APPENDIX 11-F

July 1996 SUPER SIP

Texas Phased Attainment Demonstration

Modified Phase II Approach For Ozone SIP Planning

with Midcourse Realignment

INTRODUCTION

Texas has developed a number of State Implementation Plans (SIPs) to control ozone pollution and in the process has developed expertise in rule development, emissions inventory (EI), and the Urban Airshed Model (UAM). Our experience has shown that not enough time was provided for these processes when the Federal Clean Air Act (FCAA) Amendments of 1990 were developed. Table 1 provides estimates of the minimum amount of time required for major components of ozone SIP development.

The United States Environmental Protection Agency (EPA) recognized some of these difficulties and in March, 1995 developed a two phase approach for the submittal of the attainment demonstration SIPs for areas classified as serious and above. Phase I consisted of a set of specific control measures to be implemented, a requirement for volatile organic compound (VOC) reasonably available control technology (RACT), a requirement to obtain reductions in the amount of 9 percent of ozone precursors between 1996 and 1999 to demonstrate reasonable further progress, a submittal of UAM modeling performed, and a schedule for the Phase II SIP activities. On November 9, 1994, Texas submitted a SIP that essentially fulfilled the requirements of EPA's Phase I approach.

EPA's guidance for Phase II, to be submitted by mid-1997, would require completion of modeling and plans to demonstrate attainment of the standard by the attainment date specified in the FCAA Amendments. By 1999 the rules to implement the attainment plans would have to be adopted. EPA had

included the additional time for the Phase II modeling to allow for analysis of the impact of boundary conditions in areas affected by transport and to allow improvements in modeling techniques and in emissions inventories to be incorporated into the process.

Mary Nichols, the EPA Assistant Administrator for Air and Radiation, issued a memorandum on March 2, 1995 which provides the most recent guidance on meeting EPA's two phase attainment demonstration requirements for serious and above nonattainment areas. The memo discusses three important guidelines:

Ë Meeting the attainment dates in the Clean Air Act while maintaining progress toward attainment,

Ë Ensuring enforceability of commitments to adopt additional measures needed to reach attainment, and

Ë Promoting market-based alternatives.

The memo further states that this guidance applies to areas significantly affected by ozone transport and that EPA regional offices should determine with the states whether to apply it to other areas as well. For a severe area, such as the Houston/Galveston nonattainment area, the current EPA process requires that a SIP be developed based on an emissions inventory projected from 1990 to 2007. The Texas Phased Attainment Demonstration (TxPhAD) approach builds on these guidelines and applies them to the particular situations of the Houston/ Galveston (HGA) and Beaumont/Port Arthur (BPA) nonattainment areas.

LONG TIME HORIZON SIP PLANNING

Our experience has shown that the planning horizon of 17 years required to develop a SIP for attainment of the standard is too long to provide confidence in the effectiveness of a process which requires states to determine the controls needed 17 years into the future with current information. The TxPhAD involves a paradigm shift in ozone control. States were previously expected to identify reductions far into the future. As the Texas SIP planning process has progressed, certain limitations have surfaced which the traditional interpretation of the Clean Air Act was not flexible enough to address. These limitations include:

Ë Difficulty of reliably estimating emission growth several years into the future.

Ë Impossibility of forecasting and applying future advances in control technology.

Ë Difficulty of forecasting future national rules, establishing associated reductions, and utilizing these rules and reductions in the planning process.

Ë Inability of this planning approach to change with the various needs of the nonattainment area.

Ë Decreasing sensitivity of UAM's ozone response to changes in emissions when modeling relatively low exceedance concentrations of ozone and precursors.

Ë Large impact of changes in boundary conditions on locally generated ozone concentrations, especially as ozone concentrations approach the standard.

Ë Lack of analysis for future boundary conditions and methods to reduce these concentrations.

Ë No method to evaluate the efficacy of the current SIP planning process prior to the attainment date years in the future.

Ë No method to incorporate improvements in monitoring, such as the Photochemical Assessment Monitoring System (PAMS) data, or in photochemical modeling.

These limitations create a lack of confidence in the results of the modeling and control strategy development, which in turn makes it difficult to garner support for the indicated control strategies that must be considered for further reduction of ozone.

THE TEXAS PLAN

Ë Realistic Time Horizon Planning

An analysis of the time estimates in Table 1 indicates that a SIP planning period of six years is more practical than the current process. Six years is long enough to allow states and the regulated community to develop and plan the implementation of control measures, but not so long as to base such controls on unreliable forecasts. Therefore, Texas is proposing an alternative to EPA's suggested Phase II SIP process. The Texas approach provides a number of enhancements.

The TxPhAD is based on taking highly effective, well defined, measured steps toward ozone attainment, and on checking the effectiveness of the whole SIP planning process at regular intervals to ensure

progress in ozone reduction. Inherent in the process is having well defined steps for making midcourse realignments so that technical innovations and better information developed after the initial submittal can be incorporated in subsequent steps. The shorter time-horizons and iterative nature of the process reduce the limitations and uncertainty of the traditional attainment demonstration. Given that the very essence of the TxPhAD is to abandon the flawed single step, long-range planning process, a requirement to perform modeling out to 2007 and determine the amount of reductions and controls necessary to achieve attainment in the initial step is inconsistent, and serves no purpose.

Ë **Paradigm Shifts**

This new approach requires a shift in three paradigms found in the FCAA Amendments. First, the process shifts from identifying the path to attainment from one quantum step to several smaller steps. Secondly, the process focuses on obtaining reasonable progress toward reduction of ozone rather than reductions of ozone precursors. Thirdly, at interim steps it evaluates the effectiveness of the process before moving forward. This process allows for timely application of the following:

Ë New technical advances in emissions control,

Ë New modeling techniques,

Ë New and improved methods for emission calculation,

Ë Incorporation of results from boundary condition analyses,

Ë Use over shorter time periods of more accurate and better growth estimates,

Ë Process for integration of PAMS monitoring data, and

Ë Focus on ozone reduction instead of precursor reduction.

ELEMENTS OF THE TXPHAD

The TxPhAD is a multi-step periodic SIP process which:

Ë Establishes interim ozone targets for each step,

Ë Performs a SIP process evaluation with actual data at each step,

Ë Makes midcourse realignments when warranted, and

Ë Makes Rate-of-Progress (ROP) reductions in ozone by phasing in new controls that have been developed and tested through the model or enhancing existing controls that have been proven effective in reducing ozone during the last time period.

Each of these elements is discussed in more detail in the paragraphs that follow.

Ë Interim Dates

The time period to the attainment year will be divided into periods with interim dates. For the HGA area with an attainment date of 2007, the interim dates are 1999, 2002 and 2005. The intermediate dates are shown in Table 2.

Ë Interim Targets

EPA guidance on the use of the UAM for ozone SIP development requires that the maximum modeled concentration over the domain be used to guide control strategy development. In some cases this domain wide maximum may be greater than the maximum measured in the area, and in some cases it may be lower than the maximum measured over the area. When the model underpredicts it must be within 15% of the maximum monitored ozone value to be considered acceptable modeling. For each interim date, an ozone reduction target will be established using the modeling design value. The modeling design value will be the highest modeled concentration for all days for which acceptable modeling was achieved. For example, for the HGA area with an attainment date of 2007, the interim ozone reduction for 1999 will be 9/17 of the difference between the modeled design value and the standard. The interim reduction target is then the difference between the modeling design value and the interim ozone reduction. Results of the UAM modeling with the Coastal Oxidant Assessment for Southeast Texas (COAST) data set will be used to determine the interim target concentrations. An example of how the interim ozone concentration target will be determined can be shown using the 1990 UAM modeling episode the commission completed for the Phase I SIP submittal in November 1994. For this episode the modeling design value for the HGA area was 0.263 ppm (the maximum monitored value was 0.202 ppm). The interim ozone reduction for 1999 would be 0.074 ppm (i.e., (9/17)[0.263-0.124]), and the interim reduction target for 1999 would be

0.189 ppm. This interim reduction target is just an example. The actual value used for the SIP may vary by a significant amount. This example is included in Table 3.

Ë Process Evaluation With PAMS Data

At the beginning of each step there will be an evaluation of the SIP development process used to develop the controls implemented in the previous step. For each interim date, actual data will be compared to the corresponding data used to develop the controls to be implemented by the interim date. The actual emissions inventory (EI) will be compared to the projected EI to determine the accuracy of the EI projection process. For each interim date the UAM predictions with the projected EI will be compared to the monitored concentrations for ozone, nitrogen oxides (NO_x), and speciated VOC. This comparison will determine if the process accurately predicts future pollutant concentrations and if confidence can be placed in the use of the process to develop plans to reduce ozone. In addition to modeling with the projected EI, modeling with the actual EI will be performed and the results compared to monitored data, enhanced by the PAMS network, to determine if the episode selection process accurately covers pertinent meteorological conditions. New episodes will be developed if warranted and added to those previously used.

For example, in May of 2000, we will perform comparisons between the 1999 PAMS data and modeled concentrations based upon the 1999 projected EI. Comparisons will be performed on a site-specific basis between monitored values and corresponding modeled values. This analysis will evaluate trends between projected EI and monitored concentrations. This will involve two steps: 1) At each monitoring site we will use PAMS VOC and NO_x monitoring data to determine the actual annual rate of VOC and NO_x reductions from 1993 to 1999 and compare them to corresponding modeled reductions from 1993 to 1999

predicted at that site. 2) At each monitoring site we will use actual PAMS ozone data to determine an ozone rate of reduction for 1993-1999 and compare it to the modeled reduction from 1993 to 1999 at that site.

Ë Midcourse Realignments

The TxPhAD provides a mechanism to make midcourse realignments to the planning process. The future emissions will be projected with better emissions methods that have been developed since the last time step, and will incorporate better, more accurate emission growth factors based on analysis or actual data rather than using population or economic indicators as surrogate growth estimates. Also, emissions that fluctuate with population can be better estimated with current population trends. Mobile emissions can be more accurately estimated with current trends from analysis of recent data on vehicle miles traveled, vehicle registration, roadway network modifications, and the analysis of data collected from the inspection and maintenance program.

New approaches to UAM modeling developed since the last interim date can be utilized. For example, present sensitivity analyses from across the country indicate that changes in ozone in response to changes in emissions at concentrations near the standard are not as large as when the ozone concentration is closer to the design value. Special boundary condition studies will be conducted to address this issue. As another example, it appears that the current version of the carbon bond IV (CBIV) mechanism used in the UAM may need to be updated to more accurately depict biogenic emissions. It is anticipated that within the next three years there will be modifications to resolve issues of this nature. The new SIP process will allow analysis of the episode selection to ensure that appropriate episodes have been used for SIP development. If additional episodes are needed, they will be added to those being used.

The process will allow consideration of new control technology that has been developed since the last interim date. The effectiveness of existing rules will be analyzed. If necessary, existing rules will be modified to make them more effective rather than adopting new rules.

National rules are being developed for a number of source categories, but final rules will not be available for use in development of the SIPs due in mid 1997 with the current process. The logical process would be to analyze the impact of national rules, quantify reductions from them, and then develop additional rules if needed to meet the ozone reduction target. The TxPhAD process allows this approach to proceed. To use the current process, states have to make a guess about the provisions of the future rules, estimate the corresponding reductions, and adopt potentially overlapping rules to compensate for gaps in the federal rules. Texas has had this experience with both the small engine rule and the fugitive emissions rules from the Hazardous Organic National Emissions Standards for Hazardous Air Pollutants (HON). This has resulted in duplicative efforts, law suits, and a loss of public confidence, none of which would have occurred if the TxPhAD approach had been followed.

Ë Intra-Domain Impacts

Intra-domain impacts, due to movement of pollutants withing the modeling domain from the HGA nonattainment area to the BPA nonattainment area or vice versa and from attainment areas, can play a major role in developing a plan to attain the standard. Nonattainment areas that are affected by emissions from other areas should be allowed to develop control plans that provide for attainment of the standard based only on local emissions. Additional time should be allowed to achieve attainment for areas affected by intra-domain impacts. If emissions from attainment areas are affecting an area's ability to attain the standard, time must be allowed to develop a process to reduce these emissions. It appears that the current

EPA two phase approach will allow such a process in areas that have demonstrated "overwhelming transport", but the process should be available for other areas. Texas will be analyzing the effect of intra-domain impacts and simulating these impacts with boundary conditions used in the UAM.

Ë Rate of Progress Reductions

To provide progress towards attainment of the ozone standard, the FCAA Amendments requires that states make reductions in precursors of ozone at a rate of 3% per year averaged over each three year period after 1996 until the standard is attained. However, modeling has shown that not all reductions in VOC or NO_x have an equal effect on ozone concentrations. Speciation, spatial, and temporal conditions all play a role in ozone formation. Large reductions in certain VOCs may yield small reductions in ozone, and vice-versa. Therefore, there is no scientific basis for a reduction of 3% per year of ozone precursors. For these reasons, the TxPhAD focuses on reductions in ozone, which is the criteria pollutant, instead of reductions in the precursors.

From 1990 to 2007, the TxPhAD provides for a measured reduction of ozone of approximately 5.88% per year averaged over each reduction period. This reduction is achieved by using modeling to dictate the most effective control strategies in the nonattainment areas for the given time periods. In practice, this reduction may or may not correspond precisely to the 3% per year reduction of precursors envisioned in the Act, but it maintains the progression of measured steps to attainment that was clearly the intent of this requirement.

Texas understands the need to maintain a database of current and future control strategies and the creditable reductions they provide for each milestone. Texas will continue to maintain this database for

planning purposes, and will submit it as part of periodic SIP revisions to report progress in reducing ozone levels. The levels of VOC and/or NO_x needed to make the ozone reductions for each target year will become the ROP reduction levels. However, the planning process for ozone attainment should not be constrained by a requirement to make a guaranteed 3% per year reduction of emissions of precursors if this is incompatible with making effective and reasonable ozone reductions.

Ë Attainment

The TxPhAD provides for developing a SIP that shows how the standard will be met by the attainment dates mandated in the FCAA Amendments. However, the plan will not immediately identify nor implement all rules necessary to attain the standard. Instead the process allows for a stepped approach to attainment. Texas realizes the importance of having a periodic "snapshot" of future air quality, and of the levels of reductions that may be necessary to achieve attainment of the standard. Therefore, the TxPhAD provides for an estimate of the levels of VOC and NO_x that may be necessary to attain the standard. However, this demonstration is more appropriately based on the next projected target year's EI, and not on the attainment year's EI. For example, in the 1997 submittal based on the projected 1999 EI, Texas will use across-the-board reductions to indicate the levels needed to attain the standard. This approach will provide a "snapshot" and indicate the direction and magnitude of reduction to attain the standard. This process will avoid the potentially flawed approach of requiring the use of questionable data to project emissions to the year 2007, and then make decisions on implementation of controls based on modeling this questionable data. Only the specific controls and the corresponding levels of reductions of VOC and NO_x necessary to reach the interim target concentration for 1999 will be developed using the projected 1999 EI.

Ë Enforceability

One of the fundamental principles of the TxPhAD is that Texas will make well-defined steps that lead to measured progress toward attaining the standard by the mandated attainment dates. At each step, each rule will be analyzed for its effectiveness, and enforceability concerns can be corrected in a timely fashion rather than waiting until the attainment date to perform such an analysis. This process will ensure that effective rules have been implemented. As part of EPA's Phase I SIP approach, the TxPhAD plan and a corresponding schedule will be submitted to EPA for approval. Once the approach is approved by EPA with the schedule, EPA will have "hooks" upon which EPA can take enforcement action should the state not implement part of the schedule.

Ë Market Based Approaches

The TxPhAD ozone reduction strategy is more compatible with a market-based approach. Traditionally the market-based trading approach has been difficult to quantify in such a way that it can be used for creditable VOC and NO_x requirements. Also, the offset requirements for New Source Review, banking, and trading have never been adequately addressed in a fashion which allowed credits to be taken as part of a SIP. Under the TxPhAD, the model determines if and how much ozone reduction is yielded by the trading program, and only the real ozone benefits are counted for SIP purposes. Not having to deal with the creditability of offsets makes the program much more attractive to states.

Ë 182(f) NO_x Waiver

According to §182(f), a waiver from NO_x RACT will be granted when the Administrator determines that net air quality benefits are greater in the absence of reductions of oxides of nitrogen from the sources concerned. EPA has interpreted this to mean that in the HGA and BPA areas only a temporary NO_x waiver can be granted based upon interim UAM modeling which shows that NO_x reductions would be a disbenefit in the area. EPA granted a two year temporary waiver under the presumption that by May 1997 Texas will have submitted a full attainment demonstration, based upon the COAST study, which definitively indicates the role of NO_x reductions. EPA has expressed concern that the TxPhAD contravenes this guidance because it does not contain modeling which would attempt to predict the efficacy of NO_x reductions at the attainment date.

The premise upon which Texas petitioned EPA for a temporary waiver was based upon the argument that the UAM model using the COAST data would allow for better science to dictate the necessity and the degree of NO_x controls. The TxPhAD is taking this same premise and applying it to the entire attainment demonstration process. Texas will perform modeling for each interim target year to determine the direction and level of controls necessary to attain the target at that time. For example, in 1996, modeling will be done based on the projected 1999 EI to determine the levels of VOC and NO_x which would be necessary to attain the target (e.g., 0.189ppm; see Table 3). This modeling will be used to provide directional guidance for the time period through 1999 regarding the benefit of future NO_x controls in the reduction of ozone. If this modeling showed that NO_x controls would be beneficial to reducing ozone levels to the 1999 target, action would be taken to remove the temporary §182(f) waiver and to implement NO_x controls. If the modeling showed that reductions in NO_x were not beneficial to reductions in ozone, action would be taken to extend the §182(f) waiver to the year 1999. The same rationale would apply to

the other segments. This approach will provide directional guidance for decision making about NO_x controls, while avoiding the pitfalls of long time-horizon modeling.

The NO_x waiver applies to EPA's Transportation Conformity rule, which was originally granted under §182(f) of the FCAA Amendments of 1990. However, due to a recent court interpretation, further action in Transportation Conformity will be taken under §182(b)(1) of the FCAA Amendments of 1990.

Ë EPA Adjusted Attainment Plan Goals

There are five goals that EPA has identified in adjusting the attainment plan strategy. The TxPhAD is designed to fulfill these goals.

Ë No need to reopen the Clean Air Act. This process meets the goals and spirit of the FCAA Amendments. However, the process will have to be evaluated to ensure that it can be interpreted to meet the requirements of the FCAA Amendments.

Ë Proceed with substantial emission reductions. This process provides for phase-in of emission controls to control ozone. The process will allow new controls and technical advances to be utilized that could not be identified prior to 1995.

Ë Politically acceptable approach. This process provides for attainment of the standard in a timely manner. It allows the process to be evaluated in the interim to determine that the best course is being followed and that this process has been proven to be effective in the area.

Ë Provide economic certainty. Growth factors are routinely evaluated every six years to ensure that they provide for better future emission estimates. This decreases the length of the planning horizon from 17 years to 6 years and ensures that adjustments made for growth are closer to actual growth levels. Periodically before new rules are developed, this process evaluates the efficacy of previously adopted rules and rule effectiveness estimates, both of which can greatly influence emission estimates. This evaluation provides for more accurate emission estimates which are used to determine new rules. This process provides for greater economic certainty since rules are developed only after it is clear that they are needed to reach the reductions required by the next step.

Ë Sound scientific approach. The process is more scientifically sound than the current approach since it provides for periodic evaluation and feedback using actual emissions and PAMS monitoring data. This process allows for midcourse realignments to be made based on scientific process analysis prior to the final attainment demonstration. The process also focuses on the ozone standard, rather than on precursors for ozone.

CONCLUSION

EPA has recognized many of the limitations of the attainment demonstration planning process described in the FCAA Amendments, and has developed a phased process which partially addresses these difficulties. The State of Texas has built upon this approach to account for the unique situations of the HGA and BPA nonattainment areas. Instead of being tied to long time-horizon forecasting to make arbitrary reductions in precursors, the Texas approach uses the best available modeling and control strategy science to make real reductions in ozone. Texas will continue its long-standing commitment to improve air quality in partnership with local governments, consumers, small business, industry, and the

EPA.

The State believes that the Texas Phased Attainment Demonstration is more reasonable and more scientifically sound than EPA's phased attainment demonstration approach, while still meeting the goals of the FCAA Amendments of 1990 and the March 2, 1995 Mary Nichols memo. Texas believes that the statutory intent does allow the flexibility to approve an approach envisioned by the Texas Phased Attainment Demonstration.

Table 1

Time Required for SIP Processes

Prepare actual emissions inventory	12 months
Perform UAM modeling with existing base case using new inventory	6 months
Prepare projected emissions inventory	3 months
Develop new UAM base cases	18 months
Develop new rules	7 months
Adopt new rules	6 months

Table 2

Summary of Modified Phase II SIP Planning

SIP Plan Date (*)	Compare** Monitoring W/Projected EI		Compare*** Monitoring W/Actual EI		EI		Date Modeling Complete	Date SIP Submitted	Extend 182(f) Date
	Year	Date	Year	Date	Base Year	Projected Year			
1996					1993	1996	12/96	11/96****	
1999					1993	1999	12/96	5/97	1999
2002	1996	5/97	1996	6/98	1996	2002	11/98+	12/99+	2002
2005	1999	5/00	1999	6/01	1999	2005	11/01+	12/02+	2005
2007	2002	5/03	2002	6/04	2002	2007	11/04+	12/05+	PERM

* Date of interim ozone target. Controls developed to reach interim target for this date.

** Comparison of monitoring data with modeled concentrations based on projected EI.

*** Comparison of monitoring data with modeled concentrations based on actual EI.

**** The 11/96 submittal consists of technical support documentation to support the BPA attainment demonstration to be submitted by 5/97.

+Assumes no new modeling episodes. If new episodes are needed, add 9 months to date.

PERM §182(f) NO_X exemption would become permanent if warranted.

Example of Interim Ozone Reduction Targets with the

Modified Phase II SIP Approach

Houston/Galveston Area

The following is an example of how the modified SIP approach could be applied to the HGA ozone nonattainment area to determine interim ozone reduction targets. The HGA area must attain the standard by 2007. First divide the time to attainment into five three-year segments. Each segment has a target year and a target ozone concentration to attain.

Example:

Houston 1990 episode modeled with UAM.

The modeling design value for this episode is 0.263 ppm.

Target years	Ozone target
1993	0.238 ppm
1996	0.214 ppm
1999	0.189 ppm
2002	0.165 ppm
2005	0.140 ppm
2007	0.124 ppm

Modified Phase II SIP Approach

Timelines

Step 1 - 1996 Analysis

Dec, 1995 — Complete development of UAM Base Cases with COAST data.
Using 1993 EI, complete development of projected 1996 EI with 15% rate of progress.

Nov, 1996 — Submit technical support document for BPA to EPA

Step 2 - 1999 Analysis

Aug, 1996 — Using 1993 EI, complete development of projected 1999 EI with 9% rate of progress (ROP) from 1996 to 1999.
Complete boundary condition study for UAM modeling. Determine impact of emissions from attainment areas and other nonattainment areas on the HGA area. The BPA area would be included if it failed to show attainment under Step 1 and will follow successive steps until attainment is demonstrated. Determine if controls in attainment areas are needed.

Dec, 1996 — Complete UAM modeling with projected 1999 EI and determine if meet 1999 interim target.
Reductions of 3% VOC per year from 1996 to 1999 have been implemented. Based on state and federal rules existing by 1999 and future federal rules, determine projected annual reductions in VOC (and NO_x, if applicable) between 1999 and 2002.
To address the temporary 182(f) waiver, UAM modeling with the projected 1999 EI will be used to determine if NO_x controls are beneficial in reducing ozone to the 1999 interim ozone target. If NO_x controls are not beneficial in meeting the 1999 interim ozone target, action will be taken to extend the temporary 182(f) waiver to 1999.

May, 1997 — Submit SIP to EPA.

Step 3 - 2002 Analysis

Compare Monitoring to Projected Reductions for 1996

May, 1997 — Comparisons between 1996 PAMS and projected modeled concentrations. Comparisons to be performed on a site specific basis between monitored values and corresponding modeled values. This analysis will evaluate trends between the 1996 projected EI and monitored concentrations.

1. At each monitoring site use PAMS VOC and NO_x monitoring data to determine actual annual rate of VOC and NO_x reductions from 1993 to 1996 and compare to corresponding modeled reductions from 1993 to 1996 predicted at that site.
2. At each monitoring site use annual PAMS ozone data to determine an ozone rate of reduction for 1993-1996 and compare to modeled reduction from 1993 to 1996 at that site.

Compare Monitoring to Actual Reductions for 1996
Performance Evaluation of 1996 SIP Process

Dec, 1997 Complete actual 1996 EI.

June, 1998 Complete UAM modeling with actual 1996 EI with COAST base cases.
Performance evaluation of 1996 SIP process using actual 1996 EI modeled data and PAMS monitoring data. Includes evaluation of emissions inventory, modeling, planning, and rule development.

1. Complete comparison of actual 1996 EI to projected 1996 EI.
    a. Determine effectiveness of rules.
    b. Begin modification of existing rules if appropriate.
    c. Develop new rule effectiveness values if appropriate.
    d. Complete analysis of accuracy of growth projections used to develop projected 1996 EI.
    e. Complete development of new growth projections for 2002 based on comparison of actual 1996 and projected 1996 EIs, economic growth data, and other information.
2. Complete comparison of ozone, NO_x, and speciated VOC between:
    a. modeling with projected 1996 EI, versus
    b. modeling with actual 1996 EI, and both versus
    c. monitoring for 1996.
3. Begin development of new 1996 base cases if needed.

Plan to Meet 2002 Interim Ozone Target

Sept, 1998 Use actual 1996 EI to complete projected 2002 EI.
Complete 2002 boundary condition modeling with regional version of UAM.

Nov, 1998 Complete UAM modeling of projected 2002 EI with COAST base cases.
Use UAM modeling to determine controls to attain the 2002 interim ozone target.
To address the temporary 182(f) waiver, UAM modeling with the projected 2002 EI will be used to determine if NO_x controls are beneficial in reducing ozone to the 2002 interim ozone target. If NO_x controls are not beneficial in meeting the 2002 interim ozone target, action will be taken to extend the temporary 182(f) waiver to 2002.
Based on the projected 2002 EI estimate the levels of VOC and NO_x to reach attainment of the standard.

If no new 1996 base cases were needed:

May, 1999 Complete new rules to meet 2002 interim ozone target.
Determine rate of progress target for reductions of VOC (and/or NO_x) for 2000 to 2002 to meet the 2002 interim ozone target.
Based on state and federal rules existing by 2002 and future federal rules, determine projected annual reductions in VOC (and NO_x, if applicable) for 2003 to 2005.

Dec, 1999 Adopt new rules to meet 2002 interim ozone target based on modeling with COAST base cases.

If new 1996 base cases were needed:

Aug, 1999 Complete development of new 1996 base cases.

Oct, 1999 Complete modeling of projected 2002 EI with 1996 base cases.
Use UAM modeling with 1996 base cases to determine additional controls needed to attain the 2002 interim ozone target.
Based on 1996 base cases, if NO_x controls are determined to be beneficial in reducing ozone, then NO_x controls will be implemented and action taken to remove the temporary 182(f) waiver.
Based on the projected 2002 EI estimate the levels of VOC and NO_x to reach attainment of the standard.

Mar, 2000 Complete additional new rules to meet 2002 interim target ozone target.
Based on 1996 base cases, determine new rate of progress target for reductions of VOC (and/or NO_x) from 2000 to 2002 to meet the 2002 interim ozone target. Based on state and federal rules existing by 2002 and future federal rules, determine the projected annual reductions in VOC (and NO_x, if applicable) for 2003 to 2005.

Aug, 2000 Adopt new rules to meet 2002 target with 1996 base case modeling.

<u>Step 4 - 2005 Analysis</u>

Compare Monitoring to Projected Reductions for 1999

May, 2000 Comparisons between 1999 PAMS and projected modeled concentrations. Comparisons to be performed on a site specific basis between monitored values and corresponding modeled values. This analysis will evaluate trends between the 1999 projected EI and monitored concentrations.
1. At each monitoring site use PAMS' VOC and NO_x monitoring data to determine actual annual rate of VOC and NO_x reductions from 1996 to 1999 and compare to corresponding modeled reductions from 1996 to 1999 predicted at that site.
2. At each monitoring site use annual PAMS ozone data to determine an ozone rate of reduction for 1996-1999 and compare to modeled reduction from 1996 to 1999.

Compare Monitoring to Actual Reductions for 1999
Performance Evaluation of 1999 SIP Process

Dec, 2000 Complete actual 1999 EI.

June, 2001 Complete UAM modeling with actual 1999 EI with COAST and 1996 base cases.
Performance evaluation of 1999 SIP process using actual 1999 EI modeled data and PAMS monitoring data. Includes evaluation of emissions inventory, modeling, planning, and rule development.
1. Complete comparison of actual 1999 EI to projected 1999 EI.
    a. Determine effectiveness of existing rules.
    b. Begin modification of existing rules if appropriate.
    c. Develop new rule effectiveness values if appropriate.

d. Complete analysis of accuracy of growth projections used to develop projected 1999 EI.
e. Complete development of new growth projections for 2005 based on comparison of actual 1999 and projected 1999 EIs, economic growth data, and other information.

2. Complete comparison of ozone, NO_x, and speciated VOC between:
   a. modeling with projected 1999 EI, versus
   b. modeling with actual 1999 EI, and both versus
   c. monitoring for 1999.
3. Begin development of new 1999 base cases if needed.

Plan to Meet 2005 Interim Ozone Target

Sept, 2001 — Use actual 1999 EI to complete projected 2005 EI. Complete 2005 boundary condition modeling with regional version of the UAM.

Nov, 2001 — Complete UAM modeling of projected 2005 EI with COAST and 1996 base cases.
Use UAM modeling to determine controls to attain the 2005 interim ozone target.
To address the temporary 182(f) waiver, UAM modeling with the projected 2005 EI will be used to determine if NO_x controls are beneficial in reducing ozone to the 2005 interim ozone target. If NO_x controls are not beneficial in meeting the 2005 interim ozone target, action will be taken to extend the temporary 182(f) waiver to 2005.
Based on the projected 2005 EI estimate the levels of VOC and NO_x to reach attainment of the standard.

If no new 1999 base cases were needed:

Jul, 2002 — Complete new rules to meet 2005 interim ozone target.
Determine rate of progress target for reductions of VOC (and/or NO_x) from 2003 to 2005 to meet the 2005 interim ozone target.
Based on state and federal rules existing by 2005 and future federal rules, determine projected annual reductions in VOC (and NO_x, if applicable) for 2006 and 2007.

Dec, 2002 — Adopt new rules to meet 2005 interim ozone target based on modeling with COAST and 1996 base cases.

If new 1999 base cases were needed:

Aug, 2002 — Complete development of new 1999 base cases.

Oct, 2002 — Complete modeling of projected 2005 EI with 1999 base cases.
Use UAM modeling with 1999 base cases to determine additional controls needed to attain the 2005 interim ozone target.
Based on 1999 base cases, if NO_x controls are determined to be beneficial in reducing ozone, then NO_x controls will be implemented and action taken to remove the temporary 182(f) waiver.
Based on the projected 2005 EI determine the levels of VOC and NO_x to reach attainment of the standard.

Mar, 2003 Complete additional new rules to meet 2005 interim target ozone target.
Based on 1999 base cases, determine new rate of progress target for reductions of VOC (and/or NO_x) from 2003 to 2005 to meet the 2005 interim ozone target. Based on state and federal rules existing by 2005 and future federal rules, determine projected annual reductions in VOC (and NO_x if applicable) for 2006 and 2007.

Aug, 2003 Adopt new rules to meet 2005 target with 1999 base case modeling.

Step 5 -2007 Analysis

Compare Monitoring to Projected Reductions for 2002

May, 2003 Comparisons between 2002 PAMS and projected modeled concentrations. Comparisons to be performed on a site specific basis between monitored values and corresponding modeled values. This analysis will evaluate trends between the 2002 projected EI and monitored concentrations.

1. At each monitoring site use PAMS VOC and NO_x monitoring data to determine actual annual rate of VOC and NO_x reductions from 1999 to 2002 and compare to corresponding modeled reductions from 1999 to 2002 predicted at that site.
2. At each monitoring site use annual PAMS ozone data to determine an ozone rate of reduction for 1999-2002 and compare to modeled reduction from 1999 to 2002.

Compare Monitoring to Actual Reductions for 2002
Performance Evaluation of 2002 SIP Process

Dec, 2004 Complete actual 2002 EI.

June, 2004 Complete UAM modeling with actual 2002 EI with COAST, 1996, and 1999 base cases. Performance evaluation of 2002 SIP process using actual 2002 EI modeled data and PAMS monitoring data. Includes evaluation of emissions inventory, modeling, planning, and rule development.

1. Compare actual 2002 EI to projected 2002 EI.
    a. Determine effectiveness of existing rules.
    b. Begin modification of existing rules if appropriate.
    c. Develop new rule effectiveness values if appropriate.
    d. Complete analysis of accuracy of growth projections used to develop projected 2002 EI.
    e. Complete development of new growth projections for 2007 based on comparison of actual 2002 and projected 2002 EIs, economic growth data, and other information.
2. Complete comparison of ozone, NO_x, and speciated VOC between:
    a. modeling with projected 2002 EI, versus
    b. modeling with actual 2002 EI, and both versus
    c. monitoring for 2002.
3. Begin development of new 2002 base cases if needed.

Plan to Meet Standard in 2007

Sept, 2004 Use actual 2002 EI to complete projected 2007 EI. Complete 2007 boundary conditions modeling with regional version of the UAM.

Nov, 2004 Complete UAM modeling of projected 2007 EI with COAST, 1996, and 1999 base cases.
Use UAM modeling to determine controls to attain the standard by 2007.
To address the temporary 182(f) waiver, UAM modeling with the projected 2007 EI will be used to determine if NO_x controls are beneficial in reducing ozone to the standard. If NO_x controls are not beneficial in meeting the standard by 2007, action will be taken to make the 182(f) waiver permanent.

If no new 2002 base cases were needed:

Jul, 2005 Complete new rules to meet the standard by 2007. Determine rate of progress target for reductions of VOC (and/or NO_x) for 2006 and 2007 to meet the standard.

Dec, 2005 Adopt new rules to meet standard by 2007.

If new 2002 base cases were needed:

Aug, 2005 Complete development of new 2002 base cases.

Oct, 2005 Complete modeling of projected 2007 EI with 2002 base cases.
Use UAM modeling with 2002 base cases to determine additional controls needed to attain the standard by 2007.
Based on 2002 base cases, if NO_x controls are determined to be beneficial in reducing ozone, then NO_x controls will be implemented and action taken to remove the temporary 182(f) waiver.

Mar, 2006 Complete additional new rules to meet standard by 2007.

Aug, 2006 Adopt new rules to meet standard by 2007 target with 2002 base case modeling.