

SOUTHEAST TEXAS PHOTOCHEMICAL MODELING TECHNICAL COMMITTEE

Meeting Summary
April 13, 2011

H-GAC Offices
3555 Timmons Avenue
Houston, Texas

Members and Guests Present:

Dan Baker, Bruce Davis, Ken Gathright, Graciela Lubertino, Ryan Perna, Jian Zhang, Bright Dornblaser and Dick Karp, and via telephone Lola Brown, Angela Kissel, Steve Smith, Dan Cohan, Rohit Sharma, Tom Tesche, Jim Wilkinson, Carl Young, Ashley Mohr, Dayana Medina, Bob Cameron, and Liz Hendler.

All presentations are available on the SETPMTTC Web site,
http://www.tceq.state.tx.us/implementation/air/airmod/committee/pmtc_set.html.

SIP Planning and Implementation Update – Lola Brown (TCEQ)

Lola gave a verbal update via the conference telephone. Lola reported that at the April 20, 2011, commissioners' agenda, staff will be recommending SO₂ area designations. When asked about areas to be recommended for nonattainment designation, Lola responded that only Jefferson County was being recommended for nonattainment designation

Lola also reported that at the June 8, 2011, commissioners' agenda, staff will be proposing a RACT rule revision for Chapter 115, VOC, and a RACT Analysis Update SIP revision. Lola explained that for some of the VOC emissions categories, the TCEQ was not able to include the RACT analysis in the latest SIP due to delays in EPA providing guidance. Lola was asked whether the RACT analyses would change the emissions used in the HGB attainment demonstration SIP, and responded that no emission changes were needed.

For questions or more information, please contact Lola at lola.brown@tceq.texas.gov.

H-GAC Air Quality Issues – Graciela Lubertino, Ph.D. (H-GAC)

Graciela presented a review of the draft results from the TTI comparison study of MOVES versus MOBILE6 for the 2006 baseline and 2018 future year HGB on-road link-based emissions. In particular, the 2006 baseline NO_x emissions increase by 42 %, from 207 tpd to 293 tpd, and the 2018 future year NO_x emissions increase by 110 %, from 52 tpd to 109 tpd. Of particular importance to H-GAC is the doubling of the future year NO_x emissions and the EPA mandate that after March 2012, mobile source conformity analyses must use the new MOVES emissions factor model. Graciela reported that H-GAC, along with other national transportation planning organizations

(i.e., AMPO, AASHTO), met with EPA-OTAQ to express their concerns that SIP revisions for the new ozone standard, which would include MVEBs developed using the MOVES emissions factor model, will not be submitted prior to the March 2012 date requiring MOVES to be used for conformity. Recently, EPA-OTAQ informed the AMPO and AASHTO that they were beginning the process to extend the MOVES grace period beyond March 2012, possibly up to one year later. As Graciela showed, even March 2013 is too early because the HGB SIP revision for the new ozone standard is not expected until July 2014.

Graciela also presented an update on the H-GAC project to develop a methodology for estimating greenhouse gas emissions and assessing mitigation options for project level applications for on-road mobile source. Several mitigation options (control strategies) have been identified, including HOV facilities and Hybrids/Electrification of vehicle fleets, and GHG emission reductions are being estimated.

For questions or more information, please contact Graciela Lubertino at graceila.lubertino@h-gac.com

EPA Update – Carl Young, Ashley Mohr, Dayana Medina (EPA)

Carl presented an update on the new ozone standard and the 185 fees. The current primary and secondary ozone standard is 75 ppb, and based upon the latest validated ozone data (2009), three areas of Texas are monitoring nonattainment (i.e., DFW, HGB, BPA). At the highest ozone level being considered for the revised standard (i.e., 70 ppb) an additional five areas in Texas would have been monitoring nonattainment based on the 2009 ozone data.

Carl reported that EPA expects to issue the implementation guidance for the revised ozone standard along with the revised primary level and unique secondary standard on July 29, 2011. The implementation guidance will include the classification scheme and pertinent dates for SIP-related submissions. For example, EPA will defer ozone area designations until reconsideration of the 75 ppb standard is complete, and thus expects to finalize the designations and classifications during the 2012/2013 time period. Since SIP submissions are due three years after designation, EPA expects SIPs for the revised 2011 ozone standard will be due in the 2015/2016 timeframe.

Carl was asked about the possibility that EPA would leave the ozone standard at the 75 ppb level, and responded that it seemed quite unlikely. Carl was also asked about the 2015/2016 timeframe for SIP submissions, in particular, whether other SIP-related activities, such as using MOVES for conformity, would be delayed. Carl responded that issues, such as MOVES, would need to be addressed. Carl was also asked about revisions to the modeling guidance, and responded that he was not aware of any changes to the modeling guidance.

Carl presented information concerning the Clean Air Act Section 185 fees, which are applicable to severe and above ozone nonattainment areas that fail to attain the ozone standard by their attainment date. Since the HGB area was classified Severe-17 for the one-hour ozone standard (124 ppb) and did not attain by 2007, the 185 fees are

applicable. In March 2008 and in January 2010, EPA issued guidance on calculating the baseline emissions for major sources and on the elements of a fee program, respectively. Carl indicated that the guidance sets forth the process for terminating a fee program once an area achieves attainment. Additionally, the guidance provides a provision for areas that are not meeting the one-hour ozone standard, but have met the 1997 eight-hour ozone standard to request a termination of the 185 fee program. Since the HGB met the 1997 eight-hour ozone standard in 2010 (i.e., with an ozone design value = 84 ppb), the TCEQ submitted a request (May 2010) to suspend the 185 fee program for the HGB area. Carl indicated EPA is still reviewing the request and assessing the level of permanent and enforceable emissions reductions and the likelihood that the HGB area will continue to attain the 1997 eight-hour ozone standard. As Carl showed, Manvel Croix Park (CAMS 84), the HGB design value monitor for the 1997 eight-hour ozone standard, can have a fourth high no greater than 75 ppb for 2011, in order for the area to remain attainment.

Carl was asked about the recent federal notice disapproving the Interstate Transport SIP for the 2006 24-hour PM_{2.5} standard. Carl explained that a number of states had relied on CAIR emission reductions as part of their SIP, but since CAIR was remanded, EPA cannot approve the portion of those SIPs which relied on CAIR.

Ashley and Dayana presented information on the new one-hour SO₂ standard of 75 ppb. During the presentation, Ashley indicated that after receipt of the states' recommended designations (no later than June 2011), the EPA must notify states within 120 days of the date of promulgation (June 2012), if they have issues with any of the recommended designations and plan to modify the recommendations. States would then have 60 days to provide additional information to support their recommendation. Also during the presentation, Ashley and Dayana indicated that EPA does not think it is realistic or appropriate to expect states to complete modeling for all significant sources of SO₂ and assess the results in time for the designations recommendations due by June 2011.

Therefore, since EPA is requiring modeling and monitoring, if available, to support an initial designation of attainment, they expect that states will submit "unclassifiable" designation recommendations for most of the areas within their boundaries. All states are expected to submit SIPs by June 2013, addressing section 110(a)(2) infrastructure requirements, ensuring that the standard will be attained, maintained, and enforced.

Attainment areas are expected only to submit section 110(a)(2) infrastructure SIPs.

Nonattainment areas must submit SIPs within 18 months of the effective date of designation (i.e., by February 2014) demonstrating attainment by August 2017.

Unclassifiable areas are expected to submit section 110(a)(1) SIPs that include: (1) an attainment demonstration using dispersion modeling; (2) an attainment inventory; (3) a control strategy, as appropriate; (4) a contingency plan; and (5) a plan for verification of continued attainment.

Emissions from Oil and Gas Platforms in Texas Waters – Dick Karp (TCEQ)

Dick's presentation provided a summary of an emissions improvement project conducted by Eastern Research Group (ERG) to update emissions from oil and gas platforms in Texas waters, i.e., less than 10.3 miles from shore. The primary objective of this project was to develop accurate emissions for the various sources on the oil and gas

platforms operating in Texas waters of the Gulf of Mexico by identifying and characterizing the various process units (emission sources) deployed on the platforms. Dick indicated that this would allow the emissions from the platforms in Texas waters to be modeled as discrete point sources, similar to how the emissions from platforms in federal waters are modeled.

Since permitting and recordkeeping for offshore oil and gas activities in Texas waters is regulated by the Texas Railroad Commission (RRC) and the Texas General Land Office (GLO), ERG contacted these agencies for data pertinent to the platforms, including location, process units and process unit activity levels. ERG also contacted other state and federal agencies that compile some data from oil and gas activities in the Gulf of Mexico, including the TCEQ, the Energy Information Administration (EIA) and the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE, predecessor to the Minerals Management Service). Unfortunately, ERG was unable to obtain sufficient usable information regarding the platforms and their process units, particularly from RRC and GLO to meet the primary study objective. In addition, ERG found inconsistencies in similar data provided from different sources (e.g., platform location).

As Dick showed, ERG modified the project approach to estimate emissions based upon the data they were able to obtain. This approach used the detailed BOEMRE Gulf-wide platform emissions inventory to define a typical oil producing platform and separately, a typical gas producing platform with typical process units and annual activity levels assigned to each platform type. Combining the ratio of process unit annual activity levels to annual production (i.e., oil and gas) with process unit emission factors (e.g., AP-42) and the 2008 annual county-level offshore Texas waters oil and gas production, ERG estimated 2008 annual emissions from oil and gas platforms in Texas water at a county-level resolution.

The TCEQ has reviewed the 2008 annual emission estimate provided by ERG and compared the emission/production ratios for oil and gas producing platforms in Texas waters to the emission/production ratios for oil and gas producing platforms in federal waters (BOEMRE), which appears to indicate an inconsistency. The annual emission/production ratio for oil production in Texas waters is a factor of seven times higher than the emission/production ratio for oil production in federal waters, while the emission/production ratio for gas production in Texas waters is a factor of five times lower than the emission/production ratio for gas production in Texas waters.

Dick indicated that although emissions from oil and gas platforms in state waters are not expected to constitute major sources of ozone precursors, modeling them as discrete point sources is much more appropriate and would provide better model performance than modeling them as area sources, which is the procedure for emissions estimated at a county-level resolution.

Dick was asked about the possibility of negotiating a memorandum of understanding (MOU) with the RRC and GLO to enhance cooperation in providing usable data for platforms in Texas waters so emissions could be estimated as discrete point sources. Dick responded that he was not aware of any MOU with either agency, but that the

TCEQ has negotiated MOUs with other agencies in the past, such as TxDOT for assisting in the development of on-road mobile source emissions. Dick indicated he would check into the possibility of negotiating an MOU with the RRC and GLO.

Also during the presentation, it was pointed out that the 2008 annual gas production from platforms in federal waters was in error. Dick indicated he would consult with Bob Cameron (BOEMRE) to correct the error. Subsequent to the meeting Dick conferred with Bob and determined that the error was a typographical error, which has been corrected, and the 2008 annual emission/production ratio for gas production in federal waters is correct as presented.

WRF Meteorological Modeling Status for Houston – Bright Dornblaser, Ph.D., (TCEQ)

Bright provided an update on the status of the Weather Research and Forecast (WRF) meteorological modeling for the HGB area. Bright indicated that WRF is replacing MM5 as the preferred meteorological model for developing meteorological inputs to photochemical models, such as CAMx. As Bright explained, similar to MM5, WRF modeling requires the selection of a configuration, including the mapping projection of the various sized gridded domains, physics options and ambient aerometric data nudging options.

Bright showed the new TCEQ meteorological modeling domains, which use the same mapping projection parameters used by the EPA and regional planning organizations (RPOs). In particular, there are two fine-grid 4 km nested meteorological modeling domains encompassing most of Texas. The western fine grid domain will be used for modeling El Paso and the eastern fine grid domain, which is relatively large in extent (864 km by 1152 km), will be used for modeling a number of new areas (e.g., San Antonio), in addition to the HGB area. Bright was asked whether WRF would be used to model a finer grid domain for the HGB area, such as 1 km. Bright responded that a decision to model at a finer scale will depend on the need for finer resolution and management concurrence.

Bright explained that modeling for the new ozone standard will primarily focus on an extended June 2006 episode (May 29 through July 2, 2006), a period when relatively high daily maximum eight-hour ozone concentrations were monitored in each of the areas likely to be designated nonattainment. In addition to the extended June 2006 episode, the episodes that occurred during TexAQS II will also be modeled for the HGB area.

Bright indicated that over 18 major WRF modeling simulations and additional minor simulations have been run testing a variety of planetary boundary level (PBL) options, cumulus cloud schemes and land-use options. Additionally, analysis (NCEP-NAM) and observational nudging of aloft (profilers) and surface (NCAR-ds472.0) wind measurements were applied to the un-nudged simulations which improved the comparison with ambient aerometric data (e.g., winds, temperature, humidity). Bright stated that currently, the best overall WRF modeling performance (i.e., comparison of monitored and modeled wind speed and direction) in the 4 km gridded domain has been

attained using analysis and observational (surface and aloft) nudging and the following physics options:

- YSU PBL scheme,
- Kain-Fritsch cumulus parameterization,
- WSM 6 microphysics, and
- a five-layer thermal diffusion.

Bright showed hourly time series of domain-wide averaged surface-level monitored and modeled wind speed and direction, for the extended June 2006 episode. The time series compare quite favorably. In addition, Bright showed similar time series of HGB area averaged surface-level monitored and modeled wind speed and direction for the extended June 2006 episode and the TexAQS II episodes. As may be expected, since fewer monitors are being averaged for the HGB area, the overall comparison between the monitored and modeled wind parameters is not as favorable as for the domain-wide comparison. However, as Bright pointed out, for those days when high daily maximum eight-hour ozone concentrations were monitored in the HGB area, the comparison is generally quite favorable, while the more unfavorable comparisons typically occur on days with high monitored wind speeds, which are associated with low monitored daily maximum eight-hour ozone concentrations.

Bright reported that current and future meteorological modeling activities include performance evaluation of wind parameters for additional sub-regions of the 4-km gridded domain (e.g., DFW, SAT, TLM), evaluation of wind parameters for key monitors within sub-regions and evaluation of other meteorological parameters (e.g., PBL heights, clouds, temperature). Bright concluded showing graphical examples of the evaluation for some of the other meteorological parameters (e.g., modeled cloud optical depth versus GOES-measured cloud cover fraction).

Bright was asked about the application of the enhanced sea-surface temperature (SST) and land-use procedures developed for the MM5 to the WRF model. Bright responded that the previous MM5 modeling evaluation did not indicate that the enhanced SST made a noteworthy improvement over use of the daily NCEP SST data. However, the enhanced land-use data procedure will be adapted to use in WRF. Bright was asked a follow-on question about the performance of the model in replicating air temperatures. Bright responded that generally attaining good wind performance is the primary focus, since wind appears to be the meteorological parameter to which ozone is most sensitive. Therefore, when considering changes or adjustment to improve temperature performance, it is important not to degrade wind performance. The TCEQ has been supporting various projects, such as ACM2 development, which would facilitate the assimilation of GOES cloud data into WRF and in part improve temperature performance.

Bright was also asked about continued discussions and sharing of data with the 8-Hour Coalition contractor (Dennis McNally), and responded that he has talked with Dennis and they have discussed the physics options the TCEQ is currently using.

8-Hour Coalition Update – Jim Wilkinson, Ph.D., (Alpine Geophysics) and Tom Tesche, Ph.D., (CARA)

Jim gave a verbal update concerning modeling activities being conducted for the 8-Hour Coalition. Currently, an extended modeling work plan through 2012 is being developed, in response to the EPA implementation schedule for the new ozone standard. Technical work is ongoing, with meteorological modeling of 2008 and 2009 using MM5 and WRF and CAMx modeling of 2009 expected to be completed in mid-October 2011. This will be followed with CAMx modeling of 2008 and WRF modeling of 2010.

Tom Tesche explained that the ensemble modeling approach to ozone SIP modeling is ground-breaking work. A major element of the approach is determining modeling bias in the ensemble modeling of the historical episodes and appropriately adjusting the ensemble modeling of the future years.

Next Meeting Schedule and Agenda– Dick Karp, (TCEQ)

Dick indicated that the next meeting is tentatively scheduled for Wednesday June 29, 2011. Conference rooms at H-GAC were available on that date and Graciela submitted a reservation request, and the meeting date has now been confirmed. Dick also mentioned that based upon the Flare Task Force Study Final Report schedule (June 14, 2011), it may be possible to have a presentation summarizing the study findings. Additionally, Dick mentioned that Lamar University is scheduled to make a presentation on the status of their flare-related studies. Ryan Perna with the TCEQ Houston office also agreed to present a summary of the ozone monitoring data to date.

Dick suggested that a Webinar be setup for the August 2011 meeting, and the participants seemed to be agreeable. Dick indicated he would contact the appropriate TCEQ staff to determine what needed to be done. The meeting was then adjourned.