

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

FIX-UPS TO THE

15% RATE-OF-PROGRESS SIP  
FOR DALLAS/FORT WORTH, EL PASO,  
BEAUMONT/PORT ARTHUR, and HOUSTON/GALVESTON  
OZONE NONATTAINMENT AREAS

EMPLOYER TRIP REDUCTION PROGRAM SIP

EL PASO SECTION 818  
ATTAINMENT DEMONSTRATION

POST-1996 RATE-OF-PROGRESS SIP  
FOR BEAUMONT/PORT ARTHUR AND HOUSTON/GALVESTON  
OZONE NONATTAINMENT AREAS

SUMMARY OF THE REVISED 1990 BASE YEAR OZONE NONATTAINMENT  
AREA STATE IMPLEMENTATION PLAN EMISSION INVENTORY FOR  
ALL TEXAS NONATTAINMENT AREAS

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION  
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Appendices are on file with the Texas Natural Resource Conservation Commission and are available upon request by calling Elizabeth Johnson at (512) 239-1967.

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## VI: Ozone Control Strategy

### A. INTRODUCTION

Requirements for State Implementation Plans (SIP) specified in 40 Code of Federal Regulations (CFR) Part 51.12 provide that "...in any region where existing (measured or estimated) ambient levels of pollutant exceed the levels specified by an applicable national standard," the plan shall set forth a control strategy which shall provide for the degree of emission reduction necessary for attainment and maintenance of such national standard. Ambient levels of sulfur dioxide and oxides of nitrogen (NO<sub>x</sub>), as measured from 1975 through 1977, did not exceed the national standards set for these pollutants anywhere in Texas. Therefore, no control strategies for these pollutants were included in revisions to the Texas SIP submitted on April 13, 1979. Control strategies were submitted and approved for inclusion in the SIP for areas in which measured concentrations of ozone, total suspended particulate (TSP), or carbon monoxide (CO) exceeded a National Ambient Air Quality Standard (NAAQS) during the period from 1975 to 1977. On October 5, 1978, the Administrator of the U.S. Environmental Protection Agency (EPA) promulgated a lead ambient air quality standard. The Federal Clean Air Act (FCAA) Amendments of 1977 required that each state submit an implementation plan for the control of any new criteria pollutant. A SIP revision for lead was submitted in March of 1981.

The control strategies submitted in 1979 provided by December 31, 1982 the amount of emission reductions required by EPA policy to demonstrate attainment of the primary NAAQS, except for ozone in the Harris County nonattainment area. For that area, an extension to December 31, 1987 was requested, as provided for in the FCAA Amendments of 1977.

Supplemental material, including emission inventories for volatile organic compounds (VOC) and TSP submitted with the 1979 SIP revisions, is included in Appendices H and O of the 1979 SIP submittal.

Proposals to revise the Texas SIP to comply with the requirements of the FCAA Amendments of 1977 were submitted to EPA on April 13, November 2, and November 21, 1979. On December 18, 1979 (44 FR 75830-74832), EPA approved the proposed revision to the Texas SIP relating to vehicle inspection and maintenance and extended the deadline for attainment of the NAAQS for ozone in Harris County until December 31, 1987. (See Appendix Q of the 1979 SIP submittal for the full text of the extension request and the approval notice.) On March 25, 1980 (45 FR 19231-19245), EPA approved and incorporated into the Texas SIP many of the remaining provisions included in the proposals submitted by the state in April and November 1979. The March 25, 1980 Federal Register notice also included conditional approval of a number of the proposed SIP revisions submitted by the state.

Additional proposed SIP revisions were submitted to EPA by the state on July 25, 1980 and July 20, 1981 to comply with the requirements of the March 25, 1980 conditional approvals. By May 31, 1982, all of the proposed revisions to the Texas SIP submitted to EPA in April and November 1979, July 1980, and July 1981, with the exception of provisions relating to the definition of major modification used in new source review (NSR) and certain portions of the control strategy for TSP in Harris County, had been fully approved or addressed in a Federal Register notice proposing final approval. The NSR provisions were approved on August 13, 1984.

The FCAA Amendments of 1977 required SIPs to be revised by December 31, 1982 to provide additional emission reductions for those areas for which EPA approved extensions of the deadline for attainment of the NAAQS for ozone or CO. Paragraph B.5. of this section of the SIP contains the

revision to the Texas SIP submitted to comply with the FCAA Amendments of 1977 and EPA rules for 1982 SIP revisions. Supplementary emissions inventory data and supporting documentation for the revision are included in Appendices Q through Z of the 1982 SIP submittal.

The only area in Texas receiving an extension of the attainment deadline to December 31, 1987 was Harris County for ozone. Proposals to revise the Texas SIP for Harris County were submitted to EPA on December 9, 1982. On February 3, 1983, EPA proposed to approve all portions of the plan except for the Vehicle Parameter Inspection/Maintenance (I/M) Program. On April 30, 1983, the EPA Administrator proposed sanctions for failure to submit or implement an approvable I/M program in Harris County. Senate Bill 1205 was passed on May 25, 1983 by the Texas Legislature to provide the Texas Department of Public Safety (DPS) with the authority to implement enhanced vehicle inspection requirements and enforcement procedures. On August 3, 1984, EPA proposed approval of the Texas SIP pending receipt of revisions incorporating these enhanced inspection procedures and measures ensuring enforceability of the program. These additional proposed SIP revisions were adopted by the state on November 9, 1984. Final approval by EPA was published on June 26, 1985.

Although the control strategies approved by EPA in the 1979 SIP revisions were implemented in accordance with the provisions of the plan, several areas in Texas did not attain the primary NAAQS by December 31, 1982. On February 23, 1983, EPA published a Federal Register notice identifying those areas and expressing the intent to impose economic and growth sanctions provided in the FCAA. However, EPA reversed that policy in the November 2, 1983 Federal Register, deciding instead to call for supplemental SIP revisions to include sufficient additional control requirements to demonstrate attainment by December 31, 1987.

On February 24, 1984, the EPA Region 6 Administrator notified the Governor of Texas that such supplemental SIP revisions would be required within one year for ozone in Dallas, Tarrant, and El Paso Counties and CO in El Paso County. The Texas Air Control Board (TACB) requested a six-month extension of the deadline (to August 31, 1985) on October 19, 1984. EPA approved this request on November 16, 1984.

Proposals to revise the Texas SIP for Dallas, Tarrant, and El Paso Counties were submitted to EPA on September 30, 1985. However, the revisions for Dallas and Tarrant Counties did not provide sufficient reductions to demonstrate attainment of the ozone standard and on July 14, 1987, EPA published intent to invoke sanctions. Public officials in the two counties expressed a strong desire to provide additional control measures sufficient to satisfy requirements for an attainment demonstration.

A program of supplemental controls was taken to public hearings in late October 1987. As a result of testimony received at the hearings, a number of the controls were modified and several were deleted, but sufficient reductions were retained to demonstrate attainment by December 31, 1991. These controls were adopted by the TACB on December 18, 1987 and were submitted to EPA as proposed revisions to the SIP. Supplemental data and supporting documentation are included in Appendices AA through AO of the 1987 SIP submittal.

The FCAA Amendments of 1990 authorized EPA to designate areas failing to meet the NAAQS for ozone as nonattainment and to classify them according to severity. The four areas in Texas and their respective classifications include: Houston/Galveston (severe), Beaumont/Port Arthur (serious), El Paso (serious), and Dallas/Fort Worth (moderate).

The FCAA Amendments required a SIP revision to be submitted for all ozone nonattainment areas classified as moderate and above by November 15, 1993 which described in part how an area intends to decrease VOC emissions by 15%, net of growth, by November 15, 1996. The amendments also required all nonattainment areas classified as serious and above to submit a revision to the SIP by November 15, 1994 which described how each area would achieve further reductions of VOC and/or NO<sub>x</sub> in the amount of 3.0% per year averaged over three years and which includes a demonstration of attainment based on modeling results using the Urban Airshed Model (UAM). In addition to the 15% reduction, states were also required to prepare contingency rules that will result in an additional 3.0% reduction of either NO<sub>x</sub> or VOC, of which up to 2.7% may be reductions in NO<sub>x</sub>. Underlying this substitution provision is the recognition that NO<sub>x</sub> controls may effectively reduce ozone in many areas and that the design of strategies is more efficient when the characteristic properties responsible for ozone formation and control are evaluated for each area. The primary condition to use NO<sub>x</sub> controls as contingency measures is a demonstration through UAM modeling that these controls will be beneficial toward the reduction of ozone. These VOC and/or NO<sub>x</sub> contingency measures would be implemented immediately should any area fall short of the 15% goal.

Texas submitted rules to meet the Rate-of-Progress (ROP) reduction in two phases. Phase I consisted of a core set of rules comprising a significant portion of the required reductions. This phase was submitted by the original deadline of November 15, 1993. Phase II consisted of any remaining percentage toward the 15% net of growth reductions, as well as additional contingency measures to obtain an additional 3.0% of reductions. Phase II was submitted by May 15, 1994. The complete list of contingency measures was submitted by November 15, 1994. The appropriate compliance date was to be incorporated into each control measure to ensure that the required reductions will be achieved by the November 15, 1996 deadline. A commitment listing the potential rules from which the additional

percentages and contingency measures were selected was submitted in conjunction with the Phase I SIP on November 15, 1993. That list of Phase II rules was intended to rank options available to the state and to identify potential rules available to meet 100% of the targeted reductions and contingencies. Only those portions of the Phase II rules needed to provide reasonable assurance of achieving the targeted reduction requirements were adopted by the commission.

The Dallas/Fort Worth (DFW) and El Paso (ELP) areas achieved sufficient reductions with the 15% ROP SIP to demonstrate attainment by 1996. Attainment Demonstration SIP Revisions for these two areas were submitted on September 14, 1994.

The FCAA Amendments of 1990 classified the Beaumont/Port Arthur (BPA) area as a serious nonattainment area. The BPA nonattainment area includes Hardin, Jefferson, and Orange Counties. The BPA nonattainment area has an ozone design value of 0.16 ppm, which places the area in the serious classification.

The FCAA Amendments of 1990 require a Post-96 ROP SIP revision and accompanying rules to be submitted by November 15, 1994. According to the FCAA Amendments, this submittal had to contain an Attainment Demonstration based on UAM. Additionally, the revision had to demonstrate how the HGA and BPA nonattainment areas intend to achieve a 3% per year reduction of VOC and/or NO<sub>x</sub> until the year 2007, and additional reductions as needed to demonstrate modeled attainment. The plan was also required to carry an additional 3% of contingency measures to be implemented if the nonattainment area fails to meet a deadline. To use NO<sub>x</sub> reductions for all or part of the Post-96 controls or the contingency measures required a demonstration using UAM showing that NO<sub>x</sub> controls would be beneficial in reducing ozone.

On November 9, 1994, the state submitted a SIP revision designed to meet the 3% per year ROP requirements for the years 1997-1999. This Post-96 ROP SIP revision detailed how the BPA and HGA nonattainment areas intend to achieve these three years' reductions of VOC (or 9% net-of-growth). Most of this amount was achieved by quantifying additional reductions due to existing rules and reductions due to federally-mandated rules. Rules to achieve the further reductions needed to meet the ROP SIP goal were submitted to EPA on January 11, 1995. This submittal included modeling demonstrating progress toward attainment, using a 1999 future year emissions inventory.

On August 14, 1994, the state submitted preliminary UAM modeling results for the BPA and HGA nonattainment areas that showed the relationship between emission levels of VOC and NO<sub>x</sub>, and ozone concentrations. This modeling was conducted with a 1999 future year emissions inventory. Based on the results of this preliminary modeling, which show a disbenefit to NO<sub>x</sub> reductions, on April 12, 1995 the state received a temporary Section 182(f) exemption from all NO<sub>x</sub> requirements including reasonably available control technology (RACT), I/M, NO<sub>x</sub> NSR, and transportation conformity requirements. Permanent §182(f) exemptions from all NO<sub>x</sub> requirements were granted for DFW and ELP, and temporary exemptions until December 31, 1996 for HGA and BPA. The commission has subsequently requested that EPA extend this date until December 31, 1997.

On March 2, 1995, Mary Nichols, EPA Assistant Administrator for Air and Radiation, issued a memo which gave states some flexibility to design a phased Attainment Demonstration. It provided for an initial phase which was intended to continue progress in reducing levels of VOC and/or NO<sub>x</sub> while giving states an opportunity to address scientific issues such as modeling and transport. The second phase was designed to draw upon the results of the scientific effort and design a plan to bring the area

into attainment. To constitute Phase I under this approach, the EPA guidance required that states submit the following SIP elements by December 31, 1995:

- ◆ Control strategies to achieve reductions of ozone precursors in the amount of 3% per year from the 1990 baseline emissions inventory (EI) for the years 1997, 1998, and 1999.
  
- ◆ UAM modeling out through the year 1999, showing the effect of previously-adopted control strategies which were designed to achieve a 15% reduction in VOCs from 1990 through 1996.
  
- ◆ A demonstration that the state has met the VOC RACT requirements of the FCAA Amendments.
  
- ◆ A detailed schedule and plan for the "Phase II" portion of the attainment demonstration which will show how the nonattainment areas can attain the ozone standard by the required dates.
  
- ◆ An enforceable commitment to:
  - ◆ Participate in a consultative process to address regional transport,
  
  - ◆ Adopt additional control measures as necessary to attain the ozone NAAQS, meet ROP requirements, and eliminate significant contribution to nonattainment downwind, and
  
  - ◆ Identify any reductions that are needed from upwind areas to meet the NAAQS.

Texas submitted the first two of these required sections in November 1994. The remaining three, a VOC RACT demonstration, the required commitments, and a Phase II plan and schedule, were submitted on January 10, 1996 to EPA.

ROP SIP modeling is being developed for the HGA nonattainment area in two phases using the UAM. The first phase of ROP modeling was the modeling submitted in January, 1995, as described above. The second phase of the ROP modeling is being conducted using data obtained primarily from the Coastal Oxidant Assessment for Southeast Texas (COAST) project, an intensive 1993 field study. The COAST modeling for HGA and the associated SIP are projected to be completed by December, 1996 for submittal in May of 1997. Control strategies developed in this second phase will be based on a more robust data base, providing a higher degree of confidence that the strategies will result in attainment of the ozone NAAQS or target ozone value. A discussion of the schedule for the UAM modeling for the Phase II Attainment Demonstration can be found in Appendix 11-F. Modeling for the BPA attainment demonstration is underway as well, and is planned to be submitted to EPA along with HGA's in May of 1997.

On January 29, 1996, the EPA proposed a limited approval/limited disapproval for the Texas 15% ROP SIP revision. The EPA proposed a limited approval because the SIP revision will result in significant emission reductions from the 1990 baseline, and will, therefore, improve air quality. Simultaneously, the EPA proposed a limited disapproval because they believe that the plan fails to demonstrate sufficient reductions to meet the 15% ROP requirements. They also proposed a limited approval/disapproval of the contingency plans (designed to achieve an additional 3% of reductions if needed because a milestone is missed) along the same lines as the 15% action. The EPA stated that some of the control measures submitted along with the SIP revision did not meet all of the requirements

of the FCAA Amendments of 1990, and, therefore, cannot be approved. The EPA further stated that they were not making a determination at this time whether the state has met its requirements regarding RACT, or any other underlying FCAA Amendments of 1990 requirements. Finally, the EPA proposed approval of the Alternate Means of Control portion of the November 9, 1994 Post-96 SIP submittal, but did not propose action on any other portion of that submittal.

Additionally, on November 29, 1995, the President signed the National Highway Systems Designation Act, which, among other things, prohibited EPA from discounting the creditable emissions from a decentralized vehicle I/M testing program if an approvable conditional I/M SIP revision was submitted to EPA within 120 days of the bill's signature. EPA's Office of Mobile Sources issued guidance stating that they will accept an interim I/M SIP proposal and Governor's letter 120 days after signature of the bill in lieu of an adopted SIP revision. The SIP proposal and letter was submitted to the EPA prior to the March 27, 1996 deadline to meet the 120 day timeframe, and EPA would then parallel process the results of the state and federal public comments to determine whether the SIP revision is approvable.

Part of EPA's determination that the new I/M SIP is approvable is dependant on the program's ability to achieve sufficient creditable VOC reductions so that the 15% ROP can still be achieved. The commission has designed this revised I/M program to fit in with the other elements of the 15% SIP to achieve the full amount of creditable reductions required. The I/M program also achieves creditable reductions for the Post-96 ROP SIP.

Changes to the I/M program have had an impact on the El Paso §818 Attainment Demonstration as well. This demonstration was predicated on the assumption that the I/M program would be

implemented as adopted for the 15% SIP. An addendum to the §818 Demonstration is being proposed showing that the basic underlying assumptions of the modeling still pertain despite the revisions to the I/M program.

The ETR program revision to the SIP and ETR rule were adopted in October 1992 by the Texas Air Control Board to meet the mandate established in the FCAA Amendments of 1990 (§182 (d) (1) (B)). This section of the FCAA required states with severe or extreme ozone nonattainment areas to develop and implement ETR programs in those areas. For Texas, the only area affected was the HGA area. The ETR program required large employers (those with 100 or more employees) to implement trip reduction programs that would increase the average passenger occupancy rate of vehicles arriving at the workplace during the peak travel period by 25% above the average for the area.

Congress amended the FCAA in December of 1995 by passing House Rule 325. This amendment allows the state to require an ETR program at its discretion. It also allows a state to “remove such provisions (ETR program) from the implementation plan...if the state notifies the Administrator, in writing, that the state has undertaken, or will undertake, one or more alternative methods that will achieve emission reductions (1.81 tons/day) equivalent to those achieved by the removed...provisions.” As such, large employers will no longer be mandated to implement trip reduction programs. The HGA ozone nonattainment area will, however, through the coordination of the Houston-Galveston Area Council, implement a voluntary regional initiative to reduce vehicle trips.

The 1990 Adjusted Base Year EI was submitted on November 12, 1993. It is the official inventory of all emission sources (point, area, on-road and off-road mobile) in the four nonattainment areas. There have been several changes to the EI due to changes in assumptions for certain area and non-road

mobile source categories. Changes to the baseline EI have affected the target calculations and creditable assumptions made in the 15% and 9% SIPs.

In December of 1990, then-Texas Governor William Clements requested that the BPA area be reclassified as a "moderate" ozone nonattainment area in accordance with Section 181(a)(4) of the FCAA Amendments of 1990. That request was denied on February 13, 1991. A recent review of the original request and supporting documentation has revealed that this denial was made in error. As provided by Section 110(k)(6) of the Act, the EPA Administrator of the has the authority to reverse a decision regarding original designation if it is discovered that an error had been made.

Monitoring data from a privately-funded, special purpose monitoring network which was not included in the Aerometric Information Retrieval System database was improperly used to deny this request. Furthermore, subsequent air quality trends demonstrate that BPA is more properly classified as a moderate nonattainment area, and should attain the standard by the required date for moderate areas of November 15, 1996. Therefore, Governor Bush sent a letter and technical support to EPA on July 20, 1995, requesting that the BPA area be reclassified to moderate nonattainment status. BPA plans to demonstrate attainment one of the following ways:

- ◆ Monitored values showing attainment of the standard at state-operated monitors for the years 1994-1996, which is the timeline the FCAA Amendments of 1990 specifies for moderate areas.
  
- ◆ UAM modeling showing attainment of the standard but for transport of ozone and/or precursors.

EPA Region VI verified the data submitted in support of this request, and concurred that it is valid. On June 3, 1996, the reclassification of the BPA area became effective. Because the area was classified as serious, it was following the SIP submittal and permitting requirements of a serious area, which included the requirements for a Post-96 SIP. With this consolidated SIP submittal, the commission has removed the BPA area from the Post-96 SIPs, which became applicable to the HGA nonattainment area only.

## B. OZONE CONTROL STRATEGY

1. POLICY AND PURPOSE (No change.)
2. SUMMARY OF THE PRINCIPAL ELEMENTS ADDRESSED WITHIN THIS PLAN  
(No change.)
3. OZONE CONTROL PLAN FOR 1979 SIP REVISION (No change.)
4. CONTROL STRATEGY FOR 1979 SIP REVISION (No change.)
5. 1982 HARRIS COUNTY SIP REVISION (No change.)
6. SIP REVISIONS FOR POST-1982 URBAN NONATTAINMENT AREAS (No change.)
7. SIP REVISIONS FOR 1993 RATE-OF-PROGRESS (Revised.)

a. Ozone Control Plan

1) - 3) (No Change.)

4) Identification of Emission Changes

a) Emissions Inventory

The FCAA Amendments of 1990 required that EIs be prepared for ozone nonattainment areas. Since ozone is photochemically produced in the atmosphere when VOCs are mixed with NO<sub>x</sub> and CO in the presence of sunlight, it is important that the planning agency compile information on the sources of these precursor pollutants. The EI identifies the source types present in an area, the amount of each pollutant emitted, and the types of processes and control devices employed at each plant or source category. The EI provides data for a variety of air quality planning tasks, including establishing baseline emission levels, calculating the 15% and Post-96 reduction targets, developing control strategies for achieving the required emissions reductions, developing inputs to air quality simulation models, and tracking actual emissions reductions against the established emissions growth and control budget.

Compiling the EI is an ongoing, dynamic and continually improving process. While federal mandates and other requirements may demand the presentation of a certain set of emissions numbers to be used as a benchmark, the emissions inventory is subject to changes. These changes may be necessitated by a variety of circumstances such as new and improved models for estimating emissions, improved emission factors for estimating emissions from sources, better information about activity levels of

emission sources, improved methodologies developed in interim periods between reports, more up-to-date, accurate forecasts of population and economic growth, and improved models for growth projection of inventories. The revisions to the 1990 Base Year EI are described below.

(1) - (7) (No change.)

(8) Changes to the Emissions Inventory as a result of the COAST Study

(a) Changes in Area Source and Non-road Mobile Source Categories

COAST field study was an intensive, multi-phased, and multifaceted study of the HGA and BPA ozone nonattainment areas, and adjacent offshore waters. The project was undertaken in conjunction with the Minerals Management Service and represents an effort to obtain the regional information necessary to develop cost-efficient, effective ozone control strategies. While the major thrust of the study has focused on regional monitoring and modeling of the 1993 ozone season, the COAST project had many other components. One such project was the Bottom-up Emissions Inventory Project.

A traditional emissions inventory of area sources utilizes so-called top-down methodologies in order to estimate the county-wide emissions required for SIP inventory reporting. This approach involves using such statistics (national or state level) as are available on the level of activity (e.g., gallons of gasoline sold, widgets produced, and so on) of the particular area source category being investigated. The activity level is then adjusted, or allocated, to the county level based on some known surrogate such as population or Standard Industrial Classification Code (SIC) employment (e.g., the population of X County is 15% of the state population so 15% of the state level activity is taking place at the county

level). The available alternative, a bottom-up inventory, is not usually performed because it is costly. The COAST project provided an opportunity to conduct a bottom-up inventory.

A bottom-up inventory entails collecting as much local, category specific activity level information as is possible. In the specific case of the Bottom-up Emissions Inventory Project, the approach was to have a contractor take a random, stratified sample, or survey, to determine the activity levels of the following area source and non-road mobile source categories: Dry Cleaners, Gasoline Stations, Lawn Mower usage, Recreational Marine usage, Generators <50 HP usage, Surface Coatings, and Surface Cleaning. The contractor then used this activity level information with known, or to be developed, emission factors to estimate emissions.

The work done for the Bottom-up Emissions Inventory also included follow-up work involving a host of organizations and people including the commission, City of Houston Bureau of Air Quality staff, the Non-road Mobile Source Working Group of the Houston-Galveston Area Council, and the sponsorship of the Houston Regional Monitoring Network organization in hiring Radian Corporation to review specific categories of the 1990 Base Year EI. The combined efforts of these organizations to conduct telephone surveys, telephone interviews, purchase proprietary information, contract for services, provide comments and input, and review existing inventory work resulted in the changes that have occurred in the emissions inventories for the 1990 base year inventory.

The categories in which changes have occurred may be seen in Table 8 below. A brief explanation of why the changes occurred in each area source and non-road category affected will follow after the table.

**TABLE 8****Categories with Changes in 1990 Base Year Inventory Emissions Estimates**

Category	Ozone Nonattainment Areas			
	Houston/Galveston	Beaumont/Port Arthur	Dallas/Fort Worth	El Paso
Other Product Coatings	Y	Y	Y	Y
High Performance Maintenance	Y	Y	Y	Y
Marine Vessel Loading Losses	Y	Y	N	N
Surface Cleaning	Y	Y	Y	Y
Architectural Coatings	Y	Y	Y	Y
Auto Refinishing	Y	Y	Y	Y
Sheet, Strip and Coil	Y	Y	Y	Y
Vessels with Outboards	Y	Y	N	N
Commercial Vessels	Y	N	N	N
Generators <50 HP	Y	Y	N	N
Residential Lawnmowers	Y	Y	N	N
Military Aircraft	N	N	Y	N

### **Other Product Coatings, High Performance Maintenance, and Other Special Product Coatings**

These Area Source categories are all surface coatings categories that were estimated for the 1990 inventory using per capita emission factors of .6, .7 and .8 lbs./yr./person, respectively. Per capita and per employee emission factors provided by EPA are typically national level estimates of usage of a product divided by population or number of employees. Early in the process of reviewing the inventory, agency staff requested that EPA either provide more information about what activities (specific coatings usage) the factors were related to, or that the agency be allowed to drop the emissions estimates from these categories, if no information could be provided. EPA staff was eventually able to locate the source document for the original emissions estimates. In the interim, the agency staff review of the categories resulted in better estimation of the point source emissions to be subtracted from the areas source estimate. That increased subtraction applies only to the categories Other Product Coatings and High Performance Maintenance.

Examples of Other Product Coatings are coatings used on concrete products, photographic equipment, toys and sporting goods, and so on. Examples of High Performance Maintenance coatings are coatings used in oil and gas extraction operations (e.g., pipe coatings), food processing, metals production, mining, and so on. Lastly, examples of Other Special Purpose Coatings are roof coatings, marine shelf goods, and metallic paints.

### **Marine Vessel Loading Losses**

The emission estimate in this area source category is based on the amounts of petroleum and volatile chemical cargoes loaded to marine vessels in Texas ports. Since most of the emissions due to loading

may be attributed to point sources of emissions, a part of the process of estimating is to subtract the point sources of emission estimates, which are self-reported through the Emissions Inventory Questionnaire, from the estimate of area source emissions. It was discovered that the point source emissions had been underestimated in the 1990 inventory. When the point source emission numbers were recompiled and the subtraction performed, the area source emissions went from 15.94 tons per day in HGA to zero and the emissions in BPA went down by about 0.3 of a ton per day.

### **Surface Cleaning**

This category of emissions was estimated in the 1990 inventory using a per capita emission factor of 4.3 lbs./yr./person. The agency hired a contractor to do an inventory of surface cleaning facilities in the HGA and BPA areas, but the results were inconclusive and the contractor recommended follow-up survey work. To that end, agency staff conducted 41 site visits, in addition to the survey work done by the contractor. The total number of facilities surveyed was 124; the number of facilities that reported not using VOC solvents was 83; the number of facilities that provided information about usage was 41; the sample standard deviation was .0704 and the relative error was estimated at 16.66%. There are about 10,607 facilities in 15 SIC codes in the HGA and BPA areas that are potentially involved in surface cleaning/degreasing activities. Given the relative error associated with the survey sample, and the fact that the sites selected were chosen using a random number generator, it is thought that these results hold for other areas as well. This has been reinforced by a discussion with SafetyKleen, a major supplier of degreasing solvents. A per capita emission factor has been developed based on the agency survey results and emissions, based on population, have been estimated for DFW and ELP nonattainment areas.

## Architectural Coatings

Architectural coatings, also known as trade paints, are used primarily by homeowners and painting contractors. Architectural coatings include interior and exterior house and building paints as well as coatings for other surfaces, such as curbs and signs. The coatings are applied by spray, brush or roller and dry or cure at ambient conditions. Oil-based paints and coatings account for about 29 percent of architectural coatings by volume. These typically have volatile solvent contents of about 54 percent. Water-borne paints, which make up the balance of architectural coatings, have substantially lower solvent contents, typically about 8 percent. Paints are also classified by the environment the surface is exposed to, either interior or exterior.

Average annual VOC air emissions from architectural painting activities is dependent on the following:

- 1) amount of VOCs contained in the various types of paints,
- 2) amount of the various types of paints used,
- 3) amount of VOCs in the material to “thin” the paints (when thinner is used),
- 4) amount of VOCs in the “cleanup” solvents (when used), and
- 5) amount of thinning and cleanup solvents used.

A per capita emission factor of 4.6 lbs./year per person was used to estimate emissions from this category for the original 1990 inventory. Information obtained from the National Paint and Coatings Association, combined with information collected by agency staff about thinner usage, has been used to improve the emissions estimate and to develop a new emission factor. The factor of 3.49 lbs./per

capita/per year has been used to calculate the emissions that replace the original 1990 base year estimate.

### **Automobile Refinishing**

Automobile refinishing coatings (referred to as paints), paint thinners, reducers, hardeners, catalysts and cleanup solvents used during their application, contain VOCs which are precursors to ground level ozone formation. Some of these painting compounds create hazardous air pollutants (HAPs), which are toxic. The evaporation of the VOCs from the paints, thinners, reducers, hardeners, catalysts and cleanup solvent create "area source" VOC air emissions.

Auto refinishing is the repainting of worn or damaged automobiles, light trucks and other vehicles. Coating of new cars is not included in the category but falls under industrial coatings. Auto refinishes are classified by industry as a "Special Purpose Coating" while the coatings used for new vehicles are classified as original equipment manufacture (OEM) coatings.

For this analysis, the materials used to refinish "autos" were divided into four categories; "coatings," the "thinners and reducers," the "hardeners and catalysts" and the "cleanup solvents." The "coatings" include the primers, surfacers, base coats, topcoats and clear coats. The "thinners" are material to thin the coatings. The "reducers" reduce the viscosity of the coating and act as a "thinner."

In the fall of 1995, agency staff conducted two surveys. The first survey was to collect usage information from paint and body shops (the places where most of the activity takes place) on the thinners, reducers, hardeners, catalysts and "cleanup" solvents. The second survey was to collect

information from auto refinishes manufacturers on the “average” physical properties of auto refinishes and the other materials identified above.

It is estimated that VOC air emissions from auto refinishing activities in Texas nonattainment counties decreased about 47% from 1990 through 1993. This is attributed to the following:

- 1) the quantity of paint used and/or quality of OEM new auto coating applications in the 1980's, sales of auto refinishes peaked in 1990,
- 2) the trend since 1990 has been for applicators to switch from air atomized painting equipment to high volume/low pressure equipment which has about a 40% better transfer rate (and produces less waste because there are no paint in lines),
- 3) improved coating formulations require less paint to do the same job, and
- 4) the average size of cars decreased.

Average annual VOC air emissions from automobile refinishing activities is dependent on the following:

- 1) amount of VOCs contained in the coatings,
- 2) amount of VOCs in the material to “thin” or “reduce” the coatings,
- 3) amount of VOCs in the hardener/catalyst used,
- 4) amount of VOCs in the “cleanup” solvents used,
- 5) amount of the coatings used,
- 6) amount of hardener/catalyst used, and
- 7) amount of cleanup solvents used.

Information collected from the surveys enabled staff to calculate 1990 and 1993 U.S. VOC emission factors for auto refinishing activities, then allocate those emissions to the nonattainment areas. The factor used for 1990 is 3.92 lbs./per capita/per year. For 1993 the factor is estimated to be 1.939 lbs./per capita/per year and estimated at 1.52 lbs./per capita/per year in 1996. The VOC emissions for a region are assumed to be equal to the emission factor times the population of the region.

### **Sheet, Strip, and Coil**

Metal coil coating is a linear process whereby protective or decorative organic coatings are applied to flat metal sheet or strip packaged in rolls or coils. The solvents most often used include xylene, toluene, methyl ethyl ketone, butanol, diacetone alcohol, isoprene, butyl carbonyl, mineral spirits, ethanol, nitropropane, tetrahydrofuran, methyl isobutyl ketone, isopropanol, diisoamyl ketone, and several trademarked solvents. Emissions are created at several stages of the coating operations, including coating application, curing, and quenching.

This category was estimated for the 1990 inventory using a per employee emission factor of approximately 1.5 tons/year per employee. The number of employees in the SIC Code related to this industry (3479) was obtained from a Bureau of the Census publication, County Business Patterns, Texas.

SIC 3479 includes many types of businesses not engaged in coil coating operations therefore using a per employee emission factor inflated the emissions above the levels being actually emitted by the companies involved in the specific activity. A list of companies in Texas involved in coil coating operations was obtained from the National Coil Coaters Association that enabled agency staff to

determine that either all of the coil coating companies in the nonattainment areas were reporting their emissions to the agency both in 1990 and in 1993 or they did not actually have coil coatings facilities at their locations. Instead of doing it themselves they subcontracted the work out. Therefore, there are no area source emissions, as all emissions have been accounted for in the point source inventory and inclusion in the inventory of an area source estimate would result in double-counting of emissions.

### **Vessels with Outboards**

A contractor conducted a telephone survey of registered pleasure craft owners in the HGA and BPA areas that yielded more than 800 respondents. Perhaps the most significant finding, apart from the improvement in information about spatial allocation (where used, and on which body of water), was the discovery that 62.3% of boat usage takes place on the weekend. Since, by EPA definition, an ozone emissions inventory is a weekday (Monday through Friday) inventory this finding resulted in a tremendous reduction in estimated emissions (from approximately 60 tons per day to 20 tons per day in HGA, for example). This method of reducing the total inventory estimate after accounting for weekend usage has been accepted by EPA Region VI (Dallas). Region VI allowed such a reduction in response to a survey done by the North Central Texas Council of Governments (NCTCOG) in the DFW area.

### **Commercial Vessels**

This category of non-road mobile source emissions consists of the emissions from fuel combustion by oceangoing vessels, harbor vessels, and the fishing fleet. Emissions were estimated for the 1990 inventory from information collected by the Army Corps of Engineers, Waterborne Commerce Statistics Center on freight traffic at harbors and by allocating national fuel usage to Texas. The

improvement work that has been done is based on a methodology that was developed for the EPA in October 1992 by Booz-Allen contained in a report titled, "Commercial Marine Vessel Contributions to Emissions Inventories." This methodology has been accepted by EPA's Office of Mobile Sources and its use, in substitution of the original work for 1990, has yielded emissions reductions of about 11 tons per day in the HGA area. The Booz-Allen methodology has also been applied to the 1993 emissions inventory for this category. Since the Booz-Allen study made no attempt to estimate emissions from Commercial Vessels in the BPA area, the percentage difference between the emissions estimated for HGA in 1990 and 1993 has been applied to the emissions estimate for BPA for 1993 to derive a 1990 emissions estimate for BPA.

#### **Generators < 50 HP**

This category of Non-road Mobile Source emissions is from both consumer and commercial usage of generators with power ratings of less than 50 horsepower. Emissions are from the exhaust of the generator, fuel evaporation, and refueling. The original 1990 emissions estimates, like those for Vessels with Outboards, were supplied by EPA to the states and the allocation of the emissions to the Texas nonattainment areas was through the use of regression equations applied to national level usage statistics from a proprietary database. The VOC emissions from this category represented about 6 percent of the non-road mobile source emissions (trains, planes, ships, and other non-road equipment).

The emissions inventory work that replaces the original emissions estimate was done by a contractor employed by the agency for the COAST project. The inventory is an improvement because it is based on local area-specific construction and recreational area information and is also based on more current information about horsepower distributions in equipment populations.

## **Residential Lawnmowers**

Emissions from lawn and garden equipment are also classified as Non-road Mobile Sources. The original 1990 inventory included emissions estimates for approximately 80 different types of non-road mobile equipment in a catchall category called, "Other Small Engines." The EPA hired a contractor to perform the inventory, which is described in a document called the Non-road Engine and Vehicle Emissions Study--Report, November 1991. The change in emissions that the agency has made to the original estimate is an adjustment to reflect differences in usage by residential sources. By definition, the 1990 Base Year EI was to be an inventory of emissions that occurred through the week (i.e., Monday through Friday). In making a temporal adjustment to the residential portion of lawnmower emissions only (since commercial usage patterns are unknown) the agency has reduced the overall residential emissions by the amount of the emissions reported for weekend usage. The justification for the adjustment is drawn from a survey conducted by agency staff of 1434 randomly selected residences in the HGA and BPA areas which had a 21% response rate. Survey statistics are: 59% of lawns were mown by the resident or by a friend or neighbor, 8% of lawns were mown by commercial services, and 33% reported that they had no lawns to mow. Of the 160 applicable residential lawnmowers, 59% reported that they mowed their lawns on Saturday or Sunday. The residential emissions have been adjusted accordingly, while the commercial portion is unchanged.

## **Military Aircraft**

This category of non-road mobile source emissions has only been reworked for the DFW ozone nonattainment area. This adjustment accounts for the reduced levels of activity at Carswell Air Force Base, Texas due to closure and realignment. In 1992 when information for the 1990 inventory was

being collected, Carswell's base commander was contacted by the NCTCOG. Given the information supplied by the Air Force, the emissions were estimated by NCTCOG at .6356 tons per day. Subsequently, the Air Force has self-reported, in a draft environmental impact statement on the closure of Carswell, that 1990 VOC emissions were 8.48 tons per day. This adjustment and backcast of the 1990 inventory corrects that discrepancy, while still including an estimate of the military aircraft activity at the base after the realignment.

#### (b) Changes to On-road Mobile Source Emissions Estimates

The major change that has occurred in the estimation of On-road Mobile Source emissions included in the original 15% SIP submission for the 1996 projection inventory is the substitution of a revised I/M Program for automobiles in all ozone nonattainment areas. The I/M Program that was to have been effective beginning January 1, 1995 was not implemented due to action by the Texas Legislature. Senate Bill 178 canceled the centralized vehicle emissions testing program, reinstated the previous testing program, and authorized the Governor to negotiate a more convenient, less costly program. I/M Program changes may be found in other sections of this document that deal specifically with the revised I/M Program. The commission, assisted by the local Council of Governments, Metropolitan Planning Organizations (MPOs), the Texas Transportation Institute, and the Texas Department of Transportation, modeled the impact of changes in the I/M program on the 1996 inventory and individual control program reductions.

In addition, the 1990 base year inventories and 1996 projection inventories for BPA and ELP were updated to reflect a change in inventory methodology. The new methodology is a bottom-up, link-based inventory rather than a top-down, facility-type inventory. A link-based inventory is one

developed using specific information about vehicle miles traveled (VMT) and vehicle speeds associated with each link in the transportation network for a given county. A facility-based analysis, or road-type-based inventory, is a less detailed inventory, which aggregates the links into facility types (e.g., 12 road types: arterial, collector, highway, etc.) and uses average speeds. These updates are being done in order to obtain consistency with other FCAA Amendments inventory-based requirements (i.e., conformity analysis and conformity budgets).

TABLE 9  
Final 1996 ROP Required VOC Emissions Reductions Calculations  
Dallas-Fort Worth Ozone Nonattainment Area  
Ozone Season VOC Tons Per Day  
June 12, 1996

Step	Emissions Basis	Stationary		Mobile		Total
		Point	Area	On-road	Non-road	
1	1990 ROP Nonattainment Area Base Year EI	65.27	174.02	306.60	105.19	651.08
2	1990 Adjusted Base Year EI	65.27	174.02	204.35	105.19	548.83
3	RVP and FMVCP Reductions [On-road mobile:steps(1-2)]			102.25		
4	15% of Adjusted Base Year EI (0.15*step 2)					82.32
5	RACT Fix-Up and I/M Corrections Reductions	0.99	0.00	0.00		0.99
6	1990 to 1996 Noncreditable Reductions Without Growth [steps(3+5)]					103.24
7	Total ROP Required Reductions Without Growth [steps(3+4+5)]					185.56
8	1996 Target Level Emissions [steps(1-7)]					465.52
9	1996 Emissions Forecast (Growth and Pre-90 Controls)	70.64	162.62	241.89	107.92	583.07
10	Total ROP Required Reductions with Growth [steps(9-8)]					117.55

Base year on-road mobile emissions calculated with MOBILE5 for an ozone season weekday

Adjusted base year on road mobile emissions and 1996 forecast on-road mobile emissions calculated with MOBILE5A for an ozone season weekday

All on-road MOBILE5A forecasts are interpolated to November 15, 1996

TABLE 10  
 Final 1996 ROP Required VOC Emissions Reductions Calculations  
 El Paso Ozone Nonattainment Area  
 Ozone Season VOC Tons Per Day  
 June 27, 1996

Step	Emissions Basis	Stationary		Mobile			Total
		Point	Area	On-road	Int'l Bridges	Non-road	
1	1990 ROP Nonattainment Area Base Year EI	9.45	24.94	36.87	1.40	10.99	83.65
2	1990 Adjusted Base Year EI	9.45	24.94	23.18	0.84	10.99	69.40
3	RVP and FMVCP Reductions [steps(1-2)]			13.69	0.56		14.25
4	15% of Adjusted Base Year EI (0.15*step 2)						10.41
5	RACT Fix-Up and I/M Corrections Reductions	0.04	1.53	0.00	0.00		1.57
6	Noncreditable Reductions w/o Growth [steps(3+5)]						15.82
7	Total ROP Required Reductions w/o Growth [steps(3+4+5)]						26.23
8	1996 Target Level Emissions [steps(1-7)]						57.42
9	1996 Emissions Forecast (Growth and Pre-90 Controls)		23.30	28.34	1.01	11.64	73.61
10	Total ROP Required Reductions with Growth [steps(9-8)]						16.19

Base year on-road mobile emissions calculated with MOBILE5 for an ozone season weekday

Adjusted base year on road mobile emissions and 1996 forecast on-road mobile emissions calculated with MOBILE5A for an ozone season weekday

All on-road MOBILE5A forecasts are interpolated to November 15, 1996

Source: TNRCC Emissions Inventory Section

Table 11  
Final 1996 ROP Required VOC Emissions Reductions Calculations  
Beaumont-Port Arthur Ozone Nonattainment Area  
Ozone Season VOC Tons Per Day  
June 18, 1996

Step	Emissions Basis	Stationary		Mobile		Total
		Point	Area	On-road	Non-road	
1	1990 ROP Nonattainment Area Base Year EI	245.35	30.63	29.35	18.44	323.77
2	1990 Adjusted Base Year EI	245.35	30.63	19.11	18.44	313.53
3	RVP and FMVCP Reductions [On-road mobile:steps(1-2)]			10.24		
4	15% of Adjusted Base Year EI (0.15*step 2)					47.03
5	RACT Fix-Up and I/M Corrections Reductions	2.38	1.90	0.00		4.28
6	1990 to 1996 Noncreditable Reductions Without Growth [steps(3+5)]					14.52
7	Total ROP Required Reductions Without Growth [steps(3+4+5)]					61.55
8	1996 Target Level Emissions [steps(1-7)]					262.22
9	1996 Emissions Forecast (Growth and Pre-90 Controls)	250.96	28.71	21.87	18.47	320.01
10	Total ROP Required Reductions with Growth [steps(9-8)]					57.79

Base year on-road mobile emissions calculated with MOBILE5 for an ozone season weekday

Adjusted base year on road mobile emissions and 1996 forecast on-road mobile emissions calculated with MOBILE5A for an ozone season weekday

All on-road MOBILE5A forecasts are interpolated to November 15, 1996

TABLE 12  
Final 1996 ROP Required VOC Emissions Reductions Calculations  
Houston-Galveston Ozone Nonattainment Area  
Ozone Season VOC Tons Per Day  
June 12, 1996

Step	Emissions Basis	Stationary		Mobile		Total
		Point	Area	On-road	Non-road	
1	1990 ROP Nonattainment Area Base Year EI	481.95	200.07	251.72	129.98	1063.72
2	1990 Adjusted Base Year EI	481.95	200.07	163.39	129.98	975.39
3	RVP and FMVCP Reductions [On-road mobile:steps(1-2)]			88.33		
4	15% of Adjusted Base Year EI (0.15*step 2)					146.31
5	RACT Fix-Up and I/M Corrections Reductions	3.50	2.04	10.77		16.31
6	1990 to 1996 Noncreditable Reductions Without Growth [steps(3+5)]					104.64
7	Total ROP Required Reductions Without Growth [steps(3+4+5)]					250.95
8	1996 Target Level Emissions [steps(1-7)]					812.77
9	1996 Emissions Forecast (Growth and Pre-90 Controls)	504.93	189.85	192.89	138.37	1026.04
10	Total ROP Required Reductions with Growth [steps(9-8)]					213.27

Base year on-road mobile emissions calculated with MOBILE5 for an ozone season weekday

Adjusted base year on road mobile emissions and 1996 forecast on-road mobile emissions calculated with MOBILE5A for an ozone season weekday

All on-road MOBILE5A forecasts are interpolated to November 15, 1996

## b) Factors Affecting Magnitude of VOC Emissions

### (1) Changes in Stationary, Area, and Non-Road Mobile Source Emissions Regulations

(a) - (b) (No change.)

### (c) Proposed New VOC Control Measures

#### (i) New or Modified Point Source Controls

This section will discuss control measures implemented to control VOC emissions from point sources. Later sections will discuss estimated reductions expected from these rules for each specific nonattainment area. The following rules deal mainly with point sources. The Control Measure Catalog (CMC), as discussed in Appendix E, ranks the various control measures based on a variety of criteria. This ranking will be especially useful in determining rules to be used as contingency measures.

Values for rule effectiveness (RE), rule penetration, and control efficiency can be found for the rules in the discussion of each nonattainment area.

Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes and Distillation Operations (§§115.121-115.129).

This rule applies to all nonattainment areas, but reductions are quantified for the HGA nonattainment area only.

These rules control VOC by revising the vent gas rule to include more stringent limits on VOC emissions from SOCMI reactor processes and distillation units. New control requirements specify that emission control equipment for SOCMI reactor processes and SOCMI distillation operations must have a destruction efficiency of at least 98% or control the vent gas stream to a VOC emission rate of no more than 20 parts per million by volume (ppmv).

Industrial Wastewater (§§115.140-115.149).

This rule applies to ELP, DFW, and HGA.

These rules require control of industrial wastewater in specific source categories (organic chemicals, plastics, and synthetic fibers manufacturing; pesticides manufacturing; petroleum refining; pharmaceutical manufacturing; and hazardous waste treatment, storage, and disposal facilities).

Industrial wastewater operations are required to cover wastewater treatment areas and route the vapors through a control device.

Marine and Other Vessel Loading (§§115.211-115.219).

Marine vessel loading applies to HGA. Marine terminals with 100 TPY or more of VOC emissions are required to install controls.

Loading requirements for land-based transport vessels apply to all areas. Gasoline terminals in all non-attainment areas are required to reduce emissions from the vapor recovery system vent to no more than 10.8 mg/liter of gasoline transferred. The rule also requires gasoline terminals in DFW, ELP, and HGA to implement a fugitive emissions monitoring program and automatic shutdown of the loading system during vapor control device malfunctions. Effective March 7, 1996, the commission removed the requirement for vacuum-assisted vapor collection systems at gasoline terminals in DFW, ELP, and HGA. This action is consistent with Maximum Achievable Control Technology (MACT) standards for gasoline terminals promulgated by EPA on December 14, 1994.

Fugitive Emissions--Natural Gas Processing, Petroleum Refinery, and SOCFI (§§115.352-115.359).

This rule applies to all four nonattainment areas.

These rules apply a more stringent fugitive monitoring program to all natural gas processing, petroleum refinery, and SOCFI facilities.

Acetone Replacement (§§115.412-115.419).

Effective March 7, 1996, the commission excluded acetone from the definition of VOC, and concurrently deleted the rule requirements concerning acetone usage at polyester resin operations (cultured marble and fiber-reinforced plastic manufacturing). This action followed the EPA June 16, 1995 rulemaking exemption of acetone from the federal definition of VOC. The rule was previously expected to generate 0.289 TPD reduction in DFW and 1.434 TPD reduction in HGA. The commission agrees that these reductions are no longer creditable. No reduction was expected in ELP. The rule did not apply in BPA.

Offset Lithography Printing (§§115.440-115.449).

This rule applies to ELP and is a contingency rule in HGA and DFW.

The rule requires process changes for offset lithographic printing operations such as those used in the printing of newspapers and advertisements. The rule specifies control requirements for several types of offset printing. In some cases, add-on controls are required.

Marine and Other Vessel Cleaning (§§115.541-115.549).

This rule applies to BPA and HGA, and is a contingency rule for DFW and ELP.

In the past, the VOC emissions from cleaning or repair of storage tanks, tank trucks, rail cars, barges, and ships have been vented directly to the atmosphere without control. This rule changes that practice by requiring the emissions to be routed to a control device.

#### Benzene National Emissions Standards for Hazardous Air Pollutants (NESHAPS) Reductions.

VOC emission reductions associated with benzene NESHAPS apply to the HGA nonattainment area and are described in Appendix 7-G.

#### Rule Effectiveness Improvements.

RE improvements are applicable to all nonattainment areas.

Credits can be obtained with real emission reductions resulting from the specific implementation program improvements through better or clearer rules, more frequent inspections, more inspectors, improved recordkeeping requirements, more stringent penalties for non-compliance, or more strict control requirements. The RE National Protocol provides guidance to the states and local agencies for conducting rule effectiveness studies that conform to standards set by the Stationary Source Compliance Division (SSCD). SSCD protocol studies, as they are called, are a detailed source-by-source checklist to determine RE and were initiated in 1988 as a compliance tool. The agency has developed its own methodology pursuant to the Addendum of the EPA guidance document, Guidelines for Estimating and Applying Rule Effectiveness for Ozone/CO State Implementation Plan Base Year Inventories. This methodology has been approved for use by EPA, but must be confirmed in 1996 by a commitment to perform an SSCD study to verify that the reductions taken are accurate.

Rather than perform a costly and time-consuming SSCD protocol study, the agency is committing to use the following approach, which it believes more accurately determines the actual RE of each control measure.

1. As a result of a planned realignment of agency resources, there will be significant increases in regional office compliance and enforcement staff. These additional field office resources will enable inspectors to precisely determine in-use control efficiency as part of each annual inspection. This determination will identify three elements: the SIC code, the process unit, and the control equipment. This determination will be based on data from continuous emissions monitors, parametric emission monitoring programs, stack sampling, records of equipment performance vendor data, and other applicable information. The results of this determination will be reported in conjunction with the annual EI submission.

2. The upset/maintenance rule will be revised to require more detailed recordkeeping. Information on the exact amount of the emissions released in excess of the in-use control efficiency will be required.

These two pieces of information taken together will allow the staff to determine an exact actual annual emission rate for each emission point. The results of an SSCD protocol study, on the other hand, provide only an industry average that may or may not accurately reflect the conditions at any given site or for a specific piece of control equipment. The sources for further study will be prioritized based on the amount of reductions obtainable--those industries with the largest reductions will receive top priority. Tables 14 and 15 are lists of prioritized source categories with creditable RE improvements.

**TABLE 14****Reductions Due to Rule Effectiveness Improvements--Area Sources****(tons per ozone day)**

<b>CATEGORY</b>	<b>DFW</b>	<b>ELP</b>	<b>BPA</b>	<b>HGA</b>
Tank Truck Unloading	1.245	0.170	0.421	1.640
Surface Cleaning	0.290	0.606	0.000	0.280
Sheet Strip Coil	0.023	0.000	0.000	0.179
Architectural Coatings	0.184	0.000	0.000	0.000
Metal Containers	0.083	0.000	0.000	0.110
Machinery/Equipment	0.049	0.010	0.000	0.049
Other Trans Equipment	0.066	0.000	0.000	0.000
Factory Finished Wood	0.020	0.005	0.000	0.037
Auto New-Misc Metal	0.058	0.000	0.000	0.000
Tank Trucks in Transit	0.015	0.002	0.008	0.021
Cutback Asphalt	0.022	0.000	0.006	0.011
Electrical Insulation	0.012	0.002	0.000	0.000
Appliances	0.013	0.000	0.000	0.000
<b>TOTAL</b>	<b>2.080</b>	<b>0.795</b>	<b>0.435</b>	<b>2.327</b>

**TABLE 15****Reductions Due to Rule Effectiveness Improvements--Point Sources  
(tons per ozone day)**

<b>CATEGORY</b>	<b>DFW</b>	<b>ELP</b>	<b>BPA</b>	<b>HGA</b>
Gasoline Terminals	1.301	0.776	0.286	0.000
Roof Tanks-Ext Float	0.018	0.063	1.868	1.950
Resins-Polyethylene	0.000	0.000	1.582	2.065
Gasoline Plants	0.151	0.043	0.000	0.590
Pet Ref: Vac Prod	0.000	0.032	0.199	0.973
Storage Tanks-Fixed	0.045	0.001	0.286	1.617
Air Oxidation-SOCMI	0.000	0.000	0.000	0.123
Graphic Arts	0.555	0.000	0.000	0.049
Resins-Polypropylene	0.000	0.000	0.000	0.590
Auto New-Misc Metal	0.241	0.000	0.000	0.007
Resins-Polystyrene	0.141	0.000	0.013	0.660
Surf Coat Misc Met	0.111	0.014	0.001	0.069
Surface Cleaning	0.077	0.000	0.002	0.042
Cans	0.032	0.000	0.000	0.032
Metal Coils	0.028	0.000	0.000	0.020
Paper Products	0.033	0.000	0.000	0.000
Factory Finished Wood	0.026	0.000	0.000	0.000
Metal Furniture	0.013	0.000	0.000	0.000
Appliances	0.004	0.000	0.000	0.000
VOC/Water Separators	0.000	0.000	0.367	1.418
Fabrics	0.004	0.005	0.000	0.000
<b>TOTAL</b>	<b>2.780</b>	<b>0.934</b>	<b>4.604</b>	<b>10.205</b>

(ii) New or Modified Area Source Controls

The following rules apply mainly to area sources of VOC emissions.

Commercial Bakeries (§§115.121-115.129).

This rule applies to major source bakeries in DFW, and HGA, and is a contingency rule for ELP and minor source bakeries in DFW.

This rule requires VOC emission reductions of at least 30% overall from 1990 base year emissions. Bakeries with total oven emissions less than 25 TPY of VOC are exempt.

Municipal Landfills (§§115.152-115.159).

This rule applies to DFW and ELP, and is a contingency rule for HGA.

EPA has proposed New Source Performance Standards rules which use a gas extraction system to reduce VOC emissions from sanitary landfills. The state is permitted to implement these rules early and claim credit for VOC reductions.

Auto Body Shops (§§115.421-115.429).

This rule applies to ELP, DFW, and HGA.

This rule establishes VOC emission limitations for coatings and solvents used in vehicle refinishing. The rule also specifies the procedures that vehicle refinishing operations must use to minimize VOC emissions during equipment cleanup, and requires vehicle refinishing operations to utilize coating application equipment with a transfer efficiency of at least 65%.

Architectural Coatings (§§115.421-115.429).

This rule applies to architectural coatings in all nonattainment areas. This rule regulates nine categories of architectural coatings. EPA is developing a national architectural coatings rule which will specify VOC emission limitations for approximately 30 categories of architectural coatings. In a memo dated March 22, 1995, EPA stated that the national rule will reduce VOC emissions from the 1990 baseline by 20% by 1996. A March 7, 1996 EPA memo states that despite delays in the rule proposal and final compliance date "...the overall reduction estimate for the rule remains at 20 percent" and that "...States may still claim credit for the 20 percent reduction from the rules in their 15 Percent Rate-of-Progress Plans." The commission may decide to repeal the state rule when EPA has adopted the national architectural coating rule.

Petroleum Dry Cleaning (§§115.552-115.559).

This rule is a contingency rule for ELP, DFW, and HGA.

This rule adds control requirements for dry cleaning operations which use VOCs such as naphtha or Stoddard solvent as the cleaning solvent. Dry cleaners which use perchloroethylene, which EPA has reclassified as a non-VOC, are not included.

Consumer/Commercial Products (§§115.610-115.619).

This rule is applicable statewide to maximize the amount of creditable reductions in the nonattainment areas due to enhanced rule effectiveness.

This rule controls the amount of VOC used in a variety of products such as air fresheners, bathroom and tile cleaners, automotive cleaners, floor polishes and waxes, general purpose cleaning supplies, toiletries, and laundry detergents. The rule includes a procedure for exemption of an innovative consumer product from the table of standards emissions limits. The manufacturer must show to the satisfaction of the agency that use of the product will result in equal or less VOC emissions as a result of some characteristic of the product formulation, design or delivery system. Appendix 7-P lists the innovative products which have been approved by the agency's executive director under the case-by-case premarket review procedure of section 115.614.

(iii) New or Modified Non-Road Mobile Source Controls

The FCAA Amendments of 1990 do not specifically mandate controls for non-road mobile sources. However, this category of VOC emissions represents a substantial source of emissions in many Texas nonattainment areas, particularly DFW. Therefore, implementing controls on non-road mobile sources is important to the overall reduction of ozone. Included in the non-road mobile category are construction and farm vehicles, marine vessels, locomotives, airplanes, utility engines, off-road motorcycles, and off-highway vehicles.

Small Utility Engines (§§115.621-115.625).

Effective February 1, 1996, the commission repealed this rule which had established emission limits for small gasoline powered and diesel utility engines with power ratings of 25 horsepower and less. This action followed EPA's promulgation of a national small utility engine rule in May, 1995. Emission reduction credit is being taken for the national rule.

Gasoline Volatility (Reid Vapor Pressure) Controls (§§115.252-115.259).

Representatives of local government and the Chevron refinery in El Paso approached the agency about the possibility of lowering Reid Vapor Pressure (RVP) in summer gasoline instead of using reformulated gasoline (RFG) to minimize the cost of refinery modifications, resulting in lower cost at the pump for consumers. Chevron submitted results from the EPA complex model for predicting fuel effects. The results show VOC reductions that are substantially equivalent to those from the use of RFG when RVP is lowered to 7.0 pounds per square inch (psi).

Due to the substantially equivalent VOC reductions obtainable from low-RVP gasoline and the overwhelming support for the low-RVP program by local government and industry, the agency will implement a low-RVP gasoline program in El Paso. RVP gasoline has benefits for both on-road and non-road mobile sources. Additionally, it will be possible to sell the low-RVP gasoline in Ciudad Juarez, obtaining more widespread benefits for the air basin.

Current estimates indicate low-RVP gasoline resulting in a one-cent-per-gallon increase at the pump as opposed to a predicted four to ten-cents-per-gallon increase for RFG.

### Commercial Airport Rules.

Large commercial airports can be a significant source of VOC and NO<sub>x</sub> emissions which are produced by a wide variety of sources. These sources include, but are not limited to, aircraft take-offs and landings, aircraft taxi and queuing activities, aircraft refueling operations, aircraft gate support and servicing operations, aircraft maintenance and painting operations, fuel farm operations and fuel tank fugitives, fire training facility operations, automobile VMT emissions from service and passenger vehicles, evaporative emissions from parked vehicles, and increased congestion from airport vicinity traffic.

The agency is not currently proposing specific airport rules. However, creditable reductions are being claimed from the federal aircraft noise control rules which phase in "Stage 3" aircraft. These rules will provide emissions reductions because the "Stage 3" engines are more fuel efficient in addition to being less noisy.

### Stage II Vapor Recovery (§§115.241-115.249).

This rule applies to all public and private motor vehicle refueling facilities dispensing 10,000 gallons or more of gasoline per month. Independent small business marketers of gasoline whose facilities have a throughput of less than 50,000 gallons per month may request an extended compliance schedule. They will then be required to install Stage II systems when their storage tanks are replaced or equipped with corrosion protection, but no later than December 22, 1998.

A full description of the Stage II program is included in Appendix 7-F.

### Stage I Vapor Recovery (§§115.221-115.229)

Rules concerning the filling of gasoline storage tanks for motor vehicle fuel dispensing facilities (Stage I vapor recovery) were adopted in the late 1970's and early 1980's for some of the nonattainment counties, and in 1992 for perimeter nonattainment counties. Amendments to these rules were adopted in November 1993 to bring the Stage I program into alignment with the Stage II vapor recovery requirements and improve enforceability.

### Accelerated Vehicle Retirement Program (§114.29)

The agency has developed a vehicle scrappage program, titled "Accelerated Vehicle Retirement Program", as §114.29 in Regulation IV. This program will not generate any SIP reduction credits as currently designed, but may produce some milestone credits if the scrappage is used in lieu of a monetary penalty.

The purpose of this program is to reduce mobile source emissions and provide additional flexibility for stationary sources in the nonattainment areas: HGA, DFW, ELP, and BPA. A scrappage program reduces VOC, NO<sub>x</sub>, and CO emissions from mobile sources, such as automobiles and light duty trucks, by permanently removing high-emitting vehicles from the area-wide fleet. With this rule, stationary sources will have the opportunity to select the most cost effective approach to complying with federal and state regulations for ozone reduction.

## (2) Changes in Mobile Source Emissions

(a) - (b) (No change.)

(c) Transportation Planning

Much of the responsibility for the planning and implementation of Transportation Control Measures (TCMs) has been delegated to the applicable MPOs. TCMs are designed to either reduce the number of vehicle miles traveled, reduce or eliminate vehicle trips, or improve the flow of traffic. There are a variety of TCMs being considered (see list below), and each nonattainment area will choose from among them. Title 30 of the Texas Administrative Code (TAC) §114.23, concerning Transportation Control Measures, has been adopted to provide enforceability to the TCM strategy and related categories of TCMs selected for each area. This rule contains TCM-specific definitions; designations of affected MPOs responsible for TCM development, funding, and implementation; requirements that MPOs submit specific information provided by agencies or entities responsible for TCM implementation and a quantification of the emission reduction benefits; requirements that MPOs maintain and provide specific information to the agency regarding TCM implementation status; requirements that the MPOs modify the transportation improvement program for the area, as necessary, to correct implementation deficiencies; and prescribed enforcement actions to be taken if deficiencies remain unresolved or if knowing violations of TCM commitments occur. A TCM summary for DFW, ELP, and the HGA ozone nonattainment areas is located in Appendix 7-K. Those listed below are examples of TCMs which may be adopted. Those specific TCM projects not needed will be deleted as long as the TCM categories in the approved SIP are not deleted and the emission reduction totals remain the same, and others may be added as they become available or identified. TCMs under consideration include the following:

- Restriction of certain roads or lanes to passenger buses or high-occupancy vehicles (HOVs), and programs for the provision of all forms of high-occupancy, shared-ride services.
- Trip-reduction initiatives.
- Traffic flow improvement programs that reduce emissions. Included are signal timing improvements and computer controlled signal coordination/progression that permits vehicles traveling in the direction of the major traffic flow to receive a green light whenever possible, thereby reducing idling time. Intersections can also be modified to improve traffic flow and reduce emissions.
- Programs to limit or restrict vehicle use in the downtown area or other areas of high emission concentration, particularly during periods of peak use.
- Programs to limit portions of road surfaces or certain sections of the metropolitan area to bicycle or pedestrian use, and to construct new roads or paths for this purpose. Also programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the protection and convenience of bicyclists, in both public and private areas.
- Programs to reduce emissions due to extended idling of vehicles and extreme cold start conditions.
- Programs and ordinances to facilitate non-automobile travel, to facilitate provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity. Programs for improved public transit routes, service, frequency, and route modifications are also included. Other programs include reduced transit fare and municipal car pool/van pool programs.

- Programs to encourage the voluntary removal from the marketplace and from use of pre-1980 model year light-duty vehicles and trucks.
- Programs and ordinances for parking incentives and disincentives to promote use of multi-occupancy vehicles or mass transit.
- Programs and ordinances to promote use of alternatively fueled vehicles.

#### (d) Vehicle I/M Program

The FCAA Amendments of 1990 mandate vehicle emissions inspection and maintenance programs in areas that do not meet the NAAQS for ozone. Congress also set minimum performance standards for these programs such as centralized testing, annual testing of some vehicles, minimum expenditure amounts in "enhanced" I/M program areas, and registration enforcement.

EPA has promulgated federal rules that include specific performance standards for I/M programs.

These rules, based on the direction provided in the FCAA Amendments, state what is expected by EPA.

"Basic" programs are required for nonattainment areas with moderate ozone classifications.

"Enhanced" programs are required for those areas with a 1980 population of 200,000 or more, which are classified as having serious, severe, or extreme ozone pollution levels. The HGA and ELP

nonattainment areas fall into this category and are required to have enhanced I/M programs. The BPA nonattainment area is a moderate nonattainment area, and its 1980 population of less than 200,000 in an urbanized area qualifies it for a basic program. The DFW area is a moderate ozone nonattainment area and requires at least a basic program.

The EPA issued a rule on November 5, 1992 that outlined very specific requirements for vehicle emissions testing. A vehicle emissions testing program was designed and implemented on January 1, 1995 that met all EPA requirements. The Texas Legislature suspended the program and authorized Governor Bush to negotiate a new vehicle emissions testing program. On September 19, 1995, EPA issued a rule allowing states to implement less stringent vehicle emissions testing programs. This rule also raised the population requirements for I/M programs, thus allowing the BPA area to develop a pollution control strategy that does not include I/M. On November 10, 1995, Governor Bush announced the Texas Motorist's Choice Vehicle Emissions Testing Program.

The emissions testing program will include the following:

- o Scheduled testing will be required in Dallas, Tarrant, El Paso and Harris counties.
- o Annual testing will be conducted in conjunction with the safety inspection.
- o Motorists will choose a facility to perform tests, such as:
  - o Annual, two-speed idle tests at test-and-repair facilities,
  - o Annual, two-speed idle tests at test-only facilities,
  - o Biennial, loaded or transient tests at test-only or test-and-repair facilities.
- o Two-speed idle test fees are set at test-and-repair sites, test fees for an annual two-speed idle program are \$13.00 and test fees for a biennial test are \$26.00. Test fees for loaded mode equipment have not been set.
- o Vehicles registered in Denton, Collin, Brazoria, Galveston, Chambers, Liberty, Waller, Montgomery, and Fort Bend counties will be subject to a vehicle emissions test if detected as a "grossly polluting vehicle" as a result of remote sensing.

- o Vehicles 2 to 24 years old will be tested annually. Vehicles 0 to 2 years old will be subject to remote sensing inspection scans. Vehicles failing a remote sensing screening will be required to have an emissions test.
- o Vehicles six to 24 years old registered in Dallas, Tarrant or Harris counties must be tested at a test-only facility prior to transferring title after resale if legislative authority is granted.
- o Waivers must be performed by a recognized repair technician in order to qualify for a waiver.
- o Low Income Time Extensions will be available.
- o All inspection facilities will participate in a central database via a dial-up modem.

The emission control device inspection in all I/M program areas will consist of two components: a visual test to verify presence (if applicable) of the catalytic convertor, exhaust gas recirculation system, positive crankcase ventilation system, evaporative system, thermostatic air cleaner and air injection system, and an automated inspection procedure for testing tail pipe emissions and the integrity of the gas cap.

Inspection of the emissions control devices is performed through direct observation or through indirect observation using a mirror, video camera, or other visual aid. Also referred to as an "anti-tampering inspection," it shall include a determination as to whether each device is present and properly connected and whether it is the correct type for the certified vehicle configuration. Aftermarket parts, as well as the original equipment manufactured parts, may be considered correct if they are of the proper design and fit for the certified vehicle configuration.

EPA proposes to approve I/M SIP submissions which are consistent with the following standards and approved methods of testing for vehicle emissions.

(i) Emission Standards

Emission standards are limits for hydrocarbon (HC) and CO emissions. In transient testing, units of measure are expressed as grams per mile (g.p.m.), while in idle and steady state testing, units of measure are expressed in ppm or as a percentage. These standards will apply to all vehicles subject to the program. Failure of any standard will necessitate appropriate repairs.

(ii) Evaporative System Integrity Test Procedure

This test procedure consists of a series of steps to measure an unacceptable drop in pressure, which indicates deterioration of the gas cap. This portion of the test may be failed if the gas cap is missing or is damaged or is no longer working properly.

(iii) Loaded-Mode, Two-Speed Test

This test will be conducted using an analyzer and a dynamometer. The dynamometer can range from a simple chassis dynamometer to a more sophisticated variable inertial weight dynamometer. Tail pipe emissions are sampled from the vehicle at a simulated speed of approximately 30 miles per hour and at idle. Some motorists may choose this test-only option and will receive an emissions test that is valid for two years. Equipment specifications and cut-points have not been developed.

#### (iv) Preconditioned Two-Speed Idle Test

This test is conducted using a BAR90-type analyzer without a dynamometer. The test sequence consists of a high-speed mode at approximately 2,500 revolutions per minute followed immediately by an idle mode. Additional preconditioning followed by an identical second-chance test is performed only if the vehicle fails the first test cycle. Dedicated four-wheel drive and heavy-duty vehicles must be tested using this test type. Motorists may elect this type of test and will receive an emissions test that is valid for one year.

On November 29, 1995, President Clinton signed the National Highway System Designation Act of 1995. Section 348 of the legislation prohibits EPA from applying a default 50% penalty to a decentralized vehicle I/M program if a SIP revision was submitted to EPA within 120 days of the bill's signature. Texas met this requirement, thus gaining additional credit for the vehicle emissions testing program.

#### (e) Gasoline Volatility (Reid Vapor Pressure) Controls

Representatives of local government and the Chevron refinery in El Paso approached the agency about the possibility of lowering RVP in summer gasoline instead of using RFG to minimize the cost of refinery modifications resulting in lower costs at the pump for consumers. Chevron submitted results from the EPA complex model for predicting fuel effects. The results show VOC reductions that are substantially equivalent to those from the use of reformulated fuel when RVP is lowered to 7.0 psi.

Due to the substantially equivalent VOC reductions obtainable from low-RVP gasoline and the overwhelming support for the low-RVP program by local government and industry, the commission will implement a low-RVP gasoline program. RVP gasoline has benefits for both on-road and non-road mobile sources. Additionally, it will be possible to sell the RVP gasoline in Ciudad Juarez, obtaining more widespread benefits for the air basin.

Current estimates indicate RVP gasoline resulting in a one cent per gallon increase at the pump as opposed to a predicted three to five cents per gallon increase for reformulated gasoline.

(f) Accelerated Vehicle Retirement Program

The agency has developed a vehicle scrappage program, the Accelerated Vehicle Retirement Program (30 TAC §114.29). This program will not generate any SIP reduction credits as currently designed, but may produce some milestone credits if the scrappage credits are donated to the state or generated through state funding.

The purpose of this program is to reduce mobile source emissions and provide additional flexibility for stationary sources in the nonattainment areas: HGA, DFW, ELP, and BPA. A scrappage program reduces VOC, NO<sub>x</sub>, and CO emissions from mobile sources, such as automobiles and light duty trucks, by permanently removing high-emitting vehicles from the area-wide fleet. With this rule, stationary sources will have the opportunity to select the most cost effective approach for complying with federal and state regulations for ozone reduction.

c) - e) (No change.)

b. Dallas/Fort Worth Ozone Control Strategy

1) General

As a result of the FCAA Amendments of 1990, Collin, Dallas, Denton, and Tarrant Counties were classified as a moderate nonattainment areas. The DFW nonattainment area has an ozone design value of 0.14 ppm, which places the area at the lower end of the moderate classification boundary.

2) Estimated Emission Reductions

Table 16 summarizes the breakdown of anthropogenic emissions in the DFW area by emission categories.

**TABLE 16**  
**Anthropogenic VOC Emissions in the**  
**Dallas/Fort Worth Area**

<b>CATEGORY</b>	<b>AMOUNT IN TPD</b>	<b>PERCENTAGE</b>
Point	65.27	12
Area	174.02	32
Non-Road Mobile	105.19	19
On-Road Mobile	204.35	37

a) 15% Targeted Reductions (No change.)

## b) Stationary and Area Source Controls Toward 15% Reduction

Stationary or point sources in the DFW nonattainment area account for only 12% of the total anthropogenic emissions while area sources account for a much larger fraction, estimated to be 32%. There are several federally mandated programs that will be creditable towards the 1993 ROP SIP, but additional measures will be needed in order for the DFW area to meet its goal.

The DFW nonattainment area will receive creditable reductions from RACT catch-ups and leveling the playing field. Table 17 identifies reductions due to RACT catch-ups and RE improvements for both point and area sources. Reductions for leveling the playing field are included under RACT catch-ups. For an explanation of the formulas used to calculate the reductions, see Appendix 7-I. For an explanation of the catch-up rules, see Appendix 7-D.

Table 17

## POINT SOURCES

Dallas/Fort Worth -Reductions Due to RACT Catch-ups 3/8/96

Group	Category	EI 1990 (TPD)	EI 1996 (TPD)	Permits	CE-90	CE-96	Non-Permitted		Permitted		Catch-up RE Reduction		
							RE-90	RE-96	RE-90	RE-96	1990 (TPD)	90-96 (TPD)	New1996 (TPD)
A	Cans	0.00	0.00	0.00	0.0%	55.2%	96.0%	99.0%	96.0%	99.0%	0.000	0.000	0.000
B	Metal Coils	0.00	0.00	0.00	0.0%	55.9%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
C	Paper Products	0.02	0.03	0.03	0.0%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.002	0.028
D	Fabrics	0.00	0.00	0.00	0.0%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
E	Auto New-misc. metal	0.00	0.00	0.00	0.0%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
F	Metal Furniture	0.00	0.00	0.00	0.0%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
H	Appliances	0.00	0.00	0.00	0.0%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
I	Gasoline Plants	0.00	0.00	0.00	0.0%	77.0%	80.0%	85.0%	90.0%	95.0%	0.000	0.000	0.000
J	Storage Tanks-Fixed	0.00	0.00	0.00	0.0%	61.9%	80.0%	85.0%	90.0%	95.0%	0.000	0.000	0.000
K	Pet.Ref.:Vacuum Producing Sys.	0.00	0.00	0.00	0.0%	100.0%	80.0%	85.0%	90.0%	95.0%	0.000	0.000	0.000
K	VOC/Water Separators	0.00	0.00	0.00	0.0%	95.0%	60.0%	65.0%	85.0%	90.0%	0.000	0.000	0.000
K	Process Unit Turnarounds	0.00	0.00	0.00	0.0%	98.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	0.000
M	Gasoline Terminals	0.00	0.00	0.00	0.0%	93.3%	87.5%	90.0%	0.0%	0.0%	0.000	0.000	0.000
O	Surface Cleaning	0.08	0.08	0.08	0.0%	55.7%	70.0%	75.0%	90.0%	95.0%	0.000	0.004	0.076
P	Surface Coating Misc.Metals	0.00	0.00	0.00	0.0%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
Q	Factory Fin. Wood	0.24	0.30	0.16	0.0%	55.6%	80.0%	85.0%	85.0%	90.0%	0.062	0.012	0.225
R	Graphic Arts	0.49	0.58	0.17	0.0%	60.0%	70.0%	75.0%	85.0%	90.0%	0.172	0.023	0.385
S	Petroleum Refinery Equip	0.00	0.00	0.00	0.0%	75.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	0.000
T	Roof Tanks-Ext.Float	0.00	0.00	0.00	0.0%	61.9%	88.0%	90.0%	93.0%	95.0%	0.000	0.000	0.000
Z	Resins-Polyethylene	0.00	0.00	0.00	0.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
Z	Polypropylene	0.00	0.00	0.00	0.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
Z	Polystyrene	0.00	0.00	0.00	0.0%	98.0%	80.0%	85.0%	85.0%	90.0%	-0.001	0.000	0.000
AA	Natural Gas Processing Plants	0.02	0.02	0.00	0.0%	75.0%	95.0%	95.0%	98.0%	98.0%	0.014	0.000	0.006
AB	SOCMI	0.00	0.00	0.00	0.0%	75.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	0.000
AC	Air Oxidation SOCMI	0.00	0.00	0.00	0.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
	TOTALS	0.85	1.01								0.248	0.041	0.721

Table 17 (Continued)

## POINT SOURCES

Dallas/Fort Worth -RE Improvements Only 3/8/96

Group Category	EI 1990 (TPD)	EI 1996 (TPD)	Permits	CE-90	CE-96	Non-Permitted		Permitted		Catch-up RE			
						RE-90	RE-96	RE-90	RE-96	Reduction 1990 (TPD)	Reduction 90-96 (TPD)	New 1996 (TPD)	
A	Cans	0.90	0.90	0.36	55.2%	55.2%	96.0%	99.0%	96.0%	99.0%	0.000	0.032	0.868
B	Metal Coils	0.49	0.62	0.00	55.9%	55.9%	70.0%	75.0%	90.0%	95.0%	0.000	0.028	0.592
C	Paper Products	0.55	0.61	0.18	55.6%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.031	0.579
D	Fabrics	0.06	0.07	0.00	55.6%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.004	0.066
E	Auto New-misc. metal	2.63	5.00	1.28	55.6%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.241	4.759
F	Metal Furniture	0.20	0.24	0.17	55.6%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.013	0.227
H	Appliances	0.09	0.09	0.00	55.6%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.004	0.086
I	Gasoline Plants	0.72	1.47	0.16	77.0%	77.0%	80.0%	85.0%	90.0%	95.0%	0.000	0.151	1.319
J	Storage Tanks-Fixed	0.46	0.71	0.22	61.9%	61.9%	80.0%	85.0%	90.0%	95.0%	0.000	0.045	0.665
K	Pet.Ref.:Vacuum Producing Sys.	0.00	0.00	0.00	100.0%	100.0%	80.0%	85.0%	90.0%	95.0%	0.000	0.000	0.000
K	VOC/Water Separators	0.00	0.00	0.00	95.0%	95.0%	60.0%	65.0%	85.0%	90.0%	0.000	0.000	0.000
K	Process Unit Turnarounds	0.00	0.00	0.00	98.0%	98.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	0.000
M	Gasoline Terminals	2.91	9.83	1.60	93.3%	93.3%	87.5%	90.0%	91.5%	94.0%	0.000	1.301	8.529
O	Surface Cleaning	1.18	1.51	0.38	55.7%	55.7%	70.0%	75.0%	90.0%	95.0%	0.000	0.073	1.437
P	Surface Coating Misc.Metals	1.76	2.25	0.86	55.6%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.111	2.139
Q	Factory Fin. Wood	0.23	0.27	0.01	55.6%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.014	0.256
R	Graphic Arts	4.95	9.16	6.17	60.0%	60.0%	70.0%	75.0%	85.0%	90.0%	0.000	0.532	8.628
S	Petroleum Refinery Equip	0.00	0.00	0.00	75.0%	75.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	0.000
T	Roof Tanks-Ext.Float	0.23	0.65	0.15	61.9%	61.9%	88.0%	90.0%	93.0%	95.0%	0.000	0.018	0.632
Z	Resins-Polyethylene	0.00	0.00	0.00	98.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
Z	Polypropylene	0.00	0.00	0.00	98.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
Z	Polystyrene	0.43	0.48	0.48	98.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.141	0.339
AA	Natural Gas Processing Plants	0.02	0.02	0.00	75.0%	75.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	0.020
AB	SOCMI	0.08	0.10	0.01	75.0%	75.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	0.100
AC	Air Oxidation SOCMI	0.00	0.00	0.00	98.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
	TOTALS	17.89	33.98								0.000	2.738	31.242



Stage II Vapor Recovery will be implemented in the DFW nonattainment area. This program will control gasoline vapors escaping during the refueling of motor vehicles. The estimated reduction in VOC emissions in the DFW area is identified in Table 18.

The CMC in Appendix 7-E includes a listing of control measures designed specifically for the DFW nonattainment area ranked in priority order based on a variety of criteria. Most, if not all, of the measures will need to be implemented in the area to achieve a 15% net of growth and the 3.0% contingency emission reductions of VOCs by the 1996 milestone. The primary condition to use NO<sub>x</sub> controls as contingency measures is a demonstration through UAM modeling that these controls will be beneficial toward the reduction of ozone. Contingency measures in the DFW area will be selected after consultation with local government organizations.

Proposed rules will be included in the General Rules and Regulations IV and V (30 TAC Chapters 101, 114, and 115). The explanation of and formula for creating the CMC is located in Appendix 7-E.

Table 18 identifies the estimated reductions toward the 1993 ROP goal that are available for each control measure, both mandated and optional. This information, combined with the CMC, has been used to formulate a ranking of the most effective and cost efficient rules for a particular nonattainment area. This table is intended to identify options available to the state and is not intended to specify reduction targets for each category.

Table 18 - Revised 6/12/96

**ESTIMATES TOWARDS 15% ROP SIP - Dallas/Fort Worth**

<b>EMISSIONS INVENTORY</b>	1990	Percent	Growth	1996	Percent
Area Sources	174.02	31.7%	-6.6%	162.62	27.9%
Point Sources	65.27	11.9%	8.2%	70.64	12.1%
On-road Mobile Sources	204.35	37.2%	18.4%	241.89	41.5%
Off-road Mobile Sources	105.19	19.2%	2.6%	107.92	18.5%
<b>TOTALS</b>	<b>548.83</b>		<b>6.2%</b>	<b>583.07</b>	

**ESTIMATED REDUCTIONS**

<b>MANDATED RULES</b>	96 Projected TPD	Reduction	% of requirement	Cumulative %
Catchups	10.11	4.03	3.43%	3.43%
Vehicle Refueling (Stage II)	22.39	18.19	15.47%	18.90%
Aircraft Stage 3	5.40	0.60	0.51%	19.41%
Other VOC Storage, tra	0.06	0.05	0.04%	19.45%
Major Source Bakeries	0.41	0.12	0.10%	19.56%
** I/M, Tier I, RFG	241.89	69.46	59.09%	78.65%
	<b>Subtot</b>	<b>92.45</b>	<b>78.65%</b>	
<b>15% RULES</b>				
*** Auto Refinishing	26.43	10.57	8.99%	78.65%
Fugitives	0.11	0.07	0.06%	78.70%
RE Improvements	75.39	4.86	4.13%	82.84%
Gas Utility Engines	65.21	7.76	6.60%	89.44%
TCMs	241.89	6.94	5.90%	95.34%
Architectural Coatings	23.84	4.77	4.06%	99.40%
Consumer/Comm Products	20.46	4.09	3.48%	102.88%
Municipal Landfills	6.36	3.49	2.97%	105.85%
Bulk Gasoline Terminals	9.83	2.17	1.85%	107.69%
Traffic Markings	2.79	0.56	0.47%	108.17%
High Perform. Maintenance	4.80	0.96	0.82%	108.98%
Other Special Purpose	5.89	1.18	1.00%	109.99%
Wood Furniture	10.38	1.35	1.15%	111.14%
CAFB Fire Training Pit	1.20	1.20	1.02%	112.16%
Reform Gas (off-road)	107.92	4.23	3.60%	115.76%
	<b>Subtot</b>	<b>43.62</b>	<b>37.11%</b>	
<b>Contingency Rules</b>				
Vessel Cleaning	0.25	0.18	0.15%	115.91%
Offset Printing	1.92	0.85	0.73%	116.64%
Commercial Bakeries	0.50	0.15	0.13%	116.76%
Naptha Dry Cleaners	4.39	2.22	1.89%	118.65%
TCMs	241.89	2.03	1.73%	120.38%
I/M & FMVCP 1997	241.89	2.54	2.16%	122.54%
96-97 Utility Engine	66.29	0.73	0.62%	123.15%
	<b>Subtot</b>	<b>8.70</b>	<b>7.40%</b>	
	<b>Target Improvement</b>	<b>117.55</b>	100.00%	21.4%
	<b>15% Rules + Mandated Rules</b>	<b>136.07</b>	115.76%	
	<b>Excess (Shortfall)</b>	<b>18.52</b>	15.76%	
	<b>Required Contingency</b>	<b>16.46</b>		3.0%
	<b>Target + Contingency</b>	<b>134.01</b>	100.0%	24.4%
	<b>Total Reductions</b>	<b>144.77</b>	108.0%	
	<b>Excess (Shortfall)</b>	<b>10.75</b>	8.0%	

\*\* Total credits from reform gas, FMVCP Tier I, and a preliminary I/M reduction based on an EPA approved factor based analysis

\*\*\* Credits from this category are not counted

## c) Mobile Source Controls

### (1) Transportation Control Measures

TCMs will be implemented in the DFW nonattainment area as necessary. Those that will be considered include: high occupancy vehicle lanes, intersection improvements, travel demand incentives, bikeways, incident detection and response programs, park-and-ride lots, signal timing/progression, grade separations, enhanced travel demand management, commuter rail, light rail, new and widened roadways, discount transit fare, accelerated retirement of older vehicles, and trip reduction initiatives. A full description of the TCMs for the DFW area is included in Appendix 7-K. NCTCOG has specifically committed to those measures identified in Appendix 7-K.

### (2) Vehicle Inspection/Maintenance Program

The Texas Motorist's Choice Vehicle Emission Testing Program in the DFW nonattainment area will subject gasoline powered light-duty cars and trucks and heavy-duty trucks registered in Dallas and Tarrant Counties to emission testing. Exhaust gas testing for HC, CO, and carbon dioxide (CO<sub>2</sub>) is required. A hybrid program will allow the motorist to choose an annual two-speed idle test at test-and-repair or test-only facilities or a biennial loaded or transient test at a test-only facility. Vehicles registered in Denton and Collin Counties will be subject to a vehicle emissions test if detected as a "grossly polluting vehicle" as a result of remote sensing.

Of the registered vehicles in Dallas and Tarrant Counties, vehicles 0 to 24 years old will be tested annually. If legislative authority is granted, vehicles 6 to 24 years old will be required to be tested at a

test-only facility prior to transferring title after resale, and vehicles 0-24 years will be subject to remote sensing scans. In addition to the emissions test, there will be an emission control device inspection which will consist of a visual test to verify presence (if applicable) of the catalytic convertor, exhaust gas recirculation system, positive crankcase ventilation system, evaporative system, thermostatic air cleaner and air injection system and an automated inspection procedure for testing the integrity of the gas cap.

Dedicated four-wheel drive vehicles, meaning any constant four-wheel drive vehicle which cannot be converted to two-wheel drive except by removing one of the vehicle's drive shafts, shall be subject to a preconditioned two-speed idle test.

### (3) Reformulated Gasoline

On January 1, 1995, the DFW non-attainment area began using reformulated gasoline. This type of fuel has significant air quality benefits for both on-road and non-road engines.

### 3) Demonstration of Attainment

The commission submitted a modeled demonstration of attainment for the DFW nonattainment area using the UAM on September 14, 1994. The DFW nonattainment area will be required to demonstrate monitored attainment of the NAAQS on November 15, 1996. Demonstration of attainment will be based on monitoring data from 1994, 1995, and 1996.

### 4) Contingency Plan (No change.)

### c. El Paso Ozone Control Strategy

#### 1) General

The FCAA Amendments of 1990 classified El Paso as a serious nonattainment area. El Paso County is the only county included in the nonattainment area designation. The El Paso nonattainment area has a design value of 0.17.

El Paso is in a unique situation because of its proximity to Ciudad Juarez, Mexico. All nonattainment areas in Texas are required to implement the 1993 ROP SIP reduction and additional reductions as mandated by the FCAA. However, in recognition of El Paso's close proximity to Juarez, a computer model demonstration of attainment was allowed using United States emissions alone. Because the computer simulation showed ELP in compliance with the NAAQS, it will not have to implement additional controls. Therefore, under §818 of the FCAA Amendments, El Paso will not be required to be redesignated to a higher nonattainment classification with corresponding more stringent controls should ambient air monitoring still show ozone levels in excess of the NAAQS in 1999.

#### 2) Estimated Emission Reduction

Table 19 summarizes the breakdown of emissions in the El Paso area by emission categories.

**TABLE 19**

**Anthropogenic VOC Emissions in the El Paso Area**

<b>CATEGORY</b>	<b>AMOUNT IN TPD</b>	<b>PERCENTAGE</b>
Point	9.45	13
Area	24.94	35
Non-Road Mobile	10.99	15
On-Road Mobile	24.02	37

a) 15% Targeted Reductions (No change.)

b) Stationary and Area Source Controls Toward 15%

Stationary or point sources in the El Paso area account for 13% of the total anthropogenic emissions. Area sources account for another 35%. There are several federally mandated programs which will be creditable towards the 1993 ROP SIP, but additional measures will be needed in order for the El Paso area to meet its goal.

The El Paso nonattainment area will receive creditable reductions from RACT catch-ups and leveling the playing field. Table 20 identifies reductions due to RACT catch-ups and rule effectiveness improvements for both point and area sources. Reductions for leveling the playing field are included under RACT catch-ups. For an explanation of the formulas used to calculate the reductions, see Appendix 7-I. For an explanation of the catch-up rules, see Appendix 7-D.

Table 20

## POINT SOURCES

## EI Paso -Reductions Due to RACT Catch-ups 6/12/96

Group Category	EI 1990 (TPD)	EI 1996 (TPD)	Permits	CE-90	CE-96	Non-Permitted		Permitted		Catch-up RE		
						RE-90	RE-96	RE-90	RE-96	Reduction 1990 (TPD)	Reduction 90-96 (TPD)	New1996 (TPD)
M Gasoline Terminals	0.86	3.00	0.07	86.6%	93.3%	87.5%	90.0%	91.5%	94.0%	0.709	0.293	1.998
TOTALS	0.86	3.00								0.709	0.293	1.998

## EI Paso -RE Improvements Only 6/12/96

Group Category	EI 1990 (TPD)	EI 1996 (TPD)	Permits	CE-90	CE-96	Non-Permitted		Permitted		Catch-up RE		
						RE-90	RE-96	RE-90	RE-96	Reduction 1990 (TPD)	Reduction 90-96 (TPD)	New1996 (TPD)
A Cans	0.00	0.00	0.00	55.2%	55.2%	96.0%	99.0%	96.0%	99.0%	0.000	0.000	0.000
B Metal Coils	0.00	0.00	0.00	55.9%	55.9%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
C Paper Products	0.00	0.00	0.00	55.6%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
D Fabrics	0.10	0.10	0.10	55.6%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.005	0.095
E Auto New-misc. metal	0.00	0.00	0.00	55.6%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
F Metal Furniture	0.00	0.00	0.00	55.6%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
H Appliances	0.00	0.00	0.00	55.6%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
I Gasoline Plants	0.10	0.34	0.34	77.0%	77.0%	80.0%	85.0%	90.0%	95.0%	0.000	0.043	0.297
J Storage Tanks-Fixed	0.01	0.01	0.01	61.9%	61.9%	80.0%	85.0%	90.0%	95.0%	0.000	0.001	0.009
K Pet.Ref.:Vacuum Producing Sys.	0.16	0.13	0.00	100.0%	100.0%	80.0%	85.0%	90.0%	95.0%	0.000	0.032	0.098
K VOC/Water Separators	0.00	0.00	0.00	95.0%	95.0%	60.0%	65.0%	85.0%	90.0%	0.000	0.000	0.000
K Process Unit Turnarounds	0.00	0.00	0.00	98.0%	98.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	0.000
M Gasoline Terminals	0.86	3.00	0.07	93.3%	93.3%	87.5%	90.0%	91.5%	94.0%	0.000	0.383	2.617
O Surface Cleaning	0.00	0.00	0.00	55.7%	55.7%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
P Surface Coating Misc.Metals	0.22	0.26	0.26	55.6%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.014	0.246
Q Factory Fin. Wood	0.00	0.00	0.00	55.6%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
R Graphic Arts	0.00	0.00	0.00	60.0%	60.0%	70.0%	75.0%	85.0%	90.0%	0.000	0.000	0.000
S Petroleum Refinery Equip	1.79	1.78	0.81	75.0%	75.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	1.780
T Roof Tanks-Ext.Float	0.72	2.30	0.18	61.9%	61.9%	88.0%	90.0%	93.0%	95.0%	0.000	0.063	2.237
Z Resins-Polyethylene	0.00	0.00	0.00	98.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
Z Polypropylene	0.00	0.00	0.00	98.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
Z Polystyrene	0.00	0.00	0.00	98.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
AA Natural Gas Processing Plants	0.01	0.01	0.01	75.0%	75.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	0.010
AB SOCM1	0.00	0.00	0.00	75.0%	75.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	0.000
AC Air Oxidation SOCM1	0.00	0.00	0.00	98.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
TOTALS	3.97	7.93								0.000	0.542	7.388



Stage II Vapor Recovery will be implemented in the El Paso nonattainment area. This program will control gasoline vapors escaping during the refueling of motor vehicles. The estimated reduction in VOC emissions in the El Paso area is identified in Table 21.

The CMC in Appendix 7-E includes a listing of control measures designed specifically for the El Paso nonattainment area ranked in priority order based on a variety of criteria. Most, if not all, of the measures will need to be implemented in the area to achieve a 15% net of growth and the 3.0% contingency emission reductions of VOCs by the 1996 milestone. The primary condition to use NO<sub>x</sub> controls as contingency measures is a demonstration through UAM modeling that these controls will be beneficial toward the reduction of ozone.

Proposed rules will be included in the General Rules and Regulations IV and V (30 TAC Chapters 101, 114, and 115). The explanation of and formula for creating the CMC is located in Appendix 7-E.

Table 21 identifies the estimated reductions toward the 1993 ROP goal that are available for each control measure, both mandated and optional. This information, combined with the CMC, has been used to formulate a ranking of the most effective and cost efficient rules for a particular nonattainment area. This table is intended to identify options available to the state and is not intended to specify reduction targets for each category.

Table 21 - Revised 7/12/96

**ESTIMATES TOWARDS 15% ROP SIP - EL PASO**

<b>EMISSIONS INVENTORY</b>	1990	Percent	Growth	1996	Percent
Area Sources	24.94	35.9%	-6.6%	23.30	31.7%
Point Sources	9.45	13.6%	-1.4%	9.32	12.7%
On-road Mobile Sources	24.02	34.6%	22.2%	29.35	39.9%
Off-road Mobile Sources	10.99	15.8%	5.9%	11.64	15.8%
<b>TOTALS</b>	<b>69.40</b>		<b>6.1%</b>	<b>73.61</b>	

**ESTIMATED REDUCTIONS**

<b>MANDATED RULES</b>	96 Projected TPD	Reduction	% of requirement	Cumulative %
Catchups	3.00	0.71	4.39%	4.39%
Vehicle Refueling (Stage II)	2.30	1.87	11.53%	15.92%
Aircraft Stage 3	0.29	0.02	0.12%	16.04%
** I/M , Tier I, RVP	28.34	7.37	45.52%	61.56%
	<b>Subtot</b>	<b>9.97</b>	<b>61.56%</b>	
<b>15% RULES</b>				
***Auto Refinishing	4.39	1.76	10.84%	61.56%
Offset Printing	1.27	0.56	3.45%	65.02%
Vessel Loading	0.40	0.32	1.98%	66.99%
Fugitives	1.79	1.13	6.98%	73.97%
RE Improvements	10.66	1.63	10.07%	84.04%
Gas Utility Engines	7.55	0.88	5.46%	89.50%
TCMs	28.34	0.35	2.16%	91.66%
Architectural Coatings	3.99	0.80	4.92%	96.58%
Consumer/Comm Products	3.52	0.70	4.35%	100.93%
Municipal Landfills	0.39	0.21	1.28%	102.21%
Industrial Wastewater	0.37	0.27	1.67%	103.88%
Bulk Gasoline Terminals	3.00	0.77	4.77%	108.65%
Outdoor Burning	0.84	0.40	2.47%	111.12%
Traffic Markings	0.44	0.09	0.54%	111.66%
High Perform. Maintenance	0.57	0.12	0.71%	112.37%
Wood Furniture	0.29	0.04	0.22%	112.59%
RVP (off-road)	11.64	0.09	0.56%	113.15%
	<b>Subtot</b>	<b>8.35</b>	<b>51.59%</b>	
<b>Contingency Rules</b>				
Vessel Cleaning	0.13	0.09	0.56%	113.71%
Commercial Bakeries	0.22	0.07	0.40%	114.11%
Naptha Dry Cleaners	0.59	0.30	1.85%	115.95%
TCMs	28.34	0.53	3.27%	119.23%
I/M & Tier 1 1997	28.34	0.50	3.06%	122.29%
96-97 Utility Engine	7.55	0.08	0.51%	122.80%
	<b>Subtot</b>	<b>1.56</b>	<b>9.65%</b>	
	<b>Target Improvement</b>	<b>16.19</b>	100.00%	23.3%
	<b>15% Rules + Mandated Rules</b>	<b>18.32</b>	113.15%	
	<b>Excess (Shortfall)</b>	<b>2.13</b>	13.15%	
	<b>Required Contingency</b>	<b>2.08</b>		3.0%
	<b>Target + Contingency</b>	<b>18.27</b>	100.0%	26.3%
	<b>Total Reductions</b>	<b>19.88</b>	108.8%	
	<b>Excess (Shortfall)</b>	<b>1.61</b>	8.8%	

\*\* Total credits from FMVCP Tier I, and a preliminary I/M reduction based on an EPA approved factor based analysis

\*\*\* Credits from this category are not counted

The agency has relied upon the provisions of §818 of the FCAA concerning International Border Areas to formulate a strategy for dealing with El Paso's unique shared airshed. This section provides nonattainment areas on an international border a mechanism to avoid being "bumped up" to the next higher classification if it fails to attain by the attainment deadline. ELP can elect to show via a technical analysis that it would have attained by the mandatory deadline "but for" emissions emanating from Mexico.

Texas elected to take advantage of this provision and performed §818 modeling exercises which were submitted to EPA on September 14, 1994, in lieu of an attainment demonstration as required for other serious ozone nonattainment areas. This analysis included only emissions for the ELP side of the border as comparable data is not yet available for Juarez, Mexico. This provision does not provide for any relaxation of current or future controls, nor does it signify that ELP will not continue to strive to reach attainment of the NAAQS. It merely states that ELP will not be subject to increasingly stringent federally mandated control measures if the air quality problem is not solely generated in El Paso. This approach has the support of local government and civic leaders. In addition, the citizens of ELP can institute local programs, like improved TCMs, if they desire.

There have been several important programs to improve coordination and air quality between the United States and Mexico. For example, basin-wide air quality modeling is required by the 1983 La Paz Agreement between the United States and Mexico. The agency is working with EPA and the Mexican national, state, and city governments to establish an air quality monitoring network, develop a basin-wide CO control strategy, and complete an emissions inventory for Juarez.

#### c) Mobile Source Controls

### (1) Transportation Control Measures

A variety of TCMs will be implemented in the El Paso nonattainment area. The ELP MPO has specifically committed to those measures identified in Appendix 7-K. Several additional TCMs are being considered for implementation in this area, and these measures may include, but are not limited to: land use densification, mixed land use development, pedestrian improvements, traffic signal timing improvements, college traffic management, K-12 school traffic management, employee transit pass subsidy, non-metro service area transit, fixed commuter rail, bicycle improvements, trip reduction initiatives, ridesharing, parking management, telecommuting, flexible work hours, compressed work week, gasoline tax increase, emission pricing, roadway pricing, motorist information system, incident management and response, special events management, and control of truck movements. A full description of TCM categories to be implemented in the ELP area is included in Appendix 7-K.

### (2) Vehicle I/M Program

The Texas Motorist's Choice Vehicle Emission Testing Program in the ELP nonattainment area will subject gasoline powered light-duty cars and trucks and heavy-duty trucks registered in El Paso County to emission testing. The vehicle emissions testing program will allow the motorist to choose an annual two-speed idle test at test-and-repair or test-only facilities. In addition, vehicles registered in El Paso County will be subject to a vehicle emissions test if detected as a "grossly polluting vehicle" as a result of remote sensing.

Of the registered vehicles in El Paso County, vehicles 0 to 24 years old will be tested. In addition to the emissions test, there will be an emission control device inspection which will consist of a visual test to

verify presence (if applicable) of the catalytic convertor, exhaust gas recirculation system, positive crankcase ventilation system, evaporative system, thermostatic air cleaner and air injection system and an automated inspection procedure for testing the integrity of the gas cap.

Dedicated four-wheel drive vehicles, meaning any constant four-wheel drive vehicle which cannot be converted to two-wheel drive except by removing one of the vehicle's drive shafts, shall be subject to a preconditioned two-speed idle test.

(3) Reformulated Gasoline, Lower Reid Vapor Pressure Gasoline, and  
Clean Fuel Vehicle Program

Representatives of local government and the Chevron refinery in ELP approached the agency about the possibility of lowering the RVP in summer gasoline instead of using RFG to minimize the cost of refinery modifications resulting in lower costs at the pump for consumers. Chevron submitted results from the EPA complex model for predicting fuel effects. The results show VOC reductions that are approximately equivalent to those from the use of reformulated fuel when RVP is lowered to 7.0 psi.

Due to the approximately similar reductions of VOCs obtainable from low RVP gasoline and the overwhelming support of the low RVP program by local government and industry, the commission is implementing a low RVP gasoline program in ELP. Low RVP gasoline has benefits for both on-road and non-road mobile sources. Additionally, it may be possible to sell low RVP gasoline in Ciudad Juarez, obtaining more widespread benefits for the air basin.

Current estimates indicate low RVP gasoline results in a one cent per gallon increase at the pump as opposed to a predicted three to five cents per gallon increase for RFG.

The use of vehicles certified to a minimum of the low-emission vehicle (LEV) standards is mandated by statute for certain privately owned and local government fleets by 1998 and thereafter. Agency rules that implement this requirement will constitute a separate revision to the SIP as a substitute for the Federal Clean Fuel Fleet (FCFF) program that is mandated for serious, severe, or extreme nonattainment areas. The agency will work with local MPOs to determine the number of LEVs and the amount of emission reductions generated by them.

### 3) Demonstration of Attainment

ELP has elected to demonstrate attainment under §818 of the FCAA Amendments of 1990 by performing UAM modeling which indicates that the area would attain the standard “but for” emissions from Juarez, Mexico.

### 4) Contingency Plan (No change.)

#### d. Beaumont/Port Arthur Ozone Control Strategy

##### 1) General

The FCAA Amendments of 1990 classified the BPA area as a serious nonattainment area. The BPA nonattainment area includes Hardin, Jefferson, and Orange Counties. The BPA nonattainment area has an ozone design value of 0.16 ppm, which places the area in the serious classification.

In December of 1990, then-Texas Governor William Clements requested that the BPA area be reclassified as a "moderate" ozone nonattainment area in accordance with Section 181(a)(4) of the FCAA Amendments of 1990. That request was denied on February 13, 1991. A recent review of the original request and supporting documentation has revealed that this denial was made in error. As provided by Section 110(k)(6) of the Act, the EPA Administrator of the has the authority to reverse a decision regarding original designation if it is discovered that an error had been made.

Monitoring data from a privately-funded, special purpose monitoring network which was not included in the Aerometric Information Retrieval System database was improperly used to deny this request. Furthermore, subsequent air quality trends demonstrate that BPA is more properly classified as a moderate nonattainment area, and should attain the standard by the required date for moderate areas of November 15, 1996. Therefore, Governor Bush sent a letter and technical support to EPA on July 20, 1995, requesting that the BPA area be reclassified to moderate nonattainment status. BPA plans to demonstrate attainment one of the following ways:

- ◆ Monitored values showing attainment of the standard at state-operated monitors for the years 1994-1996, which is the timeline the FCAA Amendments of 1990 specifies for moderate areas.
  
- ◆ UAM modeling showing attainment of the standard but for transport of ozone and/or precursors.

EPA Region VI verified the data submitted in support of this request, and concurred that it is valid. On June 3, 1996, the reclassification of the BPA area became effective.

2) Estimated Emission Reductions

Table 22 summarizes the breakdown of emissions in the BPA area by emission categories.

**TABLE 22**  
**Anthropogenic VOC Emissions in the**  
**Beaumont/Port Arthur Area**

<b>CATEGORY</b>	<b>AMOUNT IN TPD</b>	<b>PERCENTAGE</b>
Point	245.35	78
Area	30.63	10
Non-Road Mobile	18.44	6
On-Road Mobile	19.11	6

a) 15% Targeted Reductions (No Change.)

b) Stationary and Area Source Controls Toward 15% Reduction

Stationary or point sources in the BPA nonattainment area account for 78% of the total anthropogenic emissions, the overwhelming majority of emissions. Area sources account for a further 10%. There

are several federally mandated programs that will be creditable towards the 1993 ROP SIP, but additional measures will be needed in order for the BPA area to meet its goal.

The BPA nonattainment area will receive creditable reductions from RACT catch-ups and leveling the playing field. Table 23 identifies reductions due to RACT catch-ups and improvements for both point and area sources. Reductions for leveling the playing field are included under RACT catch-ups. For an explanation of the formulas used to calculate the figures in these spreadsheets, see Appendix 7-I. For an explanation of the catch-up rules themselves, see Appendix 7-D.

Table 23

## POINT SOURCES

BEAUMONT -Reductions Due to RACT Catch-ups 3/9/96

Group Category	EI 1990 (TPD)	EI 1996 (TPD)	Permits	CE-90	CE-96	Non-Permitted		Permitted		Catch-up RE Reduction			
						RE-90	RE-96	RE-90	RE-96	1990 (TPD)	90-96 (TPD)	New1996 (TPD)	
A	Cans	0.00	0.00	0.00	0.0%	55.2%	96.0%	99.0%	96.0%	99.0%	0.000	0.000	0.000
B	Metal Coils	0.00	0.00	0.00	0.0%	55.9%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
C	Paper Products	0.00	0.00	0.00	0.0%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
D	Fabrics	0.00	0.00	0.00	0.0%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
E	Auto New-misc. metal	0.00	0.00	0.00	0.0%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
F	Metal Furniture	0.00	0.00	0.00	0.0%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
H	Appliances	0.00	0.00	0.00	0.0%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
I	Gasoline Plants	0.00	0.00	0.00	0.0%	77.0%	80.0%	85.0%	90.0%	95.0%	0.000	0.000	0.000
J	Storage Tanks-Fixed	0.00	0.00	0.00	0.0%	61.9%	80.0%	85.0%	90.0%	95.0%	0.000	0.000	0.000
K	Pet.Ref.:Vacuum Producing Sys.	0.00	0.00	0.00	0.0%	100.0%	80.0%	85.0%	90.0%	95.0%	0.000	0.000	0.000
K	VOC/Water Separators	0.00	0.00	0.00	0.0%	95.0%	60.0%	65.0%	85.0%	90.0%	0.000	0.000	0.000
K	Process Unit Turnarounds	0.00	0.00	0.00	0.0%	98.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	0.000
M	Gasoline Terminals - Jeff & Orange	1.90	2.91	0.09	86.6%	93.3%	87.5%	90.0%	91.5%	94.0%	0.682	0.286	1.941
M	Gasoline Terminals - Hardin	0.00	0.00	0.00	0.0%	93.3%	87.5%	90.0%	0.0%	0.0%	0.000	0.000	0.000
O	Surface Cleaning	0.06	0.06	0.00	0.0%	55.7%	70.0%	75.0%	90.0%	95.0%	0.025	0.002	0.037
P	Surface Coating Misc.Metals	0.01	0.03	0.00	0.0%	55.6%	70.0%	75.0%	90.0%	95.0%	0.010	0.001	0.015
S	Petroleum Refinery Equip	0.34	0.34	0.34	0.0%	75.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	0.335
T	Roof Tanks-Ext.Float	0.00	0.00	0.00	0.0%	61.9%	88.0%	90.0%	93.0%	95.0%	0.000	0.000	0.000
Z	Resins-Polyethylene	6.99	9.54	4.56	0.0%	98.0%	80.0%	85.0%	85.0%	90.0%	3.900	1.582	4.054
Z	Polypropylene	0.00	0.00	0.00	0.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
Z	Polystyrene	0.23	0.25	0.00	0.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.198	0.013	0.043
AA	Natural Gas Processing Plants	0.99	0.93	0.14	0.0%	75.0%	95.0%	95.0%	98.0%	98.0%	0.559	0.000	0.369
AB	SOCMI	10.52	11.49	6.04	0.0%	75.0%	95.0%	95.0%	98.0%	98.0%	3.881	0.000	7.604
AC	Air Oxidation SOCMI	0.00	0.00	0.00	0.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
	TOTALS	21.03	25.54								9.256	1.883	14.398

Table 23 (Continued)

BEAUMONTRE Improvement only 3/9/96

Group Category	EI 1990 (TPD)	EI 1996 (TPD)	Permits	CE-90	CE-96	Non-Permitted		Permitted		Catch-up RE Reduction		
						RE-90	RE-96	RE-90	RE-96	1990 (TPD)	90-96 (TPD)	New1996 (TPD)
A Cans	0.00	0.00	0.00	55.2%	55.2%	96.0%	99.0%	96.0%	99.0%	0.000	0.000	0.000
B Metal Coils	0.00	0.00	0.00	55.9%	55.9%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
C Paper Products	0.00	0.00	0.00	55.6%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
D Fabrics	0.00	0.00	0.00	55.6%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
E Auto New-misc. metal	0.00	0.00	0.00	55.6%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
F Metal Furniture	0.00	0.00	0.00	55.6%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
8 Appliances	0.00	0.00	0.00	55.6%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
I Gasoline Plants	0.00	0.00	0.00	77.0%	77.0%	80.0%	85.0%	90.0%	95.0%	0.000	0.000	0.000
J Storage Tanks-Fixed	4.17	4.59	0.55	61.9%	61.9%	80.0%	85.0%	90.0%	95.0%	0.000	0.286	4.307
K Pet.Ref.:Vacuum Producing Sys.	0.96	0.79	0.01	100.0%	100.0%	80.0%	85.0%	90.0%	95.0%	0.000	0.199	0.593
K VOC/Water Separators	3.93	3.25	0.06	95.0%	95.0%	60.0%	65.0%	85.0%	90.0%	0.000	0.367	2.883
K Process Unit Turnarounds	0.00	0.00	0.00	98.0%	98.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	0.000
O Surface Cleaning	0.00	0.00	0.00	55.7%	55.7%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
P Surface Coating Misc.Metals	0.00	0.00	0.00	55.6%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
S Petroleum Refinery Equip	17.51	19.80	3.94	75.0%	75.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	19.797
T Roof Tanks-Ext.Float	21.77	67.72	13.32	61.9%	61.9%	88.0%	90.0%	93.0%	95.0%	0.000	1.868	65.852
TOTALS	69.36	121.69								0.000	2.720	93.431



Stage II Vapor Recovery will be implemented in the BPA nonattainment area. This program will control gasoline vapors escaping during the refueling of motor vehicles. The estimated reduction in VOC emissions in the BPA area is identified in Table 24.

The CMC in Appendix 7-E includes a listing of control measures designed specifically for the BPA nonattainment area ranked in priority order based on a variety of criteria. Most, if not all, of the measures will need to be implemented in the area to achieve a 15% net of growth and the 3.0% contingency emission reduction of VOCs by the 1996 milestone. The primary condition to use NO<sub>x</sub> controls as contingency measures is a demonstration through UAM modeling that these controls will be beneficial toward the reduction of ozone.

Proposed rules will be included in the General Rules and Regulations IV and V (30 TAC Chapters 101, 114, and 115). The explanation of and formula for creating the CMC is located in Appendix 7-E.

Table 24 identifies the estimated reductions toward the 1993 ROP goal that are available for each control measure, both mandated and optional. This information, combined with the CMC, has been used to formulate a ranking of the most effective and cost efficient rules for a particular nonattainment area. This table is intended to identify options available to the state and is not intended to specify reduction targets for each category.

Table 24 - Revised 6/27/96  
**ESTIMATES TOWARDS ROP SIP - BEAUMONT/PORT ARTHUR**

<b>EMISSIONS INVENTORY</b>	1990	Percent	Growth	1996	Percent
Area Sources	30.63	9.8%	-6.3%	28.71	9.0%
Point Sources	245.35	78.3%	2.3%	250.96	78.4%
On-road Mobile Sources	19.11	6.1%	14.4%	21.87	6.8%
Off-road Mobile Sources	18.44	5.9%	0.2%	18.47	5.8%
<b>TOTALS</b>	<b>313.53</b>		<b>2.1%</b>	<b>320.01</b>	

**ESTIMATED REDUCTIONS**

<b>MANDATED RULES</b>	96 Projected TPD	Reduction	% of requirement	Cumulative %
Catchups	26.74	9.88	17.09%	17.09%
TSDf	0.01	0.01	0.01%	17.10%
Vehicle Refueling (Stage II)	2.39	1.96	3.40%	20.49%
General Vent Gas	68.70	11.75	20.33%	40.82%
Benzene NESHAPS	0.30	0.28	0.48%	41.31%
FMVCP Tier I	21.87	0.21	0.36%	41.67%

**Subtot 24.08 41.67%**

**15% RULES**

*** Auto Refinishing	2.69	1.08	1.86%	131.01%
Vessel Cleaning	0.02	0.02	0.03%	41.70%
Fugitives	28.11	17.46	30.21%	71.91%
** RE Floating Roof Tank	67.72	25.62	44.33%	116.25%
RE Improvements	98.92	5.04	8.72%	124.96%
Gas Utility Engines	8.00	0.95	1.65%	126.61%
Stage I	2.92	1.49	2.59%	129.19%
Architectural Coatings	2.23	0.45	0.77%	129.97%
Consumer/Comm Products	1.91	0.38	0.66%	130.63%
Traffic Markings	0.27	0.05	0.09%	130.72%
High Perform. Maintenance	0.23	0.05	0.08%	130.80%
Other Special Purpose	0.60	0.12	0.21%	131.01%

**Subtot 51.63 89.34%**

**Contingency Rules**

I/M & FMVCP 1997	21.87	0.69	1.19%	132.20%
96-97 Utility Engine	8.10	0.08	0.14%	132.34%

**Subtot 0.77 1.34%**

<b>Target Improvement</b>	<b>57.79</b>	100.00%	18.4%
<b>15% Rules + Mandated Rules</b>	<b>75.71</b>	131.01%	
<b>Excess (Shortfall)</b>	<b>17.92</b>	31.01%	
<b>Required Contingency</b>	<b>9.41</b>		3.0%
<b>Target + Contingency</b>	<b>67.20</b>	100.0%	21.4%
<b>Total Reductions</b>	<b>76.48</b>	113.8%	
<b>Excess (Shortfall)</b>	<b>9.29</b>	13.8%	

\*\* RE credits claimed from this category under "RE Improvements" are subtracted out to avoid double counting

\*\*\* Credits from this category are not counted

### c) Mobile Source Controls

#### (1) Vehicle I/M Program

The BPA nonattainment area is not required to have an I/M program per the EPA's I/M Flexibility Amendments promulgated September 18, 1995, because the 1990 urbanized area population for the area is less than 200,000. Please see section B.7.a.4)b)(2)(d) of this document for more details regarding the state's Motorist's Choice Vehicle Emission Testing Program.

#### (2) Reformulated Gasoline

RFG is not being considered in the BPA nonattainment area, although RFG has air quality benefits for both on-road and non-road gasoline engines. Mobile source emissions are only a small portion of the BPA area and the required reductions can be met without RFG.

#### 3) Demonstration of Attainment

The BPA nonattainment area will be required to demonstrate attainment of the NAAQS on November 15, 1996. Demonstration of attainment will be based on monitoring data from 1994, 1995, and 1996, or on a UAM demonstration showing the influence of transported emissions or ozone on the area's airshed.

#### 4) Contingency Plan (No change.)

e. Houston/Galveston Ozone Control Strategy

1) General

The FCAA Amendments of 1990 classified the HGA area as a Severe II nonattainment area. The HGA nonattainment area includes the counties of Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller. The HGA nonattainment area has an ozone design value of 0.22 ppm, which places the area in the Severe II classification.

2) Estimated Emission Reductions

Table 25 summarizes the breakdown of emissions in the HGA area by emission categories.

**TABLE 25**

**Anthropogenic VOC Emissions in the  
Houston/Galveston Area**

<b>CATEGORY</b>	<b>AMOUNT IN TPD</b>	<b>PERCENTAGE</b>
Point	481.95	50
Area	200.07	20
Non-Road Mobile	129.98	13
On-Road Mobile	163.39	17

a) 15% Targeted Reductions (No change.)

## b) Stationary and Area Source Controls Toward 15% Reduction

Stationary or point sources in the HGA nonattainment area account for 50% of the total anthropogenic emissions. Area sources account for 20%. There are several federally mandated programs that will be creditable towards the 1993 ROP SIP, but additional measures will be needed in order for the HGA area to meet its goal.

The HGA nonattainment area will receive creditable reductions from RACT catch-ups and leveling the playing field. Table 26 identifies reductions due to RACT catch-ups and rule effectiveness improvements for both point and area sources. Reductions for leveling the playing field are included under RACT catch-ups. For an explanation of the formulas used to calculate reductions, see Appendix 7-I. For an explanation of the catch-up rules, see Appendix 7-D.

Table 26

## POINT SOURCES

HOUSTON -Reductions Due to RACT Catch-ups 3/9/96

Group Category	EI 1990 (TPD)	EI 1996 (TPD)	Permits	CE-90	CE-96	Non-Permitted		Permitted		Catch-up RE Reduction			
						RE-90	RE-96	RE-90	RE-96	1990 (TPD)	90-96 (TPD)	New1996 (TPD)	
A	Cans	1.93	2.09	2.09	0.0%	55.2%	96.0%	99.0%	96.0%	99.0%	0.000	0.074	2.017
B	Metal Coils	0.04	0.06	0.06	0.0%	55.9%	70.0%	75.0%	90.0%	95.0%	0.000	0.003	0.059
C	Paper Products	0.00	0.00	0.00	0.0%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
D	Fabrics	0.00	0.00	0.00	0.0%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
E	Auto New-misc. metal	0.00	0.00	0.00	0.0%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
F	Metal Furniture	0.00	0.00	0.00	0.0%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
H	Appliances	0.16	0.16	0.08	0.0%	55.6%	70.0%	75.0%	90.0%	95.0%	0.032	0.007	0.124
I	Gasoline Plants	0.00	0.00	0.00	0.0%	77.0%	80.0%	85.0%	90.0%	95.0%	0.000	0.000	0.000
J	Storage Tanks-Fixed	3.01	3.09	0.18	0.0%	61.9%	80.0%	85.0%	90.0%	95.0%	1.440	0.102	1.544
K	Pet.Ref.:Vacuum Producing Sys.	0.00	0.00	0.00	0.0%	100.0%	80.0%	85.0%	90.0%	95.0%	0.000	0.000	0.000
K	VOC/Water Separators	0.00	0.00	0.00	0.0%	95.0%	60.0%	65.0%	85.0%	90.0%	0.000	0.000	0.000
K	Process Unit Turnarounds	0.00	0.00	0.00	0.0%	98.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	0.000
M	Gasoline Terminals - Cham, Ft Bend, Lib, Mont, Wab	0.48	0.51	0.53	0.0%	93.3%	87.5%	90.0%	91.5%	94.0%	0.064	0.086	0.457
M	Gasoline Terminals - Braz, Galv, Harr	1.65	2.74	0.43	86.6%	93.3%	87.5%	90.0%	91.5%	94.0%	0.560	0.291	1.893
M	Gasoline Terminals-Harris	5.22	6.24	0.04	0.0%	93.3%	87.5%	90.0%	91.5%	94.0%	5.060	0.151	1.030
O	Surface Cleaning	0.15	0.17	0.00	0.0%	55.7%	70.0%	75.0%	90.0%	95.0%	0.065	0.005	0.096
P	Surface Coating Misc.Metals	0.21	0.25	0.00	0.0%	55.6%	70.0%	75.0%	90.0%	95.0%	0.097	0.007	0.149
Q	Factory Fin. Wood	0.00	0.00	0.00	0.0%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
R	Graphic Arts	0.09	0.21	0.21	0.0%	75.0%	70.0%	75.0%	85.0%	90.0%	0.000	0.022	0.188
S	Petroleum Refinery Equip	3.42	3.54	0.55	0.0%	75.0%	95.0%	95.0%	98.0%	98.0%	2.135	0.000	1.409
T	Roof Tanks-Ext.Float	0.13	0.34	0.34	0.0%	61.9%	88.0%	90.0%	93.0%	95.0%	0.001	0.010	0.334
Z	Resins-Polyethylene	0.91	1.82	0.10	0.0%	98.0%	80.0%	85.0%	85.0%	90.0%	1.345	0.114	0.360
Z	Polypropylene	0.00	0.00	0.00	0.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
Z	Polystyrene	0.00	0.00	0.00	0.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
AA	Natural Gas Processing Plants	14.65	13.90	0.01	0.0%	75.0%	95.0%	95.0%	98.0%	98.0%	9.895	0.000	4.004
AB	SOCMI	1.58	1.99	0.17	0.0%	75.0%	95.0%	95.0%	98.0%	98.0%	1.297	0.000	0.694
AC	Air Oxidation SOCMI	0.00	0.00	0.00	0.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
	TOTALS	33.63	37.22								21.990	0.873	14.356

## HOUSTON RE Improvement only 3/9/96

Group Category	EI 1990 (TPD)	EI 1999 (TPD)	Permits	CE-90	CE-99	Non-Permitted		Permitted		Catch-up RE			
						RE-90	RE-99	RE-90	RE-99	Reduction 1990 (TPD)	Reduction 90-99 (TPD)	New 1999 (TPD)	
A	Cans	0.85	0.95	0.20	55.2%	55.2%	96.0%	99.0%	96.0%	99.0%	0.000	0.033	0.914
B	Metal Coils	0.30	0.47	0.12	55.9%	55.9%	70.0%	75.0%	90.0%	95.0%	0.000	0.023	0.448
C	Paper Products	0.00	0.00	0.00	55.6%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
D	Fabrics	0.00	0.00	0.00	55.6%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
E	Auto New-misc. metal	0.14	0.14	0.06	55.6%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.007	0.129
F	Metal Furniture	0.00	0.00	0.00	55.6%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.000
H	Appliances	0.00	0.00	0.00	55.6%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.000	0.001
I	Gasoline Plants	0.00	0.00	0.00	77.0%	77.0%	80.0%	85.0%	90.0%	95.0%	0.000	0.000	0.000
J	Storage Tanks-Fixed	19.95	26.11	5.25	61.9%	61.9%	80.0%	85.0%	90.0%	95.0%	0.000	1.646	24.460
K	Pet.Ref.:Vacuum Producing Sys.	3.40	3.58	0.10	100.0%	100.0%	80.0%	85.0%	90.0%	95.0%	0.000	0.921	2.660
K	VOC/Water Separators	11.90	10.10	1.66	95.0%	95.0%	60.0%	65.0%	85.0%	90.0%	0.000	1.342	8.754
K	Process Unit Turnarounds	0.00	0.00	0.00	98.0%	98.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	0.000
M	Gasoline Terminals	0.00	0.00	0.00	93.3%	93.3%	87.5%	90.0%	91.5%	94.0%	0.000	0.000	0.000
O	Surface Cleaning	0.83	0.92	0.13	55.7%	55.7%	70.0%	75.0%	90.0%	95.0%	0.000	0.043	0.874
P	Surface Coating Misc.Metals	1.15	1.59	0.50	55.6%	55.6%	70.0%	75.0%	90.0%	95.0%	0.000	0.078	1.516
Q	Factory Fin. Wood	0.00	0.00	0.00	55.6%	55.6%	80.0%	85.0%	85.0%	90.0%	0.000	0.000	0.000
R	Graphic Arts	0.80	1.02	0.00	60.0%	60.0%	70.0%	75.0%	85.0%	90.0%	0.000	0.053	0.967
S	Petroleum Refinery Equip	24.80	25.58	5.54	75.0%	75.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	25.576
T	Roof Tanks-Ext.Float	24.18	70.59	21.58	61.9%	61.9%	88.0%	90.0%	93.0%	95.0%	0.000	1.962	68.627
Z	Resins-Polyethylene	6.18	8.27	5.38	98.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	2.235	6.039
Z	Polypropylene	1.49	2.24	1.96	98.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.639	1.603
Z	Polystyrene	2.06	2.71	1.45	98.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.711	1.999
AA	Natural Gas Processing Plants	2.90	2.93	0.16	75.0%	75.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	2.934
AB	SOCMI	34.32	41.03	19.58	75.0%	75.0%	95.0%	95.0%	98.0%	98.0%	0.000	0.000	41.026
AC	Air Oxidation SOCMI	0.07	0.56	0.00	98.0%	98.0%	80.0%	85.0%	85.0%	90.0%	0.000	0.126	0.430
	TOTALS	135.32	198.78								0.000	9.820	188.957



Stage II Vapor Recovery will be implemented in the HGA nonattainment area. This program will control gasoline vapors escaping during the refueling of motor vehicles. The estimated reduction in VOC emissions in the HGA area is identified in Table 27.

The CMC in Appendix 7-E includes a listing of control measures specifically for the HGA nonattainment area ranked in priority order based on a variety of criteria. Most, if not all, of the measures will need to be implemented in the area to achieve a 15% net of growth and the 3.0% contingency reduction in emissions of VOC by the 1996 milestone.

Proposed rules will be included in the General Rules and Regulations IV and V (30 TAC Chapters 101, 114, and 115). The explanation of and formula for creating the CMC is located in Appendix 7-E.

Table 27 shows the estimated reductions toward the 1993 ROP goal that are available for each control measure, both mandated and optional. This information, combined with the CMC, can be used to formulate a ranking of the most effective and cost efficient rules for a particular nonattainment area.

Table 27 - Revised 7/12/96

**ESTIMATES TOWARDS 15% ROP SIP - HOUSTON/GALVESTON**

<b>EMISSIONS INVENTORY</b>	1990	Percent	Growth	1996	Percent
Area Sources	200.07	20.5%	-5.1%	189.85	18.5%
Point Sources	481.95	49.4%	4.8%	504.93	49.2%
On-road Mobile Sources	163.39	16.8%	18.1%	192.89	18.8%
Off-road Mobile Sources	129.98	13.3%	6.5%	138.37	13.5%
<b>TOTALS</b>	<b>975.39</b>		<b>5.2%</b>	<b>1026.04</b>	

**ESTIMATED REDUCTIONS**

<b>MANDATED RULES</b>	96 Projected TPD	Reduction	% of requirement	Cumulative %
Catchups	46.75	27.81	13.04%	13.04%
TSDf	14.48	13.48	6.32%	19.36%
Vehicle Refueling (Stage II)	20.83	16.89	7.92%	27.28%
General Vent Gas	78.65	13.97	6.55%	33.83%
Reform Gas (off road)	150.46	5.30	2.49%	36.31%
** I/M, Tier I, RFG	192.89	40.41	18.95%	55.26%
	<b>Subtot</b>	<b>117.86</b>	<b>55.26%</b>	
<b>15% RULES</b>				
*** Auto Refinishing	27.57	11.08	5.19%	55.26%
Vessel Cleaning	4.14	3.01	1.41%	56.67%
Stage I	12.23	6.26	2.94%	59.61%
SOCMI Reactor/Distillation	4.61	1.68	0.79%	60.40%
Marine Vessel Loading	31.57	15.73	7.37%	67.77%
Fugitives	74.36	46.03	21.58%	89.36%
RE Improvements	186.44	12.82	6.01%	95.37%
Gas Utility Engines	71.15	8.47	3.97%	99.34%
TCMs	192.89	0.36	0.17%	99.51%
Architectural Coatings	25.16	5.03	2.36%	101.87%
Consumer/Comm Products	22.21	4.44	2.08%	103.95%
Industrial Wastewater	11.71	8.56	4.02%	107.97%
Bulk Gasoline Terminals	6.46	3.36	1.57%	109.54%
Major Source Bakeries	0.75	0.22	0.10%	109.64%
Traffic Markings	2.79	0.56	0.26%	109.91%
High Perform. Maintenance	4.94	0.99	0.46%	110.37%
Other Special Purpose	6.22	1.24	0.58%	110.95%
Wood Furniture	2.90	0.37	0.17%	111.13%
	<b>Subtot</b>	<b>119.14</b>	<b>55.86%</b>	
<b>Contingency Rules</b>				
Municipal Landfills	7.27	3.99	1.87%	113.00%
Offset Printing	5.00	2.20	1.03%	114.03%
Naptha Dry Cleaners	3.72	1.88	0.88%	114.91%
I/M & FMVCP 1997	192.89	7.94	3.72%	118.63%
96-97 Utility Engine	71.15	0.76	0.35%	118.99%
	<b>Subtot</b>	<b>16.77</b>	<b>7.86%</b>	
	<b>Target Improvement</b>	<b>213.27</b>	100.00%	21.9%
	<b>15% Rules + Mandated Rules</b>	<b>237.00</b>	111.13%	
	<b>Excess (Shortfall)</b>	<b>23.73</b>	11.13%	
	<b>Required Contingency</b>	<b>29.26</b>		3.0%
	<b>Target + Contingency</b>	<b>242.53</b>	100.0%	24.9%
	<b>Total Reductions</b>	<b>253.77</b>	104.6%	
	<b>Excess (Shortfall)</b>	<b>11.24</b>	4.6%	

\*\* Total credits from reform gas, FMVCP Tier I, and a preliminary I/M reduction based on an EPA approved factor based analysis. For a detailed

\*\*\* Credits from this category are not counted

## c) Mobile Source Controls

### (1) Transportation Control Measures

A TCM program is mandated for the HGA nonattainment area. Several additional TCMs are being considered for implementation in the area. These measures may include, but are not limited to: land use densification, mixed land use development, pedestrian improvements, traffic signal timing improvements, college traffic management, K-12 school traffic management, employee transit pass subsidy, non-metro service area transit, fixed commuter rail, bicycle improvements, trip reduction initiatives, ridesharing, parking management, telecommuting, flexible work hours, compressed work week, gasoline tax increase, emission pricing, roadway pricing, motorist information system, incident management and response, special events management, control of truck movements. TCMs scheduled to be implemented include: high occupancy vehicle lanes, arterial traffic flow improvements, park-and-ride lots, transit improvements, area-wide rideshare, and intelligent transportation systems (formerly known as intelligent vehicle highway systems). A TCM summary is included in Appendix 7-K. The Houston-Galveston Area Council has specifically committed to those measures identified in Appendix 7-K.

### (2) Vehicle Inspection/Maintenance Program

The Texas Motorist's Choice Vehicle Emission Testing Program in the HGA nonattainment area will subject gasoline powered light-duty cars and trucks and heavy-duty trucks registered in Harris County to emission testing. Exhaust gas testing for HC, CO, and CO<sub>2</sub> is required. A hybrid program will allow the motorist to choose an annual two-speed idle test at test-and-repair or test-only facilities or a biennial

loaded or transient test at a test-only facility. Vehicles registered in Brazoria, Galveston, Montgomery, Chambers, Liberty, Waller, and Fort Bend Counties will be subject to a vehicle emissions test if detected as a “grossly polluting vehicle” as a result of remote sensing.

Of the registered vehicles in Harris County, vehicles 0 to 24 years old will be tested. Vehicles 6 to 24 years old will be required to be tested prior to transferring title after resale, pending legislative authority. In addition to the emissions test, there will be an emission control device inspection which will consist of a visual test to verify presence (if applicable) of the catalytic convertor, exhaust gas recirculation system, positive crankcase ventilation system, evaporative system, thermostatic air cleaner and air injection system and an automated inspection procedure for testing the integrity of the gas cap.

Dedicated four-wheel drive vehicles, meaning any constant four-wheel drive vehicle which cannot be converted to two-wheel drive except by removing one of the vehicle's drive shafts, shall be subject to a preconditioned two-speed idle test.

### (3) Reformulated Gasoline and Clean Fuel Vehicle Program

Beginning on January 1, 1995, reformulated gasoline was introduced in the HGA nonattainment area. This type of fuel has significant air quality benefits for both on-road and non-road gasoline engines.

The use of vehicles certified to a minimum of the LEV standards is mandated by statute for certain privately owned and local government fleets by 1998 and thereafter. Agency rules that implement this requirement will constitute a separate revision to the SIP as a substitute for the FCFE program that is

mandated for serious, severe, or extreme nonattainment areas. The agency will work with local MPOs to determine the number of LEVs and the amount of emission reductions generated by them.

3) Demonstration of Attainment (No change.)

4) Contingency Plan (No change.)

8. SIP REVISIONS FOR MOBILE SOURCES (Revised.)

a. Vehicle Inspection/Maintenance (I/M) Program (No change.)

b. Vehicle Miles Traveled Offset (No change.)

c. Employer Trip Reduction Program. (Repealed.)

9. SIP REVISIONS FOR THE ATTAINMENT DEMONSTRATION (Revised.)

a. ELP §818 Attainment Demonstration (Revised--Addendum.)

## EL PASO §818 ATTAINMENT DEMONSTRATION

### Addendum: Technical Support Document

#### Introduction

In November 1993, the commission submitted a revision to the SIP for the control of ozone in El Paso. The purpose of this revision was to achieve a 15% reduction in emissions of VOCS below 1990 levels by November 15, 1996. The largest reductions were to be achieved through the implementation of a vehicle I/M program. On February 1, 1995, the Legislature suspended the I/M program in all Texas nonattainment counties, and authorized Governor Bush to negotiate a new program that is more convenient to the public. This action resulted in a one-year delay in the implementation of the I/M program, now scheduled to begin in January 1997.

The commission submitted an attainment demonstration for the ELP ozone nonattainment area in November 1994 under the conditions of §818 of the FCAA Amendments of 1990. This section allows the commission to demonstrate that ELP would be in compliance with the NAAQS for ozone “but for emissions emanating from outside the United States”. The demonstration used the emission reductions expected from the I/M program to project that ELP would be in compliance with the NAAQS by November 15, 1996. The purpose of the following discussion is to demonstrate that the I/M delay will have no significant effect on the validity of the attainment demonstration.

## Technical Discussion

The agency used version IV of the UAM, an EPA-approved photochemical grid model, to perform the modeling for the ELP ozone nonattainment area. All modeling activities were performed as outlined in the UAM modeling protocol, and in accordance with EPA's "Guideline for Regulatory Application of the Urban Airshed Model" (ref. 1). The UAM modeling protocol for the ELP area was approved by the EPA on February 9, 1994. The modeling attainment demonstration SIP for the ELP ozone nonattainment area was submitted to the EPA on September 14, 1994.

The first step in the photochemical modeling effort was to select historical "base case" ozone episodes for the ELP area. Selected episodes were characterized by high monitored ozone concentrations and meteorological conditions which are typically conducive to the development of high ozone levels.

A meteorological model was employed to simulate weather patterns and develop the necessary meteorological input files (e.g., wind fields) for each ozone episode. Concurrently, emissions input files were developed for each ozone episode using the Emissions Processing System, which spatially and temporally models emissions of VOC, NO<sub>x</sub>, and CO for point, area, and mobile source categories. These modeling emissions input files were based upon data collected for the 1990 Base Year EI.

The modeling emissions used for the ELP nonattainment area were limited to United States sources only, as per provisions of §818 of the FCAA Amendments of 1990. Although a VOC and NO<sub>x</sub> emissions inventory for Juarez, Mexico is being developed, it was not available at the time the ozone SIP for El Paso was due (i.e., November 15, 1994), and is still not complete.

The UAM modeling for each of the base case ozone episodes, conducted with the episode-specific emissions derived from the 1990 Base Year EI, predicted ozone concentrations that were notably lower than monitored levels. Table 1 compares measured and modeled ozone concentrations for two episodes for which the modeling performance was deemed acceptable (ref. 2). The local air monitors with exceedances of the ozone NAAQS are highlighted. The difference between measured and modeled ozone is primarily attributable to the omission of emission sources from Juarez in the modeling.

A future case modeling EI was developed by projecting the 1990 base case emissions to the year 1996. Demographic and econometric forecasting methods were employed to develop the future inventory, which also included the 15% net-of-growth VOC reductions mandated by the FCAA Amendments of 1990. Table 2 summarizes the source category VOC emissions data for the 1990 modeling base year and the projected 1996 attainment year. The projected inventory is based on the originally submitted 15% net-of-growth VOC reductions. The data in the table projects a VOC reduction between 1990 and 1996 of 38.70 tons per day. A portion of this reduction is attributable to the Federal Motor Vehicles Control Program and RVP requirements that predate the FCAA Amendments of 1990. Biogenic VOC emissions were not included in the modeling since such emissions in the ELP area have a negligible contribution to ozone formation.

Similarly, Table 3 summarizes source category NO<sub>x</sub> emissions data for the 1990 modeling base year and the projected 1996 attainment year. This data projects a NO<sub>x</sub> increase between 1990 and 1996 of 6.5 tons per day.

Table 4 lists the various VOC emission source categories and the corresponding portion of the originally submitted 15% ROP net-of-growth reductions for the ELP nonattainment area. The data

shows that the I/M program, as originally conceived, contributed 6.32 tons per day of VOC reduction in the 1996 inventory.

Table 5 compares the results of UAM modeling with the projected 1996 modeling emissions inventory to the results from the 1990 base year modeling inventory. For each of the two episodes, the predicted domain-wide maximum ozone concentrations using the projected 1996 inventory are not only well below the ozone NAAQS of 120 parts per billion, but they are also below the domain-wide maximum ozone concentration using the modeling base year inventory. Thus even though the projected 1996 modeling emissions inventory includes a NO<sub>x</sub> increase of 6.5 tons per day, the 38.7 tons per day decrease in VOC for 1996 resulted in a notable decrease in the predicted domain-wide maximum ozone concentration. Most importantly, the 6.32 tons per day VOC decrease attributed to the original I/M program is well within the 38.7 tons per day VOC decrease which resulted in modeled 1996 ozone levels which were below the 1990 modeled concentrations. This means that, even if there were no reductions attributable to an I/M program, the modeled ozone levels for 1996 would be below those levels modeled for 1990.

### Conclusion

The UAM modeling based on United States emissions alone indicated that ELP would meet the ozone NAAQS with the 1990 emissions were it not for emissions emanating from Juarez, Mexico. In addition, UAM modeling with the reduced level of VOC's projected in the 1996 emissions predicted even lower ozone levels. Thus, even without the original I/M program's VOC reductions (i.e., 6.32 tons per day), the projected 1996 VOC emissions inventory would have been less than the 1990 base year inventory, and modeled concentrations for 1996 would have been lower than those for 1990. Thus,

remodeling with the UAM is not needed to demonstrate that, with an I/M program having lower emissions reductions than the original program, ELP would be in compliance with the ozone NAAQS in 1996.

Aside from the change in the I/M program, other changes to the 1990 base year EI occurred in the SIP revision. These changes will result in a reduction to the 1990 VOCs, which will then result in a reduction to the 1996 projected emissions. Since these changes reduce VOCs, remodeling with the UAM is not needed to demonstrate that ELP would be in compliance with the ozone NAAQS in 1996.

**TABLE 1. Selected Ozone Episodes in the  
ELP Ozone Nonattainment Area**

Exceedance Date	Site	Maximum Ozone Concentration (ppb)				Maximum Modeled Precursor Concentration (ppb)	
		Measured		Modeled		NO <sub>x</sub>	VOC
		Ozone (ppb)	Time	Ozone (ppb)	Time		
2/10/87	C12	<b>*170</b>	1400	34	1500	—	—
6/24/87	C06	<b>190</b>	1100	62	1500	143	1181
	C12	<b>200</b>	1100	63	1500		
	C30	<b>170</b>	1000	74	1500		
7/02/87 7/03/87	C30	<b>130</b>	1100	85	1400	199	1644
	C30	<b>180</b>	900	60	1200	282	1548
10/12/89	C06	60	1000	48	1400	—	—
	C12	70	1400	48	1400		
	C30	<b>130</b>	1100	57	1300		
10/14/89	C06	<b>260</b>	1100	3	1200	—	—
	C12	<b>200</b>	1100	3	1200		
	C30	120	1000	3	1300		

\*Figures in bold indicate measured ozone values in excess of the NAAQS of 120 ppb.

**TABLE 2. UAM VOC Emissions Inventory Development for 1996  
ELP Attainment Demonstration**

	Emission Source Category (Tons/Day)			
	Point	Area	Off-Road Mobile	On-Road Mobile
Base 1990 Inventory	9.02	27.60	11.90	67.33
RACT Fixups	-0.00	-1.52	-0.00	—
Adjusted 1990 Inventory	9.02	26.07	11.90	—
Projected Growth	+0.24	+2.03	+1.36	—
Projected 1996 Inventory	9.26	28.10	13.26	—
ROP Reductions	-3.73	-6.86	-0.94	—
1996 Modeled Projected Emissions	5.53	21.25	12.33	38.04

**TABLE 3. UAM NO<sub>x</sub> Emissions Inventory Development for 1996  
ELP Attainment Demonstration**

	Emission Source Category (Tons/Day)			
	Point	Area	Off-Road Mobile	On-Road Mobile
Base 1990 Inventory	37.40	2.4	15.00	38.90
RACT Fixups	-	-	-	—
Adjusted 1990 Inventory	37.40	2.4	15.00	38.9
Projected Growth	+3.6	+0.3	+1.9	+0.7
Projected 1996 Inventory	41.0	2.7	16.9	39.6
ROP Reductions	-	-	-	—
1996 Modeled Projected Emissions	41.0	2.7	16.9	39.6

**TABLE 4. Rate-of-Progress VOC Emission Reductions for ELP**

<b>Source Category</b>	<b>1996 Projected Emissions (Tons/Day)</b>	<b>Modeled Reduction (Tons/Day)</b>
<b>Mandated Rules</b>		
Catchups	2.00	0.71
Vehicle Refueling (Stage II)	2.30	2.03
Aircraft Stage 3	0.29	0.02
FMVCP Tier I	31.18	0.25
Enhanced I/M	31.18	6.32
<b>SUBTOTAL</b>	<b>N/A</b>	<b>9.33</b>
<b>Phase I Rules</b>		
Auto Refinishing	2.84	1.13
Offset Printing	0.85	0.56
Vessel Loading	0.40	0.32
Fugitives	1.79	1.13
Rule Effectiveness Improvements	12.07	0.61
Gasoline Utility Engines	7.57	0.84
Transportation Control Measures	31.18	0.30
<b>SUBTOTAL</b>	<b>N/A</b>	<b>4.89</b>
<b>Phase II Rules</b>		
Architectural Coatings	5.25	1.42
Consumer/Commercial Products	5.69	0.61
Municipal Landfills	0.38	0.21
Industrial Wastewater	0.37	0.27
Bulk Gasoline Terminals	0.86	0.82
Outdoor Burning	0.81	0.40
Other Coatings	1.48	0.30
Wood Furniture Coating	0.29	0.04
Reform Gasoline (on-road)	31.18	2.61
Reform Gasoline (off-road)	12.58	0.40
<b>SUBTOTAL</b>	<b>N/A</b>	<b>7.08</b>
<b>TOTAL</b>	<b>N/A</b>	<b>21.30</b>

**TABLE 5. Attainment Demonstration for ELP**

Episode Date	Maximum Predicted Ozone Concentration, ppb		Maximum Predicted Precursor Concentration, ppb	
	Base Year (1987)	Attainment Year (1996)	NO <sub>x</sub>	VOC
6/24/87	114	87	165	524
7/02/87	98	80	179	681
7/03/87	78	68	457	666

## REFERENCES

- U. S. EPA. 1991. Guideline for Regulatory Application of the Urban Airshed Model. U.S. EPA (EPA-450/4-91-013)
- TNRCC. 1994. ELP Ozone Nonattainment Area Section 818 Demonstration Report. TNRCC, Office of Air Quality, Air Quality Planning Division.

- b. Dallas/Fort Worth Attainment Demonstration (No change.)
10. SIP REVISIONS FOR THE REDESIGNATION AND MAINTENANCE PLANS (No change.)
11. SIP REVISIONS FOR POST-96 RATE-OF-PROGRESS (Revised.)
- a. Ozone Control Plan
    - 1) General (No change.)
      - a) Requirement For Reductions (No change.)
    - 2) Ozone Nonattainment Area Designations in Texas (No change.)
    - 3) Local Consultation (No change.)
    - 4) Identification of Emission Changes
      - a) Urban Airshed Modeling (UAM)

ROP SIP modeling is being developed for the HGA and BPA nonattainment areas in two phases using the UAM. The first phase of ROP modeling was based on historical ozone episodes. This modeling was submitted to EPA on January 11, 1995. The second phase of the ROP modeling is being conducted

using data obtained primarily from the COAST project, an intensive 1993 field study. The COAST modeling for HGA and associated SIP are projected to be completed by December, 1996 for submittal in May of 1997. Control strategies developed in this second phase will be based on a more robust data base, providing a higher degree of confidence that the strategies will result in attainment of the ozone NAAQS or target ozone value. A discussion of the schedule for the UAM modeling for the Phase II Attainment Demonstration can be found in Appendix 11-F.

b) Emissions Inventory

(1) - (6) (No change.)

(7) Inventory Summaries

The progression from the 1990 ROP Base Year Inventory to the emission reductions needed to meet the 1999 target level for each of the nonattainment areas is shown in Table 11.

TABLE 11  
Final 1999 ROP Required VOC Emissions Reductions Calculations  
Houston/Galveston Ozone Nonattainment Area  
Ozone Season VOC Tons Per Day  
July 12, 1996

Step	Emissions Basis	Stationary		Mobile		Total
		Point	Area	On-road	Non-road	
1	1990 ROP Nonattainment Area Base Year EI	481.95	200.07	251.52	129.98	1063.52
2	1990 Adjusted Base Year EI relative to 1996	481.95	200.07	163.39	129.98	975.39
3	1990 Adjusted Base Year EI relative to 1999	481.95	198.71	153.01	129.98	963.65
4	9% of Adjusted Base Year EI relative to 1999 (0.09*step 3)					86.73
5	RVP and Fleet turnover correction:steps(2-3)		1.36	10.38		11.74
6	1996 Target Level Emissions					804.83
7	1999 Target Level Emissions [steps(6-5-4)]					706.36
8	1999 Emissions Forecast (Growth and Pre-90 Controls)	516.95	196.68	172.68	142.87	1029.18
9	Total Reductions Required by 1999 with Growth (steps 8-7)					322.82
10	Creditable Reductions to Date					242.30
11	Shortfall					80.52

Base year on-road mobile emissions calculated with MOBILE5 for an ozone season weekday

Adjusted base year on road mobile emissions and 1996 forecast on-road mobile emissions calculated with MOBILE5A for an ozone season weekday

All on-road MOBILE5A forecasts are interpolated to November 15, 1996

(8) Changes to the Emissions Inventory as a result of the COAST Study

(a) Changes in Area Source and Non-road Mobile Source

Categories

The COAST field study was an intensive, multi-phased, and multifaceted study of the HGA and BPA ozone nonattainment areas, and adjacent offshore waters. The project was undertaken in conjunction with the Minerals Management Service and represents an effort to obtain the regional information necessary to develop cost-efficient, effective ozone control strategies. While the major thrust of the study has focused on regional monitoring and modeling of the 1993 ozone season, the COAST project had many other components. One such project was the Bottom-up Emissions Inventory Project.

A traditional emissions inventory of area sources utilizes so-called top-down methodologies in order to estimate the county-wide emissions required for SIP inventory reporting. This approach involves using such statistics (national or state level) as are available on the level of activity (e.g., gallons of gasoline sold, widgets produced, and so on) of the particular area source category being investigated. The activity level is then adjusted, or allocated, to the county level based on some known surrogate such as population or SIC Code employment (e.g., the population of X County is 15% of the state population so 15% of the state level activity is taking place at the county level). The available alternative, a bottom-up inventory, is not usually performed because it is costly. The COAST project provided an opportunity to conduct a bottom-up inventory.

A bottom-up inventory entails collecting as much local, category specific activity level information as is possible. In the specific case of the Bottom-up Emissions Inventory Project, the approach was to

have a contractor take a random, stratified sample, or survey, to determine the activity levels of the following area source and non-road mobile source categories: Dry Cleaners, Gasoline Stations, Lawn Mower usage, Recreational Marine usage, Generators <50 HP usage, Surface Coatings, and Surface Cleaning. The contractor then used this activity level information with emission factors to estimate emissions.

The work done for the Bottom-up Emissions Inventory also included follow-up work involving a host of organizations and people including the commission, the City of Houston Bureau of Air Quality, the Non-road Mobile Source Working Group of the Houston-Galveston Area Council, and the sponsorship of the Houston Regional Monitoring Network organization in hiring Radian Corporation to review specific categories of the 1990 Base Year EI. The combined efforts of these organizations to conduct telephone surveys, telephone interviews, purchase proprietary information, contract for services, provide comments and input, and review existing inventory work resulted in the changes that have occurred in the emissions inventories for the 1990 base year inventory.

The categories in which changes have occurred may be seen in Table 12 below. An explanation of the changes which occurred can be found in the revision to the 1990 Adjusted Base Year EI which is being proposed as part of this SuperSIP package.

TABLE 12

Categories with Changes in 1990 Base Year Inventory Emissions Estimates

Category	Ozone Nonattainment Areas			
	HGA	BPA	DFW	ELP
Other Product Coatings	Y	Y	Y	Y
High Performance Maintenance	Y	Y	Y	Y
Marine Vessel Loading Losses	Y	Y	N	N
Surface Cleaning	Y	Y	Y	Y
Architectural Coatings	Y	Y	Y	Y
Auto Refinishing	Y	Y	Y	Y
Sheet, Strip and Coil	Y	Y	Y	Y
Vessels with Outboards	Y	Y	N	N
Commercial Vessels	Y	N	N	N
Generators <50 HP	Y	Y	N	N
Residential Lawnmowers	Y	Y	N	N
Military Aircraft	N	N	Y	N

c) Factors Affecting Magnitude of VOC Emissions

(1) Changes in Stationary and Area Source Emissions Regulations

(a) Additional Control Techniques Guidelines (CTGs), Federal Rules, and Other Federal and State Programs

Section 182(b)(2) of the FCAA Amendments of 1990 requires implementation of RACT for ozone nonattainment areas classified as moderate and above for: (A) each category of VOC sources covered by a CTG document issued between November 15, 1990 and the date of attainment; (B) all VOC sources covered by any CTG document issued prior to November 15, 1990; and (C) all other major stationary sources of VOC. A detailed discussion of the state's demonstration that existing state or proposed federal rules/programs represent a reasonable level of control and thus fulfill RACT requirements is found in Appendix 11-I.

(i) Federal Rules and Other Federal and State Programs

According to §108(b)(1) of the FCAA Amendments of 1990, the EPA Administrator shall issue to the states and appropriate air pollution control agencies information on air pollution control. Sections 182(b)(1)(C) and (D) of the FCAA Amendments of 1990 specify in general terms which emissions reductions are creditable toward the ROP reduction requirements and which are not. Section 182(b)(1)(D) does not specifically limit the creditability of emissions reductions associated with the programs discussed in this section toward the ROP requirements; therefore, emissions reductions associated with the programs listed below are generally creditable. However, some additional

limitations do exist to the extent that emissions reductions associated with the programs listed below must be quantifiable, real, enforceable, replicable, accountable, and occur between November 15, 1990 and November 15, 1999. The federal programs listed below are generally creditable, provided they meet these limitations. Additionally, some state programs may be creditable provided they meet these limitations.

--Control Technique Guidelines

--Benzene National Emissions Standards for Hazardous Air Pollutants

--Treatment, Storage, and Disposal Facilities

--Hazardous Air Pollutant Standards

--New Source Performance Standards

--Controls required for mobile sources

In general, in order to take ROP SIP emission reduction credit, emission limits must be established by rule before the SIP submittal deadline. The EPA has allowed states to claim ROP credit on a limited basis without preemptive rulemaking. The commission is pursuing this approach for the MACT standards and for the national engine rules. The FCAA Amendments of 1990 preclude states from separate rulemaking for the engine categories. The following are federal programs for which the state has taken credit in either the 15% or the current SIP.

--Clean Fuel Vehicle Program (Substitute for Federal Clean Fuel Fleet)

--Aircraft Engines (Federal Aviation Administration Rule)

--Architectural Coatings

--Hazardous Organic National Emission Standards for Hazardous Air Pollutants

- Landfills subject to New Source Performance Standards
- Pulp and Paper Manufacture (MACT)
- Recreational Marine Vessels
- Waste Treatment, Storage, and Disposal Facilities (MACT)

The FCAA Amendments of 1990 significantly changed the permitting process for new sources or modifications of existing sources. The most important changes are with respect to the application of rules requiring emissions offsets in nonattainment areas. The definition of "major source" also changed for certain nonattainment areas. In Texas, the major source definition is 25 TPY in the HGA area. An additional impact of lowering the definition of major source in the nonattainment areas is the lower trigger for implementing the Lowest Achievable Emissions Rate for new major sources or major modifications in accordance with the state construction permit rules in §116.150. Any reductions which do occur as a result of the FCAA Amendments' of 1990 major source definition and offset requirements will be creditable towards the Post-96 reduction.

The offset requirement is managed by an "emissions banking" regulation. This allows industries to bank emissions they have made voluntarily (beyond those required by other rules or their agency permit) if those reductions can be verified. New or expanding industries which would not otherwise have been permitted to operate can take advantage of these banked emissions. Nonattainment areas can, therefore, still attract new or expanding industry while obtaining subsequent emissions decreases through the required offsets.

Under the banking system, industries which are capable of demonstrating a verifiable voluntary reduction in emissions may sell these banked emissions to new or expanding industries. The

purchasing industry must prove a greater than one-to-one offset ratio. These offset ratios vary between nonattainment areas. For HGA, the offset ratio is 1.3 to 1, yielding a 30% net reduction.

Nonattainment areas may also take credit for permanent shutdowns of stationary sources within their airshed. The credits may not be double-counted as part of NSR, banking, or any other offset program. The shutdowns must occur between 1990 and 1999. Within this framework, an area may take credit for the entire emissions from the closed facility or operations.

Certain rules or programs included as part of the 15% ROP SIP continue to gain creditable emission reductions either through equipment turnover or phasing in of more stringent requirements between 1997 and 1999. These reductions are being quantified, and include categories such as the following:

- Small Utility Engines
- Automobile Inspection/Maintenance
- Federal Motor Vehicle Control Program
- Federal Reid Vapor Pressure Control
- Underground Storage Tank Remediation
- Stage II Gasoline Vapor Recovery

(b) Extended Compliance Schedule (No change.)

(c) Alternate Methods of Control (AMOC) (No change.)

(d) Proposed New VOC Control Measures

(i) New or Modified Point Source Controls

The following rules were developed and submitted to EPA on January 11, 1995 to meet the 9% ROP requirements for the HGA nonattainment area.

Storage of Volatile Organic Compounds (§§115.112-115.119)

The revisions add recordkeeping requirements for external floating roof storage tanks for all four ozone nonattainment areas. The purpose of the recordkeeping changes is to improve recordkeeping requirements for secondary seal gap exceedances and the associated emissions in order to improve rule effectiveness, resulting in additional emission reduction credits.

(ii) New or Modified Area Source Controls

No area source controls were modified or proposed to meet the requirements of this SIP.

(2) Changes in Mobile Source Emissions

(a) Federal Motor Vehicle Control Program (No change.)

(b) Federal Gasoline Volatility (Reid Vapor Pressure) Control Program (No change.)

(c) Transportation Planning

Much of the responsibility for the planning and implementation of TCMs has been delegated to the nonattainment areas' local governments and MPOs. TCMs are designed to reduce the number of vehicle miles traveled, reduce or eliminate vehicle trips, or improve the flow of traffic. There are a variety of TCMs being considered, and each nonattainment area will choose from among them. 30 TAC §114.23, concerning Transportation Control Measures, has been adopted to provide enforceability to the TCM strategy selected for each area. This rule contains TCM-specific definitions; designations of affected MPOs responsible for TCM development, funding, and implementation; requirements that MPOs submit specific information provided by agencies or entities responsible for TCM implementation and a quantification of the emission reduction benefits; requirements that MPOs maintain and provide specific information regarding TCM implementation status; requirements that the MPOs modify the transportation improvement program and the metropolitan transportation plan for the area, as necessary, to correct implementation deficiencies; and prescribed enforcement actions to be taken if deficiencies remain unresolved or if knowing violations of TCM commitments occur. A TCM table for the HGA ozone nonattainment area is located in Appendix 11-G. The TCMs listed below are examples of those which may be adopted. Those not needed and/or adopted will be deleted, and others may be added as they become available or identified. TCMs under consideration include the following:

- HOV Lanes. Restrict certain roads or lanes for passenger buses or high-occupancy vehicles, and programs for the provision of all forms of high-occupancy, shared-ride services;
- Trip-reduction initiatives;
- Traffic flow improvement programs that reduce emissions;

- Signal timing improvements and computer controlled signal coordination/progression permit vehicles traveling in the direction of the major traffic flow to receive a green light whenever possible, thereby reducing idling time. Intersections can also be modified to improve traffic flow and reduce emissions;
- Programs to limit or restrict vehicle use in the downtown area or other areas of high emission concentration, particularly during periods of peak use;
- Programs to limit portions of road surfaces or certain sections of the metropolitan area to bicycle or pedestrian use, and to construct new roads or paths for this purpose. Also programs for secure bicycle storage facilities and other facilities; including bicycle lanes, for the protection and convenience of bicyclists, in both public and private areas;
- Programs to reduce emissions due to extended idling of vehicles and extreme cold start conditions;
- Programs and ordinances to facilitate non-automobile travel, to facilitate provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events centers, and other centers of vehicle activity;
- Programs for improved public transit routes, service, frequency, and route modifications. Other programs include reduced transit fare and municipal car pool/van pool programs;
- Programs to encourage the voluntary removal from use and the marketplace of pre-1980 model year light-duty vehicles and trucks;
- Programs and ordinances for parking incentives and disincentives to promote use of multi-occupancy vehicles or mass transit;
- Programs and ordinances to promote the use of alternatively fueled vehicles.

#### (d) Vehicle I/M Program

The FCAA Amendments of 1990 mandate vehicle emissions inspection and maintenance programs in areas that do not meet the NAAQS for ozone. Congress also set minimum performance standards for these programs such as centralized testing and registration enforcement.

EPA has promulgated federal rules that include specific performance standards for I/M programs.

These rules, based on the direction provided in the FCAA Amendments, state what is expected by EPA.

"Basic" programs are required for nonattainment areas with moderate ozone classifications.

"Enhanced" programs are required for those areas with a 1980 population of 200,000 or more, which are classified as having serious, severe, or extreme ozone pollution levels. The HGA and ELP nonattainment areas fall into this category and are required to have enhanced I/M programs. The BPA nonattainment area is a moderate nonattainment area, and its 1980 population of less than 200,000 in an urbanized area means it is not required to implement an I/M program. The DFW area is a moderate ozone nonattainment area and requires at least a basic program.

EPA issued a rule on November 5, 1992 that outlined very specific requirements for vehicle emissions testing. A vehicle emissions testing program was designed and implemented on January 1, 1995 that met all EPA requirements. The Texas Legislature passed Senate Bill 178 in response to the concerns of numerous citizens which suspended the centralized program, reinstated the previous vehicle emissions testing program in Dallas, Tarrant, and El Paso counties, and authorized Governor Bush to negotiate a new vehicle emissions testing program. On September 19, 1995, EPA issued a rule allowing states to implement less stringent vehicle emissions testing programs. This rule also raised the population requirements for I/M programs, thus allowing the BPA area to develop a pollution control strategy that

does not include I/M. On November 10, 1995, Governor Bush announced the Texas Motorist's Choice Vehicle Emissions Testing Program.

The emissions testing program will include the following:

- o Scheduled testing will be required in Dallas, Tarrant, El Paso and Harris counties.
- o Annual testing will be conducted in conjunction with the safety inspection.
- o Motorists will choose a facility to perform tests, such as:
  - o Annual, two-speed idle tests at test-and-repair facilities,
  - o Annual, two-speed idle tests at test-only facilities,
  - o Biennial, loaded or transient tests at test-only or test-and-repair facilities.
- o Two-speed idle test fees are set at test-and-repair sites, test fees for an annual two-speed idle program are \$13.00 and test fees for a biennial test are \$26.00. Test fees for loaded mode equipment have not been set.
- o Vehicles registered in Denton, Collin, Brazoria, Galveston, Chambers, Liberty, Waller, Montgomery, and Fort Bend counties will be subject to a vehicle emissions test if detected as a "grossly polluting vehicle" as a result of remote sensing.
- o Vehicles 2 to 24 years old will be tested annually. Vehicles 0 to 2 years old will be subject to remote sensing inspection scans. Vehicles failing a remote sensing screening will be required to have an emissions test.
- o Vehicles six to 24 years old registered in Dallas, Tarrant, El Paso, or Harris counties must be tested at a test-only facility prior to transferring title after resale if legislative authority is granted.
- o Waivers must be performed by a recognized repair technician in order to qualify for a waiver.

- o Low Income Time Extensions will be available.
- o All inspection facilities will participate in a central database via a dial-up modem.

The emission control device inspection in all nonattainment areas will consist of two components: a visual test to verify presence (if applicable) of the catalytic convertor, exhaust gas recirculation system, positive crankcase ventilation system, evaporative system, thermostatic air cleaner and air injection system and an automated inspection procedure for testing tail pipe emissions and the integrity of the gas cap.

Inspection of the emissions control devices is performed through direct observation or through indirect observation using a mirror, video camera, or other visual aid. Also referred to as an "anti-tampering inspection," it shall include a determination as to whether each device is present and properly connected and whether it is the correct type for the certified vehicle configuration. Aftermarket parts, as well as the original equipment manufactured parts, may be considered correct if they are of the proper design and fit for the certified vehicle configuration.

EPA proposes to approve I/M SIP submissions which are consistent with the following standards and approved methods of testing for vehicle emissions.

#### (i) Emission Standards

Emission standards are limits for HC and CO emissions. In transient testing, units of measure are expressed as g.p.m., while in idle and steady state testing, units of measure are expressed in ppm or as a

percentage. These standards will apply to all vehicles subject to the program. Failure of any standard will necessitate appropriate repairs.

#### (ii) Evaporative System Integrity Test Procedure

This test procedure consists of a series of steps to measure an unacceptable drop in pressure, which indicates deterioration of the gas cap. This portion of the test may be failed if the gas cap is missing or is damaged or is no longer working properly.

#### (iii) Loaded-Mode, Two-Speed Test

This test is conducted using a BAR90 type analyzer and a dynamometer. The dynamometer can range from a simple chassis dynamometer to a more sophisticated variable inertial weight dynamometer. Tail pipe emissions are sampled from the vehicle at a simulated speed of approximately 30 miles per hour and at idle. Some motorists may choose this test-only option and will receive an emissions test that is valid for two years.

#### (iv) Preconditioned Two-Speed Idle Test

This test is conducted using a BAR90-type analyzer without a dynamometer. The test sequence consists of a high-speed mode at approximately 2,500 revolutions per minute followed immediately by an idle mode. Additional preconditioning followed by an identical second-chance test is performed only if the vehicle fails the first test cycle. Dedicated four-wheel drive and heavy-duty vehicles must

be tested using this test type. Motorists may elect this type of test and will receive an emissions test that is valid for one year.

#### (v) Transient Emission Test

This test results in a mass emission measurement using a constant volume sampling system while the vehicle is driving through a computer monitored driving cycle on a dynamometer with inertial weight settings appropriate for the weight of the vehicle. The driving cycle includes acceleration, deceleration, and idle operating modes in a test sequence that must be approved by the EPA.

These test features exceed EPA's low enhanced performance standards.

On November 28, 1995, President Clinton signed the National Highway System Designation Act of 1995. Section 348 of the legislation allows States to submit to EPA by March 27, 1996, I/M Program SIPs that reflect good faith estimates for implementing a test-and-repair program without EPA's default of 50%. Texas will meet this requirement, thus gaining additional credit for the vehicle emissions testing program.

#### (e) Accelerated Vehicle Retirement Rule

The agency has developed a vehicle scrappage program, titled "Accelerated Vehicle Retirement Program". It will be included in §114.29 in Regulation IV. This program will not generate any SIP reduction credits as currently designed, but may produce some milestone credits if the scrappage credits are donated to the state or generated through state funding.

The purpose of this program is to reduce mobile source emissions and provide additional flexibility for stationary sources in the nonattainment areas: HGA, DFW, ELP, and BPA. A scrappage program reduces VOC, NO<sub>x</sub>, and CO emissions from mobile sources, such as automobiles and light duty trucks, by permanently removing high-emitting vehicles from the area-wide fleet. With this rule, stationary sources will have the opportunity to select the most cost effective approach to complying with federal and state regulations for ozone reduction.

d) Emissions Tracking (No change.)

e) Contingency Plan Requirements (No change.)

f) Control Measure Catalog (No change.)

g) Commitment to Consultative Process (No change.)

b. Beaumont/Port Arthur Ozone Control Strategy

1) General

In December of 1990, then-Texas Governor William Clements requested that the BPA area be reclassified as a "moderate" ozone nonattainment area in accordance with Section 181(a)(4) of the FCAA Amendments of 1990. That request was denied on February 13, 1991. A recent review of the original request and supporting documentation has revealed that this denial was made in error. As

provided by Section 110(k)(6) of the Act, the EPA Administrator of the has the authority to reverse a decision regarding original designation if it is discovered that an error had been made.

Monitoring data from a privately-funded, special purpose monitoring network which was not included in the Aerometric Information Retrieval System database was improperly used to deny this request. Furthermore, subsequent air quality trends demonstrate that BPA is more properly classified as a moderate nonattainment area, and should attain the standard by the required date for moderate areas of November 15, 1996. Therefore, Governor Bush sent a letter and technical support to EPA on July 20, 1995, requesting that the BPA area be reclassified to moderate nonattainment status. BPA plans to demonstrate attainment one of the following ways:

- ◆ Monitored values showing attainment of the standard at state-operated monitors for the years 1994-1996, which is the timeline the FCAA Amendments of 1990 specifies for moderate areas.
- ◆ UAM modeling showing attainment of the standard but for transport of ozone and/or precursors.

EPA Region VI verified the data submitted in support of this request, and concurred that it is valid. On June 3, 1996, the reclassification of the BPA area became effective. Because the area was classified as serious, it was following the SIP submittal and permitting requirements of a serious area, which included the requirements for a Post-96 SIP. With this consolidated SIP submittal, the commission has removed the BPA area from the Post-96 SIPs, which became applicable to HGA only.

c. Houston/Galveston Ozone Control Strategy

1) General

The FCAA Amendments of 1990 classified the HGA area as a Severe II nonattainment area. The HGA nonattainment area includes the counties of Brazoria, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller, and Chambers. The HGA nonattainment area has an ozone design value of 0.22 ppm, which places the area in the Severe II classification.

2) Estimated Emission Reductions

a) 9% Targeted Reductions

Table 13 summarizes the breakdown of emissions in the HGA area by emission categories. Table 14 summarizes the estimated emission reductions for the 9% reduction requirement, and associated 3% contingency measures. More information on these reductions can be found in Appendix 11-C.

**TABLE 13**  
**Anthropogenic VOC Emissions in the**  
**Houston/Galveston Area**

<b>CATEGORY</b>	<b>AMOUNT IN TPD</b>	<b>PERCENTAGE</b>
Point	481.95	49
Area	200.07	21
Non-Road Mobile	129.98	14
On-Road Mobile	153.01	16

Table 14 - Revised 7/12/96

**ESTIMATES TOWARDS 9% ROP SIP - HOUSTON/GALVESTON**

<b>EMISSIONS INVENTORY</b>	1990	Percent	Growth	1999	Percent
Area Sources	200.07	20.7%	-1.7%	196.68	19.1%
Point Sources	481.95	49.9%	7.3%	516.95	50.2%
On-road Mobile Sources	153.01	15.9%	12.9%	172.68	16.8%
Off-road Mobile Sources	129.98	13.5%	9.9%	142.87	13.9%
<b>TOTALS</b>	<b>965.01</b>		<b>6.6%</b>	<b>1029.18</b>	

**ESTIMATED REDUCTIONS**

<b>MANDATED RULES</b>	99 Projected TPD	Reduction	% of requirement	Cumulative %
HON	0.53	0.47	0.58%	0.58%
Enhanced Monitoring		31.00	38.50%	39.08%
Aircraft Engines	2.43	0.97	1.20%	40.29%
Pulp & Paper MACT	9.18	8.26	10.26%	50.55%
Tx Alternative Fuel Fleet	172.68	0.08	0.10%	50.65%
Recreational Marine	27.30	0.06	0.08%	50.73%
	<b>Subtot</b>	<b>40.85</b>	<b>50.73%</b>	
<b>Existing Rules</b>				
Utility engine 1997-1999	65.67	6.31	7.84%	58.56%
UST Remediation	2.05	2.05	2.55%	61.11%
TCMs	172.68	0.50	0.62%	61.73%
** Tier I, I/M, RFG	172.68	4.37	5.43%	66.54%
MSW Landfills NSPS & EG	7.40	4.06	5.05%	71.58%
RFG - Tanks	N/A	2.45	3.04%	74.63%
RFG - Loading Racks	N/A	3.76	4.67%	79.30%
*** RE Floating Tanks	70.96	26.86	33.36%	112.66%
	<b>Subtot</b>	<b>50.37</b>	<b>62.55%</b>	
<b>Contingency Rules</b>				
Rec. Marine Vess. (2000)	76.18	0.31	0.38%	113.04%
Enhanced Monitoring (2000)		15.50	19.25%	132.29%
Tx Alternative Fuel Fleet	172.68	0.17	0.22%	113.25%
Offset Printing	5.32	2.34	2.91%	116.16%
Naptha Dry Cleaners	3.88	1.97	2.44%	118.60%
Utility Engine 1999-2000	65.67	1.51	1.88%	120.48%
	<b>Subtot</b>	<b>21.80</b>	<b>27.07%</b>	
	<b>Target Improvement</b>	<b>80.52</b>	100.00%	8.3%
	<b>15% Rules + Mandated Rules</b>	<b>91.21</b>	113.28%	
	<b>Excess (Shortfall)</b>	<b>10.69</b>	13.28%	
	<b>Required Contingency</b>	<b>28.95</b>		3.0%
	<b>Target + Contingency</b>	<b>109.47</b>	100.0%	11.3%
	<b>Total Reductions</b>	<b>113.01</b>	103.2%	
	<b>Excess (Shortfall)</b>	<b>3.54</b>	3.2%	

\*\* Total credits from reform gas, FMVCP Tier I, and a preliminary I/M reduction based on an EPA approved factor based analysis

\*\*\* RE credits claimed from this category under "RE Improvements" are subtracted out to avoid double counting.

b) Stationary and Area Source Controls (No Change.)

c) Mobile Source Controls

(1) Transportation Control Measures

A TCM program is mandated for the HGA nonattainment area. Several additional TCMs are being considered for implementation in the area, including: land use densification, mixed land use development, pedestrian improvements, traffic signal timing improvements, college traffic management, K-12 school traffic management, employee transit pass subsidy, non-metro service area transit, fixed commuter rail, bicycle improvements, trip reduction initiatives, ridesharing, parking management, telecommuting, flexible work hours, compressed work week, gasoline tax/cost increase, emission pricing, roadway pricing, motorist information system, incident management and response, special events management, and control of truck movements. TCMs scheduled to be implemented in the SIP revision include: HOV lanes, arterial traffic flow improvements, park-and-ride lots, transit service improvements, area-wide rideshare initiatives, and intelligent transportation systems (formerly known as intelligent vehicle highway systems). The Houston-Galveston Area Council has specifically committed to the Post-1996 TCM commitments identified in Appendix 11-G. These are in addition to the TCM commitments identified for the 15% ROP SIP.

## (2) Vehicle Inspection/Maintenance Program

The Texas Motorist's Choice Vehicle Emission Testing Program in the HGA nonattainment area will subject gasoline powered light-duty cars and trucks and heavy-duty trucks registered in Harris County to emission testing. Exhaust gas testing for HC, CO, and CO<sub>2</sub> is required. A hybrid program will allow the motorist to choose an annual two-speed idle test at test-and-repair or test-only facilities or a biennial loaded or transient test at a test-only facility. Vehicles registered in Brazoria, Galveston, Montgomery, Chambers, Liberty, Waller, and Fort Bend Counties will be subject to a vehicle emissions test if detected as a "grossly polluting vehicle" as a result of remote sensing.

Of the registered vehicles in Harris County, vehicles 0 to 24 years old will be tested. Vehicles 6 to 24 years old will be required to be tested prior to transferring title after resale, pending legislative authority. In addition to the emissions test, there will be an emission control device inspection which will consist of a visual test to verify presence (if applicable) of the catalytic convertor, exhaust gas recirculation system, positive crankcase ventilation system, evaporative system, thermostatic air cleaner and air injection system and an automated inspection procedure for testing the integrity of the gas cap.

Dedicated four-wheel drive vehicles, meaning any constant four-wheel drive vehicle which cannot be converted to two-wheel drive except by removing one of the vehicle's drive shafts, shall be subject to a preconditioned two-speed idle test.

### (3) Reformulated Gasoline and Clean Fuel Vehicle Program

Beginning on January 1, 1995, only reformulated gasoline will be marketed in the HGA nonattainment area. This type of fuel has significant air quality benefits for both on-road and non-road gasoline engines.

The FCAA Amendments of 1990 mandated a clean fuel fleet program, commonly referred to as the Federal Clean Fuel Fleet (FCFF) program. Contained within the FCFF program was the option for states to opt-out of the federal program and implement a substitute program of their own. A committal SIP adopted by the former Air Control Board in November 1992 officially opted Texas out of the FCFF program. An initial substitute program was adopted by the commission in July of 1994.

The 1995 Legislature gave the commission further direction for crafting an opt-out program through passage of Senate Bill 200. Senate Bill 200 defined alternative fuels to mean any specific vehicle/fuel combination that is certified to, at a minimum, the federal LEV standards. Agency rules will cover certain private and local government fleets in the serious and above ozone and CO nonattainment areas of the state. These rules will constitute the state's substitute program.

Agency staff are working with members of the regulated community, state and federal agencies, local governments, fuel providers, vehicle manufacturers, major stakeholders, and bill sponsors to implement a federal opt-out program. The program will have equivalent emission reductions to the FCFF program.

### 3) Evidence of Attainment (No Change.)

4) Contingency Plan (No Change.)

12. SOCIAL AND ECONOMIC CONSIDERATIONS OF THE PLAN (No change.)

13. FISCAL AND MANPOWER RESOURCES (No change.)

14. HEARING REQUIREMENTS

a. - g. (No change.)

h. Public Hearings for the Consolidated SIP Package

Table 18 lists the public hearings that were conducted in each of the nonattainment areas regarding the consolidated SIP package.

**TABLE 18**

**Public Hearings for the Consolidated SIP Package**

<b>Nonattainment Area</b>	<b>Date</b>	<b>Time</b>	<b>Location</b>
<b>Beaumont/ Port Arthur</b>	May 6, 1996	7:00pm	John Gray Institute
<b>Houston/ Galveston</b>	May 7, 1996	2:00pm and 7:00pm	Houston/ Galveston Area Council
<b>El Paso</b>	May 8, 1996	6:00pm	City Council Chambers
<b>Dallas/ Ft Worth</b>	May 9, 1996	1:00pm	Irving Public Library

**SUMMARY OF THE REVISED 1990 BASE YEAR OZONE NONATTAINMENT AREA  
STATE IMPLEMENTATION PLAN EMISSION INVENTORY FOR  
ALL TEXAS NONATTAINMENT AREAS**

**July 1996**

**Texas Natural Resource Conservation Commission**

**P.O. Box 13087**

**Austin, Texas 78711-3087**

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## **Introduction**

The purpose of this summary document is twofold. First, it briefly describes the elements of the 1990 Base Year Ozone Nonattainment State Implementation Plan (SIP) Emissions Inventory (EI). Second, it describes the changes in the inventory that have been made in response to improved information gathered from a number of studies about the area source and non-road categories. Emissions from point source facilities have been changed to reflect adjustments made as a result of additional efforts to place emissions in the appropriate source category and United States Environmental Protection Agency (EPA) action to delist acetone from the volatile organic compound (VOC) classification.

## **Background Information about the Original 1990 SIP Emissions Inventory**

The Federal Clean Air Act (FCAA) Amendments of 1990 required that 1990 base year emissions inventories (BYEI) be prepared for each ozone nonattainment area in the state. Because ozone is photochemically produced in the atmosphere when VOCs are mixed with oxides of nitrogen ( $\text{NO}_x$ ) and carbon monoxide (CO) in the presence of sunlight, it is important that the agency compile information on the important sources of these ozone 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 employed at each plant or source category. The 1990 BYEI provides data for a variety of air quality planning tasks directed toward development of SIPs to meet FCAA Amendments planning requirements for achieving and maintaining compliance with the ozone ambient air quality standard. These tasks include establishing baseline emission levels for an area, calculating the 15% emissions reduction target for the rate of progress (ROP) SIP, identification of sources for application of control strategies to achieve the required emissions reductions, providing emissions data inputs into

air quality simulation models, and establishing the emissions budget for an area to use in tracking actual emissions reductions against the projected emissions growth and controls. The total inventory of emissions for an area is summarized from the estimates developed for five general categories of emissions sources; stationary point, area, on-road mobile, non-road mobile, and biogenic sources.

The commission has developed extensive documentation, in accordance with EPA guidance, on the methodology followed in the preparation of each nonattainment area's BYEI. This comprehensive documentation was submitted to EPA in November 1992 as required by the FCAA Amendments, and has recently been resubmitted to EPA for additional review after a number of changes were made to address EPA comments. Procedures used to develop emissions data are in many cases estimates of emissions with a degree of uncertainty inherent in the process.

Figure 1.0 shows the percentage of emissions by source category for the nonattainment area and Tables 2A, 2B, 2C, 6A, 6B, 6C, 9A, 9B, 9C, 13A, 13B, and 13C list VOC, NO<sub>x</sub>, and CO emissions by source category for each ozone nonattainment area.

### **1) Point Sources**

Stationary point sources are defined for inventory purposes in the nonattainment areas for the 1990 BYEI as industrial, commercial, or institutional plants/operations responsible for generating annual VOC emissions of 10 tons per year (TPY) or greater and/or 100 TPY or greater of NO<sub>x</sub> or CO emissions (this was changed in 1993 to 10 TPY, 25 TPY, and 100 TPY, respectively). For counties outside of the core nonattainment area, but included in the nonattainment modeling domain, point sources emitting 100 TPY or greater VOC, NO<sub>x</sub>, or CO are required to report EI data. To collect

emissions and industrial process operating data for these plants, the agency sends out EI questionnaires (EIQ) to all sources identified as having the potential to generate emissions triggering EI reporting requirements. Companies are asked to report not only emissions data for all emissions generating units and emission points, but also the type and amount of materials used in each process which may result in emissions, such as painting and degreasing materials, storage tank materials, or fuels combusted. Information is also requested in the EIQ on process equipment descriptions, emissions control devices currently in use, and on emissions point parameters, such as stack location, height, and exhaust gas flow rate. All data submitted via the EIQ is then subjected to rigorous quality assurance procedures by the commission before entry into the agency's point source data base (PSDB). To accomplish tasks requiring the use of EI data for SIP development, the data is extracted from PSDB in a tons per day (TPD) report format and then adjusted for rule effectiveness (RE), where appropriate, based on algorithms derived by commission staff for specific process/control equipment types. The RE adjustment to actual reported VOC emissions was made following EPA guidance assuming less than 100% of rated control efficiency for controls installed pursuant to regulatory requirements. The original point source estimates have been adjusted, where appropriate, to account for the delisting by EPA of acetone and for the shift of marine vessel loading loss emissions from area sources.

## **2) Minor and 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 from these sources on a source category or group basis. Minor and 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: evaporative emissions or fuel combustion emissions. Examples of evaporative losses include: printing, industrial coatings, degreasing solvents, house paints, leaking underground storage tanks and 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 and forest fires. 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. Amount of population is the activity most commonly used for many area source categories while other activity data include amount of gasoline sold in an area, employment by industry type, and harvested acres of cropland. For the ozone SIP inventory, area source emissions are estimated and reported for an ozone season weekday and adjusted, where appropriate, for the impact of RE. The area source emissions, by category, may be seen in Tables 3, 7, 10 and 14.

### **3) On-Road Mobile Sources**

On-road mobile sources consist of automobiles, trucks, motorcycles, and other internal combustion engine powered vehicles traveling on roadways in the nonattainment area. Combustion-related emissions are estimated for vehicle engine exhaust and evaporative emissions are estimated for the fuel tank and other evaporative mechanisms on the vehicle. Emission factors have been developed using the most current version of the EPA's mobile emissions factor model. Various inputs are provided to the model to simulate the vehicle fleet driving in each particular nonattainment area. These 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 inspection/maintenance (I/M) program in place, and gasoline vapor pressure. All of these inputs have an impact on the emission factor calculated by the MOBILE program, and every effort is made to input parameters reflecting local conditions where possible. To complete the emissions estimate, the emission factors calculated by the MOBILE model must then be multiplied by the level of vehicle activity, vehicle miles traveled (VMT). The level of vehicle travel activity is developed from travel demand models run by the Texas Department of Transportation or the local municipal planning organizations. The travel demand models have been validated against actual ground counts of traffic passing over counters placed in various locations throughout each county. Estimates of VMT have been provided for the Beaumont and El Paso (ELP) areas based on outputs of the federal Highway Performance Monitoring System (HPMS), which is a United States Department of Transportation model using vehicle count data from a number of traffic counters located on specific roadway types in each area. Mobile Source emissions may be found in the summary Tables 2A, 2B, 2C, 6A, 6B, 6C, 9A, 9B, 9C, 13A, 13B, and 13C.

#### **4) Non-Road Mobile Sources**

This source category includes military, commercial and general aircraft, marine vessels, recreational boats, railroad locomotives, and a very broad category that includes everything from the engines on construction equipment and tractors to lawn mowers and chainsaws. Calculation methods for emissions from non-road engine sources vary considerably because of the differences in usage patterns, but, in general, are based on manufacturer supplied information about engine horsepower, load factor, emission factors, usage, and equipment sales and distribution.

Emissions estimates for all sources in the non-road category, except aircraft, locomotives, and commercial vessels, were developed by a contractor to EPA's Office of Mobile Sources (OMS). Engine population and type information was assembled by the contractor from national sales data and patterns of equipment usage were derived by the contractor from several regional surveys. Aircraft emissions were estimated with landings and takeoff data for airports in each area multiplied by EPA-developed emission factors for aircraft operations. Tables 4, 8, 11 and 15 are summary tables of all non-road categories for the entire nonattainment area. A more detailed listing, by category, of the Other Non-Road Engines (Small Engine Sources) follows each overall non-road table [except in the Dallas/Fort Worth (DFW) nonattainment area, which had no changes in the Other Non-road Engine categories (e.g., vessels with outboards)].

## **5) Biogenic Sources**

Biogenic sources are essentially all types of plant life in the biosphere; forests, crops, lawn grass, and other vegetation. Plants are sources of VOCs such as isoprene, monoterpene, and alpha-pinene. Tools for estimating emissions include satellite imaging for mapping of vegetative types and computer modeling of emissions estimates based on emission factors by plant species. Emissions from biogenic sources are subtracted from the inventory prior to determining any required reductions for the 15% ROP SIP. However, the biogenic emissions are important in determining the overall emissions profile of an area and are included in the modeling of strategies for reaching attainment of the ozone air quality standard. There has been no change in the original biogenic emissions estimate from that made in the original BYEI submission. Although biogenic emissions are estimated in order to obtain a complete emissions profile for an area, they are deducted from the inventory for control strategy and planning purposes and, therefore, are not a part of the emissions reductions goal or target.

## **1990 Base Year Emissions Inventory Changes**

The commission has continued to make changes to the inventory since the inventory was submitted to EPA in November 1992. All of these modifications have been in response to events such as new and improved models for estimating emissions, improved emission factors for estimating emissions from sources, better information about activity levels of emission sources, improved inventory methodologies, more up-to-date, accurate forecasts of population and economic growth, improved models for growth projection of inventories, comments and input from outside peer reviewers of the inventory (e.g., private industry, local agencies, councils of government committees), and so on. These factors motivated the commission to seek modifications in a variety of Area Source and Non-road Mobile Source categories and in the On-road Mobile Source inventory, as the individual circumstances indicated and as better information came to light. The focus of these modifications has been on the 1990 base year inventory. However, given their relationship, changes made in the 1990 inventory have affected both the 1996 and 1999 projection inventories (and their related 15% and 9% SIPs). A more complete discussion of these modifications, including the specific categories changed, may be found in the 15% and 9% SIP documents.

## **Changes to the Emissions Inventory as a Result of the Coastal Oxidant Assessment for Southeast Texas (COAST) Study**

The COAST field study was an intensive study of the Houston/Galveston (HGA) and Beaumont/Port Arthur (BPA) ozone nonattainment areas, and adjunctive offshore waters, in southeast Texas. The project was undertaken in conjunction with the Minerals Management Service and represents an effort

to obtain the regional information necessary to develop cost-efficient, effective ozone control strategies. One project from the COAST study was the Bottom-up EI Project.

A traditional EI of area sources utilizes top-down methodologies in order to estimate the county-wide emissions required for SIP inventory reporting. This approach involves using such statistics (national or state level) on the level of activity (e.g., gallons of gasoline sold) of the particular area source category being investigated. The activity level is then adjusted, or allocated, to the county level based on some known surrogate such as population or Standard Industrial Classification (SIC) Code employment (e.g., the population of X County is 15% of the state population so 15% of the state level activity is taking place at the county level). The alternative, a bottom-up inventory, is not usually performed because it is expensive. The COAST project provided an opportunity to conduct a bottom-up inventory.

A bottom-up inventory entails collecting local, category-specific activity level information. In the specific case of the Bottom-up EI Project, the approach was to have a contractor take a random, stratified sample, or survey, to determine the activity levels of the following area source and non-road mobile source categories: Dry Cleaners, Gasoline Stations, Lawn Mower usage, Recreational Marine usage, Generators <50 HP usage, Surface Coatings, and Surface Cleaning. The contractor then used this activity level information with emission factors to estimate emissions. A variety of follow-up work was performed to verify and complete the study. The results of this study resulted in the changes to the EI for the 1990 BYEI which, in turn, affect the projected 1996 and 1999 EIs.

The categories in which changes have occurred may be seen in the following table. A brief explanation of why the changes occurred in each area source and non-road category affected will follow after the table. The actual number changes in emissions levels may be seen in the graphics, which display the changes from the original 1990 levels of emissions to the revised 1990 estimates.

**Table 1A**

**Categories with Changes in 1990 Base Year Inventory Emissions Estimates**

Category	Ozone Nonattainment Areas			
	Houston/Galveston	Beaumont/Port Arthur	Dallas/Fort Worth	El Paso
Other Product Coatings	Y	Y	Y	Y
High Performance Maintenance	Y	Y	Y	Y
Marine Vessel Loading Losses	Y	Y	N	N
Surface Cleaning	Y	Y	Y	Y
Architectural Coatings	Y	Y	Y	Y
Auto Refinishing	Y	Y	Y	Y
Sheet, Strip and Coil	Y	Y	Y	Y
Vessels with Outboards	Y	Y	N	N
Commercial Vessels	Y	N	N	N
Generators <50 HP	Y	Y	N	N
Residential Lawnmowers	Y	Y	N	N
Military Aircraft	N	N	Y	N

**Table 1B**

**Changes in 1990 State Implementation Plan Emissions Inventories**

**Houston/Galveston**

	Old 1990 TPD	Rev. 1990 TPD
<u>Area Source Categories</u>		
Other Product Coatings	0.61	0.9
High Performance Maintenance	5.74	4.5
Other Special Purpose Coatings	5.39	5.7
Marine Vessel Loading Losses	15.94	0.0
Surface Cleaning	16.43	8.4
Architectural Coatings	31.2	23.2
Auto Refinishing	16.5	25.5
Sheet, Strip and Coil	5.58	0.0
<b>Totals</b>	<b>229.01</b>	<b>200.0</b>

Non-road Mobile Source Categories

Vessels with Outboards	61.39	20.4
Commercial Vessels	14.81	3.8
Generators	11.96	9.2
Lawnmowers	33.43	22.9
<b>Totals</b>	<b>195.11</b>	<b>129.9</b>

**Beaumont/Port Arthur**

	Old 1990 TPD	Rev. 1990 TPD
<u>Area Source Categories</u>		
Other Product Coatings	0.15	0.3
High Performance Maintenance	0.56	0.2
Other Special Purpose Coatings	0.56	0.5
Marine Vessel Loading Losses	7.72	7.4
Surface Cleaning	2.47	0.8
Architectural Coatings	2.96	2.2
Auto Refinishing	1.60	2.4
Sheet, Strip and Coil	0.00	0.0
<b>Totals</b>	<b>32.48</b>	<b>30.6</b>

Non-road Mobile Source Categories

Vessels with Outboards	10.28	3.0
Generators	0.5	0.5
Lawnmowers	4.11	2.8
Commercial Vessels	6.4	0.8
<b>Totals</b>	<b>22.46</b>	<b>18.4</b>

**Table 1B**

**Changes in 1990 State Implementation Plan Emissions Inventories**

<b>Dallas/Fort Worth</b>		
	<b>Old 1990 TPD</b>	<b>Rev. 1990 TPD</b>
<b><u>Area Source Categories</u></b>		
Other Product Coatings	0.00	0.73
High Performance Maintenance	5.48	4.40
Other Special Purpose Coatings	N/A	N/A
Surface Cleaning	11.35	8.00
Architectural Coatings	28.89	22.10
Auto Refinishing	13.61	24.40
Sheet, Strip and Coil	0.72	0.00
<b>Totals</b>	<b>174.25</b>	<b>174.00</b>
<b><u>Non-road Mobile Source Categories</u></b>		
Military Aircraft/Carswell Closure	1.44	9.10
<b>Totals</b>	<b>97.44</b>	<b>105.10</b>
<b>El Paso</b>		
	<b>Old 1990 TPD</b>	<b>Rev. 1990 TPD</b>
<b><u>Area Source Categories</u></b>		
Other Product Coatings	0.46	0.60
High Performance Maintenance	0.91	0.50
Other Special Purpose Coatings	N/A	N/A
Surface Cleaning	3.92	1.30
Architectural Coatings	4.85	3.60
Auto Refinishing	2.62	4.00
Sheet, Strip and Coil	0	0.00
<b>Totals</b>	<b>27.43</b>	<b>24.90</b>
<b><u>Non-road Mobile Source Categories</u></b>		
Lawnmowers	2.81	1.90
<b>Totals</b>	<b>11.88</b>	<b>10.00</b>

## **Changes in Area and Non-road Mobile Source Categories**

### **Other Product Coatings, High Performance Maintenance, and Other Special Purpose Coatings**

These Area Source categories are all surface coatings categories that were estimated for the 1990 inventory using per capita emission factors of .6, .8 and .8 lbs./yr./person, respectively. Per capita and per employee emission factors provided by EPA are typically national level estimates of usage of a product divided by population or number of employees. Early in the process of reviewing the inventory, the commission requested that EPA provide more information about what activities (specific coatings usage) the factors were related to or that the commission be allowed to drop the emissions estimates from these categories, if no information could be provided. The EPA staff was eventually able to locate the source document for the original emissions estimates. In the interim, the commission review of the categories resulted in better estimation of the point source emissions to be subtracted from the areas source estimate. That increased subtraction applies only to the categories Other Product Coatings and High Performance Maintenance.

For the sake of clarification, examples of Other Product Coatings are coatings used on concrete products, photographic equipment, toys and sporting goods, and so on. Examples of High Performance Maintenance coatings are coatings used in oil and gas extraction operations (e.g., pipe coatings), food processing, metals production, mining, and so on. Lastly, examples of Other Special Purpose Coatings are roof coatings, marine shelf goods, and metallic paints.

### **Marine Vessel Loading Losses**

The emission estimate in this area source category is based on the amounts of petroleum and volatile chemical cargoes loaded to marine vessels in Texas ports. Since most of the emissions due to loading are controlled and may be attributed to point sources of emission, a part of the process of estimating is to subtract the point sources of emission estimates, which are self-reported through the EIQ, from the estimate of area source emissions. It was discovered that the point source emissions had been underestimated in the 1990 inventory. When the point source emission numbers were recompiled and the subtraction performed, the area source emissions went from 15.94 TPD in HGA to zero and the emissions in BPA went down by about 1/3 TPD.

### **Surface Cleaning**

This category of emissions was estimated in the 1990 inventory using a per capita emission factor of 4.3 lbs./yr./person. The commission hired a contractor to do an inventory of surface cleaning facilities in the HGA and BPA areas, but the results were inconclusive and the contractor recommended follow-up survey work. To that end, the commission conducted 41 site visits, in addition to the survey work done by the contractor. The total number of facilities surveyed was 124; the number of facilities that reported not using VOC solvents was 83; the number of facilities that provided information about usage was 41; the sample standard deviation was .0704 and the relative error was estimated at 16.66%. There are about 10,607 facilities in 15 SIC codes in the HGA and Beaumont areas that are potentially involved in surface cleaning/degreasing activities. Given the relative error associated with the survey sample, and the fact that the sites selected were chosen using a random number generator, it is thought that these results hold for other areas as well. This has been reinforced by a discussion with

SafetyKleen, a major supplier of degreasing solvents. A per capita emission factor has been developed based on the commission survey results and emissions, based on population, have been estimated for DFW and HGA nonattainment areas.

### **Architectural Coatings**

Architectural coatings, also known as trade paints, are used primarily by homeowners and painting contractors. Architectural coatings include interior and exterior house and building paints as well as coatings for other surfaces, such as curbs and signs. The coatings are applied by spray, brush, or roller and dry or cure at ambient conditions. In 1990, oil-based paints and coatings account for about 24% of architectural coatings by volume. These typically have volatile solvent contents of about 59%. Water-borne paints, which make up the balance of architectural coatings, have substantially lower solvent contents, typically about 6%. Paints are also classified by the environment the surface is exposed to, either interior or exterior.

Average annual VOCs air emissions from architectural painting activities is dependent on the following:

- 1) amount of VOCs contained in the various types of paints,
- 2) amount of the various types of paints used,
- 3) amount of VOCs in the material to “thin” the paints (when thinner is used),
- 4) amount of VOCs in the “cleanup” solvents (when used), and
- 5) amount of thinning and cleanup solvents used.

A per capita emission factor of 4.6 lbs./yr/person was used to estimate emissions from this category for the original 1990 inventory. Information obtained from the National Paint and Coatings Association, combined with information collected by commission staff about thinner usage, has been used to improve the emissions estimate and to develop a new emission factor. The factor of 3.49 lbs./ per capita/per year has been used to calculate the emissions that replace the original 1990 base year estimate.

### **Automobile Refinishing**

Automobile refinishing coatings (referred to as paints), paint thinners, reducers, hardeners, catalysts, and cleanup solvents used during their application, contain VOCs which are precursors to ground level ozone formation. Some of these painting compounds create hazardous air pollutants which are toxic. The evaporation of the VOCs from the paints, thinners, reducers, hardeners, catalysts and cleanup solvent create "area source" VOC air emissions.

Auto refinishing is the repainting of worn or damaged automobiles, light trucks, and other vehicles. Coating of new cars is not included in the category but falls under industrial coatings. Auto refinishes are classified by industry as a "Special Purpose Coating" while the coatings used for new vehicles are classified as original equipment manufacture (OEM) coatings.

For this analysis, the materials used to refinish "autos" were divided into four categories; "coatings," the "thinners and reducers," the "hardeners and catalysts," and the "cleanup solvents." The "coatings" include the primers, surfacers, base coats, topcoats, and clear coats. The "thinners" are material to thin the coatings. The "reducers" reduce the viscosity of the coating and act as a "thinner."

In the fall of 1995, the commission conducted two surveys. The first survey was to collect usage information from paint and body shops (the places where most of the activity takes place) on the thinners, reducers, hardeners, catalysts, and “cleanup” solvents. The second survey was to collect information from auto refinishes manufactures on the “average” physical properties of auto refinishes and the other materials identified above.

It is estimated that VOC air emissions from auto refinishing activities in Texas nonattainment counties decreased about 47% from 1990 through 1993. This is attributed to the following:

- 1) due to the quantity of paint used and/or quality of OEM new auto coating applications in the 1980's, sales of auto refinishes peaked in 1990,
- 2) the trend since 1990 has been for applicators to switch from air atomized painting equipment to high volume/low pressure equipment which has about a 40% better transfer rate (and produces less waste because there is no paint in lines),
- 3) improved coating formulations require less paint to do the same job, and
- 4) the average size of cars decreased.

Average annual VOCs air emissions from automobile refinishing activities is dependent on the following:

- 1) amount of VOCs contained in the coatings,
- 2) amount of VOCs in the material to “thin”or “reduce” the coatings,
- 3) amount of VOCs in the hardener/catalyst used,
- 4) amount of VOCs in the “cleanup” solvents used,

- 5) amount of the coatings used,
- 6) amount of hardener/catalyst used, and
- 7) amount of thinners, reducers and cleanup solvents used.

Information collected from the surveys enabled staff to calculate 1990 and 1993 United States VOC emission factors for auto refinishing activities, then allocate those emissions to the nonattainment areas. The factor used for 1990 is 3.92 lbs./per capita/per year. For 1993 the factor is estimated to be 1.94 lbs./per capita/per year and estimated at 1.52 lbs./per capita/per year in 1996. The VOC emissions for a region are assumed to be equal to the emission factor times the population of the region.

### **Sheet, Strip, and Coil**

"Metal coil coating is a linear process whereby protective or decorative organic coatings are applied to flat metal sheet or strip packaged in rolls or coils ... The solvents most often used include xylene, toluene, methyl ethyl ketone, butanol, diacetone alcohol, isoprene, butyl carbonyl, mineral spirits, ethanol, nitropropane, tetrahydrofuran, methyl isobutyl ketone, isopropanol, diisoamyl ketone, and several trademarked solvents." Emissions are created at several stages of the coating operations, including coating application, curing, and quenching.

This category was estimated for the 1990 inventory using a per employee emission factor of 2,877 lbs./year per employee. The number of employees in the SIC Code related to this industry (3479) was obtained from a Bureau of the Census publication, County Business Patterns, Texas.

SIC 3479 includes many types of businesses not engaged in coil coating operations; therefore, using a per employee emission factor inflated the emissions above the levels being actually emitted by the companies involved in the specific activity. A list of companies in Texas involved in coil coating operations was obtained from the National Coil Coaters Association that enabled commission staff to determine that either all of the coil coating companies in the nonattainment areas were reporting their emissions to the commission both in 1990 and in 1993 or they did not actually have coil coatings facilities at their locations. Instead of doing it themselves they subcontracted the work out. Therefore, there are no area source emissions, as all emissions have been accounted for in the Point Source inventory and inclusion in the inventory of an area source estimate would result in double-counting of emissions.

### **Vessels with Outboards**

A contractor conducted a telephone survey of registered pleasure craft owners in the HGA and BPA areas that yielded more than 800 respondents. Perhaps the most significant finding, apart from the improvement in information about spatial allocation (where used, which body of water), was the discovery that 62.3% of boat usage takes place on the weekend. Since, by EPA definition, an ozone EI is a weekday (Monday through Friday) inventory this finding resulted in a tremendous reduction in estimated emissions (from approximately 60 TPD to 20 TPD in HGA, for example). This method of reducing the total inventory estimate after accounting for weekend usage has been accepted by EPA Region 6 (Dallas). Region 6 allowed such a reduction in response to a survey done by the North Central Texas Council of Governments (NCTCOG) in the DFW area.

### **Commercial Vessels**

This category of non-road mobile source emissions consists of the emissions from fuel combustion by oceangoing vessels, harbor vessels, and the fishing fleet. Emissions were estimated for the 1990 inventory by recourse to information collected by the Army Corps of Engineers, Waterborne Commerce Statistics Center on freight traffic at harbors, and by allocating national fuel usage to Texas. The improvement work that has been done is based on a methodology that was developed for the EPA in October 1992 by Booz-Allen contained in a report titled, "Commercial Marine Vessel Contributions to Emissions Inventories." This methodology has been accepted by EPA's OMS and its use, in substitution of the original work for 1990, has yielded emissions reductions of about 11 tons per day in the HGA area. The Booz-Allen methodology has also been applied to the 1993 emissions inventory for this category. Since the Booz-Allen study made no attempt to estimate emissions from Commercial Vessels in the BPA area, the percentage difference between the emissions estimated for HGA in 1990 and 1993 has been applied to the emissions estimate for BPA for 1993 to derive a 1990 emissions estimate for BPA.

### **Generators < 50 HP**

This category of Non-road Mobile Source emissions is from both consumer and commercial usage of generators with power ratings of less than 50 horsepower. Emissions are from the exhaust of the generator, fuel evaporation, and refueling. The original 1990 emissions estimates, like those for Vessels with Outboards, were supplied by EPA to the states and the allocation of the emissions to the Texas nonattainment areas was through the use of regression equations applied to national level usage statistics from a proprietary database. The VOC emissions from this category represented about 6% of

the non-road mobile source emissions (trains, planes, ships, and other non-road equipment) of 195.11 TPD.

The EI work that replaces the original emissions estimate was done by a contractor employed by the commission using COAST funding. The staff feels that the inventory is an improvement because it is based on local area-specific construction and recreational area information and is also based on more current information about horsepower distributions in equipment populations.

### **Residential Lawnmowers**

Emissions from lawn and garden equipment are also classified as Non-road Mobile Sources. The original 1990 inventory included emissions estimates for approximately 80 different types of non-road mobile equipment in a catchall category called "Other Small Engines." The EPA hired a contractor to perform the inventory, which is described in a document called the Non-road Engine and Vehicle Emissions Study--Report, November 1991. The change in emissions that the commission has made to the original estimate is an adjustment to reflect differences in usage by residential sources. By definition, the 1990 BYEI was to be an inventory of emissions that occurred through the week (i.e., Monday through Friday). In making a temporal adjustment to the residential portion of lawnmower emissions only (since nothing is known about commercial usage) the commission has reduced the overall residential emissions by the amount of the emissions reported for weekend usage. The justification for the adjustment is drawn from a survey conducted by commission staff of 1434 randomly selected residences in the HGA and BPA areas which had a 21% response rate. Survey statistics are: 59% of lawns were mown by the resident or by a friend or neighbor, 8% of lawns were mown by commercial services, and 33% reported that they had no lawns to mow. Of the 160

applicable residential lawnmowers, 59% reported that they mowed their lawns on Saturday or Sunday. The emissions have been adjusted accordingly, while, again, leaving the commercial portion as is.

### **Military Aircraft**

This category of non-road mobile source emissions has only been reworked for the DFW ozone nonattainment area. This is an attempt to account for the reduced levels of activity at Carswell Air Force Base, Texas due to closure and realignment. In 1992 when information for the 1990 inventory was being collected, the emissions were estimated by NCTCOG at .6356 TPD. Subsequently, the Air Force has self-reported, in a draft environmental impact statement on the closure of Carswell, that 1990 VOC emissions were 8.48 tons per day. This adjustment and backcast of the 1990 inventory is an attempt to correct that discrepancy, while still including an estimate of the military aircraft activity at the base after the realignment.

### **Changes to On-road Mobile Source Emissions Estimates**

This section summarizes the procedures used for the interim updates and anticipated final updates to the on-road mobile source inventories and control strategy reductions for the four Texas nonattainment areas. Control strategy emission reduction estimates include effects of the federal Tier 1 exhaust emissions standards, the new Texas motor vehicle I/M program and the reformulated gasoline program for November 15, 1996.

## **General Discussion**

Updates to the on-road mobile source emission and reduction estimations are 1) required in order to reflect changes in the Texas inspection and maintenance program for motor vehicles in the Texas nonattainment areas, 2) required in order to reflect updates in demographics, speed limits, and other data sets affecting transportation networks and travel characteristics, and 3) desired in order to make the BPA and ELP SIP inventory and reduction estimation procedure consistent with the methodology required for the BPA and ELP conformity analysis.

## **Texas Inspection and Maintenance Program Changes**

The original 15% SIP submission included estimation of emission reductions due to enhanced I/M in DFW, ELP and HGA and a basic I/M in BPA as required by FCAA Amendments of 1990. The EPA I/M flexibility policy provided the commission with the opportunity to reevaluate the I/M programs for all four nonattainment areas. The details of the new I/M programs are documented in the I/M section of the 15% SIP. In DFW, ELP and HGA major I/M program changes include change in the test type from I/M 240 to a combination of two speed idle and acceleration simulation mode testing, changes in the counties covered by I/M, emissions tests required upon resale, inclusion of technician training and certification, and incorporation of remote sensing technology. In BPA the basic I/M program was canceled with no replacement program planned. Due to the time required to analyze new I/M program options and develop appropriate specifications and rules, the I/M program start was delayed from beginning January 1, 1995, to beginning July 1, 1996, in DFW and January 1, 1997, in ELP and HGA.

In order to meet the deadline for submittal of good faith estimates of emissions changes due to the I/M program changes a factor based approach (FBA) was developed. A similar approach was used to determine control program reductions for November 15 as part of the HGA and DFW 15% SIP. The methodology involves using ratios of MOBILE5\_H (the latest EPA mobile emission factor model) composite emission factors to estimate changes in the current control emission inventory (CCEI), the control strategy emissions inventory (CSEI) and individual control program reductions. For the final submittal in June 1996 detailed link based/time-of-day analysis will be used to refine the FBA estimates.

### **Transportation Network Updates**

Transportation networks need to be updated as input data sets undergo change. Major changes to transportation networks since the 1993 SIP submittal include: demographic updates, speed limit changes, and changes to networks in order to meet conformity requirements. Also, demographic changes have been incorporated and all other network updates since the 1993 submittal have been incorporated into the emission estimates.

### **BPA and ELP SIP Inventory Methodology Updates**

For the inventory update for BPA and ELP, in addition to the I/M program change assessment, a change in the emissions estimation methodology, from the HPMS facility type/24 hour analysis to a link based/time-of-day analysis was performed. The primary reason for investing resources in changing the inventory methodology is to bring the BPA and ELP SIP inventory and reduction estimation procedure into consistency with the methodology required for the BPA and ELP conformity

analysis. Since the emissions calculation procedure is changing, the update will require recalculation of the 1990 Base Year Inventory and the 1990 Adjusted Base Year Relative to 1996, in addition to the 1996 Projected CCEI and CSEI updates.

Previous inventory development methodology for BPA and ELP 1) used VMT and speeds aggregated into the 12 HPMS facility types, and 2) used MOBILE5A inputs averaged over a 24-hour period. A link based methodology incorporates VMT and speed estimates at the road link level into the emission calculations, and aggregates the emissions into facility types after emissions are calculated. A time-of-day analysis incorporates VMT, speed, and time-of-day sensitive MOBILE5A inputs, for four time-of-day periods into emission calculations, rather than 24-hour averages.

A link based/time-of-day analysis incorporates both road link data and time-of-day data into the emissions estimation procedure. The link speeds are used in the MOBILE5A emission factor model to obtain emission factors for each link for each time of day. The link emission factor is multiplied by the link VMT to determine link emissions. Each link is classified as an HPMS facility type. Total emissions and emissions for each facility type are determined by summing the appropriate link emissions.

### **Methodology for Interim Update**

For the interim emission and reduction estimation updates, methodology was based upon time available to meet the interim submittal deadline and the requirement to make a good faith estimate of the impacts of I/M program changes on the 15% SIP. Highlights of the interim submittal updates for each area include:

Beaumont/Port Arthur

Methodology consistent with 1993 SIP submittal

I/M program removed from CSEI

El Paso

1996 inventory methodology updated to link based/time-of-day analysis

I/M program updated to reflect new Texas I/M program

Dallas/Fort Worth and Houston/Galveston

CCEI and CSEI updated using FBA

Individual control program reduction estimates updated using FBA

**Methodology for Final Update Submittal**

For the inventory update final submittal the emissions estimation methodology for BPA and ELP was updated from the HPMS facility type/24 hour analysis to a link based/time-of-day analysis, HGA and DFW updated the interim estimates based upon results from link based analysis, transportation networks were updated and speed limit change impacts were assessed.

Beaumont/Port Arthur

Methodology updated to link based/time-of-day from facility type/24 hour

I/M program removed from CSEI

1990 Base Year Inventory updated

El Paso

Methodology updated to link based/time-of-day from facility type/24 hour

I/M program updated to reflect new Texas I/M program

1990 Base Year Inventory updated

Dallas/Fort Worth and Houston/Galveston

CCEI and CSEI updated using original SIP methodology(link based/time-of-day)

Individual control program reduction estimates updated

Transportation networks updated

**Table 2A**

**Summary of VOC Emissions in the Beaumont/Port Arthur Nonattainment Area  
by Source Type**

<b>BPA</b>	<b>Point Sources</b>		<b>Area Sources</b>		<b>Non-Road Mobile Sources</b>	
	<b>TPY</b>	<b>TPD</b>	<b>TPY</b>	<b>TPD</b>	<b>TPY</b>	<b>TPD</b>
	86195.94	245.54	10614.58	30.63	5711.22	18.44
	<b>On-Road Mobile Sources</b>		<b>Biogenic Sources</b>		<b>Total Sources</b>	
	<b>TPY</b>	<b>TPD</b>	<b>TPY</b>	<b>TPD</b>	<b>TPY</b>	<b>TPD</b>
	NA	31.61	NA	91.95	NA	418.17

Notes: Biogenic emissions are calculated through use of an Environmental Protection Agency software package called PC-BEIS which yields results in U. S. short tons per day;  
no annual totals are calculated. Annual totals are not required in the On-Road Mobile Sources category per E.P.A. guidelines.

**Table 2B**

**Summary of NO<sub>x</sub> Emissions in the Beaumont/Port Arthur Worth Nonattainment Area  
by Source Type**

<b>BPA</b>	<b>Point Sources</b>		<b>Area Sources</b>		<b>Non-Road Mobile Sources</b>	
	<b>TPY</b>	<b>TPD</b>	<b>TPY</b>	<b>TPD</b>	<b>TPY</b>	<b>TPD</b>
	77335.00	221.01	709.90	1.44	10447.31	33.32
	<b>On-Road Mobile Sources</b>		<b>Biogenic Sources</b>		<b>Total Sources</b>	
	<b>TPY</b>	<b>TPD</b>	<b>TPY</b>	<b>TPD</b>	<b>TPY</b>	<b>TPD</b>
	NA	41.09	NA	NA	NA	296.86

Notes: Biogenic emissions are calculated through use of an Environmental Protection Agency software package called PC-BEIS which yields results in U. S. short tons per day;  
no annual totals are calculated. Annual totals are not required in the On-Road Mobile Sources category per E.P.A. guidelines.

**Table 2C**

**Summary of CO Emissions in the Beaumont/Port Arthur Nonattainment Area  
by Source Type**

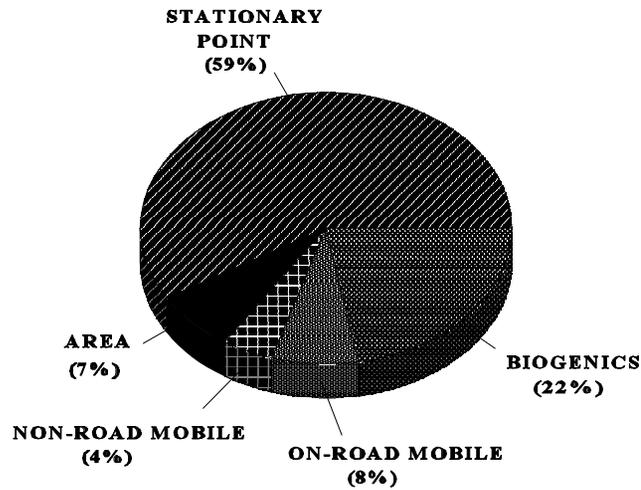
<b>BPA</b>	<b>Point Sources</b>		<b>Area Sources</b>		<b>Non-Road Mobile Sources</b>	
	<b>TPY</b>	<b>TPD</b>	<b>TPY</b>	<b>TPD</b>	<b>TPY</b>	<b>TPD</b>
	42399.00	117.16	6249.00	16.08	50710.02	152.55
	<b>On-Road Mobile Sources</b>		<b>Biogenic Sources</b>		<b>Total Sources</b>	
	<b>TPY</b>	<b>TPD</b>	<b>TPY</b>	<b>TPD</b>	<b>TPY</b>	<b>TPD</b>
	NA	282.69	NA	NA	NA	568.48

Notes: Biogenic emissions are calculated through use of an Environmental Protection Agency software package called PC-BEIS which yields results in U. S. short tons per day;

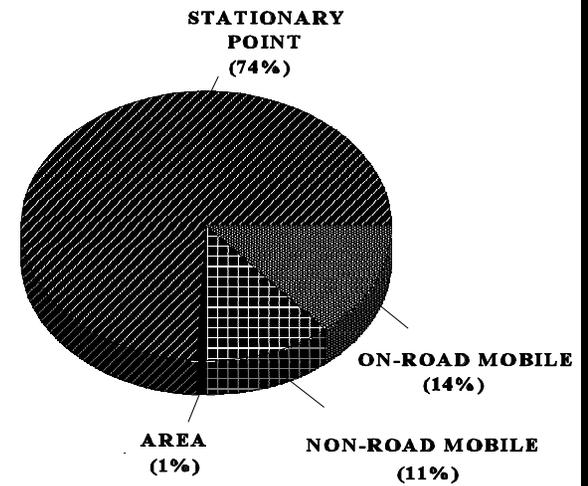
no annual totals are calculated. Annual totals are not required in the On-Road Mobile Sources category per E.P.A. guidelines.

**FIGURE 1.  
BEAUMONT -PORT ARTHUR  
OZONE NONATTAINMENT AREA  
1990 EMISSIONS BY  
MAJOR CATEGORY**

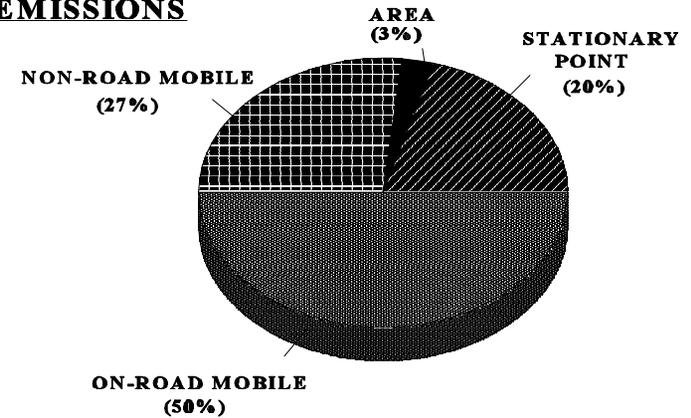
**VOC EMISSIONS**



**NOX EMISSIONS**



**CO EMISSIONS**



# Emissions Inventory Changes

Beaumont/Port Arthur VOC Emissions from All Sources

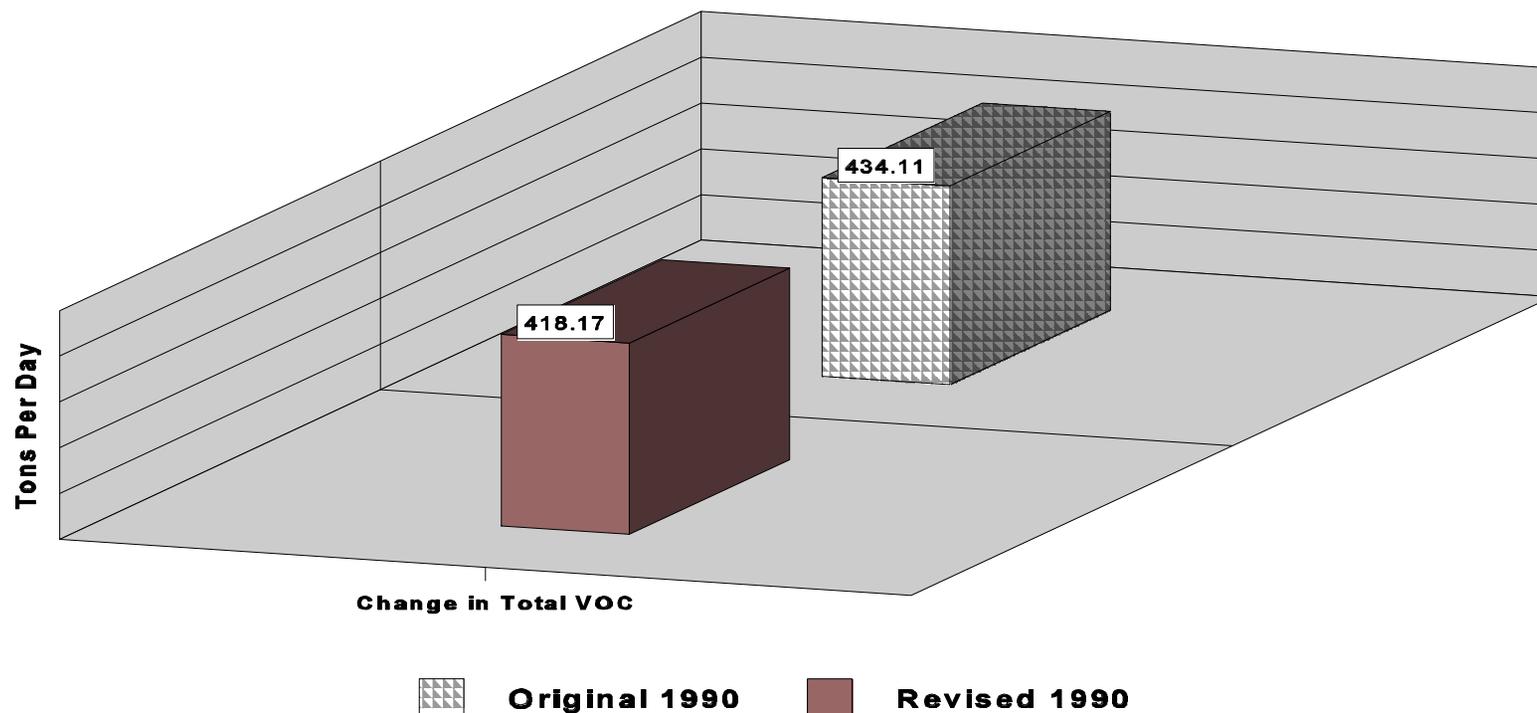


FIGURE 2

FIGURE 3

# Emissions Inventory Changes

## Beaumont/Port Arthur VOC Area Sources

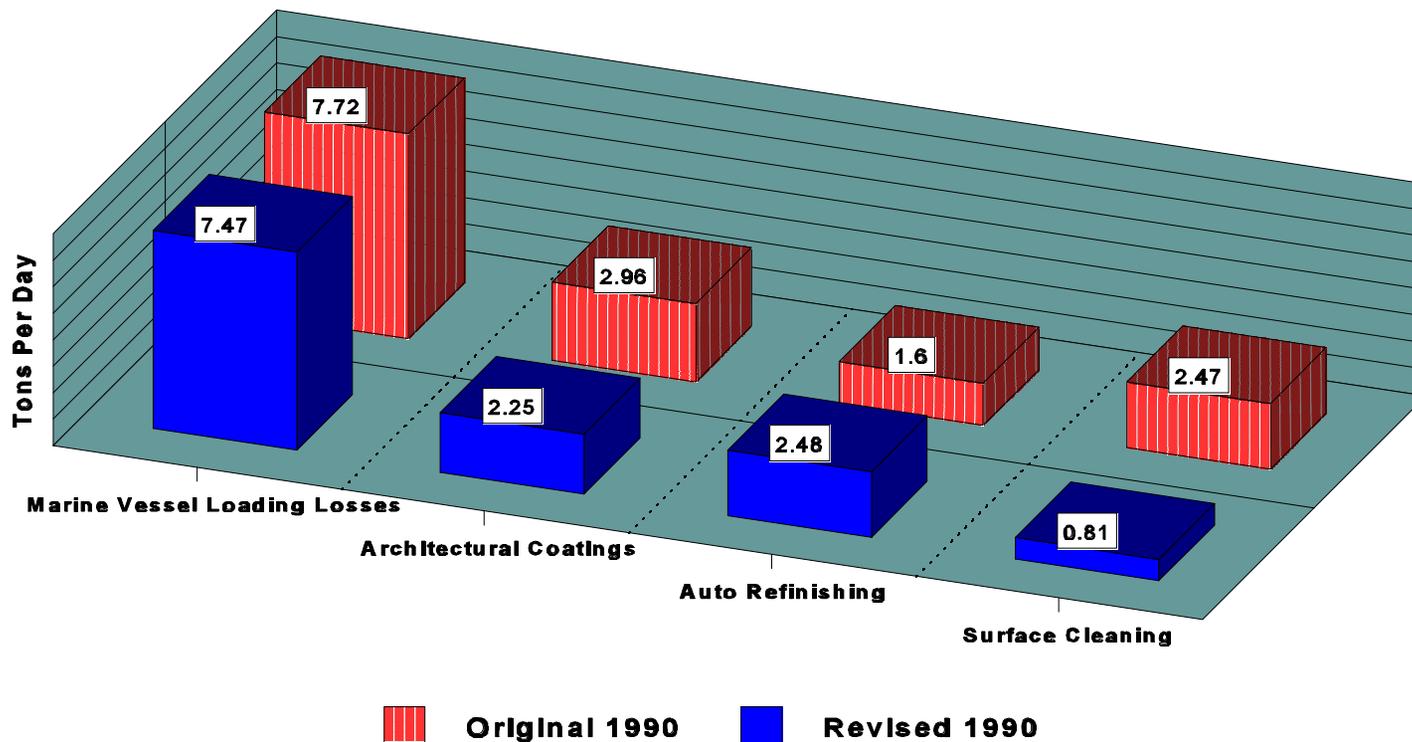


FIGURE 4

# Emissions Inventory Changes

## Beaumont/Port Arthur VOC Area Sources

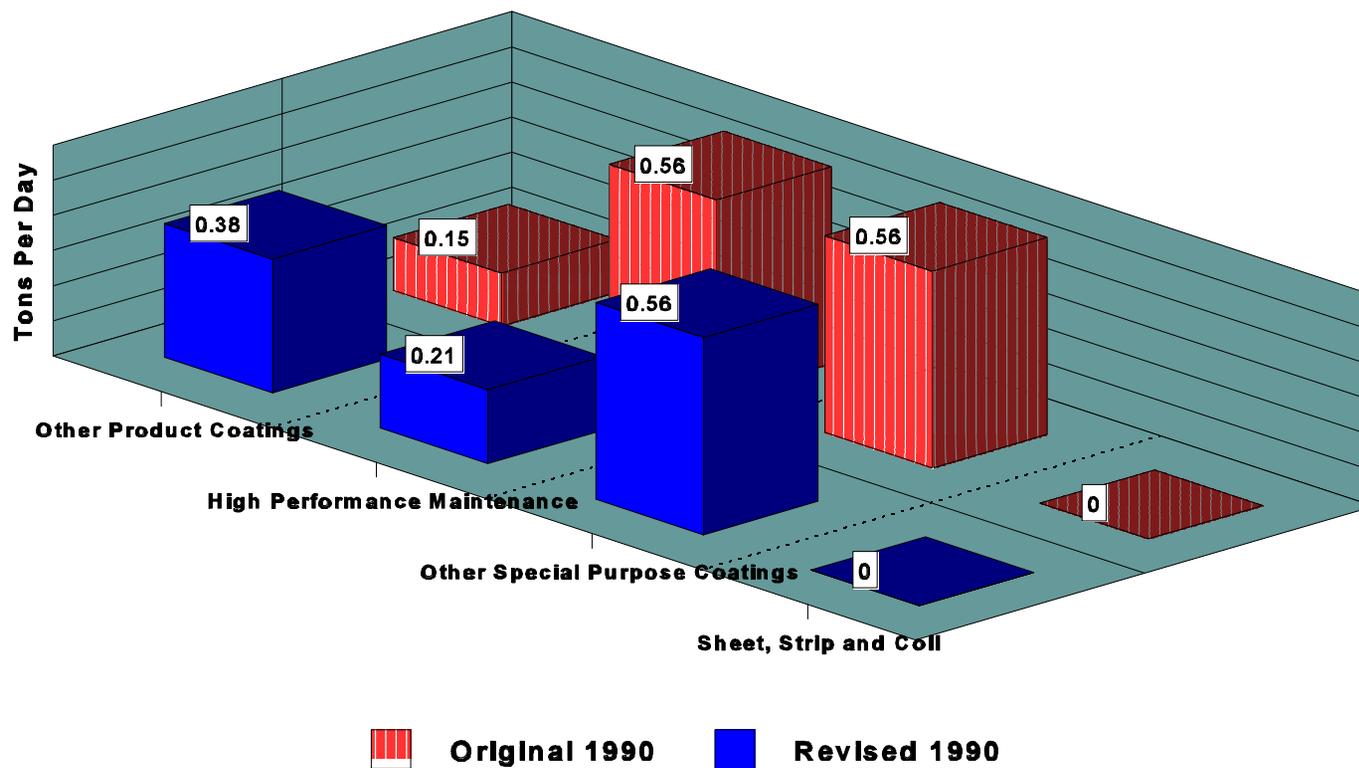


FIGURE 5

# Emissions Inventory Changes

## Beaumont/Port Arthur VOC Non-road Mobile Sources

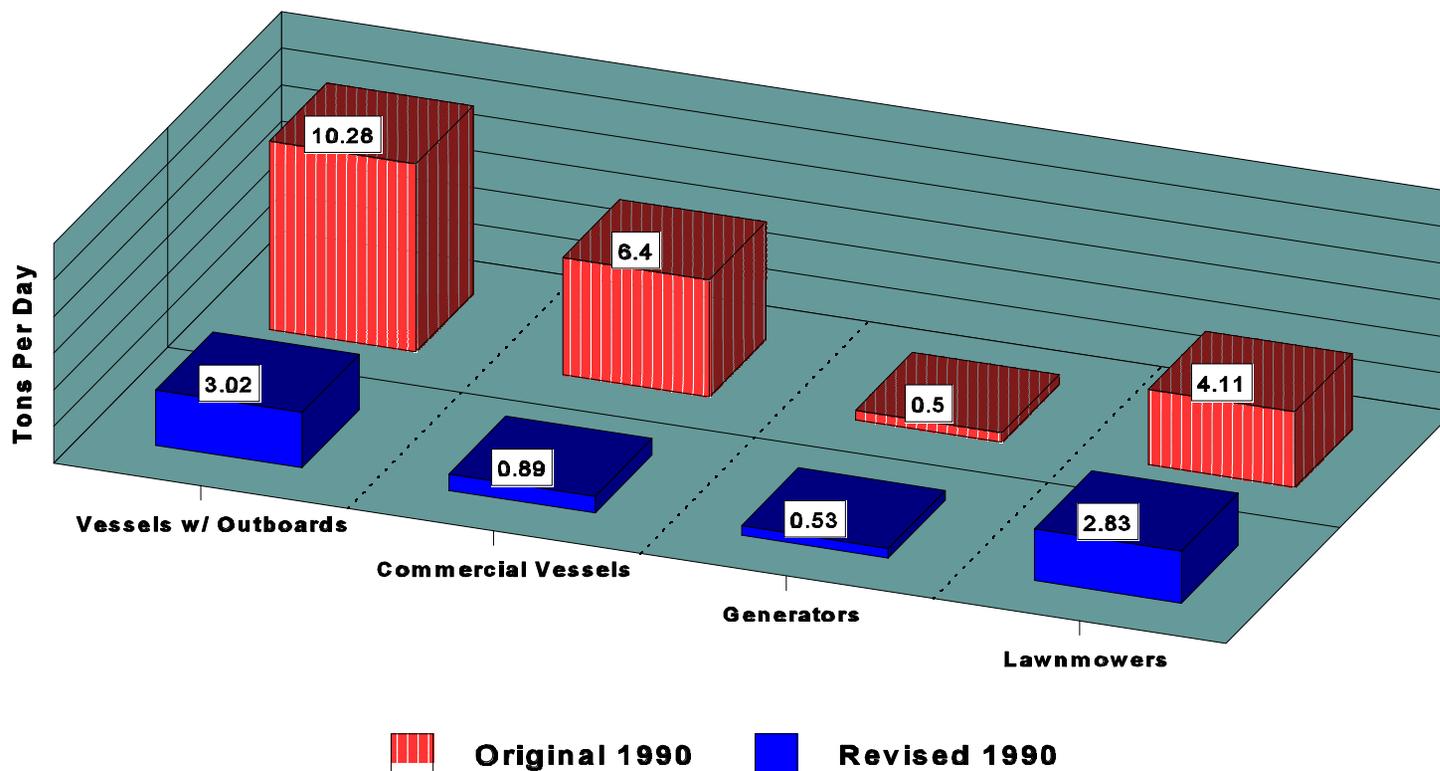


TABLE 3

## SUMMARY OF 1990 EMISSIONS FROM AREA SOURCES FOR BEAUMONT/PORT ARTHUR (REVISED)

CATEGORY	VOC	VOC	NOX	NOX	CO	CO
	TPY	TPD	TPY	TPD	TPY	TPD
OIL & GAS PRODUCTION	943.08	2.7994				
OIL & GAS PRODUCTION - OFF SHORE	4.10	0.0112	99.63	0.2730	12.60	0.0345
SERVICE STATIONS - VEHICLE REFUELING	735.03	2.3899				
SERVICE STATIONS - TANK TRUCK UNLOADING	900.68	2.8868				
SERVICE STATIONS - TANK TRUCKS IN TRANSIT	15.53	0.0425				
SERVICE STATIONS - TANK BREATHING LOSSES	103.53	0.2836				
SERVICE STATIONS - OTHER	72.47	0.1985				
AIRCRAFT REFUELING	0.31	0.0008				
MARINE VESSEL LOADING LOSSES	2799.11	7.4675				
SYNTHETIC ORGANIC CHEMICAL STORAGE TANKS	0.00	0.0000				
LEAKING UNDERGROUND TANKS	592.76	0.3360				
ARCHITECTURAL COATINGS	631.73	2.2500				
AUTO REFINISHING	708.00	2.4800				
TRAFFIC MARKINGS	90.31	0.2474				
FURNITURE & FIXTURES	0.00	0.0000				
METAL CONTAINERS	0.00	0.0000				
AUTOMOBILES (NEW)	0.00	0.0000				
MACHINERY & EQUIPMENT	18.17	0.0699				
APPLIANCES	0.00	0.0000				
OTHER TRANSPORTATION EQUIP.	5.29	0.0203				
SHEET, STRIP, & COIL	0.00	0.0000				
FACTORY FINISHED WOOD	0.00	0.0000				

TABLE 3  
SUMMARY OF 1990 EMISSIONS FROM AREA SOURCES FOR BEAUMONT/PORT ARTHUR (REVISED)

CATEGORY	VOC	VOC	NOX	NOX	CO	CO
	TPY	TPD	TPY	TPD	TPY	TPD
ELECTRICAL INSULATION	0.00	0.0000				
OTHER PRODUCT COATINGS	99.37	0.3822				
HIGH-PERFORMANCE MAINT.	54.49	0.2096				
MARINE COATINGS	26.95	0.1037				
OTHER SPEC. PURPOSE COATINGS	144.49	0.5557				
BARGE,TANK,TANK TRUCK,RAIL CAR,DRUM CLEAN.	0.00	0.0000				
BREWERIES	0.00	0.0000				
WINERIES	0.00	0.0000				
DISTILLERIES	0.00	0.0000				
CATASTROPHIC/ACCIDENTAL RELEASES	6.89	0.0189				
SURFACE CLEANING	231.44	0.8070				
DRY CLEANING	85.34	0.3282				
GRAPHIC ARTS	234.80	0.9031				
CUTBACK ASPHALT	51.67	0.1416				
EMULSIFIED ASPHALT	27.70	0.1065				
CONSUMER/COMMERCIAL SOLVENT USE	1137.86	3.1174				
PESTICIDE APPLICATION	119.00	0.4958				
MUNICIPAL WASTE LANDFILLS	240.16	0.6580				
MUNICIPAL WASTEWATER TREATMENT (POTW)	5.02	0.0138				
INDUSTRIAL WASTEWATER TREATMENT	2.05	0.0056				
WASTEWATER PACKAGE PLANTS	0.00	0.0000				
COMMERCIAL BAKERIES	0.00	0.0000				

**TABLE 3**  
**SUMMARY OF 1990 EMISSIONS FROM AREA SOURCES FOR BEAUMONT/PORT ARTHUR (REVISED)**

	VOC	VOC	NOX	NOX	CO	CO
CATEGORY	TPY	TPD	TPY	TPD	TPY	TPD
<b>STATIONARY SOURCE FUEL COMBUSTION:</b>	0.00	0.00				
FUEL OIL-RESIDENTIAL	0.00	0.0000	0.02	0.0000	0.00	0.0000
FUEL OIL-COMMERCIAL/DISTILLATE	0.08	0.0002	6.20	0.0119	1.55	0.0030
FUEL OIL-COMMERCIAL/RESIDUAL	0.00	0.0000	0.36	0.0007	0.02	0.0000
FUEL OIL-INDUSTRIAL/DISTILLATE	1.79	0.0057	126.41	0.4052	44.87	0.1438
FUEL OIL-INDUSTRIAL/RESIDUAL	0.12	0.0004	24.46	0.0784	2.22	0.0071
COAL-RESIDENTIAL	0.00	0.0000	0.00	0.0000	0.00	0.0000
COAL-COMMERCIAL	0.00	0.0000	0.00	0.0000	0.00	0.0000
COAL-INDUSTRIAL	0.00	0.0000	0.00	0.0000	0.00	0.0000
NATURAL GAS-RESIDENTIAL	13.93	0.0114	263.02	0.2162	52.60	0.0432
NATURAL GAS-COMMERCIAL	3.16	0.0061	51.00	0.0981	10.20	0.0196
NATURAL GAS-INDUSTRIAL	0.87	0.0028	43.18	0.1384	10.80	0.0346
LPG-RESIDENTIAL	1.10	0.0009	20.79	0.0171	4.19	0.0034
LPG-COMMERCIAL	0.07	0.0001	1.47	0.0028	0.29	0.0006
LPG-INDUSTRIAL	0.26	0.0008	13.42	0.0430	3.36	0.0108
WOOD-RESIDENTIAL	41.99	0.0000	4.19	0.0000	346.16	0.0000
STRUCTURE FIRES	0.08	0.0001	0.01	0.0000	0.44	0.0011
FOREST FIRES	334.50	0.9164	55.75	0.1527	1962.42	5.3765
PRESCRIBED BURNING	29.44	0.0807	0.00	0.0000	864.64	2.3689
SLASH BURNING	99.88	0.2736	0.00	0.0000	2932.65	8.0347
OPEN BURNING	0.00	0.0000	0.00	0.0000	0.00	0.0000
ORCHARD HEATERS	0.00	0.0000	0.00	0.0000	0.00	0.0000
AGRICULTURAL BURNING	0.00	0.0000	0.00	0.0000	0.00	0.0000
<b>TOTAL</b>	<b>10614.59</b>	<b>30.6303</b>	<b>709.90</b>	<b>1.4374</b>	<b>6249.00</b>	<b>16.0819</b>

**Table 4****Summary of Emissions from Non-Road Mobile Sources for Beaumont/Port Arthur**

<b>Category</b>	<b>VOC TPY</b>	<b>VOC TPD</b>	<b>NO<sub>x</sub> TPY</b>	<b>NO<sub>x</sub> TPD</b>	<b>CO TPY</b>	<b>CO TPD</b>
Railroad Locomotives	102.76	.28	1914.05	5.24	260.79	.71
Commercial Aircraft	5.77	.02	1.31	.00	115.75	.32
Military Aircraft	8.06	.02	3.45	.01	4.71	.01
General Aircraft	9.71	.02	1.60	.00	296.05	.81
Vessels	323.18	.89	2643.74	7.24	17544.75	32.81
Other Non-Road Engines	5261.74	17.22	5883.16	20.83	32487.96	117.89
<b>Total</b>	<b>5711.22</b>	<b>18.45</b>	<b>10447.3</b>	<b>33.32</b>	<b>50710.01</b>	<b>152.55</b>

TABLE 5

SUMMARY OF 1990 EMISSIONS FROM SMALL ENGINE SOURCES FOR  
THE BEAUMONT-PORT ARTHUR NONATTAINMENT AREA

ALL ENGINES (2-CYCLE + 4-CYCLE + DIESEL)		VOC	VOC	NOX	NOX	CO	CO
Class	EQUIPMENT TYPES	TPY	TPD	TPY	TPD	TPY	TPD
1	Trimmers/Edgers/Brush Cutters	191.20	0.71	0.34	0.00	522.25	1.94
1	Lawn Mowers	755.64	2.83	4.26	0.01	1224.19	17.51
1	Leaf Blowers/Vacuums	50.69	0.19	0.11	0.00	148.13	0.55
1	Rear Engine Riding Mowers	8.29	0.03	0.27	0.00	204.33	0.76
1	Front Mowers	2.92	0.01	0.07	0.00	53.51	0.20
1	Chainsaws <4 HP	282.36	0.77	0.42	0.00	563.39	1.54
1	Shredders <5 HP	0.35	0.00	0.00	0.00	1.43	0.00
1	Tillers <5 HP	40.77	0.15	0.34	0.00	340.86	1.26
1	Lawn & Garden Tractors	140.04	0.52	15.16	0.05	3597.59	13.40
1	Wood Splitters	5.19	0.02	0.04	0.00	45.78	0.18
1	Snowblowers	0.00	0.00	0.00	0.00	0.00	0.00
1	Chippers/Stump Grinders	32.08	0.12	6.52	0.02	258.21	0.95
1	Commercial Turf Equipment	128.57	0.48	27.52	0.09	3894.84	14.51
1	Other Lawn & Garden Equipment	4.11	0.02	0.01	0.00	17.56	0.05
	<b>Subtotal</b>	<b>1642.21</b>	<b>5.83</b>	<b>55.06</b>	<b>0.17</b>	<b>10872.07</b>	<b>52.85</b>
2	Aircraft Support Equipment	0.00	0.00	0.00	0.00	0.00	0.00
2	Terminal Tractors	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
3	All Terrain Vehicles (ATVs)	198.07	0.96	1.77	0.01	950.24	3.86
3	Minibikes	2.45	0.01	0.03	0.00	17.39	0.07
3	Off-Road Motorcycles	77.58	0.32	0.31	0.00	116.48	0.47
3	Golf Carts	200.39	0.90	1.29	0.00	734.61	2.98
3	Snowmobiles	0.00	0.00	0.00	0.00	0.00	0.00
3	Specialty Vehicles Carts	63.50	0.26	0.18	0.00	106.77	0.43
	<b>Subtotal</b>	<b>541.99</b>	<b>2.46</b>	<b>3.58</b>	<b>0.01</b>	<b>1925.49</b>	<b>7.81</b>

TABLE 5

SUMMARY OF 1990 EMISSIONS FROM SMALL ENGINE SOURCES FOR  
THE BEAUMONT-PORT ARTHUR NONATTAINMENT AREA

ALL ENGINES (2-CYCLE + 4-CYCLE + DIESEL)		VOC	VOC	NOX	NOX	CO	CO
Class	EQUIPMENT TYPES	TPY	TPD	TPY	TPD	TPY	TPD
4	Vessels w/Inboard Engines	84.51	0.44	30.11	0.14	539.51	2.84
4	Vessels w/Outboard Engines	1444.94	3.02	16.93	0.04	2516.88	5.27
4	Vessels w/Stern-drive Engines	177.37	0.93	58.36	0.31	2011.43	10.59
4	Sailboat Auxiliary Inboard Engines	0.32	0.00	0.33	0.00	0.94	0.00
4	Sailboat Auxiliary Outboard Engines	1.58	0.00	0.01	0.00	2.97	0.01
	<b>Subtotal</b>	<b>1708.72</b>	<b>4.40</b>	<b>105.74</b>	<b>0.49</b>	<b>5071.73</b>	<b>18.71</b>
5	Generator Sets <50 HP	160.87	0.54	20.76	0.06	3732.04	4.05
5	Pumps <50 HP	49.59	0.13	10.56	0.02	1077.61	2.95
5	Air Compressors <50 HP	27.88	0.07	5.34	0.01	711.77	1.96
5	Gas Compressors <50 HP	1.32	0.00	1.19	0.00	24.77	0.07
5	Welders <50 HP	46.72	0.13	21.55	0.06	1187.14	3.25
5	Pressure Washers <50 HP	14.44	0.04	0.47	0.00	331.34	0.91
	<b>Subtotal</b>	<b>300.82</b>	<b>0.91</b>	<b>59.87</b>	<b>0.15</b>	<b>7064.67</b>	<b>13.19</b>
6	Aerial Lifts	5.97	0.01	6.00	0.01	99.32	0.27
6	Forklifts	104.77	0.27	252.78	0.70	1618.02	4.42
6	Sweepers/Scrubbers	21.94	0.05	111.94	0.30	222.42	0.60
6	Other General Industrial Equipment	22.72	0.06	36.25	0.10	156.62	0.43
6	Other Material Handling Equipment	1.33	0.00	5.88	0.01	15.52	0.04
	<b>Subtotal</b>	<b>156.73</b>	<b>0.40</b>	<b>412.85</b>	<b>1.12</b>	<b>2111.90</b>	<b>5.76</b>

TABLE 5  
SUMMARY OF 1990 EMISSIONS FROM SMALL ENGINE SOURCES FOR  
THE BEAUMONT-PORT ARTHUR NONATTAINMENT AREA

ALL ENGINES (2-CYCLE + 4-CYCLE + DIESEL)		VOC	VOC	NOX	NOX	CO	CO
Class	EQUIPMENT TYPES	TPY	TPD	TPY	TPD	TPY	TPD
7	Asphalt Pavers	2.99	0.01	30.22	0.10	32.70	0.12
7	Tampers/Rammers	16.25	0.06	0.01	0.00	34.41	0.11
7	Plate Compactors	63.53	0.23	1.17	0.00	299.02	1.08
7	Concrete Pavers	1.79	0.01	15.84	0.06	7.22	0.02
7	Rollers	25.52	0.09	135.54	0.49	265.07	0.95
7	Scrapers	27.98	0.10	338.53	1.22	194.56	0.70
7	Paving Equipment	39.38	0.14	73.09	0.25	338.61	1.21
7	Surfacing Equipment	5.01	0.02	0.48	0.00	92.46	0.34
7	Signal Boards	0.71	0.00	3.07	0.01	6.29	0.02
7	Trenchers	19.91	0.07	62.71	0.21	270.40	0.98
7	Bore/Drill Rigs	7.55	0.02	30.14	0.10	71.81	0.27
7	Excavators	16.48	0.06	246.48	0.89	119.23	0.43
7	Concrete/Industrial Saws	16.79	0.06	1.78	0.01	349.46	1.26
7	Cement and Mortar Mixers	7.63	0.03	1.00	0.00	132.98	0.49
7	Cranes	35.81	0.13	271.92	0.98	138.33	0.51
7	Graders	38.57	0.14	233.37	0.85	92.37	0.34
7	Off-Highway Trucks	29.51	0.10	325.55	1.18	94.96	0.35
7	Crushing/Proc. Equipment	5.29	0.01	35.26	0.13	42.02	0.15
7	Rough Terrain Forklifts	18.95	0.07	74.68	0.27	152.76	0.56
7	Rubber Tired Loaders	57.83	0.20	647.55	2.34	361.81	1.31
7	Rubber Tired Dozers	5.83	0.02	64.34	0.23	18.77	0.07
7	Tractors/Loaders/Backhoes	86.36	0.31	591.04	2.14	435.89	1.59
7	Crawler Tractors	143.01	0.51	1129.65	4.09	526.44	1.91
7	Skid Steer Loaders	34.09	0.12	116.01	0.42	280.70	1.01
7	Off-Highway Tractors	53.96	0.19	253.56	0.91	312.54	1.13
7	Dumpers/Tenders	1.13	0.00	0.16	0.00	20.48	0.07
7	Other Construction Equipment	5.55	0.01	32.96	0.11	50.59	0.17
	Subtotal	767.41	2.71	4716.11	16.99	4741.88	17.15

TABLE 5

SUMMARY OF 1990 EMISSIONS FROM SMALL ENGINE SOURCES FOR  
THE BEAUMONT-PORT ARTHUR NONATTAINMENT AREA

ALL ENGINES (2-CYCLE + 4-CYCLE + DIESEL)		VOC	VOC	NOX	NOX	CO	CO
Class	EQUIPMENT TYPES	TPY	TPD	TPY	TPD	TPY	TPD
8	2-Wheel Tractors	0.14	0.00	0.01	0.00	2.20	0.00
8	Agricultural Tractors	89.95	0.34	438.15	1.63	356.16	1.32
8	Agricultural Mowers	0.13	0.00	0.01	0.00	2.65	0.01
8	Combines	3.08	0.01	27.10	0.10	9.90	0.04
8	Sprayers	0.60	0.00	0.36	0.00	10.49	0.04
8	Balers	0.02	0.00	0.05	0.00	0.03	0.00
8	Tillers >5 HP	11.11	0.04	0.10	0.00	95.63	0.35
8	Swathers	1.88	0.01	1.95	0.00	27.06	0.10
8	Hydro Power Units	0.51	0.00	0.17	0.00	10.21	0.05
8	Other Agricultural Equipment	0.34	0.00	1.02	0.00	3.16	0.01
	Subtotal	107.76	0.40	468.92	1.73	517.49	1.92
9	Chainsaws >4 HP	28.47	0.08	0.08	0.00	82.20	0.23
9	Shredders >5 HP	2.94	0.01	0.09	0.00	72.52	0.20
9	Skidders	2.86	0.01	37.11	0.10	17.08	0.05
9	Fellers/Bunchers	1.83	0.00	23.75	0.07	10.93	0.03
	Subtotal	36.10	0.10	61.03	0.17	182.73	0.51
	<b>Grand Total</b>	<b>5261.74</b>	<b>17.22</b>	<b>5883.16</b>	<b>20.83</b>	<b>32487.96</b>	<b>117.89</b>

1 = Lawn & Garden  
2 = Airport Service  
3 = Recreational

4 = Recreational Marine  
5 = Light Commercial  
6 = Industrial

7 = Construction  
8 = Agricultural  
9 = Logging

**Table 6A**

**Summary of VOC Emissions in the Dallas/Fort Worth Nonattainment Area  
by Source Type**

DFW	Point Sources		Area Sources		Non-Road Mobile Sources	
	TPY	TPD	TPY	TPD	TPY	TPD
	19642.37	65.27	54697.53	174.02	36713.28	105.19
	<b>On-Road Mobile Sources</b>		<b>Biogenic Sources</b>		<b>Total Sources</b>	
	TPY	TPD	TPY	TPD	TPY	TPD
	NA	306.60	NA	126.09	NA	777.17

Notes: Biogenic emissions are calculated through use of an Environmental Protection Agency software package called PC-BEIS which yields results in U. S. short tons per day; no annual totals are calculated. Annual totals are not required in the On-Road Mobile Sources category per E.P.A. guidelines.

**Table 6B**

**Summary of NO<sub>x</sub> Emissions in the Dallas/Fort Worth Nonattainment Area  
by Source Type**

DFW	Point Sources		Area Sources		Non-Road Mobile Sources	
	TPY	TPD	TPY	TPD	TPY	TPD
	28378.00	108.86	9664.06	19.99	53294.10	174.53
	<b>On-Road Mobile Sources</b>		<b>Biogenic Sources</b>		<b>Total Sources</b>	
	TPY	TPD	TPY	TPD	TPY	TPD
	NA	293.03	NA	NA	NA	596.41

Notes: Biogenic emissions are calculated through use of an Environmental Protection Agency software package called PC-BEIS which yields results in U. S. short tons per day; no annual totals are calculated. Annual totals are not required in the On-Road Mobile Sources category per E.P.A. guidelines.

**Table 6C**

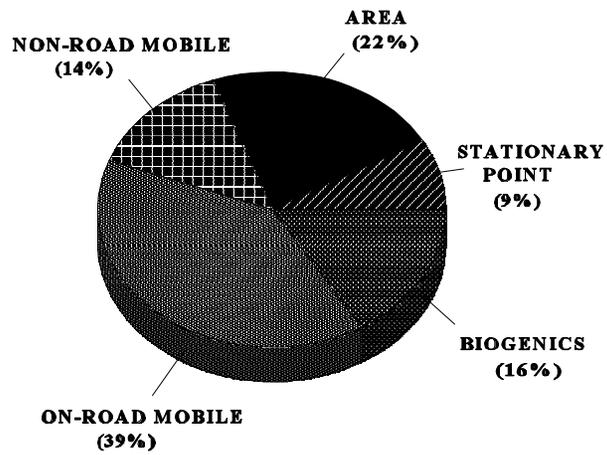
**Summary of CO Emissions in the Dallas/Fort Worth Nonattainment Area  
by Source Type**

DFW	Point Sources		Area Sources		Non-Road Mobile Sources	
	TPY	TPD	TPY	TPD	TPY	TPD
	3096.00	13.33	2961.52	4.47	345966.60	1126.98
	<b>On-Road Mobile Sources</b>		<b>Biogenic Sources</b>		<b>Total Sources</b>	
	TPY	TPD	TPY	TPD	TPY	TPD
	NA	2837.88	NA	NA	NA	3982.66

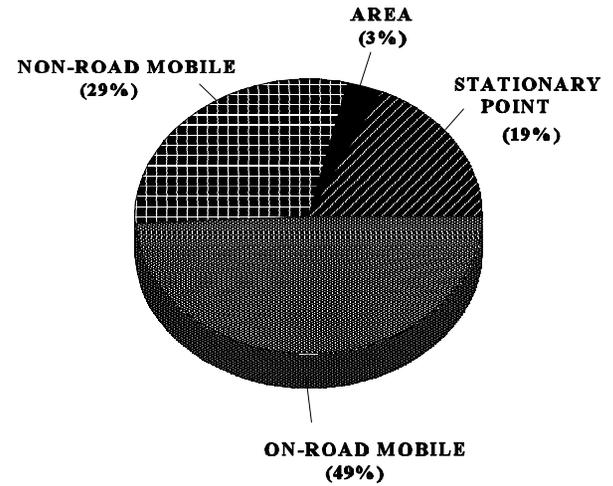
Notes: Biogenic emissions are calculated through use of an Environmental Protection Agency software package called PC-BEIS which yields results in U. S. short tons per day;  
no annual totals are calculated. Annual totals are not required in the On-Road Mobile Sources category per E.P.A. guidelines.

**FIGURE 6**  
**DALLAS-FORT WORTH**  
**OZONE NONATTAINMENT AREA**  
**1990 EMISSIONS BY**  
**MAJOR CATEGORY**

VOC EMISSIONS



NOX EMISSIONS



CO EMISSIONS

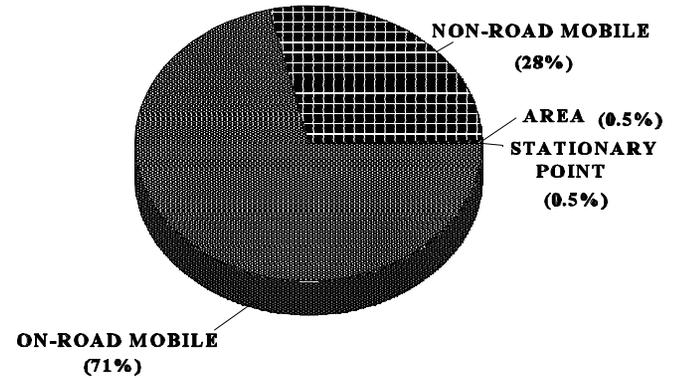


FIGURE 7

# Emissions Inventory Changes

Dallas/Ft. Worth VOC Emissions from All Sources

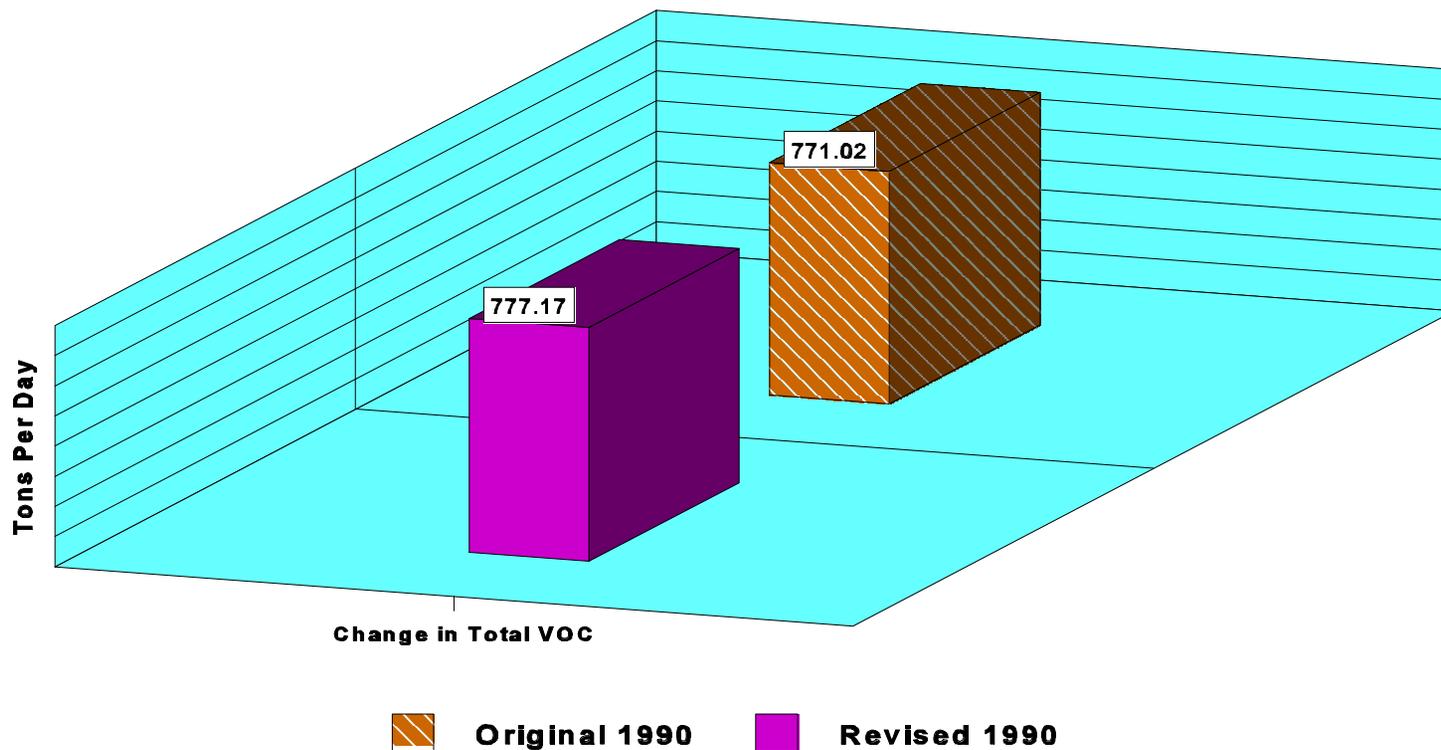


FIGURE 8

# Emissions Inventory Changes

Dallas/Ft. Worth VOC Area Sources

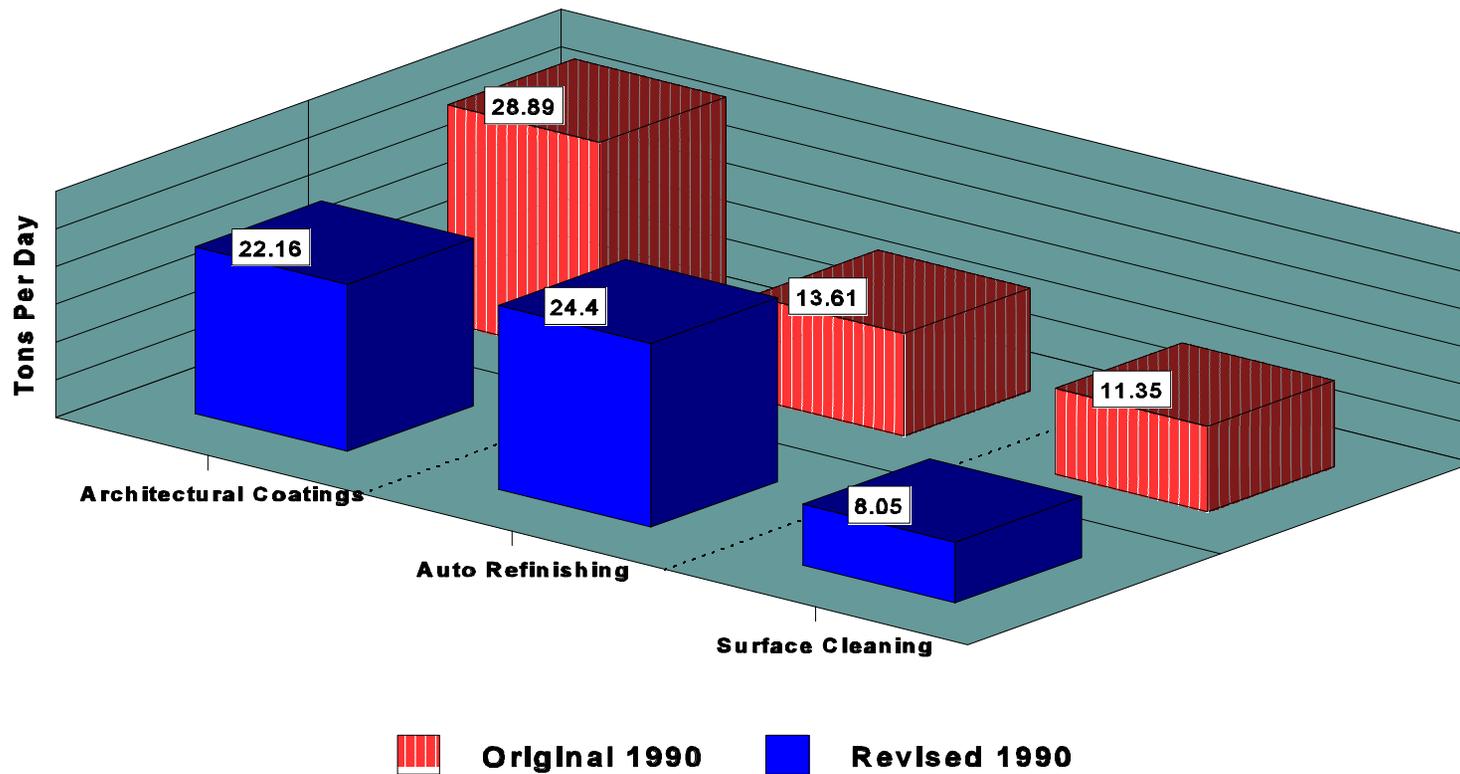


FIGURE 9

# Emissions Inventory Changes

## Dallas/Ft. Worth VOC Area Sources

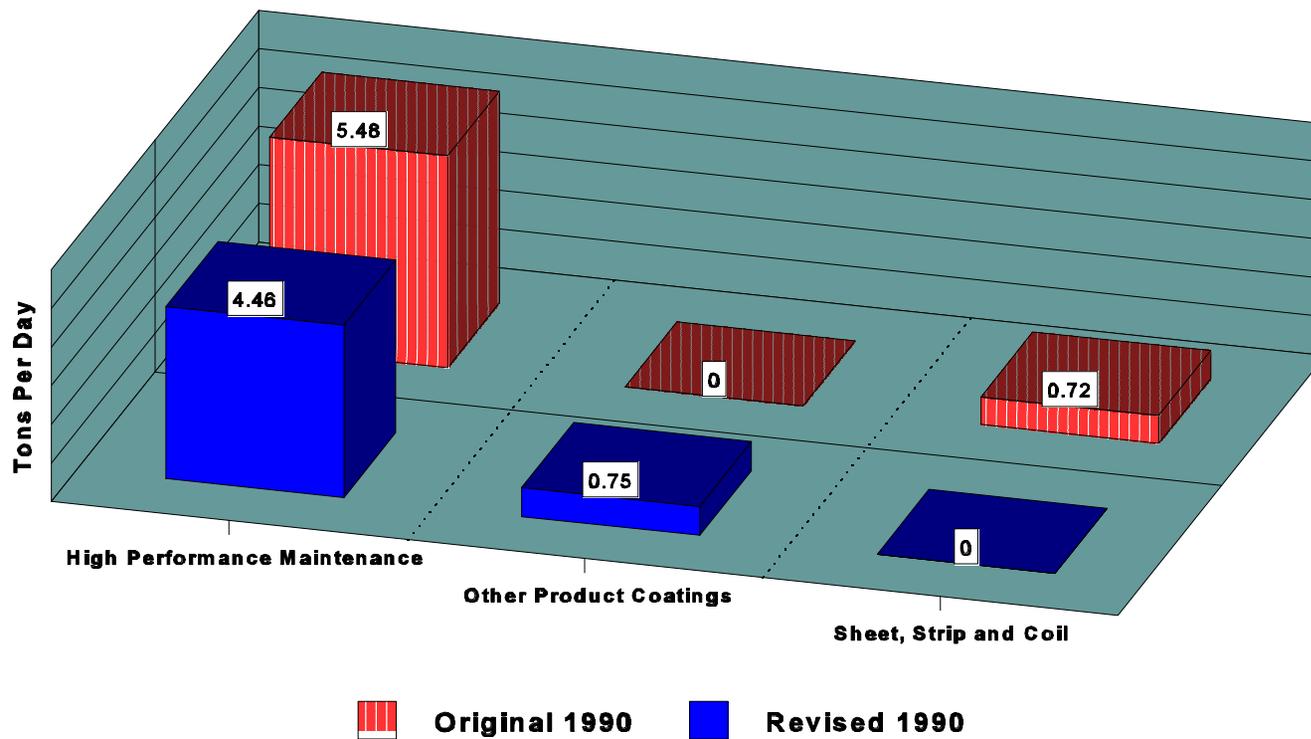


FIGURE 10

# Emissions Inventory Changes

## Dallas/Ft. Worth VOC Non-road Mobile Sources

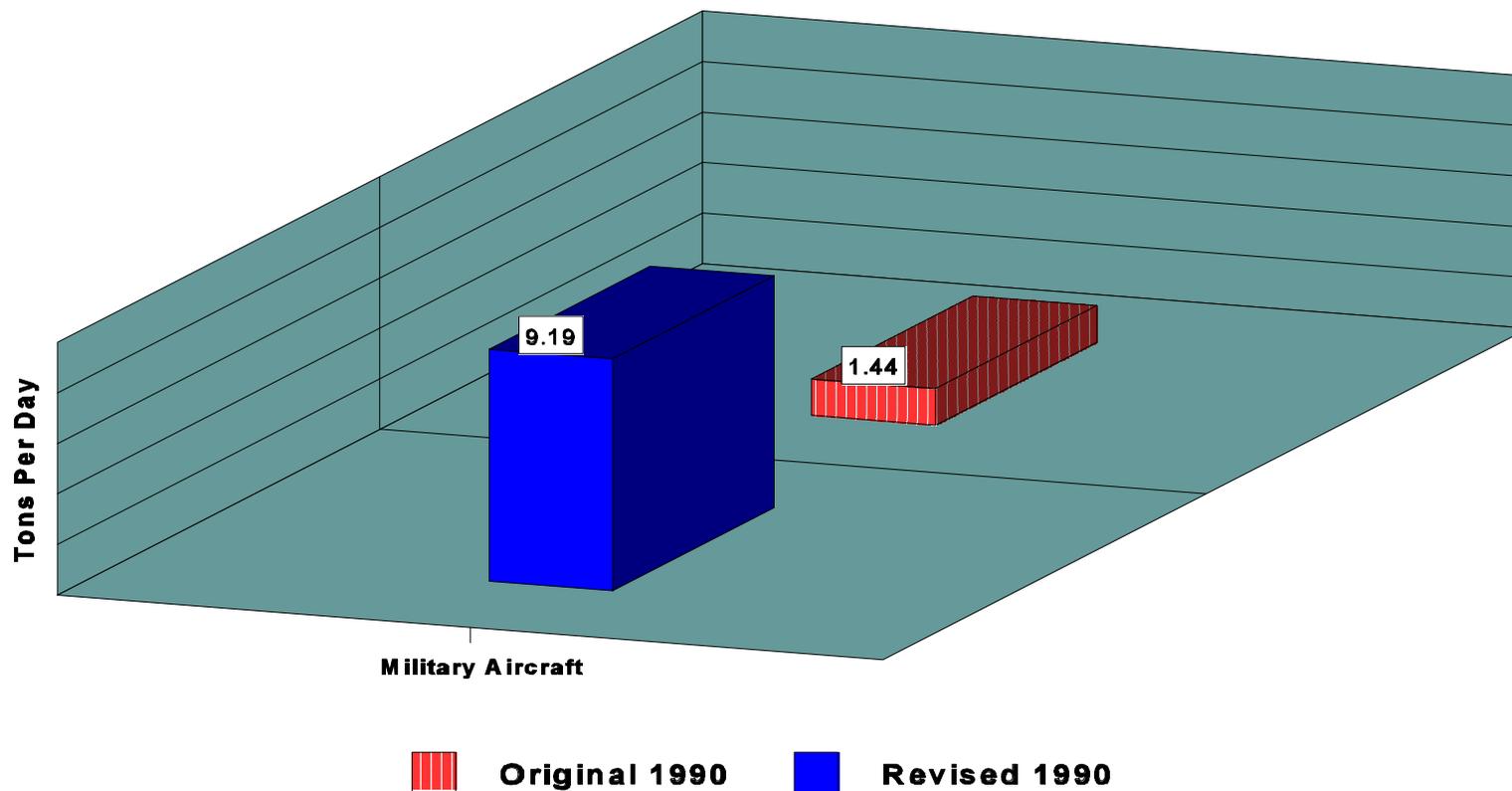


TABLE 7  
SUMMARY OF 1990 EMISSIONS FROM AREA SOURCES FOR DALLAS/FT. WORTH (REVISED)

CATEGORY	VOC	VOC	NOX	NOX	CO	CO
	TPY	TPD	TPY	TPD	TPY	TPD
OIL & GAS PRODUCTION	38.88	0.11				
OIL & GAS PRODUCTION - OFF SHORE	0.00	0.00				
SERVICE STATIONS - VEHICLE REFUELING	6204.97	22.3871				
SERVICE STATIONS - TANK TRUCK UNLOADING	2818.31	9.0308				
SERVICE STATIONS - TANK TRUCKS IN TRANSIT	42.28	0.1158				
SERVICE STATIONS - TANK BREATHING LOSSES	873.94	2.3944				
SERVICE STATIONS - OTHER	611.76	1.6760				
AIRCRAFT REFUELING	138.58	0.3797				
MARINE VESSEL LOADING LOSSES	0.00	0.00				
SYNTHETIC ORGANIC CHEMICAL STORAGE TANKS	0.00	0.0000				
LEAKING UNDERGROUND TANKS	2386.37	1.6100				
ARCHITECTURAL COATINGS	6216.22	22.1600				
AUTO REFINISHING	6977.00	24.4000				
TRAFFIC MARKINGS	890.12	2.4387				
FURNITURE & FIXTURES	2311.12	8.8721				
METAL CONTAINERS	959.93	3.7213				
AUTOMOBILES (NEW)	1203.10	4.4899				
MACHINERY & EQUIPMENT	461.93	1.7767				
APPLIANCES	107.49	0.4134				
OTHER TRANSPORTATION EQUIP.	507.57	2.1117				
SHEET, STRIP, & COIL	0.00	0.0000				
FACTORY FINISHED WOOD	145.63	0.6178				

TABLE 7  
SUMMARY OF 1990 EMISSIONS FROM AREA SOURCES FOR DALLAS/FT. WORTH (REVISED)

CATEGORY	VOC TPY	VOC TPD	NOX TPY	NOX TPD	CO TPY	CO TPD
ELECTRICAL INSULATION	149.34	0.5744				
OTHER PRODUCT COATINGS	195.09	0.7504				
HIGH-PERFORMANCE MAINT.	1159.18	4.4584				
MARINE COATINGS	9.09	0.0349				
OTHER SPEC. PURPOSE COATINGS	1424.19	5.4777				
BARGE,TANK,TANK TRUCK,RAIL CAR,DRUM CLEAN.	0.00	0.0000				
BREWERIES	0.01	0.0000				
WINERIES	0.00	0.0000				
DISTILLERIES	0.00	0.0000				
CATASTROPHIC/ACCIDENTAL RELEASES	9.80	0.0268				
SURFACE CLEANING	2308.46	8.0498				
DRY CLEANING	841.16	3.2352				
GRAPHIC ARTS	633.85	0.8972				
CUTBACK ASPHALT	219.08	0.6002				
EMULSIFIED ASPHALT	164.10	0.6312				
CONSUMER/COMMERCIAL SOLVENT USE	10884.49	29.8205				
PESTICIDE APPLICATION	724.50	3.0188				
MUNICIPAL WASTE LANDFILLS	2235.79	6.1255				
MUNICIPAL WASTEWATER TREATMENT (POTW)	59.56	0.1632				
INDUSTRIAL WASTEWATER TREATMENT	13.03	0.0357				
WASTEWATER PACKAGE PLANTS	0.00	0.0000				
COMMERCIAL BAKERIES	317.90	0.8709				

TABLE 7  
SUMMARY OF 1990 EMISSIONS FROM AREA SOURCES FOR DALLAS/FT. WORTH (REVISED)

CATEGORY	VOC TPY	VOC TPD	NOX TPY	NOX TPD	CO TPY	CO TPD
<b>STATIONARY SOURCE FUEL COMBUSTION:</b>	0.00	0.00				
FUEL OIL-RESIDENTIAL	0.00	0.0000	0.02	0.0000	0.01	0.0000
FUEL OIL-COMMERCIAL/DISTILLATE	6.75	0.0130	396.74	0.7630	99.21	0.1908
FUEL OIL-COMMERCIAL/RESIDUAL	0.49	0.0009	23.66	0.0455	2.14	0.0041
FUEL OIL-INDUSTRIAL/DISTILLATE	23.62	0.0757	2366.35	7.5845	591.57	1.8961
FUEL OIL-INDUSTRIAL/RESIDUAL	0.70	0.0022	315.92	1.0126	27.94	0.0896
COAL-RESIDENTIAL	2.83	0.0000	0.85	0.0000	25.45	0.0000
COAL-COMMERCIAL	0.00	0.0000	0.00	0.0000	0.00	0.0000
COAL-INDUSTRIAL	0.00	0.0000	0.00	0.0000	0.00	0.0000
NATURAL GAS-RESIDENTIAL	156.53	0.1287	2944.75	2.4203	588.96	0.4841
NATURAL GAS-COMMERCIAL	131.66	0.2532	2455.88	4.7228	490.91	0.9441
NATURAL GAS-INDUSTRIAL	16.84	0.0540	842.05	2.6989	210.51	0.6747
LPG-RESIDENTIAL	3.67	0.0030	69.02	0.0567	13.94	0.0115
LPG-COMMERCIAL	3.28	0.0063	61.48	0.1182	12.42	0.0239
LPG-INDUSTRIAL	3.47	0.0111	176.94	0.5671	44.24	0.1418
WOOD-RESIDENTIAL	103.09	0.0000	10.30	0.0000	849.86	0.0000
STRUCTURE FIRES	0.80	0.0023	0.10	0.0001	4.35	0.0118
FOREST FIRES	0.00	0.0000	0.00	0.0000	0.00	0.0000
PRESCRIBED BURNING	0.00	0.0000	0.00	0.0000	0.00	0.0000
SLASH BURNING	0.00	0.0000	0.00	0.0000	0.00	0.0000
OPEN BURNING	0.00	0.0000	0.00	0.0000	0.00	0.0000
ORCHARD HEATERS	0.00	0.0000	0.00	0.0000	0.00	0.0000
AGRICULTURAL BURNING	0.00	0.0000	0.00	0.0000	0.00	0.0000
<b>TOTAL</b>	<b>54697.53</b>	<b>174.0230</b>	<b>9664.06</b>	<b>19.9897</b>	<b>2961.52</b>	<b>4.4723</b>

**Table 8****Summary of Emissions from Non-Road Mobile Sources for Dallas/Ft. Worth**

<b>Category</b>	<b>VOC TPY</b>	<b>VOC TPD</b>	<b>NO<sub>x</sub> TPY</b>	<b>NO<sub>x</sub> TPD</b>	<b>CO TPY</b>	<b>CO TPD</b>
Railroad Locomotives	368.53	1.01	6359.88	17.42	890.07	2.44
Commercial Aircraft	1907.35	5.40	4434.49	12.15	11221.12	30.74
Military Aircraft	3354.89	9.19	3234.06	8.86	4292.12	11.76
General Aircraft	178.48	.49	32.98	.09	5661.23	15.51
Vessels	.00	.00	.00	.00	.00	.00
Other Non-Road Engines	30904.03	89.10	39232.69	135.29	323902.02	1065.93
Total	36713.28	105.19	53294.1	173.81	345966.56	1126.38

**Table 9A**

**Summary of VOC Emissions in the El Paso Nonattainment Area  
by Source Type**

County	Point Sources		Area Sources		Non-Road Mobile Sources	
	TPY	TPD	TPY	TPD	TPY	TPD
El Paso	2466.70	9.45	8526.88	24.94	3227.34	10.99
	On-Road Mobile Sources		Biogenic Sources		Total Sources	
	TPY	TPD	TPY	TPD	TPY	TPD
	NA	39.00	NA	12.62	NA	97.00

Notes: Biogenic emissions are calculated through use of an Environmental Protection Agency software package called PC-BEIS which yields results in U. S. short tons per day; no annual totals are calculated. Annual totals are not required in the On-Road Mobile Sources category per E.P.A. guidelines.

**Table 9B**

**Summary of NO<sub>x</sub> Emissions in the El Paso Nonattainment Area  
by Source Type**

County	Point Sources		Area Sources		Non-Road Mobile Sources	
	TPY	TPD	TPY	TPD	TPY	TPD
El Paso	7092.00	33.43	1422.14	2.43	4612.67	15.02
	On-Road Mobile Sources		Biogenic Sources		Total Sources	
	TPY	TPD	TPY	TPD	TPY	TPD
	NA	36.90	NA	NA	NA	87.78

Notes: Biogenic emissions are calculated through use of an Environmental Protection Agency software package called PC-BEIS which yields results in U. S. short tons per day; no annual totals are calculated. Annual totals are not required in the On-Road Mobile Sources category per E.P.A. guidelines.

**Table 9C**

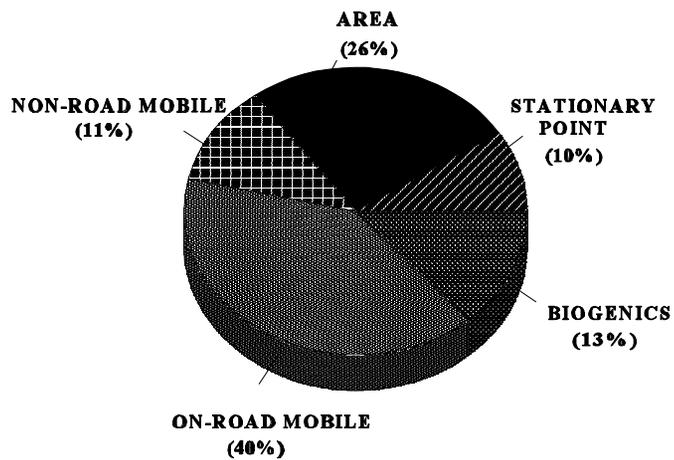
**Summary of CO Emissions in the El Paso Nonattainment Area  
by Source Type**

County	Point Sources		Area Sources		Non-Road Mobile Sources	
	TPY	TPD	TPY	TPD	TPY	TPD
El Paso	2634.00	7.41	1201.97	2.64	33499.69	106.69
	On-Road Mobile Sources		Biogenic Sources		Total Sources	
	TPY	TPD	TPY	TPD	TPY	TPD
	NA	327.10	NA	NA	NA	443.84

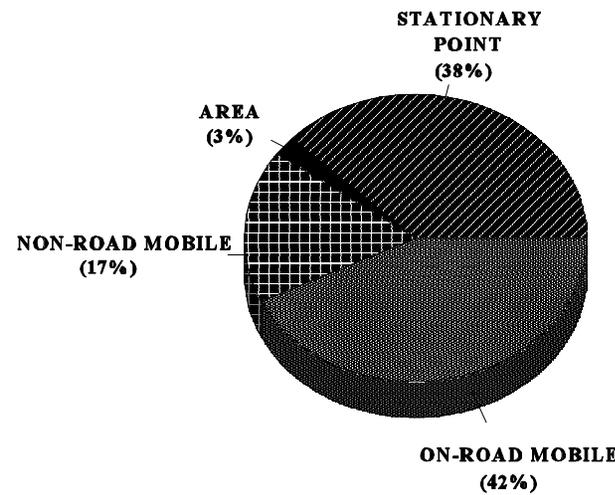
Notes: Biogenic emissions are calculated through use of an Environmental Protection Agency software package called PC-BEIS which yields results in U. S. short tons per day; no annual totals are calculated. Annual totals are not required in the On-Road Mobile Sources category per E.P.A. guidelines.

**FIGURE 11**  
**EL PASO**  
**OZONE NONATTAINMENT AREA**  
**1990 EMISSIONS BY**  
**MAJOR CATEGORY**

**VOC EMISSIONS**



**NOX EMISSIONS**



**CO EMISSIONS**

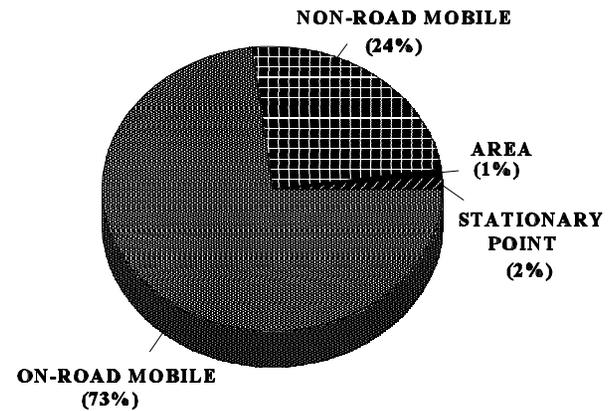


FIGURE 12

# Emissions Inventory Changes

El Paso VOC Emissions from All Sources

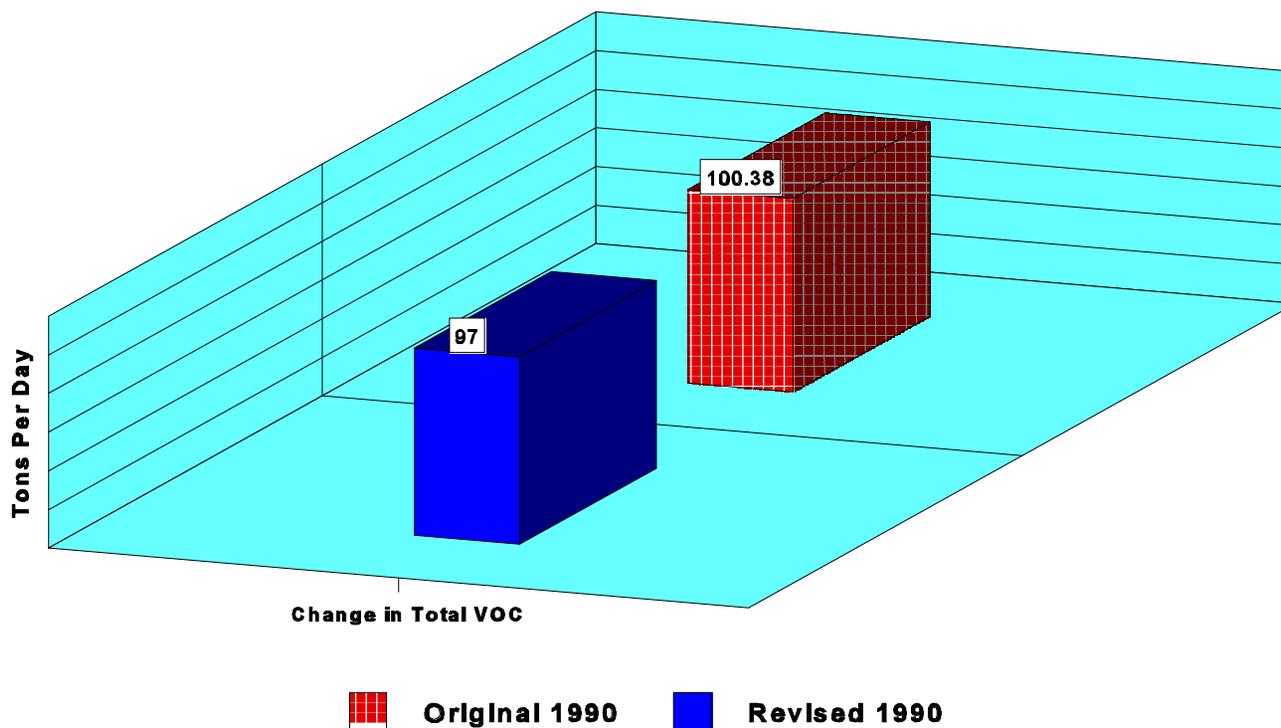


FIGURE 13

# Emissions Inventory Changes

## El Paso VOC Area Sources

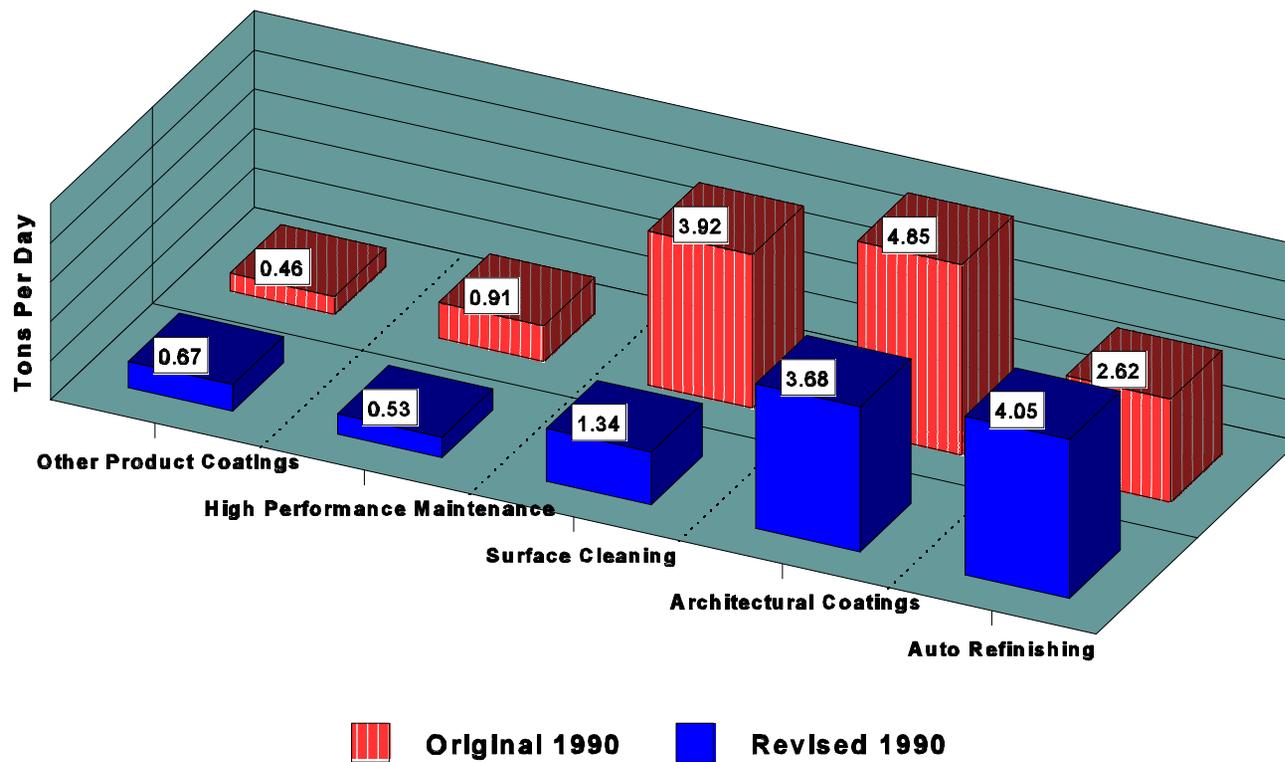


FIGURE 14

# Emissions Inventory Changes

## El Paso VOC Non-road Mobile Sources

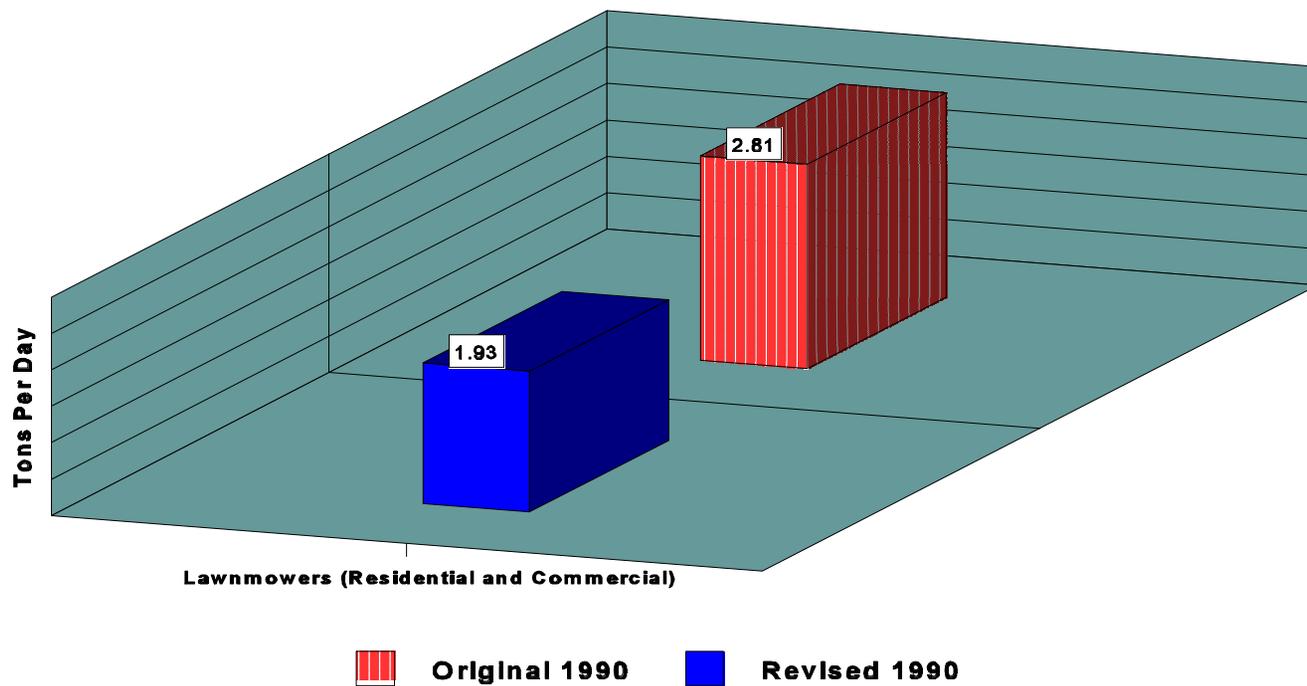


TABLE 10  
SUMMARY OF 1990 EMISSIONS FROM AREA SOURCES FOR EL PASO COUNTY (REVISED)

CATEGORY	VOC TPY	VOC TPD	NOX TPY	NOX TPD	CO TPY	CO TPD
OIL & GAS PRODUCTION	0.00	0.0000				
SERVICE STATIONS - VEHICLE REFUELING	1137.68	2.2987				
SERVICE STATIONS - TANK TRUCK UNLOADING	264.52	0.8478				
SERVICE STATIONS - TANK TRUCKS IN TRANSIT	3.72	0.0102				
SERVICE STATIONS - TANK BREATHING LOSSES	103.43	0.2834				
SERVICE STATIONS - OTHER	72.40	0.1984				
AIRCRAFT REFUELING	0.58	0.0016				
SYNTHETIC ORGANIC CHEMICAL STORAGE TANKS	0.00	0.0000				
LEAKING UNDERGROUND TANKS	413.91	0.0140				
ARCHITECTURAL COATINGS	1033.23	3.6800				
AUTO REFINISHING	1159.00	4.0500				
TRAFFIC MARKINGS	147.90	0.4052				
FURNITURE & FIXTURES	68.44	0.2632				
METAL CONTAINERS	0.00	0.0000				
AUTOMOBILES (NEW)	0.00	0.0000				
MACHINERY & EQUIPMENT	77.52	0.2982				
APPLIANCES	0.00	0.0000				
OTHER TRANSPORTATION EQUIP.	3.92	0.0151				
SHEET, STRIP, & COIL	0.00	0.0000				
FACTORY FINISHED WOOD	38.12	0.1466				

TABLE 10  
SUMMARY OF 1990 EMISSIONS FROM AREA SOURCES FOR EL PASO COUNTY (REVISED)

CATEGORY	VOC TPY	VOC TPD	NOX TPY	NOX TPD	CO TPY	CO TPD
ELECTRICAL INSULATION	17.97	0.0691				
OTHER PRODUCT COATINGS	173.48	0.6672				
HIGH-PERFORMANCE MAINT.	136.64	0.5256				
MARINE COATINGS	0.00	0.0000				
OTHER SPEC. PURPOSE COATINGS	236.64	0.9102				
BARGE,TANK,TANK TRUCK,RAIL CAR,DRUM CLEAN.	0.00	0.0000				
BREWERIES	0.00	0.0000				
WINERIES	0.03	0.0001				
DISTILLERIES	0.00	0.0000				
CATASTROPHIC/ACCIDENTAL RELEASES	0.00	0.0000				
SURFACE CLEANING	383.57	1.3376				
DRY CLEANING	139.77	0.5376				
GRAPHIC ARTS	384.55	1.4790				
CUTBACK ASPHALT	0.00	0.0000				
EMULSIFIED ASPHALT	1863.57	5.1057				
CONSUMER/COMMERCIAL SOLVENT USE	22.00	0.0603				
PESTICIDE APPLICATION	77.00	0.3208				
MUNICIPAL WASTE LANDFILLS	132.38	0.3627				
MUNICIPAL WASTEWATER TREATMENT (POTW)	5.76	0.0158				
INDUSTRIAL WASTEWATER TREATMENT	0.99	0.0027				
WASTEWATER PACKAGE PLANTS	0.00	0.0000				
COMMERCIAL BAKERIES	76.99	0.2109				

TABLE 10  
SUMMARY OF 1990 EMISSIONS FROM AREA SOURCES FOR EL PASO COUNTY (REVISED)

CATEGORY	VOC TPY	VOC TPD	NOX TPY	NOX TPD	CO TPY	CO TPD
<b>STATIONARY SOURCE FUEL COMBUSTION:</b>						
FUEL OIL-RESIDENTIAL	0.00	0.0000	0.00	0.0000	0.00	0.0000
FUEL OIL-COMMERCIAL/DISTILLATE	0.02	0.0000	1.22	0.0023	0.30	0.0006
FUEL OIL-COMMERCIAL/RESIDUAL	0.00	0.0000	0.07	0.0001	0.00	0.0000
FUEL OIL-INDUSTRIAL/DISTILLATE	1.09	0.0035	262.36	0.8409	65.59	0.2102
FUEL OIL-INDUSTRIAL/RESIDUAL	0.18	0.0006	35.75	0.1146	3.25	0.0104
COAL-RESIDENTIAL	0.00	0.0000	0.00	0.0000	0.00	0.0000
COAL-COMMERCIAL	0.00	0.0000	0.00	0.0000	0.00	0.0000
COAL-INDUSTRIAL	0.00	0.0000	0.00	0.0000	0.00	0.0000
NATURAL GAS-RESIDENTIAL	39.08	0.0321	737.42	0.6061	78.47	0.0645
NATURAL GAS-COMMERCIAL	1.93	0.0037	218.76	0.4207	40.97	0.0788
NATURAL GAS-INDUSTRIAL	1.26	0.0040	63.12	0.2023	15.78	0.0506
LPG-RESIDENTIAL	1.02	0.0008	19.21	0.0158	3.88	0.0032
LPG-COMMERCIAL	0.30	0.0006	5.68	0.0109	1.15	0.0022
LPG-INDUSTRIAL	0.39	0.0013	19.61	0.0629	4.90	0.0157
WOOD-RESIDENTIAL	22.28	0.0000	2.22	0.0000	183.71	0.0000
STRUCTURE FIRES	0.13	0.0003	0.02	0.0000	0.72	0.0020
FOREST FIRES	0.00	0.0000	0.00	0.0000	0.00	0.0000
PRESCRIBED BURNING	0.00	0.0000	0.00	0.0000	0.00	0.0000
SLASH BURNING	0.00	0.0000	0.00	0.0000	0.00	0.0000
OPEN BURNING	283.50	0.7767	56.70	0.1553	803.25	2.2007
ORCHARD HEATERS	0.00	0.0000	0.00	0.0000	0.00	0.0000
AGRICULTURAL BURNING	0.00	0.0000	0.00	0.0000	0.00	0.0000
<b>TOTAL</b>	<b>8526.88</b>	<b>24.9411</b>	<b>1422.14</b>	<b>2.4320</b>	<b>1201.97</b>	<b>2.6389</b>

**Table 11****Summary of Emissions from Non-Road Mobile Sources for El Paso**

<b>Category</b>	<b>VOC TPY</b>	<b>VOC TPD</b>	<b>NO<sub>x</sub> TPY</b>	<b>NO<sub>x</sub> TPD</b>	<b>CO TPY</b>	<b>CO TPD</b>
Railroad Locomotives	18.84	.05	410.27	1.12	53.13	.15
Commercial Aircraft	105.92	.29	225.06	.62	454.28	1.24
Military Aircraft	53.25	.14	22.82	.06	31.10	.09
General Aircraft	18.37	.05	3.03	.01	560.13	1.53
Vessels	.00	.00	.00	.00	.00	.00
Other Non-Road Engines	3030.96	10.46	3951.49	13.21	32401.05	103.68
Total	3227.34	10.99	4612.67	15.02	33499.69	106.69

TABLE 12  
SUMMARY OF 1990 EMISSIONS FROM SMALL ENGINE SOURCES FOR  
THE EL PASO NONATTAINMENT AREA

ALL ENGINES (2-CYCLE + 4-CYCLE + DIESEL)		VOC	VOC	NOX	NOX	CO	CO
Class	EQUIPMENT TYPES	TPY	TPD	TPY	TPD	TPY	TPD
1	Trimmers/Edgers/Brush Cutters	129.00	0.48	0.00	0.00	353.00	1.31
1	Lawn Mowers	505.96	1.93	5.49	0.01	3127.05	11.66
1	Leaf Blowers/Vacuums	28.00	0.10	0.00	0.00	83.00	0.31
1	Rear Engine Riding Mowers	15.00	0.06	0.00	0.00	377.00	1.41
1	Front Mowers	5.00	0.02	0.00	0.00	104.00	0.39
1	Chainsaws <4 HP	89.00	0.25	0.00	0.00	178.00	0.49
1	Shredders <5 HP	1.00	0.01	0.00	0.00	7.00	0.03
1	Tillers <5 HP	32.00	0.12	0.00	0.00	267.00	1.00
1	Lawn & Garden Tractors	95.00	0.37	9.00	0.03	2411.00	8.98
1	Wood Splitters	4.00	0.02	0.00	0.00	38.00	0.14
1	Snowblowers	0.00	0.00	0.00	0.00	0.00	0.00
1	Chippers/Stump Grinders	28.00	0.11	6.00	0.02	226.00	0.84
1	Commercial Turf Equipment	116.00	0.45	5.00	0.02	3603.00	13.43
1	Other Lawn & Garden Equipment	3.00	0.01	0.00	0.00	14.00	0.06
	<b>Subtotal</b>	<b>1050.96</b>	<b>3.93</b>	<b>25.49</b>	<b>0.08</b>	<b>10788.05</b>	<b>40.05</b>
2	Aircraft Support Equipment	7.00	0.02	34.00	0.09	73.00	0.20
2	Terminal Tractors	69.00	0.19	436.00	1.19	610.00	1.68
	<b>Subtotal</b>	<b>76.00</b>	<b>0.21</b>	<b>470.00</b>	<b>1.28</b>	<b>683.00</b>	<b>1.88</b>
3	All Terrain Vehicles (ATVs)	121.00	0.50	1.00	0.00	561.00	2.27
3	Minibikes	2.00	0.01	0.00	0.00	11.00	0.04
3	Off-Road Motorcycles	53.00	0.22	0.00	0.00	79.00	0.32
3	Golf Carts	208.00	0.86	1.00	0.00	761.00	3.08
3	Snowmobiles	0.00	0.00	0.00	0.00	0.00	0.00
3	Specialty Vehicles Carts	57.00	0.24	0.00	0.00	96.00	0.39
	<b>Subtotal</b>	<b>441.00</b>	<b>1.83</b>	<b>2.00</b>	<b>0.00</b>	<b>1508.00</b>	<b>6.10</b>

TABLE 12  
SUMMARY OF 1990 EMISSIONS FROM SMALL ENGINE SOURCES FOR  
THE EL PASO NONATTAINMENT AREA

ALL ENGINES (2-CYCLE + 4-CYCLE + DIESEL)		VOC	VOC	NOX	NOX	CO	CO
Class	EQUIPMENT TYPES	TPY	TPD	TPY	TPD	TPY	TPD
4	Vessels w/Inboard Engines	0.00	0.00	0.00	0.00	0.00	0.00
4	Vessels w/Outboard Engines	0.00	0.00	0.00	0.00	0.00	0.00
4	Vessels w/Stern-drive Engines	0.00	0.00	0.00	0.00	0.00	0.00
4	Sailboat Auxiliary Inboard Engines	0.00	0.00	0.00	0.00	0.00	0.00
4	Sailboat Auxiliary Outboard Engines	0.00	0.00	0.00	0.00	0.00	0.00
	Subtotal	0.00	0.00	0.00	0.00	0.00	0.00
5	Generator Sets <50 HP	470.00	1.32	42.00	0.11	6830.00	18.71
5	Pumps <50 HP	82.00	0.24	17.00	0.05	1789.00	4.90
5	Air Compressors <50 HP	46.00	0.13	8.00	0.02	1180.00	3.23
5	Gas Compressors <50 HP	2.00	0.00	1.00	0.00	29.00	0.08
5	Welders <50 HP	77.00	0.22	35.00	0.10	1970.00	5.40
5	Pressure Washers <50 HP	24.00	0.07	1.00	0.00	549.00	1.50
	Subtotal	701.00	1.98	104.00	0.28	12347.00	33.82
6	Aerial Lifts	26.00	0.09	27.00	0.07	468.00	1.28
6	Forklifts	205.00	0.59	412.00	1.13	3203.00	8.77
6	Sweepers/Scrubbers	31.00	0.09	164.00	0.44	331.00	0.91
6	Other General Industrial Equipment	34.00	0.10	54.00	0.15	231.00	0.63
6	Other Material Handling Equipment	2.00	0.00	7.00	0.02	23.00	0.06
	Subtotal	298.00	0.87	664.00	1.81	4256.00	11.65

TABLE 12  
SUMMARY OF 1990 EMISSIONS FROM SMALL ENGINE SOURCES FOR  
THE EL PASO NONATTAINMENT AREA

ALL ENGINES (2-CYCLE + 4-CYCLE + DIESEL)		VOC	VOC	NOX	NOX	CO	CO
Class	EQUIPMENT TYPES	TPY	TPD	TPY	TPD	TPY	TPD
7	Asphalt Pavers	1.00	0.00	13.00	0.04	13.00	0.04
7	Tampers/Rammers	12.00	0.04	0.00	0.00	24.00	0.09
7	Plate Compactors	24.00	0.09	0.00	0.00	115.00	0.41
7	Concrete Pavers	1.00	0.00	7.00	0.03	3.00	0.01
7	Rollers	8.00	0.03	30.00	0.11	90.00	0.33
7	Scrapers	12.00	0.04	143.00	0.52	82.00	0.30
7	Paving Equipment	29.00	0.11	53.00	0.19	246.00	0.90
7	Surfacing Equipment	4.00	0.01	0.00	0.00	67.00	0.24
7	Signal Boards	0.00	0.00	2.00	0.01	4.00	0.02
7	Trenchers	8.00	0.02	26.00	0.10	102.00	0.37
7	Bore/Drill Rigs	6.00	0.02	22.00	0.08	53.00	0.19
7	Excavators	7.00	0.03	106.00	0.39	51.00	0.19
7	Concrete/Industrial Saws	12.00	0.05	1.00	0.00	256.00	0.93
7	Cement and Mortar Mixers	6.00	0.02	0.00	0.00	97.00	0.35
7	Cranes	26.00	0.09	198.00	0.72	102.00	0.37
7	Graders	25.00	0.09	149.00	0.54	59.00	0.21
7	Off-Highway Trucks	24.00	0.08	260.00	0.94	76.00	0.27
7	Crushing/Proc. Equipment	5.00	0.01	26.00	0.10	34.00	0.12
7	Rough Terrain Forklifts	11.00	0.04	45.00	0.16	79.00	0.28
7	Rubber Tired Loaders	36.00	0.13	412.00	1.48	215.00	0.77
7	Rubber Tired Dozers	4.00	0.02	46.00	0.17	13.00	0.05
7	Tractors/Loaders/Backhoes	35.00	0.12	238.00	0.86	175.00	0.64
7	Crawler Tractors	58.00	0.21	459.00	1.66	214.00	0.77
7	Skid Steer Loaders	15.00	0.05	53.00	0.19	113.00	0.41
7	Off-Highway Tractors	39.00	0.14	183.00	0.67	226.00	0.82
7	Dumpers/Tenders	1.00	0.00	0.00	0.00	15.00	0.05
7	Other Construction Equipment	4.00	0.01	23.00	0.08	43.00	0.15
	Subtotal	413.00	1.45	2495.00	9.04	2567.00	9.28

TABLE 12  
SUMMARY OF 1990 EMISSIONS FROM SMALL ENGINE SOURCES FOR  
THE EL PASO NONATTAINMENT AREA

ALL ENGINES (2-CYCLE + 4-CYCLE + DIESEL)		VOC	VOC	NOX	NOX	CO	CO
Class	EQUIPMENT TYPES	TPY	TPD	TPY	TPD	TPY	TPD
8	2-Wheel Tractors	0.00	0.00	0.00	0.00	1.00	0.00
8	Agricultural Tractors	34.00	0.13	167.00	0.62	139.00	0.52
8	Agricultural Mowers	0.00	0.00	0.00	0.00	1.00	0.00
8	Combines	1.00	0.00	10.00	0.04	4.00	0.01
8	Sprayers	0.00	0.00	0.00	0.00	4.00	0.01
8	Balers	0.00	0.00	0.00	0.00	0.00	0.00
8	Tillers >5 HP	3.00	0.01	0.00	0.00	22.00	0.08
8	Swathers	4.00	0.02	4.00	0.02	52.00	0.19
8	Hydro Power Units	0.00	0.00	0.00	0.00	4.00	0.01
8	Other Agricultural Equipment	2.00	0.01	10.00	0.04	5.00	0.03
	Subtotal	44.00	0.17	191.00	0.72	232.00	0.85
9	Chainsaws >4 HP	7.00	0.02	0.00	0.00	20.00	0.05
9	Shredders >5 HP	0.00	0.00	0.00	0.00	0.00	0.00
9	Skidders	0.00	0.00	0.00	0.00	0.00	0.00
9	Fellers/Bunchers	0.00	0.00	0.00	0.00	0.00	0.00
	Subtotal	7.00	0.02	0.00	0.00	20.00	0.05
	<b>Grand Total</b>	<b>3030.96</b>	<b>10.46</b>	<b>3951.49</b>	<b>13.21</b>	<b>32401.05</b>	<b>103.68</b>

1 = Lawn & Garden  
2 = Airport Service  
3 = Recreational

4 = Recreational Marine  
5 = Light Commercial  
6 = Industrial

7 = Construction  
8 = Agricultural  
9 = Logging

**Table 13A**

**Summary of VOC Emissions in the Houston/Galveston Nonattainment Area  
by Source Type**

HGA	Point Sources		Area Sources		Non-Road Mobile Sources	
	TPY	TPD	TPY	TPD	TPY	TPD
	165969.34	483.38	63809.96	200.07	47218.33	129.99
	On-Road Mobile Sources		Biogenic Sources		Total Sources	
	TPY	TPD	TPY	TPD	TPY	TPD
	NA	251.72	NA	335.47	NA	1400.63

Notes: Biogenic emissions are calculated through use of an Environmental Protection Agency software package called PC-BEIS which yields results in U. S. short tons per day; no annual totals are calculated. Annual totals are not required in the On-Road Mobile Sources category per E.P.A. guidelines.

**Table 13B**

**Summary of NO<sub>x</sub> Emissions in the Houston/Galveston Nonattainment Area  
by Source Type**

HGA	Point Sources		Area Sources		Non-Road Mobile Sources	
	TPY	TPD	TPY	TPD	TPY	TPD
	267491.00	780.65	7407.49	14.37	61838.58	198.52
	On-Road Mobile Sources		Biogenic Sources		Total Sources	
	TPY	TPD	TPY	TPD	TPY	TPD
	NA	337.03	NA	NA	NA	1330.57

Notes: Biogenic emissions are calculated through use of an Environmental Protection Agency software package called PC-BEIS which yields results in U. S. short tons per day; no annual totals are calculated. Annual totals are not required in the On-Road Mobile Sources category per E.P.A. guidelines.

**Table 13C**

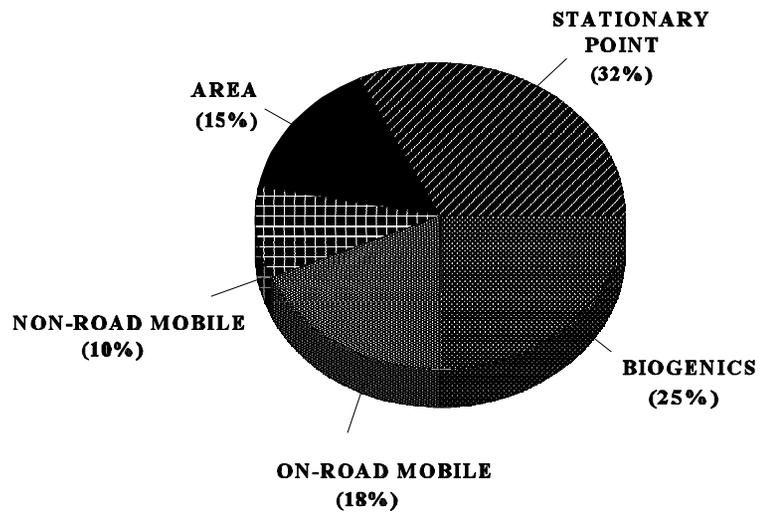
**Summary of CO Emissions in the Houston/Galveston Nonattainment Area  
by Source Type**

HGA	Point Sources		Area Sources		Non-Road Mobile Sources	
	TPY	TPD	TPY	TPD	TPY	TPD
	119864.00	334.38	11809.11	28.03	344988.76	1150.32
	<b>On-Road Mobile Sources</b>		<b>Biogenic Sources</b>		<b>Total Sources</b>	
	TPY	TPD	TPY	TPD	TPY	TPD
	NA	2412.68	NA	NA	NA	3925.41

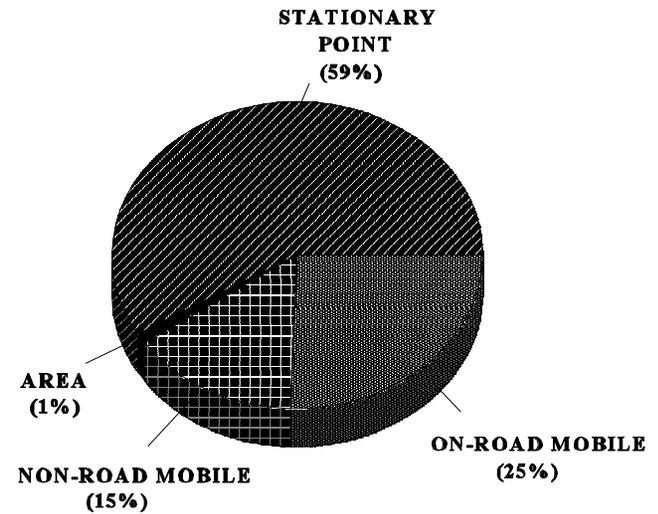
Notes: Biogenic emissions are calculated through use of an Environmental Protection Agency software package called PC-BEIS which yields results in U. S. short tons per day; no annual totals are calculated. Annual totals are not required in the On-Road Mobile Sources category per E.P.A. guidelines.

**FIGURE 15**  
**HOUSTON - GALVESTON**  
**OZONE NONATTAINMENT AREA**  
**1990 EMISSIONS BY**  
**MAJOR CATEGORY**

VOC EMISSIONS



NOX EMISSIONS



CO EMISSIONS

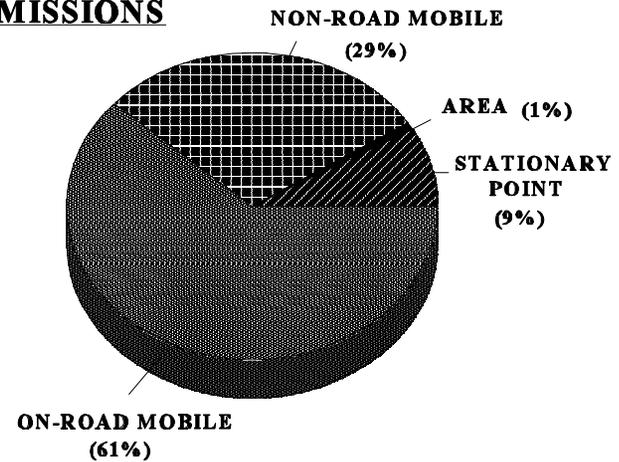


FIGURE 16

# Emissions Inventory Changes

## Houston/Galveston VOC Emissions from All Sources

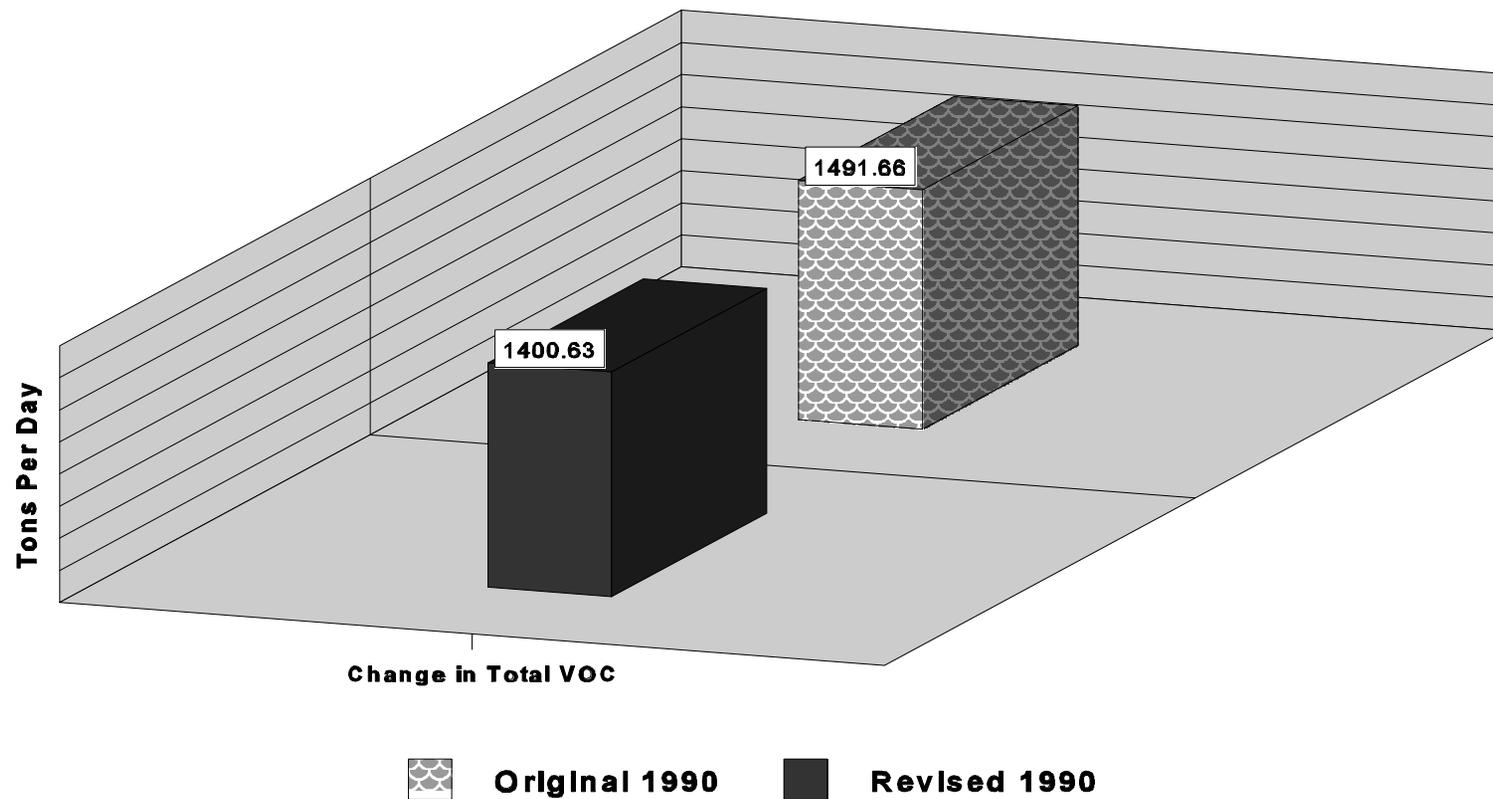


FIGURE 17

# Emissions Inventory Changes

## Houston/Galveston VOC Area Sources

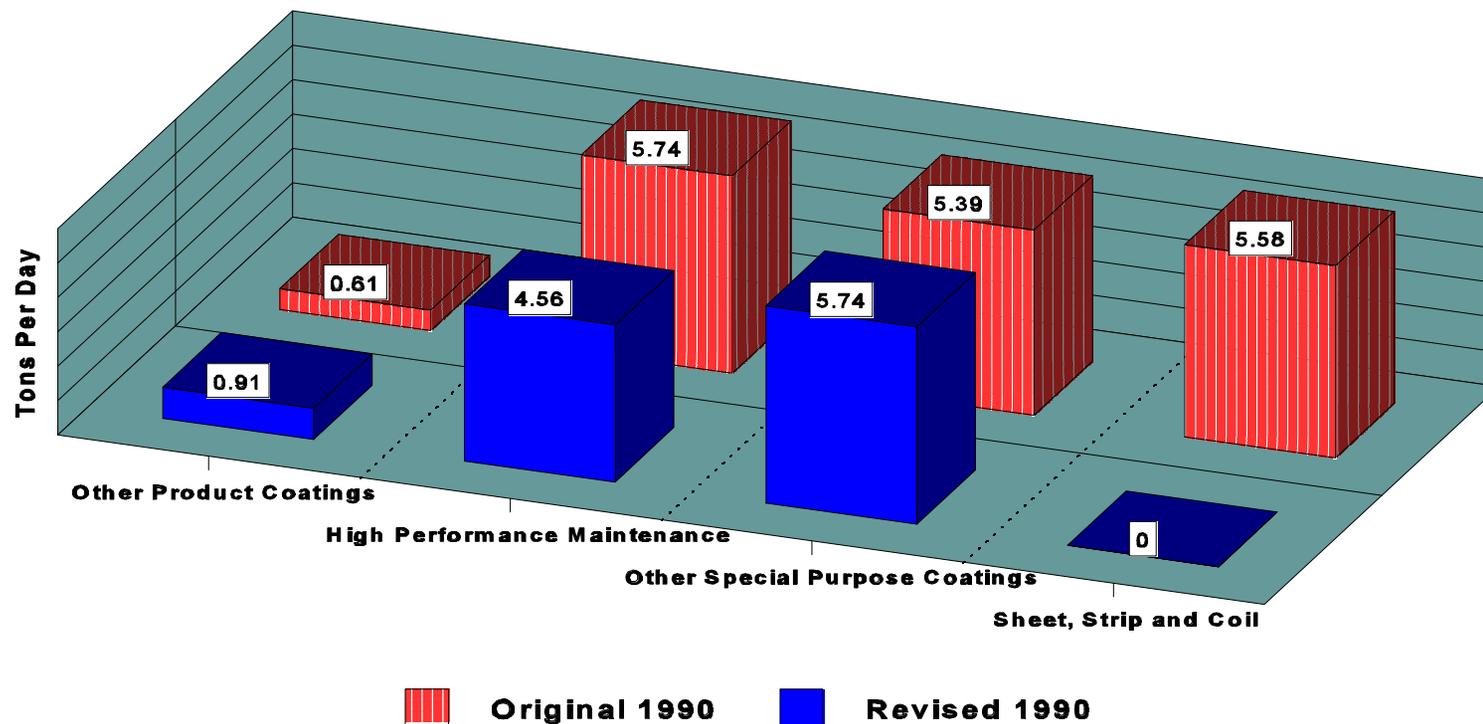


FIGURE 18

# Emissions Inventory Changes

## Houston/Galveston VOC Area Sources

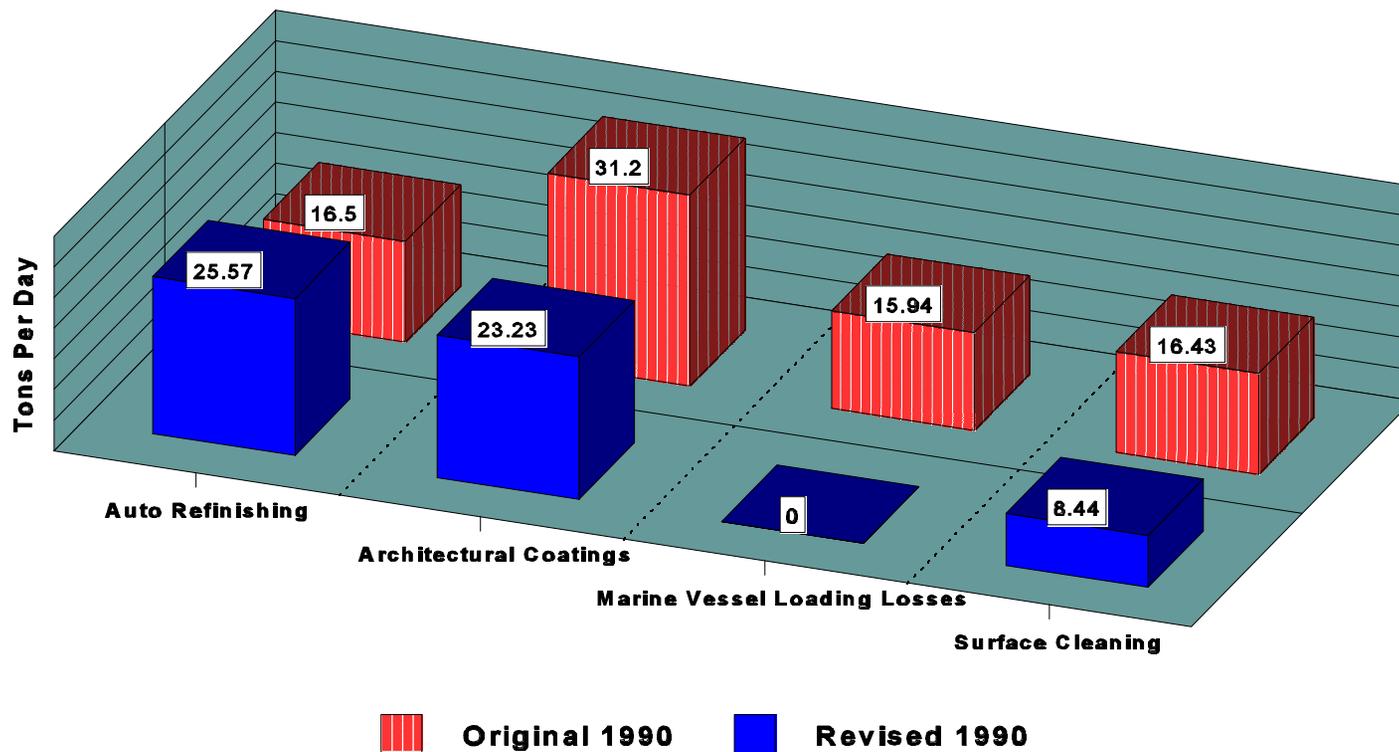


FIGURE 19

# Emissions Inventory Changes

## Houston/Galveston VOC Non-road Mobile Sources

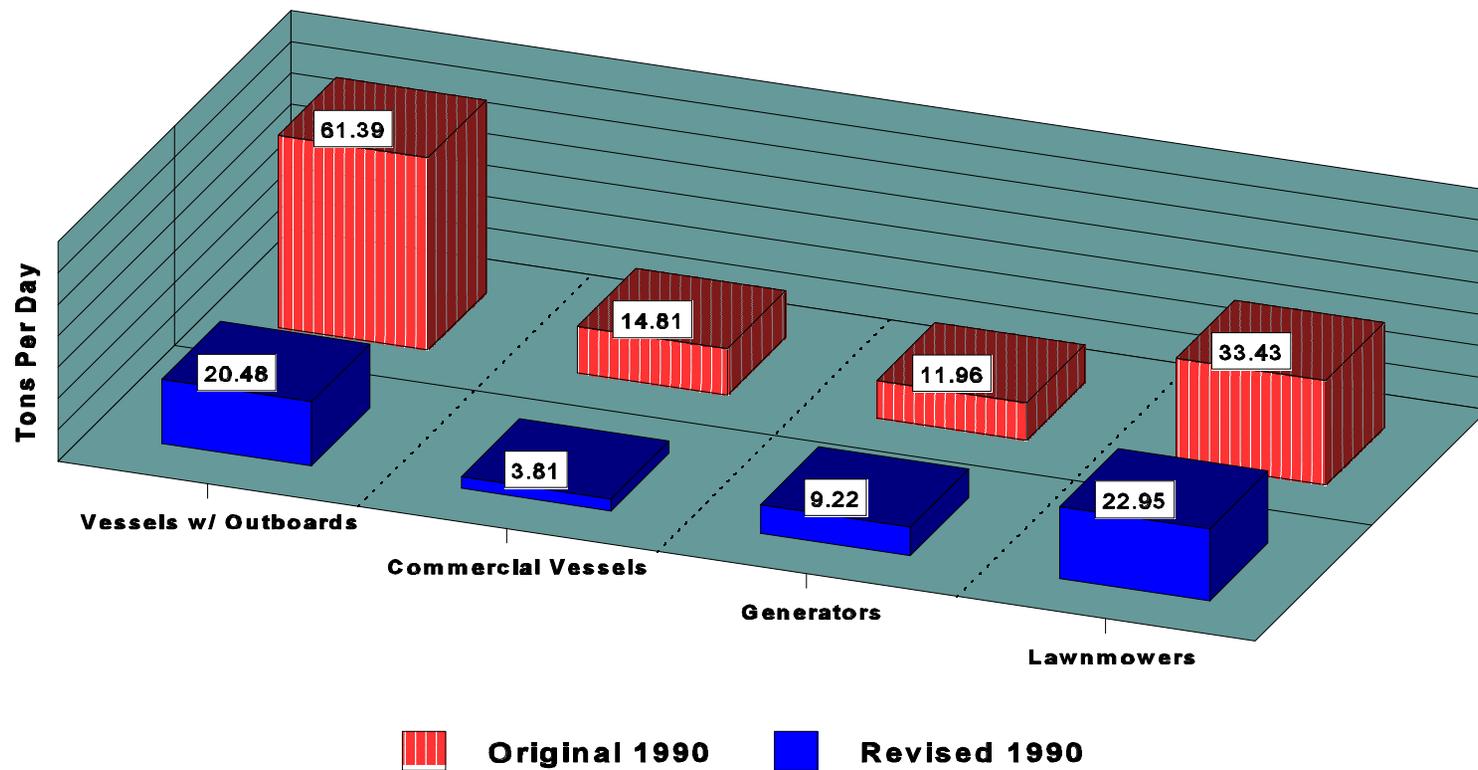


TABLE 14  
SUMMARY OF 1990 EMISSIONS FROM AREA SOURCES FOR HOUSTON/GALVESTON (REVISED)

CATEGORY	VOC	VOC	NOX	NOX	CO	CO
	TPY	TPD	TPY	TPD	TPY	TPD
OIL & GAS PRODUCTION	1947.30	5.1242				
OIL & GAS PRODUCTION - OFF SHORE	113.51	0.2620	591.20	1.6197	74.65	0.2045
SERVICE STATIONS - VEHICLE REFUELING	6580.94	20.7928				
SERVICE STATIONS - TANK TRUCK UNLOADING	3813.18	12.2265				
SERVICE STATIONS - TANK TRUCKS IN TRANSIT	56.85	0.5517				
SERVICE STATIONS - TANK BREATHING LOSSES	901.50	2.4699				
SERVICE STATIONS - OTHER	631.05	1.7289				
AIRCRAFT REFUELING	10.38	0.0284				
MARINE VESSEL LOADING LOSSES	0.00	0.0000				
SYNTHETIC ORGANIC CHEMICAL STORAGE TANKS	0.00	0.0000				
LEAKING UNDERGROUND TANKS	2166.64	1.8200				
ARCHITECTURAL COATINGS	6519.47	23.2300				
AUTO REFINISHING	7312.00	25.5655				
TRAFFIC MARKINGS	932.78	2.5556				
FURNITURE & FIXTURES	697.14	2.6813				
METAL CONTAINERS	1355.21	6.1074				
AUTOMOBILES (NEW)	0.00	0.0000				
MACHINERY & EQUIPMENT	453.36	1.7437				
APPLIANCES	0.00	0.0000				
OTHER TRANSPORTATION EQUIP.	14.63	0.0563				
SHEET, STRIP, & COIL	0.00	0.0000				
FACTORY FINISHED WOOD	51.21	1.1653				

TABLE 14  
SUMMARY OF 1990 EMISSIONS FROM AREA SOURCES FOR HOUSTON/GALVESTON (REVISED)

CATEGORY	VOC	VOC	NOX	NOX	CO	CO
	TPY	TPD	TPY	TPD	TPY	TPD
ELECTRICAL INSULATION	0.00	0.0000				
OTHER PRODUCT COATINGS	236.88	0.9110				
HIGH-PERFORMANCE MAINT.	1186.36	4.5630				
MARINE COATINGS	244.09	0.9388				
OTHER SPEC. PURPOSE COATINGS	1492.45	5.7400				
BARGE,TANK,TANK TRUCK,RAIL CAR,DRUM CLEAN.	0.00	0.0000				
BREWERIES	0.00	0.0000				
WINERIES	0.00	0.0000				
DISTILLERIES	0.00	0.0000				
CATASTROPHIC/ACCIDENTAL RELEASES	160.24	0.4390				
SURFACE CLEANING	2419.10	8.4400				
DRY CLEANING	881.48	3.3903				
GRAPHIC ARTS	2356.97	8.7314				
CUTBACK ASPHALT	184.94	0.5067				
EMULSIFIED ASPHALT	80.40	0.3092				
CONSUMER/COMMERCIAL SOLVENT USE	11753.06	32.2002				
PESTICIDE APPLICATION	826.00	3.4417				
MUNICIPAL WASTE LANDFILLS	2555.74	7.0020				
MUNICIPAL WASTEWATER TREATMENT (POTW)	13.10	0.0374				
INDUSTRIAL WASTEWATER TREATMENT	4857.24	13.3075				
WASTEWATER PACKAGE PLANTS	0.00	0.0000				
COMMERCIAL BAKERIES	260.16	0.7128				

TABLE 14  
SUMMARY OF 1990 EMISSIONS FROM AREA SOURCES FOR HOUSTON/GALVESTON (REVISED)

CATEGORY	VOC	VOC	NOX	NOX	CO	CO
	TPY	TPD	TPY	TPD	TPY	TPD
<b>STATIONARY SOURCE FUEL COMBUSTION:</b>	0.00	0.00				
FUEL OIL-RESIDENTIAL	0.00	0.0000	0.08	0.0001	0.00	0.0000
FUEL OIL-COMMERCIAL/DISTILLATE	5.87	0.0113	345.98	0.6653	86.46	0.1663
FUEL OIL-COMMERCIAL/RESIDUAL	0.42	0.0008	20.61	0.0396	1.89	0.0036
FUEL OIL-INDUSTRIAL/DISTILLATE	1.08	0.0035	1430.70	4.5856	357.67	1.1464
FUEL OIL-INDUSTRIAL/RESIDUAL	0.98	0.0031	194.97	0.6249	17.69	0.0567
COAL-RESIDENTIAL	2.53	0.0021	0.76	0.0000	22.72	0.0000
COAL-COMMERCIAL	0.00	0.0000	0.00	0.0000	0.00	0.0000
COAL-INDUSTRIAL	0.00	0.0000	0.00	0.0000	0.00	0.0000
NATURAL GAS-RESIDENTIAL	137.89	0.1133	2602.17	2.1388	520.40	0.4277
NATURAL GAS-COMMERCIAL	114.66	0.2205	1563.65	3.0070	372.98	0.7173
NATURAL GAS-INDUSTRIAL	6.89	0.0221	344.21	1.1032	86.05	0.2758
LPG-RESIDENTIAL	6.59	0.0054	124.29	0.1022	25.10	0.0206
LPG-COMMERCIAL	2.83	0.0054	53.71	0.1033	10.83	0.0208
LPG-INDUSTRIAL	2.11	0.0068	107.02	0.3430	26.75	0.0857
WOOD-RESIDENTIAL	135.18	0.0000	13.49	0.0000	1114.55	0.0000
STRUCTURE FIRES	0.79	0.0020	0.12	0.0002	4.56	0.0123
FOREST FIRES	79.89	0.2189	13.32	0.0365	468.71	1.2841
PRESCRIBED BURNING	54.83	0.1502	0.00	0.0000	1958.43	5.3655
SLASH BURNING	185.98	0.5095	0.00	0.0000	6642.45	18.1985
OPEN BURNING	6.08	0.0166	1.22	0.0033	17.21	0.0472
ORCHARD HEATERS	0.00	0.0000	0.00	0.0000	0.00	0.0000
AGRICULTURAL BURNING	0.00	0.0000	0.00	0.0000	0.00	0.0000
<b>TOTAL</b>	<b>63809.96</b>	<b>200.07</b>	<b>7407.49</b>	<b>14.37</b>	<b>11809.09</b>	<b>28.03</b>

**Table 15****Summary of Emissions from Non-Road Mobile Sources for Houston/Galveston**

<b>Category</b>	<b>VOC TPY</b>	<b>VOC TPD</b>	<b>NO<sub>x</sub> TPY</b>	<b>NO<sub>x</sub> TPD</b>	<b>CO TPY</b>	<b>CO TPD</b>
Railroad Locomotives	406.78	1.11	6438.43	17.64	930.37	2.55
Commercial Aircraft	664.95	1.82	1692.32	4.63	2840.93	7.78
Military Aircraft	412.03	1.13	176.58	.48	240.76	.66
General Aircraft	181.74	.50	29.98	.08	5541.78	15.18
Vessels	1391.00	3.81	14977.00	41.03	2131.00	5.84
Other Non-Road Engines	44161.61	121.62	38524.27	134.65	333303.92	1118.32
<b>Total</b>	<b>47218.11</b>	<b>129.99</b>	<b>61838.58</b>	<b>198.51</b>	<b>344988.76</b>	<b>1150.33</b>

TABLE 16  
SUMMARY OF 1990 EMISSIONS FROM SMALL ENGINE SOURCES FOR  
THE HOUSTON-GALVESTON NONATTAINMENT AREA

ALL ENGINES (2-CYCLE + 4-CYCLE + DIESEL)		VOC	VOC	NOX	NOX	CO	CO
Class	EQUIPMENT TYPES	TPY	TPD	TPY	TPD	TPY	TPD
1	Trimmers/Edgers/Brush Cutters	1431.19	5.35	2.58	0.01	3918.28	14.60
1	Lawn Mowers	9481.59	22.95	32.28	0.93	37185.69	138.56
1	Leaf Blowers/Vacuums	477.35	1.79	0.99	0.00	1397.97	5.21
1	Rear Engine Riding Mowers	145.42	0.58	4.69	0.01	3593.78	13.39
1	Front Mowers	52.31	0.22	1.17	0.00	979.22	3.65
1	Chainsaws <4 HP	1956.08	5.37	2.81	0.00	3908.38	10.71
1	Shredders <5 HP	12.21	0.04	0.08	0.00	94.30	0.34
1	Tillers <5 HP	199.80	0.76	1.65	0.00	1673.93	6.20
1	Lawn & Garden Tractors	817.03	3.22	75.82	0.27	20754.53	77.32
1	Wood Splitters	53.76	0.22	0.49	0.00	474.50	1.78
1	Snowblowers	0.00	0.00	0.00	0.00	3.53	0.00
1	Chippers/Stump Grinders	347.77	1.32	67.68	0.25	2801.25	10.45
1	Commercial Turf Equipment	1441.42	5.58	56.34	0.21	44628.79	166.28
1	Other Lawn & Garden Equipment	42.56	0.14	0.16	0.00	182.00	0.68
	<b>Subtotal</b>	<b>16458.49</b>	<b>47.54</b>	<b>246.74</b>	<b>1.68</b>	<b>121596.15</b>	<b>449.17</b>
2	Aircraft Support Equipment	39.73	0.11	201.49	0.55	426.74	1.17
2	Terminal Tractors	404.65	1.11	2541.86	6.96	3523.27	9.65
	<b>Subtotal</b>	<b>444.38</b>	<b>1.22</b>	<b>2743.35</b>	<b>7.51</b>	<b>3950.01</b>	<b>10.82</b>
3	All Terrain Vehicles (ATVs)	389.39	1.61	3.20	0.00	1724.51	7.00
3	Minibikes	50.22	0.21	0.64	0.00	325.19	1.31
3	Off-Road Motorcycles	191.00	0.78	0.68	0.00	275.35	1.12
3	Golf Carts	703.40	2.88	4.20	0.00	2402.22	9.74
3	Snowmobiles	45.48	0.19	0.67	0.00	346.65	1.41
3	Specialty Vehicles Carts	206.08	0.84	0.57	0.00	330.96	1.34
	<b>Subtotal</b>	<b>1585.57</b>	<b>6.51</b>	<b>9.96</b>	<b>0.00</b>	<b>5404.88</b>	<b>21.92</b>

TABLE 16  
SUMMARY OF 1990 EMISSIONS FROM SMALL ENGINE SOURCES FOR  
THE HOUSTON-GALVESTON NONATTAINMENT AREA

ALL ENGINES (2-CYCLE + 4-CYCLE + DIESEL)		VOC	VOC	NOX	NOX	CO	CO
Class	EQUIPMENT TYPES	TPY	TPD	TPY	TPD	TPY	TPD
4	Vessels w/Inboard Engines	412.88	2.00	107.34	0.57	2675.00	14.06
4	Vessels w/Outboard Engines	12426.69	20.48	104.57	0.20	20033.59	39.05
4	Vessels w/Stern-drive Engines	922.32	4.79	286.84	1.52	9886.74	52.04
4	Sailboat Auxiliary Inboard Engines	1.28	0.01	1.49	0.01	2.78	0.01
4	Sailboat Auxiliary Outboard Engines	5.86	0.02	0.05	0.00	11.00	0.05
	Subtotal	13769.03	27.30	500.29	2.30	32609.11	105.21
5	Generator Sets <50 HP	2778.08	9.22	360.57	1.20	64824.08	214.98
5	Pumps <50 HP	744.79	2.10	158.35	0.42	16186.85	44.36
5	Air Compressors <50 HP	417.93	1.19	80.06	0.19	10673.37	29.22
5	Gas Compressors <50 HP	15.48	0.04	13.92	0.04	290.40	0.80
5	Welders <50 HP	701.35	2.02	324.25	0.88	17822.86	48.81
5	Pressure Washers <50 HP	216.49	0.63	7.08	0.02	4969.11	13.61
	Subtotal	4874.12	15.20	944.23	2.75	114766.67	351.78
6	Aerial Lifts	130.61	0.37	139.10	0.36	2419.14	6.61
6	Forklifts	1056.51	3.03	2086.08	5.72	16469.40	45.12
6	Sweepers/Scrubbers	153.59	0.41	777.50	2.12	1567.72	4.28
6	Other General Industrial Equipment	160.08	0.43	259.63	0.69	1101.65	2.99
6	Other Material Handling Equipment	9.18	0.02	37.20	0.10	110.73	0.30
	Subtotal	1509.97	4.26	3299.51	8.99	21668.64	59.30

TABLE 16  
SUMMARY OF 1990 EMISSIONS FROM SMALL ENGINE SOURCES FOR  
THE HOUSTON-GALVESTON NONATTAINMENT AREA

ALL ENGINES (2-CYCLE + 4-CYCLE + DIESEL)		VOC	VOC	NOX	NOX	CO	CO
Class	EQUIPMENT TYPES	TPY	TPD	TPY	TPD	TPY	TPD
7	Asphalt Pavers	14.10	0.05	143.61	0.52	152.97	0.54
7	Tampers/Rammers	138.40	0.50	0.11	0.00	292.77	1.06
7	Plate Compactors	288.84	1.04	6.04	0.03	1359.16	4.91
7	Concrete Pavers	8.85	0.03	78.39	0.30	35.75	0.12
7	Rollers	85.73	0.30	311.30	1.12	1053.87	3.83
7	Scrapers	94.50	0.34	1142.11	4.13	656.39	2.39
7	Paving Equipment	337.39	1.23	626.77	2.25	2900.85	10.48
7	Surfacing Equipment	42.63	0.15	4.01	0.01	787.22	2.83
7	Signal Boards	6.04	0.02	26.72	0.10	51.53	0.17
7	Trenchers	93.13	0.32	312.78	1.11	1199.63	4.32
7	Bore/Drill Rigs	64.81	0.22	256.24	0.92	617.85	2.24
7	Excavators	102.96	0.37	1536.84	5.57	743.39	2.67
7	Concrete/Industrial Saws	145.16	0.54	16.60	0.05	3018.32	10.91
7	Cement and Mortar Mixers	65.25	0.24	8.60	0.03	1137.73	4.11
7	Cranes	306.32	1.09	2329.15	8.43	1186.01	4.27
7	Graders	218.54	0.79	1322.43	4.79	523.47	1.89
7	Off-Highway Trucks	174.59	0.61	1927.93	6.97	562.31	2.03
7	Crushing/Proc. Equipment	47.64	0.16	310.62	1.13	391.21	1.44
7	Rough Terrain Forklifts	129.09	0.46	537.30	1.94	920.32	3.32
7	Rubber Tired Loaders	340.53	1.21	3873.91	14.00	2067.93	7.47
7	Rubber Tired Dozers	49.46	0.18	546.66	1.98	159.45	0.57
7	Tractors/Loaders/Backhoes	410.79	1.48	2820.10	10.20	2054.32	7.42
7	Crawler Tractors	765.09	2.74	6048.30	21.87	2818.62	10.19
7	Skid Steer Loaders	162.50	0.57	569.65	2.05	1273.08	4.59
7	Off-Highway Tractors	459.89	1.65	2159.97	7.82	2662.34	9.63
7	Dumpers/Tenders	9.59	0.03	1.25	0.00	175.29	0.62
7	Other Construction Equipment	50.50	0.16	279.69	1.02	494.29	1.81
	Subtotal	4612.32	16.48	27197.08	98.34	29296.07	105.83

TABLE 16  
SUMMARY OF 1990 EMISSIONS FROM SMALL ENGINE SOURCES FOR  
THE HOUSTON-GALVESTON NONATTAINMENT AREA

ALL ENGINES (2-CYCLE + 4-CYCLE + DIESEL)		VOC	VOC	NOX	NOX	CO	CO
Class	EQUIPMENT TYPES	TPY	TPD	TPY	TPD	TPY	TPD
8	2-Wheel Tractors	0.98	0.00	0.15	0.00	15.84	0.05
8	Agricultural Tractors	631.57	2.31	3060.94	11.38	2546.77	9.51
8	Agricultural Mowers	0.95	0.00	0.10	0.00	19.00	0.06
8	Combines	22.51	0.07	189.08	0.69	89.00	0.35
8	Sprayers	4.11	0.00	2.50	0.00	72.24	0.27
8	Balers	0.33	0.00	1.13	0.00	0.57	0.00
8	Tillers >5 HP	40.03	0.16	0.32	0.00	343.37	1.29
8	Swathers	18.78	0.06	72.43	0.27	101.56	0.37
8	Hydro Power Units	3.25	0.00	1.06	0.00	66.66	0.24
8	Other Agricultural Equipment	7.01	0.00	33.25	0.13	36.51	0.16
	Subtotal	729.52	2.60	3360.96	12.47	3291.52	12.30
9	Chainsaws >4 HP	154.02	0.43	0.43	0.00	444.75	1.23
9	Shredders >5 HP	7.15	0.03	0.21	0.00	174.19	0.47
9	Skidders	9.58	0.03	124.52	0.34	57.30	0.16
9	Fellers/Bunchers	7.45	0.02	96.99	0.26	44.64	0.12
	Subtotal	178.20	0.51	222.15	0.60	720.88	1.98
	<b>Grand Total</b>	<b>44161.61</b>	<b>121.62</b>	<b>38524.27</b>	<b>134.65</b>	<b>333303.92</b>	<b>1118.32</b>

1 = Lawn & Garden  
2 = Airport Service  
3 = Recreational

4 = Recreational Marine  
5 = Light Commercial  
6 = Industrial

7 = Construction  
8 = Agricultural  
9 = Logging