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***Memorandum***

**Subject: Temporal, Speciation, and SCC Improvements**  
**To: Tom Moore, Alice Edwards, Dennis Schwehr**  
**From: Zac Adelman**  
**CEP Environmental Modeling for Policy Development**  
**Date: June 3, 2004**

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This memo summarizes the work performed under Task 1CD of the Western Regional Air Partnership (WRAP) Regional Modeling Center (RMC) 2003 work plan (see Appendix for text of Task 1CD). Part of Task 1CD targeted improvements to the WRAP emissions modeling input files by reviewing the temporal and speciation profiles used by SMOKE to prepare emissions inventories for input to numerical air quality models (AQM's). Task 1CD also called for a review of the SCC assignments in the area and point source emissions inventories in the WRAP states. The extent of the work completed for this Task is discussed here as well as reasons why the Task was not completed. Included are recommendations for how to improve the work requested under Task 1CD based on the experiences from managing this part of the project.

SMOKE uses tabulated look-up tables of temporal and chemical allocation profiles to distribute anthropogenic emissions in time and to a parameterized chemical mechanism, respectively. The basis of these look-up tables is the source classification code (SCC) for defining which sources receive the different profiles. The purpose of task 1CD was to review the SCCs in the WRAP area and point source emissions inventories and to explore the temporal and chemical profiles applied to these SCCs and make any necessary improvements. To accomplish this task, we used SMOKE to generate annual emissions summaries for the WRAP area and point source inventories. We distilled the summaries into the top 80% of the sources for only the significant pollutants in each source category (Tonnesen et al., 2003). We created unique reports for each of the 13 WRAP states and posted them to the CEP FTP site for distribution. We distributed a memorandum with the state reports on September 30, 2003 that explained how to interpret and review the reports and communicate any changes back to the CEP (Adelman, 2003). We revised the summaries to use a new version of the point source inventory and reissued a call for comments on February 12, 2004.

Between the two comment periods six of the thirteen WRAP states acknowledged receiving the request and three, New Mexico, Colorado, and Montana, provided actual feedback on the summaries. In compiling the summaries, the CEP made some recommendations for updates to the temporal and speciation profile assignments. Supplemental recommendations for updates to the temporal and speciation profile assignments also comes with a new set of files produced by the U.S. EPA that are currently under review and will be released by Summer, 2004 (EPA, 2003).

The deliverables for Task 1CD in reviewed/improved SCC assignments, improved temporal profile assignments, and improved chemical profile assignments have not been completed as of the writing of this memo. As mentioned previously a little less than half of the WRAP states acknowledged the request for comments on the inventory and profile summaries. Of the six states

to respond, three, Colorado, New Mexico and Montana, sent actual comments back to the CEP. The CEP will make another request for comments before compiling the information into revised SCC assignments and profiles. The combination of the comments from CEP, comments from a few of the WRAP states, and a preliminary version of the new EPA profiles could ultimately produce updates to the SMOKE ancillary input files during the preliminary §308 modeling occurring in 2004.

Task 1CD was difficult to complete as stated in the Work Plan for a few reasons.

- 1) The reality of the staff support available at the different departments of air quality (DAQs) throughout the WRAP region was not clearly defined. As the level of expertise differs in the DAQs, the ability of these organizations to handle data review requests will also differ. Despite the high level of cooperation between the WRAP participants, many of the states and tribes do not yet have the staff to commit to data reviews. It was also not clear to CEP staff what states were in agreement that they would take part in the survey. With a better initial plan, the CEP could have targeted their efforts to accommodate only those states that committed to reviewing the data in the time frame of this part of the project.
- 2) A clear communication line between CEP and the data review staffs at the DAQs was never established. As a large amount of communication took place between CEP and those states that participated in the data reviews, it became clear that CEP needed a list of contacts for each participating state or tribe to follow up with at set intervals through the review process. Using the WRAP Modeling Forum listserv was not effective in establishing communication between the WRAP participants and CEP. Direct email and occasional phone contact is required to complete this review. A question and answer conference call between CEP and all of the participating WRAP reviewers would have been an efficient means for initiating Task 1CD.
- 3) The way that Task 1CD was defined in the Work Plan provided insufficient point source inventory information for the states to complete the reviews. The Work Plan did not explicitly state that the reports needed to be at the county level, only the state and SCC level. For point sources, defining a plant ID at the state level is meaningless because the plant ID's are county specific, i.e. there could be a facility using a plant ID of "1" in every county in a state. In addition to reporting the emissions at the county level, we also added plant names to the summaries to facilitate the identification of the individual sources by the data reviewers. CEP regenerated the point source reports to include county level information and posted them to their FTP site.

We recommend that the WRAP maintain an open task for assimilating the new 2002 emissions inventory data and related information from the WRAP states and Tribes as it becomes available. Based on the range of experience and time frames that the different WRAP constituents are working with, a mechanism needs to be in place to continually review the emissions data and assimilate new information. The formation of a data review committee or forum would be consistent with the outside review and gate keeping requirements of the WRAP emissions QA protocol (Adelman, 2004). The WRAP Emissions Data Management System (EDMS) may provide the exact mechanism needed to assimilate new information as it becomes available from the WRAP states and tribes.

## References

U.S. EPA, "Operation Shakeout," Contract no. 68D-02-066, Assignment no. 1-01, Tasks 4, 5, 6, March 19, 2003.

Tonnesen, G., M. Houyoux, R. Morris, "WRAP Regional Modeling Center 2003 Work Plan," University of California at Riverside – Center for Environmental Research and Technology, addressed to Tom Moore – Western Regional Air Partnership, April 15, 2003.

Adelman, Z, "Memorandum: Temporal and Speciation SCC Improvements", University of North Carolina – Carolina Environmental Program, addressed to the WRAP Emissions Forum and WRAP States, September 19, 2003

Adelman, Z. "Quality Assurance Protocol: WRAP RMC Emissions Modeling with SMOKE," University of North Carolina – Carolina Environmental Program, addressed to WRAP Modeling Forum, January 7, 2004.

## Appendix – 2003 Workplan Task 1CD

### Task 1CD: Temporal Allocation and Speciation Improvements to the WRAP Point and Area Sources.

**Purpose:** Temporal Allocation and Speciation Improvements to the WRAP Point and Area Sources' Modeling Emissions Inventory

- I. Correction of SCC Errors
- II. Temporal Allocation Improvements
- III. Speciation Improvements.

**Products:**

1. List of sources including FIPS and SCCs and/or sources that are to be corrected, and the new SCC for each old SCC, by 5/30/03. (CEP)
2. List of SCCs that need different temporal profile and cross reference code, and new temporal profiles if needed, by 5/31/03. (CEP)
3. List of SCCs that need different speciation profile and cross-reference code. (CEP), by 5/31/03.
4. Corrected area and point sources inventory files. (RMC) by 5/31/03.
5. BEIS3 emissions inventory, 7/31/03.

**Approach:**

1. Area sources: Using the inventory files for the GC states (13 states) an annual inventory table for each source classification code (SCC) and state will be developed. The sources per state will be ranked by total annual inventory. The top sources will be investigated for SCC, temporal profiles, and speciation profiles correctness.
2. Point source: Using the inventory files for the GC states, an annual inventory table for each point source facility (not SCC) and state will be developed. The sources per state will be ranked by total annual inventory. The top sources will be investigated for SCC, temporal profiles, and speciation profiles correctness.
3. Inventory, temporal, and speciation:
  - a. The lists of sources with SCCs, temporal profiles, and speciation profiles will be used to generate new inventory files.
  - b. Run BEIS3 in SMOKE to produce updated inventory.
  - c. Review BEIS3 and GLOBEIS for treatment of sesquiterpenes.

**Total Cost:** \$39,587 (details in spreadsheet)