TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

January 30, 2008

Mr. Guy Donaldson
Chief, Air Planning Section (6PD-L)
U.S. Environmental Protection Agency
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Re: Clean Air Act Reclassification of the Houston/Galveston/Brazoria Ozone Nonattainment Area; Texas; Proposed Rule

Dear Mr. Donaldson:

In the *Federal Register* notice published December 31, 2007, the U.S. Environmental Protection Agency (EPA) proposed to grant a request by Governor Perry to voluntarily reclassify the Houston-Galveston-Brazoria (HGB) ozone nonattainment area from a moderate eight-hour ozone nonattainment area to a severe eight-hour ozone nonattainment area. The Texas Commission on Environmental Quality (TCEQ) agrees with the EPA that pursuant to the Federal Clean Air Act (FCAA), Section 181, the Administrator shall grant the request of any state to reclassify a nonattainment area in that state to a higher classification.

The TCEQ concurs with EPA's interpretation of the FCAA, based on the severe classification, that the HGB area must attain the eight-hour standard as expeditiously as practicable but no later than June 15, 2019.

The EPA also proposed a range of dates from December 15, 2008, to April 15, 2010, for submission of the revised HGB State Implementation Plan (SIP) for the eight-hour ozone standard. The TCEQ recommends April 15, 2010, as the appropriate date for submission of the HGB SIP for the eight-hour ozone standard due to the extraordinarily complex nature of ozone formation in the HGB area; the need to successfully model a large number of ozone days; the vast trove of new scientific information just now beginning to emerge from the Texas Air Quality Study II (TexAQS II); complicated issues associated with developing and implementing emission reductions measures; and the need for extensive stakeholder involvement.

Requiring the state to submit an attainment demonstration any time before April 2010 does not change the attainment date nor does it advance the protection of public health. In fact, an earlier submittal schedule is counterproductive to protecting public health. A December 2008 deadline would mean that all initial technical work on the HGB SIP would be discontinued. The SIP revision would contain little more than previous modeling (2000 episode) and a control strategy package that relies on fleet turnover from federal rules.

SIP-relevant analyses from data collected as a part of TexAQS II in 2005 and 2006 are now becoming available. Collectively, these results will be critical in guiding the TCEQ modeling development and in validating the results. Developing a modeling demonstration that does not account for these critically important initial research findings would be irresponsible and a waste of the public funds used for this research. The modeling demonstration would likely need to be completely redone almost immediately.

The TCEQ cannot complete the modeling and associated quality assurance and peer review needed to adequately support an attainment demonstration prior to March 2009. Attempting to do so will only serve to delay the development of an attainment demonstration based on the latest scientific understanding of the complex process of ozone formation in the HGB area.

The TCEQ will be using the 2006 Nitrogen Oxide (NO_X) and Volatile Organic Compound (VOC) Emissions Inventory (EI) year for control strategy development. However, processing and quality assuring the 2006 EI, which is being expedited for the HGB area, will not be complete until early 2008, meaning some of the early aspects of control strategy development cannot begin until spring 2008. The 2006 EI year will represent the most accurate VOC EI for the HGB area to date, which is critical considering the under representation of VOC emissions in previous HGB SIP modeling. This EI data is important for the agency to evaluate the potential need for further VOC controls. In addition, the regulated community has implemented the highly reactive volatile organic compound (HRVOC) monitoring requirements at substantial cost. Similarly, the 2006 NO_X EI is preferable because it is closer to the final 2007 step-down phase of the NO_X Mass Emissions Cap and Trade (MECT) Program, the largest emission reduction strategy in the HGB area. The 2006 NO_X EI will best reflect the status of the controlled NO_X point source inventory when evaluating potential NO_X control strategies. Not using this improved EI data for evaluation purposes in the eight-hour ozone attainment demonstration will diminish the TCEQ's ability to develop meaningful control strategies, beyond relying on fleet turnover and federal engine standards.

After identification of control strategies, the rule and SIP development process will begin in early 2009. The rulemaking process under the Texas Administrative Procedure Act, combined with rule and SIP agency guidelines typically takes about one year and includes: stakeholder meetings, proposal of the rules and SIP revision, publication of the rules in the *Texas Register*, public hearings, the public comment period, developing response to the comments received, and preparation of the SIP revision and the rules adoption packages.

It is imperative that the EPA provide the TCEQ adequate time to develop a comprehensive and technically sound HGB eight-hour ozone attainment demonstration. If the TCEQ does not have sufficient time to include the 2006 data, the HGB SIP and improvement in air quality and public health protection in the HGB area may be delayed because the TCEQ will not have adequate data to focus efforts on those strategies that may reap the fastest and greatest reward in air quality improvement.

The TCEQ appreciates the opportunity to comment on the EPA's proposed range of dates from December 15, 2008, to April 15, 2010, for submission of the revised SIP for the eight-hour ozone standard. Please see the enclosed detailed justification of the TCEQ's anticipated schedule for developing the HGB Eight-Hour Ozone Attainment Demonstration SIP. Thank you for your commitment to work with the TCEQ on the HGB SIP submittal date and attainment of the standard as expeditiously as practicable. If you have any questions, please contact David C. Schanbacher, P.E., Chief Engineer, at 512-239-1228.

Sincerely,

Glenn Shankle, Executive Director
Texas Commission on Environmental Quality

Enclosure

Texas Commission on Environmental Quality's (TCEQ)
Comments/Justification to the U.S. Environmental Protection Agency's (EPA)
Clean Air Act Reclassification of the Houston/Galveston/Brazoria Ozone Nonattainment Area

Three principal components are critical in developing the eight-hour attainment demonstration for the Houston-Galveston-Brazoria (HGB) area: modeling demonstration, control strategy development, and the stakeholder process. Further, development of the Reasonable Further Progress State Implementation Plan (SIP) should be completed concurrent with the attainment demonstration SIP.

Modeling Demonstration

The TCEQ is developing new modeling episodes from 2005 and 2006. The new ozone modeling episodes will incorporate currently available emissions inventories (EIs) (i.e., 2005, 2006) and a large quantity of ambient monitoring data from automated gas chromatographs (auto-GC) and the Texas Air Quality Study 2006 (TexAQS II).

Background

The development of an eight-hour ozone attainment demonstration for the HGB area is complicated by many factors contributing to ozone formation in this area. A hot, sunny climate combined with a large urban population and a highly concentrated industrial area provide the framework for ozone formation. Other challenges to modeling and controlling ozone in the HGB area include the significant biogenic emissions and complex meteorology including a land/sea/bay breeze that can cause recirculation of air parcels.

Ozone attainment demonstrations are based primarily on the modeled future design values (DV_F) at monitoring sites in the nonattainment area. The DV_F for each monitor is calculated using a relative response factor (RRF) at that monitor. Each RRF is calculated based on the change in modeled concentrations from the current baseline to the future baseline (attainment date) and is limited to days where the baseline modeled concentrations exceed, or are close to exceeding, the ozone National Ambient Air Quality Standards (NAAQS).

The HGB eight-county area has more than 20 monitors that exceed the eight-hour ozone NAAQS. These monitors are spread across a geographic area of several hundred square miles. Some monitors record high ozone concentrations on only a few days per year when meteorological conditions are favorable. The variety of conditions that are favorable for ozone formation in this complex coastal meteorological regime means that a considerable number of modeling episodes is necessary to amass an adequate number of qualifying days to calculate the RRF. As per EPA guidance, the RRF for each monitor should be based on a minimum of 10 days with baseline modeled concentrations greater than 84 parts per billion (ppb). Although the guidance allows using days with baseline modeled concentrations as low as 70 ppb, the guidance also shows that using days with lower modeled concentrations biases the modeled response of ozone to emission reductions, resulting in modeled DV_Fs that are too high. Thus, there is a compelling need to model a sufficient number of episodes to ensure the RRFs at the various monitors are calculated on as many days with concentrations above 84 ppb as practicable.

The TexAQS 2000 Episode

Modeling for recent HGB SIP revisions was based on the period August 22–September 6, 2000. This period of high ozone coincided with the TexAQS 2000 intensive study period and was chosen primarily because the large volume of non-routine aerometric data collected allowed the TCEQ to develop adequate meteorological characterizations of the period and provided a robust dataset for model performance evaluation.

This episode was well suited to one-hour ozone modeling since the one-hour attainment test is based on modeled extreme values, but is inadequate for developing eight-hour attainment strategies for two reasons. First, the modeled DV_Fs based on the 2000 episode may likely be overestimated due to several

monitors having only one or two days with baseline concentrations over 80 ppb (see above). Second, the latter half of the 2000 episode is the hottest week ever recorded in the HGB area. In 57 years of records at Hobby Airport, five of the nine days with maximum temperatures exceeding 104°*F* occurred during this week. The appropriateness of control strategies designed for such rare, extreme conditions could be highly questionable. These considerations led the TCEQ to abandon the 2000 episode prior to the submission of the 2007 eight-hour SIP revision and instead focus its attention on developing several new episodes that better reflect what specifically is needed for eight-hour attainment strategy development.

New Episodes Planned for the Next Attainment Demonstration

To ensure that enough modeled days will be available to provide robust predicted DV_Fs, the TCEQ is planning to model several episodes that occurred during 2005 and 2006. Based on monitored concentrations, it will be necessary to model the episodes from both 2005 and 2006 to amass an adequate number of qualifying days. Due to the complicated source-receptor relationships, which, in large part, are a consequence of the complicated meteorological features common in the HGB area (e.g., land/bay/sea breeze), adequately modeling historical episodes requires an intensive effort. The following paragraphs explain that development of innovative methods is required to replicate the unique combination of these meteorological and emissions features in the models. Thus, 6 - 12 months additional time is needed to model this complex scenario than when modeling more typical urban areas. Considerable federal and state resources have been expended to collect data (e.g., TexAQS 2000 and TexAQS II) to enhance the understanding of ozone formation in the HGB area and thus to improve the ability to replicate historical events. The TCEQ is also enlisting assistance from the scientific community with expertise in meteorological and air quality modeling to further ensure the adequacy of modeling episodes.

TexAQS-II and Related Model Enhancements

The preliminary SIP-relevant analyses from data collected as a part of TexAQS II in 2005 and 2006 became available on August 31, 2007, when the Rapid Science Synthesis report was finalized. In addition, many TexAQS II researchers have just finished or are currently working on publishing results in peer-reviewed journals. A number of these papers were presented at the American Geophysical Union meeting in December 2007 and more will be presented at the American Meteorological Society conference in January 2008. Collectively, these results will be critical in guiding the TCEQ modeling development and in validating the results. Developing a modeling demonstration that does not account for these critically important initial research findings would be irresponsible. The modeling demonstration would likely need to be completely redone almost immediately to incorporate those findings. To allow sufficient time to incorporate the initial TexAQS II analyses, development of the new baseline modeling cannot realistically be finalized before mid to late 2008, depending on the magnitude and complexity of required modifications to the modeling process.

Important questions that will be addressed by TexAQS II include, but are not limited to:

- Adequacy of current EIs: TexAQS researchers collected data for a vast array of primary pollutants and reaction products and are in the process of comparing their measurements with current inventories in several key areas, including shipping, on-road mobile sources, industrial VOCs (highly reactive and otherwise), primary emissions of formaldehyde, and biogenic and anthropogenic isoprene emissions.

- Representation of chemical pathways in the models: Researchers made millions of measurements of concentrations of radicals, photolysis rates, and other key parameters controlling the formation and destruction of ozone in the HGB area. The adequacy of how these parameters are represented in the models is integral to conducting reliable modeling analyses.

- Characterization of meteorology: TexAQS II data included meteorological observations from numerous surface sites, two towers, hundreds of balloons, five aircraft, the National Oceanic and Atmospheric Association (NOAA) Research Vessel Ron Brown, and an offshore platform. The measurements collected provide invaluable information on parameters such as wind speed and direction, cloud cover and the ultraviolet (UV) radiation balance, and horizontal and vertical mixing rates. These data will help to better characterize and represent key meteorological phenomena that control the potential for ozone formation in the HGB area: land/sea/bay breeze, nocturnal jets, stagnation, frontal passages, dispersion and mixing of ozone precursors, and transport.

In addition to playing a significant role in conducting, managing, and directing research efforts related to TexAQS II, the TCEQ is also conducting a number of projects to ensure the adequacy of modeling episodes. These activities are being incorporated into the draft modeling protocol.

- The TCEQ is enhancing the meteorological model to incorporate geographically varying hourly sea-surface temperature and more up-to-date and higher resolution land use and land cover data.

- The TCEQ is sponsoring a project to compare and contrast biogenic emissions developed using both the Model of Emissions of Gases and Aerosols from Nature and Global Biosphere Emissions and Interactions System biogenic models and will use up-to-date and higher-resolution land use and land cover data.

- A variety of EI reconciliation analyses are being conducted, comparing reported emissions and monitored concentrations (e.g., Potential Source Contribution Factors and Top Down Emissions Verification). While the 2005 State of Texas Air Reporting System (STARS) EI is being used presently, similar analyses will be conducted using the 2006 STARS data when it becomes available early in 2008. The 2006 STARS data will begin to reflect emission changes resulting from the Highly Reactive Volatile Organic Compound Emissions Cap and Trade (HECT) rule.

- The TCEQ will employ recent enhancements made to the Comprehensive Air Model with Extensions (CAMx) photochemical model to adequately model the complex air chemistry in the HGB area. These enhancements include newly released chemical mechanisms (e.g., Carbon Bond, version 2005 (CB05) and Statewide Air Pollution Research Center, version 07 (SAPRC07) with associated process analysis and source apportionment tools, and precursor (e.g., VOC, NO_X) sensitivity tools, such as Higher-order Decoupled Direct Method (HDDM). Additionally, for the CB05 chemical mechanism, the TCEQ is sponsoring a modification to handle toluene chemistry more explicitly.

Summary

The TCEQ is modeling more than 50 ozone episode days from 2005 and 2006 to try to achieve enough days at each monitor to calculate reliable DV_Fs upon which to base an attainment demonstration. The combination of complex coastal meteorology and highly heterogeneous emission sources makes successfully modeling even a single episode very challenging, and even the most basic modeling exercise will require 12 - 18 months to address the issues discussed previously. In addition to basic model development, the TCEQ is making many needed improvements to the modeling process, each of which requires additional effort and time. Finally, TexAQS II results are emerging. While it may be years before all results are published, significantly more information pertinent to the attainment demonstration modeling will become available over the next 12 months. Properly understanding and incorporating this new information into the modeling process will take several months or more.

Therefore, the TCEQ cannot complete the modeling work and associated quality assurance and peer review needed to adequately support a proposed modeling and attainment demonstration prior to March 2009. Attempting to do so will only serve to delay the development of an attainment demonstration based on the latest scientific understanding of the complex process of ozone formation in the HGB area.

If the SIP submission date is prescribed as December 2008, the plan would need to be completed and reviewed by TCEQ management by March 2008 in order to propose in May 2008 to allow for a November 2008 adoption. The TCEQ would have to rely on the 2000 modeling episode, since there is insufficient time to include the new HGB modeling. The TCEQ would be required to suspend work on new modeling episodes to expeditiously complete attainment year (2018) modeling with the 2000 episode. Due to the limitations of the 2000 episode in developing eight-hour attainment strategies, as discussed above, there is considerable likelihood that the attainment year modeling will be flawed in its projection of future design values. It will then be necessary for the TCEQ to subsequently revise the SIP at a later date. The net effect of setting December 2008 as the SIP submission date will be to delay the development of effective attainment strategies based upon the new HGB modeling using episode days from 2005 and 2006 and the associated enhancements in the emissions and the findings from TexAQS II.

Control Strategy Development

The TCEQ must analyze the most recent and accurate emissions data to develop effective industrial, mobile, and local control strategies that address ozone formation in the HGB area.

The TCEQ is committed to developing and applying the best science and technology to address and reduce ozone formation in the HGB area and other nonattainment areas in Texas. In conjunction with other state and federal organizations, the TCEQ conducted an exhaustive field study of ozone formation, TexAQS II, from June 2005 through September 2006. TexAQS II findings will be incorporated into SIP planning as the data is analyzed. Similar to how the highly reactive volatile organic compound (HRVOC) rules for the HGB one-hour ozone attainment demonstration were an outgrowth of the TexAQS 2000, the TexAQS II findings will help the agency develop targeted control strategies that will be the most effective for reducing ozone formation in the HGB area for the eight-hour ozone attainment demonstration. To accomplish this, the TCEQ must have adequate time that allows for thorough analysis of the point source inventory data in combination with the research data gathered during TexAQS II.

In addition, the TCEQ will use the 2006 NO_X and VOC EI year for control strategy development because the 2006 EI year is the most recent and accurate inventory year available. However, the 2006 EI, which is being expedited for the HGB area, will not be complete until early 2008, delaying some of the early aspects of control strategy development until spring 2008.

The 2006 EI year will represent the most accurate VOC EI for the HGB area to date, in part due to the monitoring and testing requirements for the HRVOC rules for flares, vents, and cooling towers. While some sources may have implemented monitoring and testing early and included the improved emission data in the 2005 EI, the 2006 EI will include improved data from all the sources that were required to comply with the HRVOC rules. This improved EI data is beneficial for control strategy development to help the agency evaluate the need for further VOC controls. In addition, the regulated community has implemented the HRVOC monitoring requirements at substantial cost. Therefore, the TCEQ anticipates that industry, as well as other stakeholders, will expect the agency to use this enhanced HRVOC monitoring data for evaluation purposes in the eight-hour ozone attainment demonstration.

The 2006 point source inventory reflects years of continuous emissions data improvement efforts including aggressive inventory reconciliation with ambient emissions monitoring data. Since TexAQS

2000, when ambient VOC concentrations were measured to be greater than EI estimates, EI improvements have targeted more accurate speciation and reporting of VOC emissions. TCEQ improvements that have directly impacted the HGB point source inventory include:

- Annual updating and publishing *Emissions Inventory Guidelines*, a comprehensive guidance document that explains all aspects of the point source EI process. Currently, six technical supplements provide detailed guidance on determining emissions from potentially under-reported VOC emissions sources such as cooling towers, flares, and storage tanks.

- Conducting a special landing loss EI that required the reporting of landing loss emissions from floating roof tanks. This special inventory required regulated entities in the HGB area to revise their EIs, resulting in a reporting increase of approximately 7,000 to 8,000 tons of VOC per year. Since landing loss emissions are episodic in nature, the TCEQ's modeling for the HGB 2005 and 2006 episodes will represent the variability of these emissions by incorporating site-specific landing loss activity data into the model. These data are currently being collected via TCEQ surveys.

- Using TCEQ survey results to quality assure HGB flare and cooling tower data. The TCEQ conducted these surveys as part of the VOC EI Improvement Stakeholder Group to determine the current level of VOC monitoring being performed on flares and cooling towers in the HGB area.

- Conducting a month-long hourly EI data collection from approximately 1,200 emissions sources at 125 industrial sites during the TexAQS II intensive period. These hourly data, which comprise three million records, will be integrated into the 2006 modeling episode, providing highly resolved hourly VOC and NO_X emissions data for sources located in the HGB area. Monitoring data was collected for the majority of the VOC hourly emissions and all of the NO_X emissions rates. These NO_X sources are not included in the Acid Rain database; therefore, modeling these hourly data represents an opportunity to model a unique and extensive set of monitoring data that adequately characterizes the time-dependent nature of industrial ozone precursor emissions.

Additionally, as mentioned above, the HGB 2006 VOC inventory will be the most accurate to date due to the impact of the HRVOC monitoring rules. If industrial HRVOC emissions from flares, cooling towers, and vent stacks have been under-reported in past inventories due to inadequate emissions estimation methods, the 2006 inventory will be the first inventory to reflect any potential changes due to monitoring data. However, the TCEQ needs to conduct extensive analysis of the HRVOC component of the HGB inventory before any conclusions can be made.

Similarly, the 2006 NO_X EI is preferable because it is closer to the final 2007 step-down phase of the NO_X Mass Emissions Cap and Trade (MECT) Program. The 2006 NO_X EI will better reflect the status of the controlled NO_X point source inventory when evaluating potential NO_X controls through the MECT Program.

Due to the extensive controls already required for major sources in the HGB area, more stringent control strategies may need to be considered. Additional time is needed for conducting more inventory and survey work on area sources for potential control strategies to ensure that any area source control strategies are appropriately considered. Time is also needed to research NO_X and VOC control technologies on sources that may not be historically regulated for ozone control or sources much smaller than what the "typical" technologies have been applied. Furthermore, small businesses may be potentially impacted by minor and area source control strategies. The TCEQ will need to carefully evaluate this

potential impact to small businesses and may have to consider possible alternatives. More stakeholder meetings and outreach may also be needed during the control strategy development phase for control strategies impacting small businesses and sources not historically regulated for ozone control.

The earliest deadline of December 15, 2008, does not allow sufficient time for the rule development process after identification of the control strategies that would need to be implemented in rules adopted by the commission. The rulemaking process under the Texas Administrative Procedure Act, combined with TCEQ rulemaking practice, typically takes about one year. However, sensitivity analyses are necessary to evaluate the benefits of selected controls and those are not currently available, given the amount of the modeling work that is required, as discussed earlier.

Stakeholder Process

A thorough public participation process is needed to develop a list of proposed mobile source measures, as well as provide thorough input regarding potential controls for other source categories. Rapid economic and population growth continue to create air quality challenges for the HGB area, even as the key ozone-targeting regulatory programs have reduced the number and magnitude of ozone exceedances, the area of exceedance, and the population exposed to exceedances. Because the air quality challenges in the HGB area require emissions reductions from all source categories, including those under the jurisdiction of local governments, broad involvement and participation from different sectors of the community will be needed.

Reasonable Further Progress (RFP)

The RFP analysis for HGB with the new attainment date of June 15, 2019, will require inventory development and control strategy quantification for each of the new RFP milestone years. For the on-road mobile inventories, the Metropolitan Planning Organization will need to develop the inputs and perform travel demand modeling before the on-road inventory work can be started. The additional control strategies that will likely be developed as a result of the attainment demonstration may be needed in order to demonstrate RFP. Due to all these constraints, the RFP SIP revision should be on a timeline concurrent with the attainment demonstration SIP. This analysis will most effectively be completed with an end date of April 2010, as discussed earlier in these comments.

Conclusion

In the 2004 HGB SIP comment in response to proposal, EPA commented that the commission should be using the best inventory possible. The EPA stated in the December 31, 2007, *Federal Register* notice that the new attainment demonstration should be based on the best information available. The EPA's guidance recommends sufficient, current modeling episodes with a sufficient number of days, but the proposed shorter timeframe does not allow adequate time to complete the modeling.

Therefore, to develop the most effective ozone control strategies that have the greatest impact on HGB air quality, the TCEQ needs sufficient time to analyze the 2006 EI and the extensive data listed above. Incorporating the most accurate data possible into new modeling episodes and control strategies development is the only way the TCEQ can assure its stakeholders that the best possible science is being used to improve HGB's air quality. Again, the TCEQ can accomplish these goals, but only with a sufficient timeline from EPA that allows the TCEQ to develop adequate modeling episodes and control strategies based upon these data.