REVISIONS TO THE STATE IMPLEMENTATION PLAN (SIP) FOR SULFUR DIOXIDE (SO_2)

MODELING DEMONSTRATION TO PREVENT REDESIGNATION TO SO_2 NONATTAINMENT FOR HARRIS COUNTY, TEXAS

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1. GENERAL

a. Background Information

As part of the Federal Clean Air Act (FCAA) Amendments of 1970, the U.S. Environmental Protection Agency (EPA) set primary and in some cases, secondary National Ambient Air Quality Standards (NAAQS) for six criteria pollutants. EPA defined the primary standard as "the level of air quality necessary to protect public health with an adequate margin of safety"; the secondary standard was stated as "the level of air quality necessary to protect public welfare from any known or anticipated adverse effects of a pollutant." Among the pollutants addressed was sulfur dioxide (SO_2); it was given both primary and secondary NAAQS standards.

Several monitored violations (two or more exceedances per year) of the primary 24-hour NAAQS SO_2 standard of 365 $\mu g/m^3$ occurred at a monitoring site located near the Houston Ship Channel in Harris County, Texas, during 1986, 1988, and 1990. Due to these exceedances, and due to a modeling study conducted in 1987 which predicted SO_2 exceedances in a part of Harris County, EPA declared, in a Federal Register notice dated April 22, 1991, that Harris County, among other areas in the United States, was under consideration as a potential SO_2 nonattainment area. In response to this, and due to the FCAA deadline for designation of SO_2

nonattainment areas (by May 23, 1991), Texas Governor Ann Richards made the recommendation, on May 10, 1991, that a small portion of Harris County be declared nonattainment for SO_2.

Subsequently the size of the recommended nonattainment area became an issue. Governor Richards made her determination of size based only on the monitoring data, which showed exceedances occurring at just one site. However, EPA then recommended that a significantly larger area be designated as such based on the results of the aforementioned SO_2 modeling analysis, which used the higher of SO_2 actual or allowable emissions. In either case, if EPA had redesignated to nonattainment, the Texas Natural Resource Conservation Commission (TNRCC) would have been required to devise a State Implementation Plan (SIP) for controlling SO_2 emissions in Harris County.

In response to the recommended redesignation, Radian Corporation (Radian), which represented the Houston Regional Monitoring Network (HRM) worked with the TNRCC to obtain voluntary reductions in SO_2 allowable emissions from Houston industries and to model the resulting emission rates in a manner acceptable to EPA. By achieving these emissions reductions, making them federally enforceable, and executing this in-depth modeling study, HRM sought to demonstrate that Harris County was in attainment for SO_2, and could thus avoid being redesignated to nonattainment.

b. Initiative

Ordinarily, following a governor's recommendation that an area be declared nonattainment for a pollutant, EPA concurs with this assertion and declares the area nonattainment. Then the formal SIP process begins. This is an extensive, detailed process conducted by the state with the ultimate goal of demonstrating how the state plans to bring the area back into attainment for the pollutant in question, and prevent any future redesignation to nonattainment. A SIP adversely affects both industry and the TNRCC by requiring costly controls, limitations on future growth, and significant staff resources.

In response to the impending redesignation, various Houston industries, working under the HRM umbrella, decided to approach EPA and the Texas Air Control Board (TACB) with a proposal that they hoped could prevent the redesignation to nonattainment. They asked the two agencies if, instead of redesignating the area, they could voluntarily reduce their SO_2 allowable emissions and then conduct an in-depth modeling study to demonstrate that the area in Harris County was indeed attainment for SO_2. These industries were further motivated to conduct this voluntary plan when they learned of the success of a similar plan, conducted by Conoco in Ponca City, Oklahoma, which resulted in attainment demonstration for SO_2 through modeling of voluntarily reduced allowable emissions.

The plan got under way as of July 1991, when the TACB began sending out letters to SO_2-emitting companies asking them to explore the possibility of voluntarily reducing their SO_2 allowable emissions to mitigate the effects of the impending redesignation. In a letter from the former TACB Executive Director Steve Spaw to each of the affected companies, Mr. Spaw informed them that the area was about to be redesignated to nonattainment. He proposed that the companies consider reducing their SO_2 allowable emissions wherever possible, since EPA was going to determine the extent of the problem by modeling allowable emissions.

Particularly for the area near the Houston Ship Channel, huge reductions in SO_2 allowable emissions are possible without changing current operating conditions. This is because many of the plants have "fuel switch" permits, which allow them to switch from using natural gas to fuel oil, should economics or other criteria favor the switch. Since nearly all of these plants are currently using natural gas, their actual SO_2 emissions are a tiny fraction of their allowable SO_2 emissions.

On July 1, 1992, staff from EPA, Region 6 met with representatives of HRM, various Houston industries, and the TACB staff to discuss the status of the SO_2 air quality study for the Houston Ship Channel Area. As outlined in the meeting, the study was three-pronged: first, the development by Radian of a data base,

:d principally on data from the TACB's Air Point Source Data :e (PSDB), which would contain SO_2 allowable emissions for all $_2$-emitting plants in the Houston area; second, plans to obtain :nforceable reductions of SO_2 allowable emissions from various industries in the area; and finally, plans to conduct a comprehensive modeling analysis using these reduced emissions rates. As a result of this meeting, EPA agreed to defer temporarily the proposal of the area as nonattainment. This was premised on following a schedule for completion of the data base development, air quality modeling study, and the State's development of enforceable restrictions on SO_2 reductions. An additional result of this meeting was the agreement by all parties on the air quality dispersion modeling protocol that would be followed for the Houston SO_2 nonattainment study modeling analysis.

In a related matter, EPA, in a Federal Register notice dated September 22, 1992, proposed to revise the SO_2 and inhalable particulate matter (PM_{10}) designations for certain areas. This notice was published to address areas in states whose governors had already been notified that the areas were potential nonattainment areas. In this notice, Jefferson County, Texas, was the only Texas SO_2 potential nonattainment area addressed. EPA concluded that it would not propose the redesignation of Jefferson County to nonattainment, because it believed, as did Texas, that the monitored SO_2 violations were caused by an exceptional event.

EPA did not act on the Houston SO_2 nonattainment area in the September 22, 1992 notice. Instead, it granted the TACB, HRM, and the involved Houston industries additional time to develop the improved data base, to complete the modeling analysis, and for the TACB to put in place enforceable restrictions on the new SO_2 emission rates.

This project has been notable in its success in bringing all three sides -- industry, the TNRCC, and EPA -- together to produce a common goal. In a letter dated January 8, 1993 from the Director of EPA's Air, Pesticides and Toxics Division, Dr. Stanley Meiburg, to former TACB Executive Director William Campbell, Dr. Meiburg stated that he had "been very pleased with the outcome of the discussions and the effort being put forth by the TACB and the Houston industries to verify the SO_2 data base and with the effort to conduct the air quality modeling for the area." Later in the letter, Dr. Meiburg commented that EPA, Region 6, was being consistently apprised by the TACB of its staff's understanding of the status of the data base development and modeling analysis, and similarly, that Radian, working on behalf of HRM, was also keeping EPA consistently informed.

As of June 1994, EPA has continued to defer redesignation of Harris County to nonattainment for SO_2. Although the original timeline was delayed numerous times, each of the problems causing these delays were solved in a method satisfactory to the EPA.

is another indication of the level of success of the
)eration between industry, the TNRCC, and EPA.

; a result of this "Voluntary Reduction Plan", a total of about
)6,000 tons per year (TPY) of federally enforceable SO_2 allowable emissions reductions were obtained. This is a reduction of about 33% from the original areawide SO_2 allowable emissions total of about 287,000 tons. In this document, it will be shown that the new maximum SO_2 emission rates, when modeled under worst-case meteorological conditions, show no exceedances at any of the receptors in the modeling grid in any of the modeling runs. As the type of modeling conducted in this study is considered to be conservative (i.e. it overpredicts SO_2 concentrations), this document demonstrates SO_2 attainment for the potential SO_2 nonattainment area in Harris County, Texas.

c. Resolution of Areas of Concern

Several areas of concern with the final report submitted by Radian on April 16, 1993 were raised by the TACB and EPA. These concerns were resolved through a series of six teleconferences between Radian, EPA, and the TNRCC (see teleconference summaries in Appendix D). All areas of concern were resolved by the final teleconference held on August 9, 1993.

The first area of concern involved two off-property receptors, numbers 97 and 119, in the modeling study. These receptors had predicted 24-hour concentrations within 91 and 97 percent, respectively, of the NAAQS SO_2 standard (365 $\mu g/m^3$). Shell Chemical and Shell Oil Company (TNRCC Air Programs Account Number HG0659W) and Lyondell Petrochemical Company (Account Number HG0048L) were two principal contributors to these high concentrations. Shell provided a more representative emission rate for its source number 6320, and Lyondell provided updated emission rates for its source numbers 790, 850, 860, 950, 1010, 1020, 1070, and 1080. These new rates were then modeled. The revised concentrations for receptors 97 and 119 became 82 and 91 percent, respectively, of the 24-hour NAAQS standard. No further evaluation was requested by EPA staff since the highest percentages predicted for the other four meteorological years were substantially lower; that is, no higher than 62 and 76 percent of the NAAQS, respectively.

The second area of concern also involved the modeling study. Receptors located within the Exxon Company USA (Account Number HG0232Q) plant boundaries showed the highest predicted SO_2 concentrations. Although these concentrations exceeded the NAAQS on the Exxon property, this was not a concern; Exxon alone contributed the overwhelming portion of the predicted concentrations, so EPA did not consider these to be ambient air exceedances. Instead, the concern was that the concentrations

e high enough to adversely impact the air quality off the property. Discussion between EPA, the TNRCC, and Radian ensued regarding whether or not to add additional receptors along the property line of the Exxon Refinery to determine fenceline levels. In analyzing the receptors just outside the plant boundary, Radian found that although the maximum concentration was nearly 75% of the 24-hour NAAQS, the next highest receptor's concentration was only 58% of the 24-hour NAAQS. The concentration gradient in the vicinity of the Exxon facility is steep and concentrations dropped rapidly away from the property. Therefore, no additional evaluation was requested.

A third area of concern, also regarding the modeling study, involved receptor number 448, located within the Mobil Mining and Minerals plant boundary. This receptor consistently exhibited concentrations above the 24-hour NAAQS for all five modeled years. Following these results, the TNRCC staff worked with Mobil staff to develop more representative modeling parameters and emission rates. When this new data was modeled, predicted concentrations for all five years never exceeded 82% of the 24-hour NAAQS.

The final major area of concern was the determination of background concentration of SO_2 to be used in the model. The initial modeling analysis did not take background concentrations directly into account as Radian staff assumed that background

concentrations were already accounted for indirectly in the modeling.

Basically, the TNRCC staff agreed with Radian staff. However, EPA staff suggested that to be consistent with a similar plan which occurred previously at Ponca City, Oklahoma, a background value should be obtained using the ratio of area source emissions to point source emissions and multiplying that value times the highest high, second high concentration (i.e. the highest value of each receptor's second-highest concentration) to obtain a background concentration. The TNRCC agreed that for this exercise only, a background concentration would be developed and added to the 24-hour concentrations. In order to obtain the background value, the TNRCC staff first refined the total area source emissions estimate. This new value was compared with the refined total point source emissions value to obtain a ratioed value. This ratio was multiplied times the revised high, second high concentration at receptor 119. That is, background concentration = 1909/191158 TPY X 333 ug/m^3 = 3.3 ug/m^3. To determine if this value was representative, it was compared to the average monitored high, second high concentration obtained from the HRM Site #10, the only nearby monitor which all parties agreed could be representative of background concentrations. The monitored concentration was 3.5 ug/m^3. All parties then agreed to use the more conservative value of 3.5 ug/m^3 as the 24-hour background concentration.

2. AIR QUALITY

a. General

Violations of the 24-hour NAAQS SO_2 standard (365$\mu g/m^3$) occurred in 1986, 1988, and 1990 at a single monitor located near the Houston Ship Channel (see Appendix C). This monitor is operated by HRM, and is known as "HRM Site 3". Only one SO_2 exceedance has occurred since that time. It occurred in 1991 at the same monitor. Since the second-high concentration at the monitor for that year was below the NAAQS standard, there was no violation that year. In the time period in question (1986 - present), no SO_2 exceedances have occurred at any of the other HRM monitoring sites, nor at any TNRCC or City of Houston monitoring stations.

b. Instrumentation

There were a total of 16 SO_2 monitors in use in the greater Houston area during most of the attainment demonstration. Seven were operated by HRM, five were operated by the City of Houston (the Crawford SO_2 monitor was shut down in the final quarter of 1993, reducing the City's number of monitors to four), and four were operated by the TNRCC. A map showing their locations, along with accompanying data, is included in Appendix C of this document.

c. Current Design Value

EPA, in the Clean Air Act in 1970, set national standards for SO_2 concentrations. The SO_2 primary standard was set at 0.14 parts per million (PPM), or 365 $\mu g/m^3$, for a 24-hour averaging period, not to be exceeded more than once per calendar year. The primary standard also includes a 0.03 PPM (80 $\mu g/m^3$) standard for an annual averaging period, not to be exceeded at all. The secondary standard was set at 0.5 PPM (1300 $\mu g/m^3$) for a three-hour averaging period, not to be exceeded more than once per calendar year.

The TNRCC maintains its own SO_2 standards for Texas. Statewide, no plant, or other source(s) located on a property, may exceed a net ground level concentration of 0.4 PPM (1050 $\mu g/m^3$) for a 30-minute averaging period. For Harris County a more rigorous net ground level concentration of 0.28 PPM (730 $\mu g/m^3$), over the same averaging period, is enforced.

Monitoring data covering 1989 through 1993, for all sites in the Houston area, is included in Appendix C. An accompanying table shows dates of all exceedances observed in the HRM monitoring network since 1986. This data shows that the last violation (two or more exceedances) of any SO_2 standard at any monitoring site occurred at HRM site 3 in the first quarter of 1990, when both the high and second high concentrations exceeded the 24-hour

tandard. Since then no monitor has had both high and second high values which exceeded any NAAQS standard in any one calendar year; this is a total of 15 quarters without any violations (see Appendix C). Part of attainment demonstration, for an area that has been designated nonattainment, is to show eight quarters of data without violations. So Harris County, by this standard, has demonstrated attainment for SO_2 since 1990.

3. EMISSIONS INVENTORY

a. Introduction

A critical part of any modeling study is the emissions data used as inputs to the study. For this project, point source emissions inventory (EI) data was extracted from the TNRCC PSDB and then reviewed and quality assured by Radian. Area and mobile source emissions, which combined were only a small fraction of the point source emissions, were estimated using various methodologies. The emissions data was then input into the model to determine the extent of the SO_2 problem and to assess what emission reductions would be necessary to demonstrate attainment.

b. Point Source Emissions Inventory

The point source emissions data, covering every SO_2 source in Harris County, consisted principally of short-term emissions rates and source parameters. This data was extracted from PSDB in August 1991; it was then reviewed and quality assured before being entered into a data base Radian had developed. The short-term allowable emission rates were revised for any of the following reasons: reductions associated with the implementation of changes in 30 TAC Chapter 112, (which requires that liquid fuels have a sulfur content no higher than 0.3 wt%); shutdowns of some emission points and plants; changes in fuel type for some processes, resulting in different emissions at their points; sources in existence but not in PSDB; errors in PSDB; and finally, voluntary reductions due to other reasons. For grandfathered sources with uniform fuel combustion, the actual emission rate was used as the allowable emission rate.

Radian used several resources to conduct the quality assurance of the EI data. Permit files were examined to determine the type of fuel used and to recalculate emissions based on future 30 TAC Chapter 112 compliance requirements for fuel oil sources. Previous nonattainment studies provided shutdown sources and other source-related information, when verified. The TACB sent letters to 58 facilities in Harris County in August 1991 requesting voluntary reductions in their allowable emissions;

adian examined the responses and incorporated revisions where appropriate. The EPA SO_2 Increment Inventory, conducted in 1990, contained an abundance of information for sources in Harris County emitting SO_2 at a rate of 3 grams/second (104 TPY) or greater. Finally, Radian sent letters to 112 facilities in Harris County requesting information on short-term actual and allowable emission rates; the information collected in the responses was incorporated where appropriate.

For those facilities that agreed to voluntarily reduce their actual and/or allowable SO_2 emissions, voluntary reduction letters were submitted to the plants for confirmation and signature. Voluntary reductions for permitted and standard-exempted emission points will be trackable and enforceable because the changes in maximum allowable emission rates will be reflected in the appropriate permits and/or standard exemptions. Reductions for non-permitted or standard-exempted emission points will be included in the Agreed Orders and will therefore be federally enforceable.

When the initial set of data was extracted from PSDB and given to Radian, there was a total of about 287,000 TPY of allowable SO_2 emissions. Once the quality assurance of this data was complete, this total had dropped to 193,000 TPY. Some of these reductions were due to companies volunteering to reduce the sulfur content of their liquid fuel(s) combusted to a maximum of

0.3% by weight; a subsequent revision to 30 TAC Chapter 112, implemented in July 1993, made the 0.3% sulfur content mandatory for nearly all facilities in Harris and Jefferson Counties. Other than by this method, all reductions were obtained by Agreed Orders for grandfathered facilities, by permit changes at permitted facilities, or by standard exemptions.

c. Area and Mobile Sources Emissions Inventory

The original estimate of area and mobile source emissions combined (i.e. background emissions) was 10,660 TPY. When the initial modeling analysis was done, these background emissions were disregarded as input to the model, as they were considered insignificant relative to the point source emissions. However, EPA decided that to be consistent with a previously submitted voluntary reduction plan (for Ponca City, Oklahoma), background concentration must be included in the model input. With this information the decision was made to carefully recalculate background emissions, because not only did they play a crucial role in the determination of background concentration, but their original estimation was largely based on obsolete data. The methodologies in the following paragraphs were used to reestimate emissions (tables showing how these emissions were estimated are located in Appendix E).

SO_2 emissions for background combustion sources were arrived at by taking the most recent carbon monoxide (CO) emissions estimates (from the 1990 TACB EI) and applying the ratio of the SO_2 emission factor to the CO emission factor found in the EPA document, AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants (450/4-90-003) for 0.3 wt % sulfur content fuel.

SO_2 emissions for aircraft and marine vessels were obtained by using CO emissions data (also from the 1990 TACB EI) for the two categories and multiplying them by the ratio of SO_2 and CO emission factors found in Table 5-3, Vol. IV, Procedures for Emission Inventory Preparation, EPA 450/4-81-026d (Rev.). The 1992 edition was used for aircraft and the 1989 edition was used for marine vessels.

Difficulty was encountered in attempting to locate SO_2 emission factors for off-highway vehicle emissions and highway vehicle emissions. While pursuing these factors, an EPA document, Nonroad Engine and Vehicle Emission Study -- Report (Ofc. of Air and Radiation, 21A-2001, November 1991), was consulted. Table 302 of this document, titled "Air Toxics Emission Inventories", provided information on sulfur oxides (SO_x) emissions (according to the text, the emissions were "derived from EPA's 1989 emission trends report".) In the table, the SO_x emissions were divided into three categories: "Nonroad sources", "Highway sources",

and "Other Area and Point Sources". This table showed that nonroad vehicle and highway vehicle SO_x sources combined were only 3.8% of the total SO_x emissions, with the remainder being attributable to "Other Area and Point Sources". This is a reasonable indication of the insignificance of vehicle SO_2 emissions relative to other categories. For this reason, and due to the fact that SO_2 emission factors were difficult to obtain, it was decided to ignore the SO_2 emissions from these categories.

The net result of recalculating background emissions was that the total dropped significantly. Using the most recent data for Harris County and including the reduction of sulfur content of fuels, background SO_2 emissions were now estimated to be 1,909 TPY.

4. MODELING RESULTS

a. Introduction

A critical step in the determination of future attainment status for an area is to conduct a thorough, accurate modeling study. The results of Radian's modeling analysis, described in Evaluation of Potential 24-Hour SO_2 Nonattainment Area in Harris County, Texas Phase II (April 16, 1993), Volumes I and II have demonstrated attainment for Harris County. The TNRCC Modeling Section staff reviewed Radian's analysis of 24-hour impacts.

Additionally, the TNRCC agreed to supplement the report by providing its own analysis of the results of the three-hour and annual modeling, which was also performed by Radian.

b. Technical Review of the Radian Report

The TNRCC staff reviewed Radian's report, Evaluation of Potential 24-Hour SO_2 Nonattainment Area in Harris County, Texas Phase II (April 16, 1993), Volumes I and II for technical accuracy and completeness, and found it acceptable. Minor discrepancies were identified and evaluated to determine whether they would cause a significant change to the modeling results. The staff determined that no significant changes would occur; therefore, the modeling demonstration did not need to be redone.

c. Supplemental Modeling Analysis

Radian Corporation submitted an addendum to the report mentioned in the previous paragraph. This addendum, completed in June 1994, contains an SO_2 emissions inventory that was revised for a few facilities, and supplemental modeling that was required to demonstrate that those emission changes would not significantly change the results of the initial modeling demonstration. The TNRCC staff's review of Radian's addendum is further delineated in Appendix K of this document.

d. Technical Approach of the TNRCC Modeling Analysis

A brief description of Radian's modeling protocol for the three-hour and annual modeling runs is presented in this section. Radian conducted modeling using the EPA's Industrial Source Complex Short-Term 2 (ISCST2) model, and provided output data in the form of three-hour and annual concentrations, for the same receptors used in their 24-hour modeling demonstration. The TNRCC staff then analyzed this output data.

1) Dispersion Modeling Analysis

The TNRCC staff reviewed and analyzed the results of the three-hour and annual modeling runs. In the analysis of predicted exceedances, the TNRCC staff used an updated version of the ISCST2 model (version 92273) which was not available to Radian staff at the time their modeling was conducted. This version contains minor maintenance modifications to ISCST2 version 92062, the version used by Radian. Modeling results should not differ significantly between the two versions of the model.

2) Analytical Procedure

The analysis of the three-hour and annual studies began with the TNRCC staff compiling a list of all predicted exceedances of the three-hour and annual SO_2 NAAQS for each meteorological year

f the five-year evaluation period. They identified and separated receptors into two categories: either "on the property" of an SO_2 facility or "off the property" of an SO_2 facility in ambient air. Then each exceedance was analyzed by category.

a) On-Property Exceedance Analysis

The on-property exceedance analysis began with a sensitivity screening procedure which was used to determine the contribution to the exceedance by on-property sources. Then the on-property concentration was subtracted from the total concentration to obtain the contribution from all other off-property sources. If the contribution from off-property sources was less than the NAAQS, then the "ambient-air" standard at the receptor located on property was not exceeded.

b) Ambient-Air Exceedance Analysis

A slightly different procedure was used for the ambient-air exceedance analysis since the predicted annual exceedances were based on short-term rather than long-term emission rates. Radian staff used short-term emission rates to expedite the modeling process, and used an ISCST2 model option to calculate annual averages in the same model run used to calculate three- and 24-hour averages. The predicted annual concentrations should be

more conservative as more refined meteorology was used and short-term emission rates were equal to or greater than long-term rates.

The procedure began with a sensitivity analysis to identify significant off-property contributors to the exceedance. Next, long-term or updated short-term emission rates were obtained as appropriate to reduce predicted concentrations below the annual NAAQS. Since the goal was to demonstrate attainment with worst-case emission rates, the TNRCC staff did not attempt to identify and obtain long-term emission rates from all sources.

e. Results and Discussion

The following discussion addresses the analyses of output from the three-hour and annual modeling runs and some of the predicted concentrations that were high. The results from exceedance analyses are contained in Tables 4-1 through 4-3 (Appendix F).

1) Three-Hour Exceedance Evaluation

There were two predicted three-hour exceedances. Each predicted exceedance was at the same receptor on Exxon Company USA (HG0232Q) property, and Exxon sources were the major contributors to the modeled concentrations. Since there were no significant

off-property contributions there was no ambient-air exceedance on Exxon's property (Table 4-1).

2) Annual Exceedance Evaluation at On-Property Receptors

There were 67 predicted exceedances of the annual NAAQS during the five-year period of record. None of the off-property contributions exceeded the NAAQS; therefore, there was no ambient-air exceedance at the on-property receptors (Table 4-2).

3) Annual Exceedance Evaluation at Ambient-Air Receptors

There were 11 predicted exceedances at ambient-air receptors, ten in or near the Houston Ship Channel and one occurring at a receptor located within a non-SO_2 emitting facility (Table 4-3).

a) Ship Channel Exceedances

Significant contributors to the predicted Ship Channel exceedances were Shell Chemical and Shell Oil Company (Account Number HG0659W) and Lyondell Petrochemical Company (Account Number HG0048L). A more accurate long-term emission rate for Shell source 6320 and reduced emission rates from Lyondell sources 790, 850, 860, 950, 1010, 1020, 1070, and 1080 were obtained and

modeled. Modeling these new rates resulted in no predicted exceedances. The new rates will be reflected in federally enforceable permit changes (see Appendix H for table of permits affected by this attainment demonstration).

b) Exceedance at Greensport Terminal

There was one predicted exceedance at a receptor located on the property of Greensport Terminal, a non-SO_2 emitting facility. Mobil Mining and Minerals (Account No. HG0534U), located near this facility, was the significant contributor to the predicted exceedance. The TNRCC staff worked with Mobil staff to develop more representative modeling parameters and emission rates. Modeling conducted with these new parameters and rates resulted in no predicted exceedances. These data will be included in the Agreed Order.

f. Conclusions

The TNRCC staff supports the designation of Harris County as an attainment area.

g. Documentation

See Appendices G and K.

5. MANAGEMENT OF NEW SOURCE GROWTH

New source growth is covered by the New Source Review and Prevention of Significant Deterioration permitting requirements. These programs shall insure that the SO_2 NAAQS is preserved.

6. PROPOSED CONTROL STRATEGY

a. Required Controls

No additional controls are necessary in order to demonstrate attainment and no regulation changes are required.

b. Contingency Measures

Contingency measures are not required since SO_2 control measures are by definition based upon what is directly and quantifiably necessary to attain the SO_2 NAAQS. It would be unlikely for an area to implement the necessary emissions controls yet fail to attain the NAAQS. The TNRCC has a comprehensive program to identify sources of violation and undertake aggressive follow-up for compliance and enforcement.

7. APPENDICES

APPENDIX A - Governor Richards' Nonattainment Declaration

APPENDIX B - Radian Corporation's Attainment Demonstration Report

APPENDIX C - SO_2 Monitoring Station Data

APPENDIX D - Teleconference Summaries

APPENDIX E - Background Emissions Estimation

APPENDIX F - Modeling Study Summary Tables

APPENDIX G - Disk Directory of Modeling Files

APPENDIX H - Table of Affected Permits

APPENDIX I - Signed Agreed Orders

APPENDIX J - List of Affected Facilities

APPENDIX K - Supplemental Modeling Analysis