

SOUTHEAST TEXAS PHOTOCHEMICAL MODELING TECHNICAL COMMITTEE

Meeting Summary
June 29, 2011

H-GAC Offices
3555 Timmons Avenue
Houston, Texas

Members and Guests Present:

Dan Baker, Susan Moore, Marise Textor, Dan Cohan, Julia Golovko, Christine Smith, Graciela Lubertino, Nathan Chenaux, Thomas Ho, Jian Zhang, Ziyuan Wang, Dan Chen, Jim Smith and Dick Karp, and via telephone Liz Hendler, Steve Smith, Greg Stella, Jed Andersen, Chris Rabideau, Jim Wilkinson, Mike Feldman and Carl Young.

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

SIP Planning and Implementation Update – Lola Brown (TCEQ)

Lola was unable to participate due to a scheduling conflict, so Dick presented the update prepared by Lola. At the June 8, 2011, commissioners' agenda, the proposed RACT rule revision for Chapter 115, VOC, and a RACT Analysis Update SIP revision for the HGB area were approved. These actions focus specifically on the seven Control Techniques Guidelines (CTG) documents issued by the U. S. Environmental Protection Agency from 2006 through 2008, and incorporate concurrently proposed CTG-related rulemaking and a revision to the HGB attainment demonstration SIP adopted March 10, 2010. A public hearing on these proposals will be held in Houston, Texas, on July 18, 2011, at 6:30 p.m., at the Houston-Galveston Area Council (H-GAC).

Among the actions taken by the commissioners at the June 22, 2011, agenda meeting, were denials of a petition requesting a revision to the Texas SIP to reflect the impacts of foreign pollutant transport (Project No. 2011-022-PET-NR), and a petition requesting a Greenhouse Gas Reduction Plan (Project No. 2011-020-PET-NR). More information is available on the Commissioners' Agenda Web page (http://www.tceq.texas.gov/agency/agendas/comm/comm_agendas.html).

Consideration of the adoption of the Title V Air Emissions Fees (Rule Project No. 2011-006-101-EN) is scheduled for the July 20, 2011, commissioners' agenda. Documents will be available on the Agenda Meetings and Work Sessions Web page (<http://www.tceq.texas.gov/agency/agendas/agenda.html>).

A Flare Task Force Stakeholder Group meeting was held June 1, 2011, at H-GAC. Informal written comments on the draft report were due June 20, 2011, and are available on the Flare Task Force Stakeholder Group Web page

http://www.tceq.texas.gov/airquality/point-source/stationary-rules/flare_stakeholder.html).

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

Ozone Monitoring Update – Nathan Chenaux (TCEQ Region 12)

Nathan presented an update of the ozone monitoring for 2011, through June 26, 2011, for the 21 regulatory monitors in the HGB area. Nathan emphasized that this data is provisional, since it has not been fully quality assured.

Thus far, there have been 14 exceedance days of the 75 ppb eight-hour ozone standard, five exceedance days of the 84 ppb eight-hour ozone standard and one exceedance day of the 124 ppb one-hour ozone standard. Nineteen of the 21 regulatory monitors have fourth-high measured ozone concentrations greater than 75 ppb. The highest fourth-high measured ozone concentration (81 ppb) was recorded at Manvel Croix (CAMS 84), which combined with the fourth-high ozone concentrations measured in 2010 and 2009 yields a current design value of 86 ppb.

Nathan was asked about the calculation of the design value, and explained that the design value is calculated as the average of the fourth-high ozone concentrations measured in 2011, 2010 and 2009.

Nathan was also asked about trends in the eight-hour period. Nathan explained that data analyses, such as trends, are handled by the Air Modeling & Data Analysis section in Austin, but most of the eight-hour periods for the exceedance days occur between late morning (e.g., 10 – 11 am) and late afternoon (e.g., 5 – 6 pm).

Nathan was also asked about weather-induced power outages that presumably could result in larger emissions of precursors and higher ozone concentrations. Additionally, a question arose concerning the analysis of “odd ozone days.” Dick responded that for purposes of SIP modeling, the agency tries to exclude any days with unique features, focusing on high ozone days with typical and recurring features. Therefore, only a limited analysis is conducted for days with unique features. As an example, Dick explained that ozone exceedance day episodes that occurred in late July 2005 were not considered for SIP modeling due to the hurricanes that may have perturbed the atmospheric conditions in the HGB area. However, as Jim Smith noted, the August-September 2000 episode used for SIP modeling were somewhat unique with the abnormally high temperatures but was used for some SIP revisions because that is when the TexAQS 2000 field study was conducted.

It was pointed out that of the 14 exceedance days, only one of the days occurred on a Sunday, June 5, 2011. For June 5, 2011, Nathan reported the temperature reached 102 degrees and the average wind condition was 3 mph out of the ENE (Ellington Field). Additionally, Steve Smith indicated the back trajectory was characteristic of the typical veering wind flow pattern associated with high ozone formation.

For questions or more information, please contact Nathan at Nathan.chenaux@tceq.texas.gov.

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

Graciela gave a verbal update. She reported that the conformity issue with the 2018 MVEB had been resolved, using new HPMS adjustment factors based on 2008 data. The 2008 data showed lower VMT than expected, which results in lower VMT projected for 2018. Graciela, also, indicated H-GAC would be revising the VMEP used in the HGB SIP demonstration.

Graciela was asked about the effect of the recession on lower VMT and responded that it could have had some effect. However, during this discussion, it was pointed out that a previous analysis presented by the TCEQ at a SETPMTC meeting (January 26, 2010) indicated the economic downturn did not appear to affect Texas until early 2009.

Graciela reported H-GAC was modeling mobile source (link-based) GHG reductions and using the UH monitoring data (e.g., CO/NO_x ratio) for model evaluation.

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

EPA Update – Carl Young, Michael Feldman (EPA)

Carl reported that EPA and the TCEQ conducted an LDAR and Flare Workshop at the TCEQ June 14-15, 2011, and one of the presentations (posted on the SETPMTC web site) presented by Jodi Howard dealt with the regulatory update for flares. Changes, clarifications and new requirements under consideration include limiting over-steaming of flares and calculating net heating values from all gases supplied to the flare. EPA intends to initially focus on the refining and chemical section with proposed rulemaking at the end of this year. For questions or more information, please contact Jodi Howard (howard.jodi@epa.gov) or Andrew Bouchard (bouchard.andrew@epa.gov).

Michael reported that the implementation guidance documents for the Clean Air Transport Rule (CATR; now known as Cross-State Air Pollution Rule, CSAPR) and the SO₂ SIP, as well as the revised ozone standard are scheduled to be released by the end of July. In addition, the comment period for the Clean Air Mercury Rule for EGUs has been extended.

Michael also reported that last week the WRAP hosted a photochemical modeling workshop (<http://www.wrapair2.org/events.aspx>) to address various modeling issues. Michael was asked whether international and regional transport was addressed at the workshop and responded that transport was not one of the major topics.

Carl and Michael were asked about PM and responded that EPA may pursue some action later this year. Carl and Michael were also asked about the rumored one-year extension of the requirement for implementing MOVES and responded that they did not have any information.

NASA Air Quality Applied Sciences Team Update –Dan Cohan, Ph.D., (Rice University.)

Dan's presentation provided an introduction to the NASA Air Quality Applied Sciences Team (AQAST; <http://acmg.seas.harvard.edu/aqast/index.html>), whose goal is to transfer earth science knowledge acquired from NASA satellites, suborbital platforms and models, to serve the needs of air quality management in the US. The team is comprised of a number of seasoned air quality researchers from federal agencies and academia. The initial AQAST meeting was held recently in conjunction with the EPA Advanced Monitoring Initiative (AMI; <http://www.epa.gov/geoss/ami/projects.html>) workshop and the GEO-CAPE (<http://geo-cape.larc.nasa.gov/>) community workshop.

Dan mentioned that prior to the initial AQAST meeting, he had discussed with TCEQ modeling staff potential projects, including quantifying policy relevant background ozone concentrations, estimating fire emissions and seasonally varying biomass densities for estimating biogenic emission.

Dan was asked about the annual budget and responded that AQAST has been allocated \$3.5M per year for the next five years, with a core funding of \$150K per year per member and an additional \$1M per year available to the team for special projects. The funds are available starting in October 2011 (i.e., FY 2012).

Dan was also asked whether any of the projects would be addressing climate change, and responded that the projects need to focus on air quality issues, but that climate change impact on air quality may be an issue. A follow up question regarded participation by private and international representatives. Dan replied that the team is U.S. only, and that the team welcomes input from industry on research priorities.

During the presentation, it was mentioned that other NASA science teams are predicting weather conditions (e.g., droughts and flooding), and the AQAST should consult with them to address the effects on air quality. There was also some discussion on the ability of satellites to detect traffic patterns and congestion. Dan noted that the spatial resolution of satellite data generally isn't high enough to detect individual roadway emissions. In addition, there was a question about the GEOSChem global model and how acetone was treated. Dan responded that acetone was definitely an ozone precursor in the upper troposphere and its concentration needed to be realistically represented in the GEOSChem global model.

Boundary Conditions Project (TCEQ-2010-67) update – Jim Smith, Ph.D. (TCEQ)

Jim presented a summary of the boundary conditions and ozone transport project conducted by Harvard University and the NASA Jet Propulsion Laboratory (JPL). Harvard University used the GEOSChem global model to derive base case (2005/06) and future year (2018) CAMx ready boundary conditions. The JPL used satellite observation data to characterize ozone transport into Texas.

During the presentation, Jim was asked about model performance for the GEOSChem global model, and responded that because of the relatively large grid size, 2° latitude by 2.5° longitude, model performance evaluation is hampered. However, Jim indicated that the TCEQ would do some model performance focusing on the higher ozone days.

Jim presented a table of the percentage change in modeled anthropogenic emissions for selected chemical species between 2005 and 2018, which showed a 5% reduction in U.S. NO_x emissions. It was noted that given the regulatory NO_x emission reductions for mobile sources and electrical generation in the U.S., one might have expected a larger decrease in NO_x emissions between 2005 and 2018. Jim agreed that there was probably insufficient control applied to US emissions, but that what is important are concentrations at the boundaries when transport into the domain is occurring. GEOS-Chem provides a reasonable inventory from a global perspective and is the best tool available for estimating and predicting global transport.

Jim was asked about the availability of the boundary conditions and responded that Environ is currently extracting the boundary conditions for the CAMx outer domain from the GEOSChem global model output files and we expect to receive the CAMx ready files in about a week.

During Jim's presentation of the ozone transport analyses, he was asked about the impacts from outside Texas and responded that although analyses like the one conducted for August 2, 2005, are promising, we can't at this time provide a reliable estimate of the impacts of all non-Texas sources on the attainment status of areas in Texas.

CFD Flare Modeling (AQRP-22) Update – Daniel Chen, Ph.D. (Lamar University)

Daniel presented an update on the computational fluid dynamic (CFD) flare modeling project (AQRP-22). This project will test the applicability of using CFD models to replicate the flare efficiencies and chemical speciation of flare combustion emissions measured during the TCEQ 2010 Flare Study. Two CFDs that have been used to model flares, Fluent and Chemkin, will be merged and used to model the low flow and low heating value vent gas mixtures, with varied air or steam assist rates tested in the TCEQ 2010 Flare Study. Additionally, this project will build on the results of the TCEQ/HARC project (H-83), which developed a flare chemical combustion mechanism.

Dan showed preliminary CFD modeling results for test case A2.1 of the TCEQ 2010 Flare Study. The A2.1 test case is pure propylene, with a relatively high heating value (2125 btu/scf), but also a high air to vent gas mass ratio, equivalent to an excess air factor of 16. The measured combustion efficiency (CE) and destruction removal efficiency (DRE) were 95.54% and 97.15%, respectively and the corresponding model values were 93.21% and 99.15%, respectively, which are in good agreement.

Flare Speciation and Air Quality Modeling (SEP) Update – Thomas Ho, Ph.D. (Lamar University)

Thomas presented an update on the SEP funded flare speciation and air quality modeling project. The objective of this project is to determine the effect that chemical speciation of the flare combustion products has on ozone formation. The project consists of two tasks. The first determines the effect of lower flare CEs (98% down to 70%) on ozone formation and the second determines the effect from an associated change in the chemical speciation of the flare combustion emissions at lower CEs.

Thomas showed results for the first task, when the flare CEs are incrementally decreased from 98% to 70 %, applied to the HGB June 2006 SIP modeling episode. At a CE of 70% (i.e., an increase of emissions by a factor of 15 times), VOC emissions from flares are increased the most in the Houston Ship Channel, resulting in higher modeled maximum daily eight-hour ozone concentration.

During the presentation, Thomas was asked about comparing the modeling results with monitored concentrations. Thomas indicated that although it was possible to make the comparisons, the adjustment to the flare combustion emissions, for the series of reduced CEs was applied uniformly to all the flares making the comparison with monitored concentrations less meaningful.

During the presentation there was also a question about the 10x flare modeling sensitivity, which the TCEQ included in the HGB SIP. Jim Smith responded that the 10x flare modeling sensitivity was compared with ambient measurements and greatly improved the replication of the aircraft monitoring, but tended to over predict concentrations at some of the surface monitors (e.g., Deer Park).

HECT-Applicable HRVOC Flare Data Request - Dick Karp (TCEQ)

Dick verbally presented the agency's rationale for issuing a HECT applicable HRVOC flare emissions-related data request for historical modeling episodes in 2006 and the entire year of 2009. The TCEQ intends to use the requested information in conjunction with the findings of the TCEQ 2010 Flare Study. Because the modeled attainment test for ozone is based on the predicted change from a baseline year to a future year, it is extremely important that the baseline year emissions be as accurate as possible. If the baseline emissions are too small, then the predicted ozone change may also be too small, leading to a potential over-prediction of future design values. This data will provide an essential component for improving the modeling baseline HRVOC emissions.

During the presentation, Dick was asked about the timing of issuing the request, and responded the he was hopeful the request could be issued by the end of July 2011. Facilities are not required to provide information that is more than five years old upon receipt of this request, so Dick asked for some cooperation in retaining and submitting the June 2006 data.

Dick was also asked whether the HECT allocations would be revised based on the data being requested and responded that he didn't think that would be necessary. Since the

HECT allocations presume DREs of 98% or 99%, which the TCEQ 2010 Flare Study indicate can be achieved, with flare operations that address the mass flow, heating value and assist rate, the HRVOC emission allocations should still be appropriate. In addition, Dick indicated it should still be appropriate to model the 2018 attainment year at the HECT cap, since by then the facilities with HECT applicable HRVOC flares should have modified their operations to achieve DREs of 98% or 99%.

Next Meeting Schedule and Agenda Topics

Dick suggested that the next meeting be during the second half of August, and he would work with Graciela to find a date when conference rooms were available. The EPA is scheduled to announce the revised ozone standard the end of July, so a presentation concerning the standard could be scheduled. Also, the presentation on the ozone sonde data that was scheduled for this meeting can be rescheduled for the August meeting. Additionally, there has been some interest in identifying exceptional events for the HGB monitored ozone, and presentations on this subject could also be scheduled for the August meeting.

The meeting was adjourned.