

**SOUTHWEST TEXAS PHOTOCHEMICAL MODELING TECHNICAL
REVIEW COMMITTEE****TENTATIVE MEETING SUMMARY**

February 15, 2006

H-GAC Conference Room C
3555 Timmons Lane, 2nd Floor
Houston, Texas 77027

Members & Guests Present:

Mamadou Djimde, Jay Olaguer, Daewon Byun, Julie Glifford, Doug Deason, Graciela Lubertino, Mark Estes, Thomas Ho, Jeetrendra Upadhyay, William Vizuete, Erik Snyder, Dan Baker, David Allen, John Wilson, Liz Hendler, Russel Wozniak, Carole Lenz, Bright Dornblaser, Jim Smith, Dick Karp

Air Quality Planning and Implementation Update – Rebecca Rentz (TCEQ)

Rebecca gave a verbal update. In particular, Ms Rentz indicated that the list of identified on & off road mobile source control measures was on the website and includes every kind of measure, even if not technically, economically or legally feasible. ENVIRON is currently reviewing the list to prioritize as to feasibility. The prioritized list should be available for review at the Stakeholders' meeting scheduled for the week of April 17, 2006.

A similar process is being conducted for stationary sources, however, the list of potential control measures is still being compiled.

EPA SIP Implementation Update – Eric Snyder (EPA)

Erik gave a verbal update. He reported that EPA/6 was still working on the 250+ pages of comments they received on the HGB 1-hour SIP. Although drafts have been compiled responding to the modeling and the emissions trading program. Erik indicated that the signature on a final decision should be forth coming in the April/May time frame and publishing in the federal Register a few weeks later.

Erik reported that in January '06, there was a high-level air directors meeting in Dallas, attended by EPA directors from RTP & DC. In part the meeting addressed the difficulty non-attainment areas, such as DFW are having preparing SIPs that achieve attainment by 2009.

Erik also reported that OAQPS is going through a re-organization and Bill Harnett is now in charge of the SIP program.

During the discussion, several questions were raised, including who is replacing Guy Donaldson as the Region 6 Houston SIP coordinator, differences in weight-of-evidence (WOE) arguments for the 8-hour as apposed to the 1-hour, and expediting the implementation of federal motor

vehicle controls. Erik indicated that Guy's replacement has been selected but he wasn't yet authorized to release that information. Erik, also indicated that many of the same WOE arguments used for 1-hour are suitable for the 8-hour. Erik didn't really address the potential of expediting the motor vehicle controls.

HGB Control Measure Catalogue Update – Graciela Lubertino (HGAC)

Dr. Lubertino gave a brief presentation of the status of the identification and compilation of potential control measures. ENVIRON is HGAC's contractor developing a Draft Short List of recommended control measures. This list will be presented to stakeholders for input to further refine the list. ENVIRON's review and evaluation in preparing the draft short list is designed to screen out measures that do not meet requirements for SIP credit. For example, a control measure must be permanent, quantifiable, surplus and enforceable to be a SIP credit. There was some discussion on this topic, since bundled measure which would qualify as voluntary measure do not require initial quantification to be a SIP credit. However, the total amount of voluntary measures can only comprise 3% of the necessary emission reductions

Dr. Lubertino indicated the next stakeholder meeting is scheduled for March 22, 2006 at the HGAC offices and that the website for control measures is:

www.h-gac.com/HGAC/Departments/Transportation/Air+Quality/default.htm

A question was raised as to whether the list-serve was adequate for reaching all the interest parties. It seemed the consensus was that the list-serve was.

TCEQ SIP Modeling Update - Dick Karp & Bright Dornblaser (TCEQ)

Dick Karp and Dr. Dornblaser, with assistance from Dr. Jim Smith presented an update on the SIP modeling activities. A new base case (i.e., Aug 16 to Sept 6, 2000 episode) modeling has been completed. Comparison of this new base case with the wealth of ambient aerometric monitoring data available from the TexQAS 2000 study for this period indicates this is the best photochemical modeling ever conducted for the Houston non-attainment area. With the completion of this modeling, the modeling of the 2000 baseline and the 2009 future (attainment) year are expected to be completed by the end of this month (Feb. '06).

Dr. Dornblaser (Bright) discussed the pertinent features of the newest meteorological modeling used in the photochemical modeling of the new base case and which will also be used in the 2000 baseline and the 2009 attainment year modeling. The new meteorological modeling builds on the version of MM5 developed by the University of Houston (U of H), which uses the NOAA Land Surface Model with new, updated land use categories. The most significant changes from the U of H MM5 configuration are the use of the ETA PBL scheme and the derivation of the vertical diffusivities (K_v 's) from the Turbulent Kinetic Energy (TKE).

Bright also presented graphical comparisons between the model predicted meteorological parameters (e.g., winds, mixing height [PBL]) and monitored values. These included "whisker" plots comparing mode predicted wind speed & direction with observations at various surface stations throughout the Houston area. Over all these whisker plots show the modeled winds replicate the monitored winds quite well, although there is a slight tendency to over predict the wind speeds. Bright also presented graphics displaying the comparison between vertical profiles of predicted wind speed & direction with measurements taken with weather sondes (balloons).

In general the model predicted wind speed & direction at aloft levels compared favorably with the weather sonde measurements, although there are noteworthy differences from time to time throughout the episode. In addition, Bright presented graphics comparing predicted PBLs using different MM5 configurations with mixing heights diagnosed from radar profiler measurements. These graphics show the temporal distribution of the height of the PBL from 8am through 5pm on selected days. There are two aspects of the PBL's that are considered of importance to ozone formation: the speed at which the mixing height increases in the morning hours (e.g., 8am to 12 noon) and the maximum height attained in the afternoon (e.g., 3pm to 5pm). The radar profiler diagnosed PBL's (i.e., observed) in these graphics indicate that typically for the days with higher ozone (e.g., 8-hour ozone > 85ppb), the speed in the growth of the mixing height and the afternoon maximum height tended to be lower than for days with low ozone concentrations. In addition, the U of H MM5 configuration, with the ETA PBL scheme and the derivation of the vertical diffusivities (K_v 's) from the TKE, seemed to provide the best comparison with the observed PBL's.

With the general suitability of the U of H MM5 configuration, with the ETA PBL scheme and the derivation of the vertical diffusivities (K_v 's) from the TKE, base case modeling has been completed for the extended 2000 episode using the expanded modeling domain and the emissions updates. The extended 2000 episode provides for a 22 day period from Aug. 16th through Sept. 6th, and the expanded domain includes the entire Eastern U. S. The emissions updates include improved area/non-road emissions, the new emissions inventory for the Gulf of Mexico (from MMS) and Canadian emissions for that portion of the expanded domain.

Dick Karp presented a summary of the evaluation of the base case model performance, showing statistical comparisons, time series comparisons between modeled and monitored ozone at selected sites, as well as time series comparisons of precursor species (e.g., NO_x, VOCs). Dr. Jim Smith concluded the presentation showing an animation of ozone tile plots for the entire episode. The animation is a concatenation of hourly ozone tile plots of the first modeling vertical layer.

Although the new ozone NAAQS is based upon an 8-hour rolling average, comparisons of modeled and monitored hourly ozone still provides a good measure of how well the model replicates the monitored ozone. Therefore, Dick showed graphics of the typical statistical metrics (e.g., normalized bias) for both the 1-hour and the 8-hour ozone. This statistical graphics also compared the current base case with the base case previously used in the Mid-Course Review, Phase-II SIP. These graphics of modeling statistics clearly indicate that the current base case modeling compares much more favorable with the monitored ambient ozone. The graphics of hourly ozone time series, Dick presented, also, displayed the superior modeling of the current base case. Although, there are still a few days at a few sites for which the model notably under-predicts the monitored ozone.

The ozone animation, shown by Dr. Smith, indicated the model is correctly generating high ozone at about the right time in the right locations. Therefore, even though the model tends to slightly under-predict the monitored ozone, the model appears to be combining precursors from the correct localities. This helps ensure that the model will provide an appropriate response to control measures applied to the various source categories.

Update on Perimeter County Air Quality Research – Dr. David Allen (UT-Austin)

Dr. Allen briefly went over the results of their study, most of which had been presented at the previous meeting, Dec. 14, 2005. Those results indicated that based upon the controls in TCEQ's latest SIP revision, which modeled a 2007 future year, most of the perimeter county monitors should be close to attainment, with the exception of the Manvel Croix monitor. In addition, the findings, from the source apportionment, indicated that the 8-hour ozone exceedances at the various monitors arise from relatively small contributions from a multitude of source-groupings, with the boundary & initial conditions, and biogenic emissions contributing the overwhelming majority of the ozone, which is quite typical. Further, by considering the change in RRF for unit reduction in NOX or VOC, the study indicates that for the more recalcitrant monitors, such as Bayland Park, an 80% reduction in NOx would be needed to model 8-hour ozone attainment. In addition, only a minor response in ozone was found to accompany reductions in VOC, which appears to be in opposition to the modeling Dr. Allen conducted to establish the 1-hour cap level. This study is available at: http://www.utexas.edu/research/ceer/perimeter_counties

Dr. Allen also presented some additional results of modeling the HRVOC trading program. In particular, there was a concern that the trading might redistribute the HRVOC's in a manner that would enhance ozone production. However, the results of the modeling showed that the redistribution only tended to increase ozone concentrations by a couple tenths of a ppb. In addition, Dr. Allen presented some results of the substitution of other VOC's for HRVOC's, which also appeared to have little impact on maximum ozone concentrations. The result of this modeling analysis tends to support the use of the MIR as a trading index for other VOC's.

Update from 8-Hour Coalition Update (HC-2) – Tom Tesche (Alpine Geophysics)

Dr. Tesche presented results from their "fast-track" future year (2009) modeling based upon their four modeling episodes from 2003, 2004 and 2005. Dr. Tesche's future (2009) modeling suggests that six monitoring sites in the HGB area would still be projected to have future year (2009) 8-hour ozone design values (DVf's) of 88 ppb or higher, with Deer Park projected to have a DVf = 93 ppb. The DVf of 88 ppb or higher is significant in that EPA requires very rigorous "weight-of-evidence" for SIP attainment modeling with 8-hour ozone of this magnitude.

Applying a 25% reduction of NOx and VOC "across-the-board" to Dr. Tesche's future (2009) modeling resulted in reducing the number of site with DVf \geq 88 ppb to four (i.e., 2 at 88 ppb and 2 at 89 ppb). Further, with a 50% reduction of NOx and VOC "across-the-board" Dr. Tesche's modeling indicated only one monitor would have DVf's greater than 80 ppb.

These results are very encouraging, however, as Dr. Tesche noted, his 2009 future year emissions inventory is based upon "projected actual" emissions, which are notably lower than the 2009 future year emissions based upon the control measures expected to be in place in 2009 (i.e., projected emission limits). TCEQ and EPA staff pointed out that the use of a "projected actual" level of emissions for attainment modeling purposes is inappropriate, since the attainment year emissions modeled establishes a legally enforceable budget for the various source categories. Therefore, using "projected actual," 2009 emissions under-estimates the real emission reductions necessary to achieve attainment of the 8-hour NAAQS. Dr. Tesche showed a

bar chart indicating that for point sources, the 2009 emissions, presumably based upon projected emission limits (note: Dr. Tesche labels these as “Maximum Allowable”), are 1.36 times larger than the “projected actual” 2009 emissions. Or considering the inverse of this ratio, Dr. Tesche’s 2009 point source emissions based upon “projected actual” are 0.735 times smaller than 2009 emissions based upon projected emission limits. Therefore, Dr. Tesche’s future year modeling results (e.g., only one monitor having DVf’s greater than 80 ppb, with a 50% reduction of NO_x and VOC “across-the-board”) project much lower DVf’s than what modeling with the appropriate emissions based upon the legally enforceable future control limits would yield.

Although Dr. Tesche’s modeling, based upon “project actual” 2009 emissions, as well as other emission inventory concerns (e.g., mobile source conformity), is not suitable for SIP modeling, it none the less may provide good weight-of-evidence material for supporting the TCEQ SIP modeling.