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CHAPTER 1: GENERAL

1.1 BACKGROUND

The BPA ozone nonattainment area consists of Hardin, Jefferson, and Orange Counties. The BPA area is classified as moderate and, therefore, was required to attain the 1-hour ozone standard of 0.12 parts per million by November 15, 1996. The BPA area did not attain the standard by that date and also did not attain the standard by November 15, 1999, the attainment date for serious areas.

In determining the appropriate attainment date for an area, EPA may consider the effect of transport of ozone or its precursors from an upwind area which interferes with the downwind area's ability to attain. On July 16, 1998, EPA issued a guidance memorandum titled "Extension of Attainment Dates for Downwind Transport Areas." The guidance, referred to hereinafter as the "transport policy," provides a means for EPA to extend the attainment date for an area affected by transported air pollution, without reclassifying ("bumping up") the area to a higher classification. The transport policy was published in the March 25, 1999 *Federal Register* with a request for comments on its interpretation. The transport policy is particularly relevant to BPA, which is downwind of the HGA area and is affected by transport from HGA. If EPA approved such a determination for BPA, the area would have until no later than November 15, 2007, the attainment date for HGA, to attain the 1-hour ozone standard.

In order to receive EPA approval under the transport policy, an area must meet the following requirements:

1. Be identified as an affected transport area;
2. Submit an approvable attainment demonstration with any necessary, adopted local measures, showing attainment of the 1-hour ozone standard no later than the date that reductions are achieved in the upwind area;
3. Adopt all applicable local measures under the area's current classification, as well as any additional measures necessary to show attainment; and
4. Implement all adopted measures as expeditiously as practicable, but no later than the date that reductions are achieved in the upwind area.

In a letter to the Governor dated October 30, 1998, the EPA Region 6 office in Dallas informed the state of the criteria under which EPA would consider extension of BPA's attainment date under the transport policy. The Governor replied to EPA in a letter dated December 21, 1998, in which the state committed to work with EPA to submit the necessary SIP revisions to obtain approval under the transport policy.

On April 16, 1999, EPA proposed in the *Federal Register* to allow BPA to take advantage of the transport policy if an approvable attainment demonstration is submitted by November 15, 1999. In a letter to the agency dated May 21, 1999, EPA stated that unless the state modeled a second ozone episode in which BPA's emissions, not HGA's transported emissions, predominantly influence BPA air quality, EPA would likely not approve the attainment date extension, resulting in bump-up to the serious classification. As a result, the agency conducted modeling of an ozone episode (September 8-11, 1993) in which BPA's locally-generated emissions predominate. EPA stated that "reasonable" point source NO_x reductions must be modeled, and appropriate rules adopted, for the attainment demonstration to be approvable. The agency modeled "Tier I" reductions, which are pre-combustion controls such as low-NO_x burners and flue gas recirculation, after EPA confirmed that this level of control would be acceptable for an approvable attainment demonstration SIP. This modeling predicted maximum peak ozone values of 131 ppb in BPA,

compared to the federal attainment standard of 125 ppb. Although the modeled ozone exceeds the standard, use of WOE techniques demonstrates attainment of the 1-hour ozone standard in BPA.

The first attainment demonstration SIP for BPA was adopted by the commission on October 27, 1999 and submitted to EPA by November 15, 1999. That SIP contained modeling for both transport and non-transport episodes, two VOC reasonably available control technology (RACT) rules, and a NO_x rule for lean-burn engines (Phase I).

The current SIP contains modeling and additional Phase II NO_x rules for the BPA attainment demonstration. Extensive discussions have been held with BPA industries and local elected officials, in addition to EPA Region 6 staff, concerning the elements of an approvable attainment demonstration for BPA. Because the current modeling analysis comes close to, but does not actually show, attainment, the current attainment demonstration relies on WOE arguments. This final attainment demonstration SIP revision will be submitted to EPA in late April, 2000.

1.2 PUBLIC HEARING INFORMATION

The commission will hold public hearings at the following times and locations:

CITY	DATE	TIME	LOCATION
El Paso	January 24, 2000	2:00 p.m.	City of El Paso Council Chambers 2 Civic Center Plaza, 2nd floor
Austin	January 25, 2000	10:00 a.m.	TNRCC 12100 N. I-35, Building E, Room 201S
Longview	January 26, 2000	10:00 a.m.	Longview City Hall Council Chambers 300 West Cotton Street
Irving	January 26, 2000	7:00 p.m.	City of Irving Central Library Auditorium 801 West Irving Blvd.
Dallas	January 27, 2000	10:00 a.m.	Dallas Public Library Auditorium 1515 Young Street
Lewisville	January 27, 2000	7:00 p.m.	Lewisville City Council Chambers Municipal Center
Fort Worth	January 28, 2000	10:00 a.m.	Council Chambers, 2nd Floor Fort Worth City Hall 1000 Throckmorton
Beaumont	January 31, 2000	1:30 p.m.	John Gray Institute 855 Florida Avenue

Houston	January 31, 2000	7:00 p.m.	Houston-Galveston Area Council 3555 Timmons Lane

The hearings are structured for the receipt of oral or written comments by interested persons. Individuals may present oral statements when called upon in order of registration. Open discussion will not be permitted during the hearings; however, agency staff members will be available to discuss the proposal 30 minutes prior to each hearing and will answer questions before and after the hearings. Written comments will also be accepted via mail or fax. All comments should be submitted to Lola Brown, Office of Environmental Policy, Analysis, and Assessment, P.O. Box 13087, MC 205, Austin, Texas 78711-3087 or fax number (512) 239-4808. The public comment period will close on February 1, 2000.

1.3 SOCIAL AND ECONOMIC CONSIDERATIONS

For a detailed explanation of the social and economic issues involved with any proposed strategies please refer to the preambles that precede each rule package accompanying this SIP.

1.4 FISCAL AND MANPOWER RESOURCES

The state has determined that its fiscal and manpower resources are adequate and will not be adversely affected through implementation of this plan.

CHAPTER 2: EMISSIONS INVENTORY

2.1 OVERVIEW

The 1990 Amendments to the FCAA require that emissions inventories be prepared for ozone nonattainment areas. Because ozone is photochemically produced in the atmosphere when VOCs are mixed with NO_x and CO[1] in the presence of sunlight, it is important that the planning agency compile information on the important sources of these precursor pollutants. It is the role of the EI to identify the source types present in an area, the amount of each pollutant emitted, and the types of processes and control devices used. The EI provides data for a variety of air quality planning tasks, including establishing baseline emission levels, calculating reduction targets, control strategy development for achieving the required emission reductions, emission inputs into air quality simulation models, and tracking actual emission reductions against the established emissions growth and control budgets. The total inventory of emissions of VOC, NO_x, and CO for an area is summarized from the estimates developed for five general categories of emissions sources, which are each explained below.

2.2 POINT SOURCES

Major point sources are defined for inventory purposes in nonattainment areas as industrial, commercial, or institutional sources which have actual emissions of criteria pollutants at or above the following levels: 10 tpy of VOC, 25 tpy of NO_x, or 100 tpy of any of the other criteria pollutants, CO, SO_x, PM_{10}, or lead. For the remaining areas of the state, any company that emits a minimum of 100 tpy of any criteria pollutant must submit an inventory. Additionally, any source which generates or has the potential to generate at least 10 tpy of any single HAP or 25 tpy of aggregate HAPs is also required to report emissions to the commission.

To collect emissions and industrial process operating data for these plants, the commission mails EIQs to all sources identified as having emissions at or above the triggering level. Companies are asked to report not only emissions data for all emissions generating units and emission points, but also the type, and, for a representative sample of sources, the amount of materials used in the processes which result in emissions. Information is also requested in the EIQ on process equipment descriptions, operation schedules, emissions control devices currently in use, abatement device control efficiency, and stack parameters such as location, height, and exhaust gas flow rate. All data submitted via the EIQ are then subjected to rigorous quality assurance procedures by the technical staff of the Industrial Emissions Assessment Section and entered into the PSDB by the Data Services Section.

In projecting point source emissions to the attainment year of 2007, commission staff used actual emission trends as determined by a survey conducted in 1996. The survey results enabled staff to account for declining NO_x emission rates observed from 1990 to 1996. This method ensures that only trends reflecting real reductions in emissions will be used in the future year projection. The methodology and conclusions of this procedure are presented in Appendix A.

2.3 AREA SOURCES

To capture information about sources of emissions that fall below the point source reporting levels and are too numerous or too small to identify individually, calculations have been performed to estimate emissions

[1]CO plays a relatively minor role in ozone formation compared with VOC and NO_x.

from these sources on a source category or group basis. Area sources are commercial, small-scale industrial, and residential categories of sources which use materials or operate processes which can generate emissions. Area sources can be divided into two groups characterized by the emission mechanism: hydrocarbon evaporative emissions or fuel combustion emissions. Examples of evaporative losses include printing, industrial coatings, degreasing solvents, house paints, leaking underground storage tanks, gasoline service station underground tank filling, and vehicle refueling operations. Fuel combustion sources include stationary source fossil fuel combustion at residences and businesses, as well as outdoor burning, structural fires, and wildfires. These emissions, with some exceptions, may be calculated by multiplication of an established emission factor (emissions per unit of activity) times the appropriate activity or activity surrogate responsible for generating emissions. Population is the most commonly used activity surrogate for many ASCs, while other activity data include amount of gasoline sold in an area, employment by industry type, and acres of cropland.

2.4 ON-ROAD MOBILE SOURCES

On-road mobile sources consist of automobiles, trucks, motorcycles, and other motor vehicles traveling on public roadways in the nonattainment area. Combustion related-emissions are estimated for vehicle engine exhaust; evaporative hydrocarbon emissions are estimated for the fuel tank and other evaporative leak sources on the vehicle. Emission factors have been developed using the EPA's mobile emissions factor model, MOBILE5a. Various inputs are provided to the model to simulate the vehicle fleet driving in each particular nonattainment area. Inputs include such parameters as vehicle speeds by roadway type, vehicle registration by vehicle type and age, percentage of vehicles in cold start mode, percentage of miles traveled by vehicle type, type of I/M program in place (if applicable), and gasoline vapor pressure. All of these inputs have an impact on the emission factor calculated by the MOBILE model, and every effort is made to input parameters reflecting local conditions. To complete the emissions estimate the emission factors calculated by the MOBILE model must then be multiplied by the level of vehicle activity, VMT. The level of vehicle travel activity is developed from travel demand models run by the Texas Department of Transportation or the local council of governments. The travel demand models have been validated against a large number of ground counts of traffic passing over counters placed in various locations throughout each county. Estimates of VMT are often calibrated to outputs from the federal HPMS, which is a model built from a smaller number of traffic counters. Finally, roadway speeds, which are required for the MOBILE model's input, are calculated by a post-processor to the travel demand model.

The BPA on-road mobile source emissions inventory is being developed under contract to the commission by TTI. Task 1 of TTI's current work order calls for preparation of a link-based, bottom-up on-road mobile source inventory for BPA, using EPA's MOBILE5a model. This work was completed in Summer of 1999. The on-road mobile inventory numbers given in this SIP reflect the final TTI data, and are given in Table 2-1.

2.5 2007 MOTOR VEHICLE EMISSIONS BUDGETS

The 2007 on-road mobile source inventory figures for VOC and NO_x determine the motor vehicle emission budgets for 2007. The budgets, used for transportation conformity purposes, are identified as being 17.22 tpod for VOC and 29.94 tpod for NO_x. These figures have been calculated by subtracting all on-road mobile source reductions from the projected, uncontrolled 2007 on-road mobile source emissions forecast. The on-road mobile inventory numbers reflect the final data provided by TTI in Summer of 1999. Motor vehicle emission budget calculations are shown in Table 2.5-1.

Table 2.5-1
2007 Motor Vehicle Emission Budgets for BPA

	VOC (tpod)	NO_x (tpod)
2007 on-road emissions projection	20.87	36.72
FMVCP, Tier I credits (1990-1996)	0.21	0.00
FMVCP, Tier I credits (1990-2007)	3.44	6.78
1996 transportation control measures	0.00	0.00
2007 transportation control measures	0.00	0.00
2007 motor vehicle emissions budget	17.22	29.94

2.6 NON-ROAD MOBILE SOURCES

Non-road mobile sources are a subset of the area source category. This subcategory includes aviation aircraft, marine vessels, recreational boats, railroad locomotives, and a very broad category that includes everything from the engines on farm and construction equipment to trimmers. Calculation methods for emissions from non-road engine sources vary considerably because of the differences in usage patterns, but in general they are based on manufacturer-supplied information about engine horsepower, load factor, emission factors, usage, and equipment sales and distribution. Emission estimates for all sources in the non-road category except aircraft were originally developed by a contractor to EPA's Office of Mobile Sources, and subsequently commission staff have projected the emission levels using EGAS. Aircraft emissions were estimated with landings and takeoff data for airports in each area multiplied by EPA-developed emission factors for aircraft operations.

2.7 BIOGENIC SOURCES

Biogenic sources are another subset of area sources, and include hydrocarbon emissions from crops, lawn grass, and forests, as well as a small amount of NO_x emissions from soils. Plants are sources of VOC such as isoprene, monoterpene, and alpha-pinene. Tools for estimating emissions include satellite imaging for mapping of vegetative types, field biomass surveys, and computer modeling of emissions estimates based on emission factors by plant species (PCBEIS-2). Emissions from biogenic sources are subtracted from the inventory prior to determining any required reductions for a ROP plan. However, the biogenic emissions are important in determining the overall emissions profile of an area and therefore are required for regional air quality dispersion modeling.

2.8 EMISSIONS SUMMARY

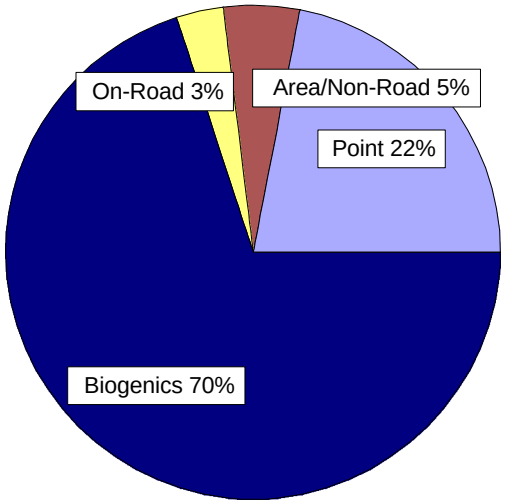
The 1993 base case emissions inventory summary for the BPA nonattainment area is included in Figures 2.8-1 and 2.8-2 for VOC and NO_x, respectively. CO emissions will be disregarded for purposes of this discussion. Contributions from VOC emission sources in ranking order are as follows: biogenic sources make up 70%; point sources make up 22%; area and non-road sources are 5%; and on-road mobile sources are 3%. Contribution from NO_x emissions sources in ranking order are as follows: point sources 68%; on-road mobile 18%; area and non-road sources 13%; and biogenic sources 1%.

The 2007 future base case emission inventory for the BPA nonattainment area is summarized in Figures 2.8-3 and 2.-4 for VOC and NO_x, respectively. The 2007 emissions inventory is estimated based on

projections from the 1993 base case inventory. Contributions from VOC sources in the 2007 inventory consist of the following: biogenic sources 71%; point sources 22%; area and non-road sources 5%; and on-road mobile sources 2%. Contributions from NO_x sources consist of the following: point sources 69%; on-road mobile sources 16%; area and non-road sources 14%; and biogenic sources 1%.

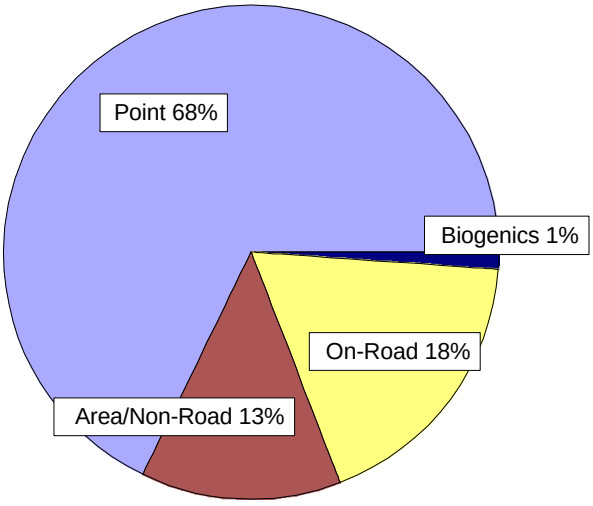
In summary, the percentages for both the 2007 VOC and NO_x emissions inventory increased for on-road mobile, area, and non-road mobile sources, and decreased for point sources.

Figure 2.8-1 - 1993 VOC Emissions in BPA



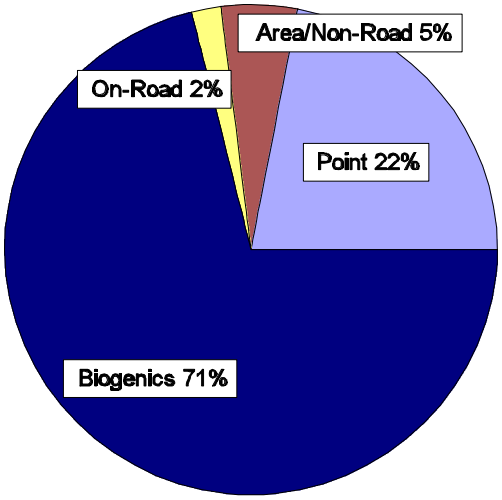
22% or 179 tpd
5% or 44 tpd
3% or 22 tpd
70% or 564 tpd

Figure 2.8-2 - 1993 NOx Emissions in BPA



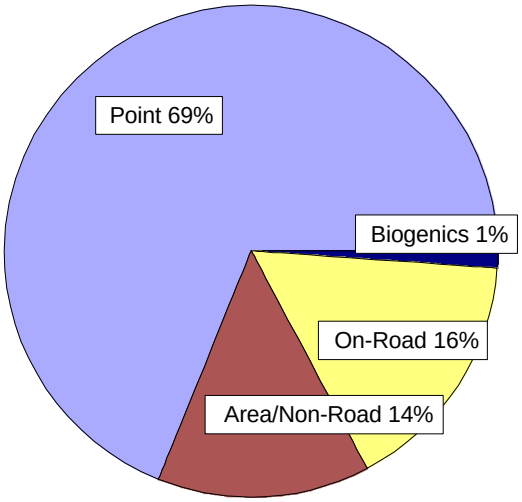
68% or 175 tpd
13% or 33 tpd
18% or 45 tpd
1% or 3 tpd

Figure 2.8-3 - 2007 VOC Emissions in BPA



22% or 179 tpd
5% or 39 tpd
2% or 18 tpd
71% or 564 tpd

Figure 2.8-4 - 2007 NOx Emissions in BPA



69% or 155 tpd
14% or 32 tpd
16% or 35 tpd
1% or 3 tpd

CHAPTER 3: PHOTOCHEMICAL MODELING

This chapter briefly describes the photochemical modeling conducted to demonstrate attainment of the 1-hour ozone standard in the BPA nonattainment area. This attainment demonstration used the September 8-11, 1993 ozone episode. This episode occurred during the COAST study, and included a rich collection of meteorological, aerometric, and emissions data. A complete technical description of the modeling conducted using the September 8-11, 1993 ozone episode is in Appendix A, the commission's May 1998 Attainment Demonstration for the HGA ozone nonattainment area. This BPA attainment demonstration will include the effects of specific point source NO_x rules that will be implemented in the BPA area, as well as the effects of other local, regional, and national, controls. In accordance with EPA's transport policy, an attainment year of 2007 (to coincide with the HGA area's attainment year) was used. Several enhancements to the traditional photochemical modeling approach were used. These include:

- Use of the public domain CAMx model. A description of the migration from UAM-V to CAMx is found in Appendix B.

- New biogenic emissions based on a comprehensive survey of biomass in the HGA and BPA nonattainment areas. A description of the changes in biomass and the effect on the base case photochemical modeling is in Appendix C

- Revised and enhanced 2007 projected on-road mobile source emissions for the HGA nonattainment counties. Also found in Appendix C.

- New emissions growth projections for point and non-road mobile sources based on, respectively, an industry survey by the commission and EPA's new Non-road model. (A complete description of how these projections were made is found in Appendix D).

- Emissions modeling using the SMOKE emissions modeling system. (Also found in Appendix D.)

- Future initial and boundary conditions derived from regional modeling conducted with CAMx (replacing similar initial and boundary conditions based upon UAM-V modeling). This is documented in Appendix E.

Because some of these changes potentially could affect the model's ability to replicate observed ozone concentrations, the 1993 base case model performance was reevaluated after updating the emissions. A number of statistical and graphical analyses were performed to compare the model's predicted ozone concentrations with monitored data. The results of this base case modeling are fully described in Appendix F. Model performance met EPA performance specifications in the BPA area for all days of this episode, with the exception of September 8, 1993. However, since this date had no monitored exceedances in the BPA subdomain, it is not required for control strategy evaluation. A set of diagnostic and sensitivity analyses were performed to ensure that the model responded as expected to perturbations in the input data, and these analyses showed that the model behaved as expected in all cases. These studies conclude that September 10, 1993 shows excellent agreement between modeled and monitored data. The commission has determined, with EPA's concurrence, that September 10 is the controlling day for the modeled episode. The control strategies modeled as part of this SIP revision are based on this conclusion. A complete discussion of the sensitivities and diagnostics is found in Appendix F.

The next step in the attainment demonstration was to assess the effects of proposed rules to be implemented for the BPA area. After establishing that the current model's base case performance was acceptable, emissions were projected from 1993 to the attainment year of 2007, and then a number of controls were applied to form the future base. The growth factors that were used to grow the point source NO_x accounted for the inclusion of shutdown and banked point source emissions. Banked emissions are emissions that have been taken out of an nonattainment area's inventory, but that could be used by companies needing emission credits. As the result of use of emission credits, emissions that formerly were banked are now emitted into the atmosphere.

Appendix A presents the methodology used to calculate the point source NO_x growth factor for the BPA nonattainment area. Taking the ratio of these two values gives the "growth" factor of 0.9744, which indicates a reduction in point source NO_x emissions for the BPA nonattainment area.

The future base modeled controls included previously adopted ROP reductions, NO_x RACT, and several rules proposed or adopted at the national level, such as low-sulfur fuels and rules governing the manufacture of small engines. In addition, an assumed list of control strategies in both the HGA area and in the central and east Texas counties was modeled. These controls, by category, were as follows:

Regional Reductions:

- SB 7 mandated that grandfathered EGFs in central and eastern Texas reduce emissions by 50% of 1997 levels

- Sources identified as grandfathered were reduced by 30%, while sources identified as permitted were not reduced. Sources whose status could not be determined were reduced by the average (weighted) value of 13%.

- Emissions from EGFs in the remainder of the state are also to be reduced by 30%

- In Oklahoma, Arkansas, Louisiana, Mississippi, and Florida, a reduction of 30% from 1996 emission levels was assumed for all point source NO_x to reflect national trends towards lowered emissions. In Georgia, Missouri, Kentucky and Tennessee, NO_x emissions were reduced by 59% from 1996 levels to reflect reductions expected under EPA's NO_x SIP Call.

On-road Mobile Sources:

On-road mobile sources, HGA eight-county nonattainment area:

California RFG fuel standards
California diesel fuel standards
Conversion of transit buses to compressed natural gas or cleaner fuel
Additional transportation control measures
Texas Motorists' Choice I/M program in Harris County
Increased I/M compliance rate due to registration denial

On-road mobile sources, central and east Texas counties (excluding HGA and BPA nonattainment counties):

Clean-burning gasoline

On-road mobile sources, central and east Texas counties, plus HGA and BPA nonattainment counties:

FMVCP
NLEV standards
Federal low sulfur gasoline
Tier II vehicle emission standards
Heavy-duty diesel standards
Update Tier II vehicles, low sulfur assumptions based on new EPA information

Offroad Mobile Sources:

Offroad mobile sources, eight-county HGA nonattainment area:
California RFG fuel standards
California diesel standards
California recreational vehicle standards
Reduce construction equipment NO_x emissions by 33%

Off-road mobile, central and east Texas counties (excluding HGA and BPA nonattainment counties):
Clean-burning gasoline

Off-road mobile, central and east Texas counties plus HGA and BPA nonattainment counties:
Locomotive standards
Compression ignition standards for vehicles and equipment
Spark ignition standards for vehicles and equipment
Commercial marine vessel standards
Recreational marine standards
Heavy duty diesel standards

Area Sources:

Low NO_X standards for new water heaters and furnaces

Stationary Sources:

Stationary sources, eight-county HGA nonattainment area:

Tier III point source controls (flue-gas cleanup plus burner modification)

A full description of these emission control scenarios is in Appendix D.

Additional controls modeled in the BPA area consisted of the following:

- VOC and NO_x controls due to federally-mandated rules such as FMVCP, Tier I, heavy duty diesel engines, small engines, locomotives, and recreational marine engines

- NO_x controls on several categories of point sources, including boilers, heaters, utility boilers, turbines, lean burn gas-fired internal combustion engines, and rich burn gas-fired rich-burn internal combustion engines.

Emission limits were assigned to the following categories of combustion units of the categories and sizes listed in Table 3-1 below. Table 3-1 also shows corresponding reduction in the NO_x emissions inventory from each control strategy.

Table 3-1. Modeled NO_x Reductions from Selected Source Categories

Category	Maximum design heat input	NO_x emission limit	% change from 2007 future base
Electric utility boilers	All units	0.10 lb/MMBtu	-45%
Industrial boilers*	≥40 MMBtu/hr	0.10 lb/MMBtu	-58%
Industrial process heaters	≥40 MMBtu/hr	0.08 lb/MMBtu	-32%
Rich-burn engines	300 hp	2 g/hp-hr	-82%
Lean-burn engines	300 hp	3 g/hp-hr	-73%
OVERALL	**–**	**–**	**-38%**

*This reduction was not applied to BIF units out of technical and economic considerations, based on the special design and operational requirements for destruction of hazardous air pollutants by BIFs.

The modeling indicates that the 1-hour maximum modeled ozone concentration over the BPA area, with these controls in place, is 131 ppb.

A summary of the emission reductions for these modeling scenarios is in Table 3-2.

Table 3-2 Point Source NO_x Emissions - Base Cases and Control Case

Modeling Scenario	Emissions of Point source NO_x (tons/day)	Percent reduction
1993 base case	175	
2007 future base case (with shutdowns and banked emissions added in)	170.49	2.57
2007 control case, including point source NO_x control rules	96.57	44.8

Table 3-3 lists the results of the modeling for both modeled episodes.

Table 3-3. Results of Attainment Demonstration Modeling

Maximum daily modeled ozone for BPA control scenario				
	Sept. 8*	**Sept. 9**	**Sept. 10**	**Sept. 11**
1993 base case	165	139	155	162
2007 future base case D	150	126	142	147
2007 control case	136	114	131	139

* September 8 base case model performance was outside of EPA specifications.

The control case modeling reflects a point source NO_x reduction of roughly 44% from the 1993 base case. The modeled concentration (131 ppb) corresponding to this emission value is still greater than the 0.12 ppm standard, which is equivalent to 120 ppb. (Using EPA's rounding convention, monitored or modeled ozone concentrations of less than 125 ppb are considered in attainment of the standard.) However, a future design value (DVf) calculation estimates the future design value over the BPA domain to be 116 ppb, which is less than the 1-hour standard. The commission believes that the modeled point source NO_x rules, coupled with the DVf calculations, demonstrate that BPA will attain the 1-hour ozone standard.

CHAPTER 4: DATA ANALYSIS

(No additions or revisions.)

CHAPTER 5: RATE OF PROGRESS

The BPA ozone nonattainment area was reclassified as a moderate area by the EPA, effective June 3, 1996. Under FCAA requirements for moderate areas, the state was required to submit a SIP for BPA demonstrating a 15% VOC emission reduction, net of growth, for the years between 1990 and 1996. That 15% ROP SIP was adopted by the commission on November 10, 1993 and May 13, 1994 and submitted to the EPA. Areas classified as serious and above are required by the FCAA to submit a 9% ROP SIP, achieving reductions of 3% per year, net of growth, for the years between 1996 and 1999, and every three years thereafter until attainment is reached. For these “post-96" reductions, however, NO_x reductions may be substituted for VOC reductions. Because of BPA’s reclassification to moderate, the 9% ROP SIP developed for BPA was withdrawn by the state.

The BPA area did not attain the 1-hour ozone standard by the November 15, 1996 deadline for moderate areas, and also did not attain the standard by November 15, 1999, the deadline for serious areas. As part of the initial negotiations, a proposed 24% ROP was put forward to meet the requirements of EPA’s Transport Policy. EPA’s letter of May 19, 1999 stated that reliance on the 24% ROP alone was not sufficient for an approvable attainment demonstration, and that additional reductions would be required. As a result, the state eliminated the 24% ROP and is instead developing a more stringent set of NO_x reductions to be achieved by rulemaking. The BPA SIP adopted by the commission on October 27, 1999 represented the first phase of these attainment demonstration NO_x reductions. The current SIP revision includes the second phase of NO_x reductions for the attainment demonstration.

CHAPTER 6: REQUIRED CONTROL STRATEGY ELEMENTS

FCAA, §182(f) requires that NO_x RACT be applied to all major sources of NO_x in ozone nonattainment areas classified moderate and above. This section of the FCAA states that the requirements for major stationary sources of VOC shall also apply to major stationary sources of NO_x. However, in contrast to VOC RACT, neither the FCAA nor the EPA specify presumptive NO_x RACT limits in the form of CTGs. As required by the FCAA, §183(c), the EPA instead issued ACT documents for categories of stationary sources of VOC and NO_x that emit more than 25 tons per year. The NO_x ACTs were issued for nine NO_x point source categories: nitric acid and adipic acid manufacturing plants, stationary gas turbines, process heaters, internal combustion engines, utility boilers, cement manufacturing, iron and steel mills, glass manufacturing, and industrial/commercial/institutional boilers. These documents identify NO_x control technologies and costs, but do not establish presumptive RACT levels.

In response to the FCAA requirements, the commission adopted NO_x RACT rules effective June 9, 1993, in Chapter 117, "Control of Air Pollution from Nitrogen Compounds." These requirements apply to electric utility boilers, industrial boilers and process heaters, gas turbines, rich-burn stationary gas-fired internal combustion engines, nitric acid plants, and adipic acid plants in the BPA area.

On October 27, 1999, the commission adopted revisions to 30 TAC Chapter 117 by adding an emission limit of 3 g NO_x/hp-hr for gas-fired, lean-burn stationary internal combustion engines rated 300 hp or greater. An analysis of the agency's recent emissions inventory data indicates that about 27 lean-burn engines, operated at five major sources of NO_x in the BPA area, are required to reduce NO_x emissions under the adopted emission limit. The existing Chapter 117 exemptions for rich-burn engines apply to lean-burn engines as well. These exemptions include the following: engines that are employed in research, testing, emergency, firefighting, or agricultural uses (among others), or that are demonstrated to operate less than 850 hours per year. The adopted rule sets an expeditious compliance date of November 15, 2001, or approximately two years after the effective date of the rule. The commission estimates that this rule will achieve NO_x reductions of 6.90 tpod below 1997 levels, or expressed as reductions below the projected 2007 levels, 6.80 tpod. The percent reduction is calculated by subtracting the 3 g NO_x/hp-hr emission limit from the emission factors, in g NO_x/hp-hr, used in the 1997 emissions inventory.

6.1 PHASE I RULEMAKING

The October 27, 1999 SIP revision represents "Phase I" of the state's NO_x rulemaking activities for the BPA attainment demonstration. As part of that SIP revision, adopted VOC rules for batch process and industrial wastewater sources and NO_x rules for lean-burn engines were submitted to EPA by November 15, 1999. The Phase I NO_x rules achieve reductions of 6.80 tpod from the projected BPA 2007 NO_x point source emissions inventory. Table 6.1-1 provides a summary of NO_x reductions to be achieved by 2000, including reductions obtained from Phase I rules.

Table 6.1-1

NO_x Reduction Estimates
(includes Phase I and Phase II rules)

Emissions Inventory	1990	Percent of 1990 Total	Growth	2007	Percent of 2007 Total
Area sources	1.44	0.5%	-13.2%	1.25	0.5%
Point sources	221.01	78.1%	-44.8%	170.51	50.2%
On-road mobile sources	27.15	9.6%	31.2%	35.61	14.6%
Non-road mobile sources	33.32	11.8%	152.7%	84.21	34.6%
TOTALS	**282.92**		**-14.1%**	**243.13**	

EPA-ISSUED RULES	2007 Projected tpod	Reduction, tpod
FMVCP, Tier I, NLEV, on-road HDD	35.61	6.40
Locomotive engines	5.24	1.89
Non-road HDD	28.42	7.73
Small engines	0.49	-0.48
Recreational marine engines	0.13	-0.10
Subtotal	68.69	15.44
TNRCC-ISSUED RULES		
FCAA NO_x RACT:		
Rich-burn engines (compliance date 11/99)		
Attainment Demonstration NO_x Rules:		
Electric utility boilers		
Industrial boilers		
Industrial process heaters		
Gas turbines		
Lean-burn engines		
Subtotal	**170.51**	**75.09**
TOTAL	**240.40**	**90.53**

6.2 PHASE II RULEMAKING

This strategy represents "Phase II" of the state's NO_x rulemaking activities for the BPA attainment demonstration. The adopted "Phase I" rules, for lean-burn engines in BPA, and a concurrent SIP revision, were submitted to EPA on November 12, 1999. The state committed in the SIP to develop additional NO_x rules as needed for attainment in BPA. These "Phase II" rules needed for attainment are expected to be submitted to EPA in April, 2000.

This strategy would apply to major stationary sources of NO_x in BPA. The proposed NO_x emission limit of 0.10 lb NO_x/MMBtu for the five electric utility power boilers in BPA represents approximately a 50% reduction in emissions from this source category. The proposed NO_x emission limit of 0.10 lb NO_x/MMBtu for industrial boilers and 0.08 lb NO_x/MMBtu for process heaters would require four refineries and 15 chemical plants which are major sources of NO_x in BPA to reduce their total NO_x by approximately 20%.

The emission reductions necessary for the BPA attainment demonstration SIP are based on the modeling episode from September 6-11, 1993, and the controlling day, September 10, 1993. The control case modeling reflects a point source NO_x reduction of roughly 40%. The commission believes that the modeled point source BPA NO_x rules, coupled with numerous additional reductions, including on-road and non-road reductions within the area (identified in Table 6.1-1), and reductions in all categories outside the area, and the design value calculations in the SIP being proposed for public hearing concurrently with these proposed rules, demonstrate that BPA will attain the 1-hour ozone standard by 2007.

6.3 WEIGHT OF EVIDENCE ANALYSES

6.3.1 Future Design Value Calculations

According to EPA's documents *Guidance on the Use of Modeled Results to Demonstrate Attainment of the Ozone NAAQS* (1996), and *Guideline for Regulatory Application of the Urban Airshed Model* (1991), the attainment test is based on the results of photochemical modeling. That is, a future attainment year case is modeled with one or more control strategies and if the modeling shows that all grid cells are less than 125 ppb (0.12 ppm), the area meets the 1-hour ozone NAAQS. However, actual monitored compliance with the standard is based on an area having no more than three expected exceedances at any monitor over a three year period. Due to the discrepancy of the modeled test versus the monitored compliance test, EPA developed the concept of WOE. Weight of Evidence allows states to use additional corroborative information to demonstrate that an area would attain the standard in the future, even though the area could not meet the modeled attainment test. For 1-hour ozone SIPs, WOE approaches may include correlation of modeled results with monitored values, analysis of trends from monitoring data (ozone and precursors), empirical analyses based only on monitoring data (observational data), and other modeling metrics beyond the maximum concentration test.

In EPA's draft guidance document entitled *Use of Models and Other Analyses in Attainment Demonstrations for the 8-Hour Ozone NAAQS (Draft)* (1998), additional WOE approaches are discussed that include methods that relate modeled ozone concentrations to monitored design values for a particular area. This method couples relative model response to controls of precursors back to actual monitored data, thus allowing a more robust comparison between the deterministic model and the probabilistic standard. A problem with using the deterministic test is that model performance can be biased high, yet still meet EPA performance criteria. In cases where model performance is biased high, it can be argued that solely tying attainment to a modeled test would result in over control of ozone precursors. An advantage of being able

to tie relative model response to actual monitored values would be to dampen out or account for inherent model over-prediction. In EPA's 1998 draft document, this approach is suggested as an integral part of the attainment demonstration. Since this approach is relevant to the 1-hour standard the commission is applying this concept, called the future design value, to the BPA 1-hour ozone attainment demonstration SIP.

6.3.2 Description of Methodology

The approach used here is based on EPA's *Use of Models and Other Analyses in Attainment Demonstrations for the 8-Hour Ozone NAAQS (Draft)* (1998). Since the ozone modeling conducted over the BPA 3-county area was based on 4 km by 4 km grid cells, a 15-km radius centered on a particular monitor is best approximated by a 9 cell by 9 cell array about the monitor. The EPA guidance suggests using monitoring data from the 3-year time frame around the modeled episode. Since both BPA episodes occurred in 1993, monitoring data from 1992 to 1994 was used. The design values (4th highest monitored value at each monitor for 1992-1994) for both commission and SETRPC monitors from that time period are found in Table 6.3-1.

Table 6.3-1. Design Values for BPA Area Monitors

Site	UTM Easting	UTM Northing	Description	1992-1994 Design Value (DVC) (ppb)
BMTC	396.4	3323.4	CAMS2, Beaumont, Jefferson County	124
PAWC	404.6	3307.3	CAMS28, Port Arthur West, Jefferson County	119
WORA	426.6	3328.4	CAMS9, West Orange, Orange County	123
S40S	413.2	3287.7	SETRPC 40, Sabine Pass, Jefferson County	135
S42S	415.9	3338.8	SETRPC 42, Mauriceville, Orange County	134
S43S	403.1	3312.0	SETRPC 43, Jefferson County Airport, Jefferson County	136
KTZA	373.6	3361.6	CAMS85, Kountze, Hardin County	109

For each of these sites, the 1993 base case maximum modeled concentration, for each day of the two episodes, found within the 9 by 9 cell array surrounding the monitor was selected. This is denoted as P_c. P_c values that met the following criteria were excluded from future consideration: (1) DVc was less than or equal to 125 ppb and P_c was less than 100 ppb or (2) DVc was less than 125 ppb and P_c was less than

DVc minus 20 ppb (DVc - 20). This is done because model results will probably not show much response to emission reductions for these scenarios and these values are significantly less than the standard. In addition, it is possible that values listed as the maximum concentration within the 9 by 9 array may actually be greater than the modeled maximum found over the 3-county area. This is because all values within the 9 by 9 array are used, even those that occur outside the 3-county area or occur over water (e.g. Sabine Pass). Table 6.3-2 lists the P_c values for each of the monitors, for each of the episode days. The last column is the mean of the maximum modeled values for each monitor over all episode days.

Table 6.3-2. Model Predicted Maximum Ozone Concentrations Near BPA Monitors - 1993 Base Case

Site	92-94 DVC	9/1/93	9/2/93	9/8/93*	9/9/93	9/10/93	9/11/93**	Mean P_c
BMTC	124	***	114.9	155.8	121.4	140.7	160.7	138.7
PAWC	119	99.6	107.6	155.8	124.1	142.6	145.1	129.1
WORA	123	110.8	132.6	149.3	144.2	138.2	132.1	134.5
S40S	135	103.0	***	149.0	117.8	157.8	122.6	130.0
S42S	134	106.2	129.0	130.8	132.7	130.6	152.6	130.3
S43S	136	***	115.6	155.8	123.3	142.6	152.4	137.9
KTZA	109	***	122.3	120.5	116.9	95.5	162.8	123.6

* Base case model performance for 9/8/93 is outside EPA performance criteria.
** BPA area affected by rebound of boundary conditions.
*** Data excluded because of DVc <= 125 ppb and P_c < 100 ppb or DVc < 125 ppb and P_c < (DVc -20) ppb

The next step in applying the future design value approach is to develop a similar table, only using future base case and/or additional control strategy model runs. Table 6.3-3 has the corresponding modeled concentrations based on the 2007 future base case modeling for both episodes. The predicted values are referred to as P_f. The 2007 future case accounts for both growth, as well as controls that will be in place by this time. As before, the P_f values are based on the maximum modeled concentration within the 9 by 9 array of cells centered on the monitoring site.

Table 6.3-3 Model Predicted Maximum Ozone Concentrations Near BPA Monitors - 2007 Future Base Case

Site	92-94 DVC	9/1/93	9/2/93	9/8/93*	9/9/93	9/10/93	9/11/93**	Mean P_f
BMTC	124	***	104.5	141.6	110.1	129.3	146.8	126.5
PAWC	119	90.5	98.0	141.6	113.3	131.8	133.0	118.0
WORA	123	100.7	120.3	135.7	130.0	126.9	122.7	122.7
S40S	135	96.9	***	133.5	108.8	145.3	112.5	119.4
S42S	134	96.5	116.1	118.7	120.4	115.5	138.3	117.6
S43S	136	***	104.6	141.6	111.9	131.8	141.8	126.3
KTZA	109	***	111.1	110.0	106.7	90.0	147.3	113.0

* Base case model performance for 9/8/93 is outside EPA performance criteria.

** BPA area affected by rebound of boundary conditions.

*** Data excluded because of DVc <= 125 ppb and P_c < 100 ppb or DVc < 125 ppb and P_c < (DVc -20) ppb

In order to calculate the future design value, DVf, it is necessary to develop a ratio of the predicted future case model results to that of the original base case modeling results. There are two methods proposed to do this. One is referred to as the (1) mean of the ratios, while the other is (2) the ratio of the means. In Method (1), for each combination of monitor location and episode day, the relative reduction factor (RRF) is calculated as the ratio of the modeled maximum concentration for the future condition, P_f in Table 3-6, divided by the corresponding maximum concentration for the base case, P_c in Table 3-5. Then the mean of these ratios is calculated for each monitor site.

Table 6.3-4 is a list of the Relative Reduction Factors (RRF) for each combination of P_f/ P_c for each day of both episode. The Mean column is the average of each day/monitor's RRF. This value is multiplied by the DVc in column 2 to calculate DVf(2) in the last column.

Table 6.3-4. Daily Relative Reduction Factors for 2007 Future Base Case - Means of the Ratios

Site	92-94 DVc	9/1/93	9/2/93	9/8/93*	9/9/93	9/10/93	9/11/93**	Mean (2)	DVf (2)
BMTC	124	***	0.91	0.91	0.91	0.92	0.91	0.91	113.0
PAWC	119	0.91	0.91	0.91	0.91	0.92	0.92	0.91	108.7
WORA	123	0.91	0.91	0.91	0.90	0.92	0.93	0.91	112.2
S40S	135	0.94	***	0.90	0.92	0.92	0.92	0.92	124.2
S42S	134	0.91	0.90	0.91	0.91	0.88	0.91	0.90	120.9
S43S	136	***	0.90	0.91	0.91	0.92	0.93	0.92	124.5
KTZA	109	***	0.91	0.91	0.91	0.94	0.90	0.92	99.9

Method (2) uses average P_c and P_f values, calculated for each monitor across all episode days. These averages are denoted in the last columns of Tables 6.3-2 and 6.3-3. Table 6.3-5 illustrates the use of the ratio of the means approach to develop the future design value, DVf. Comparing the results of Table 6.3-4 and Table 6.3-5, one can see that the results are essentially the same.

Table 6.3-5. DVf for BPA sites using Ratio of Means Approach - 2007 Future Base Case

Site	DVc	Mean P_c	Mean P_f	RRF (P_f/P_c)	DVf (1)
BMTC	124	138.7	126.5	0.91	113.1
PAWC	119	129.1	118.0	0.91	108.8
WORA	123	134.5	122.7	0.91	112.2
S40S	135	130.0	119.4	0.92	124.0
S42S	134	130.3	117.6	0.90	120.9
S43S	136	137.9	126.3	0.92	124.6
KTZA	109	123.6	113.0	0.91	99.7

For the purposes of the rest of the this analysis, only Method 2, the Ratio of the Means, will be used. In addition, values for September 8 will also be discarded, since base case model performance on this day was outside EPA acceptability criteria. Note that the RRF for this day are similar to the mean, so exclusion will not significantly alter the results.

Application to BPA Control Scenarios

Table 6.3-6 is similar to Table 6.3-5, except that instead of the future base case, this reflects modeling results based on control scenario 5b (e.g. lean-burn engines in BPA). Table 6.3-7 uses the ratio of the means to calculate DVfs for scenario 5b.

Table 6.3-6. Model Predicted Maximum Ozone Concentrations Near BPA Monitors - Control Scenario 5b

Site	92-94 DVC	9/1/93	9/2/93	9/8/93*	9/9/93	9/10/93	9/11/93**	Mean P_f
BMTC	124	***	95.6	139.2	100.5	124.8	141.7	120.4
PAWC	119	86.1	89.2	139.2	102.9	127.5	128.1	112.2
WORA	123	97.3	114.6	133.3	121.1	121.1	116.8	117.4
S40S	135	92.6	***	131.3	92	139.0	107.7	112.5
S42S	134	93.1	109.4	116.3	113.1	108.7	133.1	112.3
S43S	136	***	96.7	139.2	101.4	127.5	136.7	120.3
KTZA	109	***	86.3	91.1	89.1	82.5	142.1	98.2

Table 6.3-7. DVf for BPA sites using Ratio of Means Approach - Scenario 5b

Site	DVc	Mean P_c	Mean P_f	RRF (P_f/P_c)	DVf (1)
BMTC	124	138.7	120.4	0.87	107.6
PAWC	119	129.1	112.2	0.87	103.4
WORA	123	134.5	117.4	0.87	107.3
S40S	135	130.0	112.5	0.87	116.8
S42S	134	130.3	112.3	0.86	115.5
S43S	136	137.9	120.3	0.87	118.6
KTZA	109	123.6	98.2	0.79	86.6

The same approach is also done for scenario 5b1,which includes the Tier I point source controls within the BPA 3-county nonattainment area. Table 6.3-8 lists the maximum predicted ozone concentrations within the 9 by 9 cell matrix around each monitor, and Table 6.3-9 shows the DVf calculations based upon the Ratio of the Means.

Table 6.3-8. Model Predicted Maximum Ozone Concentrations Near BPA Monitors - Control Scenario 5b1

Site	92-94 DVC	9/1/93	9/2/93	9/8/93*	9/9/93	9/10/93	9/11/93**	Mean P_f
BMTC	124	***	93.5	133.6	97.6	120.4	136.5	116.3
PAWC	119	85.8	87.4	133.6	101.2	121.8	127.0	109.5
WORA	123	91.7	108.7	127.6	114.7	114.8	116.3	112.3
S40S	135	92.6	***	125.6	91.5	131.3	105.9	109.4
S42S	134	88.7	104.6	112.8	108.6	102.9	129.1	107.8
S43S	136	***	93.0	133.6	98.5	121.8	133.3	116.0
KTZA	109	***	86.3	90.9	89.0	82.2	136.1	96.9

Table 6.3-9. DVf for BPA sites using Ratio of Means Approach - Scenario 5b1

Site	DVc	Mean P_c	Mean P_f	RRF (P_f/P_c)	DVf (1)
BMTC	124	138.7	116.3	0.84	104.0
PAWC	119	129.1	109.5	0.85	100.9
WORA	123	134.5	112.3	0.83	102.7
S40S	135	130.0	109.4	0.84	113.6
S42S	134	130.3	107.8	0.83	110.8
S43S	136	137.9	116.0	0.84	114.4
KTZA	109	123.6	96.9	0.78	85.5

This technique demonstrates that although the modeled maximum concentration over the domain for Scenario 5b1 is 129 ppb (for September 10), the calculated future design value is 114.4 ppb, which is less than the 1-hour standard of 0.12 ppm (125 ppb). This is illustrated in Table 6.3-10.

Table 6.3-10. Summary of Modeled Maximum Concentrations vs DVf

Scenario	9/8/93 P_f*	9/9/93 P_f	9/10/93 P_f	9/11/93 P_f**	DVf
1993 Base	165 (P_c)	139 (P_c)	155 (P_c)	162 (P_c)	n/a
2007 future base	150	126	142	147	124.6
5b	139	117	136	142	118.6
5b1	133	111	129	136	114.4

* Base case model performance is outside EPA acceptability criteria within BPA area for 9/8/93.
** BPA affected by rebound of overestimated boundary conditions.

Changes to Future Design Values with new Future Base Case

As a result of comments received, The commission reran the future base case and control case scenarios to assess the impact of adding back banked and shutdown emissions. This revised modeling also included new boundary conditions to account for the previously overestimated boundary conditions occurring in the BPA area on September 11. Since the maximum concentrations changed, so did the calculated Future Design Values. Table 6.3-11 shows the results of this revised 2007 base case run.

Table 6.3-11. Model Predicted Maximum Ozone Concentrations Near BPA Monitors - Revised 2007 Future Base Case

Site	92-94 DVC	9/1/93	9/2/93	9/8/93*	9/9/93	9/10/93	9/11/93**	Mean P_f
BMTC	124	***	104.5	142.9	112.2	132.5	149.1	128.2
PAWC	119	90.5	98.0	142.9	114.2	134.8	134.6	119.2
WORA	123	100.7	120.3	138.1	133.2	130.3	123.0	124.3
S40S	135	96.9	***	135.0	109.1	149.3	111.7	120.4
S42S	134	96.5	116.1	122.1	122.4	119.0	140.9	119.5
S43S	136	***	104.6	142.9	113.9	134.8	141.9	127.6
KTZA	109	***	111.1	110.0	106.6	89.9	150.3	113.6

* Base case model performance for 9/8/93 is outside EPA performance criteria.

Table 6.3-12 lists the future design values, using the ratio of the means approach for the revised 2007 future base case.

Table 6.3-12. DVf for BPA sites using Ratio of Means Approach - 2007 Revised Future Base Case

Site	DVc	Mean P_c	Mean P_f	RRF (P_f/P_c)	DVf (1)
BMTC	124	138.7	128.2	0.92	114.6
PAWC	119	129.1	119.2	0.92	109.8
WORA	123	134.5	124.3	0.92	113.6
S40S	135	130.0	120.4	0.93	125.0
S42S	134	130.3	119.5	0.92	122.9
S43S	136	137.9	127.6	0.93	125.8
KTZA	109	123.6	113.6	0.92	100.2

Similarly, Tables 6.3-13 and 6.3-14 show the maximum predicted concentration and ratio of the means-based future design value, respectively, for the revised 5b scenario.

Table 6.3-13. Model Predicted Maximum Ozone Concentrations Near BPA Monitors - Revised Control Scenario 5b

Site	92-94 DVC	9/1/93	9/2/93	9/8/93*	9/9/93	9/10/93	9/11/93**	Mean P_f
BMTC	124	***	95.6	140.7	101.2	125.9	142.5	121.2
PAWC	119	86.1	89.2	140.7	102.8	129.1	128.2	112.7
WORA	123	97.3	114.6	135.7	123.5	123.6	115.4	118.3
S40S	135	92.6	***	132.8	92.9	142.0	105.5	113.2
S42S	134	93.1	109.4	119.1	113.1	111.6	134.2	113.4
S43S	136	***	96.7	140.7	102.5	129.1	136.0	121.0
KTZA	109	***	86.3	91.1	89.1	81.9	143.5	98.4

Table 6.3-14. DVf for BPA sites using Ratio of Means Approach - Revised Scenario 5b

Site	DVc	Mean P_c	Mean P_f	RRF (P_f/P_c)	DVf
BMTC	124	138.7	121.2	0.87	108.3
PAWC	119	129.1	112.7	0.87	103.8
WORA	123	134.5	118.3	0.88	108.2
S40S	135	130.0	113.2	0.87	117.5
S42S	134	130.3	113.4	0.87	116.6
S43S	136	137.9	121.0	0.88	119.3
KTZA	109	123.6	98.4	0.80	86.8

Finally, Tables 6.3-15 and 6.3-16 show the maximum predicted concentration and ratio of the means-based future design value, respectively, for the revised 5b1 scenario.

Table 6.3-15. Model Predicted Maximum Ozone Concentrations Near BPA Monitors - Revised Control Scenario 5b1

Site	92-94 DVC	9/1/93	9/2/93	9/8/93*	9/9/93	9/10/93	9/11/93**	Mean P_f
BMTC	124	***	93.5	136.2	98.1	121.6	137.5	117.4
PAWC	119	85.8	87.4	136.2	100.7	123.2	125.4	109.8
WORA	123	91.7	108.7	130.1	116.8	116.5	114.2	113.0
S40S	135	92.6	***	127.8	91.1	133.5	105.4	110.1
S42S	134	88.7	104.6	114.0	109.6	105.0	128.7	108.4
S43S	136	***	93.0	136.2	98.9	123.2	133.9	117.0
KTZA	109	***	86.3	91.0	89.0	80.8	137.3	96.9

Table 6.3-16. DVf for BPA sites using Ratio of Means Approach - Revised Scenario 5b1

Site	DVc	Mean P_c	Mean P_f	RRF (P_f/P_c)	DVf
BMTC	124	138.7	117.4	0.85	104.9
PAWC	119	129.1	109.8	0.85	101.2
WORA	123	134.5	113.0	0.84	103.3
S40S	135	130.0	110.1	0.85	114.3
S42S	134	130.3	108.4	0.83	111.5
S43S	136	137.9	117.0	0.85	115.4
KTZA	109	123.6	96.9	0.78	85.4

This technique demonstrates that although the modeled maximum concentration over the domain for Scenario 5b1 is 131 ppb (for September 10), the calculated future design value is 115.4 ppb, which is less than the 1-hour standard of 0.12 ppm (125 ppb). This is illustrated in Table 6.3-17.

Table 6.3-17. Summary of Modeled Maximum Concentrations vs DVf (for revised 2007 base case)

Scenario	9/8/93 P_f*	9/9/93 P_f	9/10/93 P_f	9/11/93 P_f	DVf
1993 Base	165 (P_c)	139 (P_c)	155 (P_c)	162 (P_c)	n/a
2007 future base	150	128	146	150	125.8
5b	140	119	139	143	119.3
5b1	136	113	131	137	115.4

* Base case model performance is outside EPA acceptability criteria within BPA area for 9/8/93.

Results of DVf Calculations - BPA Point Source Control Rules

As a result of the initial Phase I modeling for BPA, the Commission committed to developing rules controlling NO_x emissions from boilers, heaters, utility boilers, turbines, lean- and rich- burn internal combustion stationary engines. This modeling strategy included the revised 2007 future base case, plus specific control factors for individual stationary NO_x sources in the 3-county BPA nonattainment area. The results of those future design value calculations are described in Tables 6.3-15, 6.3-16, and 6.3-17.

Table 6.3-18. Model Predicted Maximum Ozone Concentrations Near BPA Monitors - BPA NO_x Control Rules

Site	92-94 DVC	9/1/93	9/2/93	9/8/93*	9/9/93	9/10/93	9/11/93**	Mean P_f
BMTC	124	***	93.5	137.0	98.1	121.6	139.3	117.9
PAWC	119	85.8	87.4	137.0	100.7	123.3	127.7	110.3
WORA	123	91.7	108.7	130.9	117.1	116.7	116.0	113.5
S40S	135	92.6	***	128.6	91.4	133.9	107.0	110.7
S42S	134	88.7	104.6	115.1	109.8	105.3	130.0	108.9
S43S	136	***	93.0	137.0	98.9	123.3	136.0	117.6
KTZA	109	***	86.3	91.0	89.0	80.2	138.8	97.1

Table 6.3-19. DVf for BPA sites using Ratio of Means Approach - BPA NO_x Control Rules

Site	DVc	Mean P_c	Mean P_f	RRF (P_f/P_c)	DVf
BMTC	124	138.7	117.9	0.85	105.4
PAWC	119	129.1	110.3	0.85	101.7
WORA	123	134.5	113.5	0.84	103.8
S40S	135	130.0	110.7	0.85	114.9
S42S	134	130.3	108.9	0.84	112.0
S43S	136	137.9	117.6	0.85	116.0
KTZA	109	123.6	97.1	0.79	85.6

Table 6.3-20. Summary of Modeled Maximum Concentrations vs DVf (for BPA NO_x control rules)

Scenario	9/8/93 P_f*	9/9/93 P_f	9/10/93 P_f	9/11/93 P_f	DVf
1993 Base	165 (P_c)	139 (P_c)	155 (P_c)	162 (P_c)	n/a
2007 future base	150	128	146	150	125.8
BPA_att	136	114	131	139	116.0

* Base case model performance is outside EPA acceptability criteria within BPA area for 9/8/93.

CHAPTER 7: FUTURE ATTAINMENT PLANS

The commission will perform a mid-course review and submit the results to EPA by May 1, 2004. This effort will involve a thorough evaluation of all modeling, inventory data, and other tools and assumptions used to develop the attainment demonstration. However, the mid-course review will not relate monitored ambient ozone measurements to the effectiveness of the overall control strategy, since the key strategies crucial to attainment probably will not have been implemented by that time. Although NO_x emissions will begin to decrease in the 2001/2002 time frame, these reductions may not result in lowered monitored ozone levels until the 2005/2006 time frame, considering the time needed to implement point, on-road mobile, and non-road mobile source controls.

One aspect of the mid-course review involves an intensive field study planned for the summer of 2000, which will improve understanding of the physical processes leading to high ozone concentrations in East Texas and particularly along the Gulf Coast. Together with improvements to the emissions inventory, the results of this study will provide part of the scientific basis for reassessing the ozone problem in the BPA ozone nonattainment area. The commission plans to perform new modeling after the appropriate quality assurance and analysis of the field study and inventory data are completed. New modeling results may be expected in 2003, at which time the commission would be able to re-evaluate the control strategies for the area. Completing the mid-course review in late 2003 and taking it through the proposal, hearing, and adoption process in early 2004 would allow the mid-course review SIP revision to be submitted to EPA by May 1, 2004.

The commission commits to continue working with EPA and the BPA regional stakeholders in an open, public consultative process to ensure that the mid-course review is a comprehensive and thorough evaluation.