



**Western Regional Air Partnership (WRAP)
Regional Modeling Center (RMC)**

**Monthly Progress Report
for October 2004**

Prepared by

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Introduction

This is the October 2004 Monthly Progress Report that covers the activities of the Western Regional Air Partnership (WRAP) Regional Modeling Center (RMC).

Background

The WRAP RMC is composed of staff from the University of California, Riverside (UCR), ENVIRON International Corporation, and the University of North Carolina/Carolina Environmental Program (UNC/CEP). The Principal Investigator and Project Manager for the RMC is Dr. Gail Tonnesen of UCR (tonnesen@cert.ucr.edu). Mr. Ralph Morris (rmorris@environcorp.com) and Mr. Zac Adelman (zac@unc.edu) lead the RMC efforts at ENVIRON and UNC/CEP, respectively. The RMC is the contractor for meteorological, emissions, and air quality modeling and analysis performed for WRAP region states and tribes to provide the analytical results needed to address the requirements of the EPA Regional Haze Rule.

Responsibilities of the RMC include:

- Meteorological modeling
- Emissions processing and modeling
- Air quality and visibility modeling simulations
- Analysis, display, and reporting of modeling results
- Storage/quality assurance of the modeling input and output files

More details on the WRAP 2004 activities can be found in the WRAP RMC 2004 work plan that is available on the WRAP RMC web site:

http://www.cert.ucr.edu/aqm/308/reports/RMC_2004_Workplan_Final_Version_03_01_04.pdf

The WRAP Technical Coordinator (Mr. Tom Moore) and Co chairs of the WRAP Modeling Forum (John Vimont of the National Park Service, Mary Uhl of the New Mexico Environmental Department, and Kevin Briggs of the Colorado Division of Public Health and Environment) provide day-to-day oversight of RMC activities, and the Modeling Forum oversees the activities of the RMC through regular biweekly conference calls, topical conference calls, and periodic in-person meetings and workshops.

The WRAP is one of five Regional Planning Organizations (RPOs) consisting of states, tribes, federal and local agencies, and stakeholders charged with the responsibility for conducting technical analyses and assisting in the development of State Implementation Plans (SIPs) and Tribal Implementation Plans (TIPs) for regional haze in different areas of the U.S.

The WRAP RMC 2004 work effort, described next, has focused on developing the modeling analysis needed to develop the §308 Regional Haze SIPs and TIPs due in 2007/2008.

Overview of WRAP RMC 2004 Work Effort

The WRAP RMC 2004 work efforts have focused primarily on developing a 2002 annual air quality modeling database that can be used to simulate visibility impairment in the western U.S. The WRAP visibility modeling system consists of the Sparse Matrix Operator Kernel Emissions (SMOKE) emissions model, the Mesoscale Model version 5 (MM5) meteorological model, and the Community Multiscale Air Quality (CMAQ) model. The WRAP modeling domain consists of a continental U.S. 36-km domain and a western U.S. 12-km domain. The WRAP RMC modeling efforts also include analysis of specific topics to support the other WRAP forums. In addition, the WRAP 2004 RMC activities include preliminary visibility modeling for Alaska, a WRAP state whose size and remoteness from the other states make it inefficient to include with the other states' modeling domain. The WRAP 2004 RMC work effort as laid out in the 2004 work plan is divided into 13 tasks, listed below. Note that Task 8 is not covered in this report because it did not receive funding for 2004. Also note that because the WRAP 2003 ammonia emissions modeling update activities were still gathering data at the end of 2003, the remaining funding in the 2003 budget was rolled over to 2004 and the work is presented as Task 0.5.

- Task 0.5: 2002 Ammonia Emissions Inventory for WRAP Region
- Task 1: Project Administration
- Task 2: Test, Improve, Quality Control, Obtain External Peer Review, and Finalize 36-km and 12-km MM5 Simulations for Eventual Use in CMAQ
- Task 3: 2002 Base Year Emissions Modeling, Processing, and Analysis
- Task 4: Air Quality Model Evaluation for 2002 Annual Simulation
- Task 5: Preparation and Reporting of Geographic Source Apportionment Results
- Task 6: Further Analysis of Model Performance in Regard to the Contribution of Natural Emissions to Visibility Impairment
- Task 7: Evaluation and Comparison of Alternative Models
- Task 8: Improvement of WRAP Spatial, Chemical Speciation, and Temporal Allocation Profiles (*not funded*)
- Task 9: Testing and Further Improvements to the Windblown Dust Emissions Modeling Methodology
- Task 10: Continued Improvement to Model Evaluation Software
- Task 11: Sensitivity Studies Designed to Evaluate Uncertainties in Fire Emissions
- Task 12: Preliminary Meteorological, Emissions, and Air Quality Modeling Activities for Alaska
- Task 13: Training Courses for the WRAP States and Tribes

October 2004 RMC Progress

Below we discuss, by task, our progress during this monthly reporting period (October 2004) and the expected activities during the next monthly reporting period (November 2004). We also describe any difficulties encountered and their resolutions.

Task 0.5: 2002 Ammonia Emissions Inventory for WRAP Region

Purpose:

To review current ammonia emissions generation techniques and develop a GIS-based ammonia emissions model.

Progress During This Reporting Period:

Prior to October we developed a 2002 emissions inventory and submitted a draft report on its development. No additional work was performed during October, as we are waiting for the revised 2002 MM5 meteorological data.

Expected Progress During the Next Reporting Period:

We expect to complete revised 36-/12-km MM5 simulations by the end of 2004, at which time the 2002 ammonia emissions will be updated.

Difficulties Encountered and Resolutions:

Not all data were available for ENVIRON to complete the 2003 WRAP RMC ammonia emissions update project. Consequently, \$28,285 in ENVIRON's 2003 WRAP RMC budget was rolled over into the 2004 budget to complete this project.

Task 1: Project Administration

Purpose:

To manage the WRAP RMC activities, participate in WRAP conference calls, attend WRAP meetings, and prepare project status reports.

Progress During This Reporting Period:

General Activities:

UCR, ENVIRON, and UNC/CEP participated in numerous conference calls and administrated the 2004 WRAP RMC work effort. Monthly conference calls included the biweekly WRAP Modeling Forum calls, the WRAP Emission Inventory calls, and WRAP RMC Project Management calls. Each contractor also prepared monthly progress report text and invoices.

The RMC team added Jeanne Eichinger from UNC/CEP to help with the documentation and scheduling requirements of the project. Jeanne's participation will greatly enhance the WRAP project administration. She will edit and enforce documentation schedules for the project's monthly progress reports and annual interim and final project reports, and will participate in conference calls and summarize important action items from the calls in emails.

The RMC team also transferred more reporting responsibilities to ENVIRON, with Ralph Morris and Greg Yarwood writing major sections of reports and assisting in the interpretation of results.

Data Transfer:

- UCR is working with Air Resources Specialists (ARS) to provide source attribution results in a format that can be used by ARS.
- UCR also recommends initiating a new activity. We plan to develop software to convert CMAQ and SMOKE IO/API files into the ArcGIS format to facilitate data transfer to other contractors, states, and tribes. This was not originally a planned activity, but the PI believes it is an important priority, and recommends that UCR support a part-time graduate student in November to work on this task.

Computer Systems Administration:

Tasks that required significant effort during October include the following:

- The RMC purchased and benchmarked on the base 36-km domain a new, inexpensive dual-CPU Athlon system; this system costs about 40% less than the dual-CPU Opteron systems. Benchmarking will be completed in November for 12-km and source attribution model simulations so that we can recommend the most cost-effective hardware configuration to states and tribes.
- We experimented with new operating systems to allow disk systems larger than 2 TB to be used with Linux.
- We finally received replacement drives for a serial ATA RAID5 system. Western Digital replaced the original set of drives with an “Enterprise” version that should be more reliable for RAID5 use.
- We conducted routine maintenance and repairs of computer systems. One item of note: We have inexpensive RAID5 disk systems housed in our compute nodes that were used for primary storage early in the project and are used for backup storage now. These RAID5 systems are gradually being lost due to catastrophic failures and are no longer useful for archiving data.
- We updated the project web page as needed.

Expected Progress During the Next Reporting Period:

During November we intend to start holding the WRAP Modeling Forum conference calls monthly instead of biweekly. We will also revise the monthly progress report format/content to provide more information. We will perform additional performance benchmarks on the Athlon and Opteron systems with the Tagged Species Source Attribution (TSSA) CMAQ jobs to determine which system is most cost effective for regional haze modeling. We plan to purchase and install a high-speed gigabit ethernet switch that might resolve some of the input/output errors and CPU communication errors that we have encountered.

Difficulties Encountered and Resolutions:

Addressing the WRAP Modeling Forum cochairs’ criticism of the reporting functions of the RMC, we revised the project administration plan to include a technical editor to help maintain

the project schedule and meet reporting requirements. The cochairs also requested that more detail be included in the monthly progress reports, and that more timely and detailed technical documentation be maintained for the project. With the addition of Ms. Eichinger to the RMC team, we are making efforts to revise the RMC's scheduling and documentation functions so that they are consistent with the requests made by the cochairs.

UCR continues to have problems with parallel CMAQ jobs crashing due to CPU communication errors. We plan to test more expensive, higher-speed gigabit switches in November to attempt to resolve this problem. We are also having difficulties with a new server and SCSI card that we are still working to resolve. We plan to purchase a backup server so that work is not interrupted when a primary server crashes.

Task 2: Test, Improve, Quality Control, Obtain External Peer Review, and Finalize 36-km and 12-km MM5 Simulations for Eventual Use in CMAQ

Purpose:

To perform MM5 modeling for 2002 on the 36-km Inter-RPO continental U.S. grid and a 12-km western U.S. WRAP grid.

Progress During This Reporting Period:

We documented the results of the MM5 sensitivity modeling from previous reporting periods in a draft report, "2002 Annual MM5 Simulation to Support WRAP CMAQ Visibility Modeling for the Section 308 SIP/TIP: MM5 Sensitivity Simulations to Identify a More Optimal MM5 Configuration for Simulating Meteorology in the Western United States" (dated September 10, 2004), which was submitted to the WRAP. This report was sent out for peer review. Based on some preliminary responses from the peer reviewers, during October we performed some additional MM5 sensitivity tests to investigate two model configuration issues they raised.

- (1) Use of four-dimensional data assimilation (FDDA) analysis nudging of surface temperature variables in MM5: We further reviewed MM5 recommendations and concluded that, although improved MM5 model performance is seen using surface analysis temperature nudging, instability may be introduced into the model, so we agree with the peer reviewer that nudging should be removed in the final MM5 WRAP configuration.
- (2) Use of the Betts-Miller convection scheme with a grid resolution less than 30 km (i.e., 12 km): The MM5 documentation recommends not using the Betts-Miller (BM) empirical convection parameterization with grid resolutions less than 30 km. The 12-km grid resolution is a "gray area" of crossover between parameterized versus explicit convection in MM5, so all parameterizations may be inappropriate. We will therefore perform further tests using the BM and Kain-Fritsch convective parameterization at 12 km. If better model performance continues to be exhibited using the BM scheme, it will be retained for the best and final WRAP MM5 model configuration.

Expected Progress During the Next Reporting Period:

We will wait for results from the peer reviewers and then address their comments. We will also

begin performing the revised 2002 MM5 36-/12-km simulation using the best and final configuration.

Difficulties Encountered and Resolutions:

The initial 2002 MM5 simulation exhibited performance problems in the western U.S. that need to be addressed. We performed numerous MM5 sensitivity simulations that improved MM5 performance somewhat, but performance problems persist. In August the WRAP approved transferring an additional \$20,000 from the training task (Task 13) to Task 2 so that additional MM5 sensitivity simulations could be performed and a better-performing configuration identified. The additional MM5 model sensitivity simulations have been completed and we are waiting for comments from peer reviewers.

Task 3. 2002 Base Year Emissions Modeling, Processing, and Analysis

Purpose:

To extend the work completed on the interim 2002 inventory by integrating the missing emissions sources into the modeling; to assimilate the results of applying the new analysis tools and QA plan for improving the emissions modeling process; and to integrate the final 2002 emissions inventories into a base 2002 emissions data set.

Progress During This Reporting Period:

We continued to simulate, QA, and improve emissions case Pre02d. We also completed a series of fire sensitivities and a nonroad mobile diesel emission sensitivity. We made the following changes and/or updates to emissions case Pre02d during October:

- (1) We added three new fire inventories to case Pre02d for anthropogenic and natural prescribed fires, and 2002 wildfires. In adding these sources, we had to add cross-referencing information for the new Source Classification Codes (SCCs) representing these sources to the temporal and chemical allocation input files used by SMOKE.
- (2) We split the fugitive dust sources out of the area-source inventory and processed them as a separate emissions category. The motivation for treating fugitive dust explicitly is to have the flexibility to improve these emissions separately from the rest of the area-source inventory if new information becomes available in the future.
- (3) We corrected the SMOKE inputs based on different QA/QC steps that we completed in October. These corrections included adding SCC descriptions for SCCs previously not defined, and adding cross-references for sources that had been assigned default spatial, chemical, or temporal profiles. The details of these corrections and additions will be documented in the 2004 final project report.
- (4) After waiting since the beginning of 2004 for the latest Canadian point-source inventory, we decided to move forward with the stationary-point-source processing so that we can complete this simulation during 2004. We processed the annual 2002 stationary-point-source simulation using the 1995 Clear Skies Canadian point-source inventory that we have been using since the §308 modeling for 1996 and 2018.

- (5) With the completion of the point-source simulation, we are now creating annual CMAQ-ready emissions for every source category.
- (6) We reprocessed the biogenic emissions using updated emissions factors from EPA. We upgraded to version 0.98 of the biogenic emissions factors for BEIS 3.12.

We created emissions cases Pre02e and Pre02f for assessing the impacts of the new fire inventories on CMAQ performance. Both of these simulations are based on emissions case Pre02b, which had no fires simulated in the WRAP region at all. Case Pre02e adds natural prescribed fires and natural wildfires; case Pre02f adds all new fires in the prescribed and wildfire categories, in addition to the previously created agricultural fire inventory. Comparing case Pre02e with case Pre02b will illustrate the effects of naturally occurring fires in the WRAP region. Comparing case Pre02f with case Pre02c will illustrate how the new fire inventories affect model performance relative to the older fire inventories.

We also created emissions case Pre02c_36s01 for testing the effects of the nonroad diesel engine emissions retrofit program on emissions estimates. The WRAP Economic Analysis Forum worked with the RMC to produce an input file to SMOKE that will create an emissions simulation for testing the effects of the nonroad diesel retrofit program on emissions levels in the WRAP states of Arizona, North Dakota, and Montana. The file, created by an Economic Analysis Forum contractor in conjunction with CEP, defined control factors by Federal Implementation Planning Standards (FIPS) code and SCC for these three states. During October we completed a two-month-plus-two-week emissions simulation using these control factors.

To facilitate analysis of the emissions inventories, CEP worked with the WRAP Modeling Forum contractor Air Resources to supply a comprehensive summary of the WRAP emissions for case Pre02d. CEP generated emissions summaries for the WRAP region by grid cell for every source category (except biogenic) contained in case Pre02d. We also provided Air Resources with the lat-lon coordinates of the centroid of each grid cell to allow the mapping of the emissions with a geographic information system (GIS).

Expected Progress During the Next Reporting Period:

We will merge the component files for case Pre02d and generate CMAQ-ready emissions, continue to QA and document the Pre02d emissions, and develop technical documentation for emissions case Pre02d.

Difficulties Encountered and Resolutions:

Several corrections to the emissions processing were made during October:

- (1) One step in integrating the emissions generated by the offline agricultural ammonia model and windblown fugitive dust model involved removing the sources represented by these offline models from the original emissions inventories, to avoid double counting of the emissions. QA of the area-source emissions modeling revealed that several agricultural ammonia sources that were covered in the offline model were not removed from the Visibility Improvement - State and Tribal Association of the Southeast

(VISTAS) region of the modeling domain. We removed these sources from the VISTAS area-source emissions inventory and reprocessed the area emissions.

- (2) In the first iteration of the fire emissions processing, cross-references for the new fire SCCs representing the natural and anthropogenic fires were not added to the SMOKE input files. As a result, these sources received default profiles that slightly misrepresented the diurnal temporal distribution and chemical speciation of the volatile organic compound (VOC) and PM_{2.5} components of these sources. Also in the first iteration, the fires were processed with 15 emissions layers instead of the full 19 model layers. In the second iteration of the fire emissions processing, we corrected both the profiles and the layers issues.
- (3) We modeled the nonroad mobile emissions without invoking the formula to calculate coarse-mode particulate matter emissions (PMC). We reran the nonroad mobile simulation to calculate emissions for PMC.
- (4) The original nonroad mobile retrofit sensitivity control factors file was delivered to CEP with incorrect mapping to the actual SCCs in the WRAP nonroad mobile emissions inventory. As a first approach to correcting this problem, the WRAP Economic Analysis Forum contractor who prepared this file revised it to work with the inventory as it currently exists. This interim solution will cause the effects of the sensitivity to be overstated, by controlling more emissions than the nonroad emissions retrofit program actually targets. If the air quality modeling results are promising using this crude approximation of the controls, the sensitivity can be revisited later using better, higher-resolution control factors.

Task 4: Air Quality Model Evaluation for 2002 Annual Simulation

Purpose:

To test the 2002 base year air quality modeling with CMAQ, including a preliminary simulation using the 2002 interim emissions inventory followed by several iterations with bug fixes or updates, and sensitivity experiments.

Progress During This Reporting Period:

We installed the new CMAQ release, version 4.4, on the RMC computers. We modified the source code to allow all needed species to be included in the 1-hour average concentration output file and ran a test case. We are seeing substantial differences in model predictions compared to version 4.4beta. These differences are probably attributable to correction of errors in the CMAQ vertical transport algorithms. The new v4.4 release also has a significant speedup in run time (about 15%) compared to the previous release.

Expected Progress During the Next Reporting Period:

During November we plan to complete emissions processing and QA for the Preliminary 2002 version D emissions (Pre02d) case and begin an annual model simulation using CMAQ version 4.4 and Pre02d. This will be the last "Preliminary" test case before we begin testing with the new MM5 simulations in December.

Difficulties Encountered and Resolutions:

None.

Task 5: Preparation and Reporting of Geographic Source Apportionment Results

Purpose:

To implement, test, and apply Tagged Species Source Attribution (TSSA) particulate matter (PM) algorithms in CMAQ.

Progress During This Reporting Period:

Annual model simulations were completed using the most current version of the TSSA algorithm. We have begun processing the results at selected receptor sites to prepare source attribution plots and an ASCII file containing the source attribution data for each receptor site. The processing is initially being completed using the first three approaches shown below; the fourth method in the list is in the planning stage.

- Analyze for each model day at each receptor site.
- Analyze for best and worst 20% days based on ambient data at each site.
- Analyze for best and worst 20% days based on model predictions.
- Analyze for best and worst 20% days based on model predictions stratified in time by month or season; we still need to determine how best to implement this approach.

Expected Progress During the Next Reporting Period:

We will complete the analyses and present results at the Attribution of Haze meeting to be held November 17-18 at the Desert Research Institute (DRI).

Difficulties Encountered and Resolutions:

We found that several of the output files were corrupted with random, large values (order 10^{33}) for a few species on some days. We suspect that this is caused by input/output errors associated with extreme network congestion. As a result, we need to redo the source attribution analysis to be certain that the selection of the worst 20% days was not contaminated by the corrupted output files. We hope that purchase of the new network switch (see the Task 1 section) will reduce or eliminate this type of error.

Task 6: Further Analysis of Model Performance in Regard to the Contribution of Natural Emissions to Visibility Impairment

Purpose:

To perform modeling without anthropogenic emissions to help elucidate natural background visibility levels.

Progress During This Reporting Period:

We prepared emissions case Pre02e to assess the effects of naturally occurring fires (see the section on Task 3 for more information).

Expected Progress During the Next Reporting Period:

We will develop a plan to assess haze from natural emissions sources during 2005.

Difficulties Encountered and Resolutions:

None.

Task 7: Evaluation and Comparison of Alternative Models

Purpose:

To analyze alternative models to CMAQ for 2002 modeling.

Progress During This Reporting Period:

No work was performed on this task during October. We plan to initiate this task when the Pre02d emissions and final MM5 results are available during November.

Expected Progress During the Next Reporting Period:

We will develop a plan for analyzing alternative models using the 2002 database.

Difficulties Encountered and Resolutions:

Delays in obtaining the final MM5 meteorological fields have postponed the application of alternative models.

Task 9. Testing and Further Improvements to the Windblown Dust Emissions Modeling Methodology

Purpose:

To further refine and test the WRAP windblown dust model.

Progress During This Reporting Period:

This task was initiated during October. Several conference calls were held with the WRAP Dust Emissions Joint Forum discussing the updates to the model. The new windblown dust model was applied for 2002 and the Inter-RPO 36-km domain.

An emissions inventory was prepared and CMAQ simulations were initiated using the new CMAQ v4.4 release. These simulations are being run without the chemistry solver. We expect the model simulations to be completed early in November. Also, we have discussed with the WRAP Modeling and Dust Emissions Joint Forums the need for additional emissions and CMAQ sensitivity simulations, possibly applying county-specific fugitive dust transport fractions to the windblown dust model. We will follow up on this topic during the next Modeling Forum conference call.

Expected Progress During the Next Reporting Period:

We will complete the 2002 windblown dust model simulations and evaluate the results. We will also prepare for and participate in the WRAP Dust Emissions Joint Forum Meeting to be held November 15-16, 2004, in Las Vegas, Nevada.

Difficulties Encountered and Resolutions:

Delays in getting the contract modification from the Western Governors' Association (WGA) postponed the start of this task.

Task 10. Continued Improvement to Model Evaluation Software

Purpose:

To continue the development of model evaluation software for meteorology, emissions, and air quality modeling. This includes expanding existing evaluation tools to include metrics on model bias and error, and creating visualizations for additional evaluation metrics.

Progress During This Reporting Period:

We reviewed the IMPROVE Class I Area site list and site information. We also reviewed EPA guidance documents and had extensive discussions with the WRAP and other contractors on how best to implement the site information. No conclusion was reached, so we are continuing with the original site information until we can determine how best to update this information. Related to this, we have added list of new receptor sites that are of interest for source attribution; these include the lat/lon coordinates of sites that are being used by DRI in the Causes of Haze project but for which there are no monitoring sites.

We made the following revisions to the species mapping for the model evaluation software: (1) added model performance evaluation plots for total organic matter, and (2) added model performance evaluation plots for total nitrate (HNO₃ plus aerosol nitrate).

Expected Progress During the Next Reporting Period:

Please see next paragraph.

Difficulties Encountered and Resolutions:

Discussion of the site information was a major time sink and a source of frustration during October. We need definitive guidance on what site information to use. This is not a topic on which the RMC can make the decision, so we recommend that this be sorted out by EPA or the WRAP, and that further RMC resources not be used on this topic.

Task 11: Sensitivity Studies Designed to Evaluate Uncertainties in Fire Emissions

Purpose:

To perform fire sensitivity simulations as requested by the Fire Emissions Joint Forum (FEJF).

Progress During This Reporting Period:

We have completed all fire sensitivity simulations and begun evaluation of model results and analysis. The UCR model performance evaluation has been completed for the preliminary 2002 case with wildfires only (Pre02b_wf) compared to the preliminary 2002 case with no fire emissions (Pre02b). Because the model performance evaluation is time consuming to run, we might not complete this for the other cases unless specifically requested. One possible value in running the evaluation software is that it generates time-series plots at all sites. We expect that

the primary method of analysis will be the generation of monthly-average spatial distribution plots, and perhaps stacked bar plots at Class I sites. A memo titled "Progress on Fire Sensitivity Scenarios" dated October 28, 2004, summarizes the fire sensitivity cases as well as questions that still need to be resolved for completing the analysis of the fire sensitivity simulations.

Expected Progress During the Next Reporting Period:

During November we expect to complete the evaluation for spatial distribution plots of all the fire sensitivity cases. If other analysis products are needed, we will also try to complete these in November.

Difficulties Encountered and Resolutions:

None.

Task 12: Preliminary Meteorological, Emissions, and Air Quality Modeling Activities for Alaska

Purpose:

To perform MM5 modeling of Alaska and preliminary dispersion modeling using a Lagrangian puff model.

Progress During This Reporting Period:

We completed and submitted a modeling protocol that describes our proposed procedures for conducting the WRAP 2002 Alaska modeling: "Preliminary WRAP Alaska Visibility Modeling," dated October 15, 2004. We began performing the WRAP January and July 2002 MM5 simulations, and acquiring Alaska emissions data for CALPUFF modeling.

Expected Progress During the Next Reporting Period:

We will continue to perform WRAP January and July 2002 MM5 modeling for Alaska, acquire emissions data for Alaska and process them for input into CALPUFF, and process surface and upper-air meteorological data for CALMET.

Difficulties Encountered and Resolutions:

The project started later than expected due to competing priorities with the WRAP continental U.S. 2002 MM5 modeling. Alaska modeling is proceeding quickly now.

Task 13: Training Courses for the WRAP States and Tribes

Purpose:

To conduct training activities as needed to transfer datasets and technology to WRAP member tribes and states.

Progress During This Reporting Period:

Earlier in 2004, we developed training materials for a one-day "manager's" course to assist nontechnical state/tribe staff in using modeling products of the RMC. In October we worked on compiling a FAQ list that provides information on recommended computer hardware and software for states and tribes who are considering purchasing equipment to conduct haze

modeling. The FAQ list will also address solutions to common problems encountered when installing and operating the models, including SMOKE and CMAQ.

Expected Progress During the Next Reporting Period:

Additional one-day training classes will be held as requested by the WRAP. Also, the computer equipment page on the RMC web site will be updated to include recommended hardware configurations and the above FAQ list.

Difficulties Encountered and Resolutions:

None.