

## SOUTHEAST TEXAS PHOTOCHEMICAL MODELING TECHNICAL COMMITTEE

Meeting Summary  
October 7, 2008

H-GAC Offices  
3555 Timmons Avenue  
Houston, Texas

### **Members and Guests Present:**

Dan Baker, Susan Moore, Liz Hendler, James Wilkinson, Graciela Lubertino, Shelley Whitworth, Kelli Angelae, Connie Chao, Paul Ajibogun, Rohit Sharma, Judy Bigon, Ken Gathright, Nathan Chenaux, Khalid Al-Wali, John Jolly, Jim Smith, Ashley Forbes, and Dick Karp, and Walker Williamson, Carl Young, and Erik Snyder via telephone.

### **SIP Planning and Implementation Update – Walker Williamson (TCEQ)**

Walker gave a brief update via the telephone. For question or more information, please contact Walker at [wwilliam@tceq.state.tx.us](mailto:wwilliam@tceq.state.tx.us).

Walker reported that EPA published its final ruling (October 1, 2008) granting the state's request to reclassify the HGB nonattainment area to severe, with a SIP revision submission deadline of April 15, 2010. ([www.epa.gov/fedrgstr/EPA-AIR/2008/October/DAY-01/a22685.htm](http://www.epa.gov/fedrgstr/EPA-AIR/2008/October/DAY-01/a22685.htm))

Walker reported that in support of control strategy development and evaluation, the TCEQ is involved in several projects to improve emission inventories of selected stationary and mobile source categories.

TCEQ staff is currently conducting a survey of stationary gas-fired compressor engines and dehydrators in Southeast Texas, including Angelina, Austin, Hardin, Houston, Jasper, Jefferson, Newton, Polk, Sabine, San Augustine, San Jacinto, Trinity, Tyler, and Walker Counties. The due date to provide the requested air emissions-related information for calendar year 2007, for compressor engines rated at 50 horsepower or greater and dehydrators has been extended to November 21, 2008. TCEQ staff working on mobile source emissions has been reviewing marine vessel and skid steer loader studies, recent oil/gas resource activity (e.g., oil drilling rig activity), and meeting with airport/airline representatives (Bush-Intercontinental, Houston-Hobby and Ellington-Field). Further, staff participated in a meeting (October 6, 2008) with local government and affected industry stakeholders concerning the current heavy duty vehicle idling rule and possible rule revisions.

Walker also reported that the TCEQ had planned to have another HGB Eight-Hour Ozone SIP stakeholder meeting in October, but due to the recent hurricane, it has been delayed until November. Comments received from participants at the initial HGB stakeholder meetings (held in Houston on March 25 and 26, 2008) are posted on the HGB Eight-Hour Ozone Stakeholder Group Web page ([http://www.tceq.state.tx.us/implementation/air/sip/hgb\\_stakeholder.html](http://www.tceq.state.tx.us/implementation/air/sip/hgb_stakeholder.html)).

With respect to the new eight-hour ozone standard of 75 ppb, Walker reported that the TCEQ's Designation Recommendation Team anticipates making a recommendation of nonattainment areas at a Commissioners' Agenda on December 10, 2008. States must submit designation recommendations to EPA by March 2009, and EPA will issue final designations by March 2010.

Walker also mentioned that Kim Herndon ([kherndon@tceq.state.tx.us](mailto:kherndon@tceq.state.tx.us)) is the TCEQ's new SIP Team Leader. She has been with the agency 15 years and has four years of experience on the SIP Team.

### **H-GAC Update – Graciela Lubertino, Ph.D. (H-GAC)**

(Note: Graciela's one-page presentation is available on the SETPMTTC Web site:

[http://www.tceq.state.tx.us/implementation/air/airmod/committee/pmtc\\_set.html](http://www.tceq.state.tx.us/implementation/air/airmod/committee/pmtc_set.html)). Graciela indicated that H-GAC has received the "notice to proceed" for development of the RFP SIP emission inventories (2002, 2008, 2011, 2014, 2017 and 2018). In addition, Graciela reported that H-GAC has been meeting periodically with stakeholder groups (e.g., local governments, airports, marine ports, construction industry) in a continuing effort to identify and quantify control strategies for on-road and off-road mobile source categories in preparation of the mobile source control strategy catalog. H-GAC will be submitting a draft short list of recommended control measures from the control strategy catalog to the TCEQ on December 15, 2008. The final short list and technical reports are due to TCEQ by January 29, 2009.

### **EPA SIP-Related Update**

Carl Young and Erik Snyder tied in by phone, as they were attending the CMAS conference in Research Triangle Park, NC.

Carl reported that, as Walker had previously indicated, the reclassification of the HGB area from a moderate eight-hour nonattainment area to severe was signed by the EPA administrator on October 1, 2008, and becomes effective October 31, 2008. In addition, Carl indicated that the April 15, 2010, SIP submission date was primarily justified as needed to accommodate the incorporation of the TexAQS II findings into the attainment demonstration SIP.

Erik addressed the status of the CAIR vacatur, reporting that EPA has filed a petition with the court for a re-hearing, but it will be a couple of months before EPA will know whether the court will consent to a re-hearing. In addition, Erik reported that EPA will be working with the new congress, next spring, to have the issue of EGU controls, such as CAIR, included in global climate change.

TCEQ staff indicated that neither the re-hearing nor congressional activities next spring are soon enough for the current schedule for completing the attainment modeling (March 31, 2009). Erik indicated he was fully aware of that and that we need to do something to prepare 2018 modeling emissions that do not presume CAIR. Erik reported that in support of CAIR, some years ago, the Clean Air Markets Division (CAMD) had made a non-CAIR 2015 IPM model run. However, CAMD is scheduled to make a new 2015 IPM model run without CAIR, using recent data, in the coming month. This would provide better emission estimates, at least out to 2015, for EGUs in all the states in the HGB modeling domain.

For Texas, outside of the HGB area where EGUs are subject to MECT, TCEQ staff suggested that Senate Bill 7 could be used in the development of 2018 modeling emissions for existing EGUs, rather than the results from the new IPM run. In addition, TCEQ staff indicated they have been in discussions with Erik and the Lake Michigan Air Directors Consortium (LADCO) on a “fall-back” for 2018 modeling emissions for EGUs in the states beyond Texas. LADCO has recently developed some scenarios for 2018 modeling emissions for EGUs in their modeling domain for the Chicago area.

### **Eight-Hour Coalition Update – Jim Wilkinson, Ph.D. (Alpine Geophysics [AG])**

Jim’s presentation, entitled “Near Term Modeling Support for the 2010 HGB 8-hr Ozone SIP,” is available on the SETPMTTC Web site

[http://www.tceq.state.tx.us/implementation/air/airmod/committee/pmtc\\_set.html](http://www.tceq.state.tx.us/implementation/air/airmod/committee/pmtc_set.html)). The purpose of Jim’s presentation was to outline ongoing modeling and analysis work funded by the Houston 8-Hour Ozone Coalition to achieve three goals:

- Corroborative air quality modeling (CAMx)
- Fine-scale meteorological modeling (MM5)
- Emissions modeling (SMOKE)

Jim indicated that AG’s corroborative modeling with CAMx has been very comparable to the TCEQ’s modeling, and no discernable inconsistencies have been found.

AG has conducted fine-scale MM5 modeling because of technical concerns about the adequacy of flexi-nesting (i.e., straight interpolation down from the 4 km grid) to represent local land-gulf winds and thermodynamic structures, given the length of the Gulf coastline and the perimeter of near shore embayments (e.g., Galveston Bay). Jim indicated that AG has modeled the period from May 25 to June 24, 2006, which spans the TCEQ June 2006 episode (May 29 to June 16, 2006) including a fine scale 1.3km gridded domain, which took about three months to complete. TCEQ staff indicated that their current MM5 modeling does use flexi-nesting from the 4 km grid down to the 2 km grid, and mentioned that technical concerns have been raised as to whether the MM5 model is capable of reliably resolving meteorological parameters at grid cell sizes below 4 km.

Jim showed time series (hourly averages from all monitoring stations) of MM5 modeled versus monitored humidity (water vapor mixing ratio), temperature and wind speed. Comparisons between the TCEQ and AG 4 km MM5 modeling for these meteorological parameters are quite favorable. The AG and the TCEQ modeling both tend to over predict the wind speeds, especially at night. Based on these comparisons, AG’s corroborative modeling with MM5 appeared to be suitably comparable to the TCEQ’s modeling, and no discernable inconsistencies were identified.

Jim also showed comparisons between AG MM5 modeling using standard nudging (eta-model simulated data assimilation) and additional enhanced profiler nudging using observational data (radar profilers) for both the 4 km and 1.33 km MM5 modeling. These comparisons showed very little difference, suggesting that the addition of the observational nudging did little, if anything in improving the MM5 performance. Again, the comparisons were time series of all-stations hourly averages. TCEQ staff expressed concern about using a comparison of all-stations

hourly averages to deduce the effect of using the additional observational nudging. TCEQ staff indicated that when considering less highly averaged metrics (e.g., flow reversals), observational nudging has improved MM5 performance.

Jim indicated that AG has been working on SMOKE emissions modeling for the 2005 and 2006 episodes since early 2006. AG has obtained TCEQ data sets and converted/reformatted them for use in SMOKE. Jim presented some of the errors and concerns identified during the conversion process that have been resolved in consultation with the TCEQ. A couple of errors/concerns discussed were the on-road mobile source link/node coordinate problem and the use of “urban” classified area as a surrogate for some non-road mobile source categories (e.g., construction equipment). The TCEQ staff acknowledged these problems, indicating that TTI was providing a corrected link/node file and an alternate surrogate was being developed to use with pertinent non-road mobile source categories.

Jim indicated that for temperature input to the biogenic emissions modeling as well as for temperature and humidity adjustments to on- and non-road emissions, AG uses the temperature and humidity predicted by MM5. However, the TCEQ uses observational data collected from monitoring stations throughout the modeling domain.

#### **SIP Modeling Update: First Interim TexAQS II Base Case Modeling – Jim Smith, Ph.D., TCEQ**

Jim presented the first interim base case modeling for the 2006 TexAQS II episodes (Note: Jim’s presentation is available on the SETPMTC Web site [http://www.tceq.state.tx.us/implementation/air/airmod/committee/pmtc\\_set.html](http://www.tceq.state.tx.us/implementation/air/airmod/committee/pmtc_set.html)). The presentation included a discussion of the meteorological modeling, the emissions modeling and processing, and the CAMx modeling evaluation. Jim indicated that the modeling files for these episodes would be posted to the TCEQ FTP site by early next week.

Questions and comments that arose during Jim’s presentation included:

- Do the scatter plots of winds use MM5 10-meter adjusted winds in comparison to the observed winds?
- How does the TCEQ’s Region 12 compare to the HGB area?
- What weekly and diurnal temporal profiles are used for construction equipment?
- Was the CAMx model run for non-intensive periods?
- Does the occurrence of high ozone on Thursdays (i.e., August 17 and 31, and September 7) has any significance?

Regarding the MM5 winds used in the scatter plots, which compare the modeled versus observed winds, Jim indicated he wasn’t sure whether the MM5 first layer simulated winds, with a mid-elevation of 17 meters, had been adjusted (scaled) to a 10-meter height commensurate with the observations. Generally, 17-meter wind speeds would be slightly higher than those at 10 meters. (Note: subsequent to the meeting, it was determined that the MM5 simulated winds used in the scatter plots have not been adjusted to 10 meters, and thus may account for some of the tendency of the MM5 simulated wind speed to be greater than observed.)

Jim indicated that the TCEQ's Region 12 encompasses 13 counties, i.e., five more than the eight-county HGB area. However, all of the meteorological monitoring stations are within the HGB area. So the "Region 12 average" is the average of all stations in the HGB area.

A comment was made by H-GAC staff that there appears to be an increase in the road construction occurring on weekends, now being somewhat comparable to that on week days. Also, there is appreciable road construction that now occurs at night. Jim indicated he wasn't entirely sure about the distribution of construction emissions between week days and Saturday and Sunday. However, the diurnal profile for construction does generate appreciable night time emission, although they are less than day time (6 AM to 6 PM) emissions. H-GAC staff (Shelley Whitworth) indicated they would try to find more quantitative information on the temporal distribution of construction activity in Houston. (Note: subsequent to the meeting it was determined that Saturday and Sunday emissions for all construction equipment are 50% and 30% of weekday emissions, respectively. Night time emissions for all construction equipment are 25% of day time.)

With respect to running CAMx for non-intensive periods, Jim indicated that CAMx is being run for the entire TexAQS II period of August 13 through October 12, 2006, and that during this period there were a number of consecutive days with notably low ozone concentrations (e.g., September 15-18, 2006; maximum daily eight-hour ozone approximately 45 ppb). By running the CAMx for the entire TexAQS II period, non-intensive periods have been modeled, although the low ozone periods have been only modeled for the 12 km domain.

Jim indicated that the relatively higher maximum daily eight-hour ozone concentrations measured on a few Thursdays (i.e., August 17 and 31, and September 7) is probably just coincidental.

Jim concluded his presentation, noting that based upon EPA statistical performance measures, this initial modeling for the TexAQS II episodes is suitable for SIP purposes. Jim noted that the graphical performance shows a tendency of the model to under-predict maximum daily eight-hour ozone, especially for measured values greater than 84 ppb. Future modeling for these TexAQS II episodes will include updates to the emissions (e.g., further reconciliation of the HRVOCs) and use of temporally and spatially varying boundary conditions derived from the GEOS-CHEM model.

### **SIP Modeling Update: Initial 2018 Modeling and Future Design Values – Dick Karp, TCEQ**

Dick presented the first initial 2018 future projected modeling (Note: Dick's presentation is available on the SETPMTTC Web site [http://www.tceq.state.tx.us/implementation/air/airmod/committee/pmttc\\_set.html](http://www.tceq.state.tx.us/implementation/air/airmod/committee/pmttc_set.html)). The presentation included a discussion of the meteorological modeling, the emissions modeling and processing, the CAMx modeling, and pertinent caveats concerning the results. Dick indicated that the modeling files for this initial 2018 projection would be posted to the TCEQ FTP site by early next week.

Questions and comments that arose during Dick's presentation included:

- A question about non-road VOC diurnal profile
- A suggestion concerning the scaling of the emissions pie charts
- A comment about the applicability of weight-of-evidence
- A comment about the accuracy of the across-the-board emission reduction matrix.

Dick agreed that the non-road VOC diurnal profile showing peak emissions at 8 and 9 AM (CST) was a bit puzzling, especially in comparison to the non-road NO<sub>x</sub> diurnal profile, which is rather flat during the day-time. (Note: subsequent to the meeting, it was determined that residential and commercial lawn mowing, the major source of week day VOCs, have a temporal profile with notably higher emissions for 8 and 9 AM.)

A couple of the participants recommended that the pie charts depicting the distribution of emissions by source category (e.g., point, area, mobile) be scaled to more readily show the reduction in the total emissions between the 2005 baseline and 2018 future. (Note: subsequent to the meeting, the pie charts were replaced with stacked bar charts, which directly show the reduction in the total emissions between the 2005 baseline and 2018 future, as well as the distribution of emissions by source category.)

Rohit Sharma, pointed out that three of the four monitors with 2018 projected design values greater than the NAAQS (i.e., 84 ppb) were less than 87 ppb, which is the EPA recommended level below which weight-of-evidence determinations showing the likelihood of attainment are acceptable. Although the reduction in nonattainment monitors to only four in 2018, with three less than 87 ppb, is very encouraging, Dick cautioned that this initial 2018 modeling, which presumes CAIR Phase 2, as well as a number of other caveats, may represent optimistic results. Also, with the new NAAQS at 75 ppb, the acceptance of weight-of-evidence determinations for the 84 ppb NAAQS, may be mooted to some extent.

Jim Wilkinson pointed out that the across-the-board emission reduction matrix doesn't take into account the sensitivity of ozone at the various monitors to emission reductions from different source categories. Dick concurred that the across-the-board emission reduction matrix only provides a rough estimate of the emission reductions needed to attain for each monitor.

Dick concluded his presentation emphasizing that the CAIR program has been vacated and TCEQ staff are working with EPA and other entities (e.g., LADCO) to develop 2018 non-CAIR emission estimates. In addition, there are a number of improvements to the modeling currently in progress. Some of these can be expected to increase the future design values, while others may result in a decrease.

(Note: The next meeting is scheduled for November 20, 2008.)