

REVISIONS TO THE STATE IMPLEMENTATION PLAN
FOR THE CONTROL OF OZONE AIR POLLUTION

REQUIREMENTS FOR GASOLINE VOLATILITY
IN EAST AND CENTRAL TEXAS

AND

FEDERAL CLEAN AIR ACT §211(c)(4)(C) WAIVER REQUEST

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
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SECTION VI. CONTROL STRATEGY

A. Introduction (No change)

B. Ozone (Revised)

1. *Dallas/Fort Worth* (No change.)
2. *Houston/Galveston* (No change.)
3. *Beaumont/Port Arthur* (No change.)
4. *El Paso* (No change.)
5. *Regional Strategies* (No change.)
6. *Northeast Texas Flexible Attainment Region* (No change.)

C. Particulate Matter (No change.)

D. Carbon Monoxide (No change.)

E. Lead (No change.)

F. Oxides of Nitrogen (No change.)

G. Sulfur Dioxide (No change.)

H. Conformity with the National Ambient Air Quality Standards

I. Site Specific (No change.)

J. Mobile Sources Strategies (**Revised**)

1. *Inspection/Maintenance* (No change.)
2. *Transportation Control Measures* (No change)
3. *Vehicle Miles Traveled* (No change)
4. *Clean Gasoline* (**Revised**)

**CLEANER GASOLINE SIP
LIST OF ACRONYMS**

AAMA - American Automobile Manufacturers Association
BPA - Beaumont/Port Arthur
CARE - Clean Air Responsibility Enterprise
CBG-Cleaner Burning Gasoline
CO - Carbon Monoxide
COAST - Coastal Oxidant Assessment for Southeast Texas
CRC - Coordinating Research Council
Commission - Texas Natural Resource Conservation Commission
DFW - Dallas/Fort Worth
ELP - El Paso
EP - End Point
EPA - United States Environmental Protection Agency
FCAA - Federal Clean Air Act
FTE - Full Time Employee
HGA - Houston-Galveston
I/M - Inspection and Maintenance
LDT - Light-Duty Trucks
LDV - Light-Duty Vehicles
LEV - Low Emission Vehicles
MY - Model Year
NAAQS - National Ambient Air Quality Standard
NLEV - National Low Emission Vehicles
NMHC - Non-Methane Hydrocarbon
NO_x - Nitrogen Oxides
ORVR - On-Board Refueling Vapor Recovery
OTAG - Ozone Transportation Assessment Group
PPB - Parts Per Billion
PPM - Parts Per Million
PSI - Pounds Per Square Inch
RFG - Reformulated Gasoline
RVP - Reid Vapor Pressure
SIP - State Implementation Plan
TCAS - Texas Clean Air Strategy
TCM - Transportation Control Measures
ULEV - Ultra Low Emission Vehicles
VOC - Volatile Organic Compound

**CLEANER GASOLINE SIP
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CHAPTER 1: GENERAL

1.1 BACKGROUND

The State of Texas has four 1-hour ozone nonattainment areas: HGA, DFW, BPA, ELP. SIPs for attainment of the 1-hour ozone NAAQS are under development for the HGA, DFW, and BPA areas. Several other areas around the state have already had exceedances of the 8-hour NAAQS. Due to the significant air quality concerns under the 1-hour NAAQS, and the new challenges imposed by the 8-hour NAAQS, the commission is implementing regional types of controls for ozone.

The cleaner gasoline will have a lower RVP outside DFW and HGA, and a limit on the amount of sulfur in each gallon of gasoline. In December 1999, the EPA finalized rulemaking for a national low sulfur gasoline starting January 1, 2004. This rulemaking will result in a nationwide low sulfur gasoline with an average sulfur content of 30 ppm and a cap of 80 ppm. Since the national standard starts the same time as the proposed state low sulfur standard would have started, is more stringent than the proposed state standard, and will result in even greater emission reductions, the state sulfur requirement is being repealed in lieu of the national standard. Because the federal standard covers the same counties as the state rule, the state rule is no longer applicable under 30 TAC §114.302.

The RVP required in this SIP revision is 7.8 psi starting May 1, 2000. The RVP limit will be in effect every summer from May 1st through October 1st. A 7.8 psi RVP fuel is expected to reduce evaporative emissions from automobiles, off-highway gasoline powered equipment, and all gasoline storage and transfer operations. Evaporative VOC emissions from automobiles will be reduced by at least 14%.

Sulfur is a catalyst poison, and all vehicles with catalysts are adversely impacted by sulfur poisoning. Most cars and light trucks manufactured since MY 1975 have had catalysts installed. Sulfur competes for the active sites on the catalyst surface with the ozone precursors the catalyst is attempting to control, VOC and NO_x. Sulfur can also increase emissions of CO, a metabolic poison. In addition, sulfur interferes with the oxygen storage capacity on catalytic surfaces further exacerbating the impacts on NO_x emissions. Sulfur poisoning can be reversed on some vehicles under certain conditions. Most advanced technology cars, such as NLEV and proposed Tier II vehicles, can have their emission controls severely compromised by elevated sulfur levels found in fuel.

Section 211(c)(4)(A) of the FCAA prohibits states from prescribing or attempting to enforce any “control or prohibition” of a “characteristic or component of a fuel or fuel additive” if EPA has promulgated a control or prohibition applicable to such characteristic or component under §211(c)(1). Section 211(c)(4)(C) provides an exception to this prohibition for a nonidentical state standard contained in a SIP where the standard is “necessary to achieve” the primary or secondary NAAQS that the SIP implements. EPA can approve a SIP provision as necessary if the Administrator finds that “no other measures that would bring about timely attainment exist,” or that “other measures exist and are technically possible to implement, but are unreasonable or impracticable.” Therefore, Texas is adopting this revision to the SIP as adequate justification and is requesting a waiver from §211(c)(4)(A) of the FCAA.

1.2 PUBLIC HEARINGS INFORMATION

The commission held public hearings in Austin and Longview. Written comments were accepted via mail or fax through March 27, 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 preamble that precedes the rule package accompanying this SIP revision.

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: BACKGROUND

At the time the 1990 FCAA Amendments were enacted, the focus on controlling ozone pollution was centered on local controls. However, for many years an increasing number of air quality professionals have asserted that ozone is a regional problem requiring regional strategies in addition to local control programs. As nonattainment areas across the United States prepared attainment demonstration SIP revisions in response to the 1990 FCAA Amendments, several areas found that modeling attainment was made much more difficult, if not impossible, because of high ozone and ozone precursor levels entering from the boundaries of their respective modeling domains (e.g., high background levels of ozone).

The commission conducted air quality modeling and upper air monitoring that found regional air pollution should be considered when addressing air quality in Texas' ozone nonattainment areas. This work is supported by research conducted by the OTAG, the most comprehensive attempt ever undertaken to understand and quantify the transport of ozone. Both the commission and OTAG study results point to the need to take a regional approach to controlling air pollutants.

As part of the COAST project, the commission and its contractor (Environ, Inc.), conducted regional-scale modeling to develop future year boundary conditions for the COAST modeling domain. The emissions inventory used in this modeling was based on the OTAG emission inventory. The modeling was conducted for a domain covering most of Texas as well as several southern states.

During the OTAG process, the commission modeling staff ran several sensitivity analyses using this regional modeling setup to assess the impact of potential OTAG reductions on Texas. Applying the OTAG 5c reductions across the domain (60% reduction of point source NO_x, 30% reduction of low-level NO_x, 30% reduction of VOC), compared to the case of no reductions, indicates that modeled reductions would significantly reduce ozone throughout most of the eastern half of Texas. Overall, the modeling indicates that a regional reduction strategy would be beneficial across a wide area of the state.

During modeling for the HGA attainment demonstration SIP revision, the commission modeling staff conducted sensitivity analyses to determine the benefits regional reductions might have on HGA, when applied simultaneously with local reductions. Unlike the commission regional modeling exercises discussed above, these model runs offer an opportunity to assess separately the benefits of reductions made within and outside a region, since model runs with and without the regional reductions scenarios in HGA were conducted. Modeling runs were completed to evaluate the 8-hour average ozone concentrations in the COAST modeling domain for September 8, 1993 with 2007 projected emissions and assuming a reduction of 70% NO_x and 15% VOC in the 8-county HGA area. Even with the large reductions in HGA, much of the upper Texas Coast is projected to be well above the 8-hour standard. Also, Austin, Victoria, and Corpus Christi showed modeled 8-hour average concentrations above 80 ppb. The benefit of applying OTAG 5c reductions outside the HGA 8-county area clearly showed that the reductions are beneficial to HGA and provided additional ozone benefits of between five and ten ppb in HGA. This modeling provides part of the evidence of the benefit of regional reductions on Texas' nonattainment areas. Additional modeling conducted by the agency showed 1-hour reductions of between 1 and 3.6 ppb in much of east and central Texas.

Conclusions from the commission's work are supported by OTAG studies that also illustrate the importance of implementing a regional air quality control strategy. Overall, the conclusions and

recommendations of OTAG are very consistent with a regional approach to ozone control, leading to the determination that the regional approach is necessary to achieve the NAAQS.

CHAPTER 3: TECHNICAL INFORMATION

3.1 OVERVIEW

The commission has evaluated a cleaner gasoline for the eastern and central parts of Texas. After much research, industry consultation, and communication with local, state and federal agencies, the commission is adopting a fuel it believes will move Texas much closer to achieving its overall air quality goals. The fuel is a low RVP gasoline with a sulfur cap. As noted in the introduction, the sulfur limits will now be based on the federal low sulfur requirements of an 80 ppm cap and 30 ppm average starting January 1, 2000. Although modeling was not reaccomplished to account for the lower federal sulfur standards, it is anticipated that the federal standards will provide greater NO_x reductions from current conventional gasoline levels compared to the reductions modeled for the State's proposed 150 ppm sulfur cap. Results of the commission's evaluation efforts to date are summarized below along with more detail on the proposed low RVP/150 ppm sulfur fuel.

At the time the 1990 FCAA Amendments were enacted, the focus on controlling ozone pollution was centered on local controls. However, for many years an increasing number of air quality professionals have felt that ozone is a regional problem requiring regional strategies in addition to local control programs. As nonattainment areas across the United States prepared attainment demonstration SIPs in response to the 1990 FCAA Amendments, several areas found that modeling attainment was made much more difficult, if not impossible, because of high ozone and ozone precursor levels entering from the boundaries of their respective modeling domains, commonly called transport.

The commission has conducted air quality modeling and upper air monitoring that found regional air pollution should be considered when studying air quality in Texas' ozone nonattainment areas. This work is supported by research conducted by OTAG, the most comprehensive attempt ever undertaken to understand and quantify the transport of ozone. Both the commission and OTAG study results point to the need to take a regional approach to controlling air pollutants.

As part of the COAST project, the commission and its contractor Environ, Inc., conducted regional-scale modeling to develop future-year boundary conditions for the COAST modeling domain. The emissions inventory used in this modeling was based on the OTAG emission inventory and the modeling was conducted for a domain covering most of Texas as well as several southern states.

During the OTAG process, the commission's modeling staff ran several sensitivity analyses using this regional modeling setup to assess the impact of potential OTAG reductions on Texas. Applying the OTAG reductions across the domain (clean gasoline (federal reformulated gasoline), stationary source controls, the NLEV program, ozone action days, and a series of national rules to be promulgated by the EPA among others), compared to the case of no reductions, indicated that modeled reductions would significantly reduce ozone throughout most of the eastern half of Texas. Overall the modeling indicated that a regional reduction strategy would be beneficial across the wide area of the state.

During modeling for the HGA attainment demonstration SIP, the commission's modeling staff conducted sensitivity analyses to determine the benefits regional reductions might have on HGA, when applied simultaneously with local reductions. Unlike the commission's regional modeling exercises discussed above, these model runs offer an opportunity to assess separately the benefits of reductions made within and outside a region, since model runs with and without the regional reductions scenarios in HGA were run. Modeling runs were completed to evaluate the 8-hour average ozone concentrations in the COAST

modeling domain for September 8, 1993 with 2007 projected emissions and assuming a reduction of 70% NO_x and 15% VOC in the 8-county HGA area. Even with the large reductions in HGA, much of the upper Texas Coast is well above the 8-hour standard. Also, Austin, Victoria, and Corpus Christi show 8-hour average concentrations above 85 ppb. The benefit of applying OTAG reductions outside the HGA 8-county area clearly showed additional ozone benefits of between five and ten ppb in HGA.

Additional modeling indicates that mobile source reductions (cleaner gasoline, NLEVs, and Stage I vapor recovery) have a potential to reduce peak 8-hour ozone averages of between 1 and 4 ppb in much of east and southeast Texas, with the greatest reductions seen in the Austin and San Antonio areas. This modeling indicates significant reductions in some areas with lesser reductions in others. The main conclusion to be drawn from these models is that the appropriate controls have been selected for reducing ozone levels. Modeling has also been completed assessing the potential benefits for 1-hour ozone standards. This most recent modeling shows reductions of between 1 and 3.6 ppb in much of east and central Texas.

This modeling provides part of the evidence of the benefit of regional reductions on Texas' nonattainment areas and provides further justification that a regional strategy will help maintain air quality in attainment and near-nonattainment areas. Conclusions from the commission's work are supported by OTAG studies that also illustrate the importance of implementing a regional air quality control strategy.

A cleaner gasoline is also supported based on the mobile nature and commuter lifestyle the larger urban areas promote. The majority of Texas' population centers are in the coverage area for cleaner gasoline. The highway system of Houston-Corpus-San Antonio-Austin-Dallas/Fort Worth-Tyler/Longview connects these major population centers. It is important that the fuel used by automobiles traveling between these cities is equally clean. Emissions control is very difficult in nonattainment and near-nonattainment areas if vehicles traveling in from other areas contain gasoline that is not as clean as it could be.

Timing is another critical issue where a cleaner gasoline can help. Several of our near-nonattainment areas face critical years between now and 2004. By implementing a cleaner fuel, the entire eastern half of the state would experience emission reductions in the critical mobile source inventory which is vitally important to our major metropolitan areas.

The commission has completed modeling. The first run was modeled with NLEV, cleaner gasoline, Stage I, and 50% point source NO_x reductions and showed upwards of a twelve ppb decrease in ozone. A modeling run was also made using only the mobile source controls (the NLEV program, cleaner gasoline, and Stage I vapor recovery). This second modeling run showed an overall ozone reduction of about 4 ppb. Based on the available monitoring data, these levels of reduction may be enough to keep the near-nonattainment areas in attainment with the 8-hour NAAQS. Reductions in the regional levels of ozone and ozone precursors will help to reduce the maximum ozone concentration and the duration of ozone events in the nonattainment areas. With the mobile nature and commuter lifestyle of larger urban areas, a cleaner gasoline over a broader area is much more reasonable and practicable than other types of controls. Further modeling for the 1-hour ozone standard backs up the results seen for 8-hour modeling (i.e. 1-3.6 ppb reductions in 1-hour ozone readings).

Texas and other states have used low RVP fuels for a number of years as an effective program for reducing ozone levels. As the low sulfur fuel adopted by the EPA does not limit RVP, the Commission believes it important to implement the low RVP for East Texas.

Through the NLEV program, automobile manufacturers have made a commitment to introduce cleaner cars to the nation earlier than what would have been required by the FCAA. Additionally, EPA has finalized Tier II regulations which will also lead to improvements in the popular sport utility vehicles. The reductions from these actions, although significant, may not be enough to get Texas where it needs to be in relation to overall air quality. Improvements in gasoline quality alone also may not be enough. An improvement in gasoline quality, combined with the advanced vehicle technology, will move Texas closer to achieving its overall air quality goals than either step alone could possibly achieve.

Starting in late 1997, the commission began to evaluate different types of cleaner burning fuels (gasoline, diesel, etc.) as part of an overall regional strategy. The commission eventually settled its focus on a cleaner gasoline. Of the cleaner gasolines under consideration, four were evaluated thoroughly: 1) federal RFG; 2) a gasoline with equal emissions performance to federal Phase II RFG; 3) a formula-based fuel with low RVP, low sulfur fuel; and 4) California reformulated gasoline.

After further discussions, the commission completed its analysis on the top two fuels of choice, a performance-based fuel with emissions limits equal to federal phase II RFG, and a fuel with controls on RVP and sulfur. The low RVP/low sulfur fuel was settled upon for the following reasons: 1) emissions performance; 2) effect on advanced technology cars; 3) impacts on off-road emissions; and 4) low production costs.

3.2. EMISSIONS PERFORMANCE

Several of the state's areas are in need of significant NO_x reductions along with some level of VOC reductions. Photochemical grid modeling shows that NO_x reductions are necessary for the HGA, DFW, and BPA nonattainment areas to demonstrate attainment of the 1-hour ozone standard and are very beneficial for the state's near-nonattainment areas to comply with the 8-hour ozone standard. Therefore, one of the first objectives of a cleaner gasoline was that it achieve NO_x reductions.

Additional state and federal modeling has shown that reductions in VOCs, specifically in the urbanized areas, continue to contribute to reductions in ozone. Lower RVP gasoline will reduce evaporative emissions of VOCs from not only motor vehicles but from refueling operations, gasoline terminals, off-road equipment, and refineries. The reduction of sulfur will help today's cars maintain their certified emissions levels and tomorrow's more advanced cars reach and maintain their low tailpipe emission limits.

Radian completed specific modeling for the commission in September 1997 ("Evaluating the Impact of Reformulated Gasoline in the DFW Area") evaluating low RVP and RFG. EPA's complex model indicates VOC emission reductions of 14.3% with 7.8 psi RVP fuel and a 150 ppm cap on sulfur. NO_x reductions of 8.5% are also seen with the low RVP/low sulfur fuel proposed here.

Some national studies conducted by a variety of groups regarding the impact of fuel sulfur on current and advanced technology vehicles have been completed. Some of these groups include: private industry (such as the AAMA), the automotive and refining industries (The Auto/Oil Air Quality Research (Auto/Oil) program), the federal government (EPA), state government (California, Georgia, Arizona), and other groups, such as the CRC and OTAG.

Estimates by EPA in their "Staff Paper on Gasoline Sulfur Issues" indicate that in-use vehicles, such as vehicles certified to the Tier 0 standard which have been available through MY 1993 and vehicles certified

to the Tier I standard which have been available since MY 1994, show additional reductions in emissions associated with a reduction in gasoline sulfur levels.

Decrease in Emissions with Fuel Sulfur Decreasing from Average In-Use Level (330 ppm) for Tier 0 and Tier I Vehicles (Source EPA)						
	NMHC		CO		NO _x	
Sulfur	150 ppm	40 ppm	150 ppm	40 ppm	150 ppm	40 ppm
Tier 0	4.6 %	13.0 %	4.4 %	12.6 %	5.0 %	11.1 %
Tier I	not tested but assumed to be equivalent to Tier 0	16.3%	not tested but assumed to be equivalent to Tier 0	16.4%	not tested but assumed to be equivalent to Tier 0	11.0 %

Using EPA's Complex Model, Georgia estimated the benefits of its low RVP/low sulfur gasoline. The Complex Model shows the following emission reductions from conventional fuel (modeled with 8.7 psi RVP, 330 ppm sulfur, benzene at 1.53 volume percent, olefins at 9.2 volume percent, and aromatics at 32 volume percent) for the second phase of Georgia's program (modeled with RVP at 7.0 psi, 40 ppm sulfur, olefins 4 volume percent, and aromatics 22 volume percent):

Emission Reductions: Georgia Evaluation of Their Phase II Formula-Based Gasoline Using EPA's Complex Model			
VOC	CO	NO _x	Air Toxics
23.9%	NA	14.71%	20.59%

It should be noted that the Complex Model assumes a 1990 (Tier 0) technology vehicle. It does not take into consideration Tier I or advanced technology cars (LEVs, ULEVs), nor does it consider the effects on heavier light-duty trucks (LDT 3's and 4's).

OTAG also evaluated a low sulfur fuel in typical attainment areas (no I/M, etc.) and found that with a 150 ppm sulfur level the following emission reductions were obtainable:

Emission Reductions: OTAG Evaluation of Low Sulfur (150 ppm) Gasoline			
VOC	CO	NO _x	Air Toxics
2.5 - 5.3%	3.3 - 8.0%	4.4%	NA

3.3. EFFECT ON ADVANCED TECHNOLOGY CARS

For advanced technology cars (LDV) and LDTs covered by the NLEV program (LEVs/ULEVs), EPA estimated emission increases with fuel sulfur above 40 ppm. These numbers are not comparable to the earlier table on Tier 0 and Tier I emissions improvements with low sulfur fuel. It was assumed that a low sulfur fuel would be used to certify advanced technology vehicles; therefore, the emissions impacts of fuel sulfur levels are indicated as percent increases over 40 ppm sulfur certification fuel.

Increase in Emissions with Fuel Sulfur Increases from Baseline (40 ppm) for LEVs and ULEVs (LDVs and LDTs) (Source EPA)						
Pollutant	NMHC		CO		NO _x	
Sulfur, ppm	150 ppm	330 ppm	150 ppm	330 ppm	150 ppm	330 ppm
All LDV/LDT1	26.7 %	43.0 %	58 %	75.8 %	65.7 %	136 %
All LDT2/LDT3	23.0 %	26.4 %	12.5 %	31.2 %	33.7 %	65.5 %

3.4 IMPACTS ON OFF-ROAD EMISSIONS

For non-road engines, there will be evaporative VOC benefits associated with the low RVP/low sulfur fuel. There may also be some exhaust benefits for VOC. However, NO_x benefits may be very minor, mainly because sulfur effects are associated with catalyst-equipped vehicles and engines, and non-road engines typically are not catalyst-equipped. VOC emission reductions of upwards of 3% may be seen in off-road sources.

3.5 STATE LEGAL AUTHORITY TO IMPLEMENT CLEANER GASOLINE

State authority for the commission to implement Cleaner Gasoline is contained in the following statutes:

- Texas Health and Safety Code §382.011 (general power and duties),
- Texas Health and Safety Code §382.012 (authority for SIPs),
- Texas Health and Safety Code §382.017 (authority to promulgate rules),
- Texas Health and Safety Code §382.019 (authority to control mobile sources),
- Texas Health and Safety Code §382.037(g) (confirms no specific authority needed for fuel standards if the standards are 1) federal standards, 2) necessary to achieve attainment, or 3) made in consultation with the Texas Department of Health and it is determined that a fuel standard is needed to protect public health),
- Texas Health and Safety Code §382.039, provides the commission the authority to develop and implement transportation programs and other measures necessary to demonstrate attainment and protect the public from exposure to hazardous air contaminants from motor vehicles,
- Texas Water Code §5.103, provides the commission with the authority to adopt rules necessary to carry out its powers and duties under the TWC,
- Texas Water Code Chapter §7.002 (commission can enforce its rules), and

3.6 PRODUCTION COSTS OF LOW RVP

Low RVP gasolines are used as VOC control strategies and do not have significant additional production costs. Average summertime RVP is about 8.5 - 9.0 psi. Other states have found that it generally costs from 0.3 to 0.5 cents more per gallon to produce low RVP (7.0 psi) gasoline. According to EPA's Regulatory Impact Analysis for RFG, RVP controls cost about 0.2 cents per psi of RVP reduced. For example going from 8.8 psi to 7.8 psi would cost about 0.2 cents per gallon. Therefore, the RVP reduction proposed here would cost less than 0.3 cents per gallon.

3.7 AGENCY IMPACTS

The commission will enforce the low RVP program at all levels of the distribution chain through inspection of on-site documentation. All affected persons are required to maintain, and provide for review upon

request, product transfer documents. These documents would be required to be maintained for a minimum of two years.

CHAPTER 4: EVALUATION OF OTHER CONTROLS

In the HGA and DFW areas there are significant mobile source control measures in place. Some of these include inspection and maintenance (I/M), Stage I vapor recovery, Stage II vapor recovery, RFG, and transportation control measures (TCMs). Additional mobile source controls will be put in place through federal regulations such as NLEV, heavy-duty on-highway diesel controls, small gas engines, locomotives controls etc.

The federal mobile source controls are national programs which will be implemented in all counties. However, most are being phased in such that these controls will not be in place soon enough for many of Texas' near nonattainment areas to avoid nonattainment designation. In addition to the clean gasoline, Stage I controls is another program that can be implemented quickly and therefore is also being proposed.

State law (§382.037(c)) prohibits the Texas Motorist Choice program from expanding to additional areas unless the mayor of the largest city and the county judge agrees to expansion of the program. At this time, there is not significant local interest in expanding the Texas Motorist Choice program to the 95 counties affected by this rule, making I/M impracticable as a wider control measure.

Stage II vapor recovery is prohibited by state law from expansion into attainment areas (Texas Health and Safety Code, §382.019(c)). In addition, Stage II vapor recovery is being replaced by on-board refueling vapor recovery (ORVR). ORVR will capture the majority of vehicle refueling vapors within the next 12 to 18 years. The state prohibition combined with the federal implementation of ORVR makes Stage II impracticable for use as an additional control measure.

With significant VOC point source controls already in place in the HGA and DFW areas, additional VOC point source controls for these areas do not appear to be reasonable at this time. Significant point source controls for NO_x will be put in place in the HGA and DFW areas. The magnitude of the reductions necessary indicates that point source controls alone are not able to reduce ozone levels enough to demonstrate attainment; therefore, additional NO_x controls must come from the mobile source area. Cleaner gasoline will contribute to provide NO_x reductions from commuters coming in from outlying areas.

The commission is also evaluating the implementation of point source NO_x controls outside the HGA and DFW areas. The commission believes that the combination of mobile source controls (such as cleaner gasoline, NLEV, and Stage I vapor recovery), and point source NO_x controls outside the HGA and DFW areas will be sufficient to significantly reduce the ozone levels in the state's nonattainment areas.

Modeling has previously been submitted to EPA regarding the amount of emission reduction necessary to achieve the NAAQS in the HGA and DFW areas to achieve attainment (see Tables 1, 2, 3, and 4). The NO_x and VOC reductions necessary to achieve the NAAQS are significant (see Tables 5, 6, 7, and, 8).

Several other areas of the state have already had exceedances of the 8-hour NAAQS. The emissions inventory in several of these areas are largely composed of mobile sources. Without the cleaner gasoline, these areas cannot reasonably and practicably achieve attainment of the NAAQS.

Table 1. Attainment Target Calculations for 2007 NO_x Emissions in the HGA Area

	Episode Day			
	9/8	9/9	9/10	9/11
Required reduction from 2007 base EI				
Worst-case	83%	78%	85%	80%
Best-case	62%	53%	67%	61%
2007 Projected NO _x emissions (tons/day)				
Worst-Case (Base 2007 EI)	1467	1457	1531	1376
Best-Case (Alt. EI I)	986	978	1035	930
2007 Attainment target (tons/day)				
Worst-case	249	321	230	275
Best-case	375	460	342	363
1990 baseline NO _x emissions (tons/day)			1330	
Adjusted for Alt. EI I Assumptions			908	
Required reduction relative to 1990 baseline				
Worst-case	82%	77%	83%	80%
Best-case	59%	49%	62%	60%
Required Reduction in tons/day				
Worst-case	1081	1009	1100	1055
Best-case	533	448	566	545
Reductions by 1999 from 9% SIP	(104)	(104)	(104)	(104)
Remaining required reductions				
Worst-case	977	905	996	951
Best-case	429	344	462	441

Table 2. Attainment Target Calculations for 2007 VOC Emissions in the HGA Area

	Episode Day			
	9/8	9/9	9/10	9/11
Required reduction from 2007 base EI	15%			
2007 Projected VOC emissions (tons/day)	831	838	849	847
2007 Attainment target (tons/day)	706	712	722	720
1990 baseline VOC emissions (tons/day)	1064			
Required reduction relative to 1990 baseline	34%	33%	32%	32%
Required reductions in tons/day	358	352	342	344
Reductions by 1999 from 15% & 9% SIPs	(305)	(305)	(305)	(305)
Remaining required reductions in tons/day	53	47	37	39

Table 3. Attainment Target Modeling: Reduction Levels and Predicted Design Values

Model Run #	Reduction		Predicted Design Value (ppb)
	NO _x	VOC	
1 (1999 Base)	0%	0%	139
2	30%	25%	128
3	40%	25%	124
4	50%	25%	121
5	60%	25%	116
6	70%	25%	109
7	80%	25%	100

Table 4. Attainment Target Modeling: Reduction Levels and Peak Modeled Ozone

Model Run #	Reduction		Peak Modeled Ozone (ppb)		
	NO _x	VOC	6/21/95	6/22/95	7/3/96
1 (1999 Base)	0%	0%	140	145	168
2	30%	25%	130	135	154
3	40%	25%	126	129	149
4	50%	25%	122	124	142
5	60%	25%	116	118	134
6	70%	25%	109	110	127
7	80%	25%	100	99	120

Table 5. Potential VOC Control Strategies

Federal Control Strategies

Control Measure	Estimated 2007 Emissions Reduction (tpd)
Small Gasoline Engines (<i>began phase-in 1995--phase in complete by 2005</i>)	50.80
Heavy Duty Diesel Non-Road (<i>began phase-in 1995--phase-in complete by 2008</i>)	1.74
Locomotives (<i>final rule--begin phase-in 1999--complete by 2005</i>)	0.00
Reformulated Gasoline, FMVCP Tier I, I/M (<i>RFG Phase II begins in 2000--other programs in place</i>)	29.06
Recreational Marine Engines (<i>began phase -in 1995--complete by 1998</i>)	5.42
Commercial Aircraft (<i>rule took effect in 1994</i>)	1.17
RFG Non-Road Mobile Sources (<i>RFG Phase II begins in 2000</i>)	3.48
MACT Standards--Core Counties (<i>*Please see note below</i>)	16.5
MACT Standards--Perimeter Counties out to 100km	3.5

State Control Strategies

National Low Emissions Vehicle Program--Core Counties (<i>begins phase-in MY2001</i>)	4.66
National LEV Program--perimeter counties--100km	0.95
Reformulated Gasoline out to 100km	16.33
VOC RACT out to 100km	7.90
Stage I out to 100km	23.91
Excess VOC Reduction Carryover from 9% SIP	0.69
Voluntary Industry Reductions	Amount not available at time of proposal

Local Options Control Strategies

Reductions Available from Local Option (See Appendix 9c-J for more details)	60.91
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*Historically, most MACT standards have been promulgated 1-2 years after their required promulgation date. There are approximately 30 MACT standards that were slated to be promulgated by 1997. Most appear to be running 1-2 years late for their predicted promulgation date. There are approximately 60 standards in the 2000 bin. Current EPA information is that most are on track for promulgation by 2000. Compliance dates for MACT standards are typically three years after promulgation. Therefore, even if the historical pattern of delay occurs for the 1997 bin standards, it's reasonable to assume that sources will be in compliance by 2002, and that the 2000 bin standards will be promulgated and generating emission reductions by 2005.

Table 6. Potential NO_x Control Strategies

Federal Control Strategies

Control Measure	Estimated 2007 Emissions Reduction (tpd)
On-Road Heavy Duty Diesel Standards <i>(proposed in 1997--effective date 2004)</i>	6.98
Heavy Duty Diesel Non-Road <i>(began phase-in 1995--phase-in complete by 2008)</i>	32.61
Locomotives <i>(final rule--begin phase in 1999--complete by 2005)</i>	6.49
Reformulated Gasoline, FMVCP Tier I, I/M <i>(RFG effective in 2000--other programs in place currently)</i>	39.93

State Control Strategies

National Low Emissions Vehicle Program--Core Counties <i>(currently under negotiation--could begin phase-in MY2001)</i>	12.15
National LEV Program--perimeter counties--200km	7.44
Reformulated Gasoline--perimeter counties--200km	12.38
NO _x RACT applied to perimeter counties--200km	80.00
Excess Reductions from 9% SIP--Carryover	4.25
Voluntary Industry Reductions	Amount not available at time of proposal
Point Source Combustion Modification--Tier I--Core Counties	241.00
Point Source Flue Gas Controls--Tier II--Core Counties	584.00
Point Source Tier I +Tier II=Tier III--Core Counties	620.00
Point Source Tier I--Perimeter Counties	333.00
Point Source Tier II--Perimeter Counties	811.00
Point Source Tier III--Perimeter Counties	864.00
Reformulated Gasoline for Non-Road Sources	Amount not available at time of proposal

Local Options Control Strategies

Reductions Available from Local Option (See Appendix 9c-J for more details)	72.74
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CHAPTER 5: DISCUSSION OF TEXAS' 8-HOUR NEAR-NONATTAINMENT AREAS

(No changes or revisions)