TECHNICAL APPROACH

This section presents the technical approach proposed for this project. The approach is outlined in five tasks as specified in the RFP.

A. TASK 1: IDENTIFY RELEVANT PLANS AND RECOMMEND A SUBSET FOR FURTHER EXAMINATION

In gathering and reviewing relevant plans for this task (PM_{10} SIPs, maintenance plans, natural events action plans), we think it is useful to categorize PM_{10} NAAs into several categories based on the nature of the PM_{10} nonattainment problems. Suggested categories are listed below:

- *Natural Events-Driven NAAs*: these are NAAs whose nonattainment is tied to sources associated with natural events (e.g., windblown dust);
- *Limited Anthropogenic Source-Driven NAAs*: areas where only a limited number (often one) source sector drives nonattainment. These include areas impacted by residential wood combustion, agricultural tilling/cultivation, and/or unpaved roads. Nonattainment tends to occur in only certain seasons;
- *Complex Source-Driven NAAs*: areas such as the SJV have more complex source mixes and have nonattainment problems occurring in multiple seasons; and
- *Urbanized NAAs*: urban NAAs, such as the South Coast Air Basin, have a complex mix of source contributors with heavy contributions from combustion sources (e.g., onroad and nonroad engines). Because of this, plans from this type of NAA may have limited applicability to areas near Class I areas; however, specific control strategies will have applicability.

By categorizing the NAAs into the four types listed above, a representative number of plans from each type of NAA can be selected for further analysis. This is important since certain types of plans will be limited in their coverage of control measures that might be applicable to visibility control. Also, we expect to be able to demonstrate the success of plans implemented in the first two categories above much easier than the last two categories. It will be much more difficult to tie control strategies implemented in the last two categories to specific ambient reductions. However, it will be these two types of areas that offer the most information on a variety of control programs, their effectiveness, implementation issues, etc. The proposed categorization scheme will be revised, as needed, based on comments from the Forum.

Our first step in this task will be to review the studies cited by WRAP in the RFP. In particular, it will be important to gain an understanding of the important local PM_{10} contributors to Class I areas (e.g., from the 1996 In and Near Inventory). We will also review 2002 emissions data that has been uploaded into the WRAP Emissions Data Management System (EDMS) as of about the end of February 2005. Also, team partner ARS will provide insight gained through the AoH project. As part of this work, ARS has gained a clear understanding of the locations and operational histories of IMPROVE monitoring sites throughout the western United States. The National Park Service study is also expected to provide information on local sources and control options.

A good resource that will serve as a starting point for identifying emission control strategies for Class I areas will be a recent listing of PM measures from CARB (CARB, 2004). California Senate Bill 656 required CARB, in consultation with local air districts, to develop and adopt, by January 1, 2005, a list of the most readily-available, feasible, and cost effective control measures to reduce PM_{10} and $PM_{2.5}$. The goal of the bill was to make progress toward attainment of both State and national PM standards. The proposed control measures are based on rules, regulations, and programs existing in California as of January 1, 2004 to reduce emissions from new, modified, and existing stationary, area, and mobile sources. By July 31, 2005, the bill requires CARB and air districts to adopt implementation schedules for appropriate CARB and air district measures. The list compiled by CARB includes control measures for both primary PM, as well as secondary PM sources (e.g., NO_x, VOC, ammonia, sulfur dioxide). Information on the cost effectiveness of each measure is also included.

Secondly, we plan to conduct two tiers of interviews to identify relevant plans. Our first set of interviews will be with SIP contacts at EPA Regions 6, 8, 9, and 10. During these interviews, we will first describe the objectives of this project and then ask the SIP contacts about plans that have an adequate historical record of ambient monitoring data and have demonstrated success in producing ambient PM_{10} reductions. We will also ask these EPA contacts about plans that have good documentation on the types of controls implemented, the effectiveness of these controls, and implementation/enforcement issues encountered (under Task 4, will build upon this information for all of the plans selected under Task 2).

After gaining insight from EPA Regional staff on good candidate plans, we will contact each WRAP State/local air quality department (with PM_{10} NAAs). Our list of State and local contacts will include contacts provided by the WRAP (as mentioned under Task 4 of the RFP), contacts identified by EPA regional offices, previous Pechan contacts, and agency staff directories, as needed. For State SIP contacts, we will conduct similar interviews and identify/request documentation and ambient monitoring data sets that have not been incorporated into standard databases (e.g., EPA Air Quality System or AQS).

From the interviews conducted above, Pechan will compile a list of plans for further examination and submit the list as part of a technical memorandum to the WRAP Project Manager. The list will include information on PM_{10} NAAs that are recommended for further analysis, as well as other PM_{10} NAA plans that were reviewed under this task. This list will be prepared in the form of a table with the following proposed contents:

Plan Name/ Location	PM_{10} NAA Category	Ambient Data	Control Options		
			Source Attribution	Reductions	Implement./ Enforcement
NAA area name/city or county and State	e.g., One of the NAA categories listed above	Adequate data to assess baseline and post control implementation ambient levels?	Adequate information to assess contribution of various source categories (e.g., via emission inventory, receptor modeling, etc).	Documentation of emission reductions for each control option (e.g., control efficiency, rule penetration, rule effectiveness).	Information available on implementation and enforcement issues.

After reviewing the list described above, we will consult with the Forum on a final set of plans for further examination under Task 2. From the EPA Green Book (EPA, 2004), there are approximately 50 PM_{10} NAAs in the WRAP region. After the interviews with EPA regional and State/local air quality staff and assessing the plans by NAA category, we expect that the number of areas with good candidate plans for further analysis under Task 2 will be reduced to 25 to 30. Each of these candidate plans will be identified in the list provided to the Forum. The candidate plans will be further reduced following the work under Tasks 2 and 3 (see discussion under Task 4). After consulting with the Forum on the plans chosen for further analysis, we will begin work under Task 2.

B. TASK 2: SUMMARIZE THE PLANS CHOSEN FOR FURTHER ANALYSIS

After selecting the plans for further analysis from Task 1 in consultation with the Forum, we will develop summaries of each plan as specified in the RFP. The summary for each plan will consist of one to two paragraphs with the following information:

- *NAA Description:* information on the location, size, and geographic settings of the NAA, including a map of the area;
- *PM_{10} Attainment Issues*: description of the severity of nonattainment, seasonality, contributing sources; and
- *PM_{10} Control Measures:* description of control measures implemented and their success.

After summarizing the plans, a more detailed summary for each of the NAA categories will be prepared (e.g., those categories introduced under Task 1 above), which will include example source apportionment data (from inventories or receptor modeling), simple measures of the ambient PM_{10} trends for the NAAs in each category, the types of control measures commonly implemented (effectiveness, implementation issues), the number of plans that have adopted these control measures, and their potential applicability to control of regional haze pollutants from Class I area local sources. The summaries from this task will be delivered to the Forum in a Technical Memorandum. This Technical Memorandum will serve as an appendix to the final report developed under Task 5.

In addition, any additional ambient data not obtained during Task 1 that have been identified under this task will be provided to ARS for use under Task 3. These ambient data will include those not available from other more readily-available sources [e.g., EPA's AQS, archived data from the VIEWS website]. Note that the final list of plans for in-depth review will be reduced from the initial list under Task 4. This final list will be constructed following a review of the data above, plus a review of the available ambient data under Task 3 below.

C. TASK 3: ANALYSIS OF AMBIENT PM_{10} DATA

One method to be used is to assess the approach, success, and limitations of an implemented PM_{10} control measure is to analyze the historical PM_{10} record. The trends in PM_{10} data before and after the implementation of a strategy can be a key descriptor of the actual or anticipated success of the strategy. The existence of supportive PM_{10} archives at representative monitoring sites will be a contributing factor to the selection of the final set of plans as described in Tasks 1 and 2. Once the plans are defined, analysis of the PM_{10} data will be performed. These analyses will define the relationships among PM_{10} trends, emission trends, emission reductions, and implemented strategies. The following subsections describe the anticipated data sources and analysis types that will be applied in this evaluation effort.

1. Compile PM_{10} and Supporting Data

In order to select the 25-30 plans for further analysis under Task 1, it is necessary to understand which, if any, NAA has sufficient ambient PM_{10} data for analyzing trends. For instance, some areas may have poor data quality, or the main site of interest may have been relocated, or data capture may be poor. Moreover, areas with daily or hourly data will be preferable over areas with less frequent sampling schedules. The interviews with EPA and state officials may not provide definitive information for each NAA regarding the type and quality of the available data. Therefore, ARS will provide support in this task to Pechan's assessment under Task 1, as needed, to determine the adequacy or quality of ambient PM_{10} data for purposes of selecting the best 25-30 areas for further analysis. This may include, for example, a review of supplemental data (as described below) or the data available in the AQS and VIEWS databases.

ARS will compile relevant PM_{10}, speciated $PM_{2.5}$, and other supporting data from monitoring sites that fall within the area of influence for the plans selected in Task 2. The following will be the primary sources of particulate data for use in this project:

EPA AQS - EPA managed historical national air quality data archive contains PM_{10} data operated on national monitoring schedules, data collected by continuous PM_{10} samplers (TEOMs, BAMs, etc.), EPA speciated data collected by $PM_{2.5}$ speciation samplers and supporting air quality and meteorological data. Data are generally collected by State agencies, tribes, counties, municipalities, regional organizations, and Federal agencies. Data types will include:

- PM_{10} mass - generally averaged over a 24-hour or hourly period. Data records at some sites can extend over 20 years.

- Speciation - limited $PM_{2.5}$ speciated data sets from speciation samplers in recent years.

IMPROVE - Archives on the VIEWS Web site include PM_{10} mass measurements from IMPROVE Module D and speciated $PM_{2.5}$ data for elements, ions, and carbon. These 24-hour average data are now taken every third day and historically were taken on Tuesdays and Saturdays at sites representative of Class I areas.

Supplemental Data - Sources of supplemental data will include:

- Government agencies or programs who do not submit their data to EPA AQS (such as the EPA CASTNet program). Some of these data sets may be available on the VIEWS Web site.
- Permit Monitoring - Data collected and submitted to State agencies to define pre- or post-construction air quality as required to obtain a permit or verify permit conditions.
- Special studies that characterized conditions in, near, or important to a Class I area over limited time periods. These studies could include visibility special studies (SCENES, BRAVO, WHITEX, Mt. Zirkel, GRBVS, etc.), urban or regional studies (NFRAQS, Phoenix-Tucson Urban Haze, etc.), or university or government agency research.

Most supplemental data will be of short duration (approximately one year) but could include concentrated spatial sampling, frequent measurements, and speciation data.

2. Data Analyses

Data analyses will be performed to broaden the understanding of PM_{10} trends as they relate to each selected plan. The specific analysis methods that will be applied will depend on the selected plans, NAA type, available data, and existing analyses. The analysis process will be comprised of four steps as described below.

a. Review Existing Analyses

It is likely that some data analyses already exist for the final selected plans. For example, the NPS, IMPROVE, WRAP (Air Monitoring and Reporting Forum; Sources In and Near Class I Areas Forum; Dust Emissions Joint Forum), and others have analyzed particulate data sets related to air quality impacts in Class I areas. These analyses could range from annual or multi-year data summaries provided by a State agency or national monitoring program to a detailed report prepared for a comprehensive special study. A search and review of existing analyses will be performed before an analysis approach is prepared for each selected plan area. Existing analyses may provide directly applicable results or provide a promising analytical method for further analyses.

b. Prepare Analysis Approaches

An approach shall be prepared for review and approval by the Forum to determine a simple measure(s) of PM10 trends in each of the 25-30 areas selected for further analysis in Task 2. These results will be used in the Task 2 deliverable summarizing the plans in each NAA category

and their apparent effectiveness. These results will also be used to select the 10-12 areas for more in-depth analysis.

For each of the 10-12 areas selected for more in-depth analysis, ARS will prepare for review and approval by the Forum an analysis approach based on available PM_{10} data, supplemental data, existing analyses, emissions data, control strategy, implementation records, and all other available information. Each approach will outline the most appropriate methods to determine and explain PM_{10} trends relative to the selected areas and implemented control strategies. An analysis approach will be completed for each of the final plan areas selected under Task 4 below.

c. Determine PM_{10} Trends

Trends analyses will be applied to understand the historical variations in PM_{10} concentrations. The focus of individual analyses will include some or all of the following:

- Annual average and seasonal concentrations
- Peak concentrations
- Species-specific annual and seasonal concentrations

A variety of trends methodologies exist. Determination of the most appropriate method can be a challenge because the definition of a trend is not always clear. The actual PM emissions vary over time, and emission inventories have uncertainties. Weather and climate variations also affect PM transport and dispersion. The most appropriate statistical methods to be applied will depend on the data set, analysis approach, and sensitivity desired. Trends methods that will be considered include:

- Simple linear regression - most useful as an indicator, especially when using small data sets.
- Thiel method - based on linear regression, but does not let outliers unduly affect the reported slope (used by IMPROVE and EPA for determining air quality trends).
- Mann-Kendall trend determination - useful for detecting if a positive or negative trend likely exists and can be used on small data sets.

An example trend analysis graphic using a linear regression to determine the trend slope and a Mann-Kendall test to determine trend significance is provided as Figure 1.

For the 25-30 areas summarized in Task 2, a simple measure(s) of PM10 trends will be provided. For the 10-12 areas analyzed in-depth in Task 4, additional trends analyses (e.g., using more sophisticated methods and/or other sources of data) will be employed as necessary to verify the trends and/or explain their causes.

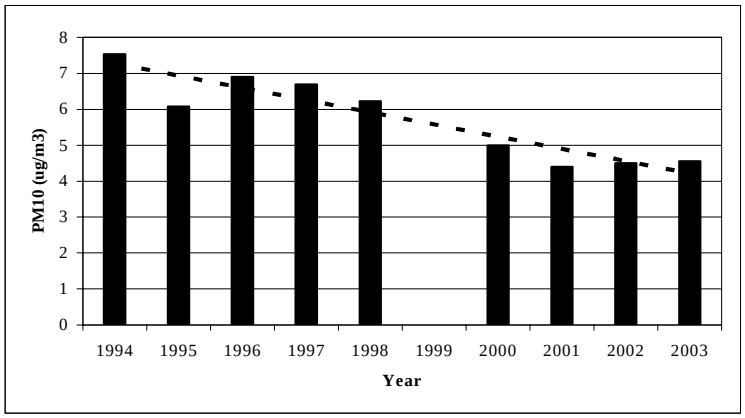
d. Explain PM_{10} Trends

Identifying the existence or lack of a trend in PM_{10} will only be the first step in an analysis. Relating identified trends to a cause or causes is critical to the interpretation of the data relative to regulatory, economic, or natural events. The initial trends results will be interpreted and

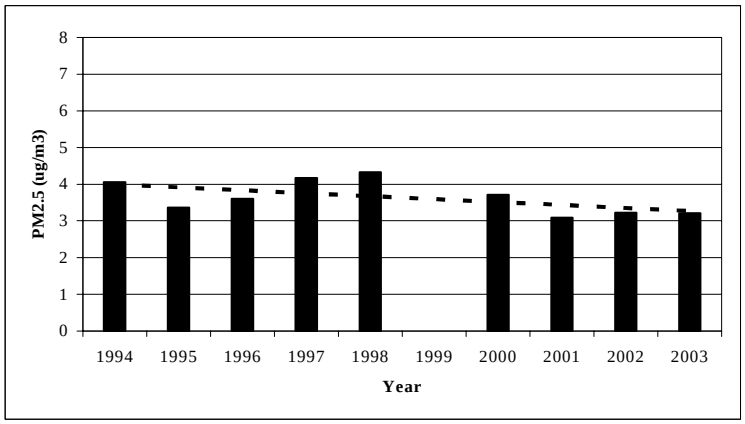
refined as necessary to identify and explain relationships among:

- Emissions and emission reductions - including long term emission trends, emission events (i.e., wild fires or nearby construction), changes in source types, economic transitions, and other relationships depending on the chosen plan area and available information.
- Control strategies - The timing and implementation of strategies to reduce PM_{10} emissions may relate to reduced PM_{10} concentrations.
- Changes in dominant particulate species - Though speciated PM_{10} data are rare, speciated $PM_{2.5}$ data are readily available for most Class I areas and many urban areas. An assessment of the $PM_{2.5}$ fine mass species may provide, under certain circumstances, insights into composition of the PM_{10} mass (fine mass, less than 2.5 : m, plus coarse mass, from 2.5 to 10 : m). For example, if analysis of long-term $PM_{2.5}$ speciated data shows a continuing reduction in vegetative burning species (i.e., K and OC) and a similar trend in collocated PM_{10} measurements is also apparent, it is possible that the reduced PM_{10} concentrations are also due to a reduction in vegetative burning. This relationship may work well for vegetative burning particulates, but would not be appropriate for species that exist primarily in the fine range (such as sulfate aerosols).

Figure 1
Long-Term Trends in PM_{10} and $PM_{2.5}$ Concentration
Class I Wilderness Area in the Pacific Northwest
1994 - 2003



Trend Slope[1] (ug/m3 per year) =	-0.34
Trend Significant[2] =	YES



Trend Slope[1] (ug/m3 per year) =	-0.08
Trend Significant[2] =	NO

1. Trend slope based on a simple linear regression of the data.

2. Trend significance based on Mann-Kendall analysis at the 10% significance level ("Yes" indicates there is less than a 10% probability of no trend; "No" indicates there is greater than a 10% probability of no trend).

- Weather or climate patterns - Changes in short- to long-term patterns may affect PM_{10} emissions and corresponding ambient concentrations. For example, abnormally high summer PM_{10} values in an area that experienced drought, high temperatures, and high winds may indicate an increase in wind-blown dust. Climate information and even dust alert data are available and can be obtained to investigate and explain anomalies or trends as needed.

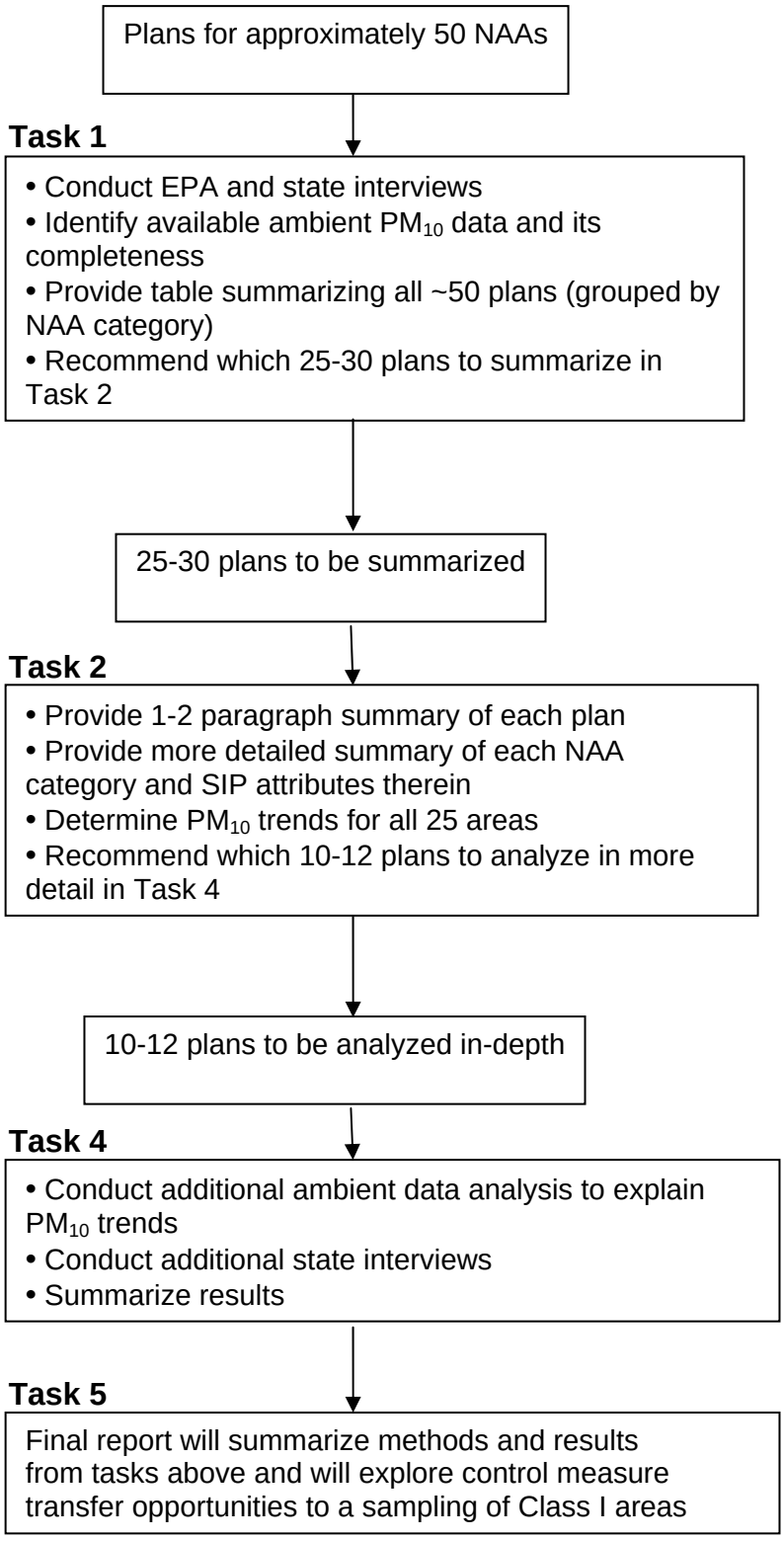
For the 10-12 areas analyzed in-depth in Task 4, additional trends analyses, timelines, regression analyses, chemical mass balance, source apportionment, and other techniques will be applied as appropriate to analyze and explain the interaction among collected data, control strategies, and other influencing parameters. Note that not all sites will exhibit trends, and reasons for certain trends and anomalies may not be discernable from available information.

The analysis performed for each selected plan will yield as much empirical information as possible to quantify the effectiveness of implemented control strategies. The analyses will also explain the uncertainties and interferences in the data to provide a level of confidence in the results. Finally, the analyses will indicate how ongoing data collection and analyses could be enhanced to track the progress of implemented strategies or future control efforts.

Throughout the analysis effort, the project team will work closely with the Forum members, agencies responsible for the selected plans, monitoring organizations, other WRAP forums, other RPOs, and other identified parties to best find, analyze, and interpret available data.

D. TASK 4: INTERVIEW STATE AND LOCAL OFFICIALS

The first step in this task will be to review and synthesize the information generated under the first three tasks for each selected area. We expect that, following a review of the data from Tasks 1 through 3, the number of plans that will be selected for in-depth coverage in the final report will be reduced to approximately 10-12. This reduction in the number of plans will occur for a variety of reasons. For example, some plan areas may not have an ambient data record that shows definitive trends in PM_{10} levels that can be tied to implemented control measures. Other areas may not have fully implemented their control programs until recently. Some plans will drop out of further analysis because they have many common elements with other plans for a given NAA category. Pechan will provide the final list of areas to the Forum for comment. Once the final list has been selected, ARS will complete the ambient monitoring data analysis for each area under Task 3. A flow chart showing how the original number of plans covering 50 NAAs will be reduced to the final set of 10 to 12 is shown in the following flow chart:



Note: Task 3 occurs concurrently and in support of the other tasks.

Figure 2. Flow Chart for Selection of Plans for Detailed Review

After synthesis of the data above, we will conduct another round of interviewing with State/local officials associated with the plans that we plan to cover in-depth in the final report. During these interviews, we will seek to fill knowledge/data gaps identified in our review of the data. In addition to filling these gaps, our overall objective for these interviews is to learn more about the success and limitations of the selected plans in achieving PM reductions.

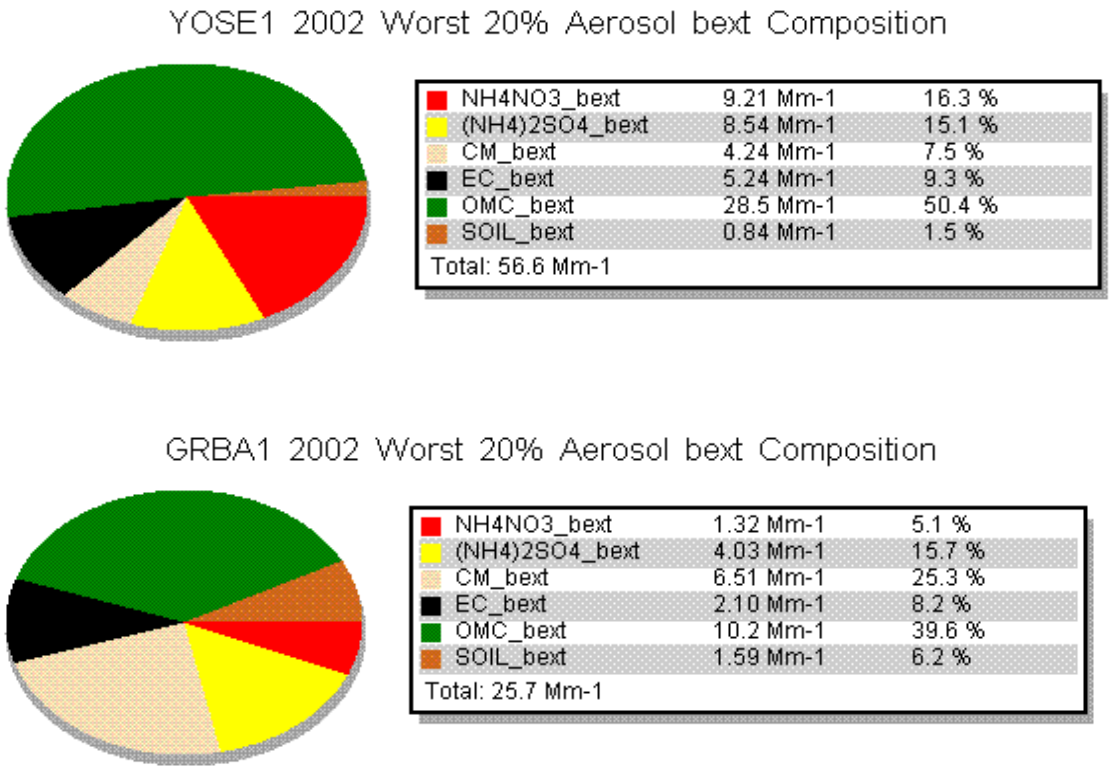
We expect that questions will remain for the final subset of selected plans in regard to the success of the PM_{10} control program. As an example, some SIP documents may not provide information on the real-world success of control measures that were to be implemented when the plan was written. We also expect that there will also be questions that arise from the review of the ambient monitoring data and a comparison against the time line for implementation of PM_{10} controls. Additional questioning of the State contacts will be needed to explain anomalies observed in the ambient data analyzed under Task 3 (e.g., episodic events that triggered high ambient PM levels, meteorological conditions that lead to much higher or lower ambient levels than expected for certain seasons/years). Information gathered during this task will be documented in the Final Report developed under Task 5.

E. TASK 5: REPORTING AND PROJECT MANAGEMENT

Under this task, Pechan and ARS staff will take part in monthly teleconferences with the forum, prepare monthly progress reports, and provide any other updates requested by the Forum. We will prepare a final report summarizing the purpose and methods for this project, results of each task, and a discussion of the applicability of PM_{10} plans to visibility control in Class I areas. After comments have been received from the Forum on the draft Final Report, we will incorporate changes and deliver the Final Report.

As mentioned under Task 1, based on feedback from the Forum, we anticipate framing the discussion of SIP Plans in the report based on the different categories of PM_{10} NAAs. For example, based on a review of visibility monitoring data, we may find that control measures adopted to control PM_{10} from geogenic sources will not provide reasonable visibility control in some Class I areas. This issue is exemplified in Figure 3, which shows pie charts of aerosol

Figure 3. 2002 Composition of Visibility-Impairing Aerosol at Yosemite and Great Basin National Parks



composition contributing to 2002 visibility impairment at Yosemite and Great Basin National Parks (VIEWS, 2004). The top chart shows that geogenic sources (primarily soil and coarse material or CM) in Yosemite NP contribute less than 10% to visibility impairment on average during the worst 20% of impaired days during 2002. On the other hand, large contributions are made from sulfates, nitrates, and organic carbon. Combustion sources are the prime contributors for these species. For Great Basin NP, the contribution from geogenic sources appears to be much more significant (on the order of 30%, soil + CM; see Figure 2), so PM_{10} control measures targeted to control sources of these species are applicable.

In the final report, Pechan and ARS will explore the control measure transfer opportunities for demonstrated PM_{10} measures to visibility control in a sampling of Class I areas in the west. These Class I areas will be selected to represent a variety of aerosol compositions contributing to the worst 20% days of visibility impairment. Control measures identified in the NAA plans and other data sources reviewed under Task 1 will then be identified in a summary table and linked to each PM species contributing to visibility impairment. Although WRAP specified in the kick-off meeting for this project, that the review of control measures should be targeted to direct PM sources (non-industrial), we feel that it is important to present information to SIP regional haze planners on the contributions from secondary PM sources where they are found to be significant in the analyses performed for this project. While this information will not include comprehensive data on secondary PM sources and control measures, we will include citations for this type of information.

A suggested outline for the Final Report is as follows:

I. Introduction - *Summarize the Project Objectives;*

II. PM_{10} Plans Selected for Analysis - *Summary of Tasks 1 and 2 (Technical Memorandum incorporated as an Appendix to the Report);*

III. Review of Ambient Monitoring Data for Selected Areas - *Summary of analysis conducted under Task 3*;

IV. Assessment of the Success and Limitations of PM_{10} Plans for Visibility Control in the WRAP Region - *Synthesize the control plan and ambient monitoring data analyses conducted in Tasks 1 - 4; Show examples of areas by PM NAA category that have successfully reduced ambient PM_{10} concentrations; Explore the contributors to visibility reduction in the WRAP region and control measures identified in selected plans and other reference sources; provide links to information sources for control measures covering secondary sources of PM.*

V. References

Appendices - *Task 2 Technical Memorandum, ambient monitoring data charts and figures, CARB list of PM control measures, STAPPA/ALAPCO measures, etc.*

F. REFERENCES

CARB, 2004. *Staff Report - Proposed Measures to Reduce Particulate Matter - PM_{10} and $PM_{2.5}$*, California Air Resources Board, October 2004.

EPA, 2004. *EPA Green Book - Currently Designated Nonattainment Areas for All Criteria Pollutants*, U.S. EPA, http://www.epa.gov/oar/oaqps/greenbk/ancl.html, accessed December 2004.

Pechan, 1994. *Development of the OPPE Particulate Programs Implementation Evaluation System*, Final Report, prepared by E.H. Pechan & Associates, Inc., prepared for EPA Office of Policy, Planning and Evaluation, September 1994.

VIEWS, 2004. Data downloaded from the VIEWS website: http://vista.cira.colostate.edu/views/. accessed December 2004.

STAFFING PLAN

Pechan's Project Manager for this contract will be Mr. Stephen Roe. Mr. Roe has 19 years of experience in process engineering, environmental management, and air quality consulting. He manages Pechan's El Dorado, CA office east of Sacramento. Mr. Roe's air quality experience includes many projects in emissions inventory development, control strategy analysis, and related policy development support. He has supported EPA Region IX, the States of Pennsylvania and Arizona, Spokane County, WA, and the San Joaquin Valley Air Pollution Control District in the development of Federal or State Implementation Plan technical analyses. He has provided support to the U.S. EPA on a number of control measure research assignments covering all criteria pollutants and toxic air pollutants. He also managed a contract to update CARB's database on point source air pollution controls (covering criteria and toxic air pollutants). Recent projects include technical support to the MANE-VU and CENRAP RPOs in the development of their base year regional haze modeling inventories. Mr. Roe has authored or co-authored numerous technical and guidance documents for EPA, RPO, State/local agencies, as well as other public and private sector clients.

As Project Manager, Mr. Roe will be the Forum's primary point of contact for all work conducted under this contract. He will personally conduct the interviews with EPA regional staff and many of the State and local contacts under Tasks 1 and 4. He will oversee all of the technical work conducted under this project, including the Task 3 work conducted primarily by ARS. He will work directly with the ARS staff to conduct the ambient monitoring data analyses under Task 3 and to synthesize these analyses with the SIP plan summaries and control measure assessments under Task 5.

Mr. Roe will receive technical support from Mr. Jim Wilson, Ms. Holly Lindquist, Dr. Ying Hsu, and Ms. Maggie Ma. Mr. Wilson, Pechan's President, will provide a quality assurance review of each deliverable under this contract. Ms. Lindquist will assist in gathering and reviewing plan documents under Tasks 1, 2, and 4. Dr. Hsu will provide assistance in reviewing plan documents under Tasks 1, 2, and 4. He will also assist in the review of ambient monitoring data analyses

under Task 3. Ms. Maggie Ma will assist in gathering plan documents, document review, and geographic information systems support. Resumes for all technical staff are provided in Section VI. Mr. Roe will receive contracts administration support from Ms. Kathleen Aguilar.

Mr. Roe will also receive technical support from ARS staff under Tasks 3 and 5. Mr. Joe Adlhoch has over 10 years experience in managing and performing visibility-related monitoring and analytical contracts. He will be the primary ARS contact for Tasks 3 and 5. He will manage ARS' effort and perform or supervise the technical work. He will be present at teleconferences, if needed by Mr. Roe, and will assist in report preparation. Mr. Adlhoch is currently the principal investigator for the WRAP AoH Project, served as the principal investigator for the visibility-related SAMI and VISTAS projects, and has led analytical efforts for a number of State and tribal contracts. His resume is provided in Section VI.

Mr. Adlhoch will be assisted by Ms. Cassie M. Archuleta. She will support technical aspects of the information and data collection, data analysis, and reporting components of Task 3. She is currently working on the WRAP AoH Project and serves as the lead scientist for the Wyoming gaseous and visibility monitoring network. Her resume is provided in Section VI.

Table 1 provides the hours by task for each of the staff proposed for this project. Table 2 provides the schedule of deliverables and milestones for this project.

Table 1. Project Staffing by Task

Staff	Hours by Task					
	1	2	3	4	5	Total
S. Roe	60	60	16	40	32	**208**
J. Wilson	2	2	0	2	4	**10**
Y. Hsu	0	0	0	40	0	**40**
H. Lindquist	80	68	0	60	16	**224**
M. Ma	40	80	0	20	8	**148**
J. Adlhoch	0	0	60	0	20	**80**
C. Archuleta	0	0	175	0	40	**215**
K. Aguilar	0	0	0	0	8	**8**
Clerical	8	8	0	8	16	**40**
Total	**190**	**218**	**251**	**170**	**144**	**973**

Schedule of Deliverables and Milestones

Task	Description	Date
1	- Conduct Interviews with EPA Regional, State, and Local Agency Staff; - Provide Technical Memorandum with List of Summarized Plans and Areas Selected for Further Analysis.	1/5/05 - 3/09/05 3/16/05
2	- Provide Summary of Selected Plans Technical Memorandum.	4/13/05
3	- Gather Ambient Monitoring Data from Standard Sources and State/Local Contacts for Selected Areas; - ARS Provides Results of Data Analysis to Pechan.	2/28/05 - 3/21/05 4/29/05
4	- Conduct Second Round of Interviews with Selected State/Local Staff; Synthesize Data from Tasks 1 through 4.	5/02/05 - 5/23/05
5	- Monthly Conference Calls (to be arranged with the WRAP Project Manager); - Deliver Draft Final Report; - Incorporate Revisions and Deliver Final Report.	Monthly 6/02/05 6/30/05