Appendix M

Modeling Correspondence with EPA

****
*** ACTIVITY REPORT ***
****

TRANSMISSION OK

TX/RX NO.	2982
CONNECTION TEL	92146657263
CONNECTION ID	
START TIME	04/21 11:38
USAGE TIME	00'50
PAGES	1
RESULT	OK

TNRCC

Protecting Texas by Reducing and Preventing Pollution

FAX TRANSMITTAL

DATE: April 21, 1998 NUMBER OF PAGES *(including this cover sheet)*: 3

TO:

Name	Dick Karp
Organization	~~EPA Region 6 Dallas~~
FAX Number	214-665-7263

FROM: TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Name	Pete Breitenbach
Division/Region	AIR QUALITY PLANNING DIVISION
Telephone Number	512-239-1468
FAX Number	512-239-1500

NOTES:

Dick, Quang, Kathy

You may recall that during our telecon on March 5, there were some unresolved questions. We indicated that we would provide you with some answers. One issue had to do with the vertical layering and the matchup between SAIMM and CAMx. The other issue was the logic used to develop vertical ozone profiles on the eastern edge of the regional domain. I have attached a response to each question to this fax, but in short:

1) SAIMM calculates wind vectors at layer tops, and CAMx uses wind vectors at the cell centers. So the best way to minimize interpolation problems is to match the SAIMM layer tops to the center of the CAMx layers.

2) TNRCC wanted to create the best possible boundary conditions for the eastern edge of the regional domain. During the day, in reality, surface ozone is mixed throughout the mixing layer. During the

TNRCC

Protecting Texas by Reducing and Preventing Pollution

FAX TRANSMITTAL

DATE: April 21, 1998 NUMBER OF PAGES *(including this cover sheet):* 3

TO:

Name	Dick Karp
Organization	EPA Region 6 Dallas
FAX Number	214-665-7263

FROM: TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Name	Pete Breitenbach
Division/Region	AIR QUALITY PLANNING DIVISION
Telephone Number	512-239-1468
FAX Number	512-239-1500

NOTES:

Dick, Quang, Kathy

You may recall that during our telecon on March 5, there were some unresolved questions. We indicated that we would provide you with some answers. One issue had to do with the vertical layering and the matchup between SAIMM and CAMx. The other issue was the logic used to develop vertical ozone profiles on the eastern edge of the regional domain. I have attached a response to each question to this fax, but in short:

1) SAIMM calculates wind vectors at layer tops, and CAMx uses wind vectors at the cell centers. So the best way to minimize interpolation problems is to match the SAIMM layer tops to the center of the CAMx layers.

2) TNRCC wanted to create the best possible boundary conditions for the eastern edge of the regional domain. During the day, in reality, surface ozone is mixed throughout the mixing layer. During the evening hours, the surface ozone is scavenged, and a layer of ozone remains aloft. Bright and Weining developed a procedure to retain some of the ozone in the higher layers during the evening in the model.

/Pete

Corrected Vertical Layers in Meteorological and Air Quality Modeling

The Draft Protocol for Photochemical Modeling for the Dallas-Fort Worth Ozone Nonattainment Area contains typos on page nine regarding the vertical layer structure in our models. The meteorological model SAIMM was run with 19 layers and with layer *tops* defined at: 10, 50, *100, 150, 200, 300, 400, 550, 800, 1050, 1400, 1800, 2600, 3400, 4200, 5000, 6000, 7000, 8000* meters. The air quality model CAMx was run with 8 layers and layer *centers* defined at: 10, 50, 150, 300, 550, 1050, 1750, 2675 meters. Since wind vectors are calculated in SAIMM at cell tops, and wind vectors are input into CAMx at cell centers (transport algorithms calculate mass flux perpendicular to cell faces), the staggered layer structures minimize the amount of interpolation required in preprocessed air quality wind fields.

Additional Information Regarding Boundary Conditions for Regional Modeling

The Draft Protocol for Photochemical Modeling for the Dallas-Fort Worth Ozone Nonattainment Area references, on pages 11 and 12, the methodology used by ENVIRON to establish regional boundary conditions for the COAST domain. The standard boundary condition preprocessor, BNDRY, has only limited options for spatially distributing chemical species data for an air quality model with fixed vertical layer structure. A separate TIME INTERVAL block was specified for each hour of the day. Between 6 P.M. and 7 A.M., we used the flag ABSPROFILE to scale ozone values in each vertical column to evening values at the ground. Weighting factors for the vertical layers were 1.0, 1.0, 1.5, 2.0, 2.5, 2.0, 1.5, 1.0 for each of the evening hours. These values were intended to preserve some nighttime ozone above the nocturnal inversion which is consistent with general observations.

Between 7 A.M. and 6 P.M., we used the ABSPROFRAT flag which scaled ozone values in the vertical column between ground level values and the region top clean boundary conditions. This scaling changed for each of the daytime hours so that the ground level ozone values were assigned to each layer up to the mixing height (uniform mixing). The next layer averaged the ground level and top boundary values, and each remaining layer above equaled the top boundary value. The rise and fall of the mixing height was arbitrary and identical for each day, and the mixing height was assumed to be a maximum of 1750 meters between 1 and 3 P.M.

From: Pete Breitenbach
To: UAMgt, BRIGGIO, BOCAMERO, BDORNBLA
Date: 3/9/98 2:53pm
Subject: Bi-Weekly Telecon with EPA (March 5, 1998, Meteorology Issues)

On March 5th, 1998, we had a teleconference with EPA/6 to discuss some Meteorological issues related to the DFW protocol.

Participants: Quang, Dick and Cathy from EPA/6.
Bob Riggio, Bob Cameron, Bright Dornblaser, and myself from TNRCC.

At the beginning of the call, I indicated that we were glad to discuss the issues the EPA had raised, but that in the future EPA should feel free to call our staff directly. I also indicated that we would send them a memo to document our responses to their questions, but that we would not modify the protocol at this time. Quang agreed that there was no reason to rework the the Protocol at this time.

There was some discussion over the relative significance of the issues that were discussed during the meeting. I pointed out that the protocol and the met work had already been done and that there was no time in the schedule to go back and redo completed work unless it affects the approvability of the SIP.

Dick raised several procedural issues and a brief summary of each topic follows:

Protocol, Page 5. Use of NWS/FAA Data. Dick wanted to know which NWS/FAA stations had not been used in the wind field modeling, and why that data had been rejected. Dick specifically wanted to know if there had been a formal selection criteria based on radius.

Bob Riggio mentioned that we had followed the protocol procedure, and that because of the difficulty of incorporating top-of-the-hour data, NWS/FAA data had been dropped where other CAMS data were near-by. Bob pointed out that individual decisions had been based on professional judgements made by experienced meteorologists rather than by an inflexible rule. We indicated we could send them a list of the NWS/FAA stations that were not used in the wind field modeling and explanations as appropriate. Quang stated that a list was not necessary, but he would like to have a better understanding of the logic.

Action: None. Closed with the following explanation. Professional meteorological judgement based on distance, wind speed and direction was applied to graphical displays of wind vectors and site locations to determine the value of each NWS/FAA station to the final product.

Protocol, Page 5 paragraph 2. Upper Air Data . Dick wanted to know if Radar Profiler data had been employed to supplement the acoustic sounder data. Bob Riggio indicated that UCAR had fielded a radar profiler somewhere nearby, but that the data had not been formatted properly so NCDC had not been able to process it. Bob indicated that he would look into data availability again for possible use in future met modeling. I indicated that even if the data became available, there was no time in the schedule to rework the SAIMM modeling.

Action: None, no answer required. However, Bob Riggio has again attempted to download the UCAR data from NCDC . NCDC has responded that it is not formatted correctly and therefore not available. A number of other NCAR studies at the same time have not used additional profiler data, leading us to believe that the original data was corrupted and unusable.

Protocol, Page 9 Vertical Layers. Dick observed out that normally, the modeled

atmospheric layers are thinnest at the surface, and get monotonically thicker at higher elevations. He pointed out that the 4th layer (centered at 380 meters) appeared too thin. We indicated that we would investigate the problem, and respond.

Dick also wanted to know how the 19 SAIMM layers corresponded to the CAMx layers. Bright pointed out that the layers and thicknesses had been selected to minimize problems as the met layers are interpolated to match the CAMx layers

Action: Bright, Evaluate layer thicknesses (especially layer 4, and indicate how the meteorological layers correspond to the CAMx layers.

Protocol, Page 12, Paragraph 4, Vertical Variation in Boundary Conditions. Dick wanted to know how the boundary conditions for the regional modeling had been calculated. He was concerned that the boundary conditions estimates might introduce notable ozone transport.

Bright indicated that he and Weining had wanted to include real data into the boundary conditions as much as possible, and developed a procedure to do so. Bright said that the method had been developed some time ago, and that he could not recall the exact procedure. Bright said he would clarify the text, and we agreed to include the clarifications in a memo.

Action: Bright, Clarify explanation of procedure used to estimate eastern edge boundary conditions for regional modeling.

Questions on HySplit Back Trajectory for June 21, 1995 Dick wanted to know if it was possible to calculate the elevation of the trajectory starting point from the HySplit graphical output. Dick indicated that he had estimated a 1400 m starting point. We replied that the panel one the bottom indicated the vertical location of the parcel at each time., and that 1400 meters was approximately correct.

Action: None, closed during discussion.

At the end of the telephone conversation, we agreed to another meeting to be held in two weeks, on the 18th of March at 2:00 PM. The agenda is yet to be determined.

/Pete

CC: internet: nguyen.quang@epa.gov