ability to ensure the sampler is physically safe (from vandalism), has power, is not affected by local air emissions sources (e.g., building exhausts), and is not sheltered by buildings or trees. Don will contact ACCWP for assistance in identifying possible locations.

Influence of BART. Brake manufacturers are concerned that emissions from copper in BART brakes could influence the monitoring data. Their preference to avoid locations near BART is unfortunately in direct conflict with the technical need to locate the sampler near the highway, as BART runs down the highway median, and a BART station is in the middle of the watershed. Manufacturers have found that the most commonly used BART brake pad material contains less than 1% copper by weight. Other brands of brake pads, are, however, used in BART maintenance from time to time. The manufacturers will follow up to learn about the frequency of use of other brake pad brands and the copper content of those pads. It may be necessary to estimate the potential relative contribution of copper from BART brake pads to determine whether the measurements might be affected by BART.

Alternative Air Deposition Monitoring Methods. If an ideal “near source” sampling location cannot be identified, alternatives will need to be considered. One alternative is to modify the sampling method to use a low-cost “passive sampler.” This would provide greater freedom in selecting the wet deposition sampling locations (as power is not required), and would reduce the security restriction (as loss or damage to some samplers could be tolerated). However, use of an alternative method would mean that the results would not be directly comparable to the previous air deposition sampling in the region.

Anticipated Next Steps
The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- April 6, teleconference meeting
- April 27, teleconference meeting
- May 19-20, in-person meeting, San Francisco
- May 21, Stakeholder Conference, Oakland (State Building)
- June 10, teleconference meeting
- June 24, teleconference meeting
DRAFT Agenda

1. Discussion of Air Deposition Monitoring Effort

- Does the model distinguish between the dry and wet deposition data? I.e., is it necessary to use a monitoring protocol that distinguishes between dry and wet deposition?

- How does having daily dry deposition samples versus weekly dry deposition samples affect the modeling needs?

- Based on what we now know about particle sizes, can we expect to see a gradient of decreasing copper over distance from a busy roadway? If so, over what length-scale would that gradient be?

- How can we get more information on whether there is copper in BART train brakes?

- Wrap-up on next steps ... either getting another opinion or making a recommendation for proceeding to the rest of the Steering Committee and Don.
The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on April 6th to discuss air deposition monitoring. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Mark Schlautman (Clemson University, project technical advisor)
- Mark Phipps (Federal-Mogul Corporation)
- Chris Shepley (Dana Corporation)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Michael Endicott (Sierra Club)
- Jim Pendergast (U.S. EPA)
- Kelly Moran (TDC Environmental)

Rodger Dabish (TMD Friction and lead representative of the Brake Manufacturer's Council Product Environmental Committee [BMC/PEC]) was unable to participate in the meeting.

The following items were discussed:

**Review Process for Aerodynamic Diameter Measurements Workplan.** The Steering Committee went over the workplan review process, which is consistent with our standard procedures (see the schedule attached). Since the workplan looks good and the charge to reviewers is simple, this should be a non-controversial try-out for the review procedures. Sarah has learned that planned scientific peer reviewer Professor Bill Nazaroff is not available; however, he suggested several other qualified professors who Sarah is contacting. This means that the review schedule will probably be delayed for several weeks.

**Air Deposition Monitoring Sampling Locations.** The Steering Committee reviewed the outcome of last week’s special teleconference. The next steps determined in that teleconference are still in progress.

**Contractor for Copper Load Estimates from Brake Pads.** The Steering Committee discussed two informal proposals received to assist the Brake Pad Partnership in developing copper release estimates from in brake pads. The two proposals (from AER and Process Profiles) both have pros and cons. Neither proposal reflects the iterative process that will be necessary given the limitations on available information and the
calculation approach desired by the Steering Committee. The Steering Committee decided to again review the proposals to select a contractor based on qualifications and then to make the first phase of the contract development of a workplan.

Stakeholder Conference Agenda. The Steering Committee generally discussed what it would like to see on the agenda. Sustainable Conservation will prepare and circulate a draft agenda for feedback.

**Anticipated Next Steps**

The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- April 27, teleconference meeting
- May 13, teleconference meeting
- May 19-20, in-person meeting, San Francisco
- May 21, Stakeholder Conference, Oakland (State Building)
- June 10, teleconference meeting
- June 24, teleconference meeting


Agenda Distributed by Sustainable Conservation via e-mail

Tuesday, April 6, noon to 1:00 p.m. PDT
Dial: 866-279-1566
Meeting Number: *4762806* (NOTE: You must dial the *s at the beginning and end of the meeting number.)

DRAFT Agenda

1. Agenda review and anything new? (5 min)

2. Characterization of Airborne Brake Wear Debris Work Plan Review Process (10 minutes)
   * See attached e-mail (also sent previously)
   Selection of expert reviewers: Bill Nazaroff is not available. He has recommended Tom Cahill of UC Davis, William Hinds of UCLA, and Costas Sioutas, USC.
   * Paul Sanders

3. Review of where we are on Locating the Air Deposition Monitoring Sample Sites (15 minutes)
   * See REVISED summary of March 30 call attached
   * Updates on action items

4. Review of Proposals for Assistance with Copper Loading Estimates from Brake Sources (15 minutes)
   * Review of the two proposals (see attachment)
   * Identification of next steps

5. Draft preliminary agenda for the May 21 Stakeholder Conference
   *draft forthcoming

6. Anything else?
THE BRAKE PAD PARTNERSHIP

Draft Review Plan for
Clemson Work Plan on Characterization of Airborne Brake Wear Debris

1. Initial review of the Draft Work Plan and Draft Charge to Reviewers by the Steering Committee and Stakeholders:

March 29 to April 5, 2004: Initial review.

2. Finalization of the Charge to Reviewers:

April 6, 2004: Steering Committee finalization of charge to reviewers.

3. Stakeholder and Scientific Advisory Team Member Review:

Proposed outside reviewers:

(1) Professor Bill Nazaroff, Department of Civil and Environmental Engineering, University of California at Berkeley

(2) Paul G. Sanders, Research Laboratory, Ford Motor Company, Dearborn, Michigan

April 7 to April 21, 2004: Review period.

Follow-up on Reviewers’ Responses and Comments.

April 22, 2004: Circulate reviewers’ and stakeholders’ comments to Steering Committee members and list-serve members

April 29, 2004 (tentative): Teleconference to discuss the results of the review process with stakeholders, the reviewers, the contractor, and the Steering Committee.

April 30, 2004: Summary of comments completed and forwarded to the Steering Committee, list-serve, and contractor.

May 7, 2004: Final Work Plan due.
MEMO

For BASMAA Member Agency Internal Use Only

TO: Geoff Brosseau & BPP Representation Work Group
FROM: Kelly D. Moran
SUBJECT: Brake Pad Partnership Conference Call—April 27, 2004

DATE: April 27, 2004
PROJECT: 16

The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee
teleconference meeting on April 27th to discuss air deposition monitoring. A copy of the
agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Mark Schlautman (Clemson University, project technical advisor)
- Mark Phipps (Federal-Mogul Corporation)
- Michael Endicott (Sierra Club)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Chris Shepley (Dana Corporation)
- Jim Pendergast (U.S. EPA)
- Kelly Moran (TDC Environmental)

Rodger Dabish (TMD Friction and lead representative of the Brake Manufacturer's
Council Product Environmental Committee [BMC/PEC]) was unable to participate in the
meeting.

The following items were discussed:

Aerodynamic Diameter Measurements Workplan Peer Review. The Steering Committee
and Professor Schlautman discussed the helpful workplan review comments received
from Professor Tom Cahill at U.C. Davis. A second reviewer has not been confirmed;
Sustainable Conservation is still working with Rodger Dabish to secure a review from
Ford researcher Paul Sanders (who made similar measurements in an article published in
Environmental Science & Technology). This means that the review schedule may be
extended.

Contractor for Copper Load Estimates from Brake Pads. The Steering Committee again
discussed two informal proposals (from AER and Process Profiles) received to assist the
Brake Pad Partnership in developing copper release estimates from in brake pads. The
Steering Committee asked Sustainable Conservation to request additional information
about the experience of both contractors with similar work and to plan to schedule
telephone interviews with both contractors prior to selecting one.
Stakeholder Conference Agenda. The Steering Committee reviewed and added detail to a draft agenda. Sustainable Conservation will continue to complete arrangements for the May 21 meeting.

Air Deposition Monitoring Sampling Site Update. SFEI has identified several possible monitoring sites close to the freeway in the Castro Valley watershed. Sustainable Conservation will ask AER if they expect these sites to be substantially different from the second (middle of watershed, not near major roads) sampling location.

Plan for Additional Staff for BPP. Sustainable Conservation intends to hire a junior project manager to work on the Brake Pad Partnership, assisting Sarah Connick with the project. This will cost-neutral to the project. This change will allow Sarah to work on other projects within Sustainable Conservation and will provide stakeholders a second contact within Sustainable Conservation. Sarah will continue to facilitate project meetings.

Anticipated Next Steps
The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- May 13, teleconference meeting
- May 19-20, in-person meeting, San Francisco
- May 21, Stakeholder Conference, Oakland (State Building)
- June 10, teleconference meeting
- June 24, teleconference meeting
DRAFT Agenda

1. Agenda review and anything new? (5 min)

2. Characterization of Airborne Brake Wear Debris Work Plan Review (15 minutes)
   * Update on status of review process
   * Steering Committee questions or comments on the reviewer comments
   * Questions for and feedback from Mark Schlautman
   * Next steps: provide a summary of the comments to Christos and Mark on April 30, with a final work plan due to the BPP on May 7.

3. Obtaining Technical Assistance with Copper Loading Estimates from Brake Sources (15 minutes)
   * At the last meeting we concluded we will need to choose one of the contractors and work very closely with her to develop a refined work plan with which the Steering Committee members are all comfortable
   * Discussion of options, and if possible, selection of one.

4. Draft Agenda for the May 21 Stakeholder Conference (15 minutes)
   * See attached draft preliminary agenda
   * Discussion, revisions, and approval for circulation.

5. Update on Locating the Air Deposition Monitoring Sample Sites (5 minutes)

6. Anything else?
The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on May 13th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Mark Schlautman (Clemson University, project technical advisor)
- Rodger Dabish (TMD Friction and lead representative of the Brake Manufacturer's Council Product Environmental Committee [BMC/PEC])
- Mark Phipps (Federal-Mogul Corporation)
- Michael Endicott (Sierra Club)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Chris Shepley (Dana Corporation)
- Jim Pendergast (U.S. EPA)
- Kelly Moran (TDC Environmental)

The following items were discussed:

**Aerodynamic Diameter Measurements Update.** The Clemson team has responded to peer reviewer comments with workplan modifications and additional technical studies demonstrating the appropriateness of the proposed methods for these measurements. Like other project-related publications, the final workplan and Clemson’s response to reviewer comments are available on the Sustainable Conservation Internet site, [http://www.suscon.org/brakepad/documents.asp](http://www.suscon.org/brakepad/documents.asp).

After the end of the workplan review process, manufacturers arranged to obtain individual (not official corporate) technical input from a group of scientists who have done previous MOUDI measurements of brake wear that were published in the journal *Environmental Science & Technology*. Clemson will be following up with the scientists on this, which may result in minor modifications in the test procedures.

The Clemson team is making final arrangements for conducting the aerodynamic diameter measurements in conjunction with manufacturer-funded wear debris generation to be conducted soon—perhaps as soon as the end of May.
Other items:

- **Agendas for Steering Committee In-Person meeting and Stakeholder Conference.** The Steering Committee reviewed, modified, and approved agendas for both meetings. Sustainable Conservation will continue to complete arrangements for the May 21 meeting.

- **Contractor for Copper Load Estimates from Brake Pads.** The Steering Committee briefly discussed short statements of qualifications received from AER and Process Profiles. The task will be discussed in more detail and both firms will be interviewed during the upcoming Steering Committee in-person meeting.

- **Written Procedure for Selecting Materials for and Generating the Representative Sample of Brake Wear Debris.** Not discussed for lack of time.

**Anticipated Next Steps**

The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- May 19-20, in-person meeting, San Francisco
- May 21, Stakeholder Conference, Oakland (State Building)
- June 10, teleconference meeting
- June 24, teleconference meeting
1. Teleconference agenda review and anything new? (5 min)

2. Review of Agenda for the May 21 Stakeholder Meeting (5 min)
   * Questions? Comments?
   * Registration to date

3. Review of the Draft Agenda for the May 19-20 Steering Committee Meeting (15 min)
   * Will everyone be there at 12:30?
   * Questions? Comments?

4. Obtaining Technical Assistance with Copper Loading Estimates from Brake Sources (10 minutes)
   * On the last call, we decided to request brief statements of qualifications from both prospective contractors, and conduct brief follow up telephone interviews during our May 19-20 Steering Committee meeting prior to making the selection.
   * Comments or questions on the SOQs (see attachments)
   * What qualities are you looking for from the contractors in the interviews?

5. Update on Characterization of Airborne Brake Wear Debris Effort (15 minutes)
   * Questions or comments for Mark following up on the completed review process?
   * Update from Mark on preparations to conduct work at Link
   * Link work plan and cost estimates

6. Obtain a Written Report on the Procedure for Selecting Materials for and Generating the Representative Sample of Brake Wear Debris, (10 minutes)
   including:
   * objective for developing the representative sample of brake wear debris
   * description of the process for selecting the materials to be sampled (including the rationale underlying the selection of three materials)
   * a description of how the selection of the specific run times for each material in making the representative sample

7. Anything else?
The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on June 10th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Rodger Dabish (TMD Friction and lead representative of the Brake Manufacturer’s Council Product Environmental Committee [BMC/PEC])
- Mark Phipps (Federal-Mogul Corporation)
- Michael Endicott (Sierra Club)
- Tim Merkel (formerly of Federal-Mogul Corporation)
- Chris Shepley (Dana Corporation)
- Jim Pendergast (U.S. EPA)
- Kelly Moran (TDC Environmental)

Mark Schlautman (Clemson University, project technical advisor) was not able to participate in the call.

The following items were discussed:

**Copper Measurements.** The Steering Committee was disappointed to learn that ToxScan, which it had selected to do chemical characterization of brake pad wear debris, does not have the special equipment needed to use the microwave extraction method developed by Clemson University for brake pad wear debris copper measurements. The microwave extraction method is preferred because it measures somewhat more copper in wear debris samples than is measured in samples prepared by the standard U.S. EPA extraction method. This finding caused the Steering Committee to discuss its plans for chemical analysis for all samples that may contain brake pad wear debris.

- **Extraction tests of representative brake pad wear debris sample.** The Steering Committee tentatively decided to ask Clemson University to conduct these tests, since Clemson indicated it had the willingness and capacity to conduct the tests. Sustainable Conservation will discuss price and schedule (the two previous concerns about working with Clemson) with Professor Schlautman prior to final selection.
• Copper measurements in dry and wet air deposition samples. Since the air deposition samples will contain brake pad wear debris, there is a possibility that the standard methods for copper measurement used in the previous San Francisco Bay Area air deposition study would underreport the total copper in the samples. For consistency with previous measurements, the Steering Committee directed SFEI to arrange for analysis of air deposition samples using the same as before. SFEI will provide feedback to the Steering Committee on the feasibility and cost of doing a special study with a subset of the samples to compare the two copper measurement methods.

Draft Scope of Work for the Estimation of Copper from Brake Pads. The Steering Committee gave conceptual approval for the scope of work for a contract to Process Profiles to develop a workplan for estimating the copper load from vehicle brake pads in the Castro Valley and Bay Area watersheds. This small contract (<$10,000) will provide the staffing needed for the Steering Committee to work through the technical and political issues associated with preparing the politically charged load estimates.

Other items:

• Air Deposition Sampling. SFEI will initiate dry deposition monitoring as soon as it selects a contractor to prepare the deposition plates and to conduct the chemical analyses. It has resolved previous concerns about dry deposition sampling locations by securing permission to use a relatively good “low impact” monitoring location in the upper watershed.

• Representative Brake Pad Wear Debris Sample and Aerodynamic Diameter Measurements. Sample generation and measurements will be conducted by Link and Clemson in the next few weeks.

• Internet Site. In the next few weeks, Sustainable Conservation will update the project Internet site to add the remaining approved workplans and information about the stakeholder listserver.

Anticipated Next Steps

The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

• June 24, teleconference meeting

Sustainable Conservation is in the process of scheduling semimonthly teleconference meetings after June 24.
DRAFT Agenda

1. Teleconference agenda review and anything new? (5 min)

2. Chemical Characterization Laboratory Analyses (20 min)
   * It turns out that ToxScan cannot exactly replicate the digestion procedure developed by Clemson. I am developing an issue/decision memorandum for your consideration.

3. Review Draft Scope of Work for the Estimation of Copper from Brake Pads Contract (15 min)
   * Draft in progress

4. Update on Air Deposition Monitoring (5 minutes)

5. Update on Timing for the Generation of the Representative Sample of Brake Wear Debris Effort (5 minutes)

6. Anything else?
For BASMAA Member Agency Internal Use Only

TO: Geoff Brosseau & BPP Representation Work Group  DATE: June 26, 2004
FROM: Kelly D. Moran  PROJECT: 16
SUBJECT: Brake Pad Partnership Conference Call—June 24, 2004

The Brake Pad Partnership (BPP) Steering Committee held a Steering Committee teleconference meeting on June 24th. A copy of the agenda is attached. The following people were on the call:

- Sarah Connick (Sustainable Conservation, Project Manager, Facilitator)
- Mark Schlautman (Clemson University, project technical advisor)
- Rodger Dabish (TMD Friction and lead representative of the Brake Manufacturer's Council Product Environmental Committee [BMC/PEC])
- Chris Shepley (Dana Corporation)
- Jim Pendergast (U.S. EPA)
- Kelly Moran (TDC Environmental)

Michael Endicott (Sierra Club), Tim Merkel (formerly of Federal-Mogul Corporation), and Mark Phipps (Federal-Mogul Corporation) were not able to participate in the call.

The following items were discussed:

New Sustainable Conservation Project Manager. Sustainable Conservation has hired Connie Liu to work with Sarah Connick on the Brake Pad Partnership. Connie will eventually be taking over the day-to-day management of the project, but Sarah will continue oversight and meeting facilitation. This staffing change will not have cost implications for the project. Connie’s background includes work in biotechnology and environmental management. Among her relevant experience is work as a consultant for the Navy investigating the release of copper from marine antifouling paint. She has a Master’s degree in Environmental Science from U.C. Santa Barbara.

Air Deposition Monitoring Status. Don Yee reported that dry air deposition monitoring in the Castro Valley watershed is about to begin. SFEI arranged to have Professor Holsen at Clarkson University work with them to do the chemical analysis and dry deposition plate preparation. For the previous SFEI Bay Area air deposition monitoring study Clarkson advised the team on techniques and San Jose did the laboratory work.

Chemical Analysis of Air Deposition Materials. Copper in vehicle brake wear debris is not always fully extracted into solution with the U.S. EPA standard copper measurement method. This was the reason that Professor Schlautman developed the microwave extraction method (the “Clemson method”) to measure copper in brake pad wear debris. Since air deposition samples will contain brake pad wear debris, it is possible that the
standard U.S. EPA copper measurement method will underreport the amount of copper deposited. The Steering Committee wants to use the U.S. EPA standard method so that its measurements are as consistent as possible with the previous San Francisco Bay area air deposition measurements.

To address the potential underreporting of copper deposition, the Steering Committee plans to do a special study on some of the air deposition samples. The study will answer the following questions.

- Is all of the copper being measured?
- If not, what is the actual amount of copper being deposited?

The Steering Committee discussed pros and cons of possible approaches to conducting the special study, with substantial assistance from Professor Schlautman and Don Yee. It decided to ask Clarkson to hold all of the solutions obtained from the U.S. EPA method (the digestion solutions). In the meantime, the two labs will compare the two measurement methods on a test material sample and report to the Steering Committee their findings. The tentative plan is to ask Clemson to use its microwave method to re-digest some of the solutions held by Clarkson, and then to measure copper in the re-digested solutions, comparing it to the Clarkson measurements.

**Extraction Tests on the Representative Sample of Brake Pad Wear Debris.** After learning that ToxScan does not have the microwave equipment to conduct copper measurements in accordance with the “Clemson Method” procedures, the Steering Committee decided to work with Clemson to repeat (using the soon to be generated representative sample of brake pad wear debris) the most important of the extraction tests conducted by Clemson University. The Steering Committee approved the proposed test plan and cost of $7,500.

Other items:

- **Watershed modeling workplan.** U.S. EPA is still working on the draft workplan. It will be available for review after about July 19th.
- **Wear Debris Generation/Aerodynamic Particle Size Diameter Measurements Update.** The BMC/PEC plans to start generation of the representative brake pad wear debris sample and Clemson plans to start aerodynamic particle size diameter measurements next week.
- **Brake Pad Copper Release Estimates Workplan.** The contract with Process Profiles is in process; work should start in the next few weeks. Wear debris will be collected in different fractions for a mass balance.

**Anticipated Next Steps**

The Steering Committee continues to focus on implementing its Action Plan. The upcoming Steering Committee meeting schedule is as follows:

- July 15, teleconference meeting
- August 20, teleconference meeting
- September 2, teleconference meeting
- September 15, teleconference meeting
- September 27, teleconference meeting
- October 20 and October 21, in-person meeting in San Francisco
BPP STEERING COMMITTEE TELECONFERENCE
Thursday, June 24, 11:00 a.m. to noon PDT
Dial: 866-279-1566
Meeting Number: *4762806*

DRAFT Agenda

1. Teleconference agenda review and anything new? (5 min)
   * Connie Liu, New Sustainable Conservation Project Manager for the BPP (see attached resume)
   * New due date for the Watershed Modeling Work Plan: July 19, 2004

2. Update on Air Deposition Monitoring from Don Yee (5 minutes)

3. Air Deposition Monitoring Laboratory Analyses (20 min) -- See attached DRAFT Chem Anal Memo 06-16-04 & attached email from Kelly Moran 06-22-04 (excerpt)
   * Issues in obtaining some secondary analyses using the Clemson method for total copper
   * Issues in obtaining a total mass deposition determination

4. Update on Contract Add-On with Clemson University for Analyses of the Representative Sample of Brake Wear Debris (15 min)
   * Budget estimate (see attached Mark’s proposed budget estimate)
   * Leaching test proposed method (see attached Mark’s proposed budget estimate)

5. Update from Mark Schlautman on Upcoming Aerodynamic Particle Size Measurements (5 min)

6. Update on Contracting for the Estimation of Copper from Brake Pads Contract (5 min)
   * Scheduling initial briefing conversations between Kirsten and Steering Committee members

7. Anything else?