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

DALLAS-FORT WORTH 1997 EIGHT-HOUR OZONE STANDARD NONATTAINMENT AREA

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
P.O. BOX 13087
AUSTIN, TEXAS 78711-3087

DALLAS-FORT WORTH REASONABLE FURTHER PROGRESS STATE IMPLEMENTATION PLAN REVISION FOR THE 1997 EIGHT-HOUR OZONE STANDARD

Project Number 2010-023-SIP-NR

Proposed June 8, 2011

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EXECUTIVE SUMMARY

The 1990 Federal Clean Air Act (FCAA) Amendments, §182, require ozone nonattainment areas with air quality classified as moderate or higher to submit plans showing reasonable further progress (RFP) toward attainment of the ozone National Ambient Air Quality Standard (NAAQS). The Dallas-Fort Worth (DFW) nonattainment area (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant Counties) is classified as a serious nonattainment area for the 1997 eight-hour ozone standard, with an attainment date of June 15, 2013. While the attainment date for the DFW area is June 15, 2013, the DFW area must implement all RFP reductions by the end of 2012, the attainment year. This proposed state implementation plan (SIP) revision is not required or intended to demonstrate attainment of the ozone NAAQS, but rather to demonstrate that the DFW nonattainment area will meet the RFP requirements for serious ozone nonattainment areas. RFP requirements for serious ozone nonattainment areas, as specified in Section 182(c)(2) of the 1990 FCAA Amendments and in federal regulations (40 Code of Federal Regulations §51.910), involve reducing ozone precursor emissions (nitrogen oxides (NO_X) and volatile organic compounds (VOC)) at annual increments between the 2002 base year and the 2012 attainment year.

The DFW RFP analysis has two RFP milestone years: 2011 and 2012. Between 2002 and 2008, 15% VOC emissions reductions were calculated for the five counties (Ellis, Johnson, Kaufman, Parker, and Rockwall Counties) added to the DFW nonattainment area under the 1997 eight-hour ozone standard, and 15% VOC and/or NO_X emissions reductions were calculated for the four original DFW nonattainment counties (Collin, Dallas, Denton, and Tarrant Counties). While emissions and reductions were calculated from 2002 through 2008, 2008 was not considered a milestone year for this proposed SIP revision because the United States Environmental Protection Agency (EPA) already approved the 2008 milestone year in the 2007 DFW Eight-Hour Ozone Nonattainment Area RFP SIP revision submittal (Project No. 2006-031-SIP-NR). The additional RFP milestone years requirements for this proposal are:

- a 9% emissions reduction for the three-year period from January 1, 2009 through December 31, 2011 for the entire DFW nonattainment area;
- a 3% emissions reduction for the one-year period from January 1, 2012 through December 31, 2012 for the entire DFW nonattainment area; and
- a 3% emissions reduction for the one-year period from January 1, 2013 through December 31, 2013 as attainment year RFP contingency for the entire DFW nonattainment area.

This proposed SIP revision incorporates a concurrently proposed VOC storage rulemaking for the DFW area (Rule Project No. 2010-025-115-EN). The rulemaking, if adopted, would reduce VOC emissions from affected sources in the DFW area by increasing the level of control for floating roof tanks. The proposed rulemaking would also require 95% control of VOC emissions from crude oil and condensate storage tanks emitting 25 tons or more of VOC per year.

This proposed SIP revision does not demonstrate RFP for the 2011 milestone year at this time using the EPA's MOBILE6.2 model due to a shortfall in VOC reductions; however, this proposed SIP revision does demonstrate RFP for the 2012 milestone year as well as milestone year and attainment year RFP contingency. The 2012 RFP demonstration includes reported emissions reductions from the Texas Emission Reduction Program (TERP) between 2008 and 2010 as part of this calculation. The Texas Commission on Environmental Quality (TCEQ) is considering a number of solutions to address any VOC reduction shortfall for the 2012 milestone year prior to adoption of the SIP revision by the commission. A solution currently being considered to

address the VOC shortfall includes investigating possible additional control measures. The process of investigation of new measures would include public participation.

The on-road mobile emissions inventories used for this proposed RFP SIP revision were developed using the EPA's MOBILE6.2 model; however, preliminary MOVES-based inventories are also included. The TCEQ is taking comment on the use of on-road mobile emissions inventories based on MOBILE6.2 and MOVES in the adopted version of the DFW RFP SIP revision.

The RFP methodology involves development of the base year and milestone years emissions inventories, emissions reductions for each milestone year, and an estimate of the effects of non-creditable reductions due to rules promulgated prior to the 1990 FCAA Amendments. The amount of emissions reductions is determined through the RFP methodology. Once calculated, the milestone target levels and emissions inventories can be compared to determine if the forecasted post-control emissions inventories are less than the target level, thus meeting FCAA RFP requirements. The results of the DFW RFP milestone years comparisons are displayed in Chapter 3: *Progress Toward Meeting Target Emissions Levels* Table 3-4: *Calculation of Required 15% and 3% per Year NO_X and VOC Reductions for the DFW RFP*.

This proposed SIP revision would also set the NO_X and VOC motor vehicle emissions budgets (MVEB) for transportation conformity purposes for 2011 and 2012. An MVEB is the on-road mobile source allocation of the total allowable emissions for each applicable criteria pollutant or precursor, as defined in the SIP. Transportation conformity determinations must be performed using the budget test once the EPA determines the budget adequate for transportation conformity purposes. To pass the budget test, areas must demonstrate that the estimated emissions from transportation plans, programs, and projects do not exceed the MVEB for the established year.

Because the DFW area has been reclassified as a serious nonattainment area for the 1997 eight-hour ozone NAAQS, the RFP milestone years adopted in the previous 2007 DFW Eight-Hour Ozone Nonattainment Area RFP SIP revision (Project No. 2006-031-SIP-NR) have been revised to reflect the area's extended attainment date. Chapter 5: *Motor Vehicle Emissions Budgets* documents the development of the revised RFP MVEBs for the DFW ozone nonattainment area.

SECTION V: LEGAL AUTHORITY

General

The Texas Commission on Environmental Quality (TCEQ) has the legal authority to implement, maintain, and enforce the National Ambient Air Quality Standards (NAAQS) and to control the quality of the state's air, including maintaining adequate visibility.

The first air pollution control act, known as the Clean Air Act of Texas, was passed by the Texas Legislature in 1965. In 1967, the Clean Air Act of Texas was superseded by a more comprehensive statute, the Texas Clean Air Act (TCAA), found in Article 4477-5, Vernon's Texas Civil Statutes. The legislature amended the TCAA in 1969, 1971, 1973, 1979, 1985, 1987, 1989, 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005, 2007, and 2009. In 1989, the TCAA was codified as Chapter 382 of the Texas Health and Safety Code.

Originally, the TCAA stated that the Texas Air Control Board (TACB) is the state air pollution control agency and is the principal authority in the state on matters relating to the quality of air resources. In 1991, the legislature abolished the TACB effective September 1, 1993, and its powers, duties, responsibilities, and functions were transferred to the Texas Natural Resource Conservation Commission (TNRCC). With the creation of the TNRCC, the authority over air quality is found in both the Texas Water Code and the TCAA. Specifically, the authority of the TNRCC is found in Chapters 5 and 7. Chapter 5, Subchapters A - F, H - J, and L, include the general provisions, organization, and general powers and duties of the TNRCC, and the responsibilities and authority of the executive director. Chapter 5 also authorizes the TNRCC to implement action when emergency conditions arise and to conduct hearings. Chapter 7 gives the TNRCC enforcement authority. In 2001, the 77th Texas Legislature continued the existence of the TNRCC until September 1, 2013, and changed the name of the TNRCC to the TCEQ. In 2009, the 81st Texas Legislature, during a special session, amended section 5.014 of the Texas Water Code, changing the expiration date of the TCEQ to September 1, 2011, unless continued in existence by the Texas Sunset Act.

The TCAA specifically authorizes the TCEQ to establish the level of quality to be maintained in the state's air and to control the quality of the state's air by preparing and developing a general, comprehensive plan. The TCAA, Subchapters A - D, also authorize the TCEQ to collect information to enable the commission to develop an inventory of emissions; to conduct research and investigations; to enter property and examine records; to prescribe monitoring requirements; to institute enforcement proceedings; to enter into contracts and execute instruments; to formulate rules; to issue orders taking into consideration factors bearing upon health, welfare, social and economic factors, and practicability and reasonableness; to conduct hearings; to establish air quality control regions; to encourage cooperation with citizens' groups and other agencies and political subdivisions of the state as well as with industries and the federal government; and to establish and operate a system of permits for construction or modification of facilities.

Local government authority is found in Subchapter E of the TCAA. Local governments have the same power as the TCEQ to enter property and make inspections. They also may make recommendations to the commission concerning any action of the TCEQ that affects their territorial jurisdiction, may bring enforcement actions, and may execute cooperative agreements with the TCEQ or other local governments. In addition, a city or town may enact and enforce ordinances for the control and abatement of air pollution not inconsistent with the provisions of the TCAA and the rules or orders of the commission.

Subchapters G and H of the TCAA authorize the TCEQ to establish vehicle inspection and maintenance programs in certain areas of the state, consistent with the requirements of the Federal Clean Air Act; coordinate with federal, state, and local transportation planning agencies to develop and implement transportation programs and measures necessary to attain and maintain the NAAQS; establish gasoline volatility and low emission diesel standards; and fund and authorize participating counties to implement vehicle repair assistance, retrofit, and accelerated vehicle retirement programs.

Applicable Law

The following statutes and rules provide necessary authority to adopt and implement the state implementation plan (SIP). The rules listed below have previously been submitted as part of the SIP.

Statutes

All sections of each subchapter are included, unless otherwise noted.

TEXAS HEALTH & SAFETY CODE, Chapter 382	September 1, 2009
TEXAS WATER CODE	September 1, 2009

Chapter 5: Texas Natural Resource Conservation Commission

- Subchapter A: General Provisions
- Subchapter B: Organization of the Texas Natural Resource Conservation Commission
- Subchapter C: Texas Natural Resource Conservation Commission
- Subchapter D: General Powers and Duties of the Commission
- Subchapter E: Administrative Provisions for Commission
- Subchapter F: Executive Director (except §§5.225, 5.226, 5.227, 5.2275,5.231, 5.232, and 5.236)
- Subchapter H: Delegation of Hearings
- Subchapter I: Judicial Review
- Subchapter J: Consolidated Permit Processing
- Subchapter L: Emergency and Temporary Orders (§§5.514, 5.5145, and 5.515 only)
- Subchapter M: Environmental Permitting Procedures (§5.558 only)

Chapter 7: Enforcement

- Subchapter A: General Provisions (§§7.001, 7.002, 7.0025, 7.004, and 7.005 only)
- Subchapter B: Corrective Action and Injunctive Relief (§7.032 only)
- Subchapter C: Administrative Penalties
- Subchapter D: Civil Penalties (except §7.109)
- Subchapter E: Criminal Offenses and Penalties: §§7.177, 7.179-7.183

Rules

All of the following rules are found in 30 Texas Administrative Code, as of the following latest effective dates:

Chapter 7: Memoranda of Understanding, §§7.110 and 7.119	December 13, 1996 and May 2, 2002
Chapter 19: Electronic Reporting	March 15, 2007
Chapter 35: Subchapters A-C, K: Emergency and Temporary Orders and Permits; Temporary Suspension or Amendment of Permit Conditions	July 20, 2006

Chapter 39: Public Notice, §§39.201; 39.401; 39.403(a) and (b)(8)-(10); 39.405(f)(1) and (g); 39.409; 39.411 (a), (b)(1)-(6), and (8)-(10) and (c)(1)-(6) and (d); 39.413(9), (11), (12), and (14); 39.418(a) and (b)(3) and (4); 39.419(a), (b), (d), and (e); 39.420(a), (b) and (c)(3) and (4); 39.423 (a) and (b); 39.601-39.605 June 24, 2010

Chapter 55: Requests for Reconsideration and Contested Case Hearings; Public Comment, §§55.1; 55.21(a) - (d), (e)(2), (3), and (12), (f) and (g); 55.101(a), (b), and (c)(6) - (8); 55.103; 55.150; 55.152(a)(1), (2), and (6) and (b); 55.154; 55.156; 55.200; 55.201(a) - (h); 55.203; 55.205; 55.209, and 55.211 June 24, 2010

Chapter 101: General Air Quality Rules May 12, 2011

Chapter 106: Permits by Rule, Subchapter A May 12, 2011

Chapter 111: Control of Air Pollution from Visible Emissions and Particulate Matter July 19, 2006

Chapter 112: Control of Air Pollution from Sulfur Compounds July 16, 1997

Chapter 113: Standards of Performance for Hazardous Air Pollutants and for Designated Facilities and Pollutants May 14, 2009

Chapter 114: Control of Air Pollution from Motor Vehicles December 13, 2010

Chapter 115: Control of Air Pollution from Volatile Organic Compounds February 17, 2011

Chapter 116: Permits for New Construction or Modification March 3, 2011

Chapter 117: Control of Air Pollution from Nitrogen Compounds May 12, 2011

Chapter 118: Control of Air Pollution Episodes March 5, 2000

Chapter 122: §122.122: Potential to Emit December 11, 2002

Chapter 122: §122.215: Minor Permit Revisions June 3, 2001

Chapter 122: §122.216: Applications for Minor Permit Revisions June 3, 2001

Chapter 122: §122.217: Procedures for Minor Permit Revisions December 11, 2002

Chapter 122: §122.218: Minor Permit Revision Procedures for Permit Revisions Involving the Use of Economic Incentives, Marketable Permits, and Emissions Trading June 3, 2001

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   2. Houston-Galveston-Brazoria (No change)
   3. Beaumont-Port Arthur (No change)
   4. El Paso (No change)
   5. Regional Strategies (No change)
   6. Northeast Texas (No change)
   7. Austin Area (No change)
   8. San Antonio Area (No change)
   9. Victoria Area (No change)
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ABY	Adjusted Base Year
ATP	Anti-Tampering Program
APU	Auxiliary Power Unit
CFR	Code of Federal Regulations
DFW	Dallas-Fort Worth
EGAS	Economic Growth Analysis System
EGU	Electric Generating Unit
EIQ	Emissions Inventory Questionnaire
EPA	United States Environmental Protection Agency
DERC	Discrete Emissions Reduction Credit
FCAA	Federal Clean Air Act
FMVCP	Federal Motor Vehicle Control Program
FR	*Federal Register*
GSE	Ground Support Equipment
HDDV	Heavy Duty Diesel Vehicles
HGB	Houston-Galveston-Brazoria
HPMS	Highway Performance Monitoring System
I/M	Inspection and Maintenance
MOVES	Motor Vehicle Emission Simulator
MVEB	Motor Vehicle Emissions Budget
NAAQS	National Ambient Air Quality Standard
NCTCOG	North Central Texas Council of Governments
NLEV	National Low Emission Vehicle Program
NO_X	Nitrogen Oxides
Pechan	E.H. Pechan and Associates, Inc.
PEI	Periodic Emissions Inventory
PN	Percent of Nitrogen Oxides
ppb	Parts per Billion
PV	Percent of Volatile Organic Compounds
REMI	Regional Economic Modeling, Inc.
RFG	Reformulated Gasoline
RFP	Reasonable Further Progress
ROP	Rate of Progress

RVP	Reid Vapor Pressure
SI	Spark Ignition
SIP	State Implementation Plan
STARS	State of Texas Air Reporting System
TAC	Texas Administrative Code
TACB	Texas Air Control Board
TCAA	Texas Clean Air Act
TCEQ	Texas Commission on Environmental Quality (commission)
TCM	Transportation Control Measure
TDM	Travel Demand Model
TERP	Texas Emission Reduction Program
TexN	Texas NONROAD Model
TNRCC	Texas Natural Resource Conservation Commission
tpd	Tons per Day
TxLED	Texas Low Emission Diesel
USC	United States Code
VMEP	Voluntary Mobile Emission Reduction Program
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds

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CHAPTER 1: GENERAL

1.1 DALLAS-FORT WORTH REASONABLE FURTHER PROGRESS BACKGROUND

The *History of the Texas State Implementation Plan*, a comprehensive overview of the state implementation plan (SIP) revisions submitted to the United States Environmental Protection Agency (EPA) by the State of Texas, is available on the Introduction to the SIP Web page (http://www.tceq.texas.gov/airquality/sip/sipintro.html/) through the Texas Commission on Environmental Quality's (TCEQ) main Web page (http://www.tceq.texas.gov).

Under the revoked one-hour ozone standard, the Dallas-Fort Worth (DFW) nonattainment area comprised Collin, Dallas, Denton, and Tarrant Counties. For those four counties, the EPA approved a rate of progress (ROP) SIP revision on April 12, 2005, which demonstrated a 15% reduction in volatile organic compounds (VOC) between 1990 and 1996 (70 *Federal Register* (FR) 18993).

On April 30, 2004, nonattainment area designations were published as part of the first phase of the EPA's implementation rule for the 1997 eight-hour ozone standard (69 FR 23936). The DFW nonattainment area was redefined as Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant Counties, which includes the original four-county one-hour ozone standard nonattainment area. The DFW 1997 eight-hour ozone nonattainment area was classified as a moderate nonattainment area, for which the Texas Commission on Environmental Quality (TCEQ) was required to submit attainment demonstration and reasonable further progress (RFP) SIP revisions to the EPA by June 15, 2007.

Phase II of the EPA's implementation rule for the 1997 eight-hour ozone standard (70 FR 71612) established RFP submittal guidelines that required nonattainment areas partially composed of one-hour ozone standard nonattainment areas with approved 15% ROP SIP revisions, like the DFW area, to choose between two options: (1) submit a 1997 eight-hour ozone standard RFP SIP revision demonstrating 15% VOC emissions reductions for the entire eight-hour nonattainment area; or (2) submit a 1997 eight-hour ozone standard RFP SIP revision demonstrating 15% VOC emissions reductions for the newly designated portion of the 1997 eight-hour nonattainment area and VOC and/or nitrogen oxides (NO_X) emissions reductions for the portion of the nonattainment area containing an approved one-hour ozone standard 15% ROP SIP revision. On May 23, 2007, the commission adopted the 2007 Dallas-Fort Worth Eight-Hour Ozone Nonattainment Area Reasonable Further Progress State Implementation Plan Revision (Project No. 2006-031-SIP-NR) based on the second option. Phase II of the EPA's implementation rule for the 1997 eight-hour ozone standard allows ozone nonattainment areas to substitute NO_X reductions for VOC reductions, but use of NO_X emissions reductions must meet the criteria in §182(c)(2)(C) in the Federal Clean Air Act (FCAA).[1] With both of the EPA's eight-hour ozone SIP options, NO_X may be substituted for VOC after the initial 15% VOC emissions reductions requirement is met, and a minimum of 3% per year NO_X and/or VOC emissions reductions is required out to attainment, beyond the initial 15% reductions.

Effective January 19, 2011, the EPA finalized a determination that the DFW nonattainment area did not attain the 1997 eight-hour ozone standard by June 15, 2010, the deadline included in the 2007 DFW RFP SIP revision and established in Phase I of the 1997 eight-hour ozone standard

[1] NO_X may be substituted for VOC under conditions defined in the EPA's December 1993 NO_X Substitution Guidance (http://www.epa.gov/ttncaaa1/t1/memoranda/noxsubst.pdf).

implementation rule for areas classified as moderate (75 FR 79302). Attainment of the 1997 eight-hour ozone standard (expressed as 0.08 parts per million) is achieved when an area's design value from the previous ozone season does not exceed 84 parts per billion (ppb). The DFW area's 2009 design value of 86 ppb exceeded that standard. Based on the EPA's determination of failure to attain, the EPA reclassified the DFW nonattainment area to serious and set a January 19, 2012, deadline for the state to submit an attainment demonstration SIP revision that addresses the 1997 eight-hour ozone standard nonattainment serious area requirements, including RFP. The DFW area's new attainment date for the 1997 eight-hour ozone standard is as expeditiously as practicable, but no later than June 15, 2013.

1.2 RFP REQUIREMENTS

The 1990 FCAA amendments, 42 United States Code §7410, require states to submit SIP revisions that contain enforceable measures to achieve the National Ambient Air Quality Standards (NAAQS). The FCAA also requires states with nonattainment areas classified as moderate or above to submit plans showing reasonable further progress toward attainment of the ozone standard. This proposed RFP SIP revision is neither required for, nor intended to demonstrate attainment of the ozone NAAQS, but rather to demonstrate that ozone precursor emissions (NO_X and/or VOC) will be reduced by specified amounts between the 2002 base year and the DFW nonattainment area's attainment year. The attainment date for the DFW area is June 15, 2013, but the DFW area's attainment year is 2012. Phase II of the EPA's 1997 eight-hour ozone standard implementation plan states that RFP requirements must be implemented by the end of the attainment year, which is the year containing the ozone season immediately preceding an area's attainment date (70 FR 71649).

Section 182(b)(1)(A) of the FCAA requires states with ozone nonattainment areas classified as moderate or higher to submit plans providing for a 15% reduction in VOC emissions in those areas. Section 182(c)(2) of the FCAA requires states with ozone nonattainment areas classified as serious or higher to submit plans providing for additional 3% annual combined reductions of NO_X, and VOC averaged over three-year increments, until the area's attainment deadline. This proposed SIP revision includes RFP target emissions reductions for:

- 2002 to 2008, which includes 15% NO_X and/or VOC reductions for the four original DFW nonattainment counties and 15% VOC reductions for the five counties added to the DFW nonattainment area under the 1997 eight-hour ozone standard;
- 2008 to 2011, which includes 9% NO_X and/or VOC reductions for all nine DFW nonattainment counties; and
- 2011 to 2012, which includes 3% NO_X and/or VOC reductions for all nine DFW nonattainment counties.

This proposal contains two milestone years, 2011 and 2012. Emissions inventories and RFP control reductions between 2002 and 2008 are included in the calculations for this SIP revision, but this proposal does not include a 2008 milestone year. The EPA approved the 2008 milestone year RFP demonstration included in the 2007 DFW RFP SIP revision (73 FR 58475).

In addition to the RFP analysis, this proposed SIP revision provides updated 2011 and 2012 RFP on-road motor vehicle emissions budgets and updated 2002 emissions inventories for point, area, non-road mobile, and on-road mobile sources. This proposed SIP revision also includes existing contingency measures requirements to be implemented if the area fails to achieve the RFP milestones.

A summary of the DFW area's progress toward meeting RFP requirements can be found in Appendix 1: *MOBILE6.2-Based Dallas-Fort Worth Nonattainment Area Reasonable Further Progress Demonstration Calculations Spreadsheet.*

1.2.1 Opportunities to Demonstrate RFP

Current RFP analyses indicate that this proposed SIP revision does not demonstrate RFP for the 2011 milestone year due to a shortfall in VOC reductions; however, this proposed SIP revision does demonstrate RFP for the 2012 milestone year. Milestone year and attainment year RFP contingency are also demonstrated in this proposal. The TCEQ is considering incorporating additional estimated emissions reductions from the Texas Emissions Reduction Program (TERP) into the SIP, as necessary, to address the target reductions presented in this proposal. Should further reductions be necessary to demonstrate RFP prior to adoption of this SIP revision, the commission may also investigate possible additional control measures. The process of investigation of new measures would include public participation.

1.3 PUBLIC HEARING AND COMMENT INFORMATION

The commission will offer public hearings at the times and locations listed below.

Table 1-1: Public Hearing Information

City	Date	Time	Location
Arlington	July 14, 2011	10:00 AM	Arlington City Council Chambers 101 W. Abram St. Arlington, TX 76010
Arlington	July 14, 2011	6:30 PM	Arlington City Council Chambers 101 W. Abram St. Arlington, TX 76010
Austin	July 22, 2011	2:00 PM	TCEQ Headquarters 12100 Park 35 Circle Bldg. E, Rm. 201 Austin, TX 78753

The public comment period will open on June 24, 2011, and close on July 25, 2011. Notice of public hearings for this SIP revision will be published in the *Texas Register* and various newspapers. Written comments will be accepted via mail, fax, or through the eComments system. All comments should reference the "Dallas-Fort Worth Reasonable Further Progress State Implementation Plan Revision for the 1997 Eight-Hour Ozone Standard" and Project Number 2010-023-SIP-NR. Comments may be submitted to Jamie Zech, MC 206, State Implementation Plan Team, Chief Engineer's Office, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087 or faxed to (512) 239-5687. If you choose to submit electronic comments, they must be submitted through the eComments (http://www5.tceq.state.tx.us/rules/ecomments) system. File size restrictions may apply to comments being submitted via the eComments system. Comments must be received by July 25, 2011.

1.4 SOCIAL AND ECONOMIC CONSIDERATIONS

For a detailed explanation of the social and economic issues involved with any of the measures, please refer to the preamble that precedes the concurrently proposed VOC storage rulemaking for the DFW area (Rule Project No. 2010-025-115-EN).

1.5 FISCAL AND MANPOWER RESOURCES

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

CHAPTER 2: EMISSIONS INVENTORIES

2.1 INTRODUCTION

The Federal Clean Air Act (FCAA) Amendments of 1990 require that reasonable further progress (RFP) emissions inventories be prepared for ozone nonattainment areas. Tropospheric ozone is produced when ozone precursors, volatile organic compounds (VOC) and nitrogen oxides (NO_X), undergo photochemical reactions in the presence of sunlight. The Texas Commission on Environmental Quality (TCEQ) maintains an emissions inventory of current information for sources of NO_X and VOC that identifies the types of emissions sources 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 emissions inventory also provides data for a variety of air quality planning tasks, including establishing baseline emissions levels, calculating reduction targets, developing control strategies to achieve emissions reductions, developing emissions inputs for air quality models, and tracking actual emissions reductions against established emissions growth and control budgets. The total inventory of NO_X and VOC emissions for an area is derived from estimates developed for five general categories of emissions sources: point, area, non-road mobile, on-road mobile, and biogenic.

The TCEQ submitted a Dallas-Fort Worth (DFW) moderate ozone nonattainment area RFP state implementation plan (SIP) revision to the United States Environmental Protection Agency (EPA) in May 2007, which was approved by the EPA on October 7, 2008 (73 *Federal Register* (FR) 58475). Effective January 19, 2011, the EPA reclassified the DFW nonattainment area to serious for the 1997 eight-hour ozone National Ambient Air Quality Standard (75 FR 79302).

To satisfy RFP requirements under §182(b)(1) of the FCAA, states must demonstrate at least a 15% reduction in VOC emissions within the first six years from the baseline year. For serious areas, states are additionally required by §182(c)(2)(B) of the FCAA to demonstrate an average of at least 3% combined annual reductions of NO_X[2] and VOC emissions, beyond the 15% VOC reduction in the first six years, out to an area's attainment date. To complete the RFP calculations, a set of inventories and control measures reductions estimates is required. In accordance with the requirement for emissions inventories and control measures reductions estimates, this proposed SIP revision includes the documentation of emissions inventories for the 2002 base year, for the 2011 and 2012 milestone years, and for the attainment year RFP contingency requirement. Those emissions inventories provide the basis for demonstrating how the required RFP emissions reductions will be met.

To develop an RFP SIP revision, states must: (1) determine the base year emissions for NO_X and VOC, which includes adjusting the inventory to remove certain emissions reductions for which credit cannot be taken; (2) calculate RFP target emissions reductions levels based on the 3% per year requirement; and (3) subtract post-control emissions reductions from milestone years uncontrolled NO_X and VOC emissions growth. When the RFP post-control emissions reductions meet or exceed the calculated target emissions reductions, then RFP is demonstrated.

This proposed DFW RFP SIP revision includes:

- a 2002 base year emissions inventory;

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[2] NO_X may be substituted for VOC under conditions defined in the EPA's December 1993 NO_X Substitution Guidance (http://www.epa.gov/ttncaaa1/t1/memoranda/noxsubst.pdf).

The base year emissions inventory is the starting point for calculating the target levels of emissions.

- 2008, 2011, and 2012 adjusted base year (ABY) emissions inventories;

  The current ABY emissions inventories are adjusted for the fleet turnover effects of the pre-1990 Federal Motor Vehicle Control Program (FMVCP) and the 1992 Reid Vapor Pressure (RVP) control. Because the defeat device for heavy duty diesel vehicles (HDDV) was affecting an FMVCP that was implemented prior to the 1990 FCAA, the HDDV NO_X off-cycle emissions effects and associated mitigation program effects are also considered non-creditable. All of these controls are on-road mobile source controls; therefore, only the on-road mobile source is adjusted as part of calculating the ABY emissions inventories for this proposed RFP SIP revision.

- 2008, 2011, and 2012 uncontrolled emissions inventories;

  The RFP analysis requires an uncontrolled emissions inventory with growth between the base year and a milestone year. The uncontrolled emissions inventories serve as the basis for determining the amount of emissions reductions required to meet the RFP target for each milestone year.

- 2011 and 2012 milestone years control reductions;

  The RFP analysis requires the calculations of emissions reductions for control strategies, which are then subtracted from the uncontrolled emissions to determine the controlled RFP inventory value. The RFP emissions reductions for each control strategy for all source categories are individually quantified. The controlled projected RFP emissions inventory is the result of subtracting the emissions reductions for controls that are used to demonstrate RFP from the uncontrolled projected emissions inventory. A discussion of RFP control strategies is provided in Chapter 4: *Control Measures to Achieve Target Levels*; therefore, the individual RFP control reductions are not discussed any further in this chapter.

- 2008, 2011, and 2012 post-control emissions inventories; and

  The post-control emissions inventories represent the projected emissions inventories with all controls implemented, even controls not used or not creditable to demonstrate RFP. The projected post-control emissions inventories may be less than the controlled RFP emissions inventories that include only controls that are used to demonstrate RFP.

- 2012 attainment year RFP contingency control reductions.

  The RFP analysis requires the calculation of the emissions reductions for control strategies for the year following the attainment year. These control reductions can be implemented in the case that there is a failure to meet a milestone requirement. A discussion of the RFP contingency control strategies for this proposed SIP revision is provided in Chapter 4.

2.1.1 Updated Uncontrolled Milestone Years Inventories

Uncontrolled milestone years emissions inventories represent what milestone years emissions inventories for each milestone year would be if no further action to control emissions were taken beyond the controls already accounted for in the 2002 base year emissions inventory. First,

emissions inventories are calculated for each source category using EPA-approved methodologies. The inventories are then combined to derive the total uncontrolled milestone year emissions inventory for NO_X and VOC. The uncontrolled milestone years emissions inventories include pre-2002 FCAA controls as well as growth in activity from 2002 to the milestone years, but they do not include post-2002 FCAA controls.

2.1.2 Updated Controlled Milestone Year Inventories

The controlled milestone years emissions inventories represent each milestone year, along with growth from the 2002 base year, with all RFP controls taken into account. Emissions inventories are calculated for each major source category using EPA-approved methodologies. Then the inventories are combined to obtain the total controlled milestone years emissions inventories for NO_X and VOC. The controlled milestone years emissions inventories include pre-2002 FCAA controls, growth in activity from the base year to the milestone year, and post-2002 FCAA controls used to meet RFP target emissions levels, but they do not include post-2002 FCAA controls that are not used to meet RFP target emissions levels.

2.1.3 Updated Adjusted Base Year Inventories

The 2008, 2011, and 2012 RFP ABY emissions inventories represent the 2002 base year emissions inventory adjusted to account for reductions from non-creditable control programs that were promulgated prior to the 1990 FCAA Amendments. The controls that are non-creditable for this SIP revision include the fleet turnover effects of the pre-1990 FMVCP and the 1992 RVP control. Both of these non-creditable controls are for on-road mobile sources; therefore, only the on-road mobile source is adjusted as part of calculating the ABY emissions inventories for this proposed SIP revision. For point, area, and non-road mobile sources, the ABY emissions inventory is equal to the base year emissions inventory. For each milestone year, the ABY emissions inventory for on-road mobile sources is added to the base year emissions inventories for the other source categories to obtain the total ABY emissions inventories for VOC and NO_X. The 2008, 2011, and 2012 ABY emissions inventories are used to calculate the RFP percent reductions. The on-road mobile source ABY emissions inventories are also used to quantify the non-creditable reductions that are used in the RFP target calculations.

2.2 POINT SOURCES

2.2.1 Emissions Inventory Development

Stationary point source emissions data are collected annually from sites that meet the reporting requirements of 30 Texas Administrative Code (TAC) §101.10. To collect the data, the TCEQ mails emissions inventory questionnaire (EIQ) requests to all sites identified as meeting the reporting requirements. Companies are required to report emissions data and to provide samples of calculations used to determine their emissions. Information characterizing the process equipment, the abatement units, and the emissions points is also required. All data submitted in the EIQ are reviewed for quality assurance purposes and then stored in the State of Texas Air Reporting System (STARS) database.

2.2.2 Updated 2002 Base Year Inventory

The 2002 base year point source inventory data were extracted from STARS on September 15, 2010. The extracted data contained ozone season daily emissions of NO_X and VOC from each site in the DFW nonattainment area that submitted an EIQ for 2002, and the data reflected revisions made on or before the extract date.

2.2.3 Updated Uncontrolled Milestone Year Inventories

In the development of the uncontrolled milestone years inventories for point sources, the TCEQ projected emissions from the 2008 inventory. Emissions were projected for major and minor sources separately and then emissions credits were applied.

The TCEQ designated the 2008 inventory as the baseline year because it was the baseline year for the modeling inventory and it is the most recent National Emissions Inventory year available. The 2008 point source inventory data were extracted from STARS on September 15, 2010; the dataset was composed of reported ozone season daily emissions of NO_X and VOC for each site in the DFW area that submitted a 2008 EIQ and reflected revisions made on or before the extract date. To determine the uncontrolled projections, the TCEQ accounted for reductions from controls with compliance deadlines before 2008.

Major source emissions were projected by adding the daily averages of nonattainment major modification thresholds for each site to the 2008 emissions. Minor source emissions were projected by using two sets of growth factors. Growth factors were derived from the Regional Economic Modeling, Inc. 5.5 (REMI) factor set of 2005 as well as the 2005 Moody's Economy, Inc. factor set updated in 2010.[3,4]

Uncontrolled milestone years inventory projections were adjusted to account for emissions credits. Emissions credits are banked emissions reductions that may be added back to the airshed in the future. To account for the possible use of the banked NO_X and VOC emissions, Emissions Reduction Credits and Discrete Emissions Reduction Credits were applied to the inventories.

2.2.4 Updated Controlled Milestone Years Inventories

In the development of the controlled milestone years inventories for point sources, the TCEQ determined the effects of controls on 2008 emissions, projected the post-control emissions from major and minor sources separately, and then applied unused emissions credits to the inventories.

The 2008 point source NO_X emissions were projected to the attainment year after the application of controls. Existing point source controls were accounted for in the 2008 emissions for electric generating units (EGU). Title 30 TAC Chapter 117 NO_X controls on non-EGUs were reviewed to determine controlled baseline emissions for NO_X projections. The controlled baseline emissions were projected using the methods detailed for uncontrolled sources, and emissions credits were added in the same manner as for the uncontrolled inventories. Point source VOC emissions were projected from 2008, and emissions credits were added, using the methods detailed for uncontrolled point sources.

A summary of the point source RFP emissions inventories is presented in Table 2-1: *DFW RFP Point Source NO_X and VOC Emissions (tons per day)*, and details on the point source projection method are available in Appendix 2: *Development of Reasonable Further Progress Point Source Emissions Inventories for the Dallas-Fort Worth Nonattainment Area*.

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[3]Eastern Research Group, Inc., "Development of County Level Growth Factors from 1990 through 2020," TCEQ Contract No. 582-04-65564, Work Order No. 65564-05-18, August 2005.

[4] Eastern Research Group, Inc., "Projection Factors for Point and Area Source," TCEQ Contract No. 582-07-84003, Work Order No. 582-07-84003-FY10-27, August 2010.

Table 2-1: DFW RFP Point Source NO_X and VOC Emissions (tons per day)

RFP Analysis Year Inventory	Uncontrolled NO_X	Controlled NO_X	Uncontrolled VOC	Controlled VOC
2002	79.24	79.24	26.43	26.43
2008	85.14	49.21	31.34	31.19
2011	105.86	62.79	39.89	39.73
2012	102.10	58.87	40.74	40.58

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 1: *MOBILE6.2-Based Dallas-Fort Worth Nonattainment Area Reasonable Further Progress Demonstration Calculations Spreadsheet* for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

2.3 AREA SOURCES

2.3.1 Emissions Inventory Development

Stationary source emissions data from sites and processes that do not meet the reporting requirements for point sources are classified as area sources. Area sources are small-scale industrial, commercial, and residential sources that use materials or perform processes that generate emissions. Emissions are calculated as county-wide totals rather than as individual facilities. Area sources are divided according to emissions mechanism: hydrocarbon evaporative emissions or fuel combustion emissions. Examples of evaporative emissions sources include: oil and gas production sources; printing operations; industrial coatings; degreasing solvents; house paints; gasoline service station underground tank filling; and vehicle refueling operations. Examples of fuel combustion emissions sources include: oil and gas production sources; stationary source fossil fuel combustion at residences and businesses; outdoor refuse burning; structural fires; and wildfires. With some exceptions, area source emissions are calculated by multiplying an established emission factor (emissions per unit of activity) by the appropriate activity or activity surrogate responsible for generating emissions. Population is one of the more commonly used activity surrogates for area sources. Other activity data include the amount of gasoline sold in an area, employment by industry type, and crude oil and natural gas production.

2.3.2 Updated 2002 Base Year Inventory

The 2002 base year area source emissions inventory was developed by backcasting the 2008 Periodic Emissions Inventory (PEI) using factors based on the EPA's Economic Growth Analysis System (EGAS), version 5.0. This provided consistency with improved methodologies and activities available for the 2008 PEI. The 2008 PEI area source emissions inventory was developed using updated activity data and methods when available. Considerable effort was expended in the development of the 2008 PEI. Improvements to the 2008 area source emissions inventory resulted from *bottom-up* surveys for some categories, such as gasoline stations and oil and gas production. Bottom-up surveys produce data that more accurately depict facility activity levels than do *top-down* approaches, which usually rely on default surrogates such as county populations and numbers of employees associated with selected EPA emission factors. Activity data for other categories were available from various sources. The United States Energy Information Administration state level fuel use data for residential, industrial, and commercial sectors were used to determine emissions from home cooking, water heating, and similar use at industrial and commercial levels. Actual 2008 oil and gas production data from the Railroad Commission of Texas were used to determine emissions from oil and gas production. The EPA's Emissions Inventory Improvement Program produced approved methodologies and inventories for several area source categories. Many categories, such as industrial coatings, graphic arts, degreasing, and consumer products, were updated for 2008.

The latest version of the EPA's growth factor system, EGAS 5.0, was used to grow emissions from the 2005 area source emissions inventory for some sources to determine the 2008 emissions.

2.3.3 Updated Uncontrolled Milestone Year Inventories

For most area source categories, the 2008 emissions inventory was projected to 2011 and 2012 using county level growth factors developed from REMI data.[5] Texas State Data Center projections were used to project future emissions for those area source categories that were not projected using REMI growth factors.

2.3.4 Updated Controlled Milestone Year Inventories

The controlled 2011 and 2012 area source emissions inventories were developed by first projecting the 2008 emissions inventory to specific years and then applying controls. Area source VOC emissions controls that were applied included the federal portable fuel container rule that was published in the *Federal Register* on February 26, 2007 (72 FR 8428). Controls in NO_X emissions included 30 TAC Chapter 117 Subchapter D controls on minor sources in ozone nonattainment areas. Rules controlling emissions from industrial coatings and gasoline station underground tank filling (Stage I) and vehicle refueling (Stage II) were accounted for in the base year numbers.

A VOC storage rule (Rule Project No. 2010-025-115-EN) being proposed concurrently with this proposed DFW RFP SIP revision, if adopted, would reduce VOC emissions from affected sources in the DFW area by increasing the level of control for floating roof tanks. The proposed rulemaking would also require 95% control of VOC emissions from crude oil and condensate storage tanks emitting 25 tons or more of VOC per year. The proposed rulemaking would also require low-leaking fittings; and limit situations when floating roof tanks are allowed to emit VOC because the roof is not floating on the liquid. The reductions in VOC emissions from the proposed VOC storage rule are only considered for milestone year 2012 since the compliance deadline for the rule is December 1, 2012.

A summary of the area source RFP inventories is presented in Table 2-2: *DFW RFP Area Source NO_X and VOC Emissions (tons per day)*, and more details on area source method development are available in Appendix 3: *Development of Reasonable Further Progress Area Source Emissions Inventories for the Dallas-Fort Worth Nonattainment Area*.

Table 2-2: DFW RFP Area Source NO_X and VOC Emissions (tons per day)

RFP Analysis Year Inventory	Uncontrolled NO_X	Controlled NO_X	Uncontrolled VOC	Controlled VOC
2002	38.63	38.63	247.03	247.03
2008	150.39	150.39	323.59	320.44
2011	168.66	40.56	351.90	346.64
2012	175.61	41.34	362.95	341.78

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

[5] See footnote 4.

2.4 NON-ROAD MOBILE SOURCES

Non-road vehicles do not normally operate on roads or highways and are often referred to as off-road or off-highway vehicles. The broad non-road source category is composed of a diverse collection of machines, many of which are powered by diesel engines. Non-road emissions sources include, but are not limited to: agricultural equipment; commercial and industrial equipment; construction and mining equipment; lawn and garden equipment; aircraft and airport equipment; locomotives; and commercial marine vessels and equipment. For this proposed RFP SIP revision, emissions inventories for non-road sources were developed as subcategories: NONROAD Model categories; aircraft; ground support equipment (GSE); locomotive; and drilling rigs. The aircraft and GSE categories are sometimes added together and presented as a total for airports. The sections below describe the emissions estimates methodologies used for the non-road mobile source subcategories.

2.4.1 NONROAD Model Categories Emissions Estimates Methodology

A Texas-specific version of the EPA's latest NONROAD 2008a model, called the Texas NONROAD (TexN) model, was used to calculate emissions from all non-road mobile source equipment and recreational vehicles, with the exception of aircraft and GSE (airports), locomotives, and oilfield drilling rigs. Because emissions for airports and locomotives are not included in either the NONROAD model or the TexN model, their emissions are estimated using other EPA methods and guidance. Though emissions for oilfield drilling rigs are included in the NONROAD model, alternate emissions calculations were developed for that source category in order to provide more accurate inventories[6]; therefore, equipment populations for oilfield drilling rigs were set to zero in the TexN model.

The TexN model is a software tool for estimating emissions for non-road mobile source categories that are included in the EPA NONROAD model, and it was developed to help build high quality non-road emissions inventories for Texas. The model allows air quality planners to replace the EPA's default data with more specific local survey data, a practice encouraged by the EPA. Local, county-level data are incorporated into the TexN model as they become available to the TCEQ. Several equipment survey studies have been conducted in Texas to improve upon the default data available in the EPA's NONROAD model. Those studies focused on various equipment categories operating in different areas of the state, including: diesel construction equipment; liquid propane gas powered forklifts; transportation refrigeration units; commercial lawn and garden equipment; agricultural equipment; and recreational marine vessels. Data used for the TexN model produce a more accurate representation of non-road emissions for the DFW nonattainment area.

A summary of the RFP emissions inventories for the NONROAD Model categories is presented in Table 2-3: *DFW RFP NO_X and VOC Emissions for NONROAD Model Categories (tons per day)*. A detailed listing of the non-road mobile source equipment studies and surveys conducted in Texas, and documentation of procedures used in developing the non-road mobile source RFP emissions inventories, can be found in Appendix 4: *Development of Reasonable Further Progress Non-Road Mobile Source Emissions Inventories for the Dallas-Fort Worth Nonattainment Area: Source Categories in the United States Environmental Protection Agency's NONROAD Model*.

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[6] Eastern Research Group, Inc., "Oil and Gas Exploration – Drilling Rig Engines," TCEQ Contract No. 582-07-83985, Work Order No. 582-07-83985-FY09-01, July 15, 2009.

Table 2-3: DFW RFP NO_X and VOC Emissions for NONROAD Model Categories (tons per day)

RFP Analysis Year Inventory	Uncontrolled NO_X	Controlled NO_X	Uncontrolled VOC	Controlled VOC
2002	115.23	103.53	105.92	73.49
2008	126.24	79.36	122.93	55.12
2011	132.10	67.75	131.04	46.01
2012	135.16	63.57	133.77	42.57

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

2.4.2 Airport Emissions Estimation Methodology

The airport non-road source category is not included in the NONROAD Model or the TexN Model, so emissions were calculated using alternate means. Emissions from airport activities in the DFW nonattainment area were estimated for Dallas Love Field, Dallas/Fort-Worth Intercontinental Airport, and eleven reliever airports: Addison; Alliance; Arlington Municipal; Collin County; Dallas Executive; Denton Municipal; Grand Prairie; Lancaster; Meacham; Mesquite; and Spinks. Emissions were calculated using the Federal Aviation Administration Emissions and Dispersion Modeling System, version 5.1. The airport emissions categories considered for this proposed RFP analysis included aircraft (commercial air carriers, air taxis, general aviation, and military), auxiliary power units (APU), and GSE operations. The 2002, 2008, 2011, and 2012 aircraft, APU, and GSE emissions were prepared by TCEQ staff with data obtained from the North Central Texas Council of Governments (NCTCOG). A summary of the RFP emissions inventories for the airport non-road mobile source category is presented in Table 2-4: *DFW RFP NO_X and VOC Emissions for the Airport Non-Road Mobile Source Category (tons per day)*, and the documentation of procedures used in developing the airport emissions inventories can be found in Appendix 5: *Development of Reasonable Further Progress Non-Road Mobile Source Emissions Inventories for the Dallas-Fort Worth Nonattainment Area: Airports Source Categories*.

Table 2-4: DFW RFP NO_X and VOC Emissions for the Airport Non-Road Mobile Source Category (tons per day)

RFP Analysis Year Inventory	Uncontrolled NO_X	Controlled NO_X	Uncontrolled VOC	Controlled VOC
2002	10.91	10.91	6.39	6.39
2008	9.87	9.87	5.28	5.28
2011	8.24	8.24	4.03	4.03
2012	8.36	8.36	5.54	5.54

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

2.4.3 Locomotive Emissions Estimation Methodology

Locomotive emissions, not included in the NONROAD or TexN models, were developed from a TCEQ-commissioned study conducted by E.H. Pechan and Associates, Inc. (Pechan)[7]. Post-control emissions estimates for 2002, 2008, 2011, and 2012 were extracted from the study by Pechan.

Estimates for uncontrolled emissions for 2002, 2008, 2011, and 2012 were developed by applying uncontrolled emissions rates to the same line haul and switchyard activity estimates described in Section II and Section III of the June 2010 Pechan study. A summary of the locomotive RFP emissions inventories is presented in Table 2-5: *DFW RFP NO_X and VOC Emissions for the Locomotives Non-Road Mobile Source Category (tons per day)*, and the documentation of procedures used in developing the locomotive emissions inventories can be found in Appendix 6: *Development of Reasonable Further Progress Non-Road Mobile Source Emissions Inventories for the Dallas-Fort Worth Nonattainment Area: Locomotives Source Category*.

Table 2-5: DFW RFP NO_X and VOC Emissions for the Locomotives Non-Road Mobile Source Category (tons per day)

RFP Analysis Year Inventory	Uncontrolled NO_X	Controlled NO_X	Uncontrolled VOC	Controlled VOC
2002	32.65	30.14	1.51	1.51
2008	28.15	20.03	1.30	1.19
2011	27.09	17.84	1.26	1.08
2012	27.47	15.97	1.27	0.95

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

2.4.4 Drilling Rigs Diesel Engines Emissions Estimation Methodology

Oilfield drilling rigs diesel engines are included in the NONROAD model category "Other Oilfield Equipment," which includes various types of equipment; however, due to significant growth in the oil and gas exploration and production industry, the emissions inventory for diesel drilling rigs was included in a contract with ERG.[8] The emissions inventory developed by ERG was used for this proposed DFW RFP SIP revision. Emissions trends were developed using oil and gas production data trends for 2002, 2008, 2011, and 2012 emissions estimates. A summary of the drilling rigs RFP emissions inventories is presented in Table 2-6: *DFW RFP NO_X and VOC Emissions for the Drilling Rigs Non-Road Mobile Source Category (tons per day)*, and the documentation of procedures used in developing the drilling rigs emissions inventories can be found in Appendix 7: *Development of Reasonable Further Progress Non-Road Mobile Source Emissions Inventories for the Dallas-Fort Worth Nonattainment Area: Drilling Rigs Source Category*.

The drilling rigs category emissions for years 2011 and 2012 may or may not be subject to revisions. The TCEQ is currently reviewing recently available activity data for year 2010.The

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[7] E.H. Pechan and Associates, Inc., "Development of Locomotive and Commercial Marine Emissions Inventory 1990 through 2040," TCEQ Contract No. 582-07-84008-04, June 30, 2010.
[8] See footnote 6.

TCEQ may make appropriate revisions before adoption of the DFW RFP SIP revision if more accurate estimates for 2011 and 2012 are able to be identified with adequate time to process them prior to adoption.

Table 2-6: DFW RFP NO_X and VOC Emissions for the Drilling Rigs Non-Road Mobile Source Category (tons per day)

RFP Analysis Year	Uncontrolled NO_X	Controlled NO_X	Uncontrolled VOC	Controlled VOC
2002	8.83	8.83	0.66	0.66
2008	22.42	21.03	1.22	1.22
2011	18.78	17.62	0.86	0.86
2012	17.41	16.33	0.78	0.78

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

2.4.5 Updated 2002 Base Year Inventory

The 2002 non-road emissions inventory for the NONROAD model categories was developed using the latest version of the TexN model, which incorporates all of the recently updated county-specific input data. The 2002 aircraft and GSE emissions were prepared by TCEQ staff with data obtained from NCTCOG. The 2002 base year emissions inventory for locomotive sources was developed from the June 2010 Pechan study. The 2002 base year emissions inventory for drilling rigs was developed from data provided by the ERG study.

2.4.6 Updated Uncontrolled Milestone Year Inventories

The NONROAD model category uncontrolled emissions for each analysis year (2002, 2008, 2011, and 2012) were calculated by adding the sum of all of the individual control reductions to the post-control emissions for that year. Since data were not available to calculate RFP control reductions for aircraft or GSE, the uncontrolled and controlled airport emissions inventories are the same value. The locomotive uncontrolled emissions inventories were obtained from the June 2010 Pechan study. The Railroad Commission of Texas provided actual annual oil and gas production data for each county, which were used to develop emissions trends for diesel drilling rigs emissions trends.

2.4.7 Updated Controlled Milestone Year Inventories

To evaluate the effects of federal and state control programs for the NONROAD model categories, the TexN model was run with 2002, 2008, 2011, 2012, and 2013 ozone season daily emissions for the NONROAD model categories. Emissions reductions for individual control measures were assessed through a series of TexN model runs for both controlled and uncontrolled scenarios for each federal and state control program. Airport landings and take-offs were projected for 2011 and 2012 using the growth factors from the Terminal Area Forecast summary for fiscal years 2008 through 2025.[9] Locomotive controlled emission estimates were obtained from the June 2010 Pechan study. Diesel drilling rigs emissions trends were developed

[9] Airport landings and take-offs for 2008 were projected based the United States Department of Transportation, Federal Aviation Administration, "Terminal Area Forecast Summary, Fiscal Years 2008-2025 (http://www.faa.gov/data_statistics/aviation/taf_reports/media/TAF2008-2025%20Summary.pdf)," FAA-APO-06-1, January 2009.

for 2002, 2008, 2011, and 2012, based on 2002 data from the Railroad Commission of Texas, but no post-control emissions reductions apply to drilling rigs.

Summaries for all of the non-road mobile source RFP emissions inventories are presented in Table 2-7: *DFW RFP Total NO_X and VOC Emissions for Non-Road Mobile Sources (tons per day)*.

Table 2-7: DFW RFP Total NO_X and VOC Emissions for Non-Road Mobile Sources (tons per day)

RFP Analysis Year Inventory	Uncontrolled NO_X	Controlled NO_X	Uncontrolled VOC	Controlled VOC
2002	167.62	153.41	114.48	82.05
2008	186.68	130.29	130.73	62.81
2011	186.21	111.45	137.19	51.98
2012	188.40	104.23	141.36	49.84

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

2.5 ON-ROAD MOBILE SOURCES

On-road mobile source category emissions inventories were developed using the EPA's MOBILE6.2 model; however, preliminary on-road mobile emissions inventories based on EPA's Motor Vehicle Emission Simulator (MOVES) model are also included in Section 2.5.6: *Preliminary MOVES-Based Analysis* of this proposal. Preliminary MOVES-based inventories are included in this proposal because the TCEQ is taking comment on using on-road emissions inventories based on MOBILE6.2 and MOVES in the adopted DFW RFP SIP revision. Because the schedule did not allow for inclusion of link-based MOVES inventory values in this proposal, the preliminary MOVES-based inventory values were calculated using a highway performance monitoring system (HPMS) based method. A link-based method is likely to produce inventory values from 4% to 20% higher than an HPMS based method. Link-based inventories are required if motor vehicle emissions budgets (MVEB) are set by the values. In the event that MOVES-based emissions inventories are used to determine RFP for the adopted SIP revision, link-based MOVES inventory values would be used and it is expected that the final emissions figures and RFP results would be different than those reported in this SIP proposal. The adopted SIP narrative may change substantially from this proposal to reflect those changes.

2.5.1 MOBILE6.2-Based Emissions Inventory Development

On-road mobile emissions sources consist of automobiles, trucks, motorcycles, and other motor vehicles traveling on public roadways. On-road mobile source emissions are usually categorized as either combustion-related emissions or evaporative hydrocarbon emissions. Combustion-related emissions are estimated for vehicle engine exhaust. Evaporative hydrocarbon emissions are estimated for the fuel tank and other evaporative leak sources on the vehicle. To calculate emissions, both the rate of emissions per unit of activity (emission factors) and the number of units of activity must be determined.

Emission factors for this proposal were developed using the EPA's mobile emission factor model, MOBILE6.2. The MOBILE6.2 model may be run using national default information or the default information may be modified to simulate the driving behavior, meteorological conditions, and vehicle characteristics specific to the DFW area. Because modifications influence

the emission factors calculated by the MOBILE6.2 model, every effort is made to input parameters reflecting local conditions, rather than national default values. The localized inputs used for the DFW RFP on-road mobile emissions inventory development include vehicle speeds for each roadway link, temperature, humidity, vehicle age distributions for each vehicle type, percentage of miles traveled for each vehicle type, type of inspection and maintenance (I/M) program, fuel control programs, and gasoline vapor pressure controls. In addition to the MOBILE6.2-based inventories in the following sections, preliminary on-road mobile emissions inventories based on the EPA's MOVES model are provided in Section 2.5.6.

To estimate on-road mobile source emissions, emission factors calculated by the MOBILE6.2 model must be multiplied by the level of vehicle activity. On-road mobile source emission factors are expressed in units of grams per mile; therefore, the activity information that is required to complete the inventory calculation is vehicle miles traveled (VMT) in units of miles per day. The level of vehicle travel activity is developed using travel demand models (TDM) run by the Texas Department of Transportation (TxDOT) or by the local metropolitan planning organizations (MPO). The TDMs are validated against a large number of ground counts, i.e., traffic passing over counters placed in various locations throughout a county or area. For SIP inventories, VMT estimates are calibrated against outputs from the federal HPMS, a model built from a different set of traffic counters.

In addition to the number of miles traveled on each roadway link, the speed on each roadway type or segment is also needed to complete an on-road emissions inventory. Roadway speeds, required inputs for the MOBILE6.2 model, are calculated by using the activity volumes from the TDM and a post-processor speed model.

A summary of the on-road mobile source VMT used to develop the various NO_X and VOC emissions levels is presented in Table 2-8: *DFW RFP Ozone Season Weekday On-Road Mobile Source VMT (miles per day)*. The on-road mobile ABY emissions inventories are summarized in Table 2-9: *MOBILE6.2-Based DFW RFP Ozone Season Weekday On-Road Mobile Source Adjusted Base Year NO_X and VOC Emissions (tons per day)*. The RFP controlled and uncontrolled on-road mobile source emissions inventories are summarized in Table 2-10: *MOBILE6.2-Based DFW RFP Ozone Season Weekday On-Road Mobile Source Controlled and Uncontrolled NO_X and VOC Emissions (tons per day)*. For complete documentation of the development of the on-road mobile source emissions inventories for the DFW RFP demonstration, refer to Appendix 8: *Development of Reasonable Further Progress On-Road Mobile Source Emissions Inventories Based on the MOBILE6.2 Model for the Dallas-Fort Worth Nonattainment Area*. The complete set of input and output files are available upon request from the TCEQ's Air Quality Division.

Table 2-8: DFW RFP Ozone Season Weekday On-Road Mobile Source VMT (miles per day)

RFP Analysis Year	Adjusted Base Year	Uncontrolled Emissions Inventory	Post-control emissions Inventory
2002	138,880,000	138,880,000	138,880,000
2008	138,880,000	167,851,000	167,851,000
2011	138,880,000	185,075,000	185,075,000
2012	138,880,000	188,162,000	188,162,000

Table 2-9: MOBILE6.2-Based DFW RFP Ozone Season Weekday On-Road Mobile Source Adjusted Base Year NO_X and VOC Emissions (tons per day)

RFP Analysis Year Inventory	ABY NO_X	ABY VOC
2002	379.41	206.06
2008	317.60	180.64
2011	315.51	179.45
2012	315.61	178.80

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

Table 2-10: MOBILE6.2-Based DFW RFP Ozone Season Weekday On-Road Mobile Source Controlled and Uncontrolled NO_X and VOC Emissions (tons per day)

RFP Analysis Year Inventory	Uncontrolled NO_X	Controlled NO_X	Uncontrolled VOC	Controlled VOC
2002 Base Year	379.41	306.99	206.06	145.07
2008	413.86	194.92	236.86	101.44
2011	438.60	142.41	273.23	88.56
2012	445.47	122.82	276.91	81.17

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

2.5.2 MOBILE6.2-Based Updated 2002 Base Year Inventory

The 2002 base year emissions inventory for on-road mobile sources was updated using emission factors calculated using the latest version of the MOBILE6.2 model, MOBILE6.2.03. Additional updates were made to incorporate the latest activity estimates from the DFW TDM 2002 network. Only control strategies implemented prior to 2002 were included in the input to the emissions inventory development for the 2002 on-road mobile source base year emissions inventory. Those controls include: pre-1990 FMVCP; fleet turnover to Tier 1 FMVCP; reformulated gasoline (RFG); and the DFW vehicle I/M program. The activity levels used to calculate the emissions inventory reflect the 2002 roadway network with 2002 VMT and speeds. A summary of the emissions inventory is presented in Table 2-10. For complete documentation of the development of the emissions inventory and details on MOBILE6.2 model inputs, refer to Appendix 8.

2.5.3 MOBILE6.2-Based Updated 2002 Adjusted Base Year Inventories for the Base and Milestone Years

The RFP planning process includes calculating the ABY emissions inventory, from which required percent emission reductions are calculated. The ABY emissions inventory is calculated by subtracting non-creditable controls from the base year emissions inventory. As specified by the FCAA, certain on-road mobile source emissions reductions are not creditable toward the required percentage reductions. The non-creditable reductions include reductions from controls that were promulgated prior to the 1990 FCAA. The two rules that are non-creditable for this proposed SIP revision are pre-1990 FMVCP and pre-1990 promulgated federal fuel volatility

regulations (summertime gasoline RVP limits beginning in 1992). Because the defeat device for HDDV was affecting an FMVCP that was implemented prior to the 1990 FCAA, the HDDV NO_X off-cycle emissions effects and associated mitigation program effects are also considered non-creditable. Therefore, for this proposed DFW RFP demonstration, on-road mobile pre-1990 non-creditable emissions reductions include pre-1990 FCAA FMVCP, 1992 summertime RVP limits, and HDDV NO_X off-cycle emissions and mitigation programs. All those controls are for on-road mobile sources and are accounted for in the on-road mobile source ABY emissions inventories.

An ABY emissions inventory for on-road mobile sources, which reflects only control strategies implemented prior to 1990, is developed for each milestone year using emission factors from the MOBILE6.2 model. By projecting the pre-1990 FMVCP into future years, the effects of additional fleet turnover benefit due to the new standards is reflected in the emission factors. The controls included in the ABY emissions inventory development include pre-1990 FCAA FMVCP and the 1992 summertime RVP control. The activity levels used to calculate the ABY emissions inventories reflect the 2002 roadway network with 2002 VMT and speeds. The estimated non-creditable emissions reductions due to pre-1990 controls are calculated by subtracting the 2002 ABY emissions inventory, relative to the target year, from the actual 2002 base year emissions inventory. A summary of the emissions inventories and associated non-creditable emissions reductions is presented in Tables 2-11: *MOBILE6.2-Based Summary of DFW RFP On-Road Mobile Source Non-Creditable NO_X Reductions (tons per day)* and 2-12: *MOBILE6.2-Based Summary of DFW RFP On-Road Mobile Source Non-Creditable VOC Reductions (tons per day)*. Creditable controls are discussed in Section 2.5.5: *MOBILE6.2-Based Updated Controlled Milestone Years Emissions Inventories*. For complete documentation of the development of the emissions inventory and details on MOBILE6.2 model inputs, refer to Appendix 8.

Table 2-11: MOBILE6.2-Based Summary of DFW RFP On-Road Mobile Source Non-Creditable NO_X Reductions (tons per day)

Analysis Year	ABY NO_X	Non-creditable NO_X Emission Reductions
2002	379.41	N/A
2008	317.60	61.81
2011	315.51	2.09
2012	315.61	-0.10

Notes: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area. Non-creditable reductions are calculated based on output from the MOBILE6.2 model and VMT. Non-creditable reductions may become negative as values approach zero.

Table 2-12: MOBILE6.2-Based Summary of DFW RFP On-Road Mobile Source Non-Creditable VOC Reductions (tons per day)

Analysis Year	ABY VOC	Non-creditable VOC Emission Reduction
2002	206.06	N/A
2008	180.64	25.42
2011	179.45	1.19
2012	178.80	0.65

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

2.5.4 MOBILE6.2-Based Updated Uncontrolled Milestone Years Emissions Inventories

The uncontrolled on-road mobile emissions inventories for each RFP milestone year were developed using emission factors that reflect only control strategies implemented prior to 2002. The latest version of the MOBILE6.2 model, MOBILE6.2.03, was used to develop the emissions inventories for this proposed SIP revision. The activity levels were updated to include the latest output from the DFW TDM. Those controls include pre-1990 FMVCP, the 1992 RVP control, fleet turnover to Tier 1 FMVCP, RFG, and the DFW vehicle I/M program. The activity levels used to calculate the emissions inventory reflect the milestone roadway network, with milestone year VMT and speeds. A summary of the emissions inventories is presented in Table 2-10. For complete documentation of the development of the emissions inventory and details on MOBILE6.2 model inputs, refer to Appendix 8.

2.5.5 MOBILE6.2-Based Updated Controlled Milestone Years Emissions Inventories

The controlled on-road mobile emissions inventories for each RFP milestone year were developed using emission factors that reflect both the control strategies implemented prior to 2002 and the control strategies used to demonstrate compliance with RFP requirements. Those controls include pre-1990 FMVCP, fleet turnover to Tier 1 of the FMVCP, fleet turnover to Tier 2 of the FMVCP, the 2007 heavy duty diesel FMVCP, summer RFG, the DFW vehicle I/M program, the anti-tampering program, and Texas Low Emission Diesel (TxLED). Control scenario inventory values include both the post-control emissions inventory and the level of reductions for each control strategy. A summary of the uncontrolled on-road mobile emissions inventory, the individual on-road mobile control reductions, and the resulting controlled on-road mobile emissions inventory for each milestone year are summarized in Tables 2-13: *MOBILE6.2-Based 2008 DFW RFP Ozone Season Weekday On-Road Mobile Source NO_X and VOC Emissions and Control Strategy Reductions*, 2-14: *MOBILE6.2-Based 2011 DFW RFP Ozone Season Weekday On-Road Mobile Source NO_X and VOC Emissions and Control Strategy Reductions*, and 2-15: *MOBILE6.2-Based 2012 DFW RFP Ozone Season Weekday On-Road Mobile Source NO_X and VOC Emissions and Control Strategy Reductions*. MVEB calculations for each milestone year are documented in Chapter 5: *Motor Vehicle Emissions Budgets*.

The activity levels used to calculate the emissions inventory reflect the milestone roadway network, with milestone year VMT and speeds. For complete documentation of the development of the emissions inventory and details on MOBILE6.2 model inputs, refer to Appendix 8.

Table 2-13: MOBILE6.2-Based 2008 DFW RFP Ozone Season Weekday On-Road Mobile Source NO_X and VOC Emissions and Control Strategy Reductions

On-Road Mobile Emissions Inventory Strategies	NO_X (tons per day)	VOC (tons per day)
2008 uncontrolled inventory	413.86	236.86
Tier 1 FMVCP	85.21	58.58
Federal RFG in the core counties only	45.98	34.72
I/M in Dallas and Tarrant Counties	17.34	15.78
National Low Emission Vehicle Program	10.18	6.75
Expanded I/M	6.85	5.11
Tier 2 FMVCP	38.37	14.34
2007 heavy duty diesel FMVCP	8.89	0.14
On-road TxLED	6.13	00.00
2008 Controlled inventory	194.91	101.44

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

Table 2-14: MOBILE6.2-Based 2011 DFW RFP Ozone Season Weekday On-Road Mobile Source NO_X Emissions and Control Strategy Reductions

On-Road Mobile Emissions Inventory Strategies	NO_X (tons per day)	VOC (tons per day)
2011 uncontrolled inventory	438.60	273.23
Tier 1 FMVCP	82.62	86.20
Federal RFG in the core counties only	73.77	38.10
I/M in Dallas and Tarrant Counties	19.89	20.96
National Low Emission Vehicle Program	10.13	6.67
Expanded I/M	10.04	6.09
Tier 2 FMVCP	69.32	26.21
2007 heavy duty diesel FMVCP	25.69	0.45
On-road TxLED	4.73	0.00
2011 controlled inventory	142.41	88.55

Table 2-15: MOBILE6.2-Based 2012 DFW RFP Ozone Season Weekday On-Road Mobile Source NO_X Emissions and Control Strategy Reductions

On-Road Mobile Emissions Inventory Strategies	NO_X (tons per day)	VOC (tons per day)
2012 uncontrolled inventory	445.47	276.91
Tier 1 FMVCP	82.64	96.98
Federal RFG in the core counties only	82.29	37.80
I/M in Dallas and Tarrant Counties	19.73	17.86
National Low Emission Vehicle Program	8.88	5.95

On-Road Mobile Emissions Inventory Strategies	NO_X (tons per day)	VOC (tons per day)
Expanded I/M	11.19	6.28
Tier 2 FMVCP	79.52	30.37
2007 heavy duty diesel FMVCP	33.88	0.50
On-road TxLED	4.52	0.00
2012 controlled inventory	122.82	81.17

2.5.6 Preliminary MOVES-Based Analysis

In March 2010, the EPA replaced the MOBILE6.2 model with MOVES as the official emission factor model for developing on-road mobile source category emissions inventories. Although MOVES represents a new approach to assessing on-road emissions, the sources are the same, and the opportunity to use local inputs for meteorological conditions, control programs and fleet characteristics is the same. The primary approach to developing an on-road inventory is the same with either MOVES or MOBILE6.2. With both models, emissions rates are produced for subsets of the on-road fleet, and the emissions rates are multiplied by the activity level of each vehicle type or source use type. The development of on-road mobile SIP inventories requires that the level of disaggregation of the VMT be done at the roadway link level. Because the DFW RFP SIP revision schedule did not allow for inclusion of link-based MOVES inventory values in this proposal, the preliminary MOVES-based inventory values were calculated using a less disaggregated level for VMT. The VMT was summed by HPMS roadway type. Average speeds for those HPMS roadway types were used in the preliminary inventory development. The HPMS-based method is described in the following subsections. In the event that MOVES-based emissions inventories are used to determine RFP for the adopted SIP revision, link-based MOVES inventory values will be used. It is expected that the final emissions figures and RFP results will be different from those reported in this SIP proposal. The method used, along with the results of the preliminary MOVES inventory assessment, is documented in Appendix 10: *Development of Preliminary MOVES-Based Reasonable Further Progress On-Road Mobile Source Emissions Inventories for the Dallas-Fort Worth Nonattainment Area*.

2.5.6.1 Preliminary MOVES-Based Emissions Inventory Development

On-road mobile emissions sources consist of automobiles, trucks, motorcycles, and other motor vehicles traveling on public roadways. On-road mobile source emissions are usually categorized as either combustion-related emissions or evaporative hydrocarbon emissions. Combustion-related emissions are estimated for vehicle engine exhaust. Evaporative hydrocarbon emissions are estimated for the fuel tank and other evaporative leak sources on the vehicle. To calculate emissions, both the rate of emissions per unit of activity (emission factors) and the number of units of activity must be determined. The emissions sources for MOBILE6.2 and MOVES are the same; however, MOBILE6.2 develops emission rates for emissions sources based on vehicle type, which is based on vehicle certification standards, vehicle weight, and vehicle fuel type. The MOVES model calculates emissions rates for emissions sources based on source use type. The MOVES source use types are categorized using vehicle certification standards, fuel type, and use profile.

The EPA's MOVES model was used to develop emission factors to provide preliminary emissions assessment using the new model. Like MOBILE6.2, the MOVES model may be run using national default information or the default information may be modified to simulate the driving behavior, meteorological conditions, and vehicle characteristics specific to the DFW area. Because modifications influence the emission factors calculated by the MOVES model,

every effort is made to input parameters reflecting local conditions rather than national default values. The localized inputs used for the preliminary MOVES-based DFW RFP on-road mobile emissions inventory development include vehicle speeds for each roadway type (for the MOBILE6.2 and any final MOVES analyses the speeds will be by roadway link), temperature, humidity, vehicle age distributions for each vehicle type, percentage of miles traveled for each vehicle type, type of I/M program, fuel control programs, and gasoline vapor pressure controls.

To estimate on-road mobile source emissions, emission factor calculated by the MOVES model must be multiplied by the level of vehicle activity. On-road mobile source emission factor are expressed in units of grams per mile; therefore, the activity information that is required to complete the inventory calculation is VMT in units of miles per day. The level of vehicle travel activity is developed using TDMs run by the TxDOT or by the local MPO. The TDMs are validated against a large number of ground counts, i.e., traffic passing over counters placed in various locations throughout a county or area. For SIP inventories, VMT estimates are calibrated against outputs from the federal HPMS, a model built from a different set of traffic counters. In the preliminary MOVES assessment, the same VMT was used as the MOBILE6.2 assessment; however, the VMT for the MOVES assessments were summarized by roadway type before performing the emissions calculations.

In addition to the number of miles traveled on each roadway link, the speed on each roadway type or segment is also needed to complete an on-road emissions inventory. For the preliminary MOVES-based inventories, the VMT was summed by roadway type, and average speeds by roadway type were calculated. Roadway speeds, required inputs for both the MOBILE6.2 and MOVES models, are calculated by using the activity volumes from the TDM and a post-processor speed model. Since the emissions rates calculated by both models are sensitive to speed, using a method with average speeds will produce a different answer.

A summary of the on-road mobile source VMT used to develop the various preliminary MOVES-based NO_X and VOC emissions levels—the same total VMT as used for the MOBILE6.2 inventories—is presented in Table 2-8. The on-road mobile ABY emissions inventories are summarized in Table 2-16: *Preliminary MOVES-Based DFW RFP Ozone Season Weekday On-Road Mobile Source Adjusted Base Year NO_X and VOC Emissions (tons per day)*. The preliminary MOVES-based RFP controlled and uncontrolled on-road mobile source emissions inventories are summarized in Table 2-17: *Preliminary MOVES-Based DFW RFP Ozone Season Weekday On-Road Mobile Source Controlled and Uncontrolled NO_X and VOC Emissions (tons per day)*. For complete documentation of the development of the preliminary MOVES-based on-road mobile source emissions inventories for the DFW RFP SIP proposal, refer to Appendix 10. The complete set of input and output files are available upon request from the TCEQ's Air Quality Division.

Table 2-16: Preliminary MOVES-Based DFW RFP Ozone Season Weekday On-Road Mobile Source Adjusted Base Year NO_X and VOC Emissions (tons per day)

RFP Analysis Year Inventory	ABY NO_X	ABY VOC
2002	683.19	252.05
2008	615.82	204.99
2011	623.66	199.74
2012	623.47	191.30

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

Table 2-17: Preliminary MOVES-Based DFW RFP Ozone Season Weekday On-Road Mobile Source Controlled and Uncontrolled NO_X and VOC Emissions (tons per day)

RFP Analysis Year Inventory	Uncontrolled NO_X	Controlled NO_X	Uncontrolled VOC	Controlled VOC
2002 Base Year	683.19	436.24	252.05	162.13
2008	771.62	360.61	257.28	104.20
2011	831.11	220.90	266.18	81.43
2012	844.71	197.34	259.18	71.56

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

2.5.6.2 Preliminary MOVES-Based Updated 2002 Base Year Inventory

The MOVES model allows for output as either emission factor or emissions. For link-based inventories, the model is run in emission factor mode and the emissions are calculated by multiplying the emission factor by the appropriate link VMT. For the preliminary inventory assessment, the model was run in emissions mode and the VMT by HPMS roadway type was input into the model for each county in the DFW nonattainment area. The preliminary 2002 base year emissions inventory for on-road mobile sources was calculated using the latest version of the MOVES model, MOVES2010a. The latest activity estimates were from the DFW TDM 2002 network. Only control strategies implemented prior to 2002 were included in the input to the emissions inventory development for the 2002 on-road mobile source base year emissions inventory. Those controls include: pre-1990 FMVCP; fleet turnover to Tier 1 FMVCP; RFG; and the DFW vehicle I/M program. The activity levels used to calculate the emissions inventory reflect the 2002 roadway network with the 2002 VMT summed by roadway type and the corresponding average roadway type speeds. A summary of the preliminary MOVES-based emissions inventory is presented in Table 2-17. For complete documentation of the development of the preliminary emissions inventory and details on MOVES model inputs, refer to Appendix 10.

2.5.6.3 Preliminary MOVES-Based Updated 2002 Adjusted Base Year Inventories for the Base and Milestone Years

The RFP planning process includes calculating the ABY emissions inventory, from which required percent emissions reductions are calculated. The ABY emissions inventory is calculated by subtracting non-creditable controls from the base year emissions inventory. As specified by the FCAA, certain on-road mobile source emissions reductions are not creditable toward the required percentage reductions. The non-creditable reductions include reductions from controls that were promulgated prior to the 1990 FCAA. The two rules that are non-creditable for this proposed SIP revision are pre-1990 FMVCP and pre-1990 promulgated federal fuel volatility regulations (summertime gasoline RVP limits beginning in 1992). Because the defeat device for HDDVs was affecting an FMVCP that was implemented prior to the 1990 FCAA, the HDDV NO_X off-cycle emissions effects and associated mitigation program effects are also considered non-creditable. Therefore, for this proposed DFW RFP demonstration, on-road mobile pre-1990 non-creditable emissions reductions include pre-1990 FCAA FMVCP, 1992 summertime RVP limits, and HDDV NO_X off-cycle emissions and mitigation programs. All those controls are for on-road mobile sources and are accounted for in the on-road mobile source ABY emissions inventories.

Normally an ABY emissions inventory for on-road mobile sources is developed for each milestone year using emission factor from the MOBILE6.2 model, which reflect only control strategies implemented prior to 1990. By projecting the pre-1990 FMVCP into future years, the effects of additional fleet turnover benefit due to the new standards are reflected in the emission factor. The controls included in the ABY emissions inventory development include pre-1990 FCAA FMVCP and the 1992 summertime RVP control. For the preliminary MOVES-based assessment, time did not permit the development of the normal link-based ABY inventories. For the MOVES assessment, the MOVES model was run in emissions mode. The uncontrolled emissions output by MOVES, which included only the non-creditable controls, was adjusted for the increase in VMT from the base year to the milestone year. This method provides an approximation of the non-creditable reductions.

The estimated non-creditable emissions reductions due to pre-1990 controls are calculated by subtracting the 2002 ABY emissions inventory, relative to each target year, from the actual 2002 base year emissions inventory. A summary of the preliminary MOVES-based ABY emissions inventories and associated non-creditable emissions reductions is presented in Tables 2-18: *Preliminary MOVES-Based Summary of DFW RFP On-Road Mobile Source Non-Creditable NO_X Reductions (tons per day)* and 2-19: *Preliminary MOVES-Based Summary of DFW RFP On-Road Mobile Source Non-Creditable VOC Reductions (tons per day)*. For complete documentation of the development of the preliminary emissions inventory and details on MOVES model inputs, refer to Appendix 10.

Table 2-18: Preliminary MOVES-Based Summary of DFW RFP On-Road Mobile Source Non-Creditable NO_X Reductions (tons per day)

Analysis Year	ABY NO_X	Non-Creditable NO_X Emission Reductions
2002	683.19	N/A
2008	615.83	67.36
2011	623.66	-7.83
2012	623.47	0.19

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 9: *Preliminary MOVES-Based Dallas-Fort Worth Nonattainment Area Reasonable Further Progress Demonstration Calculations Spreadsheet* for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area. Non-creditable reductions are calculated based on output from the MOBILE6.2 model and VMT. Non-creditable reductions may become negative as values approach zero.

Table 2-19: Preliminary MOVES-Based Summary of DFW RFP On-Road Mobile Source Non-Creditable VOC Reductions (tons per day)

Analysis Year	ABY VOC	Non-Creditable VOC Emission Reduction
2002	252.05	N/A
2008	204.99	47.06
2011	199.74	5.25
2012	191.30	8.44

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 9 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

2.5.6.4 Preliminary MOVES-Based Updated Uncontrolled Milestone Years Emissions Inventories

The preliminary MOVES-based uncontrolled on-road mobile source emissions inventories for each RFP milestone year were developed using emissions that reflect only control strategies implemented prior to 2002. The latest version of MOVES, MOVES2010a, was used to develop the emissions inventories for this proposed SIP revision. The activity levels were updated to include the latest output from the DFW TDM, and summed by HPMS roadway type. The pre-2002 controls include pre-1990 FMVCP, the 1992 RVP control, fleet turnover to Tier 1 FMVCP, RFG, and the DFW vehicle I/M program. The activity levels used to calculate the emissions inventory reflect the milestone roadway network, with milestone year VMT and speeds. A summary of the preliminary emissions inventories is presented in Table 2-17. For complete documentation of the development of the emissions inventory and details on MOVES model inputs, refer to Appendix 10.

2.5.6.5 Preliminary MOVES-Based Updated Controlled Milestone Years Emissions Inventories

The preliminary MOVES-based controlled on-road mobile emissions inventories for each RFP milestone year were developed using emissions that reflect both the control strategies implemented prior to 2002 and the control strategies used to demonstrate compliance with post-2002 RFP requirements. Those controls include: pre-1990 FMVCP; fleet turnover to Tier 1 of the FMVCP; fleet turnover to Tier 2 of the FMVCP; the 2007 HDDV FMVCP; summer RFG; the DFW vehicle I/M program; the anti-tampering program; and TxLED. Control scenario

inventory values include both the post-control emissions inventory and the level of reductions for each control strategy. A summary of the uncontrolled on-road mobile emissions inventory, the individual on-road mobile control reductions, and the resulting controlled on-road mobile emissions inventory for each milestone year are summarized in Tables 2-20: *Preliminary MOVES-Based 2011 DFW RFP Ozone Season Weekday On-Road Mobile Source NO_X and VOC Emissions and Control Strategy Reductions* and 2-21: *Preliminary MOVES-Based 2012 DFW RFP Ozone Season Weekday On-Road Mobile Source NO_X and VOC Emissions and Control Strategy Reductions*. For the preliminary MOVES assessment, the model was run only with all creditable controls on and all creditable controls off; therefore, the summary does not individually quantify the modeled control reductions.

Table 2-20: Preliminary MOVES-Based 2011 DFW RFP Ozone Season Weekday On-Road Mobile Source NO_X and VOC Emissions and Control Strategy Reductions

On-Road Mobile Emissions Inventory Strategies	NO_X (tons per day)	VOC (tons per day)
2011 uncontrolled inventory	831.11	266.18
Tier 1 FMVCP, RFG, I/M Program, ATP, Tier 2 FMVCP, 2007 HDDV FMVCP	604.20	184.75
On-road TxLED	6.00	0.00
2011 controlled inventory	220.90	81.43

Table 2-21: Preliminary MOVES-Based 2012 DFW RFP Ozone Season Weekday On-Road Mobile Source NO_X and VOC Emissions and Control Strategy Reductions

On-Road Mobile Emissions Inventory Strategies	NO_X (tons per day)	VOC (tons per day)
2012 uncontrolled inventory	844.71	259.18
Tier 1 FMVCP, RFG, I/M Program, ATP, Tier 2 FMVCP, 2007 HDDV FMVCP	642.07	187.62
On-road TxLED	5.29	0.00
2012 controlled inventory	197.34	71.56

2.6 BIOGENIC SOURCES

Biogenic sources include VOC emissions from crops, lawn grass, and trees as well as a small amount of NO_X emissions from soils. Plants are sources of VOC such as isoprene, monoterpene, and alpha-pinene. Biogenic emissions are estimated using the EPA's Biogenic Emissions Inventory tool. Biogenic emissions are important in determining the overall emissions profile of an area; therefore, they are required for regional air quality modeling and to meet periodic EPA reporting requirements. Since the 2002 base year emissions inventory is based on the inventory developed to meet EPA periodic reporting requirements, the 2002 base year emissions inventory includes biogenic emissions.

Biogenic emissions are excluded from the RFP methodology; therefore, biogenic emissions were subtracted from the 2002 base year emissions inventory for this proposed SIP revision. The resulting anthropogenic emissions inventory, composed of point, area, non-road, and on-road emissions sources, is the 2002 DFW RFP base year emissions inventory. Biogenic emissions inventories are not utilized for RFP determinations.

2.7 EMISSIONS SUMMARY

Uncontrolled and controlled base year NO_X and VOC emissions in the DFW area for each RFP source category are summarized in Table 2-22: *MOBILE6.2-Based Summary of the 2002 Base Year Ozone Season Weekday NO_X and VOC Emissions for the DFW RFP (tons per day)*. DFW-area uncontrolled and controlled NO_X and VOC emissions for each RFP source category and milestone year are summarized in Tables 2-23: *MOBILE6.2-Based Summary of the 2008 Ozone Season Weekday NO_X and VOC Emissions for the DFW RFP (tons per day)*, 2-24: *MOBILE6.2-Based Summary of the 2011 Ozone Season Weekday NO_X and VOC Emissions for the DFW RFP (tons per day)*, and 2-25: *MOBILE6.2-Based Summary of the 2012 Ozone Season Weekday NO_X and VOC Emissions for the DFW RFP (tons per day)*. Where there is no difference between the uncontrolled and post-control emissions for the base year and all milestone years, there were no controls applied to the projected source inventories.

Table 2-22: MOBILE6.2-Based Summary of the 2002 Base Year Ozone Season Weekday NO_X and VOC Emissions for the DFW RFP (tons per day)

Emissions Inventory Source	Uncontrolled NO_X	Controlled NO_X	Uncontrolled VOC	Controlled VOC
Point Sources	79.24	79.24	26.43	26.43
Area Sources	38.63	38.63	247.03	247.03
Non-Road Mobile Sources	167.62	153.41	114.48	82.05
MOBILE6.2-Based On-Road Mobile Sources	379.41	306.99	206.06	145.07
Total of All Sources	664.90	578.27	594.00	500.58

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

Table 2-23: MOBILE6.2-Based Summary of the 2008 Ozone Season Weekday NO_X and VOC Emissions for the DFW RFP (tons per day)

Emissions Inventory Source	Uncontrolled NO_X	Controlled NO_X	Uncontrolled VOC	Controlled VOC
Point Sources	85.14	49.21	31.34	31.19
Area Sources	150.39	150.39	323.59	320.44
Non-Road Mobile Sources	186.67	130.29	130.73	62.80
MOBILE6.2-Based On-Road Mobile Sources	413.86	194.92	236.86	101.44
Total of All Sources	836.06	524.81	722.52	515.87

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

Table 2-24: MOBILE6.2-Based Summary of the 2011 Ozone Season Weekday NO_X and VOC Emissions for the DFW RFP (tons per day)

Emissions Inventory Source	Uncontrolled NO_X	Controlled NO_X	Uncontrolled VOC	Controlled VOC
Point Sources	105.86	62.79	39.89	39.73
Area Sources	168.66	40.56	351.90	346.64
Non-Road Mobile Sources	186.20	111.43	137.18	51.98
MOBILE6.2-Based On-Road Mobile Sources	438.60	142.41	273.23	88.56
Total of All Sources	899.32	357.19	802.20	526.91

Table 2-25: MOBILE6.2-Based Summary of the 2012 Ozone Season Weekday NO_X and VOC Emissions for the DFW RFP (tons per day)

Emissions Inventory Source	Uncontrolled NO_X	Controlled NO_X	Uncontrolled VOC	Controlled VOC
Point Sources	102.10	58.87	40.74	40.58
Area Sources	175.61	41.34	362.95	341.78
Non-Road Mobile Sources	188.40	104.23	141.36	49.84
MOBILE6.2-Based On-Road Mobile Sources	445.47	122.82	276.91	81.17
Total of All Sources	911.58	327.26	821.96	513.37

2.7.1 Preliminary MOVES-Based Emissions Summary

The TCEQ is taking comment on using on-road emissions inventories based on MOVES as well as MOBILE6.2 in the adopted DFW RFP SIP revision; therefore, emissions summaries with preliminary MOVES-based inventories are included for commenting purposes. Uncontrolled and controlled base year NO_X and VOC emissions in the DFW area for each RFP source category, with on-road mobile source values based on preliminary MOVES analysis, are summarized in Table 2-26: *Preliminary MOVES-Based Summary of the 2002 Base Year Ozone Season Weekday NO_X and VOC Emissions for the DFW RFP (tons per day)*. The DFW area uncontrolled and controlled NO_X and VOC emissions for each RFP source category and milestone year, with on-road mobile source values based on preliminary MOVES analysis, are summarized in Tables 2-27: *Preliminary MOVES-Based Summary of the 2008 Ozone Season Weekday NO_X and VOC Emissions for the DFW RFP (tons per day)*, 2-28: *Preliminary MOVES-Based Summary of the 2011 Ozone Season Weekday NO_X and VOC Emissions for the DFW RFP (tons per day)*, and 2-29: *Preliminary MOVES-Based Summary of the 2012 Ozone Season Weekday NO_X and VOC Emissions for the DFW RFP (tons per day)*. Where there is no difference between the uncontrolled and post-control emissions for the base year and all milestone years, there were no controls applied to the projected source inventories.

Table 2-26: Preliminary MOVES-Based Summary of the 2002 Base Year Ozone Season Weekday NO_X and VOC Emissions for the DFW RFP (tons per day)

Emissions Inventory Source	Uncontrolled NO_X	Controlled NO_X	Uncontrolled VOC	Controlled VOC
Point Sources	79.24	79.24	26.43	26.43
Area Sources	38.63	38.63	247.03	247.03
Non-Road Mobile Sources	167.62	153.41	114.48	82.05
Preliminary MOVES-Based On-Road Mobile Sources	683.19	436.23	252.05	162.13
Total of All Sources	968.68	707.51	639.99	517.64

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 9 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

Table 2-27: Preliminary MOVES-Based Summary of the 2008 Ozone Season Weekday NO_X and VOC Emissions for the DFW RFP (tons per day)

Emissions Inventory Source	Uncontrolled NO_X	Controlled NO_X	Uncontrolled VOC	Controlled VOC
Point Sources	85.14	49.21	31.34	31.19
Area Sources	150.39	150.39	323.59	320.44
Non-Road Mobile Sources	186.67	130.29	130.73	62.80
Preliminary MOVES-Based On-Road Mobile Sources	771.62	360.60	257.27	104.21
Total of All Sources	1193.82	690.49	742.93	518.64

Note: 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 9 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

Table 2-28: Preliminary MOVES-Based Summary of the 2011 Ozone Season Weekday NO_X and VOC Emissions for the DFW RFP (tons per day)

Emissions Inventory Source	Uncontrolled NO_X	Controlled NO_X	Uncontrolled VOC	Controlled VOC
Point Sources	105.86	62.79	39.89	39.73
Area Sources	168.66	40.56	351.90	346.64
Non-Road Mobile Sources	186.20	111.43	137.18	51.98
Preliminary MOVES-Based On-Road Mobile Sources	831.11	220.90	266.18	81.43
Total of All Sources	1291.83	435.68	795.15	519.78

Table 2-29: Preliminary MOVES-Based Summary of the 2012 Ozone Season Weekday NO_X and VOC Emissions for the DFW RFP (tons per day)

Emissions Inventory Source	Uncontrolled NO_X	Controlled NO_X	Uncontrolled VOC	Controlled VOC
Point Sources	102.10	58.87	40.74	40.58
Area Sources	175.61	41.34	362.95	341.78
Non-Road Mobile Sources	188.40	104.23	141.36	49.84
Preliminary MOVES-Based On-Road Mobile Sources	844.71	202.64	259.18	71.56
Total of All Sources	1310.82	407.08	804.23	503.76

CHAPTER 3: PROGRESS TOWARD MEETING TARGET EMISSIONS LEVELS

3.1 INTRODUCTION

This chapter describes how the Dallas-Fort Worth (DFW) reasonable further progress (RFP) demonstration is calculated, documents the RFP calculations, and provides a summary of the DFW RFP demonstration for all RFP milestone years. For nonattainment areas required to submit RFP demonstrations that have already achieved the required 15% reduction in volatile organic compounds (VOC), the RFP guidance in the Phase I implementation rule for the 1997 eight-hour ozone standard requires an average 3% reduction of VOC and/or nitrogen oxides[10] (NO_X) per year out to an area's attainment. Guidance from the United States Environmental Protection Agency (EPA) requires states to demonstrate RFP every third year as well as the attainment year. The RFP calculations documented in this proposed state implementation plan (SIP) revision rely on an RFP base year of 2002 and a June 15, 2013, attainment date. This DFW RFP analysis has two RFP milestone years: 2011 and 2012. Between 2002 and 2008, 15% VOC emissions reductions were calculated for the five counties (Ellis, Johnson, Kaufman, Parker, and Rockwall Counties) added to the DFW nonattainment area under the 1997 eight-hour ozone standard, and 15% VOC and NO_X emissions reductions were calculated for the four original DFW nonattainment counties Collin, Dallas, Denton, and Tarrant Counties). While emissions were calculated between 2002 and 2008, 2008 was not considered a milestone year for this proposed SIP revision because the EPA already approved the 2008 milestone year in the 2007 DFW Eight-Hour Ozone Nonattainment Area RFP SIP revision submittal (Project No. 2006-031-SIP-NR). The additional RFP milestone years requirements for this proposal are:

- a 9% emissions reduction for the three-year period between 2008 and 2011 for the entire DFW nonattainment area;
- a 3% emissions reduction for the one-year period between 2011 and 2012 for the entire DFW nonattainment area; and
- a 3% emissions reduction for the one-year period between 2012 and 2013 as attainment year RFP contingency for the entire DFW nonattainment area.

Progress toward the 2011 and 2012 milestone years emissions reductions requirements is demonstrated using EPA methodologies to calculate the elements of the RFP demonstration and complete the RFP analyses. First, the emissions inventories, control reductions, and non-creditable emissions reductions are developed for each milestone year. Second, the target level of emissions is calculated for each milestone year. Third, the RFP control measures reductions for each milestone year are subtracted from the uncontrolled emissions inventory for the corresponding milestone year. The difference includes growth from the base year to the selected milestone year. When the uncontrolled projected inventory for each milestone year minus the RFP controls is less than or equal to the target level of emissions for VOC and/or NO_X, the RFP requirement has been met. Required RFP elements include:

- the 2002 base year emissions;
- non-creditable reductions for 2002, 2008, 2011, and 2012;
- 2008, 2011, and 2012 emissions target levels;
- 2008, 2011, and 2012 projected emissions, with growth; and
- individually quantified emissions reductions from control measures for 2008, 2011, and 2012.

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[10] NO_X may be substituted for VOC under conditions defined in the EPA's December 1993 NO_X Substitution Guidance (http://www.epa.gov/ttncaaa1/t1/memoranda/noxsubst.pdf).

The timing of the release of the EPA's Motor Vehicle Emission Simulator (MOVES) model did not allow for this proposed SIP revision to be based on MOVES analyses; therefore, on-road mobile source emissions inventories were developed using the EPA's MOBILE6.2 model. This proposal does include preliminary on-road mobile source emissions inventories, a preliminary RFP demonstration, and preliminary motor vehicle emissions budgets based on the MOVES model. The TCEQ is taking comment on using on-road mobile emissions inventories based on the MOBILE6.2 model and the MOVES model in the adopted version of the DFW RFP SIP revision. Discussion of the preliminary RFP demonstration using preliminary MOVES-based on-road mobile source inventories is presented in section 3.6: *Preliminary MOVES-Based RFP Demonstration*.

3.2 TARGET LEVEL METHODOLOGY

EPA guidance specifies the method states should use to calculate the maximum amount of emissions a nonattainment area can emit for each RFP milestone year. Those RFP target levels of emissions are calculated using a six step process, which is used for this proposed SIP revision.

1. Determine the 2002 base year emissions inventory.
2. Determine the 2002 RFP base year emissions inventory.
3. Determine the adjusted base year (ABY) emissions inventories for 2002, 2008, 2011, and 2012.
4. Calculate the non-creditable fleet turnover correction for each RFP milestone year.
5. Calculate the required 3% per year emissions reduction amount.
6. Calculate the 2011 and 2012 emissions target levels for VOC and NO_X.

3.3 CALCULATION OF TARGET EMISSIONS LEVELS

A summary of the six step process described above for target calculations for 2011 is presented in Table 3-1: *Summary of the Calculation Process for 2011 DFW RFP Target Levels with MOBILE6.2-Based Calculations*. The summary table serves as an example of how all target levels for each milestone year are calculated. A summary of all target levels is found in Tables 3-5: *Post-2002 RFP Target Level of NO_X Emissions Based on the MOBILE6.2 Model (tons per day)* and 3-6: *Post-2002 RFP Target Level of VOC Emissions Based on the MOBILE6.2 Model (tons per day)*.

Table 3-1: Summary of the Calculation Process for 2011 DFW RFP Target Levels with MOBILE6.2-Based Calculations

Description	NO_X	VOC
1: Step 1: 2002 base year emissions inventory (see Table 2-22)	578.27 tpd	500.58 tpd
2: Step 2: Add or subtract emissions that are to be included from outside the nonattainment area	0.00 tpd	0.00 tpd
3: Revised 2002 RFP Base Year emissions inventory (see Table 2-22) **(1 minus 2)**	578.27 tpd	500.28 tpd
4: Step 3: 2002 On-road ABY emissions inventory (see Tables 2-11 and 2-12)	379.41 tpd	206.06 tpd
5: 2011 On-road ABY emissions inventory (see Tables 2-11 and 2-12)	315.51 tpd	179.45 tpd
6: Step 4: Calculate non-creditable reductions 2002 to 2011(see Tables 2-11 and 2-12) **(4 minus 5)**	63.90 tpd	26.61 tpd
7: 2008 ABY emissions inventory for 5 newly designated counties	122.12 tpd	67.15 tpd

Description	NO_X	VOC
8: 15% VOC to meet 15% VOC reduction requirement for newly designated counties	0%	15%
9: 2008 ABY emissions inventory for 4 previously designated counties	394.34 tpd	408.01 tpd
10: Percent of NO_X (PN) and VOC (PV) to meet 15% reduction requirement, PN + PV = 15	15%	0%
11: 2011 ABY emissions inventory	514.37 tpd	473.97 tpd
12: PN and PV to meet 9% reduction requirement, PN + PV = 9	9%	0%
13: Step 5A: Calculate the 2002-to-2008 15% VOC reduction requirement for 5 newly designated counties **(7 x 8)**	N/A	10.07 tpd
14: Step 5B: Calculate the 2002-to-2008 15% NO_X and VOC reduction requirement for 4 previously designated counties **(9 x 10)**	59.15 tpd	0.00 tpd
15: Step 5C: Calculate the 2008-to-2011 9% reduction requirement **(11 x 12)**	46.29 tpd	0.00 tpd
16: Step 5D: Calculate the total 2002-to-2011 percent reduction requirement **(13+14+15)**	106.96 tpd	10.07 tpd
17: Step 6: Calculate the target level of emissions **(3 minus 6 minus 16)**	407.41 tpd	463.90 tpd

Step one of the RFP target calculation process involves the development of the 2002 base year emissions inventory. EPA guidance specifies the method states must use to develop the base year emissions inventory and all other SIP emissions inventories.[11] Details of the development of the 2002 DFW base year emissions inventory are discussed in Chapter 2: *Emissions Inventories*. Summaries for the 2002 DFW base year NO_X and VOC emissions inventories are presented in Table 2-22: MOBILE6.2-Based *Summary of the 2002 Base Year Ozone Season Weekday NO_X and VOC Emissions for the DFW RFP (tons per day).*

Step two of the RFP target calculation process adds or subtracts any emissions from outside the nonattainment area that need to be included with or excluded from the nonattainment area emissions inventory. The resulting, revised emissions inventory becomes the 2002 RFP base year emissions inventory, which represents the total anthropogenic emissions for the area. For this proposed DFW RFP SIP revision, the revised 2002 RFP base year emissions inventory is the same as the 2002 base year emissions inventory.

Step three of the RFP target calculation process involves the development of the on-road ABY emissions inventories for 2002, 2008, 2011, and 2012. Those emissions inventories are mathematical interpretations of what projected inventories would be if vehicle miles traveled (VMT) and base year controls remained static at 2002 levels. They are used only to calculate the effects of the pre-1990 Federal Clean Air Act (FCAA) Amendments controls projected to the RFP base and milestone years. As such, those emissions inventories can be used to estimate the effects of the pre-1990 FCAA controls between milestone years. That estimation allows for the calculation of the non-creditable control reduction, which occurs in step four. The emissions rates for an ABY emissions inventory are developed using the latest version of the EPA's MOBILE6.2 emission factor model, MOBILE6.2.03. The model input file is set up to turn off all 1990 FCAA effects, and the model evaluation year is set to the RFP base or milestone year. The model is run to determine emission factors for each base or milestone year with only pre-1990

[11] References for guidance documents used for emissions inventory development in this SIP proposal are listed in the *References for Guidance Documents* section at the end of this document.

FCAA controls only. The emission factors for all years are then multiplied by the 2002 base year VMT. Since all of the emissions inventories use the base year VMT, the emissions inventories are referred to as RFP ABY emissions inventories. Details of the development of the DFW RFP ABY emissions inventories are documented in Chapter 2 of this document and in Appendix 8: *Development of Reasonable Further Progress On-Road Mobile Source Emissions Inventories Based on the MOBILE6.2 Model for the Dallas-Fort Worth Nonattainment Area*.

Step four of the RFP target calculation process, calculating the non-creditable fleet turnover correction, is accomplished by subtracting the RFP ABY emissions inventory for each milestone year from the ABY emissions inventory for the previous RFP milestone year. Since the ABY emissions inventories estimate the effects of the non-creditable pre-1990 FCAA controls, the difference between RFP ABY emissions inventories represent an estimate of the non-creditable RFP emissions reductions, also referred to as the fleet turnover correction. Tables 3-2: *Summary of Non-Creditable NO_X Fleet Turnover Reduction Based on the MOBILE6.2 Model (tons per day)* and 3-3: *Summary of Non-Creditable VOC Fleet Turnover Reduction Based on the MOBILE6.2 Model (tons per day)* provide a summary of the fleet turnover corrections for all RFP milestone years. Since the first target calculated for this RFP demonstration is 2011, the non-creditable reductions from both 2002 to 2008 and 2008 to 2011 are accounted for in the 2011 target calculation. The equations for calculating the fleet turnover correction between two milestone years are shown below:

Equation 3-1A: $FTC_{MSY, VOC} = ABY_{(MSY-1), VOC} - ABY_{MSY, VOC}$

and

Equation 3-1B: $FTC_{MSY, NOx} = ABY_{(MSY-1), NOx} - ABY_{MSY, NOx}$

where:

$FTC_{MSY, VOC}$ = VOC fleet turnover correction for year MSY

$FTC_{MSY, NOx}$ = NO_X fleet turnover correction for year MSY

$ABY_{MSY, VOC}$ = MSY adjusted base year emissions inventory for VOC

$ABY_{MSY, NOx}$ = MSY adjusted base year emissions inventory for NO_X

$ABY_{(MSY-1), VOC}$ = previous MSY adjusted base year emissions inventory for VOC

$ABY_{(MSY-1), NOx}$ = previous MSY adjusted base year emissions inventory for NO_X

MSY = RFP milestone year

MSY – 1 = previous RFP milestone year

Table 3-2: Summary of Non-Creditable NO_X Fleet Turnover Reduction Based on the MOBILE6.2 Model (tons per day)

RFP Analysis Year	On-road Mobile ABY NO_X	Non-creditable NO_X Fleet Turnover Reduction	Non-creditable Pre-1990 CAA Fleet Turnover Reduction Years
2002	379.41	N/A	N/A
2008	317.60	61.81	2002-2008
2011	315.51	2.09	2008-2011
2012	315.61	-0.10	2011-2012

Table 3-3: Summary of Non-Creditable VOC Fleet Turnover Reduction Based on the MOBILE6.2 Model (tons per day)

RFP Analysis Year	On-road Mobile ABY VOC	Non-creditable VOC Fleet Turnover Reduction	Non-creditable Pre-1990 CAA Fleet Turnover Reduction Years
2002	206.06	N/A	N/A
2008	180.64	25.42	2002-2008
2011	179.45	1.19	2008-2011
2012	178.80	0.65	2011-2012

Step five of the RFP target calculation process, calculating the required 3% per year emissions reduction amount, is accomplished by multiplying the RFP milestone year ABY emissions inventory values by the percent reduction needed to meet RFP requirements. For the DFW nonattainment area, the first requirement is to reduce emissions by 15% from 2002 to 2008, and the post-2008 requirement is to reduce emissions by 3% per year from 2008 to the attainment year. Phase II of the EPA's implementation rule for the 1997 eight-hour ozone standard allows ozone nonattainment areas to substitute NO_X reductions for VOC reductions, but use of NO_X emissions reductions must meet the criteria in §182(c)(2)(C) in the FCAA. For the five counties added to the DFW nonattainment area under the 1997 eight-hour ozone standard, the 15% requirement from 2002 to 2008 must be all VOC. The four counties originally designated nonattainment under the one-hour ozone standard have already satisfied the 15% VOC only requirement; therefore, an equivalent percentage of NO_X reductions may be substituted for VOC reductions requirements in those counties between 2002 and 2008. After 2008, all nine DFW nonattainment counties may substitute NO_X reductions for VOC under the conditions the EPA's NO_X substitution guidance.[12] The total of the percent NO_X and VOC reductions must equal the total emissions reductions requirements for each milestone year. For 2008, the reduction requirement is met for the five nonattainment counties added under the 1997 eight-hour ozone standard through a 15% VOC reduction. The 2008 reduction requirement is met for the four original nonattainment counties through a 15% NO_X reduction. For the 2011 and 2012 milestone years, the reduction requirement for this proposed RFP SIP revision is satisfied by taking the entire 3% per year reduction from NO_X emissions. Equation 3-2 describes the method to calculate the percentage of NO_X emissions substituted for VOC emissions:

Equation 3-2: $N_{MSY} = [3 \times (CY_{MSY} - CY_{MSY}\text{-}1)] - V_{MSY}$

Where:

N_{MSY} = percentage NO_X reductions for year MSY

CY = calendar year

MSY = RFP milestone year

MSY -1 = previous RFP milestone year

V_{MSY} = percentage VOC reductions for year MSY

Emissions reductions percentages are multiplied by their corresponding NO_X and VOC milestone years ABY emissions inventories to calculate the required NO_X and VOC emissions

[12] See footnote 10.

reductions for each milestone year. Table 3-4: *Calculation of Required 15% and 3% per Year NO_X and VOC Reductions for the DFW RFP* provides a summary of the NO_X and VOC reductions needed to satisfy the 3% per year requirement for all RFP milestone years. The equations for calculating the 3% required reductions for NO_X and VOC are shown in Equations 3-3A and 3-3B.

Equation 3-3A: $RPR_{MSY, VOC} = [\ BY_{2002, VOC} - (\ ABY_{2002, VOC} - ABY_{MSY, VOC}\ )\ ] \times PV_{MSY}$

and,

Equation 3-3B: $RPR_{MSY, NOx} = [\ BY_{2002, NOx} - (\ ABY_{2002, NOx} - ABY_{MSY, NOx}\ )\ ] \times PN_{MSY}$

Where:

$RPR_{MSY, VOC}$ = required VOC emission reductions between 2002 and MSY

$RPR_{MSY, NOx}$ = required NO_X emission reductions between 2002 and MSY

$BY_{2002, VOC}$ = 2002 base year emissions inventory for VOC

$BY_{2002, NOx}$ = 2002 base year emissions inventory for NO_X

$ABY_{2002, VOC}$ = 2002 adjusted base year emissions inventory for VOC

$ABY_{2002, NOx}$ = 2002 adjusted base year emissions inventory for NO_X

$ABY_{MSY, VOC}$ = MSY adjusted base year emissions inventory for VOC

$ABY_{MSY, NOx}$ = MSY adjusted base year emissions inventory for NO_X

PV_{MSY} = percentage VOC reductions for year MSY

PN_{MSY} = percentage NO_X reductions for year MSY

MSY = RFP milestone year

Table 3-4: Calculation of Required 15% and 3% per Year NO_X and VOC Reductions for the DFW RFP

RFP Analysis Year	Total Percent Reduction Requirement	Percent NO_X	Percent VOC	ABY Emissions Inventory NO_X	ABY Emissions Inventory VOC	Required Reductions NO_X (tpd)	Required Reductions VOC (tpd)
2008: Five New Counties	15	0	15	122.12	67.15	N/A	10.07
2008: Four Previously Designated Counties	15	15	0	394.34	408.01	59.15	0.00
2011	9	9	0	514.37	473.97	46.29	0.00
2012	3	3	0	514.47	473.32	15.43	0.00

Note: Emissions are given in tons per day.

Step six of the RFP target calculation process, calculating RFP target levels of emissions, is accomplished by subtracting the required emissions reductions (step five) and the fleet turnover correction factor (step four) from the 2002 base year emissions inventory. The target level

represents the level of emissions for each RFP milestone year for the DFW nonattainment area to meet its 1997 eight-hour ozone standard RFP requirements. Because the fleet turnover correction affects both NO_X and VOC emissions, target levels are calculated for both pollutants even when the entire reduction requirement is taken from one pollutant or the other. The method for calculating the target levels of emissions for the DFW RFP milestone years is shown in Equation 3-4.

Equation 3-4: $TL_{MSY, X} = TL_{(MSY-1), X} - RPR_{MSY, X} - FTC_{MSY, X}$

Where:

$TL_{MSY, X}$ = target level of emissions for MSY

$TL_{(MSY-1), X}$ = target level of emissions for the previous RFP milestone year (Note: For 2008, the target level of emissions for the previous RFP milestone year is equal to the 2002 base year emissions inventory.)

$RPR_{MSY, X}$ = emission reduction requirement for MSY for pollutant X

$FTC_{MSY, X}$ = fleet turnover correction term for MSY for pollutant X

X = either VOC or NO_X

MSY = RFP milestone year

MSY - 1 = previous RFP milestone year

Appendix 1: *MOBILE6.2-Based Dallas-Fort Worth Nonattainment Area Reasonable Further Progress Demonstration Calculations Spreadsheet* documents the calculation of the target values for all RFP milestone years. Table 3-1 provides a step-by-step summary of the calculation of the target levels for 2011 for the DFW nonattainment area. Tables 3-5 and 3-6 summarize the calculation of the target levels of VOC and NO_X for all RFP milestone years and provide the Federal Motor Vehicle Control Program (FMVCP) non-creditable emissions reductions. The following sections describe how the target levels are integrated into the RFP demonstration.

Table 3-5: Post-2002 RFP Target Level of NO_X Emissions Based on the MOBILE6.2 Model (tons per day)

RFP Milestone Year	Previous Target	FMVCP Non-Creditable Reduction	Post-2002 Percent Reduction Requirement NO_X	NO_X Target
2002	N/A	N/A	N/A	*578.27
2008	578.27	61.81	59.15	457.31
2011	457.31	2.09	46.29	408.93
2012	408.93	**-0.10	15.43	393.60

*This number is the base year emissions inventory, which is the starting point for calculating target values.
**Calculations, based on EPA guidance and on the MOBILE6.2 model, produced a negative number due to the decreasing influence of Tier 0 FMVCP on emission factors.

Table 3-6: Post-2002 RFP Target Level of VOC Emissions Based on the MOBILE6.2 Model (tons per day)

RFP Milestone Year	Previous Target	FMVCP Non-Creditable Reduction	Post-2002 Percent Reduction Requirement VOC	VOC Target
2002	N/A	N/A	N/A	*500.58
2008	500.58	25.42	10.07	465.09
2011	465.09	1.19	0.00	463.90
2012	463.90	0.65	0.00	463.25

* This number is the base year emissions inventory, which is the starting point for calculating target values.

3.4 GROWTH

The proposed DFW RFP SIP revision must account for any growth in emissions between 2002 and each RFP milestone year. The NO_X and VOC uncontrolled projected milestone years emissions inventories are derived by applying the appropriate projection methodologies to the 2002 base year emissions inventory, emission factor development, and/or to activity level estimates. The resulting emissions inventories include any growth between 2002 and each projected year through 2013. The projection methodology for the uncontrolled RFP emissions inventory excludes changes in the emission factor due to control strategies so that the projections represent the total growth in emissions. When the creditable RFP control reductions are subtracted from uncontrolled projected emissions inventories that include growth, the result will be the forecast controlled RFP emissions. The controlled RFP emissions are compared to the target emissions levels to determine if a nonattainment area successfully demonstrates RFP, thereby meeting RFP requirements. The method for accounting for growth is based on EPA guidance for performing RFP calculations.[13] The development of the uncontrolled projected emissions inventory is documented in Chapter 2. The development of the projected control reductions are documented in Chapter 4: *Control Measures to Achieve Target Levels*.

3.5 RFP DEMONSTRATION

Phase II of the EPA's implementation rule for the 1997 eight-hour ozone standard (40 *Code of Federal Regulations* §51.910) requires the RFP control strategy plan to show emissions reductions that will reduce controlled RFP milestone years emissions inventories to values less than the emissions target values for those milestone years. The creditable RFP control reductions are subtracted from the uncontrolled forecast emissions inventory for each RFP milestone year. For milestone years 2011 and 2012, the controls that are reserved to demonstrate contingency are added to the controlled RFP inventory because the creditable reductions for those years include the reductions reserved for contingency. Phase II of the implementation rule allows ozone nonattainment areas to substitute NO_X reductions for VOC reductions, but use of NO_X emissions reductions must meet the criteria in §182(c)(2)(C) of the FCAA. For the DFW nonattainment area counties, an equivalent NO_X reduction may be substituted for VOC reduction requirements for all RFP milestone years. The RFP requirement is met for each milestone year if the resulting controlled RFP emissions inventory forecast is less than the target level of emissions.

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[13] United States Environmental Protection Agency, "Final Rule to Implement the 8-Hour Ozone National Ambient Air Quality Standard; Final Rule," *Federal Register* (70 FR 71631), November 29, 2005.

For both MOBILE6.2 and MOVES RFP demonstrations in this proposed SIP revision, the amount of NO_X substitution is added to the NO_X controlled RFP forecast and subtracted from the VOC controlled RFP forecast. Due to the absence of EPA guidance concerning this type of NO_X substitution, the TCEQ conducted a modeling analysis to estimate its effects on monitored ozone values in the DFW nonattainment area to determine if such an approach is appropriate. The modeling analysis demonstrates that substituting NO_X for VOC does not negatively affect the area's progress toward attainment. In fact, the modeling analysis demonstrates that reducing NO_X emissions is more effective in reducing the area's design value than reducing VOC emissions. The modeling analysis was performed to determine how sensitive the 2012 future design value estimate was to VOC and NO_X reductions. By reducing the 2012 anthropogenic VOC inventory by approximately 80 tons per day (tpd), the 2012 eight-hour ozone design value was reduced by 0.12 parts per billion (ppb). By reducing the 2012 anthropogenic NO_X inventory by approximately 78 tpd, the 2012 eight-hour ozone design value was reduced by 3.43 ppb. According to this analysis, 2012 NO_X reductions would be much more effective at reducing the 2012 1997 eight-hour ozone design value than 2012 VOC reductions. Details on the modeling analysis performed to support the TCEQ's approach for NO_X substitution in this proposed SIP revision can be found in Appendix 11: *Emission Reduction Efficiency for Nitrogen Oxides and Volatile Organic Compounds*.

3.5.1 MOBILE6.2-Based RFP Demonstration

The MOBILE6.2-based RFP demonstration calculations were completed for the 2011 and 2012 milestone years. Tables 3-7: *MOBILE6.2-Based Summary of the 2011 DFW RFP Demonstration (tons per day)* and 3-8: *MOBILE6.2-Based Summary of the 2012 DFW RFP Demonstration (tons per day)* summarize the demonstration of the proposed RFP plan for the 2011 and 2012 milestone years. All RFP calculations, including the required reductions, the fleet turnover correction factor, and the target emissions levels, are calculated and shown in Appendix 1. Details of the emissions reductions used to calculate the creditable RFP control reductions for each milestone year are documented in Chapter 4 and summarized in Tables 4-1: *Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2002 through 2008 with MOBILE6.2-Based On-Road Reductions (tons per day)*, 4-2: *Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2008 through 2011 with MOBILE6.2-Based On-Road Reductions (tons per day)*, and 4-3: *Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2011 through 2012 with MOBILE6.2-Based On-Road Reductions (tons per day)*.

Table 3-7: MOBILE6.2-Based Summary of the 2011 DFW RFP Demonstration (tons per day)

Line #	Description	NO_X	VOC
Line 1	Uncontrolled emissions forecast with growth	899.32	802.20
Line 2	Creditable RFP control reductions for five new counties 2008	56.82	21.22
Line 3	Creditable RFP control reductions for four existing counties 2008	253.95	185.68
Line 4	Creditable RFP control reductions 2008 to 2011	234.39	56.57
Line 5	Controlled RFP emissions forecast (Line 1 minus Line 2 minus Line 3 minus Line 4)	354.16	538.73
Line 6	Amount of creditable reductions reserved for milestone year 2011 contingency	15.43	0.00
Line 7	Amount of NO_X reduction substitution	39.32	-39.32

Line #	Description	NO_X	VOC
Line 8	Controlled RFP forecast without reductions reserved for contingency and accounting for NO_X substitution (Line 5 plus Line 6 plus Line 7)	408.92	499.41
Line 9	2011 RFP target level of emissions	408.93	463.90
Line 10	Excess (+) / Shortfall (-) (Line 9 minus Line 8)	+0.01	-35.52
Line 11	**Is controlled RFP emissions inventory less than target level of emissions?**	**Yes**	**No**

Notes: The five new counties are the counties added to the DFW nonattainment area under the 1997 eight-hour ozone standard (Ellis, Johnson, Kaufman, Parker, and Rockwall Counties). The four existing counties are those designated nonattainment under the one-hour and eight-hour ozone standards (Collin, Dallas, Denton, and Tarrant Counties).

Current RFP analyses indicate that this proposed SIP revision does not demonstrate RFP for the 2011 milestone year due to a shortfall in VOC reductions; however, this proposed SIP revision does demonstrate RFP for the 2012 milestone year. In addition, this proposal demonstrates RFP contingency for the 2012 attainment year. The TCEQ is considering incorporating additional estimated emissions reductions from the Texas Emissions Reduction Program (TERP) into the SIP, as necessary, to address any target reductions presented in this proposal. Should further reductions be necessary to demonstrate RFP prior to adoption of this SIP revision, the commission may also investigate possible additional control measures. The process of investigation of new measures would include public participation. Any such process would occur at a later date, not concurrent with this proposed SIP revision.

Table 3-8: MOBILE6.2-Based Summary of the 2012 DFW RFP Demonstration (tons per day)

Line #	Description	NO_X	VOC
Line 1	Uncontrolled emissions forecast with growth	911.58	821.96
Line 2	Creditable RFP control reductions for 2008 to 2011	545.16	263.47
Line 3	Creditable RFP control reductions 2011 to 2012	42.14	41.38
Line 4	Controlled RFP emissions forecast (Line 1 minus Line 2 minus Line 3)	324.28	517.11
Line 5	Amount of creditable reductions reserved for milestone year 2011 contingency	15.43	0.00
Line 6	Amount of NO_X reduction substitution	53.87	-53.87
Line 7	Controlled RFP forecast without reductions reserved for contingency and accounting for NO_X substitution (Line 4 plus Line 5 plus Line 6)	393.59	463.24
Line 8	2012 RFP target level of emissions	393.59	463.25
Line 9	Excess (+) / Shortfall (-) (Line 8 minus Line 7)	+0.01	+0.01
Line 10	**Is controlled RFP emissions inventory less than target level of emissions?**	**Yes**	**Yes**

3.5.2 Preliminary MOVES-Based RFP Demonstration

This section presents a preliminary RFP demonstration based on on-road mobile source inventories and control reductions developed using the MOVES model. The TCEQ is taking comments on using on-road mobile source emissions inventories based on MOVES in the adopted version of the DFW RFP SIP revision. In the event that MOVES-based emissions inventories are used to determine RFP for the adopted SIP revision, link-based MOVES inventory values will be used, and it is expected that the final emissions figures and RFP demonstration results will be different from those reported in this proposal.

The preliminary MOVES-based RFP demonstration calculations were completed for the 2011 and 2012 milestone years. Tables 3-9*: Preliminary MOVES-Based Summary of the 2011 DFW RFP Demonstration (tons per day)* and 3-10*: Preliminary MOVES-Based Summary of the 2012 DFW RFP Demonstration (tons per day)* summarize the preliminary MOVES-based demonstration for the 2011 and 2012 RFP milestone years. If MOVES-based calculations are used in the adopted SIP revision, the 2011 milestone year target reductions may not be met due to a shortfall in VOC, as concluded in the final row of Table 3-9. That potential shortfall is based on preliminary MOVES-based calculations explained in Section 2.5.6: *Preliminary MOVES-Based Analysis*. For the 2012 milestone year, preliminary MOVES-based calculations indicate that the DFW area would demonstrate RFP.

All RFP calculations, including the required reductions, the fleet turnover correction factor, and the target emission levels, are calculated and shown in Appendix 9: *Preliminary MOVES-Based Dallas-Fort Worth Nonattainment Area Reasonable Further Progress Demonstration Calculations Spreadsheet*. Details of the emissions reductions used to calculate the creditable RFP control reductions for each milestone year are documented in Chapter 4 and summarized in Tables 4-4: *Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2002 through 2008 with Preliminary MOVES-Based On-Road Reductions (tons per day),* 4-5: *Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2008 through 2011 with Preliminary MOVES-Based On-Road Reductions (tons per day),* and 4-6: *Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2011 through 2012 with Preliminary MOVES-Based On-Road Reductions (tons per day).*

Table 3-9: Preliminary MOVES-Based Summary of the 2011 DFW RFP Demonstration (tons per day)

Line #	Description	NO_X	VOC
Line 1	Uncontrolled emissions forecast with growth	1291.83	795.15
Line 2	Creditable RFP control reductions for NDC 2008	100.66	28.34
Line 3	Creditable RFP control reductions for EC 2008	402.18	196.21
Line 4	Creditable RFP control reductions 2008 to 2011	356.33	38.79
Line 5	Controlled RFP emissions forecast (Line 1 minus Line 2 minus Line 3 minus Line 4)	432.66	531.81
Line 6	Amount of creditable reductions reserved for milestone year 2011 contingency	19.43	0.00
Line 7	Amount of NO_X reduction substitution	63.65	-63.65
Line 8	Controlled RFP forecast without reductions reserved for contingency and accounting for NO_X substitution (Line 5 plus Line 6 plus Line 7)	515.75	468.16
Line 9	2011 RFP target level of emissions	519.83	454.33
Line 10	Excess (+) / Shortfall (-) (Line 9 minus Line 8)	+4.08	-13.84
Line 11	**Is controlled RFP emissions inventory less than target level of emissions?**	**Yes**	**No**

Notes: The five new counties are the counties added to the DFW nonattainment area under the 1997 eight-hour ozone standard (Ellis, Johnson, Kaufman, Parker, and Rockwall Counties). The four existing counties are those designated nonattainment under the one-hour and eight-hour ozone standards (Collin, Dallas, Denton, and Tarrant Counties).

Table 3-10: Preliminary MOVES-Based Summary of the 2012 DFW RFP Demonstration (tons per day)

Line #	Description	NO_X	VOC
Line 1	Uncontrolled emissions forecast with growth	1310.82	804.23
Line 2	Creditable RFP control reductions for 2008 to 2011	859.17	263.34
Line 3	Creditable RFP control reductions 2011 to 2012	52.84	33.39
Line 4	Controlled RFP emissions forecast (Line 1 minus Line 2 minus Line 3)	398.81	507.50
Line 5	Amount of creditable reductions reserved for milestone year 2011 contingency	19.43	0.00
Line 6	Amount of NO_X reduction substitution	61.62	-61.62
Line 7	Controlled RFP forecast without reductions reserved for contingency and accounting for NO_X substitution (Line 4 plus Line 5 plus Line 6)	479.87	445.88
Line 8	2012 RFP target level of emissions	500.21	445.89
Line 9	Excess (+) / Shortfall (-) (Line 8 minus Line 7)	+20.34	+0.01
Line 10	**Is Controlled RFP emissions inventory Less Than Target Level of Emissions?**	**Yes**	**Yes**

CHAPTER 4: CONTROL MEASURES TO ACHIEVE TARGET LEVELS

4.1 OVERVIEW OF CONTROL MEASURES

This chapter describes the methods used to achieve the emissions reductions in volatile organic compounds (VOC) and nitrogen oxides (NO_X) required to demonstrate reasonable further progress (RFP) for the Dallas-Fort Worth (DFW) nonattainment area (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant Counties). The projected emissions reductions reflect the identified federal and state emissions controls. All state control measures are codified in regulations for the State of Texas. Control measures used for RFP do not include all emissions reduction programs for the DFW area. Only the controls used to meet the DFW RFP requirements for 2011 and 2012 are presented in Tables 4-1: *Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2002 through 2008 with MOBILE6.2-Based On-Road Reductions (tons per day),* 4-2: *Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2008 through 2011 with MOBILE6.2-Based On-Road Reductions (tons per day),* and 4-3: *Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2011 through 2012 with MOBILE6.2-Based On-Road Reductions (tons per day)*. Individual and total values shown in the summary tables have been extracted from the spreadsheet in Appendix 1: *MOBILE6.2-Based Dallas-Fort Worth Nonattainment Area Reasonable Further Progress Demonstration Calculations Spreadsheet*. All values represent the numbers rounded to two significant figures. Since the totals in the tables are taken directly from the spreadsheet and rounded rather than summed from the rounded values in the table, there may be rounding discrepancies for the total values.

Table 4-1: Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2002 through 2008 with MOBILE6.2-Based On-Road Reductions (tons per day)

Control Strategy Description	NO_X Reductions	VOC Reductions
Chapter 117 NO_X point source controls	35.93	0.00
Coating/printing rules	0.00	0.15
Portable fuel containers	0.00	1.89
Tier 1 Federal Motor Vehicle Control Program (FMVCP)	85.21	58.58
Federal reformulated gasoline (RFG)	45.98	34.72
Inspection and maintenance (I/M) and anti-tampering in Dallas County	17.34	15.78
National Low Emissions Vehicles Program	10.18	6.75
Expand I/M	6.85	5.11
Tier 2 FMVCP	38.37	14.34
2007 heavy duty diesel FMVCP	8.89	0.14
On-road Texas low emission diesel (TxLED)	6.13	0.00
Tier I and II locomotive NO_X standards	8.11	0.12
Small non-road spark-ignition (SI) phase I	-2.62	28.07
Heavy duty non-road engines	17.51	4.58
Tier 2 and 3 non-road diesel engines	12.73	3.30
Small non-road SI engines (phase II)	1.66	22.67
Large non-road SI & recreational marine	12.92	6.38

Control Strategy Description	NO_X Reductions	VOC Reductions
Non-road TxLED	5.64	0.00
Drilling rig TxLED	0.00	0.00
Non-road RFG	-0.71	3.87
Tier 4	0.00	0.00
Diesel recreational marine	0.00	0.00
Small SI phase III	0.00	0.45
Chapter 117 NO_X area source engine controls	0.00	0.00
Texas Emission Reduction Program (non-road and locomotive)	0.65	0.00
Sum of incremental reductions from projected uncontrolled emissions	**310.77**	**206.90**

Notes: The negative emissions number in the New Non-Road Mobile SI Engines is attributed to fleet growth in light of more stringent standards. 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

Table 4-2: Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2008 through 2011 with MOBILE6.2-Based On-Road Reductions (tons per day)

Control Strategy Description	NO_X Reductions	VOC Reductions
Chapter 117 NO_X point source controls	7.14	0.00
Coating/printing rules	0.00	0.00
Portable fuel containers	0.00	2.06
Tier 1 FMVCP	-2.59	27.62
Federal RFG	27.79	3.38
I/M and anti-tampering in Dallas County	2.55	5.18
National Low Emissions Vehicles Program	-0.05	-0.08
Expand I/M	3.19	0.98
Tier 2 FMVCP	30.95	11.87
2007 heavy duty diesel FMVCP	16.80	0.31
On-road TxLED	-1.40	0.00
Tier I and II locomotive NO_X standards	1.14	0.06
Small non-road SI phase I	-0.49	1.56
Heavy duty non-road engines	1.98	0.72
Tier 2 and 3 non-road diesel engines	7.27	1.06
Small non-road SI engines (phase II)	0.43	4.75
Large non-road SI & recreational marine	7.07	-5.91
Non-road TxLED	0.15	0.00
Drilling rig TxLED	1.16	0.00
Non-road RFG	-0.11	0.49

Control Strategy Description	NO_X Reductions	VOC Reductions
Tier 4	0.59	0.05
Diesel recreational marine	0.00	0.00
Small SI phase III	0.42	2.46
Chapter 117 NO_X area source engine controls	128.14	0.00
Texas Emission Reduction Program (non-road and locomotive)	2.26	0.00
Sum of incremental reductions from projected uncontrolled emissions	**234.39**	**56.57**

Note: The negative emissions number in the New Non-Road Mobile SI Engines is attributed to fleet growth in light of more stringent standards.

Table 4-3: Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2011 through 2012 with MOBILE6.2-Based On-Road Reductions (tons per day)

Control Strategy Description	NO_X Reductions	VOC Reductions
Chapter 117 NO_X point source controls	0.15	0.00
Coating/printing rules	0.00	0.00
Portable fuel containers	0.00	0.72
Tier 1 FMVCP	0.02	10.78
Federal RFG	8.52	-0.30
I/M and anti-tampering in Dallas County	-0.16	-3.10
National Low Emissions Vehicles Program	-1.25	-0.72
Expand I/M	1.15	0.19
Tier 2 FMVCP	10.20	4.16
2007 heavy duty diesel FMVCP	8.19	0.05
On-road TxLED	-0.21	0.00
Tier I and II locomotive NO_X standards	2.25	0.14
Small non-road SI phase I	-0.06	0.54
Heavy duty non-road engines	0.82	0.23
Tier 2 and 3 non-road diesel engines	2.34	0.34
Small non-road SI engines (phase II)	0.07	0.85
Large non-road SI & recreational marine	2.50	10.29
Non-road TxLED	-0.02	0.00
Drilling rig TxLED	-0.08	0.00
Non-road RFG	0.00	0.11
Tier 4	1.21	0.10
Diesel recreational marine	0.00	0.00
Small SI phase III	0.37	2.63
Chapter 117 NO_X area source engine controls	6.13	0.00

Control Strategy Description	NO_X Reductions	VOC Reductions
Texas Emission Reduction Program (non-road and locomotive)	0.00	0.00
VOC storage tank rule	0.00	14.37
Sum of incremental reductions from projected uncontrolled emissions	**42.14**	**41.38**

Notes: The negative emissions number in the New Non-Road Mobile SI Engines is attributed to fleet growth in light of more stringent standards.

4.1.1 Overview of Control Measures with Motor Vehicle Emission Simulator (MOVES)-Based On-road Mobile Control Reductions

In March 2010, the United States Environmental Protection Agency (EPA) replaced the MOBILE6.2 model with the Motor Vehicle Emission Simulator (MOVES) model as the official emission factor model for developing on-road mobile source category emissions inventories. Preliminary MOVES-based emissions reductions are included in this proposal because the Texas Commission on Environmental Quality (TCEQ) is taking comment on using on-road mobile emissions inventories based on MOVES as well as MOBILE6.2 in the adopted DFW RFP state implementation plan (SIP) revision. The schedule for proposal of this SIP revision did not allow for inclusion of link-based MOVES inventory values, so the preliminary MOVES-based inventory values and resulting preliminary emissions reductions were calculated using a highway performance monitoring system (HPMS) based method. The HPMS method aggregates the vehicle miles traveled (VMT) to roadway types and averages the link speeds for each HPMS roadway type. On-road emissions rates are higher at very low and very high speeds. Because a link-based method captures the effects of both high and low speeds, it is likely to produce inventory values from 4% to 20% higher than an HPMS based method. Link-based inventories are required if motor vehicle emissions budgets (MVEB) are set by the inventory and control reduction values.

In the event that MOVES-based emissions inventories are used to determine RFP for the adopted DFW RFP SIP revision, the on-road inventory and emissions reduction values will be updated with values developed using a link-based method, and it is expected that the final emissions reductions will be different from those reported in this proposal. A summary of control measures that could be used for RFP with the preliminary MOVES-based on-road control reductions are presented in Tables 4-4: *Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2002 through 2008 with Preliminary MOVES-Based On-Road Reductions (tons per day)*, 4-5: *Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2008 through 2011 with Preliminary MOVES-Based On-Road Reductions (tons per day)*, and 4-6: *Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2011 through 2012 with Preliminary MOVES-Based On-Road Reductions (tons per day)*. Certain control reductions listed in Tables 4-4, 4-5, and 4-6 could not be separated according to individual controls; therefore, controls associated with those reductions were grouped. Individual and total values shown in the summary tables with the MOVES-based reductions have been extracted from the spreadsheet in Appendix 9: *Preliminary MOVES-Based Dallas-Fort Worth Nonattainment Area Reasonable Further Progress Demonstration Calculations Spreadsheet*.

Table 4-4: Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2002 through 2008 with Preliminary MOVES-Based On-Road Reductions (tons per day)

Control Strategy Description	NO_X Reductions	VOC Reductions
Chapter 117 NO_X point source controls	35.93	0.00
Coating/printing rules	0.00	0.15
Portable fuel containers	0.00	1.89
Tier 1 FMVCP, RFG, I/M Program, anti-tampering, Tier 2 FMVCP, 2007 heavy duty diesel FMVCP	400.65	153.07
On-road TxLED	10.37	0.00
Tier I and II locomotive NO_X standards	8.11	0.12
Small non-road SI phase I	-2.62	28.07
Heavy duty non-road engines	17.51	4.58
Tier 2 and 3 non-road diesel engines	12.73	3.30
Small non-road SI engines (phase II)	1.66	22.67
Large non-road SI & recreational marine	12.92	6.38
Non-road TxLED	5.64	0.00
Drilling rig TxLED	0.00	0.00
Non-road RFG	-0.71	3.87
Tier 4	0.00	0.00
Diesel recreational marine	0.00	0.00
Small SI phase III	0.00	0.45
Chapter 117 NO_X area source engine controls	0.00	0.00
Texas Emission Reduction Program (non-road and locomotive)	0.65	0.00
Sum of incremental reductions from projected uncontrolled emissions	**502.84**	**224.55**

Notes: The negative emissions number in the New Non-Road Mobile SI Engines is attributed to fleet growth in light of more stringent standards. 2002 and 2008 NO_X and VOC emissions are given for the total nine-county DFW nonattainment area. See Appendix 9 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

Table 4-5: Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2008 through 2011 with Preliminary MOVES-Based On-Road Reductions (tons per day)

Control Strategy Description	NO_X Reductions	VOC Reductions
Chapter 117 NO_X point source controls	7.14	0.00
Coating/printing rules	0.00	0.01
Portable fuel containers	0.00	1.86
Tier 1 FMVCP, RFG, I/M Program, anti-tampering, Tier 2 FMVCP, 2007 heavy duty diesel FMVCP	203.55	31.68

Control Strategy Description	NO_X Reductions	VOC Reductions
On-road TxLED	-4.37	0.00
Tier I and II locomotive NO_X standards	1.14	0.06
Small non-road SI phase I	-0.49	1.56
Heavy duty non-road engines	1.98	0.72
Tier 2 and 3 non-road diesel engines	7.27	1.06
Small non-road SI engines (phase II)	0.43	4.75
Large non-road SI & recreational marine	7.07	-5.91
Non-road TxLED	0.15	0.00
Drilling rig TxLED	1.16	0.00
Non-road RFG	-0.11	0.49
Tier 4	0.59	0.05
Diesel recreational marine	0.00	0.00
Small SI phase III	0.42	2.46
Chapter 117 NO_X area source engine controls	128.14	0.00
Texas Emission Reduction Program (non-road and locomotive)	2.26	0.00
Sum of incremental reductions from projected uncontrolled emissions	**356.33**	**38.79**

Notes: The negative emissions number in the New Non-Road Mobile SI Engines is attributed to fleet growth in light of more stringent standards.

Table 4-6: Summary of DFW NO_X and VOC Incremental Emissions Reductions from Control Strategies for 2011 through 2012 with Preliminary MOVES-Based On-Road Reductions (tons per day)

Control Strategy Description	NO_X Reductions	VOC Reductions
Chapter 117 NO_X point source controls	0.15	0.00
Coating/printing rules	0.00	0.00
Portable fuel containers	0.00	0.92
Tier 1 FMVCP, RFG, I/M Program, anti-tampering, Tier 2 FMVCP, 2007 heavy duty diesel FMVCP	37.87	2.87
On-road TxLED	-0.71	0.00
Tier I and II locomotive NO_X standards	2.25	0.14
Small non-road SI phase I	-0.06	0.54
Heavy duty non-road engines	0.82	0.23
Tier 2 and 3 non-road diesel engines	2.34	0.34
Small non-road SI engines (phase II)	0.07	0.85
Large non-road SI & recreational marine	2.50	10.29
Non-road TxLED	-0.02	0.00
Drilling rig TxLED	-0.08	0.00
Non-road RFG	0.00	0.11

Control Strategy Description	NO_X Reductions	VOC Reductions
Tier 4	1.21	0.10
Diesel recreational marine	0.00	0.00
Small SI phase III	0.37	2.63
Chapter 117 NO_X area source engine controls	6.13	0.00
Texas Emission Reduction Program (non-road and locomotive)	0.00	0.00
VOC storage tank rule	0.00	14.37
Sum of incremental reductions from projected uncontrolled emissions	**52.84**	**33.39**

Notes: The negative emissions number in the New Non-Road Mobile SI Engines is attributed to fleet growth in light of more stringent standards.

The total percent reductions due to control strategies for on-road mobile are similar between MOBILE6.2 and MOVES; although, because the MOVES uncontrolled NO_X inventory value is almost twice as high as MOBILE6.2, the actual NO_X tons of reduction using MOVES is approximately 50% higher than with MOBILE6.2. For example, 2008 NO_X emissions reductions using MOBILE6.2 are 218.94 tpd while 2008 NO_X emissions reductions using MOVES are 411.02 tpd. The higher tons of reduction with MOVES does not completely offset the NO_X increase in emissions, and the controlled NO_X inventory with MOVES remains higher than with MOBILE6.2. The 2008 controlled mobile inventory using MOVES is 360.60 tpd, versus 194.92 tpd using MOBILE6.2. By 2012, the difference is smaller though still significant, with 202.64 tpd versus 122.84 tpd respectively. The differences between MOBILE6.2 and MOVES results will change when SIP quality MOVES inventories are used; however, it is expected that the MOVES NO_X inventory and control reductions will remain significantly higher than those estimated using MOBILE6.2.

4.2 POINT SOURCE CONTROLS

Point source controls were calculated using the point source emissions inventory. Emissions reductions required by state rules were incorporated into future years projections for controlled inventories. Point source controls are detailed in Appendix 1. Primary NO_X reductions strategies are detailed in the 30 Texas Administrative Code Chapter 117 rules. Affected source categories include: electric generating units; cement kilns; heaters and furnaces; internal combustion engines; and industrial boilers. VOC reductions from surface coating regulation were applied to the five additional nonattainment counties (Ellis, Johnson, Kaufman, Parker, and Rockwall Counties). These surface coating regulations were in effect in the other four counties (Collin, Dallas, Denton, and Tarrant Counties) prior to 2002. The summary of uncontrolled and post-control emissions for point sources in the DFW nonattainment area may be found in Tables 4-7: *DFW RFP 2008 Point Source Emissions and Reductions Summary for NO_X and VOC (tons per day)*, 4-8: *DFW RFP 2011 Point Source Emissions and Reductions Summary for NO_X and VOC (tons per day)*, and 4-9: *DFW RFP 2012 Point Source Emissions and Reductions Summary for NO_X and VOC (tons per day)*.

Table 4-7: DFW RFP 2008 Point Source Emissions and Reductions Summary for NO_X and VOC (tons per day)

Emissions	NO_X	VOC
Uncontrolled Emissions	85.14	31.34
RFP Point Source Reduction	35.93	0.15
RFP Post-Control Emissions	49.21	31.19

Note: 2008 NO_X and VOC emissions and control reductions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area.

Table 4-8: DFW RFP 2011 Point Source Emissions and Reductions Summary for NO_X and VOC (tons per day)

Emissions	NO_X	VOC
Uncontrolled Emissions	105.86	39.89
RFP Point Source Reduction	43.07	0.16
RFP Post-Control Emissions	62.79	39.73

Table 4-9: DFW RFP 2012 Point Source Emissions and Reductions Summary for NO_X and VOC (tons per day)

Emissions	NO_X	VOC
Uncontrolled Emissions	102.10	40.74
RFP Point Source Reduction	43.22	0.16
RFP Post-Control Emissions	58.87	40.58

4.3 AREA SOURCE CONTROLS

Area source controls were calculated using the area source emissions inventory. Emissions reductions required by state and federal rules were incorporated into the future years projections for controlled inventories. Primary NO_X emissions reduction strategies are detailed in Chapter 117 rules controlling emissions from stationary internal combustion reciprocating engines at minor sources. Compliance dates for the rules were in 2009 and 2010. Post-control emissions were determined by applying the emissions specifications for attainment demonstration.

Area source VOC emissions reductions for this proposed RFP demonstration are derived from the federal portable fuel container rule and a VOC storage rule (Rule Project No. 2010-025-115-EN) being proposed concurrently with this proposed DFW RFP SIP revision. If adopted, the VOC storage rule would reduce VOC emissions from affected sources in the DFW area by increasing the level of control for floating roof tanks. The proposed rulemaking would also require 95% control of VOC emissions from crude oil and condensate storage tanks emitting 25 tons or more of VOC per year. The proposed rulemaking would also require low-leaking fittings; and limit situations when floating roof tanks are allowed to emit VOC because the roof is not floating on the liquid. The reductions in VOC emissions from the proposed VOC storage rule are only considered for milestone year 2012 since the compliance deadline for the rule is December 1, 2012.

To develop the post-control emissions, rule effectiveness factors were applied for respective source categories. Post-control emissions were then projected in the same manner as

uncontrolled sources. The summary of uncontrolled and RFP post-control emissions for area sources in the DFW nonattainment area may be found in Table 4-10: *DFW RFP 2008 Area Source Emissions and Reductions Summary for NO_X and VOC (tons per day)*, 4-11: *DFW RFP 2011 Area Source Emissions and Reductions Summary for NO_X and VOC (tons per day)*, and 4-12: *DFW RFP 2012 Area Source Emissions and Reductions Summary for NO_X and VOC (tons per day)*.

Table 4-10: DFW RFP 2008 Area Source Emissions and Reductions Summary for NO_X and VOC (tons per day)

Emissions	NO_X	VOC
Uncontrolled Emissions	150.39	323.59
RFP Area Source Reduction	0.00	3.15
RFP Post-Control Emissions	150.39	320.44

Note: 2008 NO_X and VOC emissions and control reductions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area. Emissions credit is not taken for all controlled reductions for the RFP demonstration; therefore, the RFP post-control emissions may not be equal to the projected post-control emissions inventory.

Table 4-11: DFW RFP 2011 Area Source Emissions and Reductions Summary for NO_X and VOC (tons per day)

Emissions	NO_X	VOC
Uncontrolled Emissions	168.66	351.90
RFP Area Source Reduction	128.10	5.26
RFP Post-Control Emissions	40.56	346.64

Note: Emissions credit is not taken for all controlled reductions for the RFP demonstration; therefore, the RFP post-control emissions may not be equal to the projected post-control emissions inventory.

Table 4-12: DFW RFP 2012 Area Source Emissions and Reductions Summary for NO_X and VOC (tons per day)

Emissions	NO_X	VOC
Uncontrolled Emissions	175.61	362.95
RFP Area Source Reduction	134.27	21.17
RFP Post-Control Emissions	41.34	341.78

Note: Emissions credit is not taken for all controlled reductions for the RFP demonstration; therefore, the RFP post-control emissions may not be equal to the projected post-control emissions inventory.

4.4 NON-ROAD MOBILE SOURCE CONTROLS

Most non-road mobile source emissions were calculated using a Texas-specific version of the EPA's NONROAD 2008a model, called the Texas NONROAD (TexN) model. Although operating the EPA's model with all of the default surrogates is acceptable, the EPA encourages states to update the model with local, county-level data based on surveys and other relevant information. The TexN model is a software tool for developing emissions estimates for non-road mobile sources in Texas using county-specific activity data. The model allows air quality planning staff to replace the EPA's default data with local bottom-up data. Local, county-level data are incorporated into the TexN model as they become available.

Emissions from the remaining non-road mobile sources that are not included in the EPA's NONROAD model—locomotives, aircraft and ground support equipment (GSE), and oilfield drilling rigs—were calculated outside of the EPA's NONROAD 2008a model using EPA-approved methodologies. Control strategies reductions for milestone years 2011 and 2012 are summarized in Tables 4-1, 4-2, and 4-3. Summaries of all non-road mobile source RFP emissions inventories are presented in Tables 4-13: *DFW RFP 2008 Non-Road Mobile Source Emissions and Reductions Summary for NO_X and VOC (tons per day), 4-14: DFW RFP 2011 Non-Road Mobile Source Emissions and Reductions Summary for NO_X and VOC (tons per day)*, and 4-15 *DFW RFP 2012 Non-Road Mobile Source Emissions and Reductions Summary for NO_X and VOC (tons per day)*.

In addition to the controls applied from the non-road mobile source category, this proposal includes a portion of the non-road emissions reductions from the Texas Emission Reduction Program (TERP) that occurred in the DFW nonattainment area in 2008, 2009, and 2010.

Table 4-13: DFW RFP 2008 Non-Road Mobile Source Emissions and Reductions Summary for NO_X and VOC (tons per day)

Emissions	NO_X	VOC
Uncontrolled Emissions	186.67	130.73
RFP Non-Road Source Reduction	56.38	67.93
RFP Post-Control Emissions	130.29	62.80

Note: 2008 NO_X and VOC emissions and control reductions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area. Emissions credit is not taken for all controlled reductions for the RFP demonstration; therefore, the RFP post-control emissions may not be equal to the projected post-control emissions inventory.

Table 4-14: DFW RFP 2011 Non-Road Mobile Source Emissions and Reductions Summary for NO_X and VOC (tons per day)

Emissions	NO_X	VOC
Uncontrolled Emissions	186.20	137.18
RFP Non-Road Source Reduction	74.77	85.20
RFP Post-Control Emissions	111.43	51.98

Notes: Emissions credit is not taken for all controlled reductions for the RFP demonstration; therefore, the RFP post-control emissions may not be equal to the projected post-control emissions inventory.

Table 4-15: DFW RFP 2012 Non-Road Mobile Source Emissions and Reductions Summary for NO_X and VOC (tons per day)

Emissions	NO_X	VOC
Uncontrolled Emissions	188.40	141.36
RFP Non-Road Source Reduction	84.17	91.52
RFP Post-Control Emissions	104.23	49.84

Notes: Emissions credit is not taken for all controlled reductions for the RFP demonstration; therefore, the RFP post-control emissions may not be equal to the projected post-control emissions inventory.

4.4.1 NONROAD Model Categories

For the proposed DFW RFP SIP revision, the TexN model was run using county-specific population and activity files, where available. In some cases, custom allocation and technology type data files were also used. The technology type file identifies what percent of an equipment population is expected to use federal non-road equipment controls for the year of interest. The effects of federal and state control programs were evaluated. The TexN model was run for ozone season daily emissions for 2002, 2008, 2011, 2012, and 2013. To evaluate RFP requirements, a series of TexN model runs was performed for both controlled and uncontrolled scenarios for each federal and state control program and each analysis year. The documentation and procedures of applicable federal and state rules that were modeled is located in Appendix 4*: Development of Reasonable Further Progress Non-Road Mobile Source Emissions Inventories for the Dallas-Fort Worth Nonattainment Area: Source Categories in the United States Environmental Protection Agency's NONROAD Model*. The emissions inventories developed include county-level ozone season day controlled and uncontrolled emissions estimates for 2002, 2008, 2011, 2012, and 2013 for the DFW nonattainment area.

Once the individual uncontrolled and post-control emissions estimates were generated by the TexN model, the effectiveness of control strategies for each year of interest was evaluated. Emissions reductions from individual federal and state controls for non-road equipment were calculated by subtracting the post-control emissions estimates from the uncontrolled emissions estimates.

4.4.2 Non-Road Categories Not Included in the EPA's NONROAD Model

Emissions from the non-road mobile sources that are not included in the EPA's NONROAD model include locomotives, aircraft and GSE, and oilfield drilling rigs. Emissions for those source categories were calculated using alternate methods. Locomotive emissions were developed by contract with E.H. Pechan and Associates, Inc for the *Development of Locomotive and Commercial Marine Emissions Inventory 1990 through 2040* study. The emissions inventories developed include county level ozone season day controlled and uncontrolled emissions estimates for 2002, 2008, 2011, 2012, and 2013, for the nine-county DFW nonattainment area. Emissions for aircraft and GSE were calculated using the Federal Aviation Administration Emissions and Dispersion Modeling System, version 5.1. Oilfield drilling rig emissions were developed by contract using drilling permit data from the Railroad Commission of Texas.[14] The drilling rigs category emissions for years 2011 and 2012 may or may not be subject to revisions. The TCEQ is currently reviewing recently available activity data for year 2010.The TCEQ may make appropriate revisions before adoption of the DFW RFP SIP revision if more accurate estimates for 2011 and 2012 are identified.

4.4.3 Texas Emissions Reduction Program (Non-Road and Locomotive)

The TCEQ has incorporated emissions reductions from TERP into the proposed MOBILE6.2-based DFW RFP SIP revision. TERP provides financial incentives to eligible individuals, businesses or local governments to reduce emissions from polluting vehicles and equipment. TERP was established by the 77th Texas Legislature in 2001, through enactment of Senate Bill (SB) 5 (http://www.legis.state.tx.us/tlodocs/77R/billtext/html/SB00005F.htm). TERP includes a number of voluntary financial incentive programs, as well as other assistance programs, to help improve the air quality in Texas.

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[14] Eastern Research Group, Inc., "Oil and Gas Exploration – Drilling Rig Engines," TCEQ Contract No. 582-07-83985, Work Order No. 582-07-83985-FY09-01, July 15, 2009.

The emissions reductions incorporated into the proposed SIP revision include a portion of the projected/expected emissions reductions from TERP-funded non-road and locomotive projects that became active beginning in 2008. The emissions reduction projections included in the proposed SIP revision were validated based on the actual performance of those projects in 2008, 2009, and 2010. The TCEQ is considering incorporating additional TERP emissions reductions into the adopted version of this SIP revision in order to demonstrate RFP.

4.5 ON-ROAD MOBILE SOURCE CONTROLS

Two sets of on-road mobile source emissions reductions estimates are provided in this section. The RFP proposal is based on the first set of reductions provided in Section 4.5.1: *MOBILE6.2-Based On-Road Mobile Source Controls.* MOBILE6.2 was used to develop the inventories and estimate control reductions presented. In March 2010, the EPA replaced the MOBILE6.2 model with MOVES as the official emission factor model for developing on-road mobile source category emissions inventories. Since the MOVES model was released several months after on-road inventory development work had to begin for this SIP revision, its use is not required based on EPA's MOVES policy guidance. The TCEQ is taking comment on using on-road control strategy reduction estimates based on the MOBILE6.2 model and the MOVES model in the adopted DFW RFP SIP revision; therefore, in addition to control strategy reduction estimates based on MOBILE6.2, preliminary MOVES-based control strategy reduction estimates are included for commenting purposes. The on-road mobile source emissions reductions based on MOVES are provided in Section 4.5.2: *Preliminary MOVES-Based On-Road Mobile Source Controls.*

4.5.1 MOBILE6.2-Based On-Road Mobile Source Controls

The projected mobile source emissions inventories documented in Appendix 8: *Development of Reasonable Further Progress On-Road Mobile Source Emissions Inventories Based on the MOBILE6.2 Model for the Dallas-Fort Worth Nonattainment Area* includes quantification of emissions reductions for all federal and state on-road mobile source control rules for each RFP milestone year for the DFW nonattainment area. A summary of the on-road mobile controls included in the 2008, 2011, 2012, and 2013 RFP emissions inventories is presented in Table 4-16: *Control Programs Modeled using MOBILE6.2 for 2008, 2011, 2012, and 2013 RFP Control Scenarios.* The reductions for each control strategy for the 2011 and 2012 RFP milestone years are summarized Tables 4-1, 4-2, and 4-3. The summary of 2011 and 2012 uncontrolled and post-control emissions for on-road mobile sources in the DFW nonattainment area may be found in Tables 4-17: *MOBILE6.2-Based DFW RFP 2008 On-Road Mobile Source Emissions and Reductions Summary for NO_X and VOC (tons per day)*, 4-18: *MOBILE6.2-Based DFW RFP 2011 On-Road Mobile Source Emissions and Reductions Summary for NO_X and VOC (tons per day)*, and 4-19: *MOBILE6.2-Based DFW RFP 2012 On-Road Mobile Source Emissions and Reductions Summary for NO_X and VOC (tons per day).*

Table 4-16: Control Programs Modeled using MOBILE6.2 for 2008, 2011, 2012, and 2013 RFP Control Scenarios

Control Program Description	Strategy Notes	Year Control Program Started	Creditable for RFP
Pre-1990 FMVCP	Pre-1990 Control	Pre-1990	No
1992 Federal Controls on Gasoline Volatility	Pre-1990 Control. Maximum Reid Vapor Pressure of 7.8 pounds per square inch	1992	No

Control Program Description	Strategy Notes	Year Control Program Started	Creditable for RFP
Anti-Tampering Program (Dallas and Tarrant counties only)	No Strategy Note	1986	Yes
I/M Program (Dallas and Tarrant counties only)	No Strategy Note	1990	Yes
Tier 1, FMVCP	No Strategy Note	1994	Yes
Reformulated Gasoline	Use EPA method to model rather than the RFG toggle	1995 for Phase One, 2000 for Phase Two	Yes
National Low Emission Vehicle Program	No Strategy Note	2001	Yes
Expanded I/M and ATP	Expanded to Collin, Denton counties	2002	Yes
Expanded I/M and ATP	Expanded to Five New Counties	2003	Yes
Tier 2, FMVCP	Phase in 2004 to 2009	2004	Yes
TxLED	15 parts per million maximum for sulfur. Low aromatic hydrocarbon and high cetane number to control NO_X	2006	Yes
Federal Low-Sulfur Highway Diesel	15 parts per million maximum sulfur content	2006	Yes
2007 Heavy duty FMVCP	Phase in 2007 to 2010	2007	Yes
Texas Emission Reduction Plan	Post process calculation	2003	Yes

Table 4-17: MOBILE6.2-Based DFW RFP 2008 On-Road Mobile Source Emissions and Reductions Summary for NO_X and VOC (tons per day)

Emissions	NO_X	VOC
Uncontrolled Emissions	413.86	236.86
RFP On-Road Source Reduction	218.94	135.42
RFP Post-Control Emissions	194.92	101.44

Notes: 2008 NO_X and VOC emissions and control reductions are given for the total nine-county DFW nonattainment area. See Appendix 1 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area. Emissions credit is not taken for all controlled reductions for the RFP demonstration. Therefore, the RFP post-control emissions may not be equal to the projected post-control emissions inventory.

Table 4-18: MOBILE6.2-Based DFW RFP 2011 On-Road Mobile Source Emissions and Reductions Summary for NO_X and VOC (tons per day)

Emissions	NO_X	VOC
Uncontrolled Emissions	438.60	273.23
RFP On-Road Source Reduction	296.19	184.67
RFP Post-Control Emissions	142.41	88.56

Notes: Emissions credit is not taken for all controlled reductions for the RFP demonstration. Therefore, the RFP post-control emissions may not be equal to the projected post-control emissions inventory.

Table 4-19: MOBILE6.2-Based DFW RFP 2012 On-Road Mobile Source Emissions and Reductions Summary for NO_X and VOC (tons per day)

Emissions	NO_X	VOC
Uncontrolled Emissions	445.47	276.91
RFP On-Road Source Reduction	322.65	195.74
RFP Post-Control Emissions	122.82	81.17

Notes: Emissions credit is not taken for all controlled reductions for the RFP demonstration. Therefore, the RFP post-control emissions may not be equal to the projected post-control emissions inventory.

4.5.2 MOVES-Based On-Road Mobile Source Controls

In March 2010, the EPA replaced the MOBILE6.2 model with MOVES as the official emission factor model for developing on-road mobile source category emissions inventories. Preliminary MOVES-based control strategy reduction estimates are included in this proposal because the TCEQ is taking comment on using on-road control strategy reduction estimates based on MOVES and MOBILE6.2 for the adopted DFW RFP SIP revision. MOBILE6.2-based on-road control strategy reduction estimates are discussed in Section 4.5.1. Documentation of the development of preliminary, MOVES-based projected mobile source emissions inventories and control strategy reductions are documented in Appendix 10: *Development of Preliminary MOVES-Based Reasonable Further Progress On-Road Mobile Source Emissions Inventories for the Dallas-Fort Worth Nonattainment Area*. Because the DFW RFP SIP revision schedule did not allow for inclusion of link-based MOVES inventory values in this proposal, the preliminary MOVES-based values were calculated using an HPMS based method. The HPMS method aggregates the VMT to roadway types and averages the link speeds for each HPMS roadway type. On-road emissions rates are higher at very low and very high speeds. Because a link-based method captures the effects of both high and low speeds, it is likely to produce inventory values from four to twenty percent higher than an HPMS based method. Link-based inventories are required if MVEBs are set by the inventory values. In the event that MOVES-based emissions inventories are used to determine RFP for the adopted SIP revision, link-based MOVES inventory values will be used, and it is expected that the final control strategy reductions may be different than those reported in this SIP proposal.

The development of preliminary, MOVES-based projected mobile source emissions inventories and control strategy reductions includes quantification of emissions reductions for all federal and state on-road mobile source control rules for each RFP milestone year for the DFW nonattainment area. For the preliminary RFP analyses MOVES was run only with all controls on and all controls off, allowing for the quantification of the total reduction but not the contribution of each control separately. MOVES does not allow for calculation of TxLED benefits, so the TxLED reductions were calculated for each RFP milestone year after the MOVES results were complete. A summary of the on-road mobile controls included in the preliminary MOVES-based 2002, 2008, 2011, and 2012 RFP emissions inventories is presented in Table 4-20: *Control*

Programs Modeled using MOVES for 2002, 2008, 2011, and 2012 RFP Control Scenarios. All RFP control reductions, including the preliminary MOVES-based reductions, for the 2008, 2011, and 2012 RFP milestone years are summarized in Tables 4-4, 4-5, and 4-6 at the beginning of Chapter 4. The summary of 2008, 2011, and 2012 uncontrolled and post-control emissions for preliminary MOVES-based on-road mobile sources in the DFW nonattainment area can be found in Tables 4-21: *Preliminary MOVES-Based DFW RFP 2008 On-Road Mobile Source Emissions*, 4-22: *Preliminary MOVES-Based DFW RFP 2011 On-Road Mobile Source Emissions and Reductions Summary for NO_X and VOC (tons per day)* and 4-23: *Preliminary MOVES-Based DFW RFP 2012 On-Road Mobile Source Emissions and Reductions Summary for NO_X and VOC (tons per day)*.

Table 4-20:Control Programs Modeled using MOVES for 2002, 2008, 2011, and 2012 RFP Control Scenarios

Control Program Description	Strategy Notes	Year Control Program Started	Creditable for RFP
Pre-1990 FMVCP	Pre-1990 Control	Pre-1990	No
1992 Federal Controls on Gasoline Volatility	Pre-1990 Control. Maximum Reid Vapor Pressure of 7.8 pounds per square inch	1992	No
Tier 1 FMVCP, Federal RFG, I/M Program, Tier 2 FMVCP, 2007 heavy duty diesel FMVCP	Modeled in MOVES as all controls on, individual control reductions were not calculated for the preliminary MOVES assessments	Post-1990 CAAA	Yes
TxLED	15 parts per million maximum for sulfur. Low aromatic hydrocarbon and high cetane number to control NO_X	2006	Yes

Table 4-21: Preliminary MOVES-Based DFW RFP 2008 On-Road Mobile Source Emissions and Reductions Summary for NO_X and VOC (tons per day)

Emissions	NO_X	VOC
Uncontrolled Emissions	771.62	257.27
RFP On-Road Source Reduction	411.02	153.06
RFP Post-Control Emissions	360.60	104.21

Notes: 2008 NO_X and VOC emissions and control reductions are given for the total nine-county DFW nonattainment area. See Appendix 9 for emissions separated between the four original and five additional counties of the DFW 1997 eight-hour ozone standard nonattainment area. Emissions credit is not taken for all controlled reductions for the RFP demonstration. Therefore, the RFP post-control emissions may not be equal to the projected post-control emissions inventory.

Table 4-22: Preliminary MOVES-Based DFW RFP 2011 On-Road Mobile Source Emissions and Reductions Summary for NO_X and VOC (tons per day)

Emissions	NO_X	VOC
Uncontrolled Emissions	831.11	266.18
RFP On-Road Source Reduction	610.21	184.75
RFP Post-Control Emissions	220.90	81.43

Notes: Emissions credit is not taken for all controlled reductions for the RFP demonstration. Therefore, the RFP post-control emissions may not be equal to the projected post-control emissions inventory.

Table 4-23: Preliminary MOVES-Based DFW RFP 2012 On-Road Mobile Source Emissions and Reductions Summary for NO_X and VOC (tons per day)

Emissions	NO_X	VOC
Uncontrolled Emissions	844.71	259.18
RFP On-Road Source Reduction	642.07	187.62
RFP Post-Control Emissions	202.64	71.56

Notes: Emissions credit is not taken for all controlled reductions for the RFP demonstration. Therefore, the RFP post-control emissions may not be equal to the projected post-control emissions inventory.

4.6 VEHCILE MILES TRAVELED, ON-ROAD EMISSIONS, AND TRANSPORTATION CONTROL MEASURES

TCMs are required to offset growth in VMT that results in an increase in vehicle emissions for nonattainment areas classified as serious under the National Ambient Air Quality Standard for ozone. The TCMs are, therefore, part of the overall control strategy for the DFW nonattainment area and are documented in the DFW Attainment Demonstration SIP Revision for the 1997 Eight-Hour Ozone Standard (Project No. 2010-022-SIP-NR). There is growth in VMT for the DFW area for the years between the 2002 RFP base year and the 2012 attainment year, as illustrated in Figure 4-1: *MOBILE6.2-Based RFP VMT Trends*; however, the growth in VMT for the area is more than offset by control measures that reduce the per mile emissions rates, resulting in a decrease in both NO_X and VOC emissions for the same time period as shown in Figure 4-2: *MOBILE6.2-Based RFP Controlled On-Road NO_X and VOC Emissions Trends*. Similarly, the preliminary results using MOVES show that the increase in VMT between 2002 and 2012 is more than offset by emissions reductions for the same period as illustrated in Figure 4-3: *Preliminary MOVES-Based RFP Controlled On-Road NO_X and VOC Emissions Trends*. The increase in VMT and decrease in vehicle emissions for the RFP time period are summarized in Tables 4-24: *MOBILE6.2-Based DFW RFP On-Road Mobile Controlled NO_X Emissions, VOC Emissions, and Vehicle Miles Traveled* and 4-25: *Preliminary MOVES-Based DFW RFP On-Road Mobile Controlled NO_X Emissions, VOC Emissions, and Vehicle Miles Traveled*. The values shown in Table 4-24 are documented in the emissions inventory development report and may be found in Exhibit I-4: *Reasonable Further Progress Emission Inventory Dallas-Fort Worth Nine County Modeling Domain, Summer Season, Midweek On Road Emissions (tons /day), Volatile Organic Compounds and Oxides of Nitrogen* and *Exhibit II-9 Reasonable Further Progress Emissions Inventory, Dallas-Fort Worth Nonattainment Area, All Counties, Vehicle Miles Travel (thousands)* of Appendix 8. The values shown in Table 4-25 are documented in Appendix 10. The control measures used to achieve the on-road mobile RFP emissions reductions, and to demonstrate RFP requirements, do not include TCMs for this DFW RFP SIP proposal. TCMs may be needed to meet RFP requirements for the area and are included as part of the control strategy for the DFW attainment demonstration SIP revision for the 1997 eight-hour ozone standard.

Table 4-24: MOBILE6.2-Based DFW RFP On-Road Mobile Controlled NO_X Emissions, VOC Emissions and Vehicle Miles Traveled

RFP Milestone Year	NO_X (tons per day)	VOC (tons per day)	VMT (miles per day)
2002	306.99	145.07	138,880,000
2008	194.92	101.44	167,851,000
2011	142.41	88.56	185,075,000
2012	122.82	81.17	188,162,000

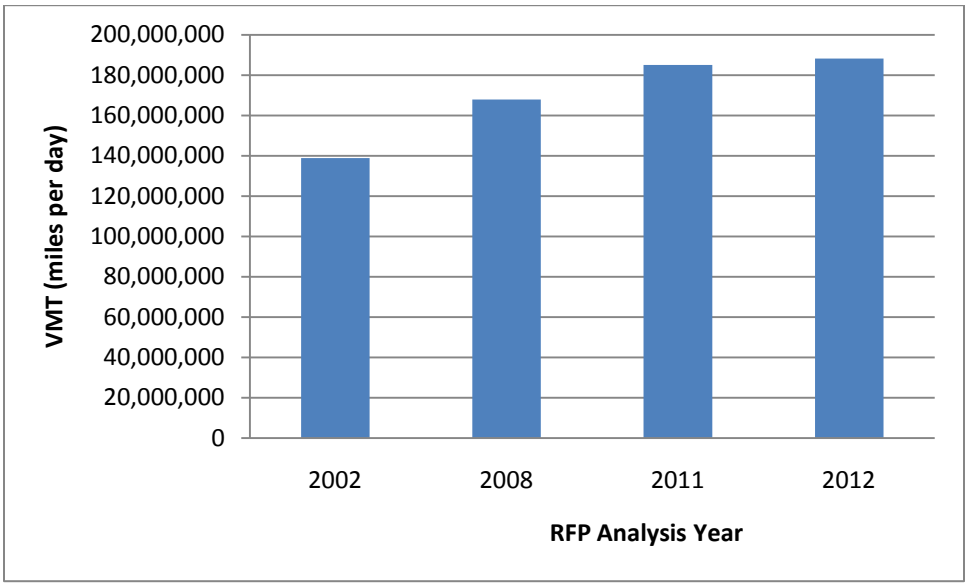

Figure 4-1: MOBILE6.2-Based RFP VMT Trends

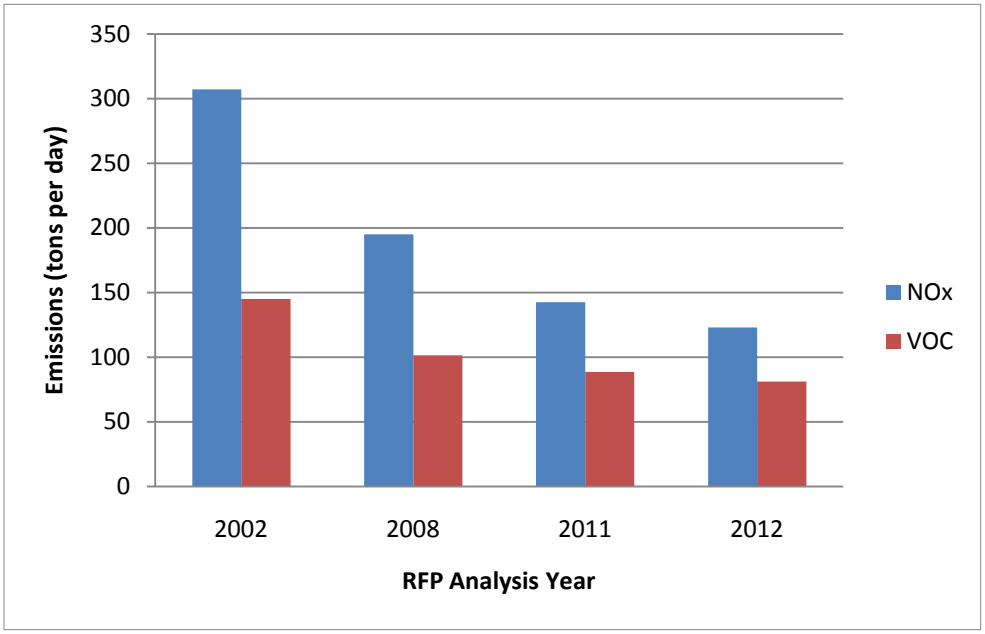

Figure 4-2: MOBILE6.2-Based RFP Controlled On-Road NO_X and VOC Emissions Trends

Table 4-25: Preliminary MOVES-Based DFW RFP On-Road Mobile Controlled NO_X Emissions, VOC Emissions, and Vehicle Miles Traveled

RFP Milestone Year	NO_X (tons per day)	VOC (tons per day)	VMT (miles per day)
2002	436.23	162.13	138,880,000
2008	360.60	104.21	167,851,000
2011	220.90	81.43	185,075,000
2012	202.64	71.56	188,162,000

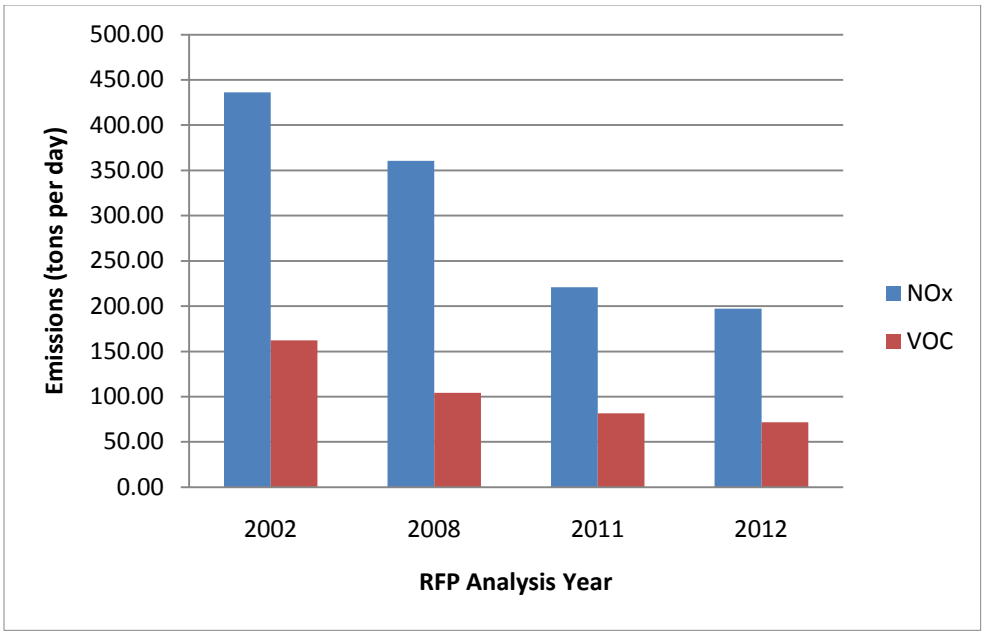

Figure 4-3: Preliminary MOVES-Based RFP Controlled On-Road NO_X and VOC Emissions Trends

4.7 CONTINGENCY MEASURES

In the event of a milestone failure, contingency control measures estimated to reduce emissions by an additional 3% between each milestone year and the next calendar year are required. As with the 3% per year reduction requirement, the 3% contingency requirement is based on the adjusted base year (ABY) and may be met using VOC and/or NO_X reductions. This proposed SIP revision contains a milestone year RFP contingency demonstration and an attainment year RFP contingency demonstration. Table 4-26: *MOBILE6.2-Based DFW RFP Contingency Demonstration for the 2011 Milestone Year (tons per day)* shows the milestone year 2011 contingency, for which the 3% contingency analysis is based on a 3% reduction in NO_X, with no reductions coming from VOC, to be achieved between 2011 and 2012. Reductions needed for milestone year contingency were reserved from the 2011 milestone year target reductions. The milestone year contingency reductions are subtracted from creditable control reductions for milestone years 2011 and 2012 to account for the contingency requirements for the 2011 milestone year. If the RFP milestone year requirement is met for 2012, the contingency reductions designated for the 2011 milestone year will be available to be used as contingency reductions for the attainment year RFP contingency demonstration.

Table 4-26: MOBILE6.2-Based DFW RFP Contingency Demonstration for the 2011 Milestone Year (tons per day)

Contingency Demonstration Description	NO_X	VOC
2012 ABY emissions inventory	514.47	473.32
Percent for milestone year 2011 contingency calculation (total of 3%)	3.00	0.00
2011 to 2012 required contingency reductions (ABY emissions inventory x (contingency percent))	15.43	0.00
Control reductions to meet contingency requirements		
Reserved excess reductions from 2011 RFP demonstration	15.43	0.00
Subtract 2011 MVEB safety margin from excess reductions from 2011 RFP demonstration	0.00	0.00
Unspecified control	0.00	0.00
Total contingency reductions	15.43	0.00
Contingency Excess (+) or Shortfall (-)	0.00	0.00
Are contingency reductions greater than required contingency reduction?	**Yes**	**Yes**

For the purposes of taking public comment, a contingency demonstration for the 2011 milestone year was calculated with inventories that included on-road mobile inventories developed with the MOVES model. As shown in Table 4-27: *Preliminary MOVES-Based DFW RFP Contingency Demonstration for the 2011 Milestone Year (tons per day)*, the 3% contingency analysis for the 2011 milestone year is based on a 3% reduction in NO_X, with no reductions coming from VOC, to be achieved between 2011 and 2012. Preliminary calculations indicate that the RFP milestone year contingency requirement would be met for the 2011 milestone year if the MOVES model is used for on-road mobile inventory development.

Table 4-27: Preliminary MOVES-Based DFW RFP Contingency Demonstration for the 2011 Milestone Year (tons per day)

Contingency Demonstration Description	NO_X	VOC
2012 ABY emissions inventory	647.80	456.89
Percent for milestone year 2011 contingency calculation (total of 3%)	3.00	0.00
2011 to 2012 required contingency reductions (ABY emissions inventory x (contingency percent))	19.43	0.00
Control reductions to meet contingency requirements		
Reserved excess reductions from 2011 RFP demonstration	19.43	0.00
Subtract 2011 MVEB safety margin from excess reductions from 2011 RFP demonstration	0.00	0.00
Unspecified control	0.00	0.00
Total contingency reductions	19.43	0.00
Contingency Excess (+) or Shortfall (-)	0.00	0.00
Are contingency reductions greater than required contingency reduction?	**Yes**	**Yes**

The 3% attainment year RFP contingency analysis is based on a 3% reduction in NO_X, with no emissions reductions coming from VOC, to be achieved between 2012 and 2013. Emissions inventory analyses were performed on the fleet turnover effects for the federal emissions certification programs for on-road and non-road vehicles. The emissions reductions for the year from 2012 to 2013 were estimated for those programs. Post-control emissions reductions not previously used in the 2012 milestone year demonstration may also be used to satisfy contingency requirements, so the excess emissions reductions from the 2012 RFP demonstration are included in the contingency analysis. If this proposed RFP SIP revision provided for a percent motor vehicle emissions budget safety margin using some of the excess emissions reductions from the 2012 RFP demonstration, those emissions are subtracted from the amount available to demonstrate RFP contingency for the 2012 attainment year. The safety margin has been set to zero and is reflected in the calculation. A summary of the 2012 attainment year RFP contingency analysis is provided in Table 4-28*: MOBILE6.2-Based DFW RFP Contingency Demonstration for the 2012 Attainment Year (tons per day)*. The analysis demonstrates that the attainment year RFP contingency reductions exceed the 3% reduction requirement; therefore, the RFP contingency requirement is fulfilled for the DFW area.

Table 4-28: MOBILE6.2-Based DFW RFP Contingency Demonstration for the 2012 Attainment Year (tons per day)

Contingency Element Description	NO_X	VOC
2012 ABY EI	514.47	473.32
Percent for contingency calculation (total of 3%)	3.00	0.00
2012 to 2013 required contingency reductions (ABY EI x (contingency percent))	15.43	0.00
Control reductions to meet contingency requirements		
Excess reductions from 2012 RFP demonstration	0.01	0.01
Subtract 2012 RFP demonstration motor vehicle emissions budget (MVEB) safety margin from excess reductions from 2012 RFP demonstration	0.00	0.00
Federal on-road mobile new vehicle certification standards	17.66	11.89
Federal on-road reformulated gasoline (RFG)	9.63	0.69
State inspection and maintenance (I/M) and anti-tampering programs (ATP)	1.88	0.78
On-road Texas low emission diesel (TxLED)	0.00	0.00
Texas Emissions Reduction Program (TERP)	0.00	0.00
Local Control Measures (TCM, VMEP)	0.00	0.00
Federal non-road mobile new vehicle certification standards	7.08	3.11
Non-road RFG	-0.01	0.08
Non-road TxLED	0.41	0.00
Federal locomotive standards	0.53	0.05
Federal marine standards	0.00	0.00
Total RFP demonstration contingency reductions	37.56	18.98
Contingency Excess (+) or Shortfall (-)	**+22.12**	**+18.98**

For the purposes of taking public comment, an RFP contingency demonstration for the attainment year was calculated with inventories that included on-road mobile inventories developed with the MOVES model. As shown in Table 4-29: *Preliminary MOVES-Based DFW RFP Contingency Demonstration for the 2012 Attainment Year (tons per day)*, the 3% contingency analysis is based on a 3% reduction in NO_X, with no reductions coming from VOC, to be achieved between 2012 and 2013. Preliminary calculations indicate that the RFP post-attainment-year contingency requirement would be met for if the MOVES model is used for on-road mobile inventory development.

Table 4-29: Preliminary MOVES-Based DFW RFP Contingency Demonstration for the 2012 Attainment Year (tons per day)

Contingency Element Description	NO_X	VOC
2012 ABY EI	647.80	456.89
Percent for contingency calculation (total of 3%)	3.00	0.00
2012 to 2013 required contingency reductions (ABY EI x (contingency percent))	19.43	0.00
Control reductions to meet contingency requirements		
Excess reductions from 2012 RFP demonstration	20.34	0.01
Subtract 2012 RFP demonstration motor vehicle emissions budget (MVEB) safety margin from excess reductions from 2012 RFP demonstration	0.00	0.00
Federal on-road mobile new vehicle certification standards	23.56	9.87
Federal on-road reformulated gasoline (RFG)	0.00	0.00
State inspection and maintenance (I/M) and anti-tampering programs (ATP)	0.00	0.00
On-road Texas low emission diesel (TxLED)	0.71	0.00
Texas Emissions Reduction Program (TERP)	0.00	0.00
Local Control Measures (TCM, VMEP)	0.00	0.00
Federal non-road mobile new vehicle certification standards	7.08	3.11
Non-road RFG	-0.01	0.08
Non-road TxLED	0.41	0.00
Federal locomotive standards	0.53	0.05
Federal marine standards	0.00	0.00
Total RFP demonstration contingency reductions	52.99	15.49
Contingency Excess (+) or Shortfall (-)	**+33.56**	**+15.49**

CHAPTER 5: MOTOR VEHICLE EMISSIONS BUDGETS

5.1 INTRODUCTION

The Dallas-Fort Worth (DFW) reasonable further progress (RFP) state implementation plan (SIP) revision establishes motor vehicle emissions budgets (MVEB), setting the allowable on-road mobile emissions an area can produce while continuing to demonstrate RFP. The DFW RFP MVEBs are calculated by subtracting the on-road mobile source control strategies emissions reductions necessary to demonstrate RFP from the uncontrolled, projected on-road mobile source emissions for RFP milestone years. Local transportation planning organizations use the MVEBs to demonstrate that projected emissions from transportation plans, programs, and projects are equal to or less than the MVEBs, as required by the federal transportation conformity rule.

In addition to MVEBs based on the Environmental Protection Agency's (EPA) MOBILE6.2 model, this SIP revision includes preliminary MVEBs based on the Mobile Vehicle Emissions Simulator (MOVES) model. In March 2010, the EPA replaced the MOBILE6.2 model with the MOVES model as the official emission factor model for developing on-road mobile source category emissions inventories. Preliminary MOVES-based MVEBs are included for in this proposal because the Texas Commission on Environmental Quality (TCEQ) is taking comment on using on-road emissions inventories based on MOBILE6.2 and MOVES in the adopted DFW RFP SIP revision.

The schedule for proposal of this SIP revision did not allow for inclusion of link-based MOVES inventory values, so the preliminary MOVES based inventory values and resulting preliminary MVEBs in this proposal were calculated using a highway performance monitoring system (HPMS) based method. The HPMS method aggregates the vehicle miles traveled to roadway types and averages the link speeds for each HPMS roadway type. On-road emission rates are higher at very low and very high speeds. Because a link-based method captures the effects of both high and low speeds, it is likely to produce inventory values from 4% to 20% higher than an HPMS based method. Link-based inventories are required if MVEBs are set by the inventory values. In the event that MOVES-based emissions inventories are used to determine RFP for the adopted SIP revision, link-based MOVES inventory values will be used, and it is expected that the final MVEBs will be different than those reported in this proposal. Preliminary MOVES-based MVEBs are provided in Section 5.4: *Preliminary MOVES-Based Motor Vehicle Emissions Budgets for RFP Milestone Years* of this proposal.

5.2 OVERVIEW OF METHODOLOGIES AND ASSUMPTIONS

The TCEQ developed updated on-road mobile source emissions inventories and control strategies reductions estimates using the latest planning assumptions and the newest version of the EPA's emission factor model. Updated emissions inventory development included development of a 2002 base year emissions inventory, adjusted base-year emissions inventories for 2008, 2011, and 2012, uncontrolled milestone years emissions inventories for 2011 and 2012, controlled milestone years emissions inventories for 2011 and 2012, and control strategies reduction estimates for 2008, 2011, 2012, and 2013. The TCEQ contracted the North Central Texas Council of Governments (NCTCOG) to develop the RFP emissions inventories and control strategies reductions. Detailed documentation of the on-road mobile emissions inventory development is provided in the NCTCOG contractor report in Appendix 8: *Development of Reasonable Further Progress On-Road Mobile Source Emissions Inventories Based on the MOBILE6.2 Model for the Dallas-Fort Worth Nonattainment Area.*

5.3 MOBILE6.2-BASED MOTOR VEHICLE EMISSIONS BUDGETS FOR RFP MILESTONE YEARS

The RFP MOBILE6.2-based MVEBs reflect the on-road mobile source emissions inventories for RFP milestone years, the on-road mobile source reductions strategies used to demonstrate RFP, and a transportation conformity safety margin, if one is used. A transportation conformity safety margin is allowed when there is an excess of emissions reductions beyond those required to demonstrate RFP for a milestone year. The amount of the safety margin must be less than the total in excess emissions reductions for nitrogen oxides (NO_X) and volatile organic compounds (VOC); therefore, even if the safety margin is used for a transportation conformity determination, the DFW nonattainment area will meet the 1997 eight-hour ozone standard RFP requirements for all milestone years. Summaries for MOBILE6.2-based MVEB calculations for each RFP milestone year are presented in Tables 5-1: *MOBILE6.2-Based 2011 RFP Motor Vehicle Emissions Budgets for the DFW Ozone Nonattainment Area (tons per day)* and 5-2: *MOBILE6.2-Based 2012 RFP Motor Vehicle Emissions Budgets for the DFW Ozone Nonattainment Area (tons per day)*. Details for MVEB calculations are documented in Appendix 1: *MOBILE6.2-Based Dallas-Fort Worth Nonattainment Area Reasonable Further Progress Demonstration Calculations Spreadsheet*. Although the RFP control strategy produces more than the required emissions reductions for each milestone year, none of the excess emissions reductions are used to provide a safety margin. The safety margin is set to zero in the calculations for the 2011 and 2012 MVEBs. Final MVEBs could change at adoption, subject to the necessity to fulfill RFP requirement.

Table 5-1: MOBILE6.2-Based 2011 RFP Motor Vehicle Emissions Budgets for the DFW Ozone Nonattainment Area (tons per day)

Control Strategy Description	NO_X	VOC
2011 On-road emissions projection without post-1990 Federal Clean Air Act (FCAA) controls	438.60	273.23
2011 On-Road Mobile RFP Controls	**NO_X**	**VOC**
Tier 1 Federal Motor Vehicle Control Program (FMVCP)	82.62	86.2
Federal Reformulated Gasoline (RFG) (All Counties)	73.77	38.1
Inspection and Maintenance (I/M) and Anti-Tampering Program (ATP) in Dallas and Tarrant Counties	19.89	20.96
National Low Emissions Vehicle Program	10.13	6.67
Expanded I/M	10.04	6.09
Tier 2 FMVCP	69.32	26.21
2007 heavy duty diesel FMVCP	25.69	0.45
On-Road Texas Low Emissions Diesel (TxLED)	4.73	0.00
2011 On-road emissions projection with post-1990 FCAA controls (uncontrolled emissions inventory minus control reductions)	142.41	88.55
Add transportation conformity safety margin	0.00	0.00
2011 RFP MVEBs	142.41	88.55

Note: Although the 2011 RFP reductions exceed the required emission reductions, no excess emissions are used to provide a safety margin for 2011. The safety margin is therefore set to zero.

Table 5-2: MOBILE6.2-Based 2012 RFP Motor Vehicle Emissions Budgets for the DFW Ozone Nonattainment Area (tons per day)

Control Strategy Description	NO_X	VOC
2012 on-road emissions projection without post-1990 FCAA controls	445.47	276.91
2012 On-Road Mobile RFP Controls	**NO_X**	**VOC**
Tier 1 FMVCP	82.64	96.98
RFG (All Counties)	82.29	37.8
I/M and ATP in Dallas and Tarrant Counties	19.73	17.86
National Low Emission Vehicle Program	8.88	5.95
Expanded I/M	11.19	6.28
Tier 2 FMVCP	79.52	30.37
2007 heavy duty diesel FMVCP	33.88	0.50
On-road TxLED	4.52	0.00
2012 on-road emissions projection with post-1990 FCAA controls (uncontrolled inventory minus control reductions)	105.12	71.24
Add transportation conformity safety margin	0.00	0.00
2012 RFP MVEBs	122.82	81.17

Note: Although the 2012 RFP reductions exceed the required emission reductions, no excess emissions are used to provide a safety margin for 2012. The safety margin is therefore set to zero.

5.4 PRELIMINARY MOVES-BASED MOTOR VEHICLE EMISSIONS BUDGETS FOR RFP MILESTONE YEARS

The preliminary MOVES-based RFP MVEBs reflect the on-road mobile source emissions inventories for RFP milestone years, the on-road mobile source reductions strategies that will be used to demonstrate RFP, and a transportation conformity safety margin, if one is used. A transportation conformity safety margin is allowed when there is an excess of emissions reductions beyond those required to demonstrate RFP for a milestone year. Summaries for preliminary MOVES-based MVEB calculations for each RFP milestone year are presented in Tables 5-3: *Preliminary MOVES-Based 2011 RFP Motor Vehicle Emissions Budgets for the DFW Ozone Nonattainment Area (tons per day)* and 5-4: *Preliminary MOVES-Based 2012 RFP Motor Vehicle Emissions Budgets for the DFW Ozone Nonattainment Area (tons per day)*. Details for MVEB calculations are documented in Appendix 9: *Preliminary MOVES-Based Dallas-Fort Worth Nonattainment Area Reasonable Further Progress Demonstration Calculations Spreadsheet*. The safety margin is set to zero in the calculations for the preliminary 2011 and 2012 MVEBs. The inventories and MVEBs for the preliminary MOVES-based RFP values were developed using an HPMS method. Link-based inventories are required if MVEBs are set by the inventory values. In the event that MOVES-based emissions inventories are used to determine RFP for the adopted SIP revision, link-based MOVES inventory values will be used. The final MVEBs are expected to be different than those reflected in this SIP proposal. For the preliminary budgets, none of the excess emissions reductions are used to provide a safety margin.

Table 5-3: Preliminary MOVES-Based 2011 RFP Motor Vehicle Emissions Budgets for the DFW Ozone Nonattainment Area (tons per day)

Control Strategy Description	NO_X	VOC
2011 on-road emissions projection without post-1990 FCAA controls	831.11	266.18
2011 On-Road Mobile RFP Controls	**NO_X**	**VOC**
Tier 1 FMVCP, RFG, I/M Program, Tier 2 FMVCP, 2007 heavy duty diesel FMVCP	604.20	184.75
On-road TxLED	6.00	0.00
2011 on-road emissions projection with post-1990 FCAA controls (uncontrolled emissions inventory minus control reductions)	220.90	81.43
Add transportation conformity safety margin	0.00	0.00
2011 RFP MVEBs	220.90	81.43

Note: Although the 2011 RFP reductions exceed the required emission reductions, no excess emissions are used to provide a safety margin for 2011. The safety margin is therefore set to zero.

Table 5-4: Preliminary MOVES-Based 2012 RFP Motor Vehicle Emissions Budgets for the DFW Ozone Nonattainment Area (tons per day)

Control Strategy Description	NO_X	VOC
2012 on-road emissions projection without post-1990 FCAA controls	844.71	259.18
2012 On-Road Mobile RFP Controls	**NO_X**	**VOC**
Tier 1 FMVCP, RFG, I/M Program, Tier 2 FMVCP, 2007 heavy duty diesel FMVCP	642.07	187.62
On-road TxLED	5.29	0.00
2012 on-road emissions projection with post-1990 FCAA controls (uncontrolled inventory minus control reductions)	197.34	71.56
Add transportation conformity safety margin	0.00	0.00
2012 RFP MVEBs	197.34	71.56

Note: Although the 2012 RFP reductions exceed the required emission reductions, no excess emissions are used to provide a safety margin for 2012. The safety margin is therefore set to zero.

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Appendices Available Upon Request

Jamie Zech
jamie.zech@tceq.texas.gov
512.237.3935