

Response to Comments Received Regarding the Houston/Galveston/Brazoria (HGB) 1-Hour Ozone Attainment Demonstration State Implementation Plan (SIP)

The commission received comments from the following entities: Environmental Defense (ED), U.S. Environmental Protection Agency (EPA), Galveston Bay Preservation Conservation Association (GBPCA), Galveston-Houston Association for Smog Prevention (GHASP), the Greater Houston Partnership (Partnership), Harris County Public Health and Environmental Services (HCPHES), City of Houston and Harris County (Houston/Harris County), Houston-Galveston Area Council (HGAC), Houston Regional Group Sierra Club (Sierra Club), Mothers for Clean Air (MCA), League of Women Voters (LWV), TexasGenco, Transportation Policy Council (TPC), The Honorable Nancy R. Edmonson/ Mayor of the City of Shoreacres, physicians Ralph Feigin and Martin Lorin and 181 citizen e-mails (Tom Attwood, Greg Barker, Cindy Bartos, Janet Becker, Kandice Belgau, Lewis Bell, Mildred Bell, Trudy Belz, Camille Bloom, Debbie Bolen, Ross Bolen, Sam Bolen, Laura Borst, Meryl Bote, Greg Boudreaux, R.M. Bowerman, Robert Bowerman, Rick Brenke, George Brenner, Juana Brenner, Sara Brown, James Bulla, Kathy Bulla, Gonzalo Camancho, Judith Campbell, Cynthia Cason, Terri Chadwick, Jennette Champagne, Eunice Cherry, Catherine Childs, Evelyn Chorush, Henry Chu, Rose Cintron, Robert Claussen, Sara Cloots, Sara and David Cook, Patrick Cox, Donalee Cushman, Valerie Daniel, Barbara Daniel, Dawn Davis, David Davis, Judy Deaton, Cay Dickson, Lisha Doucet, Melissa Dowling, James Doyle, John Dyer, Nancy Edwards, Jane Elioseff, Debbie Evans, Tiffany Farnham, Pete Folles, Rosemary Folles, Beverly Feldman, John Ferguson, Nephi Ferguson, Peggy Fitzpatrick, Carole Frascella, Twilight Freedman, Rob Fruth, Cynthia and Burr Furlong, Joy George, Jean Gilruth, Bert Golding, Lucille Griffith, Courtney Guynes, Mary Halligan, Joyce Hanton, Harry Harkey, Melissa Hartman, Sue Heinbuch, Dan Henn, Nancy Henninger, Elizabeth Hess, Mary Hintikka, Jack Hofberger, Angela Hsu, Julie Hsu, Chiehwen Hsu, Kuang Hsu, Rosa Humphrey, Jennifer Hunter, John Hunter, Ann Isaacson, Kirk Jackson, Gary Janszen, Carole Keene, Vicky Keller, Douglas Koch, Juli Kring, Karen Laake, Diane Landon, Lauryn Langhorne, Belita Leal, Polly Ledvina, Robert Levy, Susanne Lim, David Lim, Mary Lockwood, Gary Loh, Ralph Longoria, Sylvia Longoria, Martin Lorin, Corey Lutz, Daniel Lutz, Irvin Lutz, Karen Lutz, Nichole Lutz, Mary Maher, Carla Marienfeld, D. Marrack, Lisa Marshall, Beverly Martin, Ann May, Scott McCready, Margaret McGinty, Thomas Mckittrick, Thomas McWhorter, Matt Meares, Tammy Monroe, M. Needham, Jennifer O'brien, Timothy O'brien, Michol Oconnor, Celeste Oehl, Kay Ogden, Janis Olszewska, Susan Orwig, Irving Pass, B. Pechin, Lisa Peterson, William Peterson, Robert Plant, Sue Porretto, Alisa Porter, Rick Potthoff, Pat Price, Amy Quincey, Mary Quinlan, Tina Rad, David Rajmon, Lucy Randel, Alison Rasch, Amy Ratcliffe, Katharyn Reiser, Mary Rose, Jana Salinger, Matthew Salinger, Richard Schmidt, Janette Sexton, William Sibley, John Sieber, Holly Sincox, Melody Smith, Allen Sory, Colleen Stadnick, Robert Stark, Anna Stavinoha, Kim Stoilis, James Stone, Roberta Taylor, David Tesch, Nikki Thibault, Julie Thobae, Terri Thomas, Larry Tidwell, Laurence Tobin, Alejandro Torre, Virginia Turner, Leslie Ungar, Anastasia Voight, Donald Weaver, Richard Wehrman, Katherine Wells, Michael Wheeler, Mary Ellen Whitworth, John Wilson, Kari Wisenbaker, Gay York).

Health Effects

Sierra Club stated that people are suffering health effects and in some cases dying while the Texas Commission on Environmental Quality (TCEQ) waits to gather more information on ozone before implementing all of the HGB SIP. One individual stated that clean air and water are paramount to public health and expressed concern that smog is affecting Houston residents daily. One individual stated that she has personally experienced adverse health effects from Houston's air pollution. She also expressed

concern taking her child outdoors during summer days in Houston due to poor air quality.

The commission agrees that reducing ozone is important. The HGB SIP will improve air quality in the HGB area by reducing ozone and the chemicals that contribute to ozone formation. Reductions of VOC and NO_x emissions have already been achieved in the HGB area as a result of existing control measures.

The primary health concerns for ozone are effects to the lungs and overall respiratory system. Examples of effects include respiratory irritation and inflammation, impaired ability of the lungs to function normally, and aggravation of preexisting respiratory diseases such as asthma. These effects are generally associated with short-term exposure to high levels of ozone, levels that have been detected in the Houston area. Health effects from ozone generally resolve quickly once an individual is no longer exposed to high levels. However, in some sensitive individuals, effects may linger and take longer to resolve. Based on the current health science, premature mortality is not considered to be a likely effect from elevated ozone exposure.

One individual stated that a significant number of Houston residents have some type of respiratory problems, with a large number being children and the elderly. He is concerned that the cost of air pollution in the Houston area has never been quantified in terms of the health problems it creates.

Leading scientific researchers have noted an increased incidence of respiratory diseases in the United States, particularly in select populations. The reasons for this increase are not entirely known and are likely due to many factors. It is unclear what role air pollution has in causing respiratory disease. However, it is well known that some air pollutants, including ozone, can aggravate existing respiratory diseases. This reinforces the need to minimize exposure to high ozone levels and to take steps to reduce the levels of chemicals that contribute to ozone formation.

One individual commented on allergies and exhalation of carbon monoxide (CO) in association with Houston's air quality.

The current health science suggests that ozone is not responsible for causing allergies. However, the science does indicate that individuals suffering from allergies may be more sensitive to the effects of ozone. For this reason, it is important to minimize exposure to high ozone levels and to take steps to reduce the levels of chemicals that contribute to ozone formation. It is stressed that outdoor allergens such as molds and pollens, which can trigger allergies, may be elevated at times when ozone levels are not a health concern. It is always important for individuals suffering from allergies to check local allergy reports and forecasts prior to engaging in prolonged or intense outdoor activities.

While CO is not the object of this rulemaking the commission notes that, it is not uncommon to detect small amounts of CO in exhaled air. There are a wide variety of potential sources of CO in exhaled air. The human body makes CO in response to inflammation of the respiratory system. The scientific literature has suggested that the CO detected in exhaled air can serve as sign of respiratory allergy or infection.

One individual stated that "The ozone is killing us!"

Based on the current health science knowledge, premature mortality is not considered to be a likely effect from elevated ozone exposure. The primary health concerns for ozone are effects to the lungs

and overall respiratory system. Examples of effects include respiratory irritation and inflammation, impaired ability of the lungs to function normally, and aggravation of preexisting respiratory diseases such as asthma. These effects are generally associated with short-term exposure to high levels of ozone, levels that have been detected in the Houston region. Health effects from ozone generally resolve quickly once an individual is no longer exposed to high levels. However, in some sensitive individuals, effects may linger and take longer to resolve.

One individual wondered if the lungs of Houston residents were damaged from air pollutants. She particularly highlighted blackening of the lungs.

Blackening of the lungs results from the deposition and retention of air pollutants and has been primarily noted for individuals that smoke. However, lung blackening has been detected in workers occupied in specific types of employment and residents that live in heavily industrialized urban areas lacking adequate air pollution control. Cases of lung blackening associated with industrial air pollution are generally limited to historical accounts in the United States prior to the advent of modern environmental regulatory agencies or to conditions existing in developing countries experiencing rapid industrialization. It is unlikely that current air quality in the United States, or Houston specifically, is a significant contributor to lung blackening. Exposure to ozone is not associated with blackening the lungs. However, some evidence exists to suggest that prolonged exposure to high ozone levels may lead to structural alterations of the lung. It is unclear if these alterations result in impaired functioning of the lung.

One individual expressed concern regarding the sources of particulate matter in the Houston area.

The HGB SIP and associated rules will improve air quality in the HGB area by addressing those compounds that contribute to ozone formation. The HGB Area 1-Hour Ozone Attainment Demonstration does not specifically address particulate matter. However, many of the sources contributing to ozone formation included in the HGB SIP are also sources of particulate matter. Thus, the reduction of particulate matter and its precursors can be expected through control of ozone precursors.

The HGB area currently meets the health-based federal particulate matter standards (PM₁₀), (particulate matter less than or equal to 10 microns and PM_{2.5}, (particulate matter less than or equal to 2.5 microns) and continued monitoring will confirm compliance with the federal standards. In addition to health concerns, particulate matter can also contribute to nuisance conditions. Elevated particulate matter levels, even in the absence of potential health effects, can interfere with the enjoyment of daily activities. The TCEQ has procedures in place to address nuisance conditions from regulated industries. Contact the TCEQ Houston Regional Office at (713)767-3714 for further information.

Physicians Ralph Feigin and Martin Lorin discussed four ozone-related issues: vulnerability of children to air pollutants, increased asthma prevalence in children, deleterious health effects of ozone and other air pollutants, and cost.

The commission agrees with the first point that unique anatomy, physiology, and behavior of children may render children more sensitive to air pollutants such as ozone. Regarding the second point, leading scientific researchers have noted an increased incidence of respiratory diseases such as asthma in the United States, particularly in select populations. The reasons for this increase are not entirely known and are likely due to many factors. It is unclear the role that air pollution has in

potentially causing respiratory disease. However, it is well known that some air pollutants, including ozone, can aggravate existing respiratory diseases. This reinforces the need to minimize exposure to high ozone levels and to take steps to reduce the levels of chemicals that contribute to ozone formation. A relatively robust scientific literature exists on the health effects of ozone (for a recent review, please see the California Air Resources web site: <http://www.arb.ca.gov/research/aaqs/ozone-rs/ozone-rs.htm>). However, data gaps still exist in our understanding of the health effects of ozone, particularly in regards to sensitive populations, such as children. Finally, the TCEQ agrees that air pollution can potentially have significant effects not only on public health but also on public welfare, including socioeconomic costs. This reinforces the need for an effective strategy to address ozone such as the strategy in the MGB SIP.

ED, GHASP and MCA commented that the combined use of the 1- and 8-hour National Ambient Air Quality Standards (NAAQS) for ozone may be preferable to solely relying on the 8-hour ozone standard. In addition, GHASP commented that if the HGB SIP fails this year, there could be serious public health effects even if the TCEQ ultimately achieves attainment for the 8-hour ozone standard in Houston.

The EPA issued the 8-hour ozone NAAQS in 1997 based on the latest health science information that indicated that the 1-hour ozone standard was inadequate for protecting public health. Ozone can affect human health at levels lower than the 1-hour ozone standard and over exposure times longer than one hour. The 8-hour ozone standard addresses these limitations and will provide improved protection for public health. The incremental steps to improve air quality in the HGB area and ultimately achieving attainment of the 8-hour ozone standard will dramatically reduce the likelihood of all health effects from ozone, particularly those most severe.

Inventory Adjustment

EPA, ED, MCA and GHASP commented that there is evidence that non-highly reactive volatile organic compounds (HRVOC)s are underestimated in the inventory. EPA added that some ozone days appear to have been driven by large quantities of paraffins and Other Volatile Organic Compounds (OVOCs) and this will lead to more Volatile Organic Compounds (VOCs) reactivity being left in the actual future when compared to the estimated levels in the current revision.

EPA stated that they look forward to seeing the inclusion of the results of the work associated with H-12 and suggested the TCEQ take this into consideration and evaluate if additional controls might be necessary before submitting a new SIP to EPA.

GHASP commented that HRVOC emission inventory adjustments are inadequately justified and a clearer explanation is needed. ED cited a Sonoma Technology report and the TCEQ analysis that show the reported emissions for other VOCs are underestimated by roughly the same amount as HRVOC. GHASP added that the inventories and projections used in the attainment demonstration suffer because of the failure of the TCEQ to reconcile its own findings about underreporting of OVOCs.

GHASP and ED commented on the commitment made in the 2002 SIP revision to perform an in depth analysis of the contributions of the less-reactive compounds and to perform top-down analyses similar to those used for the HRVOCs. They further commented that the TCEQ used only one formulation of the OVOC emission adjustment and continually tweaked and refined its treatment of the HRVOC emission adjustment. They further noted that the single investigation is only discussed in a cursory manner in the SIP and has not been widely discussed or reviewed with other experts.

The commission remains reluctant to make any inventory adjustments which could be viewed as arbitrary for modeling purposes. Instead, the commission traditionally has used analyses which compare ambient data to emissions inventories to guide further work to identify and resolve EI/ambient discrepancies through bottom-up inventory improvements. The olefin-to-NO_x adjustment was applied only after a large body of peer reviewed research showed conclusively that such a discrepancy affected emissions of certain HRVOCs from industrial sources. The bibliography listed at the end of Chapter 3 of the SIP references many of the peer reviewed studies considered.

The commission agrees that there is some evidence that OVOCs may be underestimated in the modeling inventory, but the evidence to justify adjusting emissions of OVOC is much less conclusive and open to debate. To date, few in-depth analyses of aircraft observations have been conducted comparing OVOC concentrations with those expected based on the reported emissions. Several projects are expected to be completed within the next year. In accordance with the Future Direction described in the December 2002 SIP revision, the TCEQ compared ambient concentrations of OVOC with the reported inventories at the Clinton Drive and Deer Park monitoring locations. The study suggested that OVOC may be underreported by a factor of 4.8. The scope of this study was limited, however, because only these two sites have collected continuous, multi-year speciated hydrocarbon data in the Ship Channel industrial district. The work has not received the peer review afforded the HRVOC studies.

Because the analysis available is limited to these two monitors compared to the extensive data sets and peer reviewed analysis for the HRVOCs, the TCEQ concluded that including adjustments to the OVOC emissions in its control strategy evaluation at this time would be premature. The results of an in-house study to conduct sensitivity modeling analysis were reported in the June 2004 proposal. This analysis indicated that the adjustment applied to the OVOC, combined with the adjustment already applied to the HRVOCs, creates too much reactivity in the model.

After the current SIP revision was proposed in June 2004, the commission conducted additional sensitivity modeling which considered the effects of adjusting the future-case OVOC emissions by the same 4.8 factor used in the base-case sensitivity analysis. Results of this analysis suggest that, if the OVOC emissions are indeed underestimated substantially, then additional reductions may be necessary. A second sensitivity analysis which applied the HRVOC reductions of strategy CS-06a to the adjusted OVOC (along with the HRVOCs) indicated peak 1-hour ozone concentrations that are below, or just above, the NAAQS for all days except for August 31. Results of these sensitivity analyses are shown graphically in Chapter 3 of the SIP. For comparison, the results of the modeling without adjustment to the OVOC are also presented.

The commission plans to include appropriate results from Houston Advanced Research Center (HARC) project H-12, *Role of Modeling Assumptions in the Houston-Mid-Course Review* in future SIPs. The commission has solicited EPA comment and feedback on the project and has invited EPA to participate in updates on the project presented by the principal investigators.

GHASP notes that “the TCEQ apparently completed control strategy modeling in early May 2004, yet it has not been presented to the Photochemical Modeling Technical Committee or included in any technical support documentation for the proposed SIP revision. This committee is described in the modeling protocol as providing ‘an advisory role for the technical aspects of applying photochemical modeling and improving the science.’ In this instance, the TCEQ did not offer outside parties an opportunity to advise the staff on the modeling results. The omission of these data from any discussion in the SIP revision or

any discussion with outside technical advisors strongly suggests a selective approach to the examination of relevant data in the SIP revision.”

The modeling sensitivity to which the commentor is referring has not been presented to the Photochemical Modeling Technical Committee nor was it included in the SIP proposal. The TCEQ has, over the year, shared the overwhelming majority of the results from various sensitivity analyses. Time does not permit all results to be shared. The results will be shared with the committee at an upcoming meeting and the adopted SIP includes a table of all modeling sensitivities similar to what was included in the 2002 SIP.

EPA commented that preliminary modeling that included adjustments for some OVOC emissions yielded better model performance. It expressed a desire to see sensitivity runs to determine if the area would still attain if the VOC inventory (not just HRVOCs) were increased above reported levels by ratios found by the aircraft flights or ratios similar to those used in the Houston area.

As discussed in Chapter 3 of the SIP, this analysis indicated that the adjustment applied to the OVOC, combined with the adjustment already applied to the HRVOCs, created too much reactivity in the model, thus degrading model performance. Because of the limited amount of scientific support for this adjustment, the results are suitable for attainment demonstration purposes.

GHASP contends that results of the other adjustments are promising. GHASP commented that there is evidence that establishes that the OVOCs (actually some of these VOCs are considered highly reactive on a molar basis) do “contribute significantly to overall air mass reactivity”. When the TCEQ makes use of the information available regarding the impact of OVOCs on its control strategy evaluation, it must conclude that (1) its current control strategy will be less effective than suggested in its proposed SIP revision and (2) targeting a number of OVOCs for reductions is a necessary part of an overall control strategy.

The Sierra Club commented that since ancillary reductions cannot be verified, VOC emissions should be reduced overall, in addition to HRVOC emissions. They also commented that they support the control of the VOCs now, but the greatest VOC reductions are needed as soon as possible to eliminate ozone exceedances.

The commission has included results of a modeling sensitivity analysis in Chapter 3 of the SIP narrative. The sensitivity analyses described in the chapter show that if OVOC emissions are indeed underestimated in the current attainment demonstration, then reductions to these emissions may be required in addition to those reductions already adopted for HRVOCs. However, the base case sensitivity analyses documented in Appendix B shows that the adjustment applied may add too much reactivity to the model and therefore, may not be appropriate. The case for adjusting the OVOC emissions is not supported by a large body of peer-reviewed literature, so any adjustments are still speculative. The results of the sensitivity analyses presented in this section are informative, but it is not appropriate to make OVOC part of the attainment demonstration modeling, nor is it appropriate for making policy decisions.

The commission is addressing the issue of OVOC emissions and is sponsoring and/or participating in several studies to attempt to better define their role in ozone formation in the HGB area. These studies are listed in a new section titled “Future Directions” at the end of Chapter 3 of the SIP.

GHASP commented that the TCEQ should lead or cooperate with a comprehensive ambient/emission inventory review. Ideally, this would be done as part of projects currently sponsored by the Texas Environmental Research Consortium (TERC), but at this time the central issue related to the emission inventory adjustment for OVOCs has been excluded from the scope of project H-12.2004.8HRB.

The commission agrees and as a member of the Texas Environmental Research Consortium (TERC) Science Advisory Committee has been working with the consortium to identify appropriate projects that will help advance the understanding of emissions inventories. The scope of project H-12.2004.8HRB (H-12 - Role of Modeling Assumptions in the Houston Mid-Course Review) now includes a task to assess OVOCs.

The TCEQ has added language to reflect a stakeholder process beginning in January 2005, and ending in July 2005, to improve the emissions inventory.

General Modeling/Model Performance

EPA commented that the TCEQ has claimed that due to poor model performance, a number of extended days (i.e., 8/21, 9/5, etc.), which have high observed ozone concentrations had to be removed from the current Phase 2 MCR attainment demonstration modeling. They commented that even with underprediction bias, the modeling doesn't show attainment on four days out of the ten day modeled episode. They also note that the only two days are close to the area's design value and the model is underpredicting the peak on those two days by at least 15 and 22 percent. EPA recommends these extended days should be further investigated and included in the SIP attainment demonstration. Houston/Harris County expressed concern that the plan may not result in attainment of the standard because the modeled results did not demonstrate attainment on four of the ten days. ED commented that the days for which the model shows attainment did not predict as much ozone as was observed.

ED expressed concern that the SIP will not result in attainment of the 1-hour ozone standard in 2007. The SIP modeling, attainment demonstration and associated rules place an overwhelming emphasis on HRVOC emissions. While ED agrees that reductions of HRVOC will help reduce ozone levels, it disagrees that the proposed control strategy will be sufficient to attain the 1-hour ozone standard.

GHASP notes that the TCEQ's model performance evaluation concludes that August 25 is "a day where the model replicated the observed ozone concentrations very well." However, they comment that because the model captured the *pattern* but not the *peak exposure*, the model fails to represent the public health impact of air pollution on August 25 in a manner gives confidence to the control strategy evaluation.

GHASP commented that the TCEQ eliminated August 27 and 28 from the model based on statistical performance problems, but without presenting any consideration of factors that could be causing the problems. They commented that September 1 is not discussed in the model performance evaluation. GHASP noted that September 1 produced a modeled peak ozone concentration of 137 ppb, compared with a measured peak of 163 ppb and an aircraft-monitored peak of 210 ppb.

New future control case modeling containing control strategies, shows peak ozone concentrations of 125 ppb or less on all but two days modeled, August 31 and September 5. This modeling now shows peak ozone concentration of less than 130 ppb on September 5. The TCEQ has provided a weight of evidence analysis demonstrating that this day will reach attainment. Only August 31 now predicts peak ozone concentrations in excess of 130 ppb. The TCEQ has provided evidence that due to its unique characteristics (anomalous meteorology and unusually high biogenic emissions) August 31 should not be used to determine whether additional control strategies are needed.

While the model does under-predict the monitored peak ozone on some days, the model's statistical performance is acceptable. This fact indicates that the model is replicating the normal rise and fall of ozone in the area reasonably well, but it is not capturing the rapid-forming ozone peaks on these days. As is discussed in Chapter 3, this under-prediction of the peaks is likely due to unreported or under-reported releases of HRVOCs. Because short-term releases are mitigated under this control strategy, under-prediction of the base case peaks does not necessarily indicate a similar under-prediction in the future.

While the model did over-predict ozone formation on August 27 and 28, the primary reason these days were not considered for control strategy assessment is that neither day registered a 1-hour ozone exceedance. For this reason, the TCEQ did not devote a significant level of resources to studying these days. In any case, modeled peaks for August 27 and 28 are well below the 1-hour ozone standard in the future control case CS-06a (88 and 103 ppb, respectively), so including these days would have no effect on the control strategy.

Appendix B of the SIP revision includes, model performance for September 1 along with model performance on each of the other days modeled. Since September 1 meets all three of EPA's performance criteria and exhibits good performance using graphical analysis, the commission does not treat this day any differently from the other days showing good performance.

While it would be desirable to match every monitored peak in the model, such accuracy is not possible with today's technology. Overall, September 1 reproduces observations with the exception of an under-prediction of the peak. Even so, the modeled peak on September 1 is still within EPA's recommended performance criterion for unpaired peak accuracy.

On the other hand, even a model that replicated observations perfectly could not be expected to match aircraft observations, since the latter are taken over time intervals much shorter than the model's 1-hour reporting period. Expecting the model to match all aircraft observations would be akin to selecting the peak five-minute ozone average at a surface monitor and expecting the model's 1-hour average to match the five-minute peak. Aircraft data provides an extremely rich data set for understanding the relationship between the model's predictions and the real world, but it is not appropriate to use the aircraft measurements as a yardstick by which model performance is judged. The ozone standard is a 1-hour standard based upon ground-based instruments.

EPA commented that due to time constraint, an additional episode could not be modeled. They also acknowledged the commitment of the TCEQ to extend the TexAQS 2000 modeling episode. However, the TCEQ has claimed that due to poor model performance, a number of extended days (i.e., 8/21, 9/5, etc.), which have high observed ozone concentrations, had to be removed from the Phase 2 MCR attainment demonstration modeling. Due to the limited number of high ozone days modeled, EPA recommends these extended days be further investigated and included in the SIP attainment demonstration.

The TCEQ has thoroughly documented the reasons for extending the TexAQS 2000 episode instead of modeling older episodes in Appendix A. The revised SIP includes this documentation in Chapter 3. It is true that poor model performance on some days led these days to be excluded from control strategy evaluation. The TCEQ plans to continue work to improve performance on these days and will include them in future SIP work if appropriate.

ED commented that the days for which the model shows attainment did not predict as much ozone in the

base case as was observed in the real world.

As discussed in Chapter 5, revisions to the HRVOC strategy to include a short-term limit should ensure that the under-prediction of ozone peaks is limited to the base case. While the model does under-predict the monitored peak ozone on some days, the model's statistical performance is acceptable. This fact indicates that the model is replicating the normal rise and fall of ozone in the area reasonably well, but is not capturing the rapidly-forming ozone peaks on these days. This under-prediction of the peaks is likely due to unreported releases of HRVOCs. Because in the future these releases will be limited by the revised HRVOC control strategy, under-prediction of the base case peaks do not predict a similar discrepancy for the future case.

GHASP commented that the TCEQ eliminated August 27 and 28 from the model based on statistical performance problems, but without presenting any consideration of factors that could be causing the problems.

Biogenic Inventory

EPA commented that biogenic emissions can vary greatly from day to day and from area to area depending on ambient conditions. Inaccurately estimating biogenic emissions could produce potential model bias in the attainment demonstration modeling. Comparisons of isoprene concentrations during the TexAQS 2000, and other recent analyses have identified significant uncertainties in biogenic emissions. It suggests that these uncertainties could be due to land use/land cover assumptions and approaches used by the TCEQ to develop hourly photosynthetically-active solar radiation and temperature fields. EPA suggested that further investigations should be conducted and expressed a desire to see the results from H-12 as part of that evaluation. They also suggested that future SIP revisions take into consideration any new findings.

The Sierra Club commented that the land cover and vegetation data used for modeling is out-of-date due to the delay in obtaining this information and the rapid de-vegetation and development that is occurring in the Houston area. They contend that if the information used is older than six months then factors based on historical de-vegetation and development rates should be developed and used to update the land cover and vegetation data.

The TCEQ has been a national leader in applying the latest findings and data to development of sound biogenic emissions inventories, and the agency will continue to seek new innovations that will improve these inventories. Researchers at the Texas Forest Service (TFS), the University of Houston (UH), and the University of Texas (UT) have been investigating the sensitivity of biogenic emissions to varying methods of estimating temperatures, photosynthetically-active solar radiation, and land cover data. While these studies have not yet been published, and in some aspects have not been completed, the researchers have recently shared their preliminary results with the TCEQ.

As a follow-up to the UH and UT investigations, the H-12 project systematically investigated the modeled and measured isoprene and ozone concentrations resulting from varying the input data to the biogenic emissions model Globeis. "H-12" is Project H-12.2004.8HRB, Role of Modeling Assumptions in the Houston Mid-Course Review, a project being conducted by HARC and funded by TERC. Specific tasks of H-12 are to evaluate modeling uncertainties in these 5 areas:

- 1) Land Use and Biogenic Inventory Assumptions.**
- 2) Non-EGU HRVOC and Other VOC Inventory Adjustments and Modeling Assumptions.**
- 3) Grid Resolution Assumptions.**

- 4) August 31 and August 26-27 Performance Problems.
- 5) Chemical Mechanism Uncertainties.

The TCEQ has reviewed all of these studies. Although they have not yet been peer-reviewed or published, the TCEQ considers the findings in these documents to be generally credible, and has performed independent analyses that corroborate many of their findings.

The effects of land cover data:

The TFS project has also been attempting to estimate the rate of land cover change and deforestation, using Landsat imagery from 1990. However, this analysis has not been completed due to technical issues that cannot be resolved at this time. The analysis is scheduled to be repeated using 1992 USGS land cover and vegetation data, but it will not be complete in time for adoption of the SIP. The TCEQ intends to review this analysis when it is completed, and hopes that it will be useful in future modeling scenarios.

The UH study investigates the effect of using different land cover and vegetation data on the modeled biogenic emissions. Specifically, they used data obtained by the TFS Houston Green program, a project to survey the urban forest of Houston and vicinity, to identify areas where new trees can be planted, and to quantify the benefits of a tree-planting program. The TFS project has developed new land cover and vegetation data for the 8-county HGB area. Its cooperating partners in this project are the TCEQ, UH, U.S. Forest Service, HARC, and Global Environmental Management. The new land cover data developed by this multi-partner project became available to the TCEQ only recently. Therefore, the TCEQ did not use these new data in the SIP revision because they were not available for use in time to meet the SIP deadlines.

Comparisons of the biogenic emissions generated from the TCEQ and TFS land cover data sets show many areas of strong similarity, but a few areas of marked disagreement. In particular, the TFS-derived biogenic emissions differ greatly from the TCEQ data in the river bottomland forests of Liberty, Chambers, Harris, and Fort Bend Counties. These forests have high emissions in the TCEQ-derived biogenic inventory, but usually have much lower emissions in the TFS-derived inventory. In Fort Bend County, the difference appears to be caused by the deforestation due to urban sprawl. Therefore, in this location, the TFS data appears to be more accurate than the TCEQ data. In Liberty County and northeast Harris County, however, the TFS data seems to smooth out the biogenic emissions from the river bottomland forests, averaging them with the neighboring forests that have lower emissions. The TCEQ data show these areas as much stronger emitters than the neighboring areas. The observational data obtained by aircraft flights during the TexAQS 2000 study is consistent with the TCEQ data; the VOC data from TexAQS 2000 flights indicated hot spots of biogenic isoprene emissions over the river bottomland forests in Liberty and Harris Counties. The TFS-derived biogenic isoprene emissions, however, do not reflect these hot spots. Therefore, the TFS land cover and vegetation data represents an improvement in some ways over the TCEQ data, but also has some important flaws that need to be corrected before it can be used without reservation.

The effects of temperature and solar data:

The UT study examines the sensitivity of isoprene emissions to different temperature and solar radiation estimation techniques. To create temperature fields, they used a similar technique of interpolation as the TCEQ, i.e., kriging. They compared the emissions derived using a kriging analysis technique for temperatures to those using MM5 temperature data. For photosynthetically-active solar radiation, they used the satellite-derived solar data that the TCEQ

used, and compared it to the solar radiation fields calculated by the Globeis model assuming zero cloud cover. The researchers show that biogenic emissions vary by only 10 to 20 percent when different methods of estimating temperatures or solar radiation are used.

In addition, the TCEQ has evidence showing that the temperature field is more accurate during the daylight hours than the MM5 data. The TCEQ has compared both the MM5 temperatures and the temperatures derived from applying the kriging analysis technique to observed temperatures. In order to do an unbiased comparison, the TCEQ did not include data from one monitoring site in the Houston area in the kriging interpolation. This monitoring site is located at Prairie View A&M University, and is a part of the Soil Climate Analysis Network. Since the bulk of biogenic emissions occur during the day, it is much more important for the temperature fields used in biogenic modeling to be accurate during the day than at night. The TCEQ kriging analysis technique yielded temperatures perform better in the daytime, indicating that they will yield more accurate biogenic emissions than MM5 temperatures. Based upon these results, and the findings of the UT study, the TCEQ does not see a compelling reason to create a biogenic emissions data set using the MM5 temperatures.

On September 8, 2004, the H-12 project team presented some of its results to the TCEQ. A presentation entitled "Impact of Biogenic Emissions on Ozone Concentrations in Southeast Texas: August and September 2000: Project H-12 Results" was delivered by Dr. Allen of UT. Here are some of the primary findings of the biogenic investigations:

- **Biogenic emissions and landcover have a significant impact on ozone concentrations in the 2000 base case and the 2007 attainment demonstration.**
- **The current treatment of biogenic emissions in modeling is the best that can be done with the current scientific understanding, even though uncertainties remain.**
- **The current treatment of biogenic emissions likely overstates biogenic emissions in the base case and may overstate biogenic emissions in the attainment demonstration.**
- **The discrepancies between the biogenic emissions inventory and isoprene measurements cannot be resolved with existing data.**
- **On-going efforts are needed to continue to improve biogenic emission estimates and their ozone impacts, including improvements of land cover and vegetation data, response of biogenic emissions to drought, and the modeled vertical mixing.**

The commission uses new science that is received in a timely manner. Also, the commission plans as part of the next SIP revision to conduct sensitivity analyses of GloGEIS and CAMx using new land cover data.

GHASP commented that the importance of biogenic emissions continues to be overstated and the commission should review the entire plan's treatment of biogenic emissions and make appropriate revisions. GHASP noted that the plan states, "It is evident from the pie charts that for NO_x, the greatest man-made contribution is from point sources, and for VOC, biogenic sources." (Section 2.8). In contrast, Figure 1-1 of the Technical Support Document from the December 2002 SIP suggests that biogenic sources provide only 1/8th of ozone reactivity. The recent scientific findings provide yet another reason to conclude that trees don't cause ozone, and the commission's plan should be appropriately revised to remove misleading statements and figures.

The TCEQ has established in various projects that the role of biogenic emissions in ozone formation in the HGB area is usually relatively small. However, biogenic emissions in some cases

can play a significant role in ozone formation. Analysis of the August 31 data shows that biogenic emissions played an important part in the high ozone readings seen on that day.

The TCEQ recognizes that trees by themselves do not cause ozone. It is a well-established scientific fact, however, that isoprene and monoterpene emissions from trees can interact with NO_x emissions from combustion to create ozone (National Academy of Sciences, 1991; Fehsenfeld et al., 1992). On most days in the HGB area, biogenic VOCs play a relatively small role in ozone formation. This is primarily due to the very large anthropogenic VOC emissions that occur routinely in the HGB area. However, on certain days, such as days with record heat, biogenic VOC emissions can play a greater role in ozone formation than they usually do. Ozone formation in much of the HGB area occurs in a VOC-limited environment which is why anthropogenic VOC emission controls are effective. It also means, however, that when biogenic emissions are unusually large, they may be emitted into an environment that is favorable for ozone formation.

GHASP commented that biogenic emissions are not a justifiable excuse for failing to control industrial emissions and cited Dr. Allen's conclusion about the overall performance of the biogenic inventory. Therefore, further scrutiny of biogenic inventories should be assigned a relatively lower priority than other issues. Any discussion of these issues should consider the findings from the source apportionment analysis at Clinton Drive.

The TCEQ has been a national leader in applying the latest findings and data to development of sound biogenic emissions inventories, and will continue to seek innovations that will improve these inventories.

The commentator notes that the source apportionment study by STI shows only 8 percent of the total observed reactivity is from biogenics. There are three problems with this conclusion. First, the source apportionment study is based upon automated gas chromatography (auto-GC) data, which can reliably measure only one biogenic compound, isoprene. However, there are many biogenic compounds which the auto-GC cannot measure, e.g., a-pinene, b-pinene, limonene, and other monoterpenes, many of which are emitted by pine trees. If those compounds were included in the source apportionment analysis, the role of biogenic emissions would increase.

Second, isoprene and monoterpenes are very reactive compounds, and they react to form aldehydes, ketones, PAN analogues, and other compounds, none of which are measured by the auto-GCs. The initial reactions of isoprene and monoterpenes begin the ozone formation process by reacting with OH (hydroxyl) in radical-initiating reactions, and the secondary reaction products can continue to react with OH, yielding even more radicals that drive ozone formation. Therefore, the biogenic compounds can play a much larger role than is indicated by auto-GC data, due to the limited number of compounds the instrument can quantify. The OSAT analyses include all contributions from biogenic compounds, so that isoprene, monoterpenes, other biogenic VOCs, and all of their reaction products are included in the biogenic contribution. Therefore, OSAT analyses will always show a greater contribution than can be calculated from auto-GC data.

Third, the OSAT analysis shows that the biogenic emissions on August 31 were anomalously high, due to the very hot temperatures. The auto-GC source apportionment shows the average biogenic contribution, based upon many days of data, and should not be expected to properly reflect the biogenic contribution on the hottest day in 57 years.

Further evaluation of biogenics is important because it determines the amount of anthropogenic

VOC that can be emitted. Locally, it can determine whether the ozone is forming in VOC-sensitive or NO_x-sensitive conditions. Sensitivity analysis runs of GloBEIS and CAMx can be used to show sensitivity to biogenic emissions. OSAT shows they are important in the modeling demonstration.

EPA comments that the TCEQ relies upon OSAT in some parts of the analysis and recommends that the TCEQ consider utilizing the APCA evaluation tool, as well as OSAT, since OSAT can sometimes skew the estimated source groups unrealistically to biogenics.

Ozone Apportionment Source Technology (OSAT) analysis retains the information about whether the ozone is forming in a VOC-sensitive or NO_x-sensitive environment. OSAT analysis can therefore determine whether the ozone will respond more readily to initial VOC or NO_x reductions. Anthropogenic Precursor Culpability Analysis (APCA), however, removes biogenics which is one of the most important source categories. Therefore, APCA analysis cannot be used to determine the VOC or NO_x sensitivity of the ozone. OSAT does not “skew the estimated source groups unrealistically to biogenics”. For these reasons, the TCEQ continues to use OSAT analysis where appropriate. Use of APCA on August 31 would not show the impact biogenic emissions had on ozone formation and could lead to adopting control strategies that are not based on sound science.

Houston/Harris County commented that it urges the commission to promptly initiate an effort to remove the impediments that exist and prevents the region from securing emissions reduction credits for Urban Heat Island initiatives.

The TCEQ has participated in several projects that have attempted to model the possible pollution reduction benefits of urban heat island mitigation. However, these efforts have not yet yielded results usable for this SIP revision. An earlier project involved modeling conducted by the Lawrence Berkeley National Lab (LBNL). These results were analyzed by Environ International, and are summarized in a report to EPA (Emery and Tai (2002) *Final Report: Preliminary modeling analyses of urban heat island mitigation strategies in Houston, Texas*. EPA Contract No. 68-D-00-283, Work Assignment No. 2-38, December 27, 2002; prepared for EPA Office of Air Quality Planning and Standards). Although the study was very sophisticated in its approach, it did not successfully model the base case meteorology and ozone chemistry of the HGB area. Results from this modeling study were not used due to the poor model performance.

After the LBNL study, the TCEQ supported the next effort to model the heat-island effect, the TFS project. The TFS land cover and vegetation data project (described above) was the first stage of a larger project to estimate the possible pollution reduction benefits of urban heat island mitigation. HARC is funding modeling studies of the urban heat island and its effects upon ozone, which are still in progress. At this time, however, the preliminary results of those studies do not show that ozone reductions will result from heat island mitigation. The TCEQ has been supporting the efforts of HARC and the UH, and believes that the current project is advancing the state of the science.

The TCEQ notes that attempting to control ozone by changing the physics of the area or region is a highly unusual control strategy. Adoption of such an unusual strategy will require very sound evidence of effectiveness. To date, modeling studies to date suggest that the currently-available modeling tools and data sets may not be advanced enough to accurately model a heat island mitigation strategy. Nevertheless, the TCEQ looks forward to the final modeling results from the HARC/UH.

The Sierra Club commented that the TCEQ does not provide the public with a comparison of the EI that

was used previously (with emissions data from companies that were underestimated) and the current EI and its emissions data.

The TCEQ has revised the “Modeling the HRVOC Rules in HGB” section of Chapter 3 of the SIP, along with similar revisions to Appendix D. The modified table provides unadjusted and adjusted 2000 total for the HRVOCs, plus the 2007 adjusted totals for Harris County and the seven surrounding counties.

The Sierra Club commented that the TCEQ admits on page 3-78 of the proposed SIP that daily emissions from a single facility can vary from the annual average emissions by a factor of 10-1,000. Therefore, the agency has failed to adequately prepare an EI that can be used to model a successful attainment control strategy.

While the commission agrees that emission inventories are not exact quantitative replications of all industrial emissions, the commission notes that it has gone well beyond the requirements of the federal Clean Air Act and EPA rules and guidance to ensure that periodic emissions are adequately addressed in this SIP revision. The modeling used in the attainment demonstration relies on annual, ozone season, hourly Acid Rain Continuous Emissions Monitoring, and emission events data reported by the industry for the modeling inventories. These inventories are the best “official” information that is available.

In addition, the commission performed a special hourly inventory during the TexAQS 2000. Emission event information was collected from the 83 largest accounts sources in the HGB and BPA areas. As described in Chapter 3 of the HGB SIP, episode-day and hour-specific point source emissions data were collected by surveying the largest sources of NO_x and VOC emissions in the HGB and BPA areas to account for emissions variability due to specific operating conditions, upsets, maintenance, start-ups, and shut-downs during the TexAQS 2000 study period. Sources emitting at least 250 tpy of non-methane organic compounds (NMOC) or 1000 tpy of NO_x were requested to participate in the survey. For additional information on the Special Inventory, see Appendix D, “Point Source Modeling Inventory Development.”

The emissions inventories developed by the TCEQ for modeling undergo quality assurance reviews and are some of the most detailed used for SIP preparation in the United States. The inventories follow all of the prescribed emissions inventory development methodologies are more robust than EPA guidance. The modeling performance in the base and future case meets EPA performance criteria. While the commission agrees that inventories in case may be under-reported, it is not possible to state definitively at this time the magnitude of under-reporting. However, the TCEQ is using the best information that is currently available to adjust the EI.

The TCEQ continues to evaluate new data and new approaches to photochemical modeling, such as those being explored under HARC projects H-12 and H-13, as they become available, and strives to make improvements to existing models and input data in a timely manner.

Offroad and Area Source Emission Inventory

GHASP commented that the TCEQ has not revised offroad and area emissions to account for operations of two permitted container and cruise ship port facilities

GHASP cites the US Army Corps of Engineers approval of specific projects and states that the air quality implications of these facilities are significant – a total of 5 tpd of NO_x emissions in 2007 and 19.6 tpd in

2025. They also noted the modeling does not specifically address the LNG facilities that are being permitted. They believe the current SIP revision does not fully account for operating emissions related to the rapid growth in port facilities in the Houston region. Furthermore, these operating emissions do not include the increased train and truck emissions that would also increase as a result of the port activity. Although the TCEQ and the HGAC claim that these activities are included in regional growth projections, it is unclear whether these growth projects account for even more container port facilities. MCA commented that emissions from non-mobile sources of pollution such as ships and construction equipment also need to be addressed. They assert that the SIP was written when only one port was in place and now there will be two.

The projected 2007 shipping inventory explicitly accounts for traffic to/from the new Bayport container and cruise terminals. The shipping inventory does not account for the Texas City container terminal, which was approved long after the current inventory was developed. However, even though the facility plans to open in 2006, the level of activity through 2007 will likely be fairly modest. The TCEQ plans to revise its shipping inventory to include emissions associated with this new port in future modeling work.

Future construction emissions are normally accounted for by growth factors developed by applying econometric growth forecasts, but do not account explicitly for planned projects. The LNG terminals planned for Freeport and Golden Pass were exceptional because they supplied estimated construction emissions for 2007, so the TCEQ was able to account for these emissions explicitly in its modeling.

Locomotive emissions are grown area-wide according to projected trends. Because there is insufficient information available to allocate emissions of locomotives to specific track segments, the growth was spread across all the track miles in the 8 county area equally. A project to improve Texas locomotive emissions is currently underway and the results will be added to the model as soon as it is available and can be processed into model-ready format. This project will hopefully yield improved spatial allocation and may lead to lower emissions estimates than in the current inventory.

Truck emissions are based on travel-demand modeling conducted by HGAC, which included the Bayport and Texas City terminals in the 2007 inventories it generated for TCEQ's future case modeling.

Mayor Edmonson commented that the modeling process that shows that more roads leads to lower pollution (through less idling) is leading to erroneous policy decisions. Transportation modeling currently presumes that land uses are constant across alternatives, i.e., more roads do not affect future land use decisions. This fallacy must be corrected in future air quality analysis.

The decrease in onroad NO_x, VOC, and CO emission estimates from 2000 to 2007 is not based on an assumption that more roads will result in lower pollution. Page 3-51 of the revised SIP stated, "overall VMT [Vehicle Miles Traveled] increases with future growth, while total emissions decrease from 2000 to 2007. This is a result of tighter emissions standards for the onroad fleet and the simultaneous attrition of older, higher-emitting vehicles."

The development of the onroad mobile source inventories used for the SIP attainment demonstration process is based on the travel demand modeling work performed by HGAC. This is documented on pages 3-39 and 3-40 and in Appendices F.1, F.2, and F.3 of the revised SIP. For the

2000 base case, a 2000 roadway network as modeled by HGAC formed the basis of the VMT estimates used in the inventory development process. For the 2007 future case, a 2007 roadway network as modeled by HGAC was used. Due to the construction of additional roadway capacity between 2000 and 2007 throughout the 8-county HGB area, the 2007 network has more roadway “links” than the 2000 network.

In addition, the HGAC travel demand modeling process takes into account the effects which projected increases in human, household, and vehicle populations will have on VMT 2007. Table 3.5-32 on page 3-56 of the revised SIP states that the total 8-county VMT for a typical Monday-Thursday episode day in the 2000 base case is 127,460,894. Table 3.5-33 on page 3-53 demonstrates that the 2007 future case VMT for a typical Monday-Thursday is 146,019,214, which is a 14.6 percent increase over the 2000 VMT estimate.

As shown in Tables 3.5-34 and 3.5-35, the total onroad NO_x emission estimates for 2000 and 2007, respectively, are 356.70 tpd and 200.09 tpd. This represents a 43.9 percent decrease in NO_x emission estimates from 2000 to 2007. The corresponding decreases in VOC and CO emissions are 40.1 percent and 39.2 percent, respectively. These reductions are largely due to cleaner vehicles and fuels.

A citizen objected to the deletion of the regulation on diesel idling, since it is known that these vehicles emit a disproportionate percentage of emissions per vehicle.

The amount of “extended idling” emissions from the “18 wheeler” truck classes is documented in Tables 3.5-42 and 3.5-43 on Page 3-59 of the revised SIP. The amount of idling emissions is 4.93 tpd of NO_x for the 2000 base case inventory, and is 2.38 tpd of NO_x tpd for the 2007 future case inventory. The 2.38 tpd of NO_x in 2007 represents about 1 percent of the expected 200.1 tpd total. As referenced on page 3-58, these figures were developed by extracting 3.4 percent of the HDDV8a and HDDV8b emissions calculated with MOBILE6.2 in accordance with EPA guidance.

On November 17, 2004, the commission adopted a rule that allows local areas to opt-in to an idling restriction program with local enforcement. Additionally, new technologies may result in more reductions. New technologies include electrification of truck stops that will provide cooling and other services. A second technology will allow specially equipped trucks to “plug in” to electrical outlets to provide power. There is some development of portable generating units that would reduce truck idling.

Houston/Harris County commented that the SIP should prominently include emissions data in the finalized SIP regarding the industrial sector and other areas:

- The existing levels of NO_x, VOCs and HRVOCs that are the SIP’s starting point, by emissions category
- The specific reductions that are required in each of these pollutants by the SIP, for each emission category; and
- The residual levels that will exist relative to each of these pollutants, by emissions category, after the SIP requirements are implemented.

The existing levels of NO_x and VOC (2000 base) emissions and the residual levels that will exist after SIP requirements are implemented (2007 control) are summarized in Table 3.7-3 of the HGB SIP for the August 30 episode day. The specific reductions for each emissions category may be obtained

by subtracting residual levels from existing levels. HRVOCs are not specifically quantified for emissions categories other than point sources. The existing and residual levels of point source HRVOCs are summarized in Table D.25 of Appendix D.

Houston/Harris County urge the commission to complete preliminary modeling over the next year to determine the range of additional emission reductions which may be required from various sources for attainment of the 8-hour ozone standard, to give sources the opportunity to consider the viability of additional reductions and plan accordingly.

The commission has already conducted some preliminary modeling and is investigating new episodes. The commission will use the best information available to conduct photochemical modeling in accordance with EPA guidance and to meet 8-hour ozone SIP deadlines. Results will be shared with the Photochemical Modeling Technical Committee and other stakeholders as they become available.

HCPHES notes that there is an 80 percent reduction requirement on 492 tpd NO_x emissions from the industrial sector. This calculates to 98.4 tpd. The SIP does not clearly represent this emission rate.

The "80 percent" refers to reductions from those sources with Emission Specifications for Attainment Demonstration (ESAD) in HGB (i.e. covered by the NO_x Cap). Not all industrial sources in the HGB area are part of the Mass Emissions Cap and Trade (MECT) system. In addition, 2007 is not the final year in which reductions occur in order to reach the full 80 percent. The final phase of reductions is slated to occur in 2008. In addition there are banked emissions added to the area as well as some growth already built into MECT to account for those sources subject to ESADs but not in MECT (to account for new sources and sources that have not yet had allowances assigned). This is documented in the SIP, in Table 3.5-7

I/M Program Removal in Chambers, Liberty, and Waller Counties

Two citizens commented that dropping vehicle emissions inspections for vehicles in Chambers, Liberty and Waller Counties is short-sighted. They note that auto emissions at large emit the lion's share of the air pollution load in Houston.

Table 3.7-1 on Page 3-84 of the revised SIP summarized the NO_x and VOC emissions for both the 2000 base and 2007 future case inventories for the generalized source categories of onroad mobile sources, point sources, and area/nonroad sources. For the 2000 base case, onroad sources account for 342 tpd NO_x, point sources account for 492 tpd NO_x, and area/nonroad sources account for 184 tpd NO_x. The relative NO_x contributions in 2000 for onroad, point, and area/nonroad area sources are 33.6 percent, 48.3 percent, and 18.1 percent, respectively. The commission does not agree that mobile sources (auto emissions) emit the lion's share of the air pollution load. For the 2007 CS-08 scenario, the NO_x amounts are 175 tpd NO_x for onroad sources, 174 tpd NO_x for point sources, and 155 tpd NO_x for area/nonroad sources. The relative NO_x contributions in 2007 for CS-08 are 34.7 percent, 34.5 percent, and 30.8 percent for onroad, point, and area/nonroad sources, respectively.

If a similar analysis is performed for VOC emissions, the 2000 contributions are 151 tpd for onroad, 384 tpd for point, and 254 tpd for area/nonroad. The 2000 relative VOC contributions are 19.1 percent, 48.7 percent, and 32.2 percent for onroad, point, and area/nonroad sources, respectively. For the 2007 CS-08 inventory, the VOC contributions are 89 tpd, 245 tpd, and 234 tpd. The relative VOC contributions in 2007 are 15.4 percent, 44.1 percent, and 40.5 percent for onroad, point, and area/nonroad sources, respectively.

Modeling Grid Size

EPA commented that the TCEQ preliminary results showed good CAMx model performance was obtained by the 1 km flexi-nested grid over the 4 km grid because the 1km flexi-nested grid better simulates the relatively high density of industrial point source emissions in the HGB area and better captures concentration gradient issues that drive the ozone chemistry formation. In reviewing similar control strategy runs at 1km and 4km, differences in the predicted peak of 10 to 20 ppb in the base case and future year were observed on some days using the TCEQ's and H-13's preliminary modeling. They further comment that the modeling is underpredicting ozone levels when compared to the monitor values and sensitivity runs with a 1km grid may resolve underprediction issues. They acknowledge that some uncertainties with conducting modeling at 1km have been raised concerning the models ability to accurately represent transport phenomena on that scale, but these uncertainties are likely less of a concern than concentration gradient issues and chemical reactions rates that drive the need for 1km modeling. Their understanding is 1km modeling is necessary to get the proper chemistry/ozone generation in the H-13 project. They also look forward to seeing the inclusion of the results of the work associated with H-12 and further evaluation into whether additional controls might be necessary in the new SIP.

GHASP commented that the TCEQ has abandoned 1km resolution modeling in spite of a clear commitment: "For example, the modeling conducted for Phase 1 uses emissions gridded at 4 km, reallocated to 1 km using the CAMx flexi-nest feature. In Phase 2, the commission will develop a modeling inventory fully resolved to 1 km." Further modeling should include 1km resolution modeling.

GHASP further comments that the TCEQ has not presented a compelling technical argument for excluding 1km resolution modeling from its base case and control strategy evaluations.

ED commented that the failing to use 1km grid resolution in photochemical modeling leads to an underprediction of actual ozone in the HGB area. A 1km grid would better simulate the very concentrated and geographically variable emissions of VOC in Houston.

The TCEQ has used the 4km modeling to represent the ozone photochemistry for which the model was designed and parameterized. Significant concerns have been raised by the academic community that while the CAMx model will "work" at 1km, it has never been evaluated for correct performance at this scale and that the uncertainties associated with these concerns may undermine the credibility of the model runs upon which the control strategy was based. One of the parameters within CAMx which is suspect is horizontal diffusivity, i.e., whether or not the horizontal diffusion of emissions is replicated correctly. Another concern is that the assumptions within CAMx that apply to the hydrostatic equilibrium of horizontal and vertical transport may begin to break down at a finer grid resolution. Similarly, the vertical diffusive treatment of transport (otherwise referred to as the kv's) and vertical layers structure may not be consistent with a 1km horizontal scale.

However, prominent members of the academic community have stated that these uncertainties become relatively less important when evaluating short -term releases. These same researchers have stated that high-resolution modeling is necessary to simulate the transient ozone events associated with highly localized short-term releases, since these phenomena are capable of causing concentration gradients much steeper than would normally occur from routine emissions. Since the photochemistry is driven by precursor concentrations within the individual grid cells, using superfine grids allows the model to more faithfully replicate chemical reactions which occur over small spatial and temporal scales. In these circumstances, the chemistry is believed to dominate the

physical components of the Eulerian continuity equation. Therefore, superfine grid modeling is appropriate to evaluate short-term releases because the photochemistry effects associated with large emission events are so large that the other uncertainties introduced through a superfine grid are dwarfed in comparison. As the emission gradients are lessened, i.e., as the magnitude of the emission events is reduced, then the residual uncertainties become relatively much more important and use of superfine grids is less justifiable. By applying the appropriate tools for interpreting the two aspects of HGB ozone formation, the TCEQ has minimized uncertainty regarding accurate replication of observed ozone concentrations. Continued evaluation and peer review of these uncertainties is necessary before the model can routinely be applied at a finer resolution to replicate all conditions of ozone formation.

The commission fulfilled its commitment to develop a modeling inventory fully resolved to 1 km. This inventory has been used to conduct sensitivities which are described.

GHASP also commented that the TCEQ was not responsive to the portion of the open records request for information about reasons that the completed modeling was not used, but presumably sometime between the time that the modeling was complete and the SIP revision was published for public review.

The TCEQ responded to GHASP's request for information related to modeling. The Texas Public Information Act (PIA), Tex. Gov't Code Chapter 551 provides that the availability of public information is limited only as expressly provided by the PIA. However, the PIA does not require agencies to create documents in response to a request. Therefore, if limited or no information was provided in response to the request which provided the reasons that certain modeling was not use for the HGB SIP, then staff was not required to create documents that provided that information in response to GHASP's request.

Temperature/Humidity NO_x Correction

EPA commented that the SIP did not make clear whether the temperature/humidity NO_x correction was applied to other episode days, which have the same humidity levels as August 30. The TCEQ should explain whether the temperature /humidity correction was applied to other days of the episode. If not, the TCEQ could perform sensitivity runs for one of the other days with the temperature/humidity NO_x correction to reduce uncertainties.

The temperature/humidity NO_x correction was applied separately to all episode days for both the 2000 base case and 2007 future case modeling. The onroad mobile inventory portion of Chapter 3 was intentionally limited in scope, but appendices were provided with more detail. For example, the onroad temperature/humidity NO_x discussion spans from pages 3-55 to 3-57 of the revised SIP. On page 3-56, it states that "greater detail on this correction procedure can be found in Appendix F.1." Pages 11-15 of Appendix F.1 cover the temperature/humidity NO_x correction procedure. In particular, Tables 14 and 15 on pages 13 and 14, respectively, summarize the different NO_x impacts which this correction procedure has on each of the 20 ozone episode days in both the 2000 base case and the 2007 future case. Consequently, no additional sensitivity modeling is needed to address this issue.

EPA commented that the TCEQ did not provide specific justification that the elevated levels at the boundaries more accurately represent the actual conditions at the boundaries for the HGA modeling episode. They commented further that the use of non-default values for initial conditions and boundary conditions (IC/BCs) should be justified for each modeling episode for which they are proposed, as the IC/BCs change from time to time. Also, further justification should be provided that includes

comparisons to rural ozone and speciated monitors near the boundaries for the time period being modeled.

The justification for the IC/BCs used for the attainment demonstration can be found in a report from Environ which is referenced in Appendix A. Chapter 3 has been revised to provide an explicit link to the report

(ftp://ftp.tceq.state.tx.us/pub/OEPAA/TAD/Modeling/DFWAQSE/Modeling/Doc/DFW_1999_Basecase_Final_Report_20030831.pdf). Also the TCEQ plans to investigate expanding the lateral boundaries east and north and raising the top boundary for the 8-hour ozone analysis. These changes will replace some of the boundary condition contribution with explicit representation of emission sources, but will require significant inventory development.

Chapter 3, Section 3.3.4, Initial and Boundary Conditions, and Appendix A of the Modeling Protocol, Section 4.7 now provides additional details regarding the report used.

EPA commented that they would like the TCEQ to provide 1-hour ozone q-q plots in the document in accordance with EPA guidance.

The TCEQ has added 1-hour ozone q-q plots as requested in Appendix B to the SIP.

GHASP commented that they are concerned with final episode selection and with the modeling results for that episode. When considered cumulatively, this SIP proposal cannot be considered to, as EPA advises, contain “days with observations near but slightly above the design value and meteorological ozone forming potential likely to be exceeded about once per year.”

According to the TCEQ, the 2003 design value for the 1-hour ozone standard is 0.175 ppm. Furthermore, from 2000-2003, air pollution monitors recorded an *annual average* of 9 days with a 1-hour ozone measurement over 0.165 ppm, and about 1 additional day measured over 0.205 ppm

The EPA episode selection procedure has changed in the past and continues to evolve. The most recent guidance lists 4 primary criteria and 5 secondary criteria, and then acknowledges that the criteria often conflict with each other and tradeoffs between the criteria may be necessary.

The August 25-September 1, 2000, TexAQS 2000 episode was selected because it includes a ten day window with both weekday and weekend events, a suite of wind directions, and daily ozone peaks measured in several different areas of the city reflecting the net surface transport during each day. When combined with the extraordinary amount of meteorological and precursor data collected during the TexAQS 2000 study period, this extended ozone episode includes a well monitored and representative mix of HGB area episode types.

In response to the second part of this comment, it is important to note that six 1-hour ozone exceedance days were included in the ten day modeling period (August 25 - September 1), and the average of those peaks was 168.3 ppb which is within 10 ppb of the 175 ppb design value for the period as suggested in the most recent guidance.

GHASP commented that the emissions estimates for heavy-duty trucks do not use the best available information and cites a report from Rick Baker of ERG to Hazel Barbour (TCEQ) dated August 30, 2003. GHASP also commented that the EPA default “reflash” rate of 90 percent for heavy-duty diesel trucks was inappropriate for use in development of the 2007 onroad emissions inventory

All States except California are required to use the latest available version of EPA's MOBILE emissions model for onroad SIP inventory development purposes. In addition, States are required to follow EPA guidance when using the MOBILE model for SIP purposes. The latest version of the MOBILE6.2 User's Guide (dated August 14, 2003) can be found at <http://www.epa.gov/otaq/m6.htm>. Section 2.8.11.2.d on Page 173 of the User's Guide covers the MOBILE6.2 REBUILD EFFECTS command. Excerpts from this Section are provided: (please note that the "all caps" emphasis is from EPA):

- "The default setting for this command is to include these effects at an effectiveness rate of 90 percent. **IT IS RECOMMENDED THAT MOST USERS DO NOT USE THE 'REBUILD EFFECTS' COMMAND.**"
- "EPA's best estimate for the effects of heavy-duty vehicle NO_x off-cycle emissions and the effects of the EPA Rebuild mitigation program have been programmed into MOBILE6 as the default input. This default effectiveness level is 90 percent."
- "It is unlikely that most users will have good local data on this parameter, and are thus, encouraged to not use it."

GHASP correctly noted later in their comments that "EPA requires that states use a default compliance value of 90 percent in the photochemical modeling for 2007." They also correctly noted that "Under a 1998 consent decree with EPA, manufacturers of diesel truck engines are required to install software upgrades to engines they sold between 1993 and 1998 with "defeat devices" that resulted in higher NO_x emissions than allowed by applicable certification standards."

In order for the 2007 onroad inventories for the Attainment Demonstration SIP to be approved by EPA, they must be developed in accordance with EPA guidance. In addition, no state except California is allowed to issue vehicle emission certification standards which are different from Federal standards. Only EPA and California have the authority to issue such standards and are thus the appropriate governmental entities to enforce compliance with these emission standards.

GHASP commented that the emission reduction benefits from TCMs should be updated. According to Section 5.3.14, there have been no changes to the Transportation Control Measures (TCMs) since the December 2000 SIP revision.

The commission concurs with this statement and appreciates that it was noted. Table 3.5-45 and Section 5.3.14 of the SIP summarizes the updated TCM benefits provided by HGAC. In addition, Appendix F.6 provides the actual spreadsheet calculations submitted by HGAC as part of the TCM update submittal.

GHASP commented that aircraft data are excluded from the model performance evaluation. GHASP also commented that the TCEQ should revise the base case model performance evaluation section to include qualitative evaluation of model performance based on aircraft data, including reconsideration of alternative model approaches that may appear more favorable in light of these data.

The TCEQ performed a comparison of model results to aircraft data, but inadvertently omitted this comparison from Appendix B of the proposal. Appendix B has been revised to include the aircraft comparison. Aircraft observations can be useful in assessing model performance, but must be done with care, due to the incommensurability of the observations and the model output.

Weight of Evidence (WoE)

EPA commented that per its guidance, the WoE provided from other analyses will need to be very compelling to overcome the results of the photochemical grid model. EPA also stated that additional evidence should be documented to support attainment by 2007.

The Sierra Club commented that the information does not demonstrate that the 1-hour ozone standard will be attained in 2007.

In response to the comments received, the TCEQ has revised the photochemical modeling. This new modeling shows that the area's peak ozone values would be 125 ppb on September 4 and 6 were it not for the rare event of massive wildfires in Eastern Texas and Louisiana (associated with the extreme temperatures and drought conditions that characterized the episode). Only minimal WoE is needed to show these days are in attainment. As has been well-documented, the meteorology seen on August 31 is clearly an aberration, and is discussed further elsewhere in this response to comments. Additional WoE shows the economic infeasibility of designing a control strategy to attempt to bring August 31 to 125 ppb. Thus, only September 2 remains at issue, with a peak modeled concentration below 129 ppb.

The modeled September 2 day saw a substantial over-prediction of peak ozone at the LaPorte Supersite, less than five kilometers from the modeled peak. At LaPorte, the modeled peak was 133 ppb compared to a measured peak of 126 ppb (the highest recorded peak on this day). Therefore, the model over-predicted the base-case peak by about 7 ppb at this location. Less than 5 kilometers north of LaPorte, the model predicted overall peak concentrations of 152.7 ppb in the base case, and less than 129 ppb in the future control case. Because of the close proximity of the locations of the modeled and measured peaks, it is very likely that peak ozone at the location of the modeled peak was over-predicted in a manner similar to what was seen at LaPorte. Making the reasonable assumption that a similar over-prediction applies to the future control case. The model is over-predicting the peak by somewhere in the range of 7 ppb, resulting in the future control case peak well below 125 ppb.

The commission is following EPA's guidance memo, *Mid-Course Review Guidance for the 1-Hour Ozone Nonattainment Areas that Rely on Weight-of-Evidence for Attainment Demonstration*, and is utilizing the preferred approach by including new modeling that provides a more timely assessment. The TCEQ also has included analyses of all available air quality, meteorological, emissions and modeling data. The analysis represents a vast improvement over any previous modeling analysis used in the HGB SIP. Furthermore, the complete body of evidence presents a compelling argument that properly utilizes the results of the photochemical grid modeling and has included additional detail in this section of the SIP.

ED commented that the WoE arguments do not discuss the likelihood that the way the model was used systematically biases the predicted ozone levels downward.

The WoE section now includes discussions of possible compensating biases which could increase modeled peak ozone. The principal area of controversy is whether OVOCs should be adjusted, which would increase peak ozone. As is discussed elsewhere in this response, the possibility of such adjustment is actively being explored and, if such an adjustment proves to be justified based on data, it will be applied in modeling for the upcoming 8-hour ozone attainment demonstration.

The Sierra Club alleges that the TCEQ contradicts itself with two statements. They say that for the TCEQ to bring the modeled ozone concentrations near or below the 1-hour ozone standard on all days but

August 31 (as discussed in Section 3.11, Summary and Conclusions) is not good enough, and this statement also contradicts the following statement on page 3-108 of the proposed SIP: “While this simplistic analysis by no means proves the area will attain the standard by 2007, the recent design value trends are consistent with reaching attainment sometime around 2007.”

The commenter has taken the second statement out of context. This statement clearly refers only to the discussion of design-value trends and does not describe the SIP package as a whole. The commission stands by its conclusions that the SIP demonstrates attainment in 2007. The responses regarding the commission’s discussions of August 31 follow.

August 31 WoE

The Sierra Club commented that the Clean Air Act Amendments do not allow an “episode that is not reasonably responsive to the proposed control strategies” to be explained away as having temperatures that are too high so that the TCEQ can claim attainment. The TCEQ could have chosen another episode and the idea that biogenic emissions caused much of the high ozone during the episode is not demonstrated by the TCEQ.

The TexAQS 2000 episode and the basis for its selection is clearly articulated in Appendix A. It generally takes approximately two years to develop the meteorological fields and emissions inventory required to model episodes, perform model performance evaluation, and perform control strategy modeling, so there was not time to choose another episode. In addition, this process included peer review by the Photochemical Modeling Technical Committee. The TCEQ intends to continue working to improve model performance for the extended episode and will consider developing new episodes for the upcoming 8-hour ozone attainment demonstration.

The Sierra Club commented that on page 4-10 (Data Analysis) they are concerned that the TCEQ simply plugs in new VOC/NO_x ratios in its model without understanding where the additional emissions are coming from on a company by company and area by area basis. Plugging in numbers to make the model run right is very different from putting the right data in the right place and having the model run right.

The TCEQ generally agrees with the first part of the comment. There is simply not enough data available at this time to precisely locate all of the sources of non-inventoried HRVOC emissions. The HGB area industries have implemented what is undoubtedly the most comprehensive system to measure atmospheric concentrations of reactive hydrocarbons ever deployed. The TCEQ is pursuing several areas of research that will use this and other data to improve the spatial and temporal allocation of HRVOC emissions, and is simultaneously pursuing bottom-up methods to improve emissions inventories. These efforts will allow a much more refined treatment of “extra” hydrocarbon emissions in future modeling.

The TCEQ disagrees with the claim that it is “Plugging in numbers to make the model run right.” Clearly, adjusting HRVOC emissions is supported by a large body of evidence including several peer-reviewed papers by renowned scientists and is in fact; necessary to allow the model to reproduce the chemistry observed in the real atmosphere. Applying the adjustment any other way than was done would be speculative and could wrongly implicate sources that report emissions accurately.

EPA has reviewed the material that the TCEQ has provided about August 31 and is including those comments as an attachment to this comment letter. EPA has a number of concerns that raises EPA’s

uncertainty level and EPA has provided a potential path for further analysis that would reduce the uncertainty level.

GHASP commented on the WoE analysis for August 31. They contend the analysis is selective in its choice of data. They contend that in the December 2002 SIP the TCEQ characterized August 31 as one of the “best performing” days for the “new strategy.”

GHASP also noted that the so-called “gap reductions” resulted in what the TCEQ described as “dramatic improvements” on August 31, and that in its directional guidance modeling, the TCEQ observed that “on August 30 and 31, the additional NO_x reductions appear to provide a faster path to attainment” than the additional VOC reductions.

GHASP noted that the finding that “the conditions that led to the resistance of August 31 to proposed ozone control strategies are infrequent, and are unlikely to occur once per year.” GHASP cites four problems with the analysis:

- The TCEQ does not present any monitoring data for August 31 demonstrating that its analysis of modeled biogenic emissions reflects actual conditions on that day. There should be ambient data collected by surface and aircraft monitors that could corroborate these findings.
- The TCEQ does not present any analysis of an alternative hypothesis for the 20 ppb increase in background ozone concentrations, such as unusual transport conditions.
- The TCEQ does not present any historical temperature data for the regions where the biogenic emissions may have come from. It is possible that although August 31 was an unusual day at Hobby Airport, it may not have been so unusual further inland.
- Even if the Hobby Airport historical data are representative of a regional anomaly, the use of a 95°F peak temperature scenario represents an over correction. As illustrated in the TCEQ Figure 3.25, a peak temperature of over 100°F at Hobby Airport has occurred during many years. It is arbitrary for the TCEQ to restrict its model evaluation to “typical” summer days when Houston frequently has “atypical” weather conditions of one variety or another.

GHASP noted that the TCEQ has demonstrated that August 31 is not necessarily resistant to control strategies. In modeling conducted during 2002, the TCEQ presented control strategy model evaluations with peak ozone levels as low as 0.126 ppm for August 31.

GHASP commented that if the TCEQ cannot find a scientifically valid method for including August 31 in the attainment demonstration, then it should provide a WoE analysis with an examination of every day with peak ozone levels over 0.165 ppm during the 2000 to 2003 time period and explain why it believes that this plan will lead to attainment in light of such high ozone days.

The TCEQ does not agree with the characterization of the August 31 episode day. The OSAT analyses of base case CAMx modeling indicate that biogenic emissions play a large role in peak ozone formation on several days during the episode, including Aug 31. There are four data sets that have been examined to test the performance of the biogenic and CAMx modeling. Unfortunately, these data sets present an inconsistent picture. The aircraft data indicate that the biogenic emissions data are not substantially biased in either direction. The Williams Tower data indicate that biogenic emissions are too low. The auto-GC data from Ship Channel measurement sites indicate that biogenic emissions are too high. Consequently, the H-12

project results state that the discrepancies between the biogenic emissions inventory and the isoprene measurements cannot be resolved with existing data.

The TCEQ has presented the most likely hypothesis for the 20 ppb increase in background conditions, based upon the extreme temperature conditions observed during the episode.

The TCEQ has revised the SIP to include temperature data for 2000 for 9 weather stations in east Texas and west Louisiana (Dallas, Waco, Austin, San Antonio, Corpus Christi, Victoria, Houston, Port Arthur, and Lake Charles). These graphs were obtained from http://maestro.srcc.lsu.edu/temp_precip_2000.html, and show average minimum and maximum temperatures rather than actual minimum and maximum temperatures. The data indicate that very high temperatures were found at each of these stations throughout the eastern half of Texas and west Louisiana during late August and early September 2000. The unusually high temperatures recorded at all of these stations may lead to higher than normal biogenic emissions. Hence, the data are consistent with the OSAT analysis that shows high contribution of biogenic VOC emissions to ozone formation on those days. They are also consistent with the high background ozone concentrations that entered the HGB area from the west on August 31. The models show that high temperatures led to high biogenic emissions, and that the combination of biogenic VOC with NO_x plumes from anthropogenic sources in central and east Texas then resulted in relatively high background ozone concentrations (70 to 90 ppb). The westerly winds on August 31 carried the ozone into HGB area, as seen by the elevated concentrations on the west side of Houston on that day.

As noted in the SIP documentation, the TCEQ performed a modeling analysis to test the sensitivity of the peak ozone concentrations on August 31 to temperature. In this modeling analysis, the TCEQ substituted temperatures and emissions from days with lower temperatures into the August 31 modeling scenario. The purpose of this analysis was not to perform an attainment demonstration with lower temperatures. The purpose was to see whether the model was sensitive to temperature changes, and to changes in emissions that are highly correlated with temperature. The TCEQ found that the peak ozone was indeed sensitive to temperature alone, and even more sensitive to decreases in temperature plus temperature-dependent emissions. However, the sensitivity runs cannot be considered realistic enough to use as an attainment demonstration, since they combined the wind fields from August 31 with the temperature and humidity fields of August 25. They can, however, be used as simple sensitivity analyses, which is modeling conducted to assess the sensitivity of the model's output to perturbations in its input.

ED commented that the revisions to the point source NO_x cap have increased the possibility there will be a significant amount of trading in to the Harris County area from surrounding areas. If a significant amount of NO_x credits are traded into Harris County from surrounding counties, it may cause an increase in peak ozone levels above those predicted in the model.

Although there is a possibility that NO_x emissions could be disproportionately traded into Harris County from the outlying counties, this is an unlikely scenario. An examination of NO_x trade during calendar years 2002 and 2003 supports this conclusion. Harris Counties' NO_x allowances of NO_x account for approximately 35 to 40 percent of the total allowances in the HGB area. Approximately 4 percent of the total HGB allowances were traded in calendar 2002 and of that small percentage, slightly more allowances were traded out of Harris County than into Harris County from the other seven counties. For 2003, approximately 3 percent of NO_x

allowances were traded, again with more allowances traded out of Harris county than into Harris county.

110(l) Demonstration (Non-interference)

EPA commented that this plan must demonstrate that the revisions will not interfere with attainment of the 8 hour ozone standard. EPA has interpreted this to mean that the new plan must achieve the same benefit with regard to the 8 hour ozone standard as the approved plan. EPA stated that its interpretation does not consider whether the discontinued measures may eventually be needed when the 8-hour ozone attainment demonstration is completed, but hope that the commission is considering whether any of the discontinued measures may be necessary for eventual attainment of 8-hour ozone standard.

An appropriate non-interference analysis has been conducted. The commission has not yet determined whether any discontinued measures are necessary for attainment of the 8-hour ozone standard.

GHASP commented that recent conversations have suggested that an overly legalistic word-parsing effort has created an impression that the TCEQ only committed to a non-interference demonstration. The December 2000 SIP does not promise a "non-interference" analysis - this concept was invented later, during the fallout from the BCCA-AG lawsuit challenging the scientific basis for the December 2000 SIP adoption.

The approved HGB SIP contains a requirement to perform a mid-course review. As discussed in Chapter 1, the TCEQ committed in 2000 to perform a MCR to ensure attainment of the 1-hour ozone standard. At the time the TCEQ was preparing to move forward with the MCR, EPA promulgated designations and rules regarding the 8-hour ozone standard, which led to the TCEQ developing an approach to address the outstanding obligations under the 1-hour standard while beginning to analyze 8-hour ozone issues. At the time the MCR commitment was made, the HGB SIP was a NO_x-based strategy. The HGB SIP no longer relies solely on NO_x-based strategies, and this revision, as generally described in Chapter 1, fulfills the outstanding 1-hour ozone SIP obligations. The non-interference demonstration is an independent requirement in § 110(l) of the Federal Clean Air Act. That section requires that any plan revision must not interfere with any applicable requirement concerning attainment and reasonable further progress or any other applicable requirement of the Act 42 U.S. C. § 7410(l). This is discussed in Section 3.10 of the HGB SIP.

Furthermore, the commission disagrees with the commenter's impression. The objective of this SIP revision is to demonstrate attainment of the 1-hour ozone standard. This revision meets that objective and includes a demonstration that it will not interfere with attainment the 8-hour ozone standard. An 8-hour ozone attainment demonstration will be developed in the future.

ED commented that the TCEQ has data including a 4.8 adjustment modeling exercise that contradicts the claim that the proposed strategy will attain the 1-hour ozone standard and does not interfere with the region's ability to meet the 8-hour ozone standard.

The 4.8 adjustment modeling sensitivity described in the Chapter 3, Section 9 of the SIP shows that if ORVOC emissions are indeed underestimated in the current attainment demonstration, then reductions to these emissions may be required to meet the 8-hour ozone standard, in

addition to those already adopted for HRVOCs, however, this was one of many sensitivity analyses carried out by the commission and is not required as part of the non-interference test.

GHASP and ED commented that the 8-hour ozone non-interference demonstration is inadequate, and furthermore may be based on a faulty emission inventory. They comment that the demonstration is inadequate and biased, but does provide a strong indication that a stronger control strategy is needed. The 8-hour modeling results presented in Table 3.55 clearly show that significant additional reductions will be necessary to attain the 8-hour ozone standard.

The findings presented in Table 3.55 clearly show that the proposed 1-hour ozone strategy falls well short of reasonable progress towards the 8-hour ozone attainment deadline of 2010, and furthermore suggest that this plan represents backsliding in comparison to the EPA-approved plan. Six of the 16 monitors show higher 8-hour ozone design values (four of them at levels well above the NAAQS) under the proposed control strategy as compared to the EPA-approved control strategy. As the TCEQ acknowledges, the area of exceedance is larger on six of ten days with the proposed control strategy. The average of the relative reduction factors is essentially unchanged (0.7 percent lower after implementation of the proposed control strategy as compared to the EPA-approved control strategy).

In addition to excluding the analysis of adjustments to the ORVOC inventory, the TCEQ made a number of other assumptions that tend to bias the non-interference demonstration in favor of the proposed control strategy. Information necessary to understand and comment on this analysis was not available in the technical support documents accompanying the SIP, and it was necessary to make a considerable effort to obtain sufficient information from the TCEQ technical staff to determine the assumptions used in the CS-2000 model.

EPA commented that the TCEQ has not modeled the correct set of strategies. In addition, it is unclear from the table what emission reductions were modeled for each strategy. In particular, the 90.9 tpd and the 75.6 tpd shown as gap measures should be better explained.

EPA commented that since the modeling is being utilized to evaluate in terms of the 8-hour ozone standard for the required 110(l) analysis, a full 8-hour ozone modeling performance analysis, including all the methods/metrics outlined in Chapter 16 of the 1999 Draft 8-hour Ozone Modeling Guidance should be completed to understand the uncertainty of the 8-hour ozone projections and RRFs estimated and would reduce uncertainty in the TCEQ's 110(l) analysis.

As a part of the 8-hour ozone non-interference demonstration, EPA recommends that a "Screening" test be conducted to ensure that a proposed control strategy leads to reductions in ozone at other locations which could have current design value exceeding the NAAQS, were monitors deployed there.

The TCEQ disagrees with the assertion that the non-interference demonstration is inadequate and biased, and that it represents backsliding. The modeling, which has been updated slightly since the proposal as discussed elsewhere in this response, shows that the current strategy is equivalent or superior to the strategy in the approved December 2000 and September 2001 SIP revisions. According to guidance received from EPA, equivalence can be demonstrated by showing "that the new strategy will not create higher 8-hour ozone levels than the old strategy by showing that it will not create more 8-hour ozone exceedances, higher 8-hour ozone concentrations, or higher cumulative exposure levels than the old strategy." The first criterion, number of ozone exceedances, is met since both strategies have 8-hour ozone peaks greater than

85 ppb on all ten days. The second criterion, level of ozone exceedances, clearly favors the new strategy with lower 8-hour ozone peaks on nine of ten days. The third, cumulative exposure, also favors the new strategy on nine days out of ten.

The TCEQ agrees that additional reductions will be necessary to reach attainment of the 8-hour ozone standard, but not that the plan falls short of “reasonable progress”, since the plan is a 1-hour ozone attainment demonstration and is not required to show progress towards 8-hour ozone attainment (aside from no backsliding).

The TCEQ disagrees with the assertion that the modeling inventory is faulty. Several specific concerns about the inventory are addressed elsewhere in this response to comments. Also, the revised Section 3.10 and Table 3.10-1 more clearly explains how the inventories for the old (2001) and current control strategies were modeled in the non-interference demonstration. Those strategies can be referenced back to the emissions inventory development sections of Chapter 3 and the appendices.

The TCEQ disagrees with the assertion that any assumptions bias the results of the non-interference test one way or another. The assumptions do not tend to bias the non-interference demonstration, nor does the emissions inventory inherently make the demonstration inadequate. The demonstration was conducted in compliance with EPA non-interference guidance, and therefore should be acceptable to EPA.

The modeling presented in this SIP uses a control strategy based on what was modeled in the 2000 attainment demonstration. Since this strategy was modified slightly in the 2001 SIP revision, the commentor is technically correct in saying that the TCEQ has not modeled the correct set of strategies. The TCEQ re-modeled the analysis using a “2001” strategy instead of the “2000” strategy.

CS-2001 was run and several 8-hour ozone metrics recommended in the EPA Region 6 memo were calculated. Table 3.10-2 shows that CS-08 is slightly more beneficial than CS-2001 in both average relative reduction factor (0.931 vs. 0.940) and in future design value (107 vs. 108 ppb), even though some stations fare slightly worse under the new control strategy. Figure 3.10-1 shows peak 8-hour ozone concentration on each episode day, Figure 3.10-2 shows area of exceedance, and Figure 3.10-3 shows ozone “exposure”, which is the area of exceedance weighted by the 8-hour ozone concentration in each grid cell, more specifically, by the amount the modeled ozone concentrations exceed the 8-hour ozone standard. For both peak 8-hour ozone concentration and exposure metrics, benefits of the new strategy exceed those of the old on every day except September 6, where the old strategy is slightly better. For area of exceedance, however, the comparison is much less clear-cut. The older strategy shows more of a benefit on 6 of 10 days and the new strategy shows a greater benefit on 3 days. Both strategies indicate the same benefit on 1 day.

Section 3.10 has been revised and provides additional detail on how the control strategies were modeled for this SIP revision.

A very detailed performance evaluation of the modeling is provided in this SIP revision, both for 1-hour and 8-hour ozone prediction. In particular, Appendix B includes a large number of scatter plots (by monitor, by day, and overall), a bias calculation, and 8-hour ozone isopleths along with analysis and interpretation. This thorough analysis provides appropriate

information to understand the uncertainty of the 8-hour ozone projections and RRFs estimated. The TCEQ has evaluated most of the performance metrics suggested in EPA's Draft Guidance for the use of models and other analyses in attainment demonstrations for the 8-hour ozone NAAQS and selected the ones most appropriate for unambiguously interpreting and presenting model performance. The commission worked with EPA Region 6 to determine the most appropriate performance measures to use for the 8-hour ozone modeling. As a national leader in modeling, Texas is among the first in the nation to have practical experience in applying the measures suggested in the Draft Guidance, and thus is in a unique position to help EPA move ahead with the new standard. The 8-hour ozone model performance supplements, but cannot replace, a thorough 1-hour ozone performance evaluation. Further, the EPA has not yet issued Final Guidance on assessing 8-hour ozone performance.

Finally, the TCEQ has not attempted to employ a screening test because the EPA has been seeking an alternative to this test for some time. Alternative Kriging-based analyses have been proposed by the EPA to replace the screening test, but at this time EPA has not issued any Final Guidance, nor provided an alternative version of a screening test. The commission therefore is not following EPA's recommendation to apply a test that EPA apparently believes is deficient.

GHASP and ED made several comments regarding perceived assumptions made in the modeling of the non-interference run, and that issues related to sources other than onroad mobile are:

- The gap may not have been modeled accurately in the CS-2000 inventory. The TCEQ should have modeled the gap as 96 tpd, unless it can specifically describe the NO_x benefits from adopted and modeled control strategies. The information necessary to demonstrate that the gap measures commitment was modeled completely is not included in the SIP documentation.
- The assumptions used to estimate the effects of the ESADs adopted in December 2000 may be significantly different from values that would be determined from actual calculations.
- Reductions from small stationary diesel engines should be modeled as part of 2004 CS-2000
- The 3.6 tpd of NO_x reductions from energy efficiency measures do not appear to have been modeled in the 2004 CS-2000

For the non-interference demonstration, all rules that were identified as gap measures in the December 2000 and September 2001 SIP revision were modeled. As discussed below, reductions associated with some measures changed as a result of improving the underlying inventory. It is more appropriate to evaluate the identified measures relative to the best currently available inventory rather than evaluate them with an obsolete inventory. EPA Region 6 informed the TCEQ that it was not necessary to adjust the unidentified portions of the gap to compensate for changes occurring as a result of inventory improvements. Therefore the gap modeled in the CS-2000 (and in the new CS-2001) cases remains at 56 tpd.

The TCEQ agrees that the assumptions used to estimate the effects of the December 2000 ESADs on a current inventory may be different from values resulting from more thorough calculation methods, but measuring the effects of these old ESADs on the current modeling inventory is not a simple task. Therefore, the estimated effects of these ESADs on the current modeling inventory were as robust as possible for the non-interference runs. Due to the complexity of the MECT system and the resources required to conduct this calculation, and the

evolving nature of the MECT system, the numbers would be difficult to reconcile, therefore a reliable estimate was used.

The TCEQ agrees that the small diesel engine reductions should have been modeled as part of the CS-2000 strategy. These reductions are included in the revised modeling in the new CS-2001 strategy.

The 3.6 tpd of NO_x from energy efficiency was indeed modeled in CS-2000. For modeling purposes it was added to the gap, since it was distributed among the same sources. However, for reporting purposes it is now listed separately in the revised Section 3.10.

Both GHASP and ED argued that the overall non-interference modeling was inadequate and that the assumptions used to develop the CS-2000 inventory for the non-interference demonstration were inappropriate. The claim was made that these assumptions biased the non-interference demonstration in favor of the proposed CS-06a control strategy compared against the CS-2000 inventory. With respect to how the onroad mobile emissions inventory was developed for CS-2000, GHASP and ED stated that:

- Due to the fact that the NO_x and VOC TCM benefits in the 2000 SIP were higher than those modeled in CS-06a and CS-2000, the TCEQ should have added the difference to the gap for modeling purposes.
- Due to the fact that the 55 mph Speed Limit benefits for the MOBILE5-based December 2000 SIP inventory were 12.33 NO_x tons, and that similar MOBILE6-based benefits with the new inventory would only be 5.86 NO_x tons, the TCEQ should have added the difference to the gap for modeling purposes.
- Due to the fact that the vehicle idling benefits for the MOBILE5-based December 2000 SIP inventory were 0.48 NO_x tons, and that similar MOBILE6-based benefits with the new inventory be 2.36 NO_x tons, the TCEQ should have subtracted the difference from the gap for modeling purposes.
- The TCEQ should not have used the latest available MOBILE6.2-based 2007 inventory with a total 8-county HGB VMT of 146,019,214 and, instead, should have used the MOBILE5-based inventory from the December 2000 SIP which had an 8-county 2007 VMT of 129,362,378.
- Both the old VMT and other associated activity data should have been used for modeling CS-2000 to be consistent with the MOBILE5-based motor vehicle emissions budget (MVEB) which was established by the December 2000 SIP and acts as a “binding constraint” on the growth in motor vehicle emissions.
- The TCEQ should have developed the CS-2000 onroad inventory by coupling new MOBILE6-based emission rates with old VMT and associated activity data from the December 2000 SIP.

GHASP goes on to say that “it is impossible to accurately estimate the degree to which the TCEQ may have underestimated emissions in the CS-2000 emission inventory without going through the necessary modeling steps.”

Due to the fact that there was no formal guidance available from EPA with respect to how 8-hour ozone non-interference modeling should be conducted, the TCEQ discussed with EPA the best approach to make this demonstration. One of the key issues of concern in conducting this demonstration was the fact that the photochemical modeling is now based on a vastly improved

August-September 2000 ozone episode rather than the outdated September 1993 ozone episode, which was last utilized for the December 2000 SIP. Recognizing that this was a major change from 2000, the non-interference modeling included the control strategies listed in the December 2000 SIP together with updated inventories and updated methodologies. This was incorporated into a 2007 future case inventory projection of the “new” August-September 2000 ozone episode. This inventory was labeled CS-2000. The alternative would have been to model CS-2000 with old inventories and old methodologies or a combination of either new inventories and old methodologies or old inventories and new methodologies. Such approaches would be impractical and meaningless.

The non-interference modeling is used to determine if this plan revision would interfere with any applicable requirement concerning attainment and reasonable further progress. Specifically, this demonstration must show whether the total collection of strategies in CS-2000 is equivalent in ozone reduction effectiveness to the total collection of strategies in CS-08. Therefore, it is not only appropriate, but essential that the most recent and best available information be used in developing the inventories for comparing CS-2000 and CS-08 so that an appropriate comparison can be made. When developing emission inventories for SIP purposes, the TCEQ cannot compare new inventories to old ones and simply picking the numbers that best argue a specific position. Instead, EPA requires use of the most recently available inventory. Provided that the inventory is accurate and based on up-to-date inputs, whether the new inventory figure is lower, higher, or equivalent to the old inventory figure does not change the fact that it must be used.

The TCEQ focused on quantifying the magnitude of the CS-2000 control strategy benefits using currently available data and inputs. It is unrealistic to expect that the magnitude of NO_x and VOC control strategy benefits based on the December 2000 SIP strategies (particularly those calculated with MOBILE5 and a different set of activity data) were going to match updated estimates based on newer activity data and emission estimation tools (such as MOBILE6.2 and updated activity data). For example, a fair comparison could not be made if one scenario utilized 146 million VMT and the other utilized 129.4 million VMT. As mentioned above, GHASP commented that the TCEQ should have used the 129.4 million VMT figure when developing the CS-2000 onroad inventory, yet GHASP also commented that it is impossible to accurately estimate the degree to which the TCEQ may have underestimated emissions in the CS-2000 emission inventory. If the TCEQ had utilized the 129.4 million VMT activity figure, the CS-2000 inventory would have been significantly underestimated. The new 146 million VMT figure alone is roughly 13 percent higher than the 129.4 million VMT figure.

In addition, it was stated that old activity and emission inventory data should be used for CS-2000, but that the gap should be modified based on the differences between the old and new inventories when it comes to control strategies such as TCMs, idling restrictions, and 55 mph speed limits. Old and new inventories and methodologies cannot be mixed and incorporated into a “new” ozone episode without yielding meaningless results.

It was emphasized that the December 2000 SIP MVEB placed a “binding constraint” on how any CS-2000 onroad inventory should be developed. It was also suggested that the CS-2000 inventory should have coupled updated MOBILE6-based emission rates with the old VMT and other associated activity data from the December 2000 MVEB. This suggestion is impractical because an onroad emissions inventory which becomes an MVEB is a combination of both emission rates (from the MOBILE emissions model) and activity data (from a travel demand

model). Neither the activity data nor the emission rates alone constitute an MVEB. The commission cannot support utilizing updated emission rates without also updating the VMT.

The 2007 onroad inventory was developed in October 2000 for the December 2000 SIP. At that time, 129.4 million VMT was the best available estimate of 2007 activity levels based on HGAC's travel demand modeling. Since that time, new travel network, demographic, census data, etc. inputs have been added to HGAC's travel demand modeling process and, as of February 2004 when the latest 2007 onroad inventory was developed, 146 million VMT is the best available estimate of 2007 activity levels. This was developed by following an EPA memo entitled *Policy Guidance on the Use of MOBILE6 for SIP Development and Transportation Conformity*, dated January 18, 2002, which can be found at <http://www.epa.gov/otaq/m6.htm>.

If the TCEQ did not update the historical ozone episode upon which the 2007 future case ozone attainment demonstration was based, nor the point, area, or nonroad portions of the 2007 anthropogenic emissions inventories, then the commentor would be correct in stating that the TCEQ would be held to the MVEB established in the December 2000 SIP. Under the scenario where the base case ozone episode did not change, but the point, area, nonroad, and onroad mobile inventories did change, then the TCEQ could have an onroad mobile source inventory higher than the MVEB from the December 2000 SIP, provided that the total emissions inventory from all anthropogenic sources did not exceed the levels from the December 2000 SIP.

However, neither of the two scenarios described above apply to the current SIP modeling efforts because the actual base case episode (with different meteorology) has changed along with the estimates for every source component of the emissions inventory. The requirement for this SIP revision is that it be approved by EPA for the purposes of demonstrating attainment with the 1-hour ozone standard in 2007. Provided that it meets this test and that the inventories are found to be technically satisfactory, then no issue remains as to whether the updated 2007 onroad attainment demonstration inventory is higher, lower, or the same as the MVEB listed in the December 2000 SIP. By definition, the MVEB is the onroad portion of the overall anthropogenic emissions inventory needed to demonstrate attainment of the ozone standard in a specific year under a specific set of representative meteorological conditions for the formation of ozone. There have been significant improvements made in the modeling and inventory development of the August-September 2000 ozone episode as compared to the September 1993 ozone episode. Therefore, this supports development of a revised attainment demonstration strategy and associated MVEB .

The TCEQ consistently applies the most current and up to date inventories in analytical and modeling exercises and does selectively apply dated inventories. The commentors correctly point out that all of the inventories (point, area, nonroad, and onroad mobile) have been updated from the December 2000 SIP for inclusion with current SIP modeling efforts. It is appropriate and practical to use the latest and best estimates of both emission inventories and individual control strategies when comparing modeled ozone between the CS-2000 and CS-06a inventories. Once again, the question being asked is what impact will the collection of strategies from CS-2000 have versus the impact from CS-06a. This question cannot be properly answered with this August-September 2000 ozone episode if outdated emission inventory data are utilized.

GHASP also notes, "an error acknowledged by the TCEQ in the SIP proposal: an additional 15.4 tpd in point source NOx emissions modeled in the CS-06a inventory, and presumably in the CS-2000 modeling inventory."

The CS-2000 inventory included the additional 15.4 tpd from new EGUs permitted in the area. The errors in CS-06a and CS-2000 have been corrected and relevant documentation in Chapter 3 has been updated.

HRVOC/HECT

EPA commented that clear documentation of the modeling inventory for the HRVOCs (including cap level allocations modeled) should be provided for each facility and a comparison to the actual cap allocation should be included in the new SIP.

The TCEQ modeled an estimated cap value for each site previously listed in the December 2002 SIP Revision (Tables 6.2-1 and 6.2-2). This value was based on the cap allocations published in the December 2002 SIP and the results of fundamental changes in modeling inventory speciation and adjustment techniques. For example the total cap for eligible sources in Harris County, from the referenced Table 6.2-1, is 1937.57 lb/hr (23.25 tpd). In this table, the eligible sources at the first account listed, HG0033B, are limited to 267.4 lb/hr (3.2 tpd), or approximately 14 percent of the total for capped sources in Harris County. For modeling purposes, the TCEQ assumed this percentage would approximate that allocated to this site in the future, under the HECT program, minus some percentage of an extra 20 tpd HRVOC removed from all Harris County sources. Therefore, using the same method as the referenced tables in conjunction with the fundamental changes in speciation and adjustment techniques, a cap for eligible sources in Harris County can be estimated to be 2416.165 lb/hr (30 tpd), and HG0033B cap sources can be estimated to be limited to 374.821 lb/hr (4.5 tpd), or 15 percent of the estimated total for capped sources in Harris County. In addition, removing an extra 20 tpd HRVOC from all sources in Harris county, reduces this percentage and hourly limit further (note: the 30 tpd total for Harris County is for capped sources only--there are many sources/accounts not subject to the cap, i.e. fugitive sources). Since the allocations for the trading program will be made after participants submit their HECT-1 forms, due March 31, 2006, the commission can not explicitly state what the allocations will be for each account.

ED commented that without better source monitoring data to accurately characterize emissions of all the principal chemicals that are routinely measured in Houston's air, the TCEQ will continue to struggle to develop an effective ozone attainment strategy.

The commission agrees that better source monitoring would improve the quantification of emissions and, therefore, aid in the development of future strategies. The commission will continue to evaluate new technologies and methods of measuring VOCs, data collected from ambient monitors in the HGB area, and other on-going research activities to determine what additional monitoring is necessary for future planning of attainment of the 8-hour standard.

The TCEQ is pursuing improvements in the collection of the emissions inventory and anticipates that better data will be available regarding OVOCs as well as HRVOCs as a consequence of the enhanced monitoring requirements with Chapter 115. The commission is evaluating changes to the emission inventory data collection process to assure that improved emission estimations are provided. Further, the enhanced industry-sponsored monitoring (EISM) networks have provided information regarding ambient measurements of VOCs. The

TCEQ is pursuing identification of specific areas where ambient monitoring data is not consistent with VOC emissions estimates.

The commission is confident that the process of quality assuring the emissions inventory information required by 30 TAC §101.10 if submitted by the regulated entity results in an accurate accounting for the emissions reported. The emissions inventory requirement is a self reporting requirement. The TCEQ review of company submitted emissions inventory information includes cross checks of information about a site maintained by various divisions of the agency responsible for the air program. If a company fails to include emissions or sources of emissions, and the TCEQ cannot recognize the omission, then the emissions remain unknown to the TCEQ. It is the primary responsibility of the regulated entity responsible official to assure and then certify that the reported values accurately and completely account for all emissions at their site. Failure to do so not only subjects the responsible official to enforcement actions, but also results in all sources in the airshed potentially facing additional controls.

Because of the importance of air quality planning, the commission initiated improvements to the inventory reporting requirements. For example, in 2000, the commission instituted the requirement for companies to speciate VOCs to at least 90 percent where possible, thus helping to characterize the site by the actual mix of VOC species emitted. In the years 2000-2001, more detail on the emissions-related characteristics of combustion units, storage tanks, and wastewater treatment facilities was required. In 2002 in response to the emissions inventory findings of the TexAQS 2000 study, which indicated that more VOC emissions are being emitted into the atmosphere than can be accounted for in the inventory for HGB area the commission added cooling towers, flares, and fugitive units to the list of facility types that required more detailed emissions-related characteristics reporting. Also beginning in 2002, all HRVOC emitting facilities were required to speciate their emissions to one-tenth of a ton. Finally, in 2003, the requirement that all sources of emissions at a site must be included in the inventory was added, which eliminated a smaller source exemption that had been in place for many years. Previously exempted sources were those whose emissions were both less than one tpy of a contaminant and accounted for less than 10 percent of the total emissions from the site. Each of these enhancements was designed to ensure that all emissions attributable to normal operations are accounted for and that the emissions reported by the company are verifiable.

HB 2912 (77th legislature, 2001), regarding emissions events and scheduled maintenance, startup, and shutdown (EE/SMSS) activities requires emissions from all EE/SMSS activities to be reported to the inventory for sites subject to the inventory requirements. This has enhanced the understanding of emissions that occur during those activities.

The steps taken to date are responsive to the concern of under reporting in the point source emissions inventory. The commission continues to search for and implement new means to improve the inventory. The TCEQ is initiating a stakeholder process in January 2005 to address improvements to the emissions inventory.

EPA requested clarification of the intent of §101.396(b) because it appears that emissions from “emissions events” and from scheduled maintenance, startup, or shutdown activities that are above the short-term limit of §115.722(c) and §115.761(c) are exempt from the HRVOC Annual Cap. EPA further stated that it is EPA policy that all sources in cap and trade programs must account for all of their emissions.

All sources in the HRVOC emissions cap and trade (HECT) program are required to account for all of their emissions. The TCEQ will consider any exceedance of the short-term limit to be an emissions event and will take the appropriate enforcement actions. Hourly emissions above the short-term limit will not be deducted from the annual cap. This policy ensures that smaller HRVOC sources will not deplete their annual allowances because of an emissions event that is already subject to enforcement action.

EPA commented that it noted that for excess emissions from scheduled maintenance, startups and shutdowns, the Chapter 101 rules do not provide an affirmative defense to enforcement of emission limits established by Chapter 115. Please confirm that sources that exceed their short-term limit during a scheduled startup or shutdown would not be eligible for an affirmative defense.

The commission's rules do not provide for an affirmative defense for unauthorized emissions due to scheduled maintenance, startups and shutdowns. An exceedance of the short-term limit in § 115.722 is a separate violation from excess emissions from a scheduled startup or shutdown. An exceedance of that limit is, by rule, unauthorized emissions. If those unauthorized emissions result from any upset event or unscheduled maintenance, startup or shutdown activity, the emissions are considered an emissions event and the affirmative defense in 30 Tex. Admin. Code § 101.222(b) is available if the emissions event is a non-excessive emissions event.

GHASP commented this mid-course review SIP must "reaffirm" that its control strategy will attain the 1-hour ozone standard by 2007.

Sierra Club commented that it is astounded that the TCEQ continues to change and remove rules and controls that it has already stated are necessary for and will help achieve attainment of the 1-hour ozone standard by 2007.

EPA stated that the commission has not provided a revised Reasonably Available Control Measures (RACM) analysis regarding the change from 90 to 80 percent NO_x control on point sources. EPA requested that the commission provide a RACM analysis that includes a detailed, substantive consideration of whether the withdrawal of certain measures (diesel idling rule, the lawn and garden rule, the I/M in the 3 rural counties) were "reasonable" and would advance attainment.

The existing approved attainment demonstration is solely a NO_x based strategy and includes a 56 tpd shortfall. The December 2000 and September 2001 federally approved SIPs demonstrate attainment by modeling three of four days below 135 ppb and using a WoE analysis. The revised SIP no longer relies solely on a NO_x based strategy. This revision, in combination with the revisions to the SIP and rules in 30 Tex. Admin. Code Chapters 115 and 117 adopted by the commission in December 2002 and October 2003, addresses emissions of both NO_x and HRVOCs and demonstrates attainment without a shortfall. As discussed in Chapter 5, a combination of point source HRVOC controls and NO_x reductions appear to be the most effective means of reducing ozone in the HGB area and there is no longer a NO_x shortfall in the HGB SIP. Additional enhancements to the modeling since the SIP was proposed in June replicate peak ozone at or below 125 ppb on eight of ten days. The WoE argues that both of these days are addressed with the understanding of the causes of ozone on the two days that do no show modeled attainment.

The TCEQ re-evaluated the existing RACM analysis performed as part of the September 2001 SIP revision. For NO_x controls, it has been determined that Tables 7.3-4 *EPA's List of Reasonably Available Control Measures- Area/Point Sources* and 7.3-5 *EPA's List of Reasonably Available Control Measures- Mobile Sources* remain unchanged from the September 2001 SIP revision with the exception of those discussed below.

With regard to the control measures which resulted in an overall decrease in NO_x emissions of 90 percent from point sources of NO_x emissions, the commission has determined that these are not reasonably available control measures for all source categories. In 2002, the commission revised the NO_x rules in Chapter 117 to require fewer reductions from certain NO_x point sources. If those rules were subsequently revised to reinstate the 90 percent reduction, the legal risks associated with any subsequent revision of these rules makes this measure not reasonably available. Implementation of such requirements before the attainment date could be much greater than the costs projected by the commission at the time the rules were originally adopted in December 2000. In addition, the installation of these controls would not advance the attainment date. The NO_x reduction rules, together with the MECT, which are part of the 2001 approved SIP required final reductions by April 1, 2007. The revised (2002) reduction schedule results in fewer reductions in the years 2004 and 2005, but achieves greater NO_x reductions in 2006. The final reductions are also required by the compliance date of April 1, 2007. Therefore, retaining the 90 percent rules alone does not advance the attainment date, and this control measure is no longer RACM.

The analysis of whether these strategies which are no longer in place are reasonably available must be considered in context of this revision as a whole. Because this strategy consists of the combination of NO_x and VOC, an analysis of whether 90 percent NO_x together with HRVOC controls will advance the attainment date is not appropriate.

In addition to a number of VOC controls utilized in the previous RACM analysis, the TCEQ has adopted a control strategy to address emissions of HRVOCs. The commission has determined that these HRVOC measures are reasonably available when considered together with the current reductions required by the NO_x rules.

In addition, the commission has adopted portable fuel container rules which establish new requirements relating to the design criteria for portable fuel containers and portable fuel container spouts. Effective December 31, 2005, these new rules will limit the type of portable fuel containers and portable fuel container spouts sold, offered for sale, manufactured, and/or distributed in the State of Texas. These rules will ensure that portable fuel containers manufactured under these standards will release fewer amounts of fuel as the result of spillage and evaporation of VOC emissions. The commission has determined that these rules are RACM.

For the remaining strategies for which the commission is repealing rules, the commission has determined that retaining these various strategies will not advance the attainment date. With regard to the vehicle IM program in Chambers, Liberty and Waller Counties, the VMT for the three counties is 7,405,659 miles, which makes up 5.1 percent of the total VMT for the 8-county nonattainment area. The 82,809 registered vehicles in the three counties that are subject to the I/M testing make up only 3.0 percent of the total registered vehicles subject to I/M testing in the 8-county area. Additionally, the emission reduction estimates associated with the program in the three counties is 0.87 tpd of NO_x. The 1-hour attainment demonstration for the 8-county

HGB area includes 525 tpd of NO_x in 2007. Furthermore, preliminary estimates based on the number of registered vehicles subject to I/M testing, the emissions test fee, repair costs, and emission reduction estimates indicate the program would cost approximately \$19, 556.3 per tpd of NO_x reduced. Given the low VMT, few registered vehicles subject to I/M testing, minimal emission reductions, high cost per ton reduced cost effectiveness, and the development of a more robust attainment demonstration, the commission maintains that the inclusion of the three counties in the I/M program is not a reasonable measure, nor does it advance the 1-hour ozone attainment date of the HGB area. Therefore, this measure is not RACM.

With regard to the repeal of the heavy-duty diesel idling rules, by the year 2007, the idling limits would reduce NO_x emissions in the affected area by 0.48 tpd. The repeal of the idling restriction does not significantly impact modeled ozone concentrations. Given the minimal emission reductions, difficulty of enforcement, and the development of a more robust attainment demonstration, the commission maintains that the inclusion of the motor vehicle idling restriction rules is not a reasonable measure. These factors also indicate that this measure does not advance the 1-hour ozone attainment date of the HGB area and therefore is not RACM.

Historically, the commission has expressed a preference to implement technology-based strategies over behavior-altering strategies and these changes embody that philosophy. Changes to two behavior-altering control measures are included in this revision. Although the lawn and garden equipment use restriction rules achieve reductions in NO_x emissions, it is a behavior-altering strategy which is difficult to regulate and may prove unreliable. Given that effective implementation may not occur until long after the compliance date of April 1, 2005, inclusion of the this strategy does not advance the attainment date and therefore is not RACM. This revision also includes changes to the environmental speed limit strategy. The previous speed limit strategy is no longer RACM because the commission is now limited by law to the strategies in place as of the effective change in the statute. Therefore, only the current speed limit is RACM.

EPA commented that clear documentation of the modeling inventory for the HRVOCs (including CAP level allocations modeled) should be provided for each facility and a comparison to the actual CAP allocation should be included in the new SIP.

The commission modeled an estimated cap value for each site previously listed in the December 2002 HGB SIP Revision (Tables 6.2-1 and 6.2-2). This value was based on the cap allocations published in December 2002 and the results of fundamental changes in modeling inventory speciation and adjustment techniques. For example the total cap for eligible sources in Harris County from the referenced Table 6.2-1, is 1937.57 lb/hr (23.25 tpd). In this table the eligible sources at the first account listed, HG0033B, are limited to 267.4 lb/hr (3.2 tpd), or approximately 14 percent of the total for capped sources in Harris County. For modeling purposes, the TCEQ assumed this percentage would approximate that allocated to this site in the future, under the HECT program, minus some percentage of an extra 20 tpd HRVOC removed from all Harris County sources. Therefore, using the same method as the referenced tables in conjunction with the fundamental changes in speciation and adjustment techniques, a cap for eligible sources in Harris County can be estimated to be 2416.165 lb/hr (30 tpd), and HG0033B cap sources can be estimated to be limited to 374.821 lb/hr (4.5 tpd), or 15 percent of the estimated total for capped sources in Harris County. In addition, removing an extra 20 tpd HRVOC from all sources in Harris County, reduces this percentage and hourly limit further

(note: the 30 tpd total for Harris county is for capped sources only—there are many sources/accounts not subject to the cap, i.e. fugitive sources). Since the allocations for the trading program will be made after participants submit their HECT-1 forms, due March 31, 2006, the commission cannot explicitly state what the allocations will be for each account.

Sierra Club commented that current commission permit language allows VOC leaks in cooling towers to continue for months or years until the next shutdown and therefore investigators simply report the large VOC leaks. The commission must "tighten up" its permit language and make it apply to all cooling towers and permits retroactively.

The TCEQ recently adopted a new permit condition for emissions of VOCs from cooling towers. These conditions identifies a concentration that is the maximum in the water for which permit authorization is given. Emissions with a concentration greater than stated in the permit are not authorized. An on-going leak will result in a violation of the long-term (annual) emissions authorized. The larger the leak and the cooling tower, the sooner the leak will cause the owner or operator to be in violation of their permit. Because the commission does not have authority to reopen permits to revise permit conditions absent some other basis for a permit revision, the commission is not adopting the suggestion made by the commentor.

In addition, the HRVOC rules in Chapter 115, Subchapter H, include requirements for more frequent monitoring and therefore the commission expects that leaks will be discovered sooner. Because leaks are counted toward the HRVOC cap, the operator has incentive to repair the leaks as quickly as possible.

GHASP commented that the SIP does not address the “worst” case scenario for the annual cap. GHASP suggested evaluating the “worst” 24 hours (fixed evening hours) in the densest area, with routine variability, noncompliance, and upsets.

One of the main purposes of the photochemical modeling and data analysis efforts that support this SIP are to provide planners with useful technical guidance regarding the conditions experienced by the HGB area. A “worst” case, by its very nature, is a rare and possibly unique - event. Previous TCEQ experience analyzing these types of events suggests that the necessary analytical tools are not available and that the conclusions that can be reached from these analyses are very limited. The chances that analysis of such an event would provide relevant technical guidance for planners are very small.

When the EPA developed the 1-hour and 8-hour ozone standards it purposefully settled on using the fourth highest hourly value over three years (for the 1-hour ozone standard) and the three year average of a monitor’s annual fourth highest value (for the 8-hour ozone standard) to determine an area’s ozone design value rather than use the worst possible case. This formulation allows the 8-hour ozone design value to be based on the 98th percentile of ozone values rather than the 100th percentile. The EPA chooses this percentile because the statistical distribution of values greater than this is highly unstable and of limited use for technical analysis. Planning for this additional two percent could dramatically increase the cost of control strategies and render them economically infeasible.

The modeling episode accompanying this SIP revision is representative of the ozone design value and therefore is representative of the severe case analysis, if not the worst case analysis, of high VOC emissions. Since a severe case analysis is more representative and less unique it is

more likely to provide useful information to policy planners. Furthermore, as the long and short-term HRVOC caps are implemented and VOC emissions are reduced, the “worst” case will reduce in magnitude until it becomes less serious than the “severe” case analyzed in the current modeling episode.

GHASP commented that the TCEQ has not provided the resources to adequately oversee the emission banking/trading program and that current permitting activity will not be adequately coordinated with the implementation of the new rules.

Adequate staff is available to administer the emissions banking and trading program associated with these rules. While the initial allocation of allowances may be resources intensive, once allocated, the administration of the program will follow the NO_x MECT in terms of data management and accounting systems. Because the Emissions Banking and Trading Team operates within the Air Permits Division, coordination between air permitting activities and this rule should be improved because of the emissions banking and trading program.

GHASP commented that the proposal to exclude emissions in excess of 1,200 lbs/hr from counting toward the annual emission cap is troubling because the expectation that emission events will occur should be reflected in the modeling. ED also commented that the proposed control strategy does not include a margin of safety for emission events. ED stated that the HRVOC short-term cap may not be stringent enough.

The HARC research project H-13 has provided valuable information about emission events, the frequency and their potential impact and therefore had adequately addressed the issue of emission events being reflected in the modeling. Additionally, the short-term limitation of 1200 lbs/hr will encourage industry to examine and initiate alternative methods of preventing excursions above the 1200 lb/hr level.

The commission has demonstrated that a combination of NO_x emission reductions along with HRVOC reductions will attain the 1-hour ozone standard. The annual HRVOC cap and fugitive emission rules will reduce the overall reactivity in the air by removing the compounds that are most prevalent and most likely to react rapidly enough to cause 1-hour ozone exceedances. The short-term HRVOC limit will reduce both the frequency and magnitude of short-term HRVOC releases, thus decreasing the likelihood that these releases will occur at a time and place and be of sufficient magnitude to cause or contribute to a 1-hour ozone exceedance.

ED opposes the proposed amendments to §§115.352(2), (2)(A), (B), and (E), 115.354(10), 115.356(2)(D) and (F)(ix) and (3), and 115.359(2) and (3) because it feels that the commission should be establishing additional requirements to better characterize and reduce emissions of other VOC compounds.

The provisions that are proposed to be deleted go beyond EPA requirements for reasonably available control technology and would add a significant cost burden to entities without having any direct environmental benefit. The requirement to determine an acceptable rate of monitoring for each and every monitoring run may not be feasible due to the extreme variability of contributing conditions.

ED stated that the commission proposed annual HRVOC cap and trading with no justification to show that an annual cap will be adequate to prevent ozone exceedances. This, ED further stated, is a significant departure from the December 2002 SIP, where the commission established daily site-specific caps with no trading.

The commission agrees that an annual cap alone will not address transient high ozone exceedances, and has for this reason adopted a short-term limit in Harris County as well. The previous strategy of explicitly limiting each site to a daily emission rate of HRVOC did not adequately address the duality of the emissions problem in the HGB area. Specifically, the daily maximum would have allowed short-term exceedances on an hourly basis while research suggests that these peak HRVOC emissions can cause or contribute to ozone formation when occurring during the right atmospheric conditions. Additional issues not adequately addressed under the daily cap tables previously used in the SIP were a lack of reporting requirements, an inability to address the possibility of growth in the area and the ability to modify a site's cap while maintaining SIP integrity. For further discussion of these issues, please see the Chapter 115 HRVOC rule and HECT rules in Chapter 101.

ED views the annual HRVOC cap and trade program as premature and risky in light of the significant uncertainties associated with the HRVOC emissions inventory.

Limiting HRVOC emissions on an hourly basis while reducing the overall emissions of HRVOC on annual basis in Harris County, coupled with the enforceable limits on HRVOC emissions within the seven surrounding counties will achieve the 1-hour ozone standard. The research conducted supports the establishment of the cap. For further discussion of this issue, please see the Inventory Adjustment section of this document.

ED states that the sole purpose of the HRVOC cap and trade program appears to be to offer industry maximum flexibility to comply with an annual site-wide HRVOC cap. ED urges the TCEQ to identify the specific environmental outcome it seeks to achieve with the HRVOC cap and trade program.

By setting, short and long-term limits on HRVOC, the cap and trade program is intended to achieve compliance with the 1-hour ozone standard and protection of air quality in the most cost effective manner possible. While the cap and trade program offers the benefit of allowing companies to make the most cost-effective reductions it also eases the procedural burden to make adjustments to the HRVOC allocations in the future if further HRVOC reductions are determined to be warranted under the 8-hour standard.

ED states that the commission should explain why the proposed cap and trade program does not include all relevant emissions sources, in particular fugitive emissions.

As stated in the HRVOC rule in 2002 (27 TexReg 5396), the current inventory indicates that approximately 48 percent of the HRVOCs come from fugitives, 30 percent from flares, 8 percent from vents, and 7 percent from cooling towers. This is further documented in Attachment 8 of the Technical Support Document accompanying the December 2002 HGB SIP Revision and is available at the following website:

ftp://ftp.tceq.state.tx.us/pub/OEPAA/TAD/Modeling/HGAQSE/Modeling/Doc/TSD_PHASE1/attachment8-hrvoc_allocation.pdf

A control strategy of leak detection and repair (LDAR) has been applied in Subchapter H, Division 3 for control of HRVOC fugitive emissions. The commission would be applying overlapping control strategies to Division 3 if the fugitive emissions were made subject to the HECT. Furthermore, as previously indicated, the test method used for monitoring fugitive emissions in HRVOC in Subchapter H, Division 3 does not speciate individual compounds. Unless the particular component is in pure HRVOC service, the VOCs leaking from the component would be a mixture of HRVOC and ORVOC compounds. Therefore, some of the fugitive emissions from the leaking component would not be subject to the MECT and would have to be excluded from the emissions counted toward the site-wide cap. Similar to the issue of applying ozone formation potential factors to fugitive emissions, accounting for HRVOC and ORVOC emissions from components in mixed service would be immensely complicated and overly burdensome to affected parties.

GHASP commented that there is not a link between the modeling results and the HRVOC cap and limit strategy.

The commission disagrees. Because ozone formation occurs across an airshed where neighboring emissions combine and interact with each other to generate ozone, a cap and trade program is an appropriate method of tying the emissions through the airshed together in order to accomplish the goal of reducing ozone formation. The modeling performed for this SIP demonstration assumes a capped emission rate that is divided among HRVOC emitters in the HGB area. Total HRVOC emissions in Harris County (and the seven surrounding counties) modeled defines the maximum emissions of HRVOC expected during the control period. The commission has determined that enforceable limits on HRVOC emissions within the seven surrounding counties may be sufficient without the need for an additional cap and trade system for those counties. The executive director will continue to evaluate the necessity to require additional short-term and annual limitations on those sites subject to 30 TAC Chapter 115, Subchapter H, Divisions 1 and 2, that are located within the seven-county surrounding area. If the evaluation reveals that the total amount of enforceable HRVOC emissions is at a level that is inconsistent with the attainment demonstration of the national ambient air quality standard (NAAQS) for 1-hour ozone by the attainment date, the commission may revoke the exemption.

GHASP commented that the plan does not demonstrate that HRVOCs will actually be controlled and that it neglects the role of OVOC emissions.

In combinations with the agency's enforcement program, the point source HRVOC monitoring program will ensure that companies comply with the annual cap and short-term limits. The HRVOC fugitive emission monitoring and repair program will reduce HRVOC emissions from equipment leaks. The plan does not ignore the role of OVOCs. Ambient monitoring shows that OVOCs can sometimes contribute an equivalent amount of reactivity to the airshed as HRVOCs. However, the reactivity measure does not indicate the speed at which a VOC component helps create ozone. HRVOCs react quickly to form ozone, thus making them the most important VOCs with regard to the 1-hour ozone standard. The commission will continue to study the role of OVOCs and will address emissions of those compounds if additional VOC controls are necessary to achieve the 8-hour ozone standard. However, the concept of regulating additional VOCs was not included in the proposal. If the commission were to make the suggested changes at this time, the applicability of the rule would be greatly expanded without providing proper notice to newly affected parties.

GHASP commented that HRVOC regulation should not be based on the yet unproven NO_x cap strategy because plantwide emissions of HRVOCs are much more variable than statewide emissions of NO_x.

Establishing the bifurcated approach of addressing short-term emissions and annual emissions adequately addresses the differences between HRVOC and NO_x emission rate profiles.

GHASP commented that the TCEQ failed to present reasoned justification for the structure of the emission limit strategy. GHASP also commented that in future evaluations, the TCEQ should consider a 24-hour fixed-period cap. Further, GHASP commented that they are opposed to the change from a 24-hour sitewide cap to an annual cap.

The previous strategy of explicitly limiting each site to a daily emission rate of HRVOC did not adequately address the two-part emissions issue in Harris County. Specifically, the daily maximum would have allowed short-term exceedances on an hourly basis while research suggests that these peak HRVOC emissions can cause or contribute to ozone formation when occurring during the right atmospheric conditions. Additional issues not adequately addressed under the daily cap tables previously used in the SIP were a lack of reporting requirements, an inability to address the possibility of growth in the area, and the ability to modify a site's cap while maintaining SIP integrity. The TCEQ has determined that enforceable limits on HRVOC emissions within the seven surrounding counties may be sufficient without the need for an additional cap and trade system for those counties. The executive director will continue to evaluate the necessity to require additional short-term and annual limitations on those sites subject to 30 TAC Chapter 115, Subchapter H, Divisions 1 and 2, that are located within the seven-county surrounding area. If the evaluation reveals that the total amount of enforceable HRVOC emissions is at a level that is inconsistent with the attainment demonstration of the national ambient air quality standard (NAAQS) for 1-hour ozone by the attainment date, the commission may revoke the exemption. Furthermore, the TCEQ will continue to evaluate the period over which a cap is appropriate when addressing the 8-hour ozone standard.

Regardless, the public has had sufficient notice as to the changes to the cap structure. Further, the requirement to include reasoned justification for rules applies only to the adoption of rules, and therefore the TCEQ was not legally deficient in its proposal rule preamble.

GHASP commented that the record keeping and reporting requirements for continuous monitoring should be similar to those used for HRVOCs and should reflect less frequent and discontinuous monitoring.

The concept of regulating additional VOCs was not included in the proposal and is beyond the scope of this rulemaking. If the commission were to make the suggested changes at this time, the applicability of the rule would be greatly expanded without providing proper notice to newly affected parties.

GHASP supported a sitewide cap to limit hourly emissions to limit excess emissions events and opposed a categorical exclusion of all emissions above hourly cap.

While emissions above 1200 lb per hour would not be included in the calculation of compliance with the annual cap, those emissions are still in violation of the short-term limit. Because of the bifurcated approach to HRVOC emissions, short-term variations in emission rates should be

addressed under the short-term cap and industries exceeding the short-term cap should be penalized by reducing the long-term allowances as a result of a short-term exceedance.

GHASP questioned the appropriateness of using self-reported data estimated by a company when the method of collection is, itself, questionable.

The best data available is being used to evaluate and track emission events. Further the monitoring requirements of Chapter 115 will allow the direct measurement of flow rates and concentration that have previously been estimated. Therefore, the commission expects that future planning will be greatly improved by the measurements requirement by this rule.

GHASP opposed the removal of requirements for updating the shutdown list on a daily basis could lead to excessive emissions during the time that a facility does not update its shutdown list. GHASP opposed the removal of requirements for undertaking “extraordinary efforts” to control leaks. GHASP opposed the removal of the requirement for electronic data collection devices during monitoring, use of electronic databases and requirement for an auditing process to assure proper calibration.

The provisions that are proposed to be deleted go beyond EPA requirements for reasonably available control technology (RACT) and would add a significant cost burden to entities without having any direct environmental benefit. In fact, the requirements could have a detrimental effect by requiring a facility to shut down during the ozone season, causing a spike in VOC and NO_x emissions over a period of a few days, in order to eliminate emissions that have occurred over a period of years. Regulated entities are required by §115.356(2)(E) to maintain records of the date a leaking component is discovered, the date that a first attempt at repair is made, the date the component is repaired, the date and instrument reading of the recheck procedure that verify the repair, and the date on which a non-repairable leaking component is placed on the shutdown list. These records allow investigators to determine whether leaks are addressed in a timely manner.

GHASP commented that OVOC monitoring exemptions could be calculated using ozone formation potential. GHASP suggested that an alternative to the representative flow requirements could be the use of monitoring systems or technology to measure integrated emissions profiles. (TERC Project 31 mentioned.) GHASP commented that the compliance schedule for OVOC should be the same as used for HRVOC and that is reasonable to limit the OVOC regulations to Harris, Galveston, Brazoria, and Chambers Counties. GHASP commented that the requirements of Chapter 115, Subchapter H, Division 3 should be expanded to all OVOC species and that they would support an exclusion, if the ozone formation potential represents less than one percent of the ozone formation potential for all fugitive OVOC emissions represented in the 2000 emission inventory for the account. GHASP supported offering companies the flexibility to add additional VOC species to the list of OVOC species.

The concept of regulating additional VOCs was not included in the proposal and is beyond the scope of this rulemaking. If the commission were to make the suggested changes at this time, the applicability of the rule would be greatly expanded without providing proper notice to newly affected parties.

Unless a particular component is in pure service, the VOCs leaking from the component would be a mixture of different compounds. Speciated information is necessary to apply the suggested

approach of determining ozone formation potential to fugitive emissions from components in mixed compound service. EPA Method 21, the test method used for monitoring fugitive emissions in HRVOC in Subchapter H, Division 3, does not speciate individual compounds. A total concentration is reported as a surrogate, such as methane, that is used to calibrate the detector. The proportions of all VOCs would have to be known for each process line and component monitored. Additionally, different compounds have different detector response factors in relation to the surrogate calibration. Therefore, to determine the ozone formation potential of an individual leaking component, the total concentration measured with Method 21 have to be adjusted for the proportions of compounds that component was in service for, the various response factors of the different compounds, and the ozone formation potential factor for the specific compounds that are regulated. The data handling and recordkeeping associated with such an approach would be immensely complicated and overly burdensome to affected parties.

The commission is and has been reluctant to make any inventory adjustments which could be viewed as arbitrary for modeling purposes. Instead, the commission traditionally has used analyses which compare ambient data to emissions inventories to guide further work to identify and resolve EI/ambient discrepancies through bottom-up inventory improvements. The olefin-to-NO_x adjustment was applied only after a large body of peer-reviewed research showed conclusively that such a discrepancy indeed affected emissions of certain HR VOCs from industrial sources. The bibliography listed at the end of Chapter 3 references many of the peer-reviewed studies considered.

The commission agrees that there is some evidence that OVOCs may be underestimated in the modeling inventory, but the evidence to justify adjusting emissions of OVOC is much less conclusive and open to debate. To date, few in-depth analyses of aircraft observations have been conducted comparing OVOC concentrations with those expected based on the reported emissions (although several projects are expected to be completed within the next year). In accordance with the Future Directions described in the December 2002 SIP revision, the TCEQ conducted a study comparing ambient concentrations of OVOC with the reported inventories at the Clinton Drive and Deer Park monitoring locations. The study suggested that OVOC may be underreported by a factor of 4.8. The scope of this study was limited, however, because only these two sites have collected continuous, multi-year speciated hydrocarbon data in the Ship Channel industrial district.

Because the analysis available is limited to these two monitors compared to the extensive data sets and peer-reviewed analysis for the HRVOCs, the TCEQ concluded that including any adjustments to the OVOC emissions in its control strategy evaluation at this time would be premature. The results of an in-house study to conduct the sensitivity modeling analysis reported in the June 2004 proposed SIP revision indicated that the adjustment applied to the OVOC, combined with the adjustment already applied to the HRVOCs appears to create too much reactivity in the model.

After the current SIP revision was proposed in June 2004, the commission conducted additional sensitivity modeling which considered the effects of adjusting the future-case OVOC emissions by the same 4.8 factor used in the base-case sensitivity analysis. Results of this analysis suggest that, if the OVOC emissions are indeed underestimated substantially, then additional reductions may be necessary. A second sensitivity analysis which applied the HRVOC reductions of strategy CS-06a to the adjusted OVOC, along with the HRVOCs, indicated peak

1-hour ozone concentrations that are below, or just above, the NAAQS for all days except for August 31. Results of these sensitivity analyses are shown graphically in the SIP in Chapter 3. For comparison, the results of the modeling without adjustment to the OVOC are also presented.

The commission is committed to including appropriate results from HARC project H-12, *Role of Modeling Assumptions in the Houston-Mid-Course Review*. In addition, the commission has solicited EPA comment and feedback on the project and has invited EPA to participate in regularly scheduled updates on the project presented by the principal investigators.

GHASP commented that the trading program for HRVOC credits will be problematic until ambient monitoring can be reconciled with industry emission inventories to demonstrate that the approach has been effective.

While an important tool, ambient monitoring is not an accurate method for measuring point source emissions. Many assumptions must be made to associate ambient monitoring with point source emission estimates. Rather than rely on ambient monitoring to show compliance with the HRVOC emissions cap and trade program, the commission is requiring the installation of point source monitors. Reconciliation of the ambient monitoring data will not be necessary when HRVOC emissions are directly measured at the point source. The ambient monitoring data will, however, be valuable in determining the overall effectiveness of the HRVOC strategy program.

GHASP commented that to support an annual cap, the TCEQ must show how the cap performs under worst-case conditions and must disclose its assumptions about the level of non-compliance and upsets.

The photochemical modeling of the August - September 2000 episode coupled with a WoE argument demonstrates attainment of the 1-hour ozone standard. To achieve the necessary HRVOC reductions, the commission is adopting a two-part approach that will address variable short-term emissions through a not-to-exceed limit, and will address steady-state and routine emissions through an annual cap in Harris County. The established HRVOC caps are based on the amount of HRVOC emissions determined through current modeling to be sustainable in the HGB area while demonstrating attainment of the 1-hour ozone standard. As an additional measure, the annual caps have been reduced by 5 percent to address uncertainty in the geographic redistribution of emissions between the attainment demonstration model and how actual emissions may occur under the cap and trade program. Variable short-term emissions, including upsets, will be addressed through the not-to-exceed limit. Emissions in excess of the short-term limit are a violation of this limit and subject to formal enforcement action under the commission's rules governing emission events and scheduled maintenance, startup, and shutdown emissions.

GHASP commented that to support an hourly limit concept, the TCEQ must show how it will interact with other facilities that presumably are in compliance but might also be releasing HRVOCs at an unusually high rate.

As a result of the enhanced monitoring requirements and the hourly limit of 1200 lb/hr, industry will be more aware of and is expected to be more responsive to emissions of HRVOC. As a result, the probability of multiple industries emitting HRVOC at sufficient rates during

sufficient meteorological conditions resulting in an exceedance of the 1-hour ozone standard is expected to be greatly reduced.

Additionally, in response to comments received, the commission is reducing the annual cap allocation by 5 percent to account for the daily variability in emissions and to address uncertainty in the geographic redistribution of emissions in the attainment demonstration model and how actual emissions may occur with trading in place.

GHASP commented that the TCEQ has failed to present a reasoned justification for the structure of its emission limit strategy or any evidence that it will succeed beyond that in the photochemical model (which did not include any specific information related to the structure of the cap and limit strategy). Therefore, the public is at a disadvantage in commenting on the proposal to switch from a 24-hour rolling cap to an annual cap with a uniform hourly emission limit. In any future evaluation of alternatives, the TCEQ should also consider a 24-hour fixed-period cap (with the 24-hour period beginning sometime after sunset) as an alternative to the rolling 24-hour cap as being administratively simpler and also being more closely related to the time period when emissions are likely to influence ozone levels on a particular day.

The requirement to include reasoned justification for rules applies only to the adoption of rules, and therefore TCEQ was not legally deficient in its proposal rule preamble. The TCEQ has provided in the adoption preamble sufficient justification for the structure and limits in the rules.

Furthermore, the proposal preamble included the rule text, explanation, fiscal note, and analysis required by the Texas Administrative Procedures Act (APA). This provided the public with sufficient notice as to the proposed change to the cap structure.

The commission contends that addressing HRVOC emissions in this dual strategy of reducing the base of long term emissions and controlling sudden increases in short-term emissions is the most appropriate method of addressing the complicated nature of HRVOC emissions. A 24-hour cap would not address the rapid ozone formation that may occur as a result of a sharp increase in HRVOC emissions.

GHASP stated that two TCEQ commissioners intervened to prevent publication of the staff recommendation to establish a new division 4 in subchapter H of chapter 115 (therefore, this is not open to comment as a rulemaking issue). Without appropriate consideration of enforcement issues, it is arbitrary to conclude that the SIP will be implemented as described on paper. GHASP agrees that some of the proposed division 4 would not have been productive and that for those parts, the regulatory burden would not have been worthwhile. However, GHASP strongly objected to the decision to prevent publication of this division for comment. GHASP stated that it appears that the TCEQ has an unwritten agreement with industry under which industry representatives have a special obligation to pre-clear proposals and it also appears that there is an expectation that regardless of comments received from members of the public, there will be no major changes made in response.

The commission complies with the requirements of the Texas APA and applicable case law with regard to rulemaking, and, if the rules will be part of the SIP, also complies with the applicable federal law. Specifically, the commission provides notice of the proposed rules, allows time for comment, considers the comments and provides reasoned justification for the adopted rules. Historically, there have been changes to rules upon adoption, and those changes have been

made in compliance with applicable law. The commission staff does not provide drafts of rules to the public, except when there are announced stakeholder meetings, before the versions presented to the commission for consideration are filed with the Office of the Chief Clerk. The APA does not require reasoned justification for rules which the commission votes neither to propose nor adopt. The commission does not have a policy, written or unwritten, of seeking approval from any outside group for the proposal or adoption of rules.

ED commented that the TCEQ should eliminate the affirmative defense provision for emissions events that exceed the short-term HRVOC cap and which occur during the ozone season. Possible language could read: “An exceedance of the emission limitation in §115.722 and 115.761 which occurs during the ozone season may not be excused under §101.222, and an affirmative defense may not be claimed under that section.” Such a provision would simplify enforcement and reflect a presumption that such events, by definition, can cause or contribute to an exceedance of the NAAQS and should therefore not be eligible to use the affirmative defense.

30 Tex. Admin. Code § 101.222(b) allows a person to claim an affirmative defense for emissions associated with non-excessive emissions events. Any emission event that occurs during ozone season that results in an exceedance of the short-term cap for which an affirmative defense is claimed must prove all of the applicable criteria. Among other criteria that must be proven is that the emissions did not cause or contribute to an exceedance of the NAAQS, PSD increments, or a condition of air pollution. The commission has not proposed an exception from to §§115.722 and 115.761 which would change this from a case-by-case determination to a presumption. The commission, therefore, declines to make the suggested change because this language was not subject to public notice and comment procedures.

ED recommends that the commission address with upset emissions in the HGB area by applying the lessons learned by EPA when it dealt with vinyl chloride emissions. EPA’s vinyl chloride control strategy combined prohibitions of most discharges of vinyl chloride with aggressive enforcement. This changed manufacturing culture, and resulted in elimination of most emissions and continuance of economically viable production.

Emissions from upset events are unplanned or unanticipated occurrences or excursion of a process or operation that results in unauthorized emissions, which are defined as emissions of any air contaminant except carbon dioxide, water, nitrogen, methane, ethane, noble gases, hydrogen, and oxygen which exceeds any air emission limitation in a permit, rule, or order of the commission or as authorized by the TCAA, §382.0518(g). Therefore, the commission has already prohibited these emissions. In addition, unauthorized emissions of HRVOC are subject to the cap because all emissions must be considered in the air quality plan for HGB.

The combination of the annual cap, the enhanced fugitive rules, and the short-term limit will encourage companies to evaluate their processes with the goal of reducing routine and episodic HRVOC emissions. Moreover, the TCEQ in 2000 began an aggressive program of enhanced review of emission events and emissions from scheduled maintenance, startup and shutdown. This will further drive down these types of emissions.

GHASP stated that in 2000, the TCEQ committed that the mid-course review would represent an attainment demonstration. December 20002 SIP revision, page 7-6; see also pages 7-2, 7-4, 7-41, and response to comments pages 4,7, and 18-19, and September 2001 SIP Revision response to comments pages 4,7, and 18-19, and September 2001 SIP Revision response to comments, page12. This

commitment was widely understood at the time and was a critical component of discussions and ever normal negotiations regarding legal issues. However, recent conversations have created an impression that the TCEQ only committed to a non-interference demonstration. The December 2000 SIP does not promise a “non-interference” analysis.

GHASP further stated that EPA concluded later that an 8-hour 0.08 ppm averaging time does not effectively limit both 1-and 8-hour exposures of concern. EPA decisions did recognize that the 8-hour standard might not effectively protect the public from 1-hour health effects, and sought to retain the 1-hour ozone standard. However, for legal reasons, the EPA has abandoned this approach and expects to revoke the 1-hour standard effective next year.

GHASP commented that because it lacks confidence in the inventories and projections used in the attainment demonstration modeling, and because the TCEQ has limited its control strategy evaluation to a narrow band of relatively moderate levels of ozone, the TCEQ may not claim that it has demonstrated a reasonable expectation that attainment will occur.

The approved HGB SIP contains a requirement to perform a mid-course review. As discussed in Chapter 1, the TCEQ committed in 2000 to perform a MCR to ensure attainment of the 1-hour standard. At the time the TCEQ was preparing to move forward with the MCR, EPA promulgated its rules regarding the 8-hour standard, which led to the TCEQ developing an approach to address the outstanding obligations under the 1-hour standard while beginning to analyze 8-hour ozone issues. At the time of the MCR commitment was made, the HGB SIP was a NO_x-based strategy. The HGB SIP no longer relies solely on NO_x-based strategies, and this revision, as generally described in Chapter 1 fulfills the outstanding 1-hour ozone SIP obligations. The non-interference demonstration is an independent requirement in § 110(l) of the Federal Clean Air Act. That section requires that any plan revision must not interfere with any applicable requirement concerning attainment and reasonable further progress or any other applicable requirement of the Act 42 U.S. C. § 7410(l). This is discussed in Section 3.10 of the HGB SIP.

GHASP comments that, because the attainment demonstration modeling does not model below 125 ppb, that it does not truly demonstrate attainment of the 1-hour ozone standard.

Modeling below the 1-hour ozone standard is not the only way in which a state may demonstrate attainment of federal air quality standards. EPA has allowed Weight of Evidence (WoE) to be used in attainment demonstrations across the United States for areas which have had difficulty showing attainment via the deterministic test. The reason for this allowance is that the deterministic test is in reality much more stringent than the actual standard, which allows occasional exceedances of the standard. WoE can consist of a wide variety of analyses which can be used to augment the modeling. This SIP revision includes appropriate analytical support for WoE. The commission has performed extensive photochemical modeling to show that planned control strategies are directionally correct and substantial. The commission uses additional evidence from its own analysis of ambient monitoring data and scientific studies from some of the best scientists from around the country to show that this SIP revision will bring the HGB area into attainment of the 1-hour ozone standard.

Section 182(c)(2)(A) of the Federal Clean Air states that “. . .the attainment demonstration must be based on photochemical grid modeling or any other analytical method determined by the Administrator. . .” The WoE approach is an acceptable analytical method to show attainment.

GHASP comments that the TCEQ should develop a robust method of relating one and five second interval ozone data collected by moving aircraft to one hour ozone estimates measured by stationary ground monitors so that airborne monitoring data may be used to estimate 1-hour ozone values in areas of the HGB area that are far from ground monitoring stations.

The commission agrees that such a methodology would be a useful analytical tool and is initiating a study with the Pacific Northwest National Laboratory to discuss and illustrate problems associated with comparing observations from an airborne monitoring platform to results from photochemical model grids (which might be used with ground based monitoring data). Developing such a methodology is a challenging task since the methodology must take into account temporal differences in the data (i.e. one second interval for airborne data versus a five minute interval for ground data), spatial differences in the monitors (differences in location and elevation), and environmental differences for the monitoring equipment (temperature, humidity, solar radiation, etc.).

GHASP comments that in the December 2002, SIP revision, the commission made an explicit commitment to make up any shortfall in emissions reductions from Voluntary Mobile Emissions Reduction Program to provide attainment by 2007. GHASP believes that the commission should restate this pledge and apply it to emissions reductions claimed through the Texas Emissions Reduction Plan (TERP) as well.

The state is obligated to make up any shortfall of claimed emissions reductions from any program included in the SIP whether there is explicit commitment. The commission is confident that these voluntary programs will obtain the emissions reductions claimed in the current SIP revision. HGAC indicated that it could achieve 7 tpd in emission reductions from VMEP measures. HGAC submitted a document, which can be found in Appendix F.7 of the SIP, to the TCEQ. The TCEQ review the emission reduction estimates and found them to be reasonable. These 7 tpd do not represent the total 3 percent of emission reductions from the base case eligible for SIP VMEP credit. The commission views VMEP as a separate emission reduction strategy from TERP.

GHASP commented that the TCEQ could establish a Marine Vessel Emission Budget.

Conceptually, the emissions inventory in the SIP contains an allocation of emissions for marine sources. However, if this number were to be established as a budget and exceeded, then it would be incumbent upon the state, not marine vessels, to adjust the emissions.

GHASP suggests that the TCEQ evaluate a heavy-duty vehicle speed limit enforcement policy.

The commission does not have the authority to enforce speed limits. The Texas Department of Public Safety and local law enforcement are responsible for enforcing speed limits. Additionally, House Bill 1365 (78th Session 2003), amends the Texas Transportation Code §545.353 by adding subsection (j) prohibiting the Texas Transportation Commission from setting speed limits for environmental reasons, but did not affect environmental speed limits in place before September 1, 2003.

Idling

GHASP supports the intention to rely on truck stop electrification and local government action to reduce idling diesel trucks. GHASP supports electrification of privately owned truck stops and public rest areas. GHASP supports loans for vendors to install electrification at truck stops or rest areas or to provide a partnership between electric utilities and vendors. GHASP supports requiring public fleet owners to implement and enforce anti-idling policies within their vehicle fleets. Local governments need the authority to develop targeted or general restrictions on diesel truck idling. GHASP proposed a registration program for private and public sites where more than five diesel trucks may idle at any one time, as a first step towards voluntary, grant or regulatory programs to reduce truck idling.

ED commented that to compensate for the emissions reductions that would result from the partial repeal of the rule, the TCEQ, in cooperation with HGAC, should work with public fleet owners, such as school districts, cities, counties, TXDOT and Houston Metro, to implement and enforce anti-idling policies within their own fleets of onroad and offroad vehicles.

The commission agrees that electrification of truck stops and public rest areas will reduce emissions. Many public fleets, including Houston Metro, have implemented and enforce idling restrictions. The commission urges other entities to consider the viability of adopting such a policy. On November 17, 2004 the commission adopted revision to Chapter 114 providing local governments the authority to implement and enforce diesel idling restrictions.

Sierra Club, HRG, requested a review by the TCEQ to determine whether the idling truck rules should be kept and appropriately implemented and enforced.

The commission evaluated the heavy-duty idling restriction as a part of the rulemaking process the repeal the rule and has determined that it is unnecessary to demonstrate attainment of the 1-hour ozone standard. The commission understands there has been limited enforcement of this rule and that there is not a sound process which would allow effective use of investigators compared to other SIP requirements.

ED recommends a limited repeal that explicitly retains the idling restriction in specific instances where technological alternatives are available and enforcement is not burdensome. The best example of such an instance is truck stops or other facilities that can be electrified. ED proposes that an adequate lead time be allowed to design, finance, and install idle reduction technology by establishing a compliance date for the revised rule of June 1, 2006, roughly 18 months after the scheduled adoption of this rule. ED rejects the commission's argument that making TERP grant funding available for truck stop electrification infrastructure supports their proposed repeal of the idling restriction. The state should invest its limited TERP funds on projects that would not otherwise occur without the state funding. Truck stop electrification is a commercially viable technology that generates revenues that will more than recoup the up front capital costs. Any public funding for truck stop electrification should be limited to up-front loans to help with the vendor's potential difficulty in accessing capital. Another financing approach would be to partner with electric utilities.

The commission appreciates the suggestions provided, however, the commission disagrees that a portion of the idling restriction should be retained with a June 1, 2006 compliance date. The commission also disagrees with the assertion that potential TERP funding of truck stop electrification justifies repealing this rule. Significant emission reductions associated with truck idling are expected from truck stop electrification and TERP funding will encourage greater use of the technology. At the August 16, 2004, Commission Work Session, directions were given

to TERP staff to limit infra-structure project funding to viable for-profit business that do not require subsidies to be bridge the time between start-up and profitability.

ED also commented that the TCEQ should not allow the December 2002 roll-back of point source NO_x controls from 90 percent to 80 percent to become permanent until it is clearly established that the additional emissions reductions are not needed for attainment.

The commission has demonstrated in this SIP revision that 80 percent average point source NO_x emission reductions, along with HRVOC emission reductions, are sufficient to attain the 1-hour ozone standard. The commission will determine whether additional point source NO_x reductions are necessary to attain the 8-hour ozone standard in conjunction with the 8-hour ozone SIP revision that the EPA requires no later that June 15, 2007.

ED also commented that point source NO_x trading in Harris County may significantly increase as a result of revisions to the NO_x cap. It recommends that the TCEQ propose for comment reinstating the “90 percent” level of NO_x controls as adopted in the 2000 SIP. This level of NO_x control was found by the TCEQ through a rulemaking to be technically feasible and economically reasonable. Depending on the modeling results and the amount and location of additional reductions needed, more stringent controls could be restored only in Harris County or even in the industrialized portions of Harris County where the sources of reactive VOC emissions are most concentrated. The effective date for the last increment of controls (the 80 percent to 90 percent increment) could also be pushed back beyond the 2007 1-hour attainment date to allow and accommodate the results of further research and analysis.

This revision demonstrates attainment of the 1-hour ozone standard in 2007 and accomplishes that objective with the control strategies included in the SIP. Additional enhancements to the modeling since the SIP was proposed in June replicate peak ozone at or below 125 ppb on eight of ten days. The revision is superior to the 1-hour attainment demonstration approved by EPA on November 14, 2001. The federally approved SIP demonstrates attainment by modeling three of four days below 135 ppb and using a WoE analysis. The federally approved attainment demonstration is a NO_x based strategy and includes a 56 tpd shortfall. The HGB SIP no longer relies solely on NO_x-based strategies. A combination of point source HRVOC controls and NO_x reductions appear to be the most effective means of reducing ozone in the HGB area. The SIP revision addresses emissions of both NO_x and HRVOCs and there is no longer a NO_x shortfall in the HGB SIP.

Results from the Texas 2000 provided a wealth of data, included ambient monitoring data, and resulted in an unprecedented understanding of the formation causes and movement of ozone in the HGB area. Recent photochemical modeling suggest that ozone formation in the HGB area stems from a combination of two different events: (1) the daily variable routine emissions of a large industrial base located in an urban core with onroad and nonroad emissions typical of a large urban core, and (2) short-term releases of extremely highly reactive VOCs in the immediate presence of NO_x. The design value in the HGB area is a combination of these two phenomena. A two pronged approach is required in order to address this problem effectively. The first prong resembles strategies used by other metropolitan areas with a combination of a large urban population and a significant industrial base. The second prong is a targeted strategy to address the short-term releases of HRVOCs through the establishment of a short-term cap.

The date for attaining the 1-hour ozone standard for the HGB area is November 2007. Section 181 of the Federal Clean Air Act requires that it be met as expeditiously as practicable. 42 U.S.C. § 7511. Any proposal to delay implementation of controls beyond the attainment date would not meet this statutory requirement. Therefore, the commission declines to propose reinstating the NO_x controls adopted as part of the SIP in December 2000.

Additional collateral reductions are expected as a result of other control strategies. Additional funds are being allocated to TERP, while the cost per ton number is decreasing, which will result in more cost effective reductions. The TCEQ has approved 10 grant applications for fuel and retrofit devices that are in the verification phase that should be commercially available in the near future. A study being conducted by the Texas Department of Transportation indicates that Texas Low Emissions Diesel may have greater reductions than accounted for in the SIP. Moreover, data from the Emissions Response Monitoring Program are expected following the 2004 ozone season. All of these pieces contribute to unquantifiable, but important, activities that will result in lower ozone concentrations in the HGB area.

ED commented that while the quantitative analysis suggested might help to assess the benefit of the collateral VOC reductions, the TCEQ can only assure that collateral reductions of other VOC occur in practice by placing limits on their emissions. ED noted that if the collateral reductions are truly expected to occur as a matter of course in meeting the HRVOC caps, then industry should have no problem complying with the additional VOC emissions limits.

ED also commented that the TCEQ's arguments about collateral reductions are of little relevance to the attainment demonstration. For a SIP to satisfy the statutory requirement that it contain "enforceable emissions limitations, and such other control measures, means or techniques . . . as may be necessary to provide for attainment," 42 U.S.C. § 7502(c)(6), EPA's control strategy rule requires that the SIP contain measures that "achieve the aggregate reduction of emissions necessary for attainment." 40 C.F.R. §51.100(n). Each of these regulatory provisions requires that the control measures submitted in the SIP must be adequate to achieve the emissions reductions required for attainment. If the measures are necessary, then they must be made into an enforceable requirement.

With regard to ancillary reductions of VOCs from the HRVOC strategy, reductions in reactivity could be roughly estimated to be anywhere between 5 and 20 percent. The SIP does not include such a calculation at this time because it would be unreliable. The TCEQ does not know how each facility will choose to implement controls to comply with the cap, and the composition of the co-located species is crucial to determining associated reactivity. Results from the HARC sponsored project H-12 and the work element to investigate co-benefits of reducing HRVOCs are expected to provide some quantitative results. These results will be considered when they become available. The Emissions Inventory improvements and monitoring will enable the TCEQ to quantify the emission reductions in the future.

ED commented that the purpose of this SIP is to reduce air pollution in the HGB region sufficiently to meet the 1-hour ozone NAAQS. The TCEQ should not pursue the interpretation of EPA's 8-Hour Implementation Rules presented on page 1-5 of the proposed SIP and in the various rule proposals, that EPA's "rules and preamble suggest that a demonstration of attainment of the 1-hour ozone standard may not be required" for the HGB area. After all of the delays in meeting mandatory Clean Air Act deadlines for the HGB area to attain the 1-hour standard, it is unacceptable that the TCEQ would now attempt to permanently evade this responsibility.

ED also commented that the 8-hour ozone modeling results presented in Table 3.55 clearly show that significant additional reductions will be necessary to attain the 8-hour ozone standard. In light of that fact, ED questions why the TCEQ is going to such lengths to include only a minimum number of new emission control strategies.

The commission agrees that the objective of the proposed SIP is to reduce air pollution in order to attain the 1-hour ozone standard in 2007. The commission provided an interpretation of EPA's Phase I of the 8-Hour Implementation Rule published in the Federal Register on April 30, 2004 to inform and educate the reader of changes expected to occur as a result of the rulemaking. This information is also useful as a part of the planing process for future SIP revisions to address the 8-hour ozone standard. The commission has not evaded its responsibility to attain the 1-hour ozone standard in 2007 as this SIP demonstrates .

The commission agrees that additional reductions will be needed to attain the 8-hour ozone standard. The TCEQ continues to evaluate the contributors to ozone formation in the HGB area and will address these sources and chemicals as appropriate, as a part of the 8-hour ozone SIP.

The Early Response Monitoring network and the TexAQS II study should provide important information that will help in the development of control strategies that will further improve air quality in the HGB area. Once the TCEQ is able to examine back trajectories and identify the sources of ozone precursors identified by the network and TexAQS II, it will be necessary to determine what types or levels of controls can be achieved in a cost-effective manner. Currently, a complete or comprehensive body of science that clearly points to the next control strategies approach does not exist.

Furthermore, emission reductions from federal measures are expected beyond 2007.

ED commented that without better source monitoring data to accurately characterize emissions of all the principal chemicals that are routinely measured in Houston's air, the TCEQ will continue to struggle to develop an effective ozone attainment strategy and costs.

ED commented that the TCEQ should propose for comment the use of monitoring systems or technology to measure integrated (as opposed to process-specific) emissions profiles. The TERC Project H-31 will evaluate options commercially available and in development by September 1, 2004. The study may identify cost-effective technologies or systems that could be used as a supplement to process-specific monitoring requirements. The additional data could help validate reported emissions estimates and improve the agency's ability to enforce emissions limits.

The commission is interested in technologies to measure integrated emissions profiles; however, monitoring systems being researched are new technologies or are unproven applications of existing technology. It would be premature to put any of these monitoring approaches into rules. The technology and/or application of the technology is still in the experimental stage.

The TCEQ intends to continue to evaluate these technologies as a part of the 8-hour ozone strategy after more speciated emissions inventory data has been collected and analyzed. Better data will be available after TexAQS II to better determine which chemicals to measure and where the equipment should be located.

The TCEQ plans to initiate a stakeholder process than will focus on methods to improve the emissions inventory. The commission will use this process, in conjunction with data from other air quality studies and monitoring, to determine future action regarding OVOCs.

GHASP commented that the TCEQ should consider that emissions events may occur more frequently and cause more ozone formation than suggested by Dr. David Allen's findings. As a sensitivity test, the TCEQ should reconsider Dr. Allen's work under the assumption that short-term emissions events are releasing several times more VOCs than reported.

ED commented that stringent limits should be established for upset emissions of the most common chemicals that contribute to ozone exceedances in the HGB area, not just HRVOC.

ED also commented that the TCEQ should require each account with the potential to emit a threshold amount of other reactive VOC to achieve a 50 percent reduction in the total reactivity-weighted emissions of the designated chemicals. This control requirement would apply separately from the cap(s) that apply to the 4 HRVOC. The elements of the account-based reactivity reduction requirement would include an initial compliance plan and a final compliance plan.

In the data analysis completed to date, HRVOCs are the most common chemicals that contribute to ozone formation. Current scientific understanding which has been peer-reviewed and corroborated by some of the nation's top air quality researchers has concluded that reducing VOCs, with an emphasis on HR VOCs from industrial sources, along with significantly reducing NO_x emissions from all sources will be the most effective strategy in attaining the 1-hour ozone standard in the HGB area. The commission intends to continue evaluating ozone formation in the HGB area and to identify other chemicals which may potentially play a significant role in ozone formation. Conclusive evidence is not available to support additional requirements at this time. Furthermore, the TCEQ plans to request assistance from Texas Environmental Research Consortium to review the upset emissions database and upset emissions impact on air quality. A "Source Attribution and Emission Adjust Study" co-sponsored by the TCEQ and EPA and being conducted by Pacific Northwest National Laboratory will assess chemical compounds and concentrations at ten automated gas chromatograph (gc) sites in the HGB area. The result of this study will be beneficial in determining if there is a need for additional requirements.

Additionally, there is little evidence available at this time to warrant a correction factor for under-reported upset emissions and as a result, a sensitivity analysis will not be conducted. Any analysis at this time would be purely speculative.

Flare Destruction Efficiency

EPA expressed its longstanding concern that the projected flare destruction efficiency for ethylene and propylene for compliance with the cap was 99 percent. EPA noted that the TCEQ staff had provided information on the basis for the 99 percent destruction efficiency and stated that this documentation should be included in the SIP. EPA expressed remaining uncertainty that a 99 percent efficiency is justified.

The use of a 99 percent destruction efficiency for ethylene and propylene in a flare meeting the requirements of 40 CFR §60.18 is based on a limited amount of data from EPA flare studies conducted in the early 1980's. These data show that the combustion efficiency of a flare under these conditions (with some unexplained exceptions) is generally greater than 99 percent. The

combustion efficiency is a measure of the complete combustion of hydrocarbons to carbon dioxide and water. The formation of carbon monoxide decreases the combustion efficiency. The hydrocarbon destruction efficiency is thus higher than the combustion efficiency.

The information in AP-42 Section 13.5, Industrial Flares, is based on the same flare study data. The emission factor for total hydrocarbons is 0.14 pound per million Btu. The compound burned was crude propylene with a heating value of less than 20,000 Btu per pound. On this basis, the calculated hydrocarbon emissions would be as follows:

$$(20,000 \text{ Btu/lb HC})(0.14 \text{ lb HC}/106 \text{ Btu}) = 0.003 \text{ lb HC emitted per lb burned}$$

The corresponding efficiency would be $(1 - 0.003) \times 100 = 0.997 \times 100 = 99.7$ percent

Extrapolation of the flare test results to a wide variety of compounds must be done with caution, because some compounds are more easily destroyed by combustion than others. The test results in the study cited above are based on destruction of propylene; thus, the use of 99 percent destruction efficiency for propylene requires no extrapolation and can be justified based on actual test data. Screening tests conducted in the early 1980's (EPA-600/2-85-106) showed destruction efficiencies greater than 99 percent for ethylene, comparable to the efficiency for propane and propylene. Thus, the use of 99 percent destruction efficiency for ethylene is supported by test data and requires no extrapolation.

The HRVOC rules require that heating value and exit velocity of flares be monitored continuously to confirm that the flares are operated in continuous compliance with the heating value and velocity specifications of 40 CFR §60.18. With these added assurances that the flares are operated properly, the assumption of 99 percent destruction efficiency for ethylene and propylene is supported at this time by the available data and EPA precedent.

The commission acknowledges that this assumption of 99 percent flare destruction efficiency introduces uncertainty into the calculation of HRVOC emissions for comparison to the cap. The commission has sponsored preliminary studies of a pilot test method (passive FTIR) for the determination of actual flare destruction efficiency. The technology is not ready for commercial use, but the commission will continue to follow technological advances in this area and will re-evaluate use of the assumed destruction efficiency in the future if reliable data indicate a need to do so.

Appendix L, "Technical Justification for 99 percent Flare Destruction Efficiency" has been added to the DIP revision in response to this comment.

GHASP expressed concern regarding the TCEQ's strategy for flare monitoring, specifically with the use of assumed flare destruction efficiencies. Instead, GHASP suggested that companies should be required to present affirmative evidence such as remote sensing data that demonstrates the conditions under which the flares perform as designed. GHASP further asserted that under §115.725(d)(7), (e)(3), (f)(5), and (g)(2)(E) the TCEQ may discourage research and application of monitoring technology to verify flare destruction efficiencies.

As noted in response to the previous comment, the use of remote sensing to determine flare destruction efficiency is not ready for commercial use, but the commission will continue to follow technological advances in this area and will adjust the destruction efficiency in the future

if reliable data indicate a need to do so. The commission disagrees that the use of the assumed destruction efficiency discourages research and application of monitoring technology to verify flare destruction efficiencies. While the current body of data on flare efficiency includes information showing lower flare efficiency under certain circumstances, much of the data shows efficiencies higher than 99 percent. Facilities with well-designed and maintained flares thus have an incentive to support techniques to verify flare destruction efficiency.

Sierra Club objected to the assumption of flare destruction efficiency of 99 percent for ethylene and 98 percent for propylene, and stated that flares often operate routinely at considerably lower destruction efficiencies.

GHASP asserted that flares often operate routinely at considerably lower destruction efficiencies, and cited a study that concluded that flare combustion efficiencies may be approximately 70 percent or lower. GHASP also asserted that the TCEQ had documented major incidents with apparent flare destruction efficiency failures in the Houston region.

The study cited by Sierra Club was focused on flaring at oilfield battery sites. The flares tested were simple pipe systems with no flare tips and very crude gas-liquid separation and liquid knock-out systems. Liquid carry-over to the flare was the main cause of the lower combustion efficiencies that were measured. By comparison, flares in industrial use in the HGB area have engineered flare tips that are designed to maintain flame stability. They also use efficient knock-out systems to prevent liquid carry-over to the flare. The incident of flare destruction efficiency failure cited by GHASP involved a smoking flare, which does not meet the requirements of 40 CFR 60.18 and so would not be assumed to have a destruction efficiency of 99 percent.

Transportation Related

GHASP said the draft 2025 Regional Transportation Plan adopted by the HGAC relies too heavily on building highways as a strategy to relieve traffic congestion. GHASP also said the plan does not consider the consequences of such a strategy and is the basis for even greater road building. GHASP said the region needs plans for better mobility and guidelines that reduce driving. City of Shoreacres Mayor Nancy R. Edmonson said future air quality analyses must not assume that land uses are constant across alternatives. Mayor Edmonson and one commentor said more roads will lead to more pollution.

The commission disagrees with these comments. Travel demand modeling is an iterative process that accounts for changing route choices, mode choices, and speeds depending on the corridor or transportation investment alternatives being studied. Although land use currently is not a model variable, the area's Metropolitan Planning Organization, the HGAC, relies on a panel of experts to provide quality economic forecasts for use in modeling future growth and traffic congestion, including land use. In addition, the HGAC is the first in the nation to integrate a new model called UrbanSim in the upcoming long-range Metropolitan Transportation Plan. UrbanSim is a software-based simulation model for integrated planning and analysis of urban development, incorporating the interactions between land use, transportation, and public policy. It is intended for use by Metropolitan Planning Organizations and others needing to interface existing travel models with new land use forecasting and analysis capabilities. The commission commends the efforts of HGAC planners to identify and integrate future growth in its transportation planning.

ED said the commission should work with the HGAC and local governments in the HGB area to consider innovative measures to improve traffic mobility and curb air emissions, which they state could provide benefits in only one or two years if promoted properly. ED said strategies such as those summarized in a report by UrbanTrans have been shown to be successful at reducing emissions. ED said a random survey of drivers in the HGB area indicate willingness to change travel mode choice given the appropriate incentives.

The commission agrees there is always more to be learned and integrated into air quality planning. The commission appreciates the citation to the UrbanTrans report. The commission does provide local governments and citizens incentives to reduce emissions from engines via the TERP program. The TERP includes a number of voluntary financial incentive programs, as well as other assistance programs, to improve air quality in Texas. The TERP has awarded millions of dollars in grants for upgrading fleets with cleaner engines and/or vehicles. The program has been in effect in the HGB area and has been successful in reducing emissions. The TERP program does not provide incentives to change driver behavior however, and the commission does not plan to proceed with such a strategy. A program such as this would be better promoted and enforced by local governments and/or local organizations with more knowledge of local options authorities such as transit authorities.

HGAC and TPC said because TERP grants are competitively awarded, emission reductions may be more or less than projected. HGAC and TPC urges the commission to adopt a SIP that does not bind the state or the HGB to specific vehicle emission reduction targets for the TERP.

There is a downward cost trend for projects awarded TERP funds. The first FY05 Request for Grant Applications reduces the cost per ton amount. It is anticipated that this trend will continue and the estimates based on \$5000 per ton are achievable in the HGB area. The commission agrees with this comment and has reallocated TERP reductions based on the historical distribution between onroad and offroad sources. The commission worked with the HGAC and has agreement that the 2007 projection is realistic based on the information available today.

Energy Efficiency

The GHASP commented that the commission cannot take SIP credit for NO_x reduction benefits from appliance energy efficiency upgrades. Section 5.3.15 should be deleted from the plan and any emission inventory adjustments should be removed from the modeling. According to Table 6.3-8 (December 2002), the TCEQ is taking credit for a NO_x reduction of 3.57 tpd based on implementation of federal standards for appliance energy efficiency upgrades. Because power plants participate in the NO_x MECT program, any NO_x emission reductions resulting from improved energy efficiency will be retained as excess allowances by power plant owners and may be sold to any industrial facility in the HGB region. Furthermore, NO_x emissions are based on 90 percent controls, which is no longer being proposed. GHASP also stated that they have previously made this comment, but the TCEQ did not respond, in violation of the Texas Administrative Procedures Act. Furthermore, in another context the TCEQ has recognized that this is a correct argument.

Houston/Harris County commented that the SIP does not contain the energy efficiency measures and the related 3.5 tpd of NO_x reductions. They commented that various stakeholders are implementing energy efficiency measures and there is a pressing need to secure emission reduction credits for these programs. The commission should promptly initiate an effort to remove the impediments that exist from securing emission reduction credits.

TexasGenco commented that energy efficiency measures under SB5 and SB7 are effective tools for reducing NO_x but do not eliminate electric generation growth and are only goals. TexasGenco commented that under the current NO_x cap and trade program the only way to credit energy efficiency measures to the SIP is to retire a commensurate quantity of allowances.

TexasGenco comments that reduction of TexasGenco's point source emission cap is contrary to the settlement order between the TCEQ and the BCCA -Appeal Group (BCCA-AG), including TexasGenco. The order does not allow departures from the currently set cap level in order to transfer SIP credit to other NO_x strategies. Credit for other goals, such as energy efficiency measures, must come from the additional benefits of the VOC measures, or from other sources.

Sierra Club commented that the accuracy of the implementation of the energy efficiency measures, the specific effect of each implementation strategy, the accuracy of the NO_x/VOC emission reductions, and the verification of the continued maintenance of these measures cannot be verified.

The commission agrees that energy efficiency programs do not eliminate electric generation growth but that electric generation will be reduced through energy efficiency measures. Energy efficiency measures will reduce projected SIP baseline emissions in future years. The Texas A&M Energy Systems Laboratory (ESL) is developing a calculator that will provide emission reduction calculations that will be creditable in SIPs. This calculator has been developed with EPA's participation and takes into account factors such as degradation, maintenance factors, emission factors, strategy effectiveness, affected area, and permanence. This calculator will be a reliable source for calculating energy efficiency emission reductions.

Because of the unresolved issues concerning the HGB cap and trade program, a program has not been developed to secure emission reduction credits in this region. EPA has published an energy efficiency guidance document that provides options for securing credits in a cap and trade program. The TCEQ will evaluate the guidance to determine if any of these options will be feasible in the HGB area in the future. Moreover, emission reductions associated with energy efficiency measures have not been included the HGB photochemical modeling, nor has the commission reduced the NO_x point source cap. The TCEQ expects that energy efficiency measures in other parts of the state which are not subject to a NO_x cap will result in a reduction of NO_x emissions in those areas and as a result, improve regional background conditions for the HGB area.

The commission's actions are not in violation of the Consent Order, which stayed the now-dismissed lawsuit between BCCA-Appeal Group and the commission. That order provided that to the extent supported by the commission's science evaluation and continuing scientific assessment, the beneficiaries of episodic release evaluation and any attainment credit would be first to HGB point source owners (down to the 535 tpd level), and that the commission, in its discretion, could allocate any additional benefit to other SIP strategies and/or to the point source NO_x control strategy.

With regard to GHASP's allegation that the TCEQ did not respond to this comment made regarding the 2002 HGB SIP in violation of the Texas APA, GHASP appears to be referring to its comment that there was no demonstration that energy efficiency will provide additional NO_x reductions. The TCEQ disagrees that there was no response because that particular comment was addressed in the Response to Comments for that SIP revision. The Texas Administrative

Procedure Act does not govern revisions to SIPs which are not rulemaking actions of the TCEQ.

GHASP strongly supports the TCEQ proposal to include “emission events” in the site-wide cap for HRVOCs.

The commission appreciates GHASP’s support of the inclusion of emission events in the site-wide cap.

GHASP commented that the feasibility of this proposal is demonstrated in previous findings by the TCEQ. In the December 2000 adoption of the original ESADs, the commission laid out a detailed explanation of its reasons for determining that the original ESADs were technically feasible and that the adopted implementation schedule is also feasible. The commission has never claimed that any of the commission's December 2000 conclusions were in error.

The TCEQ has never taken the position that the December 2000 ESADs were not technically feasible. However, the TCEQ has developed the most cost effective control strategy based upon the best science available to address the ozone nonattainment issue. Scientific understanding of the ozone issues in the HGB area has dramatically increased as a result of the scientific information collected and analyzed since the December 2000 SIP was adopted. As a result of this knowledge, the TCEQ has continued to study and evaluate the best approach towards addressing ozone in the HGB area and has determined the 1-hour ozone standard can be met in a more cost effective manner with an aggressive strategy of controls on HRVOCs in conjunction with a NO_x strategy. The use of this strategy also eliminated the NO_x shortfall, while including an attainment demonstration that is superior to that of the December 2000 SIP revision.

GHASP commented that as a stronger control strategy, the NO_x cap could be lowered to limit industrial NO_x emissions to 86 tpd as supported by previous TCEQ rulemaking, approved by EPA. The TCEQ should also evaluate whether a separate trading regions should be established so that the lower cap could be limited to Harris County due to the high concentration of sources co-located with reactive VOC emissions. An alternative might be to establish an automatic reduction in allowances for each year that the 1-hour ozone standard is not met. For instance, if the standard were not met, all MECT allowances might be reduced by 10 percent. An additional 10 percent reduction could occur each subsequent year that the 1-hour standard is not met.

Addition emission reductions will be needed for the HGB area to demonstrate attainment of the 8-hour ozone standard. The TCEQ will evaluate these suggested strategies along with others as a part of the SIPs developed to address the 8-hour ozone standard.

GHASP questions the technical basis for the alternative ESADs applied by the TCEQ to establish the NO_x MECT allowance allocations, and that it commented on this issue twice in 2002, and the comment was not addressed by the TCEQ, nor has been subsequently addressed. While the TCEQ adequately disclosed the technical basis for the ESADs used in its December 2000 proposal, the commission’s only justification for the ESADs adopted in December 2002 is that they were submitted to a court by an organization that filed a lawsuit against the commission.

The commission’s justification for the ESADs, which is not limited to the reason suggested by the commentor, is contained in the rule preamble, adopted by the commission on December 13,

2002, 28 Tex. Reg. 240 (January 3, 2003). That preamble includes the commission's response to all comments submitted during the notice and comment period for that rulemaking.

Texas Emission Reduction Plan

GHASP suggest that the TCEQ revise the TERP and MDERC programs to allow funding for emission reduction projects by ocean-going ships. Also, they suggest that the TCEQ should propose revising the TERP cost-effectiveness threshold from \$13,000 to \$20,000 per ton, subject to legislative approval.

The TCEQ is receptive to ideas on reducing emissions from the ocean-going fleet vessels that frequent the ports in our nonattainment and near-nonattainment areas. However, it should be noted that the requirement that grant recipients must operate the grant-funded vessel at least 75 percent of the time in the bays adjacent to one of the eligible areas, or in the Intracoastal waterway along the Texas coast, is set forth in the statutory language. The TCEQ will continue to consider ways to make the TERP program as effective as possible.

Rather than considering a higher cost effectiveness threshold than the current \$13,000 limit, the program needs to achieve an average cost effectiveness that is much lower than the existing threshold. Based on the projected TERP revenue, the program needs to achieve an average cost effectiveness of \$5,000 per ton in order to be assured of meeting the emission reductions goals. Given the competitiveness of the last application period and the need to achieve an average cost per ton of \$5,000, the commission has lowered the cost effectiveness cap for the FY 2005 funding to \$7,000 per ton of NO_x reduced. The TCEQ will periodically assess the effectiveness of the program in meeting our emission reductions goals, and the funding threshold will be adjusted accordingly.

Sierra Club stated that TERP will not achieve the 38.9 tpd emission reductions that have been estimated. Sierra Club also stated that the commission provided no documentation that the TERP program will be effective.

A SIP emissions reduction table discussed at the August 16, 2004 Work Session indicates that the reductions will be achieved in 2007. The commission encourages the public to periodically review the TCEQ's TERP web page to obtain more information on the TERP program. It should be noted that the FY05 Request for Grant Applications will target greater cost-effectiveness

HGAC and TPC stated that TERP needs additional outreach to ensure the widest possible involvement in the program. They also expressed interest in programs to pre-approve commonly serviced and purchased diesel equipment. They suggested an analysis of the technology applications that are likely to qualify for TERP grants and include those in the SIP.

The TCEQ agrees that outreach is an important component of this program. Some of the outreach activities that have and will continue to be undertaken include the following: outreach to trade organizations; media campaigns associated with the opening of the grant application and award periods; developing and distributing grant brochures and other materials; workshops in all eligible areas as part of each grant application period; seminars to provide information on the small business grants program in all eligible areas; and significant local efforts by regional and local entities to support the program and encourage entities to apply.

The agency will continue to look at ways to reach as many entities as possible to inform them of the program.

Regarding the preapproval of certain types of projects, the competitive nature of the program makes it difficult to consider this approach. However, the TCEQ is considering ways to pass-through some of the grant funds under third party grant contracts with other governmental entities. For instance, a contract has been executed with the Railroad Commission of Texas to fund their implementation of a forklift grants program. Options are being considered for other third party grants which would provide funding to target certain types of projects in particular areas. Funding decisions would then be based on the needs identified by the regional entity entering into the third party contract with the TCEQ.

Finally, regarding the comment on identifying technology applications most likely to qualify for TERP grants, the current lack of verified retrofit technologies limits the agency's ability to include such an analysis. It is expected that a number of new technologies will be available soon, including some technologies for which the testing and verification will be supported through the New Technology Research and Development program grants. As verified retrofit systems become available, the TCEQ will consider ways to implement those technologies on a broad basis.

GHASP proposed changing the TERP and MDERC (Mobile Discrete Emission Reduction Credit) programs to allow funding for emission reduction projects by ocean-going ships with a high frequency of repeat visits to the Houston region and use of a Texas LED for marine application.

As noted in another response, there have are numerous grant applications that have not been funded that operate 75 percent or more of the time in the 41 eligible TERP counties. Prudent air quality planning would indicate a more favorable return on investment by funding those projects that are operated most in the area before funding those projects that are frequent visitors.

The TERP statute §386.104 (c) required "the vessel or engine must be operated in the intercoastal water ways or bays adjacent to a nonattainment area or affected county" "to meet the cost effectiveness requirements". Ocean-going vessels are eligible to apply for TERP grant funding, if they meet all other requirements.

Houston/Harris County urged the commission to allocate adequate TERP funds to the HGB area, based on the actual, average per ton cost realized under the TERP program, as opposed to the \$5,000 amount that was projected prior to implementation of the program.

The HCPHES urged the commission to fully fund TERP to achieve the proposed 38.9 tpd NO_x reduction.

Sierra Club stated that the TERP will not achieve the 38.9 tpd emission reductions that have been estimated. The TCEQ has provided no documentation that this program will be this effective.

The TCEQ has established a geographic allocation approach for future funding under the TERP, to ensure that the emission reduction goals for each area can be realized. The TCEQ will reconsider the allocations on at least an annual basis, and more frequently as needed, to take into account the results of the program to date. Based on current revenue estimates, the

program will need to achieve an average cost per ton that is close to the \$5,000 target.

The TCEQ disagrees with the comment that the TERP will not achieve 38.9 tpd in emission reductions. The program to date has generated substantial interest, with 479 applications, totaling \$350 million, submitted under the last funding round, for \$80 million in grant funds. The agency is also supporting the development and verification of a variety of new retrofit systems that, if verified, will become available in the state within the next several years, and can be funded under the TERP for use in a broad range of vehicles and equipment.

Additional Reductions

EPA commented that it may be better at this point to provide a commitment to adopt additional control measures to provide a margin of safety in this attainment demonstration or measures that could be implemented quickly if the area fails to attain in 2007.

EPA commented that due to some of the uncertainties of the attainment demonstration modeling for the HGB area and the questions that only time and science can provide and suggested looking for opportunities to enhance the overall plan by setting the stage to move forward with innovative measures and improved science. EPA recognizes that the TCEQ has already deployed additional ambient monitors in the HGB area establishing the Early Response Monitoring network and the next intensive field study in 2005 and 2006 which will certainly help. With the new 8-hour ozone standard established, considering new innovative measures and initiatives now will only benefit in the long term effort to achieve both the 1-hour and the 8-hour ozone goals.

EPA commented that the TCEQ should consider some of the following concepts or other initiatives that would achieve similar benefits.

- 1) Monitoring of less reactive VOCs from cooling towers and flares.
- 2) Commitment to evaluate the potential of providing shore side power for ships in port (cold ironing)
- 3) Joint EPA/TCEQ initiatives to encourage “reflashing” emission control modules on heavy duty diesel trucks.
- 4) Additional controls on sources in specific geographic areas associated with the ozone plumes
- 5) Additional controls on small diesel generators

ED commented that if some strategy is not implemented to achieve the 90 percent compliance rate associated with the heavy-duty diesel truck engine software upgrade by 2007 assumed in the photochemical modeling, then the modeling should be adjusted to account for the excess emissions. This would involve increasing mobile source emissions by 3 to 5 tpd. Options to Ensure Achievement of Emission Reductions and Avoid Loss of Emission Reduction Credit include: Option 1. Convince EPA to aggressively enforce the terms of the consent decree. Option 2. Work with engine manufacturers to initiate a voluntary program like in California to accelerate the software upgrades on trucks registered in Texas. Other potential partners are major trucking destination points (such as the Port of Houston) and agencies with statutory authority to regulate trucking safety. Option 3. Explore options to require software upgrades as condition of the registration, sale, or lease of diesel trucks.

GHASP and ED commented that emissions from small-scale electric generators degrade regional air quality and threaten the health of Texas citizens that reside near units in operation. This threat will

not be fully addressed until all existing generators used in non-emergency applications are required to reduce emissions. The TCEQ should not wait for the 8-hour ozone SIP to establish rules addressing these sources. GHASP also proposed a program to accelerate the diesel reflash program required by the EPA consent decree with truck engine manufactures.

Additional reductions beyond those currently credited in the SIP are expected from the TERP in 2008 and 2009. The TCEQ projects 44.1 tpd of total emission reductions are expected in 2008 and 53.4 tpd of total emission reductions are expected in 2009.

In response to comments received, the commission is reducing the annual cap allocation by 5 percent to account for the daily variability in emissions and to address uncertainty in the geographic redistribution of emissions between the attainment demonstration model and how actual emissions may occur with trading in place. The commission will allow sites to convert VOC emission reduction credits to a yearly allocation of HRVOC allowances, based on a ratio reactivity between the maximum incremental reactivity (MIR) for the speciated VOCs reduced and the MIR for an HRVOC.

The primary hurdle in moving forward with a control strategy for small diesel generators is an accurate assessment of the number of the engines that exist in the eastern half of the state and the significance of their contribution in ozone formation. The commission disagrees that it is not more appropriate to consider this as a part of the 8-hour ozone analysis than as part of the 1-hour ozone attainment demonstration. On many days the background ozone level is near the 8-hour ozone NAAQS indicating a need for regional reductions. The commission is in the process of developing a plan to assess and improve the inventory for these sources for incorporation into the overall 8-hour ozone SIP planning process to ensure the most cost effective strategies are applied.

Evaluating additional controls on specific geographic areas associated with ozone plumes and small diesel generators and other suggested strategies may be considered as a part of the SIPs developed to address the 8-hour ozone standard. The TCEQ has initiated a project to improve the diesel generator inventory.

Numerous practical, technical, legal, and financial impediments exist to developing cold ironing or shore power as a generally applicable control strategy. Equipment required for shore power has not been standardized. The lack of standardization at the national or international level makes it difficult for vessels to utilize shore power at more than one marine facility. Shore power is generally viable only with captive fleets or fleets that repeatedly frequent the same facility. Moreover, based on early calculations and estimates for the few marine facilities that have considered or begun to implement shore power provided by the Port of Houston Authority, costs can range up to \$60,000 per ton NO_x reduced. Shore power is not a feasible emission reduction strategy for the HGB area at this time. However, the commission remains interested in the technology and its feasibility in the future.

ED also commented that if some strategy is not implemented to achieve the 90 percent compliance rate associated with the heavy-duty diesel truck engine software upgrade by 2007 assumed in the photochemical modeling, then the modeling should be adjusted to account for the excess emissions. This would involve increasing mobile source emissions by 3-5 tpd. Options to Ensure Achievement of Emission Reductions and Avoid Loss of Emission Reduction Credit include: Option 1. Convince EPA to aggressively enforce the terms of the consent decree. Option 2. Work with engine

manufacturers to initiate a voluntary program like in California to accelerate the software upgrades on trucks registered in Texas. Other potential partners are major trucking destination points (such as the Port of Houston) and agencies with statutory authority to regulate trucking safety. Option 3. Explore options to require software upgrades as condition of the registration, sale, or lease of diesel trucks.

The commission agrees that EPA should aggressively enforce the terms of the 1998 consent decree between EPA and the manufacturers of diesel truck engines. The commission encourages EPA to implement a reflash program.

EPA commented that to address uncertainties in the emissions inventory, the TCEQ must improve inventory techniques with additional source monitoring and the use of better estimation techniques for fugitive emissions of all VOCs. EPA encouraged the TCEQ to commit to improve source monitoring of less reactive OVOCs, suggesting that less sophisticated monitoring programs without full speciation may be adequate to achieve this goal. Furthermore, EPA suggested the TCEQ consider requiring monitoring of less reactive OVOCs specifically on cooling towers and flares.

The commission has been and will continue to strive to improve the emissions inventory. Many projects are being funded and/or sponsored by the TCEQ to achieve this goal by researching new technologies and methods for measuring VOCs. However, there are substantial costs associated with requiring facilities to perform source monitoring for VOCs, even with limited speciation or analyzing total VOC. Monitoring for any specific VOCs such as those considered “less reactive” will by default require some speciation unless the only VOCs present at a specific source are just those which are the targeted species. Furthermore, the cost of monitoring for speciated VOCs is greatly impacted by the specific compounds that are required. HRVOC, as currently defined for the entire HGB, are a limited group of compounds with similar properties and a narrow range of molecular weights. It is more complicated and costly to monitor for speciated VOCs with dissimilar properties from different organic compound groups or with large differences in molecular weight. The monitoring for some sources can be further complicated by the possible presence of OVOCs that, while not considered to be reactive and not of interest, interfere in the analysis of targeted compounds. Even facilities that will be performing the required monitoring for HRVOCs could be subject to substantial additional costs if required to monitor for OVOCs by possibly being required to install additional monitoring systems. The commission must give careful consideration to the associated costs and benefits before requiring any such monitoring. At present, there is insufficient evidence to suggest that there will be significant benefits from the suggested monitoring and additional regulation of OVOCs to warrant the economic impact to the regulated community in the HGB area. The TCEQ plans to initiate a stakeholder process than will focus on methods to improve the emissions inventory. The commission will use this process, in conjunction with data from other air quality studies and monitoring, to determine future action regarding OVOCs.

GHASP commented that the TCEQ estimates of rule effectiveness are based entirely on establishing a site-wide cap, and not based on any detailed review of how effective its strategy is likely to be, considering factors such as enforcement and implementation.

Rule effectiveness was applied to the entire VOC inventory of the state and the HRVOC inventory is a subset of the VOC inventory. Addressing HRVOC emissions are a necessary part of the attainment strategy for the HGB area. The strategy chosen by the commission for control of HRVOCs is use of a site-wide cap, which does not prescribe control equipment for which rule effectiveness estimates would be applicable. Rule effectiveness is primarily related

to less-than 100 percent performance by control equipment. Given that the commission established a cap for HRVOC emissions in 2002 and that the date for compliance with the cap is sufficiently in the future for affected sites to comply, it is reasonable that no rule effectiveness is appropriate in the future case modeling.

As with the NO_x Cap in HGB, each site in Harris County will be required to certify its annual total HRVOC allowances that it used during the previous year, and the TCEQ will reconcile this with the site's HRVOC cap allowance to demonstrate cap compliance each year.

GHASP commented that the TCEQ gives too much weight to the heat wave that occurred during August and September 2000 in its reasoning for discounting August 31 from the attainment demonstration. The base case model does not produce more than 160 ppb on any day that is considered to reach attainment with the proposed control strategy.

The commission has evaluated and strengthened analysis of August 31. Similarly, the commission continues to monitor the findings of the TexAQs 2000 scientific analysis to more fully understand what is driving the ozone levels in the HGB area and the most appropriate way to assess the effectiveness of the current control strategy against it. In December 2001, Envair issued an interim report which began to evaluate the effect Transient High Ozone Events had on the HGB area design value. As a result of that study, in February 2002, the BCCA-AG presented an analysis to the commission which concluded that if transient high ozone events were accounted for, the areas design value for the 3 year period of 1999-2001 would be 157 ppb. The TCEQ concluded that the design value for the period without ozone "spikes" that climb 40 ppb or more per hour and are followed by a corresponding decline over one to two hours is 146 ppb. Chapter 4 of the SIP has been changed to reflect this phenomenon. This gives an added level of confidence to the strategy of hourly cap limits to lower the number and magnitude of spike events and the lower annual cap to lower the constant emissions coupled with the previous NO_x reductions will achieve the 1-hour ozone standard. For the purposes of their analyses, a transient high ozone event was defined as an event where monitored levels of ozone increased by greater than 40 ppb in an hour or less. Applying the relative reduction factor approach, described above, to this design value indicates that the control strategy will result in a 2007 design value of 128 ppb, if August 31 is not factored in and a 129 ppb, if it is. In conjunction with all of the other WoE arguments, it is more likely than not that this design value will be below the 1-hour ozone standard of 125 ppb.

The report by Dr. Allen represents a linear approach to short-term releases and indicated that 1000 pound HRVOC release could impact ozone readings by 2 to 3 ppb.

Sierra Club commented that the TCEQ has misrepresented the research for the short-term cap, stating that the short-term controls strategy of 1,200 lbs is weaker than the 1,000 lbs that the research it refers to recommends.

Dr. Allen's research concluded that at the most sensitive locations, at the most sensitive times of day, releases over approximately a two to three hour period can lead to increases of 2-3 ppb in peak ozone concentration per 1000 lb of additional HRVOC emissions. Based upon an analysis of the TCEQ database on event emissions, short-term releases of a magnitude to impact peak ozone are not seen to occur in time periods greater than an hour. Of those that occur at levels greater than 1000 lb, over 85 percent occur at rates less than 40 minutes. Due to the linear nature of the results, this would suggest an event of 1500 lbs would have an impact on peak

ozone equivalent to the impact of 1000 lbs over an hour. Dr. Allen also concluded that if actions are taken to reduce emission variability, however, the magnitude of the emission variability that should be expected upwind of the peak, region wide ozone concentrations could be decreased. In conjunction with all of the other efforts this attainment demonstration incorporates to reduce both the magnitude and frequency of short-term releases, the TCEQ has determined that a short-term limit of 1200 lbs over an hour will not result in an exceedance of the 1-hour ozone standard more than once a year.

ED also commented that the TCEQ should add contingency measures to the SIP to comply with the law and provide a safety net should attainment not be achieved in 2007.

The HGB Rate Of Progress (ROP) SIP adopted by the commission on October 27, 2004 contains appropriate contingency measures and the TCEQ has met the legal requirement to have contingency measures, if the area fails to attain the standard or fails to make reasonable further progress.

To meet the ROP contingency requirements the TCEQ must show an additional 3 percent reduction after 2007. To meet the requirement, the commission expects 23.57 tpd reduction in NO_x and 10.84 tpd in VOC emissions in 2008. These reductions are beyond those currently included in the photochemical modeling in the SIP. Furthermore, as discussed previously, additional TERP reductions will be made beyond 2007.

The LWV commented that Houston is particularly affected by emissions from ships at the Port of Houston, as well as numerous refineries and chemical plants.

MCA stated that emissions from nonroad mobile sources such as ships and construction equipment also need to be addressed.

The Mayor of Shoreacres stated that the Port Authority of Houston should take responsibility for the pollution from ships and trucks serving their facility and that the TCEQ has failed to address additional pollution from the proposed Bayport Container Terminal.

An individual commented that industry and ports should not receive unfair advantages in getting rules changed to meet their needs, even if ships are from foreign countries.

Another individual commented that emissions from ships and construction equipment also need to be addressed and that the Bayport facility will not be in compliance with the SIP.

While the shipping inventory has not been updated specifically for the facilities proposed by the Port of Houston and the City of Texas City, it did include the best growth projections available in 2002. The 2002 data also did not specifically include a prolonged economic slowdown which has been experienced since its adoption. Both the locomotive and shipping inventories include reasonable growth from year 2000 to 2007. Future modeling, especially for 2010, will add effects of specific facilities as time permits. At the same time the commission plans to address the HGB container ship facility progress and improve projection of this activity, as well any additional shipping operations anticipated by 2010.

A project and contract to improve Texas locomotive emissions is currently underway and the results will be added to the model as soon as they are available and can be processed into

model-ready format. This project will hopefully yield improved spatial allocation and may actually lead to lower emissions estimates than in the current inventory.

The commission uses the most up-to-date NONROAD model for determining construction emissions inventory. In addition, many Texas-specific input files based on survey-based work conducted by contract in cooperation with the construction industry have been included. The commission works collaboratively to ensure that the emissions are spatially allocated in the base and future case to best approximate what will happen and is confident in the results.

MCA commented that the HGB area still does not meet the federal clean air standards and while there has been some improvement, the state's plan is still inadequate and that 30 years of planning is long enough for Texas to come up with an acceptable plan.

MCA also stated that most of Houston's pollution comes from chemical plants and refineries and that the TCEQ must take a firm stand on industrial pollution and reinstate the NO_x emission reductions that were rolled back in 2002.

The commission acknowledges that a significant portion of the HGB area's emission are generated by chemical plants and refineries. The commission has addressed these emissions through modeling and reduction requirements that will require significant capital investment on the part of these sources. In addition, the commission has, over the last two years, required increasingly stringent controls of NO_x and VOC emissions in the area, particularly from major sources.

In addition, the commission has tremendously increased its understanding of what causes ozone in the HGB area and is using this knowledge to develop better air quality plans. There has been progress achieved through implementation of rules on all pollution sources. The greatest understanding to date was gained through the TexAQS 2000. We now have the best scientific basis for developing an improved plan that will achieve the air quality standard and will implement appropriate controls on all point, area and mobile sources. While industrial (point source) pollution is the largest contributor to ozone pollution in the 8-county area, this plan will reduce point source NO_x emissions from 492 tpd to 174 tpd in 2007 and VOC emissions from 384 tpd to 245 tpd in 2007. Recent studies and photochemical modeling results show that a combination of reductions of NO_x and HRVOCs is the most effective point source strategy for addressing the 1-hour ozone standard and bringing the area into attainment.

MCA also commented that keeping in place and achieving the 1-hour ozone standard will better serve the public as well as make great progress toward the 8-hour ozone standard.

The plan will attain the 1-hour ozone standard and make progress toward the 8-hour ozone standard.

MCA urged the commission to approve a plan that looks ahead and that a plan that ignores new mobile sources of emissions will not get there.

The attainment demonstration does not ignore new mobile sources of emissions. The commission uses, among other tools, sophisticated mobile models to account for the growth through the year 2007 of mobile sources. These modeling tools are complemented by local input developed by the regional government and the Texas Transportation Institute. Included

in the SIP are detailed discussions on mobile source growth as well as the controls applied. Mobile source emissions should decrease from 342 tpd of NO_x to 186 tpd by 2007 and from 151 tpd of VOC to 90 tpd in 2007. Many of these emissions reductions will be the result of new technologies on cars and trucks and cleaner fuels.

An individual commented that she is outraged by the lack of progress in meeting the federal health standards. She was glad that provisions are being made to clean up construction equipment, trains, and other old, polluting equipment. However, she stated that the TCEQ must strongly address pollution from chemical plants and refineries and that controls be restored on nitrogen oxide emissions to what they were before the 2002 rollback.

Another individual stated that the TCEQ must require all the necessary reductions from chemical plants and refineries including restoring nitrogen oxide controls rolled back in 2002, and must place limits on emissions of all the hydrocarbons that contribute to high ozone levels in order to achieve attainment and protect human health.

The Mayor of Shoreacres stated that the SIP seems to be more of an administrative game to fool people into thinking that something is being done about Houston's air quality than it is a serious attempt to improve air quality.

An individual commented that the TCEQ needs to require chemical plants and refineries to reduce their emissions, that limits need to be placed on all hydrocarbons that contribute to high ozone levels, and that the TCEQ needs to enforce the regulations set forth.

An individual commented that plants should not be allowed to "share the burden" and that any plant that does not comply should be shut down. He also stated that air pollution is not unique to the U.S. and that blatant violations must not be allowed.

The commission strongly disagrees with the statements that nothing is being done to improve air quality. The commission is implementing rules, including rules that will significantly limit emissions of HRVOC's, that will be effective in attaining the standard. Current scientific understanding which has been peer-reviewed and corroborated by some of the nation's top air quality researchers has concluded that reducing VOCs, with a concentration on HRVOCs from industrial sources, along with significantly reducing NO_x emissions from all sources will be the most effective strategy in attaining the 1-hour ozone standard. In addition, new research conducted through a project funded through the Houston Advanced Research Center provides evidence that HRVOC controls will result in additional reductions of other industrial VOCs from various process streams. The commission addresses enforcement mechanisms in all of its regulations.

The Partnership thanked the TCEQ for their effort over the last couple of years to advance the science of air quality in the Houston region and quickly implement new knowledge into SIP improvements. The Partnership also recognized key milestones resulting from the commission's hard work and encouraged the commission to provide a comprehensive explanation in the December 2004 SIP and chronicle the complete, concise list of measures, targets, timelines, and programs in place to help the area achieve attainment of the 1-hour ozone standard.

The commission appreciates the support of the Partnership and will continue to use explanations of the scientific understanding throughout the SIP and include results from

recently completed studies funded through the HARC and from the commission's own ongoing research efforts.

A resolution passed by the Board of Directors of the Partnership supported revisions to the HGB SIP. The resolution stated that the SIP was based on the latest scientific photochemical modeling, reaffirmed the federally approved attainment demonstration SIP, confirmed the elimination of the previous oxides of nitrogen gap, eliminated the future reinstatement of the 55 mph speed limit, and strengthened new rules reducing industrial emissions of HR VOCs.

The commission continues to use the latest scientific findings to enhance its understanding of the causes of ozone formation in the HGB area. Since the completion of the TEXAQS 2000, the commission has developed partnerships with research organizations, local governments, and other stakeholders to improve on the findings. These findings are referenced throughout the SIP and have strengthened the commission's resolve that the appropriate suite of controls is being implemented for all emissions sources. The commission agrees that this SIP revision does not rely on a NO_x gap, or a 55 mph speed limit to achieve attainment.

An individual expressed concern that there no signs indicating that the water is dangerously polluted in Buffalo Bayou.

The TCEQ appreciates the interest in water quality in the Houston area. The local county is responsible for posting this type of sign. In this case, the county is Harris County. This comment is beyond the scope of this action but has been forwarded to the appropriate agency.

An individual commented that outdoor burning of limbs, leaves, and yard clipping should be reviewed for air quality impacts and suggested that Harris County provide some type of waste service for yard waste in unincorporated areas of Harris County.

It is correct that domestic waste may be burned when the local governmental entity that has jurisdiction over such matters does not provide on-premises trash collection service or authorize a business or other entity to provide on-premises trash collection service. To limit the activity, the waste must come from a property that is both designed to be a private residence and used exclusively as a private residence for no more than three families. The waste must also be burned on the property where it was produced. Such things as tires, construction debris that is not wood, furniture, carpet, electrical wire, and appliances are not considered to be domestic waste and cannot be burned. Historically, Harris County enforces outdoor burning in the county and investigates complaints and nuisances. If a county believes such services are needed, a county commissioner courts can adopt regulations for such collections in accordance with, §363.113 of the Comprehensive Municipal Solid Waste Management, Resource Recovery, and Conservation Act which states that "Each county with a population of more than 30,000 . . . shall review the provision of solid waste management services in its jurisdiction and shall assure that those services are provided to all persons in its jurisdiction by a public agency or private person."

GHASP commented that every possible emission reduction measure possible are needed. However, excessive and burdensome programs that require mobilizing a large percentage of the public on short notice are likely to fail. GHASP favors measures to reduce emissions by industrial sources first, then a focus on diesel sources (including marine and other similar large offroad sources).

The HGB 1-hour attainment demonstration contains control strategies that address emissions of industrial facilities, as well as area, nonroad, and onroad sources. Based on projected emissions inventory estimates in 2007, sources onroad and offroad sources will continue to be major contributors of NO_x and thus evaluated for potential emission reductions as part of 8-hour SIPs. As stated previously, the TCEQ also intends to continue to evaluate VOCs as a part of 8-hour SIPs.

Enforcement

Houston/Harris County stated that site specific monitoring of the large emitters should be used to enforce the SIP.

The TCEQ agrees that monitoring is important and can be an important tool to help enforce the rules and statutory requirements for Texas. The TCEQ intends to continue its efforts in this regard. Ambient monitoring does not always provide the details needed to prove specific violations of commission rules and permits. Where monitoring indicates a potential for violations, the TCEQ will work with local governments to conduct appropriate on-site investigations.

Houston/Harris County commented that distinguishing SIP violations to ensure that the penalties are swiftly imposed and are commensurate with the seriousness of the violation and the consequences to the region if attainment of the standard is not achieved. Specifically, they and HCPHES requested an amendment of the TCEQ enforcement policy to distinguish SIP-related violations that would be subject to enhanced and escalated enforcement because the consequences of these violations could prevent the region from attaining the 1-hour ozone standard. Houston/Harris County and HCPHES also commented that the TCEQ should assess penalties that are commensurate to the violations and the emissions that were released.

The TCEQ is currently in the process of conducting an enforcement process review which includes issues such as appropriate enforcement response to violations, timeliness of enforcement actions, corrective actions in enforcement actions, appropriate penalties, and adequate resources. The commission agrees that violations that lead to elevated levels of air pollution are very important, especially given that the attainment date is three years away. The TCEQ generally agrees with the recommendation to assess penalties that are commensurate with the violations and amount and type of emissions released.

Houston/Harris County is willing to modify its contract with the TCEQ to maximize resources to work toward the goal of clean air. Houston/Harris County also commented that and the TCEQ should work together to make sure the financial reimbursement incentives are appropriate.

The TCEQ is currently discussing this possibility with Houston/Harris County.

Houston/Harris County stated that when an NOV is referred to the TCEQ and the decision is made not to pursue the NOV due to a backlog of enforcement activities, Houston/Harris County would like permission to pursue the violations to make sure there is prompt enforcement.

The TCEQ presumes the commentor is referring to NOEs. The TCEQ initiated a backlog reduction effort in the fall of 2003. Violations that are referred for enforcement are now assigned to staff within a week of the referral. Additionally, the TCEQ is looking for opportunities to reduce its enforcement case processing time in the enforcement process review.

The TCEQ encourages such discussions to help ensure that there is a consistent approach to responding to violations that impact air quality.

Houston/Harris County stated that adequate financial and human resources need to be devoted to enforcement, and support an enforcement strategy that is geared for SIP success and that does not succumb to overwhelming workloads. Houston/Harris County urged the design of enforcement procedures so the TCEQ is not overloaded and resources are not devoted to doing a backlog of minor matters.

Sierra Club expressed concern that the statement regarding the adequacy of the TCEQ's fiscal and manpower resources to implement the SIP. Concerns regarding hurried inspections, training of inspectors, and differences of interpretation of rules between various the TCEQ offices were cited as examples of the adequacy of the TCEQ's resources. Sierra Club also stated that the HRVOC QAP and test plan approvals were a workload that the TCEQ lacks sufficient staff to implement. Sierra Club points to difficulties in filling positions with certified stack testing investigators as proof of inadequate resources.

The TCEQ agrees that it is extremely important to have adequate financial and human resources devoted to investigation and enforcement. The commission agrees that investigation and enforcement strategies should lead to success in reaching attainment of the ozone standard without overwhelming workloads. The commission maintains that adequate resources are available to implement the present rules. Sampling methodologies, short-term contracting, and agency resource sharing are all tools used to accommodate peaks of workload demands. The TCEQ investigators provide professional products, training is adequate, and changes to processes are a part of the continuous improvement philosophy. To this end, the TCEQ is currently reviewing the processes related to investigation and enforcement of commission rules and permits. As part of this effort, the TCEQ is also reviewing its penalty policy, considering deterrence, impact, and economic benefit. The enforcement review is also addressing the aspect of risk-based investigations with emphasis on those activities that have the highest potential for harm to human health or to the environment. Specific recommendations, including those regarding the penalty policy, investigations, and enforcement, will be considered by the commission during several Commission Work Sessions through calendar year 2004. The TCEQ is prepared to move resources should deficiencies be discovered.

Houston/Harris County stated there is a gap relating to the lack of a compliance and enforcement strategy to compel and verify compliance with the emission reduction requirements in the SIP. Specifically, they stated the need for a sharp and targeted focus on sources with high emissions of NO_x, VOCs, and HRVOCs, as well as facilities with recurring violations.

The TCEQ agrees that enforcement of the specific rules adopted for attaining the ozone standard should be one of its prioritized enforcement targeting strategies to help ensure timely attainment of the ozone standard. The TCEQ is dedicated to fair, swift, and effective enforcement that will support the SIP emission reduction requirements, and enforcement against those that violate commission rules. As part of the enforcement review process, the TCEQ will consider what resources should be allocated to investigation as well as when to initiate enforcement.

Houston/Harris County discussed the need for penalties that are commensurate with the significance of each emissions event's impact on regional ozone attainment to deter recurring violations and

encourage overall performance improvements. The penalty policy should take into account the economic benefit gained by noncomplying regulated entities, the cost associated with regulating their activities and the SIP impacts of the violations in question.

Specific recommendations from the enforcement review process, including those regarding penalty policy, will be considered by the commission during several Commission Work Sessions through calendar year 2004.

Houston/Harris County support a return to unannounced and more frequent inspections related to the major sources of NO_x, VOC, and HRVOC emissions in the region.

The current enforcement policy regarding unannounced investigation allows ample flexibility to conduct such investigations when appropriate.

Houston/Harris County and HCPHES stated the need for a process to assure expedited corrective actions when SIP and related rule violations occur.

The TCEQ agrees with this recommendation and will include the earliest compliance dates practicable in its Notices of Violations and enforcement orders for violations of rules adopted to attain and maintain compliance with the NAAQS.

Houston/Harris County urge the commission to require entities under enforcement which contributed to the 1,429,224 pounds of HRVOC emissions during upset events in 2003 to timely complete the following actions in connection with the forthcoming enforcement actions:

- conduct root cause analyses to comprehensively and specifically determine what is causing upsets and emission events
- timely develop and implement a comprehensive plan to address the issues that caused the upsets or emission events.

The TCEQ generally agrees with these recommendations.

Houston/Harris County encourages the City, the County, and the commission to work as a multi-jurisdictional enforcement team that is superiorly trained and adequately equipped.

The TCEQ is currently discussing a multi-jurisdictional approach to enforcement. Each governing entity has trained and equipped staff performing enforcement duties and the TCEQ encourages the shared training of staff.

Houston/Harris County requested regional decision making on appropriate aspects of the enforcement process, including decisions on violations and appropriate remedies. Houston/Harris County and HCPHES recommended a multi-jurisdictional enforcement approach containing these elements:

- Adequate, timely, and joint training of state and local field investigators on the SIP's requirements
- Joint investigations, a cohesive investigation approach and purposeful collaboration on enforcement issues among the local governments and the commission with priority focus on the following:
 - major sources of NO_x
 - major sources of HRVOC
 - sources of the bulk of the HRVOCs resulting from fugitive sources

- sources of the bulk of the HRVOCs resulting from process gas streams, flares, and cooling towers
- sources of the bulk of HRVOC trade allowances, with the TCEQ regional office and local governments directly involved in the process (not just the Austin office as is currently the case)
- other significant sources of various VOCs, such as those from marine vessel loading and storage tanks, coupled with unannounced investigation
- Review of the TCEQ's enforcement policy and contracts to ensure that they do not restrict the ability of the commission or local enforcement agencies subject to the policy or party to a contract with the commission to seek remedies that are appropriate to the seriousness of SIP violations
- Removal of legal and bureaucratic obstacles to interagency enforcement coordination.

The TCEQ agrees that each governmental entity should have knowledgeable and trained staff. The TCEQ also encourage shared training opportunities related to enforcement of the rules adopted as part of the SIP. The TCEQ will provide adequate guidance for all staff concerned with permits and rules that will lead to compliance with the SIP strategies.

Joint investigations, cohesive investigation approaches, and purposeful collaboration on enforcement issues are also important as each level of government strives to reach attainment of the ozone standard. The TCEQ invites further discussion regarding the specifics of an appropriate targeting strategy for the HGB area. The TCEQ is willing to review its policies and contracts to ensure that appropriate enforcement can be taken in response to violations of the SIP.

Local governments and other interested persons have the opportunity to comment on any and all cases that the commission is considering. A summary of each proposed order is published in the *Texas Register* and a 30-day comment period is provided. The TCEQ is willing to review its policies to ensure that appropriate enforcement can be taken in response to violations of rules that are part of the SIP strategy.

Houston/Harris County commented that various commission documents indicate that 15 industrial facilities, which are owned by five corporate entities, accounted for approximately 90 percent of the HRVOCs released during upsets and other emissions events in 2003 and produced 1,429,224 pounds of HRVOC during these events. During 2003, the flow rate of HRVOCs during emission events reached 86,557 pounds per hour on one occasion, exceeded 50,000 pounds per hour on three other occasion, and were 10,000 pounds or more per hour three times a month on average. Based on this information, the Houston/Harris County urges the commission to require these entities to timely complete corrective actions as part of enforcement.

It appears that these figures come from a paper by Cynthia Murphy and Dr. David Allen at UT (*Event Emissions in the Houston Galveston Area (HGA)*, January 11, 2004, currently submitted for publication). This paper examines all events reported in the TCEQ on-line event emissions database (*Air Emission Event Reports*) in Harris, Galveston, Chambers, and Brazoria Counties from January 31 - December 31, 2003. It also examines just those HRVOC upsets reported during the period from August 20-25, 2003.

The authors find that the peak HRVOC event flow rate during the 11-month period was 39,340 lbs/hr (reached on one occasion). They also found that HRVOC event emission flow rates

exceeded the average routine HRVOC emissions flow rate on 29 occasions, a bit less than three times per month. The total HRVOC event emissions in the period were 828 tons, or about 12 percent of the routine HRVOC emissions of 6,797 tons (all routine emissions figures were taken from the 2000 TCEQ special inventory).

In the period from 8/20 to 8/25/2003, the authors found that there were 20 total HRVOC events reported, which occurred at fifteen facilities. Based on a table in the report, it appears that these facilities are owned by eleven separate companies. The authors do not report total HRVOC emissions from these events; rather, they note that in six of the events, emissions exceeded the annual routine HRVOC emissions average, by factors ranging from two to 37.

Sierra Club urges the TCEQ to review whether the idling truck rules should be kept and appropriately implemented and enforced. Sierra Club is concerned about the proposal to repeal 30 TAC 114.500, 114.502, 114.507, and 114.509, concerning the control of idling from large motor vehicles (trucks). The TCEQ has not implemented a credible enforcement effort for this rule and has discouraged local air pollution control programs from enforcing this rule. The TCEQ does not know if this rule can be enforced effectively because it has never tried to enforce this rule. Sierra Club recommend that before the TCEQ repeals the idling rule that it determine what a credible enforcement effort is in terms of resources, money, and time. The TCEQ should implement a pilot enforcement program to determine whether it can reduce emissions from enough heavy trucks to make the retention of these rules beneficial.

The commission understands that there has been limited enforcement of this rule. There is not a process through which to target vehicle idling that will allow efficient use of investigators compared to other SIP requirements. The commission has to date implemented this rule through a complaint driven process. This process has proven unsatisfactory because investigators arrive to find that the truck has already left the site of the complaint. The commission has adopted a rule that allows local governments adopt idling restrictions and enforce those restrictions at the local level.

Sierra Club stated that a further problem with this proposal is how the TCEQ will be able to determine compliance with the limit in § 115.722(c). This rule appears to require recordkeeping requirements similar to the emissions event rule. How will the TCEQ ensure that companies are truthful about the amount of emissions the emit for any one hour period?

Each emission point subject to this rule must have established a parameter monitoring trigger that will allow operators to determine when exceedances occur. The parameter selected must be monitored hourly to confirm compliance. Based on the engineering calculations that established the parameter monitoring, the operator or the investigator should be able to establish the amount of emissions that have occurred from the monitoring records.

Sierra Club commented that the requirement for HRVOC QAP and test plan approvals, within specific, mandatory time frames that are too short to adequately implement, emphasize that the TCEQ does not have adequate staff and neither do local programs. Sierra Club does not support an automatic approval of the QAP under §§ 115.726(a)(1)(C) and 115.766(I)(3) if the TCEQ has not approved or provided a deficiency letter within 180 days. Sierra Club had similar comments regarding the 45 day time period under § 115.726(a)(2)(C). This puts pressure on the TCEQ to approve QAPs that are not reviewed or are reviewed insufficiently due to the lack of personnel or the lack of adequate training. A longer time period is needed, perhaps 270 days and 120, respectively. It

is already too late to adequately train the staff. The TCEQ has had problems filling positions with certified testing investigators for its present needs. The danger is that inadequate QAP and test plans will be approved by poorly trained investigators who will not be able to enforce the plans which will not be protective of the public's health.

The commission has revised the rule regarding the submission and approval of QAPs. The revised rule requires written QAPs to be developed, implemented, and followed, but are only required to be submitted upon request by the executive director. Any modifications or alternatives to the monitoring requirements or methods specified in the rule must still be approved by the executive director. Any such requests must be specifically approved in written response from the TCEQ, and default approval will not occur. Owner or operators of affected facilities must comply with all requirements of the rules until any such site-specific request has been approved. This approach will allow the commission to adequately review and respond to modifications and alternative requests. This is more consistent with the current TCEQ procedures to address such requests regarding other TCEQ rule and permit monitoring requirements.

The LWV urge the TCEQ to purposefully and aggressively enact and enforce measures that will significantly improve the air quality for residents of our area.

The TCEQ will provide the resources necessary to fully implement and enforce this SIP.

GHASP commented that penalties for violations of the hourly limit and repeat offenders of a sitewide cap should be added to the TCEQ enforcement rules.

The current emission events rules in 30 TAC Chapter 101, subchapter f, contain adequate measures for enforcement of the HRVOC caps. Both the excessive emission event determination in § 101.222(a) and chronic emission event determinations of § 101.223(b) give the TCEQ the authority to address repeat offenders of the sitewide cap. The TCEQ has historically not included penalties in rules but rather has a policy as part of an enforcement program.

The TCEQ is currently in the process of conducting an enforcement process review which includes issues such as appropriate enforcement response to violations, timeliness of enforcement actions, corrective actions in enforcement actions, appropriate penalties, and adequate resources. Specific recommendations from the enforcement review process, including those regarding penalty policy, will be considered by the commission during several commission work sessions through calendar year 2004.

EPA requested TCEQ's views on how enforcement actions for exceedance of short-term limits for HRVOCs in the HGB area would differ from enforcement of other TCEQ rules. In particular, EPA asked what additional showings would a source have to make to show that it did not contribute to an exceedance of the NAAQS.

Enforcement actions for exceedance of HRVOC short-term limits do not differ from other enforcement actions, except as to how any violation is prioritized, and the TCEQ has established procedures to ensure a consistent approach to addressing violations. The TCEQ agrees that prioritization of enforcement of the rules that are part of the ozone SIP should be

one of its targeting strategies. The TCEQ is dedicated to fair, swift, and effective enforcement that will support the SIP, and enforces against violations of applicable commission rules.