

EVALUATION OF TESTIMONY

The commission held public hearings on proposed revisions to the SIP at the following locations: June 13, 2001, in Galveston; June 14, 2001 in Rosenberg and Houston; June 15, 2001, in Austin; and July 2, 2001 in Houston. The comment period closed on July 2, 2001.

The following twenty-one commenters submitted testimony on the proposal: City of Houston (Houston), Metropolitan Transit Authority (METRO), Greater Fort Bend Economic Development Council (Fort Bend EDC), U.S. Environmental Protection Agency (EPA), Transportation Policy Council (TPC), Port of Houston Authority (PHA), City of LaPorte (LaPorte), Houston-Galveston Area Council's Board of Directors (HGAC), HGAC's Regional Air Quality Planning Committee (RAQPC), Environmental Defense (ED), Galveston-Houston Association for Smog Prevention (GHASP), Sierra Club Houston Regional Group (Sierra-Houston), Business Coalition for Clean Air (BCCA), Business Coalition for Clean Air Appeals Group via Baker Botts (BCCAAG), Brazoria County District Attorney Jeri Yenne (D.A. Yenne), and five individuals.

Houston and BCCA commented that the lawn and garden equipment operating restriction is just as bad as the construction equipment operating restriction due to the disproportionate impact on small and minority-owned businesses as well as low income and minority workers. Houston urges that a strategy be included in the mid-course review to replace this rule. The Fort Bend EDC also requested the removal of this strategy from the SIP because the restriction is preempted by the FCAA. GHASP commented that the current proposal fails to correct any of the obvious problems with the commercial lawn equipment operating restrictions. GHASP commented that the rules are not in the best interest of public health, represent a significant environmental justice issue, and are likely to result in a public opinion backlash. GHASP commented that the commission should replace the rules with policies that assist lawn care companies to acquire and implement technologies that result in few emissions. BCCA commented that it believes the argument in the U.S. District Court ruling which preempted the commission from imposing the morning construction shift and the accelerated purchase requirements in the DFW also applies to the lawn equipment operating restriction rules and that the rules must be removed from the SIP.

The commission adopted the lawn equipment operating restrictions on December 6, 2000. No changes to that strategy were proposed with this revision to the SIP, therefore the commission is not able to act on any revisions to that strategy at this time.

Furthermore, the emission reductions from this strategy are part of the SIP to demonstrate attainment in the HGA area. The commission cannot remove this strategy unless it can be replaced with another strategy which obtains the equivalent reductions.

METRO requests that the guidance for the lawn and garden equipment operating restriction allow for flexibility for entities that engage the private sector through contractual arrangements and that those contracting entities also be allowed the opportunity to prepare a plan that can be enforced through the contract specifications.

The commission will take these comments into consideration as it finalizes the guidance.

One individual suggested that the commission look at the quality of the fuel used in the construction equipment and in lawn equipment because there are fuels which burn cleaner and improve the maintenance of the machinery. Another individual commented that the commission should do more research to develop cleaner burning fuels and build cleaner more fuel efficient vehicles.

The commission has no authority to regulate the efficiency requirements of vehicles. However, the commission has adopted regulations requiring cleaner fuels in all of the ozone nonattainment areas as well as throughout the east/central portion of the state.

BCCA commented that it believes EPA should give ozone nonattainment areas credit for emission reductions that would have occurred by their attainment deadlines if EPA had issued regulations controlling emissions from federally preempted sources in accordance with the scheduled mandated by the FCAA.

The commission agrees, as addressed in Chapter 7 of the SIP, that earlier action by EPA on regulating sources that the state is pre-empted from regulating would make a tremendous difference in the state's attainment demonstration efforts. However, the commission does not agree that it would be appropriate to take credit for regulations that have not been adopted.

One individual commented that the commission should do better on-site monitoring of the real sources of the pollution problem.

This comment has been forwarded to the appropriate divisions of the commission for their consideration as they evaluate this issue in the future.

GHASP commented that the commission must evaluate whether the proposed inspection and maintenance program will result in enough inspection stations. GHASP commented that the commission must develop a comprehensive plan for dealing with evasion through vehicle registration in counties where inspections are not required.

The commission did not propose any revisions to the I/M program as a part of this SIP revision, therefore no revisions can be made upon adoption of this SIP revision. The commission is currently proposing revisions to the I/M program in a separate rulemaking and these comments have been forwarded to the appropriate staff for their consideration.

METRO commented that the speed limit reductions should not include HOV lanes in order to provide additional incentives for vehicles to use these lanes. GHASP commented that adequate enforcement and public education as to the importance of the 55 mph speed limit are critical to its success. One individual commented that the commission should not use a 24-hour, 365-day a year blanket 55 mph speed limit to solve the ozone problem if the ozone problem is created by emissions during the morning. The commenter suggested that there are many other solutions, one of which is to reduce the speed limit during the rush hour only.

The commission did not propose revisions to the speed limit strategy as part of this SIP revision, however, these comments will be taken into consideration as the commission

continues to work with the appropriate agencies to implement the environmental speed limit strategy.

One individual commented that the regulations have been developed with models using inaccurate data and that the commission should not adopt any regulation that deals with mobile sources or that lowers any speed limit.

The commission adopted the speed limit reduction strategy on December 6, 2000. This strategy, along with all strategies dealing with mobile sources, is an important part of the attainment demonstration for the HGA area since mobile sources contribute a significant amount of the emissions in the area.

GHASP commented that it supports the agreements reached with Houston area airports and airlines to make local reductions, but calls on the commission to review implementation and pursue additional measures where feasible.

The commission appreciates the support. The commission will continue to pursue all possible measures through the mid-course review process in order to fill the remaining 56 tpd gap in emission reductions necessary to demonstrate attainment in the HGA area.

One individual questioned why the PremAir coating for vehicle radiators has not been pursued as a control strategy. The commenter suggests inducing vehicle owners to install new PremAir radiators by establishing a permanent 50% reduction in vehicle registration and licensing fees so vehicles so equipped will be able to afford this. The commenter further suggests that the commission investigate the practicality of spraying the PremAir catalyst on existing vehicle radiators.

The commission will take this suggestion into consideration as it continues to evaluate future enforceable commitment measures.

One individual commented that he was moving his family out of the state because there is nothing to indicate that people in Texas are interested in moving forward to address the air quality problems.

The commission disagrees with the statement that nothing is being done to address the air quality problems. As a result of the control strategies that have already been adopted and that are being developed, emissions of ozone precursors will be reduced in the HGA by more than 750 tpd.

METRO provided specific comments on the Texas Emission Reduction Program. D.A. Yenne requested a written response addressing how Senate Bill 5 will work and that the construction equipment operating use restriction rule will be repealed permanently.

The TERP program is being developed through separate rulemaking actions. These comments have been forwarded to the appropriate staff and will be answered during that rulemaking process.

One individual commented that there is not a single monitor in Fort Bend County and requested that one be put in near the power plant.

This comment has been forwarded to the Monitoring Operations Division for their consideration when any new monitors are considered in the future. Decisions about where to place monitors require evaluation by the commission of several factors, including but not limited to: the area in which the monitor should be placed in order to most accurately and effectively measure air quality, the security of the area in which the monitor would be placed (to prevent tampering) and costs associated with the deployment and operation of the monitor.

One individual requested that a public hearing be held in Brazoria County.

Due to fiscal and time constraints, the commission is not able to conduct public hearings in every area during every SIP revision. During the fall 2000 revision the commission did conduct a public hearing in Brazoria County. This year the commission intentionally tried to include areas that were not included in the fall, such as Rosenberg (where this comment was made) and Galveston. It is also important to note that there is no difference in how the commission views or weighs oral versus written comments. Therefore, all areas have an equal opportunity during every comment period to have their comments heard and addressed.

One individual commented that the commission needs to take action on full application and enforcement of the NSR regulations.

This comment has been forwarded to the appropriate divisions of the commission for their consideration and evaluation.

One individual commented that the commission should limit all new highway construction in the Houston area.

The commission does not oversee or make any decisions regarding when new highway construction occurs. However, there is a transportation conformity process in place to address construction and air quality issues through the implementation of motor vehicle emission budgets which must be met.

One individual commented that the commission should achieve demonstrable reductions of fugitive emissions by 90% or more.

The commission adopted fugitive monitoring rules, §§117.352 - 117.359, on November 10, 1993, which achieve such reductions in VOC emissions. These rules apply to petroleum refineries; synthetic organic chemical, polymer, resin, or methyl tert-butyl ether manufacturing processes; and natural gas/gasoline processing operations, and are estimated to have a control efficiency greater than 90%.

The Fort Bend EDC commented that more public participation would be achieved if better notification and more detailed information of the agency's plan were included in the public notice.

The commission posted the complete text of each of the rules and the SIP narrative on its web site along with summaries and public hearing information. A public hearing notice was also published in the *Houston Chronicle* 30 days prior to the hearing date. The notice included references to the web site as well as a contact name and phone number for people to call for more information or to obtain hard copies of any of the information.

Fort Bend EDC also encouraged the commission to continue its negotiations with BCCAAG. Houston commented that the commission should continue the collaborative process with regional stakeholders as the mid-course review process proceeds.

The commission intends to continue working with all affected stakeholders as it continues to work through the SIP for the HGA area.

Sierra Houston commented that the commission has repeatedly mentioned that the HGAC has implemented “a voluntary regional initiative to reduce vehicle trips,” however the commission never tells what this initiative is and how successful it has been.

The commission disagrees with this comment. Included as part of the RACM analysis for mobile source emissions (see Table 7.3-5), the commission has included a description of the types of programs HGAC has put in place, as well as the reductions those strategies will achieve.

Sierra Houston commented that EPA’s 7/16/98 guidance on extension of attainment dates for downwind transport areas is in error and that the commission, with EPA’s acquiescence, is illegally allowing both the BPA and DFW nonattainment areas additional time to reach attainment.

The commission disagrees that it has incorrectly or illegally interpreted EPA’s guidance. EPA has proposed approval of the DFW SIP and has adopted the BPA SIP, both of which include the transport arguments. However, it should also be noted that the BPA and DFW areas were not the subject of the current SIP revision.

Sierra Houston commented that the commission has ignored public comments outside of RAQPC and has done little to ensure that RAQPC really serves a public participation function.

Not only is it required by law, but it is the commission’s policy and intent to address all comments that it receives whether they are from the general public or a specific entity. The commission is one of many participating members of RAQPC, however, the commission in no way oversees or makes decisions on behalf of the group.

Sierra Houston and one individual commented that the commission has failed to propose all rules that will clean up Houston’s air by 2007 as required by the FCAA. Sierra Houston commented that the commission promised EPA and the public that this would be done by July 31, 2001, now the commission says it will not have all final clean air rules ready until 2004. ED commented that the proposed May 30, 2001 SIP revision is weaker than the SIP submitted to EPA in December 2000. ED further commented that it does not believe that the December 2000 SIP can be approved by EPA due to the lack of modeled

attainment demonstration and the lack of sufficient adopted, enforceable measures to achieve attainment. GHASP commented that the FCAA requires the commission to adopt a plan that demonstrates that Houston will attain the air quality standard for ozone by 2007, but the December 2000 plan and this current proposal fail to meet that standard.

The HGA area needs to reduce emissions by more than 750 tpd in order to demonstrate attainment of the 1- hour ozone standard. Through the December 2000 revision and this current revision to the SIP, the commission has already adopted strategies to reduce emissions by more than 700 tpd. Strategies to address the additional reductions necessary have already been identified in the enforceable commitments outlined in Chapter 7 of the current SIP revision. As stated in that chapter, the commission commits to identifying and adopting control strategies to fill the remaining gap in emission reductions necessary and to demonstrating attainment in the HGA area by 2007. The commission has worked very closely with EPA to assure that the approach the commission is taking will result in an approvable SIP. EPA has already, through parallel processing, proposed approval of this revision to the SIP.

BCCA commented that it believes the proposed SIP, in conjunction with legislation recently passed by the 77th Legislature, represents a significant improvement over the SIP revision adopted on December 20, 2000.

The commission appreciates the support.

GHASP commented that it would prefer a SIP which emphasizes reductions in all precursors to ozone, which aims now at meeting the new federal 8-hour air quality standard as well as the 1-hour standard, and which addresses public health, regional growth, transportation, and land use.

The commission agrees that reductions in other ozone precursor emissions are necessary in order to demonstrate attainment. Through previous SIP revisions the commission has adopted and implemented significant VOC reduction strategies. Although the focus is currently primarily on reducing NO_x emissions, the commission stated in the December 2000 SIP that an approximate 25% reduction in VOC emissions would be necessary in addition to any NO_x reductions to demonstrate attainment. Many of the strategies adopted in December 2000 and the strategies currently being considered will result in reductions of NO_x, VOC, and PM emissions.

Sierra Houston commented that the gap is probably closer to 80-100 tpd; that emissions have been underestimated and modeling has overstated emission reductions; and that additional VOC reductions of at least 50% are also needed to reduce upset related high ozone readings. ED commented that evaluating the entire, adopted control strategy with photochemical modeling using unbiased modeling inputs would result in an even larger shortfall than the 56 tpd estimated in the SIP. GHASP commented that its review of the adopted and proposed measures in the plan result in a projected gap of at least 94.5 tpd and that the commission should direct its staff to develop additional measures and programs in the short term to achieve at least 94.5 tpd in NO_x or an equivalent amount of VOC emissions. GHASP commented that the following reductions will need to be added to the 56 tpd gap: 3.4 tpd from clean diesel fuel; 4.6 tpd from the lawn equipment operating restrictions measure which cannot be implemented; 20 of the 23 tpd

from VMEP measure which GHASP commented will not be achievable; and .5 tpd from the federal energy efficiency measure which was overestimated at 3.57 tpd for a total of 84.5. GHASP also commented that an additional 30 tpd should be added to the gap once the commission corrects inaccurate air quality models, but that 20 tpd could be removed from the gap for the estimated benefits of the TERP program and the enforceable commitments, creating a new gap of 94.5 tpd.

The commission disagrees that the gap needs to be increased. The commission believes that the shortfall, as currently calculated, represents a reasonable approximation of the amount of additional NO_x reductions required to reach attainment. The commission is not aware of any systematic biases in the modeling inventory, although preliminary findings of the TexAQS research indicate that the VOC inventory may be understated. If these findings prove to be true, then the commission will modify its modeling inventory before the May 2004 mid-course review submittal and determine an appropriate strategy to reach attainment by 2007.

Furthermore, as described in Chapter 7 of the SIP, the mid-course review process will ensure that the HGA area demonstrates attainment by 2007. The commission has also acknowledged in Chapter 7 of the SIP that if, during the mid-course review process, it is determined that more or fewer reductions are necessary, the commission will submit the revised reduction calculation to EPA for approval. The SIP revision submitted by May 2004 will also account for any additional reductions, should they be necessary.

GHASP commented that the commission should acknowledge that the Houston area's transportation plans fail to reduce per capita VMT and that if the plan included sufficient measures to reduce VMT, significant emission reductions could be obtained.

The Houston area's transportation plan is the responsibility of HGAC, not the commission. The commission works closely with HGAC to incorporate TCMs into the SIP. As described in the RACM analysis for mobile source emissions, the commission has determined that an adequate level of TCMs have been implemented and included in the SIP at this time. The commission will continue to work with HGAC to evaluate the implementation of additional measures for future SIP revisions.

BCCA and ED resubmitted their September 25, 2000 comment letters concerning rulemakings and the associated SIP revision which were adopted by the commission on December 6, 2000, while BCCAAG incorporated by reference the September 25, 2000 BCCA comment letter. BCCA and ED had initially submitted these comment letters during the comment period for these previous rulemakings and associated SIP revision. BCCAAG also resubmitted a September 25, 2000 comment letter from Enterprise Products Operating L.P. (Enterprise) concerning rulemakings and associated SIP revision which were adopted by the commission on December 6, 2000. Enterprise had initially submitted this comment letter during the comment period for these previous rulemakings and associated SIP revision.

The comments in the BCCA, ED, and Enterprise comment letters dated September 25, 2000 were addressed in the ANALYSIS OF TESTIMONY sections of the preambles to these earlier rulemakings and SIP revisions which were published in the January 12, 2001 issue of the *Texas Register*.

Sierra Houston referenced, but did not submit, 24 letters, two memoranda, and one paper dated from August 2, 1999 through February 23, 2001 which it reported as being information previously submitted to the commission. Sierra Houston requested that this information be considered during the current rulemakings and SIP revisions. One individual referenced but did not submit previous letters addressing Houston SIP issues.

Sierra Houston and the one individual did not identify the relationship between its previous submissions and any rulemaking or SIP revision for which it had previously submitted the referenced 24 letters, two memoranda, and one paper. Consequently, it is unclear whether this information had been submitted during the comment period for previous rulemakings and SIP revisions, and if so, which ones, or whether this information had been submitted in a manner unrelated to proposed rulemaking, and if so, the project(s) for which the information was submitted in order to allow the commission to locate the information. If Sierra Houston and the individual submitted this information during the comment period for previous rulemakings and SIP revisions, then it was addressed in the ANALYSIS OF TESTIMONY section of the preambles to the earlier rulemakings and SIP revisions which were published in previous issues of the Texas Register. If, however, Sierra Houston and the individual had not submitted this information during the comment period for previous rulemakings and SIP revisions, then it is unclear how the commission is to respond to this information without having this information available during the comment period for the current rulemakings and SIP revisions.

Sierra Houston commented that the commission needs to provide an emissions budget now for mobile and industrial sources that is accurate and includes all emission reductions required to meet the ozone standard by 2007. Sierra Houston and one individual commented that the motor vehicle emissions budget provided in Chapter 2 is deficient at least 30 tpd. ED noted that it maintains its position that the attainment MVEBs for 2007 contained in the SIP are legally inadequate because the budgets do not come from an adequate attainment demonstration and for other reasons discussed elsewhere.

The commission disagrees that it has included inaccurate budgets in the SIP. However, as stated in Chapter 7, if during the mid-course review process the commission adopts any additional control measures which will affect the budgets, it will concurrently adjust the budgets and submit them to EPA as a revision to the SIP.

GHASP supported the proposed changes to the motor vehicle emissions budget that clarify the region's responsibility to develop a transportation plan that reduces those emissions to no more than 156.6 tpd of NO_x by 2007. ED supported the commission's inclusion of rate-of-progress motor vehicle emissions budgets for 2007 of 156.7 tpd of NO_x and 79.5 tpd of VOC. ED commented that these are appropriate ROP budgets because they reflect the expected emissions inventory for on-road mobile sources in 2007, considering the implementation of all applicable state and federal emission control requirements.

The commission appreciates the support.

EPA commented that the 2005 and 2007 ROP tables need to be updated to reflect the proposed revised NO_x emission limits for electric utility boilers and the proposed revised compliance deadlines.

The commission agrees and has made the revisions to the tables.

Sierra Houston commented that the reductions on page 5-1 do not demonstrate attainment as required by the attainment SIP which should have been submitted on November 15, 1996.

The ROP process was developed to ensure that areas made continued progress toward achieving the ozone standard. ROP is not intended per se to demonstrate attainment; rather, photochemical modeling is the tool specifically required to show that the ozone standard will be attained. In fact, the commission's modeling has shown that merely meeting the required 3% ROP reductions per year (or 48% from 1990 to 2007) would not be sufficient for HGA to demonstrate attainment. The commission agrees that the final attainment SIP was not submitted to EPA by November 15, 1996. The SIP introduction, starting on page I-1, provides an exhaustive discussion of the events leading up to the state's current attainment demonstration efforts.

Sierra Houston also pointed out the fact that Table 5.1-1 shows that point sources make up 59.13% of the NO_x emissions and Table 5.1-1 also shows point sources make up 64% of the NO_x emissions.

The 59.13% figure is from the 1990 ROP nonattainment area base year emissions inventory. The 64% figure is from the 2002 adjusted base year emissions inventory. It might appear that the point source contribution grew over those years. In reality, reductions from non-road and on-road sources were much greater than reductions from point sources for this timeframe. Therefore, the point sources made up a greater percentage of the overall inventory in 2002. Subsequent tables show that point source reductions catch up to and exceed ROP by 2005.

GHASP commented that the ROP plans need to be revised to be consistent with the budgets listed in Chapter 2. For example, the required NO_x reduction for the 2005 to 2007 period is more than 6% per year.

The 2007 attainment demonstration MVEB of 156.6 tpd NO_x contained in Table 2.9-2 differs from the 2007 ROP on-road mobile source budget of 189.17 tpd NO_x obtained from Tables 5.1-9 and 5.1-10. This discrepancy is expected, since the methodologies used to prepare the respective budgets are different. Specifically, the attainment demonstration MVEB is obtained from the 1993 on-road mobile source modeling inventory projected to 2007, to which the on-road control strategies are applied. The ROP budget, on the other hand, is obtained by starting with the 1990 adjusted base year on-road mobile source emissions inventory and applying growth, RVP and fleet turnover corrections, and federal controls to arrive at the projected 2007 inventory. The 2007 ROP budget was changed to 156.6 tpd to match the 2007 attainment demonstration MVEB as a result of settlement agreements. The procedure used to calculate ROP is specified by EPA, and cannot be modified to make the ROP budget conform to the attainment demonstration MVEB. At any rate, the more restrictive attainment demonstration MVEB now applies as the 2007 ROP budget.

EPA commented that the commission should clearly document in the final adoption how the TERP program will achieve ozone benefits equivalent to those that would have been achieved through the construction equipment operating restriction and accelerated purchase of tier 2/3 equipment rules.

The commission agrees and has included this documentation in Chapter 6 of the SIP.

Sierra Houston commented that Table 6.1-1 shows that the emissions inventory (point source inventory subject to revision) is not complete.

The footnote with this table states that the point source portion of the inventory is subject to revisions. Values are provided in the table, and the table is complete.

Sierra Houston commented that the commission lists measures, on pages 6-2 and 6-3, whose effectiveness cannot really be determined, such as speed limit reductions, energy efficiencies, and vehicle idling restrictions. Sierra Houston commented that these reductions look good on paper, but provide emission reductions that will not occur. Additionally, the commission lists measures such as the construction equipment operating restriction and lawn and garden equipment operating restriction which do not reduce emissions but simply allow those emissions at a different time of day. Sierra Houston commented that these emissions will still act to form ozone and will provide additional residual precursors for land/sea breeze circulation for the next morning of ozone formation.

The commission disagrees with the comment that no emission reductions will occur from the types of control measures that Sierra Houston has identified. As with any control measure, the commission will continue to evaluate the effectiveness of the measures as they are implemented to determine if adjustments need to be made. The construction equipment operating restriction has since been removed from the SIP. Regarding the lawn and garden equipment restriction, the commission acknowledges that re-circulation occurs and can be a factor in escalating daily ozone levels in Houston. As re-circulation occurs, emissions are brought back into the HGA area on a daily cycle depending on meteorological events such as a land/sea breeze. As this cycle occurs daily, the time of day of the emissions makes little difference on whether the contaminants will be returned on the subsequent day.

GHASP commented that it supports rules requiring reductions from grandfathered pipeline facilities in the eastern half of Texas. One individual commented that the commission needs to take action on the requirement that grandfathered plants get emission permits with emission limits that are applicable to new construction as of June 2001 and that these be enforced by July 2004.

The commission appreciates the support. The commission's Office of Permitting, Remediation, and Registration is taking action by implementing a program, per the requirements of HB 2912, to address the permitting of grandfathered facilities.

Sierra Houston, ED, and GHASP commented that the commission should not adopt measures relaxing requirements for reductions in point sources while there is still a gap in the attainment demonstration. ED commented that the SIP should reflect a commitment to fill any remaining shortfall in emission reductions before relaxing any previously adopted SIP rules. Further, if at any time the commission

proposes to remove or modify a strategy from the December 2000 SIP, it should simultaneously provide a replacement strategy that achieves an equivalent reduction in ozone levels to prevent the SIP from moving further away from attainment. ED also commented that any demonstration of equivalence should be quantitative and based on photochemical modeling. ED expressed concern about the commission's intention to use the results of the scientific evaluation as the basis for reducing the amount of emissions to be achieved by industrial point sources from 90% to 80%.

The existing NO_x emission specifications for attainment demonstrations (ESADs) for both utility and non-utility boilers are technically feasible, as discussed in detail in the ANALYSIS OF TESTIMONY section of the preamble to the Chapter 117 rulemaking which was published in the January 12, 2001 issue of the *Texas Register*. The revised ESADs for utility boilers in §117.106(c) were developed by BCCAAG as part of the "Consent Order" submitted to Judge Margaret Cooper, Travis County District Court, in the lawsuit styled BCCA Appeal Group, et al v. TNRCC, as described earlier in this preamble. The Consent Order specifically provides that the "Executive Director may propose . . . the Alternate ESAD Selection Rule, which shall consist of either (1) a rule confirming the . . . 80% Option, or (2) a rule establishing revised ESAD requirements for covered point sources that are different than either the 80% Option" or the ESADs in §117.106(c)(5) and §117.206(c)(1) - (17). Until the scientific assessment is completed in the spring of 2002, it cannot be known if the alternate ESADs will even be implemented and, if implemented, what level of alternate ESADs will be supported by the assessment. If these or other ESADs, or other additional rulemakings, are proposed, the commission will support that proposal with a fiscal analysis and modeling to support any changes to the HGA SIP and the rules in Chapter 117, all of which will be subject to public notice and comment. It should be noted that the existing utility boiler ESADs could be reinstated in the future if the commission determines that it is necessary for HGA to attain the ozone NAAQS.

The point source NO_x control strategy as adopted on December 6, 2000 had an associated NO_x emission reduction of 595 tpd. While the revisions to the point source NO_x rules are now expected to reduce NO_x by 586 tpd, the effect of this increase is counterbalanced by reductions enacted by the Texas Legislature requiring the permitting of grandfathered facilities in east and central Texas. The legislature requires certain grandfathered sources in this region to reduce emissions of NO_x by approximately 50%. The commission believes that the current rulemaking will provide similar air quality benefits to the December 6, 2000 SIP revision for several reasons. First, NO_x emissions in east and central Texas will be significantly lower overall under the current SIP than under the December 6, 2000 SIP revision. Second, ozone production efficiency at the sources affected by the recent legislation is expected to be very high, based on recently published results from an ozone study conducted in the Nashville, Tennessee area by the Southern Oxidant Study. Results from the Texas 2000 Air Quality Study indicate that ozone production at the Reliant Energy, Incorporated (Reliant) W. A. Parish power plant is three to five times lower than what is expected from the rural grandfathered sources. No data is currently available on ozone production efficiency at other Reliant units, but it is expected to be somewhat higher than that at the Parish facility. Third, the increased NO_x emissions will occur at peaking units, which generate most of their emissions in the

afternoon, at least during the ozone season. Modeling has shown that afternoon emissions are less important in ozone formation than are morning emissions.

The commission commits to adopt measures necessary to achieve at least 56 tpd of NO_x emission reductions in the HGA area above and beyond those reductions already identified by the control measures listed in Chapter 6, Table 6.1-2 of the SIP. Additionally, as the commission completes the mid-course review process, as outlined in Section 7.2 of the SIP, it may show that the HGA area needs more or fewer tpd of NO_x emission reductions for attainment by November 15, 2007. Should the scientific assessment and mid-course review show that more or fewer reductions are necessary, the commission will submit the revised reduction calculation to EPA for approval. The SIP revision submitted in May 2004 will account for those additional reductions above and beyond the 56 tpd commitment if the mid-course review shows they are necessary for attainment.

In any case, the revised ESAD is cost-effective in terms of cost per ton of NO_x compared to the ESADs in the December 6, 2000 SIP revision, and results in a very large reduction in emissions. Detailed modeling will be required to quantitatively assess the overall effect of these two compensating changes to the emissions inventory. The commission will address this issue during the first phase of the mid-course review.

GHASP commented that the SIP language and the form of the plan to consider the ozone issue and the review of the 90% reduction in industrial point emissions next year is unwarranted and will leave the plan even further behind.

The mid-course review process includes an examination of new information, technology, and science. A thorough evaluation of all modeling, inventory data, and other tools and assumptions used to develop the attainment demonstration has already begun. It will also include the ongoing assessment of new technologies and innovative ideas to incorporate into the plan. For example, if the science supports its development, the commission is committed to developing an enforceable plan to minimize releases of reactive hydrocarbon emissions and the emissions of chlorine. To the extent that the science confirms the benefit from this program, it is the intent of the commission to implement such a program through a SIP revision which will first offset NO_x reductions from industrial sources. Any revisions to the SIP must ensure that attainment can be reached.

The Fort Bend EDC, LaPorte, and the TPC suggested the following revisions to the language in Chapter 7, page 7-2 (of the proposal), regarding the motor vehicle emissions budget:

If the commission adopts additional control measures to reduce motor vehicle emission as a SIP revision, the commission will concurrently revise the motor vehicle emissions budget(s) for the SIP and submit such revised budget(s) to EPA as a revision to the SIP. However, this does not mean that the motor vehicle emissions budgets contained in this revision are not fully approvable, adequate and sufficient for transportation conformity purposes. With regard to on-road mobile source control measures, the state understands from EPA that only technology-related measures, such as I/M, cleaner fuels, and use restrictions/incentives may be included. Measures that could

limit future highway construction, such as growth restrictions, may not be included. Furthermore, none of the on-road mobile control measures identified in Section 7.5.1 of this (May 2001) SIP limit highway construction.

The commission agrees and has made the changes to the SIP language in Chapter 7.

The Fort Bend EDC further commented that since none of the on-road mobile control measures identified in Section 7.5.1 of the May 2001 SIP limit highway construction, the motor vehicle emissions budgets in Section 2.9 are consistent with timely and expeditious attainment and adequate for conformity's purpose of preventing new or worsened violations.

The commission concurs with this statement.

Sierra Houston commented that the commission is using EPA's incorrect guidance that states that limiting future highway construction and growth restrictions cannot be included in the SIP.

The commission disagrees with this comment. There is a transportation conformity process in place to address construction as it relates to air quality issues through the adoption of motor vehicle emission budgets which must be met. Any questions Sierra Houston has regarding whether EPA's guidance is correct should be addressed to EPA.

HGAC and RAQPC commented that the commission should consider and outline the impact of any adopted measures on existing mobile aspects of the SIP and other requirements of the FCAA. Specifically, prior to adopting any further mobile source controls, the commission should work with HGAC to consider the scope and timing of the measures to determine if they affect any motor vehicle emissions budget used for transportation conformity. Additionally, several measures being considered as enforceable commitments are currently included in the SIP as part of the VMEP program.

The commission agrees and will continue to work with HGAC and RAQPC as any future mobile source strategies are evaluated and adopted as part of future SIP revisions.

BCCAAG commented that it supports the commission's commitment to further evaluate the science of ozone formation.

The commission appreciates the support.

GHASP commented that the commission should direct its staff to take immediate steps to develop measures determined to be effective in controlling so-called ozone spikes.

The commission is currently studying the rapid formation of ozone to determine if measures can be developed. This information will be included with the Phase I portion of the mid-course review SIP revision which is scheduled to be proposed in June 2002.

HGAC and RAQPC support the commission's short-range (2002) plan to "build the science" to support the attainment plan including evaluating the role of chlorine, the effects of large episodic emissions from

upsets, and enhancing the meteorological model. HGAC and RAQPC also support the commission's call for EPA to accelerate adoption of emission controls for federally pre-empted measures.

The commission appreciates the support.

HGAC and RAQPC support the commission's long-range (2004) program to "incorporate the science" and conduct a mid-course review including modeling of additional episodes. To the extent it is consistent with enhancing the attainment plan's science, HGAC and RAQPC encourage the commission to complete and submit its Phase II SIP revisions prior to May 2004.

The commission appreciates the support.

HGAC and RAQPC support the statement in the SIP that the "commission prefers technology-based solutions to activity-based or lifestyle changing regulations." Further HGAC and RAQPC suggest that prior to adopting activity-based or lifestyle-changing regulations, the commission should give consideration to using incentive programs that would accomplish the objectives and produce the same results. Activity-based regulations have the potential of creating economic injustice issues and their impact on different segments of our society must be considered.

The commission appreciates the support. The commission also agrees and has stated that it would prefer to adopt incentive-based, or technology-based programs instead of activity-based or lifestyle-changing programs whenever possible.

HGAC is interested in more closely coordinating with the commission in developing future revisions to the SIP. Coordination and consultation among the commission, HGAC, and RAQPC will translate to good coordination with local governments, citizens, industry, and environmental organizations in the HGAC region.

The commission agrees and is currently working with HGAC staff to develop a work plan which will enhance the coordination between the agencies as the commission continues to develop future SIP revisions.

HGAC requested that the commission participate with and assist RAQPC's Enforceable Commitments and VMEPs Subcommittee as it works to develop knowledge and understanding in preparation to make intelligent decisions for the mid-course adjustment.

The commission staff has already begun participating in RAQPC's subcommittee activities and will continue to do so.

Houston commented that the gap should be 75 tpd not 56 tpd because of the proposed repeals of the construction equipment operating restriction and the accelerated purchase of tier 2/3 equipment rules. Houston commented that the mid-course review process should be revised to include a strategy to replace these repeals and that the mid-course review should include a specific goal and strategy to achieve an additional 30-40 tpd emission reduction from the TERP program by 2007.

The reductions that would have been achieved through these two rules will now be achieved through the TERP program. Therefore the gap does not need to be adjusted to reflect reductions associated with those rules. Background information on the TERP Program is included in Chapter 6 of the SIP. A description of the elements of the TERP Program is included in Chapter 7 of the SIP.

Sierra Houston commented that the Mobile Source Tunnel Study was previously listed in the May 9, 2001 SIP proposal but was removed from the May 30, 2001 SIP proposal without any explanation.

The commission agrees that this item should not have been removed without explanation. It was an oversight that this item was deleted as it was the commission's intent to move this item from the Phase I issues to the Phase II issues. This item has been added to the Phase II Modeling items in Table 7.7-1 of the SIP.

Sierra Houston questioned why the commission supports "robust economic growth" if it means more air pollution. Sierra Houston further questioned why the commission does not emphasize growth that increases quality and not quantity, or why the commission does not emphasize growth that reduces air pollution.

The commission strives to protect the state's human and natural resources consistent with sustainable economic development.

ED suggested the following revisions to various portions of Chapter 7:

The Commission commits to adopt measures necessary to achieve at least 56 tpd of NO_x emission reductions in the HGA area, above and beyond the emission reduction measures contained in the December 2000 SIP. The Commission further commits to submit to the EPA adopted rules as SIP revisions, achieving at least the 56 tpd of NO_x emission reductions as expeditiously as practicable, but not later than May 2004.

The commission agrees with the intent of this comment and has modified language in Sections 7.1 and 7.6 of the SIP with similar language.

To demonstrate short-term progress toward that the 56 tpd commitment, the Commission commits ~~intends to evaluate the following measures and~~ to adopt, by November 2002, sufficient measures in order to achieve at least 25% of the ~~estimated~~ 56 tpd needed.

The commission agrees and has revised the language in Section 7.6 of the SIP. The commission has also added language which explains that this commitment will be fulfilled through the adoption of the TERP Program.

The implementation of the measures achieving the 56 tpd of NO_x emission reductions will be as expeditious as practicable but not later than the beginning of the ozone season 2007. To demonstrate short-term progress toward that commitment, the Commission commits to have at

least 14 tpd of additional reductions, above and beyond the emission reduction measures contained in the December 2000 SIP, in effect no later than March 1, 2003.

The commission disagrees that these revisions are necessary. This commitment has already been clarified in Section 7.1.

The Commission commits to replace any measure(s) removed from the December 2000 SIP with alternative measures that achieve equivalent reductions on a similar timeframe. The Commission commits to include such replacement measure(s) in the same SIP revision that removes December 2000 measure(s). Such replacement measures shall not be considered to contribute to the 56 tpd reductions promised as enforceable commitments.

The commission disagrees that this additional language is necessary. The mid-course review process, as outlined in Chapter 7, allows for the opportunity to incorporate the latest information and make decisions based on the evaluation of all modeling, inventory data, and other tools and assumptions used to develop the attainment demonstration.

The Commission commits to submit a SIP revision with a full attainment demonstration no later than May 1, 2004 that shows attainment will be achieved by November, 2007 on the basis of photochemical modeling of the full control strategy. The attainment demonstration SIP shall include adopted control measures necessary to achieve attainment consistent with § 172(c)(1) and (2), and an adequate Motor Vehicle Emissions Budget consistent with 40 CFR § 93.118(c).

The commission disagrees that this additional language is necessary. The SIP already clarifies the commitment to submit a SIP revision to EPA by May 1, 2004 which shows that attainment will be achieved in the HGA area by November 2007, including the necessary controls measures and MVEB.

Should the May 2004 attainment demonstration SIP ~~mid-course review~~ show that more than 56 tpd of reductions are necessary to achieve attainment, the May 2004 SIP revision submitted in May 2004 will include adopted measures that produce the necessary account for those additional reductions, above and beyond the 56 tpd commitment.

The commission disagrees that these revisions are necessary. The SIP, as written, adequately explains the commission's commitment to make the appropriate adjustments, if necessary, in the form of a SIP revision to EPA.

EPA commented that the commission should document for the record that relaxing controls for electric utility generators from 93.5% to 90% still remains RACM for these sources. EPA also commented that if, as described in the Chapter 117 revisions, the commission develops additional proposed rulemaking and an additional revision to the SIP to implement alternative NO_x emission rates for point sources, the commission will have to demonstrate as part of that SIP revision that the new level of control is still RACM for point sources. Finally, EPA commented that the commission should document that a RACM level of control is being instituted for glass plants since the one significant source in the inventory has now been issued a permit requiring oxygen firing.

The commission agrees with the comments regarding RACM for electric utility generators and for glass plants. Language has been added to Section 7.3 to address these comments. Regarding any additional future rulemaking, the commission will take this comment into account if such a rulemaking does occur.

Sierra Houston commented that the commission is incorrect when it states that the Houston area has initiated a broad range of TCMs since many have not been implemented.

The commission is relying on the implementation schedule as HGAC has outlined it in their TIP, which has gone through the public comment process.

Sierra Houston commented that it had previously submitted recommendations to the commission on how to reduce VOC emissions by tightening up present rules. ED commented that the commission's RACM analysis omitted measures that are clearly reasonably available, such as greater use of economic incentives, VOC control measures, and 15 ppm sulfur gasoline.

The commission's focus with this attainment demonstration has been on a NO_x-based emissions reduction strategy. The commission has acknowledged that an additional amount of VOC reductions are also necessary, however, through the course of completing a RACM analysis for VOC measures, the commission is confident that a reasonable level of VOC controls have been implemented.

Houston commented that an effective compliance and enforcement strategy needs to be developed and included in the mid-course review process to ensure the effectiveness of the SIP, particularly regarding the vehicle idling restriction.

The commission agrees with this comment and will continue to develop an effective compliance and enforcement strategy as the mid-course review process is completed.

Sierra Houston commented that waiting until the mid-course review before deciding on control strategies and proposing rules is illegal. Sierra Houston commented that the commission was required by the FCAA to submit a SIP, by November 15, 1996, with all rules and a modeling demonstration that would demonstrate attainment. ED commented that it does not object to the use of a mid-course correction procedure to track the continuing accuracy and reliability of the modeling assumptions used to develop a SIP, but this procedure is not an acceptable substitute for submission by the State of a complete attainment demonstration based on a modeled demonstration of attainment that is based exclusively on enforceable control measure submitted as part of the SIP. ED further commented that it does not believe that EPA has the statutory authority to allow deferred submittal of control measures required for attainment, nor does EPA have authority to accept commitments to adopt control measures in the future in lieu of actual, current adoption of such measures (per the statutory mandates in §110, §172, and §181(a) of the FCAA).

The commission disagrees. As stated in Section 7.1 of the SIP, "EPA has recognized that in some limited circumstances, it may be appropriate to issue a full approval for a submission that consists, in part, of an enforceable commitment. Unlike the commitment for conditional

approval, such an enforceable commitment can be enforced in court by EPA or citizens. In addition, this type of commitment may extend beyond one year following EPA’s approval action. Thus, EPA may accept such an enforceable commitment where it is infeasible for the state to accomplish the necessary action in the short term.”

BCCA commented that it supports the use of enforceable commitments as outlined in the May 2001 proposal.

The commission appreciates the support.

ED suggested modifications to the form and content of the enforceable commitments to add certainty to the process. ED suggested that the commission adopt “strawman” measures, in place of the currently proposed, more vague commitments, that add up to a certain number of tons per day. For each measure the commission should include the manner by which the reductions will occur, the amount of reductions expected, and a projected schedule for final adoption and implementation of each measure. The commission should then commit to implementing each measure, unless a finding is made that the measure is infeasible and the needed reductions could be achieved by adopting another measure.

The commission disagrees that these revisions are necessary. As ED pointed out in their comments, a finding could be made that a measure is infeasible and that the needed reductions could be achieved by adopting another measure. A finding could also be made that a measure obtains a much greater level of reductions than anticipated and that therefore another, less beneficial measure may not be necessary. The commission will continue to evaluate all measures using the best information available at that time to determine which are the most beneficial, cost-effective measures that should be implemented. It would not be beneficial or necessary to modify the form and content of the commitments until the best information is available.

ED urged the commission to add a new section to consolidate all of the enforceable commitments in the SIP. The Commission should state explicitly that language in this new section will be controlling over the remainder of Chapter 7. ED suggested the following text:

The following table contains the enforceable commitments submitted by Texas for approval by EPA as part of the attainment SIP for the Houston-Galveston ozone nonattainment area. The schedules for performing the actions as described in this Table are intended by the State to be relied upon by EPA for the purpose of defining the tasks remaining to be performed to submit a SIP that will fully implement the requirements of §§110, 172 and 182 of the Clean Air Act, as amended. Texas acknowledges that the performance of these tasks are obligations of a SIP enforceable pursuant to §304 of the Act in addition to other remedies available to EPA.

The commission agrees that the enforceable commitments should be consolidated in the SIP and has added a new table at the beginning of Chapter 7. The commission disagrees that the additional language suggested is necessary, as the commitment to perform a mid-course review has already adequately been stated in the SIP.

GHASP commented that most of the enforceable commitment measures listed in Table 7.5-2 are speculative and that it is unlikely that emission reductions can be relied upon beyond the lower end of the range listed. GHASP commented that these measures will collectively result in no more than 20 tpd NO_x reductions.

The commission disagrees with this comment. The commission is continuing to evaluate these strategies, which is why they have not already been adopted. The commission's commitment to perform a mid-course review includes the commitment that should the mid-course review process show that more or fewer reductions are necessary, an adjusted shortfall calculation will be submitted to EPA for approval.

Houston commented that additional analysis needs to be completed by the commission to determine whether an Urban Heat Island/Cool Cities Program would help to reduce ozone in the Houston-Galveston-Brazoria Region. This should be completed as quickly as possible so that a related program may be implemented before 2007, if warranted. BCCA commented that it believes the urban heat island mitigation concept may have promise for reducing ozone levels in the Houston area.

Heat island reduction measures are fundamentally different from other kinds of control strategies. In the past, anthropogenic emissions were singled out as the only factors affecting ozone that could be controlled. The heat island reduction strategy hypothesizes that ozone can be controlled by changing the physical characteristics of the city. It is likely that the ambient temperatures in a city can be decreased by altering the reflectiveness of urban surfaces, and by planting many trees. By lowering temperatures, a decrease in electricity consumption may be expected during the ozone season.

The commission has and will continue to actively work with the scientific community, including the Center for Energy and Climate Solutions to develop a better understanding of this issue and answer basic scientific questions. The answers to these questions will provide the best evidence and science for accurately modeling the benefits. This information will be peer reviewed by leading scientists and EPA for appropriateness of calculations. The commission is involved in several projects that will help with this process. The goal is to have these measures included in the mid- course review modeling scheduled for 2003.

BCCA commented that if science progresses to the stage where mitigation strategies can be demonstrated to reduce ozone levels, these strategies must be removed from this section of the SIP, at least in part, to enable market forces to fund them. BCCA requested the addition of language to the SIP that allows for this type of market-based incentive program for urban heat island and other strategies.

The commission feels that all types of energy efficiency measures need to be reviewed and have therefore been included in the SIP for further consideration. Once the commission determines what type of program to consider, the commission will determine the best approach to incorporating those strategies into the SIP.

PHA commented on the diesel NO_x reduction system strategy listed in the enforceable commitments. PHA commented that since the time the SCR project was included in the SIP, the status of this project

has changed. PHA also notes that the extreme cost per unit makes this control technology uneconomical (although potentially viable with the support of a grant program like Senate Bill 5). PHA stated that the testing results are scheduled to be available in Fall 2001 and will be shared with the commission at that time.

The commission appreciates PHA's information regarding the status of the strategy. The commission will continue to work closely with PHA as its testing results become available, to analyze the results and to consider the future direction of this measure.

PHA commented on the fuel cell strategy listed in the enforceable commitments. PHA commented that there have been several significant changes to this project including: the cost is now estimated at \$3 million, a container ship is being evaluated instead of a cruise ship, and the potential emission reductions from this project are not quantifiable at this time. Since the \$3 million budget has not been secured at this time, PHA recommends that this project be removed from the SIP. PHA also notes that the cruise industry is addressing air pollution by using new engine technologies, including extremely low emission diesel propulsion engines, as well as the turbine-electric propulsion system that have a significant benefit to nonattainment areas like Houston. PHA will work with the commission to ensure proper inventory credits for the area when they arrive in Houston.

The commission appreciates PHA's information regarding the status of this strategy. The commission disagrees that this strategy should be removed from the SIP at this time as all measures should remain included for further evaluation. The commission will continue to work closely with PHA and other entities to determine the best direction for this measure.

PHA expressed concern about the expansion of the commission's presumed regulatory authority (regarding the dockside emissions strategy) into an area that is currently under the authority of national and international bodies. PHA is unaware of any other state that has asserted this authority and believes that the action has important ramifications for international trade and inter-port competitiveness.

The commission has proposed rulemaking (Rule Log Number 2001-002-116-AI) which corrects the definitions of "building, structure, facility or installation" and "secondary emissions" as defined in 30 TAC §116.12 and §116.160. This change eliminates the inconsistency between the commission's rules and the rules promulgated by the EPA on August 7, 1980 concerning the inclusion of marine vessel emissions in applicability determinations for Prevention of Significant Deterioration and nonattainment (NA) permits. This proposal also revises §116.160 and §116.162 to incorporate updated federal regulation citations. Sections 116.12, 116.160, and 116.162 are being submitted to the EPA as a revision to the Texas state implementation plan. The amendment implements the Texas Clean Air Act, §§382.002, 382.017, 382.051, 382.0518 and Texas Water Code, §5.103 and §5.105. Using this statutory and regulatory authority, the commission will continue to evaluate the ability to implement additional controls in the future.

Sierra Houston commented that it opposes incentives that allow HOV lanes to be used by alternatively fueled vehicles because emissions are not reduced to the same extent as if a person rides a bus or other vehicle.

The commission was given the authority to incorporate this concept into the SIP through SB 5. To the extent that the commission has not taken credit for this concept as a part of the TERP program, the commission will continue to consider this strategy as part of the additional control measures commitments.

Sierra Houston questioned why marine loading emissions have not been reduced already since that should have occurred at least 10-15 years ago.

In the August 7, 1980 version of 40 CFR Part 52, the EPA included vessels emissions at docks in federal permit applicability determinations. In the June 25, 1982 revision to its rule, the EPA reversed this interpretation and excluded all emissions from vessels on the basis of the vessels being mobile sources. The Natural Resources Defense Council (NRDC) disagreed with the change and sued the EPA on this issue. The federal court found in favor of NRDC, vacated the portions of the June 25, 1982 rules excluding emissions from vessels, and mandated that EPA revise the rules. The EPA has not made the changes, but the court order supercedes the language in the current federal register. These rule revisions are needed to correct the definitions in the state rules to accurately reflect current practices and to correct some out-of-date references to federal regulations. The commission's efforts to pursue reductions from these activities would be above and beyond measures that are already in place.

Sierra Houston supports a stringent diesel I/M program at a centralized facility that is implemented as soon as possible. Sierra Houston also supports the reduction of dockside emissions.

The commission appreciates the support.

BCCA commented that it supports the development of a federal program to provide financial incentives towards the retirement and recycling of pre-1988 commercial diesel trucks and that such a program would augment the provisions in the TERP program to accelerate the reduction of emissions and fuel consumption of these vehicles.

The commission agrees and appreciates the support.

ED commented that this SIP revision and future SIP revisions should not weaken the December 2000 HGA SIP. If at any time the commission proposes to remove or modify a strategy in the December 2000 SIP, then it should simultaneously provide a replacement strategy that achieves an equivalent reduction in ozone levels. The demonstration of equivalence should be quantitative and based on photochemical modeling. ED does not believe the qualitative argument presented by the commission about the offsetting benefits of grandfathered pipeline facilities to be adequate. ED is particularly concerned that the substituting emission reductions from pipeline facilities will not occur inside the 8-county nonattainment area.

The modeling staff plans to conduct quantitative photochemical modeling early next year of an August/September 2000 episode. This modeling will evaluate the effectiveness of the new requirements for the grandfathered pipeline facilities and determine what, if any, shortfall exists at that time. If additional measures are required to demonstrate attainment, then the

commission will include them in a future SIP revision not later than the 2004 mid-course review.

ED recommended the following language additions for the SIP:

The Commission commits to remodel the September 1993 episode with a number of enhancements and submit the results in a SIP revision no later than November 30, 2002. The Commission further commits to complete all the tasks listed in Table 7.3-1 and/or described in Section 7.3.

Building the Science - Phase II

The Commission commits to develop at least two new episodes and perform additional enhancements to those performed in Phase 1. The Commission specifically commits to complete all tasks in Table 7.4-1 and/or described in Section 7.4 or Section 7.2 (to the extent that items in Section 7.2 were not part of the Phase I process). The Commission further commits to include at least two modeled episodes that meet EPA performance criteria in the May 2004 SIP revision.

The commission believes that, for the SIP revision projected to be submitted in late 2002, the primary modeling effort should be directed toward the 2000 episode. The commission believes that prioritizing the 2000 episode makes most sense because of the availability of field data from the Texas 2000 Air Quality Study that will enhance the science involved in the modeling. However, should model performance for the 2000 episode not meet EPA requirements, the 1993 episode will be remodeled with enhancements, and will be submitted to EPA by November 30, 2002. Should model performance for the 2000 episode be acceptable, the 1993 episode modeling with enhancements will be submitted by the spring of 2004, which is in accordance with the schedule contained in the current SIP revision.

The projects listed in Table 7.4-1 and/or described in Section 7.4, were developed with input from stakeholders and the scientific community. As the knowledge of ozone formation in Houston is advanced there will be every effort made to use these enhancements in the photochemical modeling process. As stated in the SIP, the agency has selected a 2000 episode and two 1998 episodes to model for inclusion in the mid-course review submission.

ED commented that as a general concern, it believes the SIP should include a commitment to review and revise its VMT mix as part of the Phase I process. As stated in September 2000 comments, ED believes there are substantial deficiencies with this portion of the mobile emission inventory.

The commission agrees that the current local VMT mix data will require review for application with the MOBILE6 emissions model. In the past, the vehicle classification data collected from TxDOT has been converted into the eight vehicle types used by the MOBILE5 emissions model. Based on latest information available from EPA, the MOBILE6 model will report CO, NO_x, and VOC emissions by up to 28 vehicle types. Consequently, the current VMT mix based on eight vehicle types will require review in order to determine the appropriate VMT mix data inputs for the greater vehicle type resolution of the MOBILE6 model.

ED commented that it is pleased that the commission plans to undertake a scientific evaluation of ozone “spikes” in HGA. ED believes that reducing emissions of reactive hydrocarbons during upsets and other non-routine emissions events would be an important component of an effective attainment plan for HGA. GHASP applauded the commission for determining that “Stakeholders have expressed their belief that the (ozone spike) phenomenon is caused by episodic releases of highly reactive VOCs.” Some believe that major industrial sources are occasionally releasing major amounts of toxic chemicals into the air (upsets) triggering dramatic increases in ozone smog as well as creating an immediate and direct health risk to the public. The relationship between upsets and ozone episodes has been widely known for years; the time for the commission to study and propose regulations to address these releases is long overdue. Houston commented that it supports the commission’s efforts to determine the impacts of industrial upsets, chlorine, routine non-uniform emissions and the potentially highly reactive nature of NO_x and VOCs from point sources in the region so that appropriate policies may be implemented within the next two to three years before the 2004 mid-course correction.

The commissions’s scientific evaluation of ozone”spikes” will seek to address all possible causes of these events to include reactive hydrocarbons during upsets and other non-routine emissions events. Several activities are underway: to further characterize day to day levels of VOC emissions in the ship channel area; to compare monitored VOC levels with reported emissions inventories; and to study point source flares and “upsets.” These additional data gathering activities should provide better answers for addressing ozone smog in Houston. The Technical Analysis Division staff is on an accelerated time table to gather as much scientific knowledge on impacts of industrial upsets, chlorine, routine non uniform emissions and highly reactive VOCs. The commission is using stakeholders from the Houston area as well as national contractors to work on specific projects so that the best science can be used to implement new policies and/or strategies.

ED expressed concern about how the ozone spike study will be designed and the commission’s stated intentions about how the results will be used. ED requested the following considerations:

- Engage the public, especially communities adjacent to major industrial corridors, in the study, Residents of these communities should offer a unique perspective on the nature, timing and impacts of upset releases.
- Include a focus on the direct health impacts of upset releases (due to human exposure to emissions of known air toxics), in addition to the planned evaluation of their impact on ozone spikes
- Include an evaluation of the cumulative impacts of upset releases, both on the region’s ozone levels and community health due to exposure to air toxic emissions.
- Consider the impact of NO_x emissions formed during the flaring associated with non-routine emissions events.

ED welcomed the opportunity to participate in the design and execution of the study.

The commission welcomes the participation of ED in the Houston-Galveston Air Quality Science evaluation. Mr. Ramon Alvarez has been designated as a member of the steering committee and will be able to make recommendations for membership on several sub working

groups that are being formed to deal with various aspects of the study. The Texas Air Quality Study 2000 project has provided a rich data set for the state to focus on the HGA ozone problem. At this time, the focus is not on air toxics. The goal is to provide as much analysis as possible on an accelerated time table to provide the Commission with sufficient information to make a decision on SIP revision for 2002. The commission will hold bi-monthly meetings on the study. All meetings will be advertised on the commission's web site and through other e-mail groups.

GHASP commented that the commission should include representatives of the public of its review of air quality models, particularly aspects related to "ozone spikes" and the impacts of chlorine chemistry on air quality. GHASP formally requests to be kept fully updated on opportunities to review progress and comment on the actions outlined in Tables 7.3-1 and 7.4-1.

The commission is making efforts to involve representatives from many groups in its technical review process. Through the agency web page, citizens are invited to join the Houston/Galveston Photochemical Modeling Technical Committee and to participate in the technical work groups of the Interim Science Committee. Currently GHASP receives notification of the monthly photochemical modeling meetings and conference calls of the work groups.

One individual commented that there is a need to do away with computer modeling and go on strict scientific data for the implementation plan.

Photochemical modeling is the methodology approved by EPA for demonstrating attainment in the state plan. The commission believes that the TexAQS2000 study provides one of the richest scientific data sets ever collected in the Houston area. This data will lead to great improvements in future photochemical modeling and strategy development.

Sierra Houston and one individual commented that the commission's air quality modeling must demonstrate that the ozone standard can be met. No weight of evidence manipulations must be allowed. Sierra Houston commented that the tables on page 7-5 and 7-6 do not show attainment of the ozone standard by modeling. It is illegal for the commission to not have an attainment model run for the attainment SIP.

A methodology for demonstrating attainment using a gap calculation was provided in a 1999 EPA Guidance document. The intent of this document was to provide areas a means to show attainment without additional modeling. The particular gap methodology used in HGA was developed by EPA Region VI specifically for HGA region, since the methodologies proposed in the Guidance were not applicable to the case in HGA. The commission accepts Region VI's methodology as a valid means of demonstrating attainment of the ozone standard.

The commission has included several Weight-of-Evidence arguments in both the 1998 and 1999 SIP revisions which point toward the HGA area reaching attainment by 2007. In addition, a mid-course evaluation will take place by 2004 to determine whether or not the area is on

track to reach attainment. If the adopted strategy is found inadequate during the review, then additional measures to bring the area into attainment will be considered at that time.

Sierra Houston commented that the commission needs a more current land use map with forest coverage. Such a map needs to have forest ages, forest types, and the percentages of the forest that is being lost each year so that an estimate can be made each year of forest loss. The current information underestimates the forest loss that has occurred in the Houston area.

The commission agrees with the comments and is in the process of obtaining better land use maps and other satellite imagery data for use in future photochemical modeling.

GHASP commented that air quality modeling experts have represented to them that their evaluation of the commission's analysis suggests that about 30 tpd in additional NO_x reductions will be required to achieve attainment. The commission commits to complete its air quality model studies and analyses by October 31, 2003. A critical component of this analysis, the mobile source inventory is to be completed by December 31, 2002. An updated inventory is urgently needed for transportation planning purposes. They ask that the agency complete these two tasks earlier if at all possible and provide any information regarding any resource limitations that prevent an earlier completion date.

Due to the fact that the EPA's MOBILE6 emissions model contains the most recently available vehicle emissions data, the commission hopes to use it as the basis for future development of all on-road mobile source inventories. Unfortunately, EPA has not yet officially released MOBILE6, nor have they announced a firm release date. Until MOBILE6 is released, the commission cannot begin work on developing the detailed link-based inventories necessary for photochemical modeling of the HGA area. During the first six months of 2002, the commission would like to have MOBILE6 link-based inventories completed for an August 2000 episode, along with 2007 future case inventories for this episode. During the second six months of 2002, the commission hopes to have MOBILE6 inventories completed for two August 1998 episodes, along with 2007 future case inventories for both of these episodes. However, this projected schedule is based on an official release of MOBILE6 by September 1, 2001. The longer it takes for MOBILE6 to be officially released, the longer it will take to complete the link-based on-road mobile source inventories necessary for photochemical modeling of the HGA area.

One individual commented that the modeling being done offers no confidence limits or standard deviations showing how closely it applies to the real events. The individual also stated that according to the commission, of the five exceeding episodes the commission has studied, it failed to represent the events in four of them.

Developing confidence bounds on future modeling predictions is exceedingly difficult, and no generally accepted methodology for accomplishing this task exists at this time. EPA has provided no guidance on this issue, and indeed does not require states to develop confidence bounds for future predictions.

The commission always compares the base-case model with observational data to assure that the model replicates historical ozone episodes with an acceptable degree of accuracy (this comparison is documented in the December 6, 2000 SIP revision). However, in the future case, the base-case model prediction accuracy is further complicated with uncertainties in the predictions of emissions growth and the effectiveness of various types of controls. The commission welcomes constructive input regarding its modeling analyses, and invites any ideas for developing confidence bounds on future modeling predictions.

The commission has modeled five episodes for the HGA area. Four of the episodes that have been modeled have not been used in attainment demonstration. These episodes were:

October 10-13, 1991 was not suitable for attainment demonstration purposes because it significantly under-predicted ozone levels for every day except October 13, where it over-predicted observed ozone levels (no exceedances were recorded in HGA on that day). On each of the three days in which measured ozone did exceed the standard, the highest modeled peaks were all below 110 ppb, while measured peaks ranged from 150 to 240 ppb. In addition to severe under-prediction of peak ozone, the model showed unacceptably large negative bias and gross error statistics. Analyses of the time series and ozone isopleth plots confirmed the model's inability to reproduce the high measured concentrations of ozone seen on October 10-12. Additional details regarding the model's performance for this episode can be found in "Houston/Galveston Beaumont/Port Arthur Ozone Nonattainment Areas Base Case Report Performance Evaluation," September 1994.

August 18-20, 1993 was not used in the attainment demonstration because of poor performance on two days: August 19 and 20. While model performance on August 18 was good, this day had only a modest measured exceedance of 139 ppb, which was far below the 1993 design value of 200 ppb. The model significantly under-predicted peak ozone on both August 19 and 20. Modeled peak concentrations on these two days were, respectively, 152 and 149 ppb, compared with measured peak ozone concentrations of 231 and 187 ppb, respectively. The model under-predicted ozone in general on these days, as evidenced by unacceptably large bias and gross error statistics on these days. Analyses of the time series and ozone isopleth plots confirmed the model's inability to reproduce the high measured concentrations of ozone seen on August 19 and 20. Additional details can be found in the May 6, 1998 SIP revision.

Two other episodes were used in SIPs prior to 1994. Due to the age of the inventories and the uncertainties associated with the emissions inventories, the episodes were not carried forward for SIP development work.

GHASP further commented that its experts have estimated that the plan is another 30 tpd short in emissions reductions because of the air quality modeling program that is being used.

The commission is unable to address estimates from other sources without specific information being submitted with the comment. Furthermore, the commission frequently reviews emissions information from outside sources and will make recalculations as appropriate.

BCCA and BCCAAG commented that an analysis of ozone monitored data from 1990 to 1998 shows different types of ozone patterns in Houston, with some ozone exceedances reflecting daily gradual increases and decreases in observed ozone values (“typical ozone”). BCCA and BCCAAG stated that other ozone exceedances, however, result from the rapid formation of ozone that exceeds 40 ppb per hour (“spike ozone”). BCCA and BCCAAG stated that spike ozone, which is often responsible for ozone exceedances, has been observed at many monitoring points and under all types of meteorology and that the 90% reduction in NO_x emissions from point sources (adopted by the commission on December 6, 2000) will not control spike ozone or bring the HGA area into attainment. BCCA and BCCAAG stated that spike ozone requires a minimal amount of NO_x and emissions of very reactive compounds. For this reason, BCCA and BCCAAG advocated a two-part attainment strategy, to address two separate causes of ozone exceedances. As the first part of this strategy, BCCA and BCCAAG suggested that the commission use its current photochemical model to design control strategies for exceedances resulting from typical ozone. BCCA and BCCAAG stated that the commission should then address exceedances resulting from spike ozone by proposing “best management practices” for controlling reactive VOC emissions; completing a scientific assessment and evaluation of key chemical compounds and/or other causes of spike ozone; and adopting rules for controlling reactive VOC emissions.

As part of a court ordered Consent Decree, the commission’s technical analysis staff will provide to commission management written findings on the following by February 28, 2002: analysis of rapid ozone formation events versus “normal” events; whether these events can be controlled with different strategies; any alternative design value based on “normal” ozone; and any alternate NO_x reductions from point sources, concurrent with substituted emission reduction strategies designed to reduce rapid ozone formation.

Unfortunately, it is difficult to routinely observe the rate at which ozone is formed but instead one can only observe the rate of change in ozone concentration seen at monitoring sites. These two quantities are of course related, but there are important distinctions between them. Furthermore, there are several competing terminologies which are often used interchangeably to describe the various phenomena associated with rapid ozone formation. The commission is attempting to work with scientific experts to propose definitions which help to standardize the discussions of rapid ozone formations and clarify the distinctions between it and ozone “spikes.”

A series of accelerated science and technical projects carried out by contract to evaluate the data from the TexAQS 2000 period, with improved inventories and other information, will provide the commission with the best science to date for making decisions for SIP revisions. In order to propose replacement of the current NO_x ESADs, the commission must reach a sufficient understanding of the cause and effect of ozone formation events and must identify control strategies which are technically sound, sufficiently quantifiable, and readily implementable. Future control strategies may include best management procedures for control of VOC emissions.

In January 2001, BCCAAG and others filed suit against the commission challenging the December 6, 2000 SIP revision for HGA and five of the ten sets of rules associated with that SIP revision. As part of that lawsuit, the plaintiffs sought a temporary injunction to stay the effectiveness of these five sets of rules

and for the commission to withdraw the SIP from EPA consideration. A hearing on this request was held before Judge Margaret Cooper, Travis County District Court, Texas, on May 14 - 18, 2001. Before that hearing was completed, an agreement in principle was reached to settle the lawsuit, and a Consent Order was entered by Judge Cooper which includes certain specific items included in the SIP revision and rules in Chapters 101 and 117 proposed by the commission on May 30, 2001 (see the June 15, 2001 issue of the Texas Register (26 TexReg 4380 and 4400, respectively)). In support of its position that certain testimony in that hearing establishes the infeasibility of the NO_x reduction and that the air dispersion modeling used by the commission is not reliable, BCCAAG submitted the transcript from the hearing as comments on these proposals. Although the hearing was not completed before a settlement in principle was reached, the hearing transcript included testimony from BCCAAG's witnesses as well as the commission's witnesses, and therefore presents both sides of, or two different opinions on, some of the issues. Many of the documents introduced as exhibits in the hearing predate the rule changes and SIP revision proposed by the commission in the June 15, 2001 issue of the Texas Register and do not specifically address these rule changes and SIP revision. In addition, BCCAAG submitted as comments its First Amended Petition in the lawsuit and BCCA's comments from the earlier SIP, both of which were created before the settlement in principle was reached. While BCCAAG supports the substitution of new ESADs and other rule language from the Consent Order, it is not clear as to what other specific changes to the SIP and rules should be considered in this adoption in response to these particular comments.

BCCAAG commented that the testimony of several photochemical modeling experts, including Dr. Harvey Jeffries, Dr. Tom Tesche, and Cyril Durrenberger (formerly employed by the commission), casts serious doubt on the reliability of the modeling used by the commission in developing the SIP. Without reliable modeling, the commission lacks a sound scientific basis to support mandating a 90% reduction, with its significant adverse economic effects. A copy of the transcript from the May 1, 2001 temporary hearing on the Case is Exhibit A.

Following is the commission's detailed responses to the testimony of Dr. Jeffries, Dr. Tesche, and Mr. Durrenberger.

Dr. Harvey Jeffries testified that chemists within the commission knew at least a year before that "spikes" in Houston contributed to the problem.

The memo that Dr. Jeffries refers to was the result of more than 2,000 hours of staff time and approximately \$30,000 in modeling assistance from a contractor attempting to discover the exact cause of the October 7, 1999, 251 ppb reading at a monitor in the Houston area. Several hypotheses were considered, but no conclusion was drawn from the data available to commission staff. Reports of upset conditions were reported in the area over which the air parcel probably traveled, but the amounts reported as spilled were not sufficient to cause the large increase. The WordPerfect file name is "Houston, October 7, 1999. The study continued well into 2000. After it was reported to management that staff had been unable to find a cause and effect relationship with the data available, work continued on the project as time allowed.

Preliminary results of the Texas 2000 Air Quality Study and further analysis of meteorological patterns in the eight-county area as well as anecdotal information by the BCCAAG may offer insight into the causes of the rapid increase and decrease in ozone formation. Among the

possible explanations are: (1) inaccurate emissions from point sources. Aircraft monitoring indicates the ratios of expected chemicals in the air are vastly different from the monitored readings and inventory reported. (2) ozone production from NO_x emissions from industrial sources in the Houston area produce 9 to 12 times as much ozone as industrial plant sources in other areas. (3) the wind shifts directions almost hourly in the area. The average wind direction on 60 high ozone days from 1997 to 1998 indicates the wind shifts almost hourly in a clockwise progression. During 120 low ozone days during the same period, the winds were stronger and blew out of the area to the North, Northeast or Northwest. (4) there may be some instances when source plumes line up and pass over a monitor with a certain wind direction. A faster or slower wind may delay the plume from passing over the monitor, so chemistry may be at different stages on different days. (5) there may be chlorine chemistry involved that may make plumes more reactive. (6) very reactive VOCs may be present that results in rapid ozone formation

Dr. Jeffries testified that only a two-part strategy will attain the ozone standard.

There are plans and analysis underway to determine if the two-part strategy referred to by Dr. Jeffries will be effective in reducing ozone in the HGA area.

Dr. Jeffries testified that in a photochemical model there are observations that tell you what was actually present at the time the event happened and you have the prediction from the model. The model did not do a good job of representing ozone in the HGA area. The modeled prediction of high ozone occurred 50 miles away from the actual monitored reading.

The observed data is from ozone monitors in the area that continuously monitor ozone and report five-minute and hourly averages of ozone. Due to the variability that you have in any machinery, the observation could be plus or minus a small amount. Thus, one cannot assert that the observed data was actually the highest amount of ozone in the area, however, it is a good representation of what happened. The statements regarding model performance were answered in the December 2000 SIP. In addition, the EPA guidance document recommends looking at the complete suite of data and not judge performance on one or two selected monitors. Generally, scientists recognize that the photochemical model averages emissions across grid cells each of which are four square kilometers, thus the argument that the ozone predicted is not correct, is not valid. In fact, the model under predicted ozone levels in the 1993 episode. The Croquet (predicted high ozone) site is a site that records high ozone in many ozone episodes in the HGA area. From 1998 through 2000 the Croquet monitor experienced about 36 events greater than the 125 ppb standard.

Dr. Jeffries testified that he was not sure what the modeling domain for the modeling presented in the Houston SIP.

The modeling domain utilized for the Houston SIP extends to the west to Amarillo, north in Oklahoma, includes portions of Missouri, to the east to Georgia, and south over the Gulf of Mexico. The HGA area and the BPA area were included in the fine-grid (4 km grid cells) domain. Performance statistics were calculated for BPA and for the HGA area. Each area was

analyzed separately. This information was included in the December 2000 SIP and in previous SIPs.

Dr. Jeffries testified that his recommendation is to investigate potential causes of large short-term ozone spikes, using model sensitivity tests to determine if these are emissions or meteorology related.

Data collected during the Texas 2000 Air Quality Study and recently reviewed by commission staff and Dr. Jeffries, among others, indicates that both emissions and meteorology are different from our previous understanding. It must be noted that the emissions could be controlled but the meteorology moving the air parcels cannot be controlled. Staff will continue to analyze data and fine tune models to more accurately replicate ozone events in the area. More details on the commission's plans may be obtained in the December 2000 SIP.

Dr. Jeffries testified that the statistical and graphical performance on September 8th was not good. He stated that no supporting documentation was provided for this analysis and he disagreed with a commission document stating performance was good. He continued by stating that his analysis indicated the peak prediction was located at the wrong place - 30 to 35 miles away.

As explained in the December 2000 SIP, the entire suite of information should be reviewed. The modeling submitted meets the EPA's performance criteria. Further study indicates that high ozone is frequently observed at the Croquet location. The commission has not been provided any information that would indicate that improvements could be made to the model. In fact, Croquet experienced ozone greater than 125 ppb about 36 times for 76 hours between 1998 and 2000 this is more frequent than Deer Park, with 34 occasions.

Dr. Jeffries testified that it is unusual for states to have private websites for data that cannot be accessed.

The web site referred to by Dr. Jeffries was used as a file drawer for work in progress or for work that had not been quality assured. The commission's contractor, MCNC maintained a web site that was accessible to the public, although password protected. The password was used to make sure the web site stayed up. Too many simultaneous hits can cause web sites to "lock" and deny access. The commission also maintains a public web site that contains SIP documents.

Dr. Jeffries testified that the model does a good job explaining normal ozone with the normal inventory and that the model would show very good agreement without the spikes at the vast majority of stations. The model, according to Dr. Jeffries would show close to attainment without spikes.

As stated in the December 2000 SIP, the model performance meets EPA standards. Through the years, the modeling has been peer reviewed by Earth Tech. Numerous improvements to the photochemical modeling and emissions inventory have been made in 1997, 1998, 1999 and 2000. All of these improvements are discussed in depth in previous SIP documents. A close examination of the monitored data indicates that ozone at Smith Point on September 8 was beginning at noon and continuing until 4:00 p.m. The monitoring data also indicates a gradual

rise and a prolonged stay before diminishing in the late afternoon and evening. Most scientists would argue that this pattern is not a spike. In fact, the only day that appears to have a spike is September 11th. September 11th was not the controlling day.

Dr. Jeffries testified about an increase of 72 ppb in ozone during one hour followed by a one-hour decrease of 79 ppb.

Preliminary results of the Texas 2000 Air Quality Study and further analysis of meteorological patterns in the eight-county area as well as anecdotal information by the BCCAAG may offer insight into the causes of the rapid increase and decrease in ozone formation. Among the possible explanations are: (1) inaccurate emissions from point sources. Aircraft monitoring indicates the ratios of expected chemicals in the air are vastly different from the monitored readings and inventory reported. (2) ozone production from NO_x emissions from industrial sources in the Houston area produce 9 to 12 times as much ozone as industrial plant sources in other areas. (3) the wind shifts directions almost hourly in the area. The average wind direction on 60 high ozone days from 1997 to 1998 indicates the wind shifts almost hourly in a clockwise progression. During 120 low ozone days during the same period, the winds were stronger and blew out of the area to the North, Northeast or Northwest. (4) there may be some instances when source plumes line up and pass over a monitor with a certain wind direction. A faster or slower wind may delay the plume from passing over the monitor, so chemistry may be at different stages on different days. (5) there may be chlorine chemistry involved that may make plumes more reactive. (6) very reactive VOCs may be present that results in rapid ozone formation.

Dr. Jeffries testified that he used “a change to the value that was greater than 40 ppb. That is the largest possible change the model can produce” to describe an ozone spike.

Further analysis of the September 1993 episode indicates the model, without modification, produced a change of 45 ppb. It is anticipated that changes to the emissions inventory, chemistry, or meteorological inputs could increase ozone changes.

Dr. Jeffries testified that 106 one-hour values with a 40 ppb spike occurred between 1990 and 1998 and should not be considered.

EPA has not provided a mechanism to disallow using actual monitored data that might contain spikes in determining compliance with the National Ambient Air Quality Standards nor has EPA provided a mechanism to disallow spikes from control strategies or attainment demonstrations.

Dr. Jeffries testified that all of the highest values in the September 1993 episode were caused by spikes. According to Dr. Jeffries, the commission’s analysis indicates the spike frequency was highest during the September 1993 episode than during other times in Houston.

The commission disagrees with Dr. Jeffries’ theory. The biggest monitored ozone concentration on September 10th occurred at Galveston (162 ppb), but the largest one-hour

increase in ozone concentration at Galveston that day was 30 ppb. Dr. Jeffries proposed definition of “spike” would clearly not classify this event as being one. Also, while the maximum observed ozone on September 8th at Smith Point (214 ppb) does appear to fit almost any definition of “spike,” at the nearby Seabrook monitor ozone levels remained above 170 ppb for six hours that day, with three consecutive hours over 200 ppb (peak ozone was 208 ppb). This latter event might be classified as an ozone “plateau,” but certainly does not fall under any suggested definition of a “spike”.

Dr. Jeffries testified that the design value for HGA should be about 164, rather than about 200. By using the “Jeffries spike definition,” the commission simply has to demonstrate attainment from 164 to 124.

EPA has not provided a mechanism to disallow using actual monitored data that might contain spikes from attainment demonstrations.

Dr. Jeffries testified that he conducted a series of analysis that attempted to correlated meteorological variables to spike and the frequency of spikes. He concluded that there was no correlation between meteorological factors and ozone spikes.

The commission appreciates this information and urges Dr. Jeffries and BCCAAG to share this information to help the commission in its efforts to improve the accuracy of its modeling. The information will also be shared with the numerous scientists involved in the Texas 2000 Air Quality Study.

Dr. Jeffries testified that based on tests in his smog chamber that chemistry can produce 400 ppb of ozone given the “right materials,” so the chemistry is OK. He concludes that the problem is emissions of some kind and most likely are very reactive VOCs present in a very narrow plume.

Recent preliminary information by researchers involved the Texas 2000 Air Quality Study indicate very reactive emissions may contribute to high ozone foundation in the Houston area.

Dr. Jeffries testified that there was a special effort during the COAST study to collect episodic data but then uses inventories that are developed on an annual basis and then averaged over 360 days.

The commission uses as much actual information, such as CEM data, as possible. Mobile source inventories are developed using day specific inventories. If Dr. Jeffries has information that will improve the inventories that have been used in the past, he is urged to share the information with the commission.

Dr. Jeffries testified that the Houston, October 7, 1999 document written by Dr. Jim Neece, a commission employee, showed that the commission was aware of the spike problem and did not disclose it.

The commission disagrees. The document referred to was not written on October 7, 1999. It was written several months later after a lengthy attempt to explain the extremely high ozone event in Houston on October 7, 1999. Commission staff spent over 2,000 hours and a contractor, MCNC, attempted to model the event and failed. The analysis attempted to

evaluate and incorporate reported upsets and extensive analysis of possible wind trajectories to determine where the air parcel traveled. At the end of the process, there was no understanding of the actual cause of the high ozone reading. The "Houston, October 7, 1999" is a word processing file name.

Dr. Jeffries testified that he agrees with Dr. Neece's theory that the Houston ozone problem has three components (1) a generic problem, similar to most cities; (2) meteorology, geography and industry and (3) ozone spikes which are caused by unknown emissions or chemistry unique to Houston.

The commission agrees that Houston has the problems outlined by Dr. Neece. In looking at the Dallas area, which had the best model performance of all episodes modeled by the commission, the amount of reduction of NO_x required to meet the standard is approximately 60%. At the time of the commission's modeling of DFW, there was a modeled prediction that was higher than any previously monitored information. A year later, a monitor located near the modeled maximum had a reading slightly higher than the modeled prediction. Since the Houston and DFW areas have similar populations one could assume that the generic problem is correctly outlined. The meteorology, geography, and industrial complex are unique. The rapid formation of ozone appears to be unique to Houston. If you consider the similarities in the population and vehicle counts in DFW and HGA, you could assume that the airshed could accept the same amount of NO_x, approximately 320 tons. The Texas 2000 Air Quality Study will increase the commission's knowledge of the causes of ozone in the area.

Dr. Jeffries testified that based on a July 2000 e-mail from commission employee, Pete Breitenbach, to Dick Karp of EPA, the commission sought to avoid selecting episodes with spikes.

The commission had many discussions with Mr. Karp about selecting episodes for future modeling. The memo in question followed a series of discussions on the appropriateness of including or excluding spike events from performance evaluation. The issue was not resolved. In July 2000, as the special study was initiated, there was information available that lead the commission staff to believe that the additional information that would be available would help address the replication of rapid increases in ozone.

Dr. Jeffries testified that the commission has a NO_x reductions only strategy.

The Commission has adopted both NO_x and VOC control strategies as part of the comprehensive plan to reduce ozone levels in Houston. The 2000 SIP included VOC reductions from previous rules and from anticipated improvements in motor vehicles.

Dr. Jeffries testified that in the September 6-11, 1993 episode there were two types of ozone spikes (1) 15 hours above 125 that had an increase of 40 PPB or more and (2) 6 hours below 125 that had an increase of 40 PPB or more. The model did not reproduce any of these events.

The model was able to replicate increases of 44 ppb. The commission believes that using the correct emissions and meteorology in the model would result in accurately replicating those events.

Dr. Jeffries testified that the commission had seven different episodes and none of them had acceptable performance.

As explained in the December 2000 SIP, the entire suite of information should be reviewed. The modeling submitted meets the EPA's performance criteria. Further study indicates that high ozone is frequently observed at the Croquet location. The commission has not been provided any information that would indicate that improvements could be made to the model. In fact, Croquet experienced ozone greater than 125 ppb about 36 times for 76 hours between 1998 and 2000 this is more frequent than Deer Park, with 34 occasions.

Dr. Tesche testified about a 1991 EPA guidance document that referred to a document Dr. Tesche prepared that was included in the EPA Guidance document "Guideline for Regulatory Application of the Urban Airshed Model." Dr. Tesche discussed portions of the document that he wrote and that in his opinion the commission did not follow.

A review of the 1991 EPA guidance document reveals that the paper written by Dr. Tesche, P. Georgopoulos, F. L. Lurmann and P.M. Roth Improvement of procedures for Evaluating Photochemical Models, Draft Final Report, California Air Resources Board, Sacramento, CA was in fact, included as a reference. However, the document presented to the Court was the "final report," which was not included in the guidance document as a reference. There are some differences between the two documents. Both Dr. Tesche and Mr. Durrenberger participated as working group members that helped developed the guidance document. Mr. Durrenberger was involved in the selection, evaluation and modeling of the September 1993 HGA episode. The commission did follow appropriate guidance and, as stated in previous SIP revisions, the model performance meets the appropriate criteria.

Dr. Tesche testified in particular that, the commission had done little diagnostic investigation of the September 1993 HGA episode and only did that by looking at changes to the emissions inventory, particularly biogenics.

As stated in previous SIP revisions, extensive diagnostic investigation of the September 1993 episode was conducted by the commission. The commission developed a 3-D animation of the September 1993 that has been shown at numerous meetings of scientists. Extensive tile plots were provided to the Technical Review Committee during the years that this episode has been developed and modified. Changes that have taken place throughout this time are emission inventories, such as the improved inventory numbers from the construction industry. Another change was the use of a new model to develop biogenic emissions. A survey of the types of biogenic emissions sources in the HGA area resulted in modeling emissions in the correct places. Shipping emissions from in the Intercoastal Waterway and Ship Channel were elevated to duplicate the emissions coming from the ship's stack. These are just a few of the modifications that have been made to improve the model's accuracy. The SIP modeling narrative and appendices focus on things that have changed since the previous submittal and do not include previous analyses.

Dr. Tesche testified about a February 5, 1998 ozone attainment demonstration SIP that was being proposed to EPA.

It is important to note that the document to which Dr. Tesche referred was a draft document and was not a SIP that was being proposed to EPA.

Dr. Tesche testified about the seven episodes for SIP development. The commission then eliminated five of the seven episodes, leaving August 18 to 20, 1993 and the September 8 through 11, 1993 as potential episodes for future SIP development.

Dr. Tesche's statement can be misleading. Two of the episodes were selected for the Beaumont/Port Arthur area and should not be considered in the number of episodes used for SIP development for the HGA area.

Dr. Tesche testified about the commission's lack of preparation of quantile plots and scatter diagrams which were required by the 1991 guidance document.

The commission did produce and review quantile plots and scatter diagrams. However, the development of sophisticated software and more computing power available in the past nine years allows the computer to complete a great deal of the quality assurance of documents through the use of color tile plots, animation, and comparison of time series. Extensive review of the use of quantile plots indicated that they did not add to the knowledge of how well the model performed, especially after more advanced techniques were used.

Dr. Tesche testified that in a June 17, 1997, letter to EPA the commission stated that "Due to poor model performance on September 8th, only the period September 9th through the 11th will be used in preliminary (emphasis added) assessment modeling. The letter also included a number of time series. Dr. Tesche described the Croquet site as having a modeled high of around 149 ppb and at Smith Point as having a modeled prediction of about 135 to 140 ppb and the observed concentration of 214 ppb. Dr. Tesche then stated that these days would fail the unpaired peak accuracy test.

The emphasis was added to the word preliminary to indicate that in 1997 the commission concluded that September 8th did not meet EPA performance criteria. Changes to the model after June 17, 1997, previously discussed in SIPs in 1998, 1999 and 2000 did improve and meet EPA performance criteria. It is important to note that EPA's definition of the unpaired highest-prediction accuracy test is to quantify "the difference between the highest observed value and highest predicted value over all hours and monitoring stations." The acceptable range is 15-20% (plus or minus). It is clear that the guidance document anticipates the model to most likely under predicting ozone and that the location might not be exact. Because emissions are averaged over each grid cell and millions of data entry lines would have to be perfect, it is highly unlikely that anyone will ever have an exact match of the monitored value and exact location of the measured ozone.

Dr. Tesche testified that because the September 8, 1993 episode was later included in the model (because of a negative 13.1% unpaired highest-prediction accuracy) the Croquet modeled prediction of 190 ppb (up

from around 145 or 150 ppb) meets EPA performance criteria. Dr. Tesche concluded that the performance statistic is good, but that the model cannot be relied upon at the Croquet location and thus the commission got the right answer for the wrong reason.

As explained in the December 2000 SIP, the entire suite of information should be reviewed. The modeling submitted meets the EPA's performance criteria. Further study indicates that high ozone is frequently observed at the Croquet location. The commission has not been provided any information that would indicate that improvements could be made to the model. In fact, Croquet experienced ozone greater than 125 ppb about 36 times for 76 hours between 1998 and 2000 this is more frequent than Deer Park, with 34 occasions.

Dr. Tesche testified that the high peak now modeled at Croquet means that control strategies have to work even harder to reduce the high modeled ozone. Dr. Tesche rationalized that there is no acceptable explanation for changes made to the model to produce the new acceptable statistics.

The information that Dr. Tesche utilized indicated the Croquet modeled prediction is 190 ppb, however, the observed high on September 8, 1993 is 214 ppb at Smith Point. The Croquet modeled prediction is 24 ppb less than the actual monitored high at Smith Point. The primary change made to the model between 1997 and 1998 was the use of regional modeling to set boundary conditions for the base case. Prior to that date, the commission used EPA defaults and a very limited amount of monitoring data for the base case boundary conditions, but the commission was using boundary conditions derived from regional modeling for the future case. The change was made to improve the consistency between the future and base cases. It was coincidental that the modeling enhancements improved model performance on September 8th.

Dr. Tesche testified about the September 8, 1993 controlling day and his concerns about the differences in the monitored and modeled peak and their location.

Actually, September 10, 1993 was the controlling day for this episode and would require slightly more controls than September 8. However, September 10, 1993 was a weekend day. Thus, traffic patterns were different. In the December 2000 SIP, the commission used September 8 as the controlling day since it was more representative of high ozone events in the Houston area.

Dr. Tesche testified that in his work in California, California has cautioned against using model predictions along the coast versus those that were far inland, because the modeled predictions were responding to different cause and effect relationships along the coast versus near the mountains.

The commission concurs with Dr. Tesche's assessment. California has mountain ranges near the coast that provide a substantially different meteorology and emissions mixing pattern than the flat coastal area in the HGA area. The difference in geography in the California and Texas coasts would indicate that different analysis would be appropriate.

Dr. Tesche testified that localized emission sources produce very rapid chemical reactions and generate high localized urban concentrations, sometimes referred to as spikes. Dr. Tesche stated that overall

statistics can cancel out each other, implying that the localized concentrations could skew the analysis. Dr. Tesche produced a quantile plot that separated the domain into two parts; an eastern part where the model tended to underpredict, and a western part where the model tended to overpredict and then concluded that the model does not perform well.

The model performs within EPA standards. The BCCAAG submitted a theory in November 2000 that using selected data would indicate no further reductions are needed for the HGA area to be in attainment. Data can be produced in many different ways to support many different views. However, to fully evaluate the model one should use the entire suite of information available. The reader is also reminded that EPA's guidance document cautions comparing model predictions with observed values. The model output represents one-hour average concentrations but the air quality data represent points with various sampling periods. The testimony provided by Dr. Tesche and Dr. Jeffries differs in the distance between the Smith Point monitor and the Croquet monitor, with one asserting 30 to 35 miles and the other 45 miles. It is quite easy to draw a line between the two monitors and reach a conclusion that the western half of the analysis area is overpredicted and the eastern half is under predicted. However, the simple fact remains that the model under predicted by 24 ppb the maximum ozone in the HGA area on September 8, 1993.

Dr. Tesche testified that the commission used gross assumptions such as relying on EPA performance criteria to review the September 8-11, 1993 model performance rather than quartile plots or subregion analysis. Dr. Tesche stated that the model had serious compensating errors and that the performance should have been a "show stopper." Dr. Tesche provided a sub-regional analysis based on an east domain with Galveston and a west domain with Houston and provided statistical analysis that fall outside of the EPA's standard. Dr. Tesche concluded that Houston subdomain fails the accuracy test on three of four days, and Galveston fails on September 8th. Dr. Tesche stated that the bias test was failed on September 9th in the Houston area and on the 10th of September in the Galveston area. Dr. Tesche stated that the gross error was failed on September 9th in the Houston domain. None of this information was reported in the SIP that was reviewed by Dr. Tesche.

The commission contracted with Earth Tech Technologies to perform peer review of the development of the model inputs used in the September 1993 episode. In addition, meetings were held with the Technical Review Committee, with EPA and with many modelers from other states where the modeling for Houston was discussed. At no time did any of the other modeling experts raise concerns that the performance was so bad that the episode should be discarded.

Dr. Tesche testified that subregional performance analysis can be useful in some cases, but is not recommended in the 1991 EPA Guidance for one-hour ozone. Since there is no guidance on the subject, sub-regions can be defined arbitrarily, leading to the possibility that parties could use this approach to hide compensating errors (or, alternatively, to artificially worsen model performance to eliminate targeted episodes). The commission obviously evaluates model performance across the modeling domain, but has chosen not to carve up the domain in some arbitrary fashion for the purpose of performing analyses of dubious utility. The commission instead considered the model results as a whole, using ozone isopleth

plots, time series, and video representations to compare modeled versus measured ozone both temporarily and spatially.

Dr. Tesche prepared a report “grading” modeling efforts by 15 to 18 areas in 1997 and 1998. No area received an A or B rating. The Houston area modeling received a C rating and score at or above average on 19 of the 21 categories evaluated. The commission’s modeling met EPA performance criteria. The same basic modeling has been submitted to EPA several times and performance has never been a substantial issue. In fact, a letter from EPA, signed by Robert Hanneschlager to Beverly Hartsock at the commission, dated March 20, 1998 states “The EPA’s review of TNRCC’s modeling conducted in support of this attainment demonstration found the modeling to have been technically conducted according to EPA procedures and recommendations. In fact, for some technical procedures, the commission used applications which exceed EPA requirements” The experts opinions differ.

Dr. Tesche testified that an e-mail from Commissioner Marquez to a commission employee (Jim Price) could be summarized as stating that Commissioner Marquez is concerned about an area near the Croquet monitor that remains above the ozone standard after applying the proposed control strategies. Dr. Tesche presented a map of the ozone on September 8th as presented in base case run AAK 93 (the naming convention for the files used).

The modeling referred to by Dr. Tesche is a base case scenario that did not represent the latest modeling that was completed with several control scenarios. The commission concurs that the modeling submitted with the December 2000 SIP contained an area that did not meet the ozone standard with the control strategies that were modeled. The reader should be aware that the gap list measures were not modeled. It is speculative to assume that the model would or would not have shown compliance implementing additional measures.

Dr. Tesche testified, after reading several documents produced from the 150 boxes of documents supplied during discovery, that problems in the wind fields such as direction or speed that go into the model would produce high ozone in Harris County. He also states that an MCNC report calls the non-responsive area an “artifact.”

The commission concurs that there is an area of elevated ozone that does not respond to ozone controls. The commission has studied this area extensively and has reported this information in previous SIP revisions, including the December 2000 submittal. While many people have theories about this area, there has not been any information presented to correct any problems in the wind fields that go into the model.

Dr. Tesche testified that the commission planned to use the state-of-the-science model MM5 in future simulations, but that MM5 could not be completed in time to use in the December 2000 SIP.

RAMS modeling has been conducted for the episode and results indicate an area that does not respond to the control scenario modeled. The area has shifted slightly to the west in the RAMS modeling than in the SAIMM modeling used in the 1993 episode. The RAMS model is newer and has better science incorporated into the model than the SAIMM model that was

used to model the 1993 episode. The commission plans to utilize MM5 modeling of the September 1993 episode in the future. The commission has committed to utilize MM5 in future simulations as stated in the December 2000 SIP.

Dr. Tesche testified about a memo to the commission from Sonoma Technology dated November 1, 2000, that responds to a request from the commission for the peer review of the September 8th through the 11th analysis performed by Dr. Harvey Jeffries, Dr. John Nielsen Gammon, and Environ International Corporation. Dr. Tesche read parts of the memo that stated the performance of the model is not particularly good and that certain grid cells should not be used if scientists didn't understand the reason for the overprediction. Dr. Tesche then read portions of a November 9, 2000, memo to the commission from Sonoma Technology that stated that the commission should be cautious when using the September 8th date for assessing future year control strategies.

After receiving the first memo, commission staff contacted Sonoma and asked from a regulatory agency perspective if they could clarify the meaning of not using certain grid cells. At that time, it was agreed that the language would be rewritten to provide a clearer answer from a regulatory perspective. The remainder of the language in the original Sonoma memo read "This does not mean that poor model performance in one area of a model should eliminate its use altogether. On the contrary it is better to use those results that are understood than to use no information at all. Alternatively, if the type of ozone this data represents is extremely rare, consideration should be given to removing the data from the control strategy analyses altogether." Sonoma's original conclusions stated "The technical review and technical analysis is based on sound science and analysis techniques, but some concerns and conclusions could be modified in light of additional data."

Dr. Tesche testified about the use of the "Karp curve" because of the inability of the commission to model attainment in the HGA modeling domain. Dr. Tesche assumed that the Karp curve was not subjected to any kind of scientific peer review. Dr. Tesche demonstrated how the curve was calculated and discussed potential flaws in the curve, such as that the impact of VOCs in ozone formation was not considered.

The commission disagrees with Dr. Tesche's assessment of the "Karp curve." The Karp curve was peer reviewed within EPA and had to have consensus with other regional offices and EPA headquarters. EPA issued guidance to states that allowed two different methods to be used when an area could not model attainment (the situation in Houston). The commission could not use either of the two methods. One method utilized the reduction in NO_x emissions from the base year to the present and projected to the future year. In Houston the NO_x emissions increased, thus eliminating the procedure. Utilizing the second method resulted in a needed decrease larger than the remaining inventory. This method was not feasible. At that time, Mr. Karp, a former EPA employee, developed the curve and worked with the EPA's experts to obtain approval of the method.

The commission disagrees with Dr. Tesche's analysis of potential flaws. The model output used as the three points in the curve includes VOC emissions and reductions from VOCs. In fact, previous SIPs have lengthy discussions of the need in Houston for both NO_x and VOC

controls. Previous SIPs have discussed the modeled results which indicate that low levels of NO_x reductions alone might result in increased ozone production and that both NO_x and VOC controls are needed until about 25% reduction to prevent an increase in ozone. The commission and EPA were clearly aware of the significance of VOC in the formation of ozone.

The Karp curve was utilized in the 2000 SIP Proposal and submittal. The EPA's only comments on the utilization of the "Karp curve" was that the curve should be redrawn based on new modeling runs with improvements made to the emissions inventory and other improvements outlined in the December 2000 SIP. The commission complied with the request. The EPA's comment letter was signed by a member of the management team and clearly supported the use of the "Karp curve".

Dr. Tesche testified that by expanding the number of points on the Karp curve and by using various data sets, positive or negative numbers may be derived that may exceed the total amount of emissions in the inventory.

The commission concurs with these findings. Some of the documents provided in the 150 boxes of items for discovery will reveal a similar analysis of the Karp curve that was completed prior to the 2000 SIP proposal.

Dr. Tesche testified that EPA Guidance, such as the Guideline for Regulatory Applications of the Urban Air Shed Model is just that, a guidance document but further stated that portions of the document are mandatory.

The commission disagrees with Dr. Tesche's assessment. Modeling staff follow applicable guidance documents or discuss alternatives with EPA prior to deviating from those guidelines. EPA has worked closely with the Commission to gain approval for alternative methods to better replicate the complex HGA ozone formation.

Mr. Durrenberger testified that EPA's 1991 Guidance document provides minimum thresholds of performance for statistical test, but no guidance is given on what constitutes good model performance in the graphical analysis.

The commission agrees with Mr. Durrenberger's assessment. The December 2000 SIP and previous SIP met the EPA's performance requirements.

Mr. Durrenberger testified that the model frequently replicates what is monitored. The HGA monitoring network was very sparse with only 34 monitors. The model predicted ozone concentrations where there is no monitor. Therefore, you cannot establish the accuracy of the model without monitored data.

The commission agrees with Mr. Durrenberger's assessment. There is no monitor in the modeled area that remains after control strategies are modeled. The commission is hopeful that the 2000 Texas Air Quality Study provides insight into the formation and movement of ozone in the HGA area.

Mr. Durrenberger testified that seven episodes were selected to model for the area. Two of the episodes were for Beaumont and occurred during the COAST time period. Two episodes were selected for Houston and occurred during the COAST time period. Three episodes were earlier used in the 1994 SIP- (1) The October 1991 episode did not perform well and did not meet the criteria for the highest ozone in HGA, the episode was dropped. (2) The May 1998 episode performed marginally well and (3) The July 1990 episode performed fairly well. The 1998 episode and 1990 episode were included in the 1994 SIP.

Mr. Durrenberger described the three statistical tests. The first is the unpaired peak accuracy test that compares the highest concentration that was monitored over the domain to the highest concentration that was modeled. This test is used to determine if you are under predicting concentrations. The second test is the bias test that looks at all pairs at the monitored site concentrations and predicted concentrations hourly for every hour of the day for the entire episode. The third test is the gross error test which is very similar to the bias test except it compares only positive values.

The commission agrees with Mr. Durrenberger's testimony, except for one item. The May 1998 episode was actually a May 1989 episode and was included in the 1994 SIP.

Mr. Durrenberger testified about graphical tests that are used by the commission to evaluate model performance such as time series, ozone isopleth or ozone maps of the area, and animated ozone movies. Mr. Durrenberger stated that scatter plots provided very little useful information. Mr. Durrenberger stated that after reviewing all of the data the September 1993 episode met EPA's performance criteria and did have acceptable performance.

The commission agrees with Mr. Durrenberger's assessment.

Mr. Durrenberger testified about Table 3.8-34 of the adopted December 2000 SIP. The table states the highest predicted ozone for each of the episode days after control strategies were applied. Mr. Durrenberger stated that none of the four predicted days meet the one-hour standard.

The commission agrees with Mr. Durrenberger's assessment.

Mr. Durrenberger testified about the "gap." The "gap" is the difference between predicted attainment of the ozone standard and the predicted level of ozone after modeling the selected control strategy.

The commission concurs with Mr. Durrenberger's testimony.

Mr. Durrenberger testified about EPA's 1999 guidance that provided two methods to calculate the gap. EPA provided two methods to calculate the gap. Method one interpolates modeled data and Method two uses emissions inventory methods.

The commission concurs with Mr. Durrenberger's description of the two tests provided in EPA's 1999 guidance.

Mr. Durrenberger testified about the 1999 EPA Guidance and a cover memo from Dick Karp, a former EPA Region 6 employee, stating that he did not believe either method would work for the HGA area.

Mr. Karp used HGA data to show that you would have to reduce more NO_x than was in the inventory. The other method required having a 1996 NO_x emissions inventory less than the 1990 NO_x emissions inventory. The 1996 NO_x emissions inventory in HGA was larger than the 1990 NO_x emissions inventory, thus, the method could not be used.

The commission agrees with Mr. Durrenberger's and Mr. Karp's analyses.

Mr. Durrenberger testified about how the "Karp curve" was developed to calculate the tons needed to reach attainment. Mr. Karp used a quadratic equation to approximate Method one with an approach that work in HGA. Mr Durrenberger stated he had discussed the Karp curve with the EPA's national modeling experts.

The commission agrees with Mr. Durrenberger's description of the Karp curve.

Mr. Durrenberger testified about a memo that he wrote to Candy Garrett stating his concerns that the gap list should be modeled and the modeled results used to develop public policy.

This comment was addressed in the response to comments for the December 2000 SIP revision.

Mr. Durrenberger testified about three things that he thought could cause ozone spikes. One theory is an unusual or a highly reactive hydrocarbon, or batch process which would release a large amount of hydrocarbons over a short period of time. Another theory is meteorological conditions. Chemistry reaction, such as chlorine, is another potential cause.

The commission concurs with Mr. Durrenberger's testimony. The December 2000 SIP describes the actions the commission will take to further understand the cause(s) of rapid ozone formation in the HGA area. Preliminary results of the Texas 2000 Study indicate highly reactive VOCs to be controlled. As previously discussed, an extensive analysis is being conducted.

Mr. Durrenberger testified about the analysis performed by commission staff of the August 1993 modeling episode and the extensive analysis of the October 7, 1999 to determine the causes of the high ozone.

The commission concurs that extensive analysis was conducted on the August 1993 modeling episode and the October 7, 1999 high ozone event.

Mr. Durrenberger testified that the mid-course review is another opportunity to incorporate some of the science from 2000 Texas Air Quality Study.

The commission agrees with Mr. Durrenberger. A recent legislative appropriation will allow the commission to devote additional resources to study the science and incorporate more findings in the mid-course review. A detailed plan for the mid-course review is outlined in the December 2000 SIP.

Mr. Durrenberger testified about a staff analysis to documents prepared by Dr. Harvey Jeffries and Dr. John Nielsen-Gammon. The staff document entitled “Response to Assertions Regarding the Use of September 8 as the Controlling Day for the Houston-Galveston Attainment Demonstration.”

The commission agrees that staff prepared the report in response to documents provided by BCCA. Many of the analyses conducted were included as a part of the December 2000 and previous SIP revisions.

Mr. Durrenberger testified that there is a scientific basis for the commission’s SIP and associated rules.

The commission agrees that there is a scientific basis for the December 2000 SIP and associated rules.

Mr. Durrenberger testified that the model performs well but does not model spikes.

The commission agrees with Mr. Durrenberger’s analysis. The commission plans to study spikes as contained in the December 2000 SIP.

Mr. Durrenberger testified that he wrote a May 17, 2000 review of a draft conceptual model for the HGA area for the 8-hour ozone problem.

As discussed previously, the commission was developing a conceptual model for high ozone events in the HGA area to supplement the 1993 episode. Part of that analysis is the review of many episodes. The commission continued discussions with EPA regarding performance evaluation for episodes that have rapid ozone formation that the model might not be able to replicate. The commission’s plan to model additional episodes is discussed in the December 2000 SIP.

Mr. Durrenberger testified that the 1992-1993-1994 design value for the HGA area, the fourth highest values over a three-year period, was around 200 ppb. Mr. Durrenberger could not give the design value without spikes.

EPA has not provided a mechanism to ignore spikes in design value calculation.

Mr. Durrenberger testified that the relative reduction method in which modeled predictions are used to determine the level of reductions needed to meet the ozone standard. Mr. Durrenberger attempted to use the method on the September 1993 episode. Mr. Durrenberger stated the Clinton, Wayside and Aldine sites had a modeled prediction less than 125 ppb but the modeled control strategy does not reduce ozone significantly.

The commission concurs that the relative reduction method analysis does not show that the modeled control strategy reduces the ozone significantly.

Mr. Durrenberger testified about his analysis of the “Karp curve”. Mr. Durrenberger described using four points for his analysis compared to the three points used by Mr. Karp. The two resulting curves are different.

The commission concurs with this analysis. The December 2000 SIP describes the use of the quadratic equation in calculating the gap.

Mr. Durrenberger testified about a July 23, 1997, letter from Tom Diggs, EPA Region 6, to Dave Harper, a commission employee. The letter expressed EPA’s concerns about the graphical performance of the September 1993 episode and cautions the commission in assessing the model’s response to various control strategies. Mr. Durrenberger stated that EPA’s letter noted an overprediction of 40 ppb as rather poor.

The inputs to the model were improved with updated biogenic emissions, improved land use, and revised construction inventory for example. On March 20, 1998, EPA sent a letter to the commission that stated “EPA’s review of TNRCC’s modeling conducted in support of this attainment demonstration found the modeling to have been technically conducted according to EPA procedures and recommendations. In fact, for some technical procedures, the commission used applications which exceed EPA requirements.” Thus, the 1997 comments were successfully addressed by the commission.

Mr. Durrenberger testified that on September 8, 1993 the monitored peak at Croquet monitor was less than 124.

The commission agrees that the Croquet monitor did not exceed 125 on September 8, 1993. The high monitor in the HGA area was Smith Point at 214 ppb.

Mr. Durrenberger testified about an e-mail dated October 18, 2000 that he wrote stating the purpose of a weight of evidence arguments is to avoid calculating the gap. He further testified that moving forward with stringent untried controls is not good policy.

The commission encourages discussion among staff to ensure the best science is used to develop policy. Ultimately, the commission bases decisions upon the best information available at the time.

Mr. Durrenberger testified about a May 8, 1991 conference call prior to discuss a draft EPA guidance document. The conference call notes indicate a discussion between modelers on the appropriateness of comparing peak monitoring station measurements to peak modeled predictions in the modeling domain.

The final guidance document issued by EPA allows the peak monitoring station and peak modeled predicted (or the unpaired peak accuracy) to be anywhere in the domain. The commission’s modeling in the December 2000 SIP meets the task.