

# **2023 Transportation Conformity**

## **Appendix 12.6: Applicable SIP Excerpts**

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY  
**AGENDA ITEM REQUEST**  
for State Implementation Plan Revision Adoption

**AGENDA REQUESTED:** March 4, 2020

**DATE OF REQUEST:** February 14, 2020

**INDIVIDUAL TO CONTACT REGARDING CHANGES TO THIS REQUEST, IF NEEDED:** Jamie Zech, (512) 239-3935

**CAPTION: Docket No. 2019-0660-SIP.** Consideration of the adoption of the Dallas-Fort Worth (DFW) and Houston-Galveston-Brazoria (HGB) Serious Classification Reasonable Further Progress (RFP) State Implementation Plan (SIP) Revision for the 2008 Eight-Hour Ozone National Ambient Air Quality Standard (NAAQS).

To meet Federal Clean Air Act requirements, the SIP revision includes an analysis of RFP toward attainment of the 2008 eight-hour ozone NAAQS, demonstrating a 9% emissions reduction in ozone precursors from January 1, 2018 through December 31, 2020, a 3% emissions reduction from January 1, 2021 through December 31, 2021 for attainment year RFP contingency, and RFP motor vehicle emissions budgets for the 2020 attainment year. (Denine Calvin, Terry Salem) (Non-Rule Project No. 2019-079-SIP-NR)

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Copy to CCC Secretary? NO X YES

# Texas Commission on Environmental Quality

## Interoffice Memorandum

**To:** Commissioners **Date:** February 14, 2020

**Thru:** Bridget C. Bohac, Chief Clerk  
Toby Baker, Executive Director

**From:** Tonya Baer, Deputy Director  
Office of Air

**Docket No.:** 2019-0660-SIP

**Subject:** Commission Adoption of the Dallas-Fort Worth (DFW) and Houston-Galveston-Brazoria (HGB) Serious Classification Reasonable Further Progress (RFP) State Implementation Plan (SIP) Revision for the 2008 Eight-Hour Ozone Standard Nonattainment Area

DFW and HGB 2008 Eight-Hour Ozone Serious Classification RFP SIP  
Revision  
Non-Rule Project No. 2019-079-SIP-NR

### **Background and reason(s) for the SIP revision:**

The DFW 2008 eight-hour ozone serious nonattainment area, consisting of Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise Counties, along with the HGB 2008 eight-hour ozone serious nonattainment area, consisting of Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties, were previously classified as moderate nonattainment for the 2008 eight-hour ozone National Ambient Air Quality Standard (NAAQS) of 0.075 parts per million (ppm) with a July 20, 2018 attainment date. Based on monitoring data from 2015, 2016, and 2017, neither the DFW area nor the HGB area attained the 2008 eight-hour ozone NAAQS in 2017,<sup>1</sup> and neither qualified for a one-year attainment date extension in accordance with Federal Clean Air Act (FCAA), §181(a)(5).<sup>2</sup> On August 23, 2019, the United States Environmental Protection Agency (EPA) published the final notice reclassifying the DFW and HGB nonattainment area from moderate to serious for the 2008 eight-hour ozone NAAQS, effective on September 23, 2019 (84 *Federal Register* (FR) 44238).

Since the DFW and HGB areas have been reclassified by the EPA, they are now subject to the serious nonattainment area requirements in FCAA, §182(c), and the Texas Commission on Environmental Quality (TCEQ) is required to submit serious classification attainment demonstration (AD) and RFP SIP revisions to the EPA. As indicated in the EPA's *Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule* (2008 eight-hour ozone standard SIP requirements rule) published on March 6, 2015, the attainment date for a serious

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<sup>1</sup> The attainment year ozone season is the ozone season immediately preceding a nonattainment area's attainment deadline.

<sup>2</sup> An area that fails to attain the 2008 eight-hour ozone NAAQS by its attainment date would be eligible for the first one-year extension if, for the attainment year, the area's 4th highest daily maximum eight-hour average is at or below the level of the standard (75 parts per billion (ppb)). The DFW area's fourth highest daily maximum eight-hour average for 2017 was 77 ppb as measured at the Dallas North No. 2 monitor (C63/C679). The DFW area's design value for 2017 was 79 ppb. The HGB area's fourth highest daily maximum eight-hour average for 2017 was 79 ppb as measured at the Conroe Relocated monitor (C78/A321). The HGB area's design value for 2017 was 81 ppb.

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classification is July 20, 2021 with a 2020 attainment year (80 FR 12264). The EPA set an August 3, 2020 deadline for states to submit AD and RFP SIP revisions to address the 2008 eight-hour ozone standard serious nonattainment area requirements.

**Scope of the SIP revision:**

This SIP revision addresses RFP consistent with FCAA requirements for areas classified as serious nonattainment for the 2008 eight-hour ozone NAAQS. The details of the AD SIP revisions, also required for each area, are covered in separate memos (Project No. 2019-078-SIP-NR and 2019-077-SIP-NR).

**A.) Summary of what the SIP revision will do:**

This RFP SIP revision demonstrates that the DFW and HGB 2008 eight-hour ozone nonattainment areas will achieve emissions reductions in ozone precursors (volatile organic compounds (VOC) and/or nitrogen oxides (NO<sub>x</sub>) consistent with the serious ozone nonattainment area requirements of FCAA, §182(c)(2)(B) and the 2008 eight-hour ozone standard SIP requirements rule according to the following increments:

- a 9% emissions reduction in NO<sub>x</sub> and/or VOC for all counties in each area for the three-year period from January 1, 2018 through December 31, 2020; and
- a 3% emissions reduction in NO<sub>x</sub> and/or VOC for the one-year period from January 1, 2021 through December 31, 2021 for all counties in each area as an attainment year RFP contingency.

In addition to demonstrating the required emissions reductions, this SIP revision also provides motor vehicle emissions budgets (MVEB) for the 2020 attainment year.

This SIP revision demonstrates RFP for the DFW and HGB serious nonattainment areas for the 2020 attainment year as well as the 2021 contingency year.

**B.) Scope required by federal regulations or state statutes:**

This RFP SIP revision is required to demonstrate that the DFW and HGB serious nonattainment areas will achieve emissions reductions consistent with the requirements of FCAA, §182(c)(2) and the EPA's 2008 ozone standard SIP requirements rule.

The RFP calculations documented in this SIP revision rely on an RFP base year of 2011 and a 2020 attainment year. This SIP revision includes the required 3% per year emissions reductions for the three-year period from January 1, 2018 through December 31, 2020. This SIP revision also incorporates an additional 3% emissions reduction for the one-year period from January 1, 2021 through December 31, 2021 as contingency to be implemented if the area fails to achieve the targeted RFP emission reductions in 2020.

**C.) Additional staff recommendations that are not required by federal rule or state statute:**

None.

**Statutory authority:**

The authority to propose and adopt SIP revisions is derived from the following sections of Texas Health and Safety Code, Chapter 382, Texas Clean Air Act (TCAA), §382.002,

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which provides that the policy and purpose of the TCAA is to safeguard the state's air resources from pollution; §382.011, which authorizes the commission to control the quality of the state's air; and §382.012, which authorizes the commission to prepare and develop a general, comprehensive plan for the control of the state's air. This RFP SIP revision is required by FCAA, §110(a)(1) and implementing rules in 40 Code of Federal Regulations Part 51.

**Effect on the:**

**A.) Regulated community:**

The DFW and HGB RFP SIP revision sets 2020 NO<sub>x</sub> and VOC MVEBs for the 2020 attainment year for both nonattainment areas, which could, if found adequate or approved by the EPA, affect transportation planning conducted by local governments in both the DFW and HGB areas.

**B.) Public:**

The DFW and HGB RFP SIP revision does not require rulemaking for additional emissions reductions but does set MVEBs that could impact transportation planning and citizens in both the DFW and HGB areas. The general public in the DFW area may benefit from reduced ground-level ozone concentrations due to reduced emissions of ozone precursors documented in this RFP SIP revision.

**C.) Agency programs:**

The DFW and HGB RFP SIP revision has no new impact on agency programs.

**Stakeholder meetings:**

The proposed SIP revision went through a public review and comment period including two public hearings.

**Public comment:**

The public comment period opened on September 13, 2019 and closed on October 28, 2019. The commission offered two public hearings for the proposed SIP Revision. The first was held in Houston on October 14, 2019 and the second was held in Arlington on October 17, 2019. Notice of the public hearings was published in the *Texas Register* and the *Dallas Morning News*, and *Houston Chronicle* newspapers. TCEQ staff were present and ready to open both hearings for public comment; however, no attendees arrived to make comments on the record at either hearing. Therefore, the public hearings were not formally opened for comment and a transcript was not prepared.

During the comment period, staff received a comment from Earthjustice on behalf of Achieving Community Tasks Successfully, Air Alliance Houston, Earthjustice, Sierra Club, and Texas Environmental Justice Advocacy Services, concerning the use of 2014 vehicle registration data to develop the HGB area on-road emissions inventories. A summary of this comment and the TCEQ response is provided as part of this SIP revision in the Response to Comments.

**Significant changes from proposal:**

None.

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**Potential controversial concerns and legislative interest:**

Although the EPA finalized its 2015 eight-hour ozone standard SIP requirements rule (83 FR 25776), the final rule did not revoke the 2008 eight-hour ozone standard. The EPA stated that revocation of the 2008 eight-hour ozone standard would be addressed in a separate future action. However, because of the February 16, 2018 United States Court of Appeals for the District of Columbia Circuit opinion in the case *South Coast Air Quality Management District v. EPA*, 882 F.3d 1138 (D.C. Cir. 2018), the requirement for the EPA to reclassify the area and for the TCEQ to submit this RFP SIP revision is expected to remain even if the 2008 eight-hour ozone standard is revoked.

**Does this SIP revision affect any current policies or require development of new policies?**

No.

**What are the consequences if this SIP revision does not go forward? Are there alternatives to this SIP revision?**

The commission could choose to not comply with requirements to develop and submit this RFP SIP revision to the EPA. If the DFW and HGB RFP SIP revision is not submitted, the EPA could impose sanctions on the state and promulgate a federal implementation plan (FIP). Sanctions could include transportation funding restrictions, grant withholding, and 2-to-1 emissions offset requirements for new construction and major modifications of stationary sources in the DFW and HGB nonattainment areas. The EPA could impose such sanctions and implement a FIP until the state submitted, and the EPA approved, a replacement DFW and HGB 2008 eight-hour ozone RFP SIP revision for the area.

**Key points in the SIP revision adoption schedule:**

**Anticipated adoption date:** March 4, 2020

**EPA due date:** August 3, 2020

**Agency contacts:**

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

DALLAS-FORT WORTH AND HOUSTON-GALVESTON-  
BRAZORIA 2008 EIGHT-HOUR OZONE STANDARD  
NONATTAINMENT AREAS



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY  
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**DALLAS-FORT WORTH AND HOUSTON-GALVESTON-BRAZORIA  
SERIOUS CLASSIFICATION REASONABLE FURTHER PROGRESS STATE  
IMPLEMENTATION PLAN REVISION FOR THE 2008 EIGHT-HOUR  
OZONE NATIONAL AMBIENT AIR QUALITY STANDARD**

PROJECT NUMBER 2019-079-SIP-NR

Adoption  
March 4, 2020

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## EXECUTIVE SUMMARY

The 1990 Federal Clean Air Act (FCAA) Amendments, §182, require ozone nonattainment areas designated with a classification of moderate or higher to submit plans showing reasonable further progress (RFP) toward attainment of the ozone National Ambient Air Quality Standard (NAAQS). On March 27, 2008, the United States Environmental Protection Agency (EPA) published a final rule revising the eight-hour ozone standard from 0.08 parts per million (ppm) to 0.075 ppm (73 *Federal Register* (FR) 16436). On May 21, 2012, the EPA published final designations for the 2008 eight-hour ozone standard with an effective date of July 20, 2012 (77 FR 30088). The EPA designated a 10-county Dallas-Fort Worth (DFW) area (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise Counties) as nonattainment with a moderate classification. The EPA designated an eight-county Houston-Galveston-Brazoria (HGB) area (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties) as nonattainment with a marginal classification. The HGB area was later reclassified from marginal to moderate nonattainment effective December 14, 2016 (published on December 14, 2016 (81 FR 90207)). The Texas Commission on Environmental Quality (TCEQ) adopted a moderate classification RFP SIP revision for the DFW area on June 3, 2015 and for the HGB area on December 15, 2016. The EPA published final approval of the DFW moderate classification RFP SIP revision on December 7, 2016 (81 FR 88124) and published final approval of the HGB moderate classification RFP SIP revision on February 13, 2019 (84 FR 3708).

As indicated in the EPA's *Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule* (2008 eight-hour ozone standard SIP requirements rule) published on March 6, 2015, the attainment date for the moderate classification was July 20, 2018 with a 2017 attainment year (80 FR 12264). Based on monitoring data from 2015, 2016, and 2017, neither the DFW area nor the HGB area attained the 2008 eight-hour ozone NAAQS in 2017,<sup>1</sup> and neither qualified for a one-year attainment date extension in accordance with FCAA, §181(a)(5).<sup>2</sup> On August 23, 2019, the EPA published the final notice reclassifying the DFW and HGB nonattainment areas from moderate to serious for the 2008 eight-hour ozone NAAQS, effective September 23, 2019 (84 FR 44238).

Since the DFW and HGB areas have been reclassified by the EPA, they are now subject to the serious ozone nonattainment area requirements in FCAA, §182(c), and the TCEQ is required to submit serious classification attainment demonstration (AD) and RFP SIP revisions to the EPA. According to the final 2008 eight-hour ozone standard SIP requirements rule, the attainment date for a serious classification is July 20, 2021 with a 2020 attainment year (80 FR 12264). The EPA set an August 3, 2020 deadline for

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<sup>1</sup> The attainment year ozone season is the ozone season immediately preceding a nonattainment area's attainment deadline.

<sup>2</sup> An area that fails to attain the 2008 eight-hour ozone NAAQS by its attainment date would be eligible for the first one-year extension if, for the attainment year, the area's 4th highest daily maximum eight-hour average is at or below the level of the standard (75 ppb). The DFW area's fourth highest daily maximum eight-hour average for 2017 was 77 ppb as measured at the Dallas North No. 2 monitor (C63/C679). The DFW area's design value for 2017 was 79 ppb. The HGB area's fourth highest daily maximum eight-hour average for 2017 was 79 ppb as measured at the Conroe Relocated monitor (C78/A321). The HGB area's design value for 2017 was 81 ppb.

states to submit AD and RFP SIP revisions to address the 2008 eight-hour ozone standard serious nonattainment area requirements.

This RFP SIP revision is not required to demonstrate attainment of the 2008 eight-hour ozone NAAQS but rather to demonstrate that the DFW and HGB nonattainment areas 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 40 CFR §51.910, involve reducing ozone precursor emissions (nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOC)) at annual increments between the base year and the attainment year.

This RFP SIP revision demonstrates that the DFW and HGB nonattainment areas will achieve emissions reductions in NO<sub>x</sub> and/or VOC consistent with the serious ozone nonattainment area requirements of FCAA, §182(c)(2)(B) and the 2008 eight-hour ozone standard SIP requirements rule according to the following increments:

- a 9% emissions reduction in NO<sub>x</sub> and/or VOC for all counties in each area for the three-year period from January 1, 2018 through December 31, 2020; and
- a 3% emissions reduction in NO<sub>x</sub> and/or VOC for the one-year period from January 1, 2021 through December 31, 2021 for all counties in each area as an attainment year RFP contingency.

The RFP methodology involves development of the base year, attainment year, and contingency year emissions inventories, and emissions reductions for each analysis year. The amount of emissions reductions is determined through the RFP methodology. Once calculated, the target levels and emissions inventories can be compared to determine if the forecasted controlled (post-control) emissions inventories are less than the target level, thus meeting FCAA RFP requirements. The results of the DFW RFP analysis-year comparisons are provided in Chapter 3: *Progress Toward Meeting Target Emissions Levels*.

In addition to demonstrating the required emissions reductions, this SIP revision also sets 2020 NO<sub>x</sub> and VOC motor vehicle emissions budgets (MVEBs) for transportation conformity purposes, as detailed in Chapter 5: *Motor Vehicle Emissions Budget*. 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 applicable MVEB for the established year.

This SIP revision demonstrates RFP for the DFW and HGB serious nonattainment areas for the 2020 attainment year as well as the 2021 contingency year.

## SECTION V-A: 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, 2009, 2011, 2013, 2015, and 2017. 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) was the state air pollution control agency and was 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). 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. In 2011, the 82nd Texas Legislature continued the existence of the TCEQ until 2023. With the creation of the TNRCC, (and its successor the TCEQ), the authority over air quality is found in both the Texas Water Code and the TCAA. Specifically, the authority of the TCEQ 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 TCEQ, and the responsibilities and authority of the executive director. Chapter 5 also authorizes the TCEQ to implement action when emergency conditions arise and to conduct hearings. Chapter 7 gives the TCEQ enforcement authority.

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 authorizes 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, 2019
TEXAS WATER CODE	September 1, 2019

#### 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 August 22, 2019
Chapter 19: Electronic Reporting	November 11, 2010
Chapter 35: Emergency and Temporary Orders and Permits; Temporary Suspension or Amendment of Permit Conditions	
Subchapter A: Purpose, Applicability, and Definitions	December 10, 1998
Subchapter B: Authority of Executive Director	December 10, 1998
Subchapter C: General Provisions	March 24, 2016
Subchapter K: Air Orders	July 20, 2006
Chapter 39: Public Notice	
Subchapter H: Applicability and General Provisions, §§39.402(a)(1) - (6), (8), and (10) - (12), 39.405(f)(3) and (g), (h)(1)(A) - (4), (6), (8) - (11), (i) and (j), 39.407, 39.409, 39.411(a), (e)(1) - (4)(A)(i) and (iii), (4)(B), (5)(A) and (B), and (6) - (10), (11)(A)(i) and (iii) and (iv), (11)(B) - (F), (13) and (15), and (f)(1) - (8), (g) and (h), 39.418(a), (b)(2)(A), (b)(3), and (c), 39.419(e), 39.420 (c)(1)(A) - (D)(i)(I) and (II), (D)(ii), (c)(2), (d) - (e), and (h), and Subchapter K: Public Notice of Air Quality Permit Applications, §§39.601 - 39.605	May 31, 2018
Chapter 55: Requests for Reconsideration and Contested Case Hearings; Public Comment, all of the chapter except §55.125(a)(5) and (6)	May 31, 2018
Chapter 101: General Air Quality Rules	October 12, 2017
Chapter 106: Permits by Rule, Subchapter A	July 19, 2018
Chapter 111: Control of Air Pollution from Visible Emissions and Particulate Matter	August 3, 2017
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	December 29, 2016
Chapter 114: Control of Air Pollution from Motor Vehicles	April 26, 2018
Chapter 115: Control of Air Pollution from Volatile Organic Compounds	January 5, 2017
Chapter 116: Control of Air Pollution by Permits for New Construction or Modification	November 22, 2018

Chapter 117: Control of Air Pollution from Nitrogen Compounds	June 25, 2015
Chapter 118: Control of Air Pollution Episodes	May 26, 1989
Chapter 122: §122.122: Potential to Emit	February 23, 2017
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

## SECTION VI: CONTROL STRATEGY

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  - 2. Houston-Galveston-Brazoria (Revised)
  - 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)
- C. Particulate Matter (No change)
- D. Carbon Monoxide (No change)
- E. Lead (No change)
- F. Oxides of Nitrogen (No change)
- G. Sulfur Dioxide (No change)
- H. Conformity with the National Ambient Air Quality Standards (No change)
- I. Site Specific (No change)
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ABY	adjusted base year
AD	attainment demonstration
AERR	Air Emissions Reporting Requirements
APU	auxiliary power unit
ASLRRA	American Short Line and Regional Railroad Association
BY	Base Year
CFR	Code of Federal Regulations
CMV	commercial marine vessel
DFW	Dallas-Fort Worth
EDMS	Emission and Dispersion Modeling System
EI	emissions inventory
EIA	United States Energy Information Administration
EPA	United States Environmental Protection Agency
ERG	Eastern Research Group
FAA	Federal Aviation Administration
FCAA	Federal Clean Air Act
FMVCP	Federal Motor Vehicle Control Program
FR	<i>Federal Register</i>
GSE	ground support equipment
HGB	Houston-Galveston-Brazoria
I/M	inspection and maintenance
MOVES	Motor Vehicle Emissions Simulator
MVEB	motor vehicle emissions budget
NAAQS	National Ambient Air Quality Standard
NCTCOG	North Central Texas Council of Governments
NEI	National Emissions Inventory
NO <sub>x</sub>	nitrogen oxides
ppb	parts per billion
ppm	parts per million
PN	percent of NO <sub>x</sub>
PV	percent of VOC
RFG	reformulated gasoline

RFP	reasonable further progress
ROP	rate of progress
RRC	Railroad Commission of Texas
SCC	source classification code
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)
TDM	travel demand model
TexN	Texas NONROAD Model
TNRCC	Texas Natural Resource Conservation Commission
tpd	tons per day
TTI	Texas A&M Transportation Institute
TxLED	Texas Low Emission Diesel
VMT	vehicle miles traveled
VOC	volatile organic compounds

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## CHAPTER 1: GENERAL

### 1.1 REASONABLE FURTHER PROGRESS (RFP) BACKGROUND

Information on the Texas State Implementation Plan (SIP) and a list of SIP revisions and other air quality plans adopted by the commission can be found on the [Texas State Implementation Plan](http://www.tceq.texas.gov/airquality/sip) webpage (<http://www.tceq.texas.gov/airquality/sip>) on the [Texas Commission on Environmental Quality's](http://www.tceq.texas.gov/) (TCEQ) website (<http://www.tceq.texas.gov/>).

#### 1.1.1 One-Hour Ozone National Ambient Air Quality Standard (NAAQS)

On February 8, 1979, the United States Environmental Protection Agency (EPA) set the one-hour ozone standard at 0.12 parts per million (ppm) (44 *Federal Register* (FR) 8202). A design value of 0.124 ppm, or 124 parts per billion (ppb), would round down and meet the NAAQS while a design value of 0.125 ppm, or 125 ppb, would round up and exceed the NAAQS. Because of these rounding conventions, the one-hour ozone NAAQS of 0.12 ppm is commonly referenced as 124 ppb. Violation of the one-hour ozone NAAQS is based on the maximum number of expected exceedances over all the monitors in an area with a threshold of 1.0 expected exceedances per year averaged over a three-year period. The one-hour ozone NAAQS was revoked on June 15, 2005 (69 FR 23951).

##### 1.1.1.1 Dallas-Fort Worth (DFW) One-Hour Ozone NAAQS History

Under the one-hour ozone NAAQS of 0.12 ppm, the EPA designated a four-county DFW area (Collin, Dallas, Denton, and Tarrant Counties) as moderate nonattainment in 1991 with an attainment date of November 15, 1996. The Texas Natural Resources Conservation Commission (TNRCC), a predecessor to the TCEQ, adopted a rate-of-progress (ROP) SIP revision on July 24, 1996, which demonstrated a 15% reduction in volatile organic compounds (VOC) emissions between 1990 and 1996 for the DFW one-hour ozone moderate nonattainment area. The EPA fully approved the ROP SIP revision on April 12, 2005 (70 FR 18993).

On February 18, 1998, the EPA published a final determination that the DFW one-hour ozone moderate nonattainment area failed to attain the standard by the November 15, 1996 attainment date (63 FR 8128). The EPA reclassified the four-county DFW nonattainment area from moderate to serious, effective March 20, 1998, and established a new attainment date of November 15, 1999. On October 15, 1999, the TNRCC adopted a 9% ROP SIP revision for the DFW serious nonattainment area that included emissions reductions necessary to complete the ROP requirements for the years between 1996 and 1999. The EPA approved the 9% ROP SIP revision on January 12, 2000 (65 FR 1862).

In June 2005, the one-hour ozone standard was revoked after being replaced by the more stringent 1997 eight-hour ozone standard. By 2006, certified ambient monitoring data reflected attainment of the one-hour ozone standard. On October 16, 2008, the EPA published a final determination that the DFW one-hour ozone nonattainment area (Collin, Dallas, Denton, and Tarrant Counties) had attained the one-hour ozone standard with a design value of 124 ppb, based on certified 2004 through 2006 ambient monitoring data (73 FR 61357).

On August 18, 2015, the TCEQ submitted a Redesignation Substitute Report for the DFW area for the one-hour ozone standard. This report fulfilled the EPA's redesignation substitute requirements in its *Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule* (2008 eight-hour ozone standard SIP requirements rule) to lift anti-backsliding obligations under a revoked ozone NAAQS by ensuring that specific redesignation requirements are met for the DFW area under the revoked standard (78 FR 34178). This redesignation substitute took the place of a redesignation request and maintenance plan that the EPA would require for a standard that has not been revoked. On November 8, 2016, the EPA published its final approval of the DFW area redesignation substitute for the one-hour ozone and 1997 eight-hour ozone NAAQS, effective December 8, 2016 (81 FR 78688).

#### 1.1.1.2 Houston-Galveston-Brazoria (HGB) One-Hour Ozone NAAQS History

Under the one-hour ozone NAAQS of 0.12 ppm, the EPA designated an eight-county HGB area (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties) as a severe-17 nonattainment area in 1991 with an attainment date of November 15, 2007.

The TNRCC adopted an ROP SIP revision on December 6, 2000. The ROP SIP revision provided emissions inventories; ROP analyses for 2002, 2005, and 2007; and motor vehicle emissions budgets (MVEB) for nitrogen oxides (NO<sub>x</sub>) and VOC. On September 26, 2001, the Follow-Up One-Hour Ozone Attainment Demonstration and ROP SIP Revision was adopted. This revision incorporated changes to several control strategies and described how the state would fulfill the commitment to obtain the additional emission reductions necessary to address the remainder of the emission reductions shortfall and demonstrate attainment of the one-hour ozone standard in the HGB area. On November 14, 2001, the EPA approved both the December 2000 and September 2001 SIP revisions (66 FR 57159).

On October 27, 2004, the commission adopted the HGB One-Hour Ozone Post-1999 ROP SIP Revision. This revision provided updated emissions inventories and ROP analyses for 2002, 2005, and 2007 and revised MVEBs for the HGB area based on new models for estimating on-road and non-road mobile emissions sources. The SIP revision replaced the previous versions of the Post-1999 ROP that the EPA approved in November 2001. On February 14, 2005, the EPA approved the HGB One-Hour Ozone Post-1999 ROP SIP revision (70 FR 7407).

In June 2005, the one-hour ozone standard was revoked after being replaced by the more stringent 1997 eight-hour ozone standard. Although the EPA revoked the one-hour ozone NAAQS, former one-hour ozone NAAQS nonattainment areas remain subject to certain anti-backsliding requirements. The HGB area failed to attain the one-hour ozone standard by the November 15, 2007 attainment deadline, as required in 1991. On June 19, 2012, the EPA published a failure-to-attain determination effective July 19, 2012 (77 FR 36400).

As part of the transition to the 1997 eight-hour ozone standard, the EPA created a submittal termed a termination determination to address anti-backsliding requirements for the one-hour ozone standard. In May 2010, the TCEQ requested a determination regarding termination of the one-hour ozone anti-backsliding

obligations associated with the transition from the one-hour ozone standard to the 1997 eight-hour ozone standard. As a result of court action, the EPA was unable to propose approval of the request.

The HGB area demonstrated attainment of the one-hour ozone NAAQS based on 2011 through 2013 monitoring data. On May 30, 2014, the EPA concurred that the data met all the quality requirements, and that the HGB area met the one-hour ozone standard.<sup>3</sup> On July 22, 2014, the TCEQ submitted a Redesignation Substitute Report for the HGB One-Hour Ozone Standard Nonattainment Area. This report fulfilled the EPA's redesignation substitute requirements in its 2008 eight-hour ozone standard SIP requirements rule to lift anti-backsliding obligations for the revoked one-hour ozone NAAQS by ensuring that specific redesignation requirements are met for the HGB area under the revoked standard (78 FR 34178). The redesignation substitute took the place of a redesignation request and maintenance plan that the EPA would require for a standard that has not been revoked. On October 20, 2015, the EPA approved the one-hour ozone HGB redesignation substitute demonstration effective November 19, 2015 (80 FR 63429).

### **1.1.2 1997 Eight-Hour Ozone NAAQS**

On July 18, 1997, the EPA revised the NAAQS for ground-level ozone effective September 16, 1997 (62 FR 38856). The EPA phased out and replaced the previous one-hour ozone NAAQS with an eight-hour NAAQS set at 0.08 ppm based on the three-year average of the annual fourth-highest daily maximum eight-hour average ozone concentrations measured at each monitor within an area. A design value of 0.084 ppm, or 84 ppb, would round down and meet the NAAQS while a design value of 0.085 ppm, or 85 ppb, would round up and exceed the NAAQS. Because of these rounding conventions, the 1997 eight-hour ozone NAAQS is commonly referenced as 84 ppb. The EPA revoked the 1997 eight-hour ozone standard in its 2008 eight-hour ozone standard SIP requirements rule, effective April 6, 2015 (80 FR 12264).

#### 1.1.2.1 DFW 1997 Eight-Hour Ozone NAAQS History

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, effective June 15, 2004 (69 FR 23936). The DFW nonattainment area was redefined as Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant Counties. The DFW 1997 eight-hour ozone nonattainment area was classified as a moderate, with an attainment date of June 15, 2010. The TCEQ was required to submit an RFP SIP revision to the EPA for the DFW eight-hour ozone nonattainment area by June 15, 2007.

The second phase of EPA's implementation rule for the 1997 eight-hour ozone standard 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 (70 FR 71612). The first option was to submit a 1997 eight-hour ozone standard RFP SIP revision demonstrating 15% VOC emissions reductions for the entire eight-hour

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<sup>3</sup> Mark Hansen, Acting Associate Director for Air Programs, EPA. Letter to Richard A. Hyde, Executive Director, TCEQ. May 30, 2014

nonattainment area. The second option was to submit a 1997 eight-hour ozone standard RFP SIP revision demonstrating 15% VOC emissions reductions for the newly designated portion of the eight-hour nonattainment area and VOC and/or NO<sub>x</sub> 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. Since Collin, Dallas, Denton, and Tarrant Counties already had an approved plan containing the 15% VOC-only emissions reduction, only the five newly designated counties were required to demonstrate a 15% VOC reduction, while the one-hour ozone nonattainment counties were permitted to substitute NO<sub>x</sub> for VOC. The EPA approved the 1997 eight-hour ozone RFP SIP revision for the DFW nonattainment area on October 7, 2008 (73 FR 58475), including the 15% VOC-only emissions reduction for the newly designated counties.

The DFW area failed to meet the June 15, 2010 attainment deadline under its moderate classification. Effective January 19, 2011, the EPA published a final determination of failure to attain and reclassification of the DFW area from a moderate to a serious nonattainment area for the 1997 eight-hour ozone standard (75 FR 79302). The EPA set January 19, 2012 as the deadline for Texas to submit attainment demonstration and RFP SIP revisions addressing the serious ozone nonattainment area requirements of the Federal Clean Air Act (FCAA).

On December 7, 2011, the TCEQ adopted the 2011 DFW 1997 Eight-Hour Ozone RFP SIP Revision (Project No. 2010-023-SIP-NR). The 2011 RFP SIP revision demonstrated a 9% emissions reduction between 2008 and 2011 and a 3% emissions reduction between 2011 and 2012 and also included MVEBs for each milestone year and a contingency plan. The 2011 RFP SIP revision used the EPA's Motor Vehicle Emission Simulator (MOVES) model to develop the base year and milestone year on-road mobile emissions inventories and the milestone year MVEBs. The EPA published final approval of the 2011 DFW RFP SIP revision on November 12, 2014 (79 FR 67068).

Under the serious classification, the DFW nonattainment area was given until June 15, 2013 to attain the 1997 eight-hour ozone NAAQS. The area did not monitor attainment by that date but at the end of the 2014 ozone season, the eight-hour design value was 81 ppb, based on 2012, 2013, and 2014 air monitoring data, which is in attainment of the 1997 eight-hour ozone standard. On February 24, 2015, the TCEQ submitted early certification of 2014 ozone air monitoring data to the EPA along with a request for a determination of attainment for the 1997 eight-hour ozone standard for the DFW area. On September 1, 2015, the EPA published a determination of attainment for the DFW 1997 eight-hour ozone nonattainment area (80 FR 52630).

On August 18, 2015, the TCEQ submitted a Redesignation Substitute Report for the DFW 1997 Eight-Hour Ozone Standard Nonattainment Area, which fulfilled the EPA's redesignation substitute requirements in its 2008 eight-hour ozone standard SIP requirements rule to lift anti-backsliding obligations for the revoked 1997 eight-hour ozone NAAQS by ensuring that specific redesignation requirements are met for the DFW area under the revoked standard. The redesignation substitute took the place of a redesignation request and maintenance plan that the EPA would require for a standard that has not been revoked. On November 8, 2016, the EPA approved the 1997 eight-

hour ozone DFW redesignation substitute demonstration effective December 8, 2016 (81 FR 78688).

#### 1.1.2.2 HGB 1997 Eight-Hour Ozone NAAQS History

Effective June 15, 2004, Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties were designated nonattainment in the first phase of the EPA's implementation rule for the 1997 eight-hour ozone NAAQS (69 FR 23951). The HGB area was classified moderate nonattainment for the standard, with an attainment deadline of June 15, 2010. The TCEQ was required to submit an RFP SIP revision for the 1997 eight-hour ozone NAAQS to the EPA by June 15, 2007. The commission adopted the 2007 HGB 1997 Eight-Hour Ozone Nonattainment Area RFP SIP revision on May 23, 2007, which demonstrated that a required 15% emissions reduction in ozone precursors (NO<sub>x</sub> and VOC) would be met for the 2001 through 2008 RFP analysis period. On April 22, 2009, the EPA published approval of the RFP SIP revision, the associated MVEBs, and the 2002 base year emissions inventory (EI) (74 FR 18298).

On June 15, 2007, the state requested that the HGB area be reclassified from a moderate to a severe nonattainment area for the 1997 eight-hour ozone NAAQS, with an attainment deadline of June 15, 2019. On December 31, 2007, the EPA published its proposal to grant the governor's request and took comments on a range of dates for the state to submit a revised SIP (72 FR 74252). The TCEQ provided comments to the EPA that supported the reclassification and justification for an April 2010 SIP submission date. On October 1, 2008, the EPA published approval of the governor's request to voluntarily reclassify the HGB ozone nonattainment area from a moderate to a severe nonattainment area for the 1997 eight-hour ozone NAAQS (73 FR 56983), effective October 31, 2008. The EPA set April 15, 2010 as the date for the state to submit a SIP revision addressing the severe-ozone nonattainment requirements and set a new attainment deadline of June 15, 2019.

The 2010 HGB 1997 Eight-Hour Ozone RFP SIP Revision, as required by the EPA, demonstrated an 18% emissions reduction occurred for the 2002 through 2008 RFP analysis period and that an average of 3% per year emissions reduction would occur between each of the analysis years 2008, 2011, 2014, 2017, and 2018. The RFP SIP revision established baseline emission levels, calculated reduction targets, identified control strategies to meet emission target levels, and tracked actual emission reductions against established emissions growth. This revision also included an MVEB for each analysis year and a contingency plan.

On January 25, 2011, the EPA published a notice of its determination that the MVEBs in the March 10, 2010 SIP revisions, which were developed using the on-road mobile source emissions inventories based on the EPA's MOBILE 6.2 model, were adequate for transportation conformity purposes (76 FR 4342). On January 2, 2014, the EPA published approval of the RFP SIP revision (79 FR 51). On April 23, 2013, the commission adopted the 2013 HGB 1997 Eight-Hour Ozone MVEB SIP Revision. The SIP revision updated on-road mobile source emissions inventories and MVEBs for the HGB area using the MOVES2010a version of the EPA's mobile emissions estimation model. The 2013 MVEB SIP revision also met the primary obligation of the mid-course review commitment in the 2010 HGB 1997 Eight-Hour Ozone AD SIP Revision by demonstrating that the outstanding 3% contingency requirement was fulfilled. Updated

on-road inventories and emissions analysis based on the EPA's August 30, 2012 vehicle miles traveled offset guidance and a modified version of the MOVES model demonstrated compliance with FCAA requirements for transportation control measures in severe nonattainment areas.

On January 2, 2014, the EPA published approval of this 2013 HGB 1997 Eight-Hour Ozone MVEB SIP Revision along with its approval of the 2010 HGB 1997 Eight-Hour Ozone AD SIP Revision (79 FR 57). On March 6, 2015, the EPA revoked the 1997 eight-hour ozone NAAQS, effective April 6, 2015 (80 FR 12264).

The HGB area monitored attainment of the 1997 eight-hour ozone NAAQS based on 2012 through 2014 monitoring data. In February 2015, the TCEQ submitted certification of 2014 ozone data in support of the TCEQ's subsequent request for a determination of attainment, also known as a clean data determination, for the 1997 eight-hour ozone NAAQS for the HGB area. The EPA published a final determination of attainment for the 1997 eight-hour ozone NAAQS for the HGB area on December 30, 2015 (80 FR 81466).

On August 18, 2015, the TCEQ submitted the Redesignation Substitute Report for the HGB 1997 Eight-Hour Ozone Standard Nonattainment Area, which fulfilled the EPA's redesignation substitute requirements in its 2008 eight-hour ozone standard SIP requirements rule to lift anti-backsliding obligations for the revoked 1997 eight-hour ozone NAAQS by ensuring that specific redesignation requirements are met for the HGB area under the revoked standard. The redesignation substitute took the place of a redesignation request and maintenance plan that the EPA would require for a standard that has not been revoked. The EPA approved the 1997 eight-hour ozone HGB redesignation substitute demonstration on November 8, 2016 (81 FR 78691).

### **1.1.3 Redesignation Request and Maintenance Plan SIP Revisions for the One-Hour and 1997 Eight-Hour Ozone NAAQS**

On February 16, 2018, the United States Court of Appeals for the District of Columbia Circuit (D.C. Circuit Court) issued an opinion in the case *South Coast Air Quality Management District v. EPA*, 882 F.3d 1138 (D.C. Cir. 2018). The case was a challenge to the EPA's final 2008 eight-hour ozone standard SIP requirements rule, which revoked the 1997 eight-hour ozone NAAQS as part of the implementation of the more stringent 2008 eight-hour ozone NAAQS. The court's decision vacated parts of the EPA's final 2008 eight-hour ozone standard SIP requirements rule, including the redesignation substitute, removal of anti-backsliding requirements for areas designated nonattainment under the 1997 eight-hour ozone NAAQS, waiver of requirements for transportation conformity for maintenance areas under the 1997 eight-hour ozone NAAQS, and elimination of the requirement to submit a second 10-year maintenance plan.

To address the court's ruling, the commission adopted a formal redesignation request and maintenance plan SIP revision for the one-hour and 1997 eight-hour ozone NAAQS for the HGB area on December 12, 2018 and for the DFW area on March 27, 2019. The SIP revisions included a request that the DFW and HGB area be redesignated to attainment for the revoked one-hour and 1997 eight-hour ozone NAAQS. The SIP revisions also included maintenance plans ensuring the areas remain in attainment of the standards through 2032. The maintenance plans use a 2014 base year inventory

and include interim year inventories for 2020 and 2026, establish MVEBs for 2032, and include a contingency plan.

#### **1.1.4 2008 Eight-Hour Ozone NAAQS**

On March 27, 2008, the EPA lowered the primary and secondary eight-hour ozone NAAQS to 0.075 ppm or 75 ppb (73 FR 16436). Attainment of the standard (expressed as 0.075 ppm) is achieved when an area's design value does not exceed 75 ppb. On May 21, 2012, the EPA published final designations for the 2008 eight-hour ozone standard with an effective date of July 20, 2012 (77 FR 30088). The EPA's implementation rule for the 2008 eight-hour ozone NAAQS, also published on May 21, 2012 (77 FR 30160), established December 31 of each relevant calendar year as the attainment date for all nonattainment area classification categories.

On June 6, 2013, the EPA published the proposed 2008 eight-hour ozone standard SIP requirements rule (78 FR 34178). The proposed rule addressed SIP requirements, the timing of SIP submissions, revocation of the 1997 eight-hour ozone NAAQS, and anti-backsliding requirements for previous ozone standards.

The D.C. Circuit Court published an opinion on December 23, 2014 agreeing with two challenges to the EPA's May 21, 2012 implementation rule for the 2008 eight-hour ozone NAAQS. The court vacated the provisions of the rule relating to attainment deadlines and revocation of the 1997 eight-hour ozone NAAQS for transportation conformity purposes. As part of the final 2008 eight-hour ozone standard SIP requirements rule, the EPA modified 40 CFR §51.1103 consistent with the D.C. Circuit Court decision to establish attainment dates that run from the effective date of designation, i.e., July 20, 2012, and revoked the 1997 eight-hour ozone NAAQS for all purposes (80 FR 12264).

##### 1.1.4.1 DFW 2008 Eight-Hour Ozone NAAQS History

On May 21, 2012, the EPA designated a 10-county DFW area (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise Counties) as nonattainment for the 2008 eight-hour ozone NAAQS with a moderate classification, effective July 20, 2012. The attainment date for the DFW moderate nonattainment area was originally established in the EPA's implementation rule for the 2008 eight-hour ozone NAAQS, published on May 21, 2012, and was set as December 31, 2018 (77 FR 30160). Due to the D.C. Circuit Court ruling, the attainment date changed from December 31, 2018 to July 20, 2018. In addition, because the attainment year ozone season is the ozone season immediately preceding a nonattainment area's attainment date, the attainment year for the DFW moderate nonattainment area changed from 2018 to 2017.

On July 2, 2014, the commission adopted a SIP revision to satisfy FCAA, §172(c)(3) and §182(a)(1) EI reporting requirements for the DFW nonattainment area under the 2008 eight-hour ozone standard. The EPA published direct final approval of this SIP revision on February 20, 2015 (80 FR 9204).

To meet FCAA requirements for a moderate ozone nonattainment area, the commission adopted the DFW RFP SIP revision for the 2008 Eight-Hour Ozone NAAQS on June 3, 2015. The SIP revision provided an RFP analysis for a 2017 attainment year,

a contingency plan, and 2017 NO<sub>x</sub> and VOC MVEBs. The RFP demonstration was made according to the following increments:

- a 15% emissions reduction in VOC for the six-year period from January 1, 2012 through December 31, 2017 for the newly designated one-county portion of the DFW 2008 eight-hour ozone nonattainment area consisting of Wise County;
- a 15% emissions reduction in VOC and/or NO<sub>x</sub> for the six-year period from January 1, 2012 through December 31, 2017 for the previously designated nine-county portion of the DFW 2008 eight-hour ozone nonattainment area consisting of Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant Counties; and
- a 3% emissions reduction in VOC and/or NO<sub>x</sub> for the one-year period from January 1, 2018 through December 31, 2018 as attainment year RFP contingency for all counties of the DFW 2008 eight-hour ozone nonattainment area.

The 2017 Wise County RFP demonstration in the adopted DFW RFP SIP revision used a transfer of excess VOC reductions from the nine-county area previously designated as nonattainment to the newly designated Wise County. Upon notification that the option to transfer creditable VOC reductions between county groups was no longer available per the EPA's final 2008 eight-hour ozone SIP requirements rule (80 FR 12264), the TCEQ corrected the adopted DFW RFP analyses to remove the VOC reduction transfer and credit emission reductions from drilling rig controls that were available but had not been credited. The corrections were submitted to the EPA in an April 22, 2016 technical supplement.

On December 7, 2016, the EPA published final approval of the DFW RFP SIP revision for the 2008 eight-hour ozone NAAQS (81 FR 88124).

#### 1.1.4.2 HGB 2008 Eight-Hour Ozone NAAQS History

On May 21, 2012, the EPA designated an eight-county HGB area (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties) as nonattainment for the 2008 eight-hour ozone NAAQS with a marginal classification, effective July 20, 2012. The attainment date for the HGB marginal nonattainment area was originally established in the EPA's implementation rule for the 2008 eight-hour ozone NAAQS, published on May 21, 2012, and was set as December 31, 2015 (77 FR 30160). Due to the D.C. Circuit Court ruling, the attainment date changed from December 31, 2015 to July 20, 2015. In addition, because the attainment year ozone season is the ozone season immediately preceding a nonattainment area's attainment date, the attainment year for the HGB marginal nonattainment area changed from 2015 to 2014.

On July 2, 2014, the commission adopted a SIP revision to satisfy FCAA, §172(c)(3) and §182(a)(1) EI reporting requirements for the HGB nonattainment area under the 2008 eight-hour ozone standard. The EPA published direct final approval of this SIP revision on February 20, 2015 (80 FR 9204).

#### *Reclassification to Moderate for the 2008 Eight-Hour Ozone NAAQS*

The HGB area did not attain the 2008 eight-hour ozone standard in 2014 but qualified for a one-year attainment date extension in accordance with FCAA, §181(a)(5). On May



4, 2016, the EPA granted a one-year attainment deadline extension for the HGB 2008 eight-hour ozone marginal nonattainment area to July 20, 2016 (81 FR 26697).

Because the HGB area's 2015 design value of 80 ppb exceeded the 2008 eight-hour ozone NAAQS, the EPA published a proposed determination of nonattainment and reclassification of the HGB area from marginal to moderate nonattainment on September 27, 2016 (81 FR 66240). The EPA proposed a January 1, 2017 deadline for the state to submit an attainment demonstration that addresses the 2008 eight-hour ozone NAAQS moderate nonattainment area requirements, including RFP. As indicated in the EPA's 2008 eight-hour ozone standard SIP requirements rule, the attainment deadline for moderate classification was July 20, 2018 with an attainment year of 2017.

On December 15, 2016, the commission adopted the HGB 2008 Eight-Hour Ozone RFP SIP revision to satisfy the requirements of FCAA, §182(b)(1) for moderate ozone nonattainment areas. The SIP revision demonstrated a 15% emissions reduction in ozone precursors from the 2011 base year through the 2017 attainment year, a 3% reduction for contingency in 2018, and set NO<sub>x</sub> and VOC MVEBs for the 2017 attainment year. The EPA published final approval of this SIP revision on February 13, 2019 (84 FR 3708).

#### 1.1.4.3 Reclassification to Serious for the 2008 Eight-Hour Ozone NAAQS

With a moderate classification, the DFW and HGB areas had to attain the 2008 eight-hour ozone NAAQS of 0.075 ppm by a July 20, 2018 attainment date. Based on monitoring data from 2015, 2016, and 2017, neither the DFW area nor the HGB area attained the 2008 eight-hour ozone NAAQS in 2017,<sup>4</sup> and neither qualified for a one-year attainment date extension in accordance with FCAA, §181(a)(5).<sup>5</sup> On August 23, 2019, the EPA published the final notice reclassifying the DFW and HGB nonattainment areas from moderate to serious for the 2008 eight-hour ozone NAAQS, effective September 23, 2019 (84 FR 44238).

Since the DFW and HGB areas have been reclassified by the EPA, they are subject to the serious nonattainment area requirements in FCAA, §182(c), and the TCEQ is required to submit serious area RFP SIP revisions to the EPA. As indicated in the EPA's 2008 eight-hour ozone standard SIP requirements rule, published on March 6, 2015 (80 FR 12264), the attainment deadline for a serious classification is July 20, 2021, with an attainment year of 2020.

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<sup>4</sup> The attainment year ozone season is the ozone season immediately preceding a nonattainment area's attainment deadline.

<sup>5</sup> An area that fails to attain the 2008 eight-hour ozone NAAQS by its attainment date would be eligible for the first one-year extension if, for the attainment year, the area's 4th highest daily maximum eight-hour average is at or below the level of the standard (75 ppb). The DFW area's fourth highest daily maximum eight-hour average for 2017 was 77 ppb as measured at the Dallas North No. 2 monitor (C63/C679). The DFW area's design value for 2017 was 79 ppb. The HGB area's fourth highest daily maximum eight-hour average for 2017 was 79 ppb as measured at the Conroe Relocated monitor (C78/A321). The HGB area's design value for 2017 was 81 ppb.

## 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 NAAQS. The FCAA also requires states with ozone nonattainment areas classified as moderate or above to submit plans showing reasonable further progress toward attainment. 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<sub>x</sub> and/or VOC, averaged over three-year increments, until the area's attainment deadline.

For the 2008 eight-hour ozone NAAQS, the TCEQ previously adopted RFP SIP revisions for the DFW and HGB moderate nonattainment areas. The DFW RFP SIP revision adopted on June 3, 2015, demonstrated a 15% emissions reduction in VOC from the 2011 base year through the 2017 attainment year for the newly designated one-county portion of the DFW moderate nonattainment area (Wise County) and a 15% emissions reduction in NO<sub>x</sub> and/or VOC from the 2011 base year through the 2017 attainment year for the previously designated nine-county portion of the DFW moderate nonattainment area (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant Counties). The HGB RFP SIP Revision adopted on December 15, 2016 demonstrated a 15% emissions reduction in NO<sub>x</sub> and/or VOC from the 2011 base year through the 2017 attainment year for the eight-county HGB moderate nonattainment area (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties).

While emissions and emissions reductions were calculated from 2011 through 2017 for this DFW and HGB serious classification RFP SIP revision, 2017 is not considered an analysis year because the EPA approved the RFP demonstration for the 2017 analysis year for the DFW area on December 7, 2016 (81 FR 88124) and approved the RFP demonstration for the 2017 analysis year for the HGB area on February 13, 2019 (84 FR 3708). This RFP SIP revision demonstrates that the DFW and HGB nonattainment areas will achieve emissions reductions in ozone precursors (NO<sub>x</sub> and/or VOC) consistent with the serious ozone nonattainment area requirements of FCAA, §182(c)(2)(B) and the 2008 eight-hour ozone standard SIP requirements rule according to the following increments:

- a 9% emissions reduction in NO<sub>x</sub> and/or VOC for all counties in each area for the three-year period from January 1, 2018 through December 31, 2020; and
- a 3% emissions reduction in NO<sub>x</sub> and/or VOC for the one-year period from January 1, 2021 through December 31, 2021 for all counties in each area as an attainment year RFP contingency.

In addition to demonstrating the required emissions reductions, this SIP revision also provides MVEBs for the 2020 attainment year.

This SIP revision demonstrates RFP for the DFW and HGB serious nonattainment areas for the 2020 attainment year as well as the 2021 contingency year. A summary of the DFW and HGB areas' progress toward meeting RFP requirements can be found in

Appendix 1: *DFW Reasonable Further Progress Demonstration Spreadsheet* and  
Appendix 2: *HGB Reasonable Further Progress Demonstration Spreadsheet*.

### **1.3 PUBLIC HEARING AND COMMENT INFORMATION**

The public comment period opened on September 13, 2019, 2019 and closed on October 28, 2019. The commission offered two public hearings for this SIP revision. The first hearing was held on October 14, 2019 at 2:00 p.m. in Houston at the Texas Department of Transportation. The second hearing was held on October 17, 2019 at 2:00 p.m. in Arlington at the City Council Chambers. Notice of the public hearings was published in the *Texas Register* as well as the *Houston Chronicle* and *Dallas Morning News* newspapers. TCEQ staff were present and ready to open both hearings for public comment; however, no attendees arrived to make comments on the record at either hearing. Therefore, the public hearings were not formally opened for comment and a transcript was not prepared.

Written comments were accepted via mail, fax, or through the [eComments](https://www6.tceq.texas.gov/rules/ecomments/) (https://www6.tceq.texas.gov/rules/ecomments/) system. During the comment period, staff received a comment from Earthjustice on behalf of Achieving Community Tasks Successfully, Air Alliance Houston, Earthjustice, Sierra Club, and Texas Environmental Justice Advocacy Services. A summary of this comment and the TCEQ response is provided as part of this SIP revision in the Response to Comments.

### **1.4 SOCIAL AND ECONOMIC CONSIDERATIONS**

No new control strategies have been incorporated into this DFW and HGB RFP SIP revision. Therefore, there are no additional social or economic costs associated with this revision.

### **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. Ground-level (tropospheric) ozone is produced when ozone precursor emissions, volatile organic compounds (VOC) and nitrogen oxides (NO<sub>x</sub>), undergo photochemical reactions in the presence of sunlight.

The Texas Commission on Environmental Quality (TCEQ) maintains an inventory of current information for sources of NO<sub>x</sub> 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 source or source category. The total inventory of NO<sub>x</sub> and VOC emissions for an area is derived from estimates developed for four general categories of emissions sources: point, area, mobile (both non-road and on-road), and biogenic. The emissions inventory (EI) 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.

This Dallas-Fort Worth (DFW) and Houston-Galveston-Brazoria (HGB) Reasonable Further Progress (RFP) State Implementation Plan (SIP) revision demonstrates RFP for a 2020 attainment year per the guidance in the Environmental Protection Agency's (EPA) *Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule* (2008 eight-hour ozone standard SIP requirements rule), published in the *Federal Register* (FR) on March 6, 2015 (80 FR 12264). Specifically, this DFW and HGB RFP SIP revision demonstrates a 9% emissions reduction from calendar years 2018 through 2020 for the counties designated as nonattainment for ozone by combining NO<sub>x</sub> and VOC emissions reductions.

To complete the RFP calculations, a set of inventories and control measures reduction estimates is required. In accordance with the requirement for these inventories and estimates, this DFW and HGB RFP SIP revision includes documentation of emissions inventories for the 2011 base year, for the 2020 attainment year, and for the attainment year RFP contingency requirement (2021). Those emissions inventories provide the basis for demonstrating how the required RFP emissions reductions will be met.

To develop an RFP SIP revision for the 2008 eight-hour ozone National Ambient Air Quality Standard (NAAQS), states must: (1) determine the base year emissions for NO<sub>x</sub> and VOC; (2) calculate RFP target emissions reductions levels based on the RFP percent reduction requirements; (3) determine the attainment year inventories according to RFP requirements; and (4) account for creditable emissions reductions in the attainment year EI in accordance with applicable requirements. When the RFP controlled emissions reductions meet or exceed the calculated target emissions reductions, then RFP is demonstrated.

The requirement to calculate and account for the non-creditable emissions reductions due to pre-1990 Federal Motor Vehicle Control Program (FMVCP) reductions in RFP

analyses was removed under the 2008 eight-hour ozone standard SIP requirements rule. This rule change eliminates the requirements to: calculate the adjusted base year (ABY) EI that estimates the effects of the non-creditable pre-1990 FCAA controls, use the ABY EI to calculate the percent reductions, and include the non-creditable reductions in the RFP target calculations. Accordingly, the RFP analyses presented in this DFW and HGB RFP SIP revision do not include any of the RFP elements or non-creditable effects related to the pre-1990 FMVCP, including ABY emissions inventories and related summaries and documentation.

This DFW and HGB RFP SIP revision includes:

- a 2011 base year EI;

The base year EI is the starting point for calculating the target levels of emissions. A base year of 2011 was selected in accordance with the EPA's 2008 eight-hour ozone standard SIP requirements rule.

- 2020 uncontrolled EI;

The RFP analysis requires an uncontrolled EI with growth between the base year and the attainment year. The uncontrolled EI serves as the basis for determining the amount of emissions reductions required to meet the RFP target for the attainment year.

- quantification of control measure reductions for the 2020 attainment year;

The RFP analysis requires the calculations of emissions reductions for control strategies, which are then subtracted from the uncontrolled or existing controlled emissions to determine the controlled RFP EI. The RFP emissions reductions are individually quantified for each control strategy that pertains to particular source categories. A discussion of RFP control strategies is provided in Chapter 4: *Control Measures to Achieve Target Levels*.

- 2020 controlled EI; and

The controlled EI represents the projected (forecasted) EI with all controls implemented. The controlled projected RFP EI is the result of subtracting the emissions reductions for controls that are used to demonstrate RFP from the uncontrolled or existing controlled projected EI.

- 2020 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 must be implemented if an RFP requirement is not met. A discussion of the RFP contingency control strategies for this DFW and HGB RFP SIP revision is provided in Chapter 4.

### **2.1.1 Updated Uncontrolled 2020 Attainment Year Inventories for Mobile Sources**

Uncontrolled attainment year emissions inventories for mobile sources represent what each attainment year's emissions would be if the post-1990 mobile control strategies were never implemented. First, emissions inventories are calculated for each mobile source category using EPA-approved methodologies. The inventories are then combined to derive the total uncontrolled attainment year EI for NO<sub>x</sub> and VOC. The uncontrolled attainment year EI includes 1990 or prior FCAA and/or state controls as well as growth in activity from 2011 to the attainment year, but the inventory does not include post-1990 FCAA and/or state controls.

### **2.1.2 Updated Controlled 2020 Attainment Year Inventory for Mobile Sources**

The controlled attainment year EI represents projected emissions for 2020, accounting for emissions growth from either 2011 or the projection base year as detailed below and specified applicable controls. Emissions inventories are calculated for each source category using EPA-approved methodologies. Then, the inventories are combined to obtain the total controlled attainment year EI for NO<sub>x</sub> and VOC. The controlled attainment year EI includes: specified FCAA and/or state controls implemented prior to the base year or analysis year, growth in activity from the base year or the projection base year to the attainment year, and specified FCAA and/or state controls used to meet the RFP target emissions levels.

### **2.1.3 Updated Uncontrolled and Controlled 2020 Attainment Year Inventory for Stationary Sources**

For stationary sources, the uncontrolled attainment year emissions inventories represent the estimated attainment year emissions if no further action to control emissions growth were taken beyond the controls already accounted for in the EI. More recent stationary source data than the 2011 base year data is available; this newer data reflects growth that has occurred since the base year. This newer data also reflects more recent operations and applied controls since the 2011 base year. Therefore, the most recent annual EI was selected as the year from which to forecast emissions and is referred to as the *projection base year*.

Stationary source emissions inventories are calculated for each source category using methods as detailed in the appropriate sections below. The inventories are then combined to derive the total attainment year EI for NO<sub>x</sub> and VOC. This attainment year EI reflects specified FCAA and/or state controls implemented by the end of the projection base year. The attainment year EI also reflects growth in activity from the projection base year to the attainment year. The uncontrolled 2011 EI for stationary sources includes all controls and associated reductions implemented by the end of the 2011 base year.

No stationary source controls beyond the controls previously described in this section are quantified for this DFW and HGB RFP SIP revision; therefore, for the attainment year, the uncontrolled stationary source EI is equivalent to the controlled stationary source EI.

### **2.1.4 Updated Adjusted Base Year Inventories**

The on-road ABY emissions inventories are not required for this DFW and HGB RFP SIP revision. See Section 2.1: *Introduction* for additional information.

## **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. This rule, referred to as the TCEQ EI reporting rule, establishes point source EI reporting thresholds in ozone nonattainment areas that are currently at or less than major source thresholds in the DFW and HGB ozone nonattainment areas. Therefore, some minor sources in the DFW and HGB ozone nonattainment areas report to the point source EI.

To collect the data, the TCEQ sends notices to all sites identified as potentially meeting the reporting requirements. Companies are required to report emissions data and to provide sample calculations used to determine the emissions. Information characterizing the process equipment, the abatement units, and the emission points is also required. Per FCAA §182(a)(3)(B), company representatives certify that reported emissions are true, accurate, and fully represent emissions that occurred during the calendar year to the best of the representative's knowledge.

All data submitted in the EI are reviewed for quality-assurance purposes and then stored in the State of Texas Air Reporting System (STARS) database. Emissions Inventory guidance documents and historical point source emissions of criteria pollutants are available on the [TCEQ's Point Source Emissions Inventory](https://www.tceq.texas.gov/airquality/point-source-ei/psei.html) webpage (<https://www.tceq.texas.gov/airquality/point-source-ei/psei.html>). Additional information is available upon request from the TCEQ's Air Quality Division.

### **2.2.2 Updated 2011 Base Year Inventory**

The TCEQ extracted the 2011 point source inventory data from STARS on March 1, 2019. The extracted data include reported annual and ozone season daily emissions of NO<sub>x</sub> and VOC for each site in the DFW or HGB area that submitted a 2011 EI and reflect revisions made on or before the extract date.

### **2.2.3 Updated 2020 Attainment Year Inventories**

Updated attainment year inventories were developed according to the general requirements described in Section 2.2.1: *Emissions Inventory Development*. The TCEQ designated the 2016 EI as the starting point for EI projections. The year 2016 was chosen as the projection base year for point sources because it was more representative of typical point source operations than 2017, when Hurricane Harvey occurred. The TCEQ extracted the 2016 point source EI data from STARS on March 1, 2019. The extracted data include reported annual and ozone season daily emissions of NO<sub>x</sub> and VOC for each site in the DFW or HGB area that submitted a 2016 EI and reflect revisions made on or before the extract date.

#### **2.2.3.1 DFW 2020 Attainment Year Inventory**

The TCEQ reviewed major and minor sources separately. For major sources, the TCEQ reviewed cement kilns separately from other major sources. Cement kiln NO<sub>x</sub> emissions were projected by adding either 30 TAC Chapter 117 limits or site- or source-specific directly enforceable limits, as appropriate. Other major source emissions were projected by adding emissions growth allowed under the nonattainment New Source Review (NSR) major modification thresholds. Minor source

emissions were projected using growth factors. Unused emissions reductions credits were then added to the projections. For further details, please reference Appendix 3: *Development of Reasonable Further Progress Point Source Emissions Inventories for the DFW and HGB Nonattainment Areas*.

A summary of the point source RFP inventories is presented in:

- Table 2-5: *Nine-County DFW RFP Summary of the 2011 Base Year Average Summer Weekday NO<sub>x</sub> and VOC Emissions (tons per day)*;
- Table 2-6: *One-County DFW RFP Summary of the 2011 Base Year Average Summer Weekday NO<sub>x</sub> and VOC Emissions (tons per day)*;
- Table 2-7: *10-County DFW RFP Summary of the 2011 Base Year Average Summer Weekday NO<sub>x</sub> and VOC Emissions (tons per day)*; and
- Table 2-9: *10-County DFW RFP Summary of the 2020 Attainment Year Average Summer Weekday NO<sub>x</sub> and VOC Emissions (tons per day)*.

#### 2.2.3.2 HGB 2020 Attainment Year Inventory

For both major and minor sources, NO<sub>x</sub> emissions from sites with equipment applicable to the Mass Emissions Cap and Trade (MECT) Program were projected using the MECT cap. Major source VOC emissions were projected by adding emissions growth allowed under the nonattainment NSR major modification thresholds. NO<sub>x</sub> emissions from sites not listed in the MECT Program and VOC emissions from sources not identified as major for VOC were assumed to be minor source emissions and were projected using growth factors. Unused emissions reductions credits were then added to the projections. For further details, please reference Appendix 3.

A summary of the point source RFP inventories is presented in:

- Table 2-8: *HGB RFP Summary of the 2011 Base Year Average Summer Weekday NO<sub>x</sub> and VOC Emissions (tons per day)*; and
- Table 2-10: *HGB RFP Summary of the 2020 Attainment Year Average Summer Weekday NO<sub>x</sub> and VOC Emissions (tons per day)*.

## **2.3 AREA SOURCES**

### **2.3.1 Emissions Inventory Development**

Stationary emissions sources that do not meet the reporting requirements for point sources are classified as area sources. Area sources are small-scale stationary industrial, commercial, and residential sources that use materials or perform processes that generate emissions. Examples of typical VOC 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 typical fuel combustion sources that emit NO<sub>x</sub> include: oil and gas production sources, stationary source fossil fuel combustion at residences and businesses, outdoor refuse burning, and structure fires.

Area source emissions are calculated as county-wide totals rather than as individual sources. Area source emissions are typically calculated by multiplying an established emissions 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 source calculations. Other activity data commonly used include the amount of gasoline sold in an area, employment by industry type, and crude oil and natural gas production.

### **2.3.2 Updated 2011 Base Year Inventory**

The 2011 area source inventory was developed in accordance with the requirements of the Air Emissions Reporting Requirements (AERR) rule. The 2011 inventory was developed using EPA-generated emissions inventories; TCEQ-contracted projects to develop emission inventories; TCEQ staff projects to develop emission inventories; and projecting historical emissions inventories by applying growth factors derived from Eastern Research Group (ERG) study data, the [Economy and Consumer Credit Analytics](http://www.economy.com/default.asp) website (<http://www.economy.com/default.asp>), and the United States Energy Information Administration's (EIA) *Annual Energy Outlook* publication. The documentation for the development of the ERG study projection factors can be found in Appendix 4: *Growth Factors for Point and Area Sources*.

The EPA developed emissions inventories for states to use for many area source categories as part of the National Emissions Inventory (NEI). The states access these individual inventories through the [EPA's NEI](ftp://ftp.epa.gov/EmisInventory/2011nei/doc/) website (<ftp://ftp.epa.gov/EmisInventory/2011nei/doc/>). These source categories include but are not limited to: industrial coatings; degreasing; residential, commercial/institutional, and industrial fuel use; commercial cooking; aviation fuel use; and consumer products. For some source categories, the TCEQ developed state-specific emissions estimates by acquiring current state-specific activity data and applying appropriate emissions factors. These source categories include but are not limited to: gasoline storage tanks; structure fires; dry cleaners; and automobile fires.

Additionally, the TCEQ committed significant resources to improve the oil and gas area source inventory categories for the 2011 base year inventory. The improvements included the development and refinement of a state-specific oil and gas area source emissions calculator. This oil and gas area source emissions calculator uses county-level production and local equipment activity data with local emissions requirements to estimate emissions from individual production categories, including compressor engines, condensate and oil storage tanks, loading operations, heaters, and dehydrators. The documentation for the development of the oil and gas emissions calculator can be found in Appendix 5: *Characterization of Oil and Gas Production Equipment and Develop a Methodology to Estimate Statewide Emissions and Specified Oil and Gas Well Activities Emissions Inventory Update*. A significant improvement made to the oil and gas calculator for the 2011 base year inventory was the development of refined emission factors for VOC emissions from condensate storage tanks. The documentation for the refined emission factors can be found in Appendix 6: *Condensate Tank Oil and Gas Activities*. Additionally, a recently completed study developed refined emissions factors for oil and gas well mud degassing as well as hydraulic pump engines. The documentation for these refined emission factors can be found in Appendix 7: *Specified Oil and Gas Well Activities Emissions Inventory Update*.

For those area source categories affected by TCEQ rules, rule effectiveness factors are applied to the baseline emissions to estimate controlled emissions. These factors address the efficiency of the controls and the percentage of the category's population affected by the rule. Quality assurance of area source emissions involves ensuring that

the activity data used for each category is current and valid. Data such as current population figures, fuel usage, and material usage were updated, and the EPA guidance on emissions factors was used. Other routine efforts such as checking calculations for errors and conducting reasonableness and completeness checks were implemented.

### **2.3.3 Updated Attainment Year Inventories**

Updated attainment year inventories were developed according to the general requirements described in Section 2.3.1: *Emissions Inventory Development*. The TCEQ designated the 2017 EI as the starting point for EI projections of area source categories for the attainment year because it is the most recently available periodic inventory year.

The 2017 area source inventory was developed in accordance with the requirements of the AERR rule. The 2017 inventory was developed using EPA-generated emissions inventories, TCEQ-contracted projects to develop emission inventories, and TCEQ staff projects to develop emission inventories.

The area source oil and gas inventory production categories have been updated using 2017 production data from the Railroad Commission of Texas (RRC).

The updated 2020 attainment year inventory for the area source categories were developed using projection factors derived from Appendix 4. The study in this appendix contains individual projection factors for each source category and for each forecasting year. This projection method is the EPA standard and accepted methodology for developing future year emissions inventories.

The 2020 area source EI was developed by applying the selected emissions projection factor to the 2017 emissions for each area source category. Rules controlling emissions from industrial coatings, portable fuel containers, 30 TAC Chapter 117 Subchapter D controls on minor sources in ozone nonattainment areas, and gasoline station underground tank filling (Stage I) and vehicle refueling (Stage II) were applied in the base year inventory. Federal New Source Performance Standards Subpart OOOO emissions reductions were applied to the 2017 projection base year inventory but not the 2011 base year inventory due to applicable compliance deadlines. No additional controls were incorporated into the attainment year inventories; see Chapter 4 for additional details.

A summary of the area source RFP inventories is presented in Tables 2-5 through 2-10.

## **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. Non-road emissions sources include: agricultural equipment, commercial and industrial equipment, construction and mining equipment, lawn and garden equipment, aircraft and airport equipment, locomotives, drilling rigs, and commercial marine vessels (CMV). For this DFW and HGB RFP SIP revision, emissions inventories for non-road sources were developed for the following subcategories: NONROAD model categories, airports, locomotives, CMVs, and drilling rigs used in upstream oil and gas exploration activities. The airport subcategory includes estimates for emissions from the aircraft, auxiliary power units (APU), and ground support equipment (GSE) subcategories added together and

presented as a total. The sections below describe the emissions estimates methodologies used for the non-road mobile source subcategories.

#### **2.4.1 NONROAD Model Categories Emissions Estimation Methodology**

A Texas-specific version of the EPA's 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 airports, locomotives, commercial marine vessels, and drilling rigs used in upstream oil and gas exploration activities. Because emissions for airports, commercial marine vessels, and locomotives are not included in either the NONROAD model or the TexN model, the emissions for these categories are estimated using other EPA-approved methods and guidance as described in the sections below. Although emissions for drilling rigs are included in the NONROAD model, alternate emissions estimates were developed for that source category to develop more accurate county-level inventories as described in Section 2.4.2: *Drilling Rig Diesel Engines Emissions Estimation Methodology*. The equipment populations for drilling rigs were set to zero in the TexN model to avoid double counting emissions from these sources.

The TexN model is a software tool for estimating emissions for non-road mobile source categories that are included in the EPA NONROAD model, with the exception of drilling rigs, as discussed above. The model allows air quality planners to replace the EPA's default emissions data used in the NONROAD model with more specific local activity data, a practice encouraged by the EPA. Local, county-level input 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 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. Using these county-level input data produces a more accurate representation of non-road emissions for the DFW and HGB nonattainment areas. The NONROAD model category emissions included in this DFW and HGB RFP SIP revision were developed using version 1.7.2 of the TexN emissions model.

#### **2.4.2 Drilling Rig Diesel Engines Emissions Estimation Methodology**

Drilling rig diesel engines used in upstream oil and gas exploration activities are included in the EPA NONROAD model. However, due to significant growth in the oil and gas exploration and production industry, a 2015 survey of oil and gas exploration and production companies was used to develop updated drilling rig emissions characterization profiles. The uncontrolled and controlled drilling rig emissions characterization profiles from this study were combined with county-level drilling activity data obtained from the RRC to develop the drilling rigs EI. The documentation of procedures used in developing the drilling rigs EI can be found in Appendix 8: *2014 Statewide Drilling Rig Emissions Inventory with Updated Trends Inventories*.

#### **2.4.3 Commercial Marine Vessel and Locomotive Emissions Estimation Methodology**

The CMV EI was developed from a TCEQ-commissioned study using EPA-accepted EI development methods. The CMV EI includes at-port and underway emissions activity data from Category I, II, and III CMVs by county for applicable counties in the HGB

nonattainment area. Documentation of the methods and procedures used to develop the CMV EI can be found in Appendix 9: *2014 Texas Statewide Commercial Marine Vessel Emissions Inventory and 2008 through 2040 Trend Inventories*.

The locomotive EI was developed from a TCEQ-commissioned study using EPA-accepted EI development methods. The locomotive EI includes line haul and rail yard emissions activity data from all Class I, II, and III locomotive activity and emissions by rail segment. Documentation of methods and procedures used to develop the locomotive EI can be found in Appendix 10: *2014 Texas Statewide Locomotive Emissions Inventory and 2008 through 2040 Trend Inventories*.

#### **2.4.4 Airport Emissions Estimation Methodology**

The airport EI was developed from a TCEQ-commissioned study using the Federal Aviation Administration's (FAA) Aviation Environmental Design Tool (AEDT). AEDT is the most recent FAA model for estimating airport emissions and has replaced the FAA's Emissions and Dispersion Modeling System.

The airport emissions categories used for this DFW and HGB RFP SIP revision included aircraft (commercial air carriers, air taxis, general aviation, and military), APU, and GSE operations. Documentation of methodology and procedures used to develop the DFW and HGB airport emissions inventories can be found in Appendix 11: *Development of the Statewide Aircraft Inventory for 2011* and Appendix 12: *Development of the Statewide Aircraft Inventory for 2020*.

#### **2.4.5 Updated 2011 Base Year Inventory**

For certain non-road mobile source categories detailed below, the updated 2011 base year EI was developed from the 2014 periodic EI to provide consistency between emissions estimation approaches used for this DFW and HGB RFP SIP revision. Exceptions and specific details about non-road source category inventory development are included in the relevant section below.

##### 2.4.5.1 Updated 2011 Base Year NONROAD Model Category Inventory

The 2011 base year inventory used for all non-road mobile model-specific source categories was developed using the latest version of the TexN model with updated county-specific input data. More detailed information on the TexN emissions model, guidance document, and updates to the model can be found in the [TexN directory](ftp://amdaftp.tceq.texas.gov/pub/EI/nonroad/TexN/) (ftp://amdaftp.tceq.texas.gov/pub/EI/nonroad/TexN/) on the TCEQ's Air Modeling and Data Analysis file transfer protocol (FTP) site.

##### 2.4.5.2 Updated 2011 Base Year Drilling Rig Diesel Engines Inventory

The 2011 base year EI for drilling rig diesel engines used in upstream oil and gas exploration activities was developed using the results of a 2015 statewide EI improvement study combined with 2011 drilling activity data from the RRC. The documentation of procedures used in developing the 2011 drilling rigs EI can be found in Appendix 8.

##### 2.4.5.3 Updated 2011 Base Year Commercial Marine Vessel and Locomotive Inventory

The 2011 base year CMV inventory was developed from a TCEQ-commissioned study using EPA-accepted EI development methods. The CMV EI includes Category I, II, and III

CMV activity and emissions for all coastal counties within Texas. The CMV EI was developed using Automatic Identification System activity data for CMVs from PortVision, which provided vessel location, speed, and other identifying information. In addition to activity data, vessel-specific data from the Information Handling Services Vessel Database were used to determine which subsets of emissions factors were applicable for each vessel. Documentation of the methods and procedures used to develop the CMV EIs can be found in Appendix 9.

The 2011 base year Texas locomotive inventory was developed from a TCEQ-commissioned study using EPA-accepted EI development methods. The locomotive inventory was developed by ERG under contract with the TCEQ and includes Class I, II, and III locomotive activity and emissions by rail segment for all counties within Texas. The locomotive line haul and rail yard activity data were reported by companies operating in Texas to create a county-level Class I line haul inventory. Activity and emissions profiles were used for Class II and Class III railroads; these data were developed by the Eastern Regional Technical Advisory Committee in collaboration with the Federal Railroad Administration, the American Short Line and Regional Railroad Association (ASLRRA), and members of the Class II and III railroad communities. The annual gallons of fuel used by railroads were estimated from data compiled by ASLRRA from the Class II and III railroads, including total industry fuel use in 2008 for locomotives and total Class II/III route miles. Based on the EIA's *Annual Energy Outlook*, 2008 fuel usage values were projected to estimate 2011 emissions. Documentation of methods and procedures used to develop the locomotive emissions inventories can be found in Appendix 10.

#### 2.4.5.4 Updated 2011 Base Year Airport Inventory

The 2011 base year airport emissions inventories were developed by ERG under contract with the TCEQ using the FAA's AEDT along with applicable 2011 aircraft activity, fleet mix, and other AEDT model input parameters for airports within the DFW and HGB areas. Documentation of methodology and procedures used to develop the DFW and HGB airport emissions inventories can be found in Appendix 11.

#### **2.4.6 Updated Uncontrolled Analysis Year Inventories**

The NONROAD model category uncontrolled emissions for each analysis year (2011 base year, 2020 attainment year, and 2021 contingency year) were calculated by removing all federal and state controls from the model runs.

The TCEQ calculated updated, uncontrolled emissions from airports based on the information and growth factors from the ERG reports found in Appendix 11 and Appendix 12.

The updated uncontrolled analysis year emissions for the locomotive sources were developed by applying activity adjustment factors by source classification code (SCC) per the ERG report in Appendix 10. The activity adjustment factors used were based on the EIA's [Transportation Sector Key Indicators and Delivered Energy Consumption data](http://www.eia.gov/forecasts/aeo/tables_ref.cfm) ([http://www.eia.gov/forecasts/aeo/tables\\_ref.cfm](http://www.eia.gov/forecasts/aeo/tables_ref.cfm)).

Uncontrolled emissions for CMVs were based on emission factors developed by ERG with guidance from the EPA that excluded adjustments for fleet turnover and the

implementation of state and federal regulatory programs; see Appendix 9 for more information.

The uncontrolled 2011 EI for drilling rigs was developed using 2011 drilling activity data and the 2011 year-specific uncontrolled factors from the ERG report found in Appendix 8. A 2020 EI for drilling rigs was developed using 2017 drilling activity data and the 2020 year-specific uncontrolled factors from the ERG report found in Appendix 8. Because future drilling activity is difficult to predict, the 2017 drilling activity data were held constant to the 2020 attainment year, since 2017 data were the most current available.

#### **2.4.7 Updated Controlled Analysis Year Inventories**

For the NONROAD model category sources, the TCEQ developed county-level controlled inventories for the 2020 attainment and 2021 contingency year using the latest version of the TexN model. The model runs were performed accounting for all state and federal control measures.

The updated controlled attainment year emissions for airports were calculated based on the information from the ERG report found in Appendix 12. Control strategies for airport emissions included emission reductions from the GSE and APU electric conversions.

Controlled emissions for locomotive sources were determined by applying activity adjustment factors by SCC, and emission rate adjustment factors. The emission rate adjustment factors were obtained from the EPA's [Emission Factors for Locomotives Fact Sheet](https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100500B.TXT) (<https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100500B.TXT>). The activity adjustment factors used were based on the EIA's [Transportation Sector Key Indicators and Delivered Energy Consumption](http://www.eia.gov/forecasts/aeo/tables_ref.cfm) data ([http://www.eia.gov/forecasts/aeo/tables\\_ref.cfm](http://www.eia.gov/forecasts/aeo/tables_ref.cfm)).

Controlled emissions for CMVs were based on emissions factors developed by ERG with guidance from the EPA, which took into account fleet turnover and the implementation of state and federal regulatory programs; see Appendix 9 for more information.

Controlled 2020 emissions for diesel drilling rigs were based on 2017 drilling activity data combined with the 2020 year-specific controlled emission factors from the ERG report found in Appendix 8.

A summary of the non-road mobile source RFP inventories is presented in Tables 2-5 through 2-10.

## **2.5 ON-ROAD MOBILE SOURCES**

The 2011, 2020, and 2021 on-road mobile source emissions inventories for this DFW and HGB RFP SIP revision were developed under contract by the North Central Texas Council of Governments (NCTCOG) and the Texas A&M Transportation Institute (TTI) for the DFW and HGB nonattainment areas, respectively. The data, methods, activity inputs, emissions factors, and results are documented in the NCTCOG and TTI reports provided in Appendix 13: *Dallas-Fort Worth MOVES2014a-Based Reasonable Further Progress On-road Inventories and Control Strategy Reductions for 2011, 2017, 2018,*

2020, and 2021 and Appendix 14: *Production of HGB Reasonable Further Progress On-Road Mobile Emissions Inventories*. The inventories include the 10 DFW and eight HGB area counties designated as nonattainment for the 2008 eight-hour ozone NAAQS. As required by the RFP implementation rules, the on-road inventories are based on vehicle miles traveled (VMT) estimates and emission rates for an average summer work weekday. The latest major revision of the EPA's mobile source emission model, the Motor Vehicle Emission Simulator (MOVES) model, MOVES2014a, was used to estimate the summer weekday emission rates in units of grams per mile for NO<sub>x</sub> and VOC.<sup>6</sup> The roadway link-level VMT estimates were obtained from travel demand modeling for the 10-county DFW and eight-county HGB nonattainment areas for each analysis year.

### **2.5.1 On-Road 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 ozone precursor emissions are usually categorized as 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 DFW and HGB RFP SIP revision were developed using the EPA's mobile emissions factor model, MOVES2014a. The MOVES2014a model may be run using national default information or the default information may be modified to simulate data specific to an area, such as the control programs, driving behavior, meteorological conditions, and vehicle characteristics. Because modifications to the national default values influence the emission factors calculated by the MOVES2014a model, to the extent that local values are available, parameters that are used reflect local conditions. The localized inputs used for the on-road mobile EI development include vehicle speeds for each roadway link, vehicle populations, vehicle hours idling, 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 Reid vapor pressure controls.

To estimate on-road mobile source emissions, emission factors calculated by the MOVES2014a model must be multiplied by the level of vehicle activity. On-road mobile source emissions factors are expressed in units of grams per mile, grams per vehicle (evaporative), and grams per hour (extended idle); therefore, the activity data required to complete the inventory calculation are VMT in units of miles per day, vehicle populations, truck hoteling activity, and source hours idling. The level of vehicle travel activity is developed using travel demand models (TDM) run by the Texas Department of Transportation or by the local metropolitan planning organizations. 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 Highway Performance

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<sup>6</sup> For on-road EI development, MOVES2014a is technically the most recent on-road release. The more recent MOVES2014b update only impacts non-road model components and does not change the on-road portion of the model.

Monitoring System, a model built from a different set of traffic counters. Vehicle populations by source type are derived from the Texas Department of Motor Vehicles' registration database and, as needed, national estimates for vehicle source type population.

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 EI. Roadway speeds, required inputs for the MOVES2014a 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<sub>x</sub> and VOC emissions estimates for the DFW area are presented in Table 2-1: *DFW RFP Ozone Season Weekday On-Road Mobile Source VMT (miles per day)*.

A summary of the on-road mobile source VMT used to develop the various NO<sub>x</sub> and VOC emissions estimates for the HGB area are presented in Table 2-2: *HGB RFP Ozone Season Weekday On-Road Mobile Source VMT (miles per day)*.

The controlled and uncontrolled on-road mobile source emissions inventories are summarized in Table 2-3: *2020 DFW RFP Ozone Season Weekday On-Road Mobile Source NO<sub>x</sub> and VOC Emissions and Control Strategy Reductions* for the DFW area and in Table 2-4: *2020 HGB RFP Ozone Season Weekday On-Road Mobile Source NO<sub>x</sub> and VOC Emissions and Control Strategy Reductions* for the HGB area.

For complete documentation of the development of the on-road mobile source emissions inventories for the DFW RFP demonstration, refer to Appendix 13, for the HGB demonstration, refer to Appendix 14. The complete set of input and output files are available upon request from the TCEQ's Air Quality Division.

**Table 2-1: DFW RFP Ozone Season Weekday On-Road Mobile Source VMT<sup>1</sup> (miles per day)**

RFP Analysis Year	VMT
2011 Base Year	191,251,636
2020 Attainment Year	231,949,231

Note 1: For this RFP SIP revision, the same VMT is used for the uncontrolled and controlled scenarios.

**Table 2-2: HGB RFP Ozone Season Weekday On-Road Mobile Source VMT<sup>1</sup> (miles per day)**

RFP Analysis Year	VMT
2011 Base Year	145,136,623
2020 Attainment Year	193,683,005

Note 1: For this RFP SIP revision, the same VMT is used for the uncontrolled and controlled scenarios.

### 2.5.2 On-Road Mobile Updated 2011 Base Year Inventory

The 2011 base year EI for on-road mobile sources was updated using emission factors calculated using the MOVES2014a model. Additional updates were made to incorporate the latest activity estimates from the DFW and HGB TDM 2011 networks. Only control strategies implemented prior to 2011 were included in the input to the EI development for the 2011 on-road mobile source base year emissions inventories. Those controls



include: the pre-1990 FMVCP, the 1990 to 2011 FMVCP, reformulated gasoline (RFG), the East Texas Regional Low RVP Gasoline Program, federal ultra-low sulfur diesel, the vehicle I/M program, and on-road Texas Low Emission Diesel (TxLED), where applicable. The activity levels used to calculate the EI reflect the 2011 roadway networks with 2011 VMT and speeds. A summary of the EI is presented in Table 2-3 for the DFW area and Table 2-4 for the HGB area. For complete documentation of the development of the EI and details on MOVES2014a model inputs, refer to Appendix 13 for the DFW area and Appendix 14 for the HGB area.

### **2.5.3 On-Road Mobile Updated 2011 Adjusted Base Year Inventories for the Base and Attainment Years**

The on-road adjusted base year emissions inventories are not required for this DFW and HGB RFP SIP revision. See Section 2.1 for additional information.

### **2.5.4 On-Road Mobile Updated Uncontrolled Attainment Year Inventories**

The uncontrolled on-road mobile emissions inventories for each RFP attainment year were developed using emission factors that reflect only control strategies implemented prior to 1990. Those controls include pre-1990 FMVCP and the 1992 RVP control. MOVES2014a was used to develop the emissions inventories for this DFW and HGB RFP SIP revision. The activity levels were updated to include the latest output from the DFW and HGB TDMs. The activity levels used to calculate the EI reflect the attainment roadway network, with attainment year VMT and speeds. A summary of the emissions inventories is presented in Tables 2-3 and 2-4. For complete documentation of the development of the EI and details on MOVES2014a model inputs, refer to Appendix 13 for the DFW area and Appendix 14 for the HGB area.

### **2.5.5 On-Road Mobile Updated Controlled Attainment Year Inventories**

The controlled on-road mobile emissions inventories for the attainment year were developed using emission factors that include: the effects of pre-1990 control strategies, the effects of all control strategies between 1990 and 2011, and the effects of all control strategies from 1990 through the attainment year. The effects of the post-1990 control strategies between 2011 and the attainment year are creditable reductions used to demonstrate compliance with RFP requirements. The pre- and post-1990 controls include pre-1990 FMVCP, post-1990 FMVCP, RFG, the East Texas Regional Low RVP Gasoline Program, federal ultra-low sulfur diesel, the vehicle I/M program, and TxLED, where applicable. All control strategies used to demonstrate RFP for DFW and HGB are documented in Chapter 4. The on-road control strategies are documented in Section 4.5: *On-Road Mobile Source Controls*.

The activity levels used to calculate the attainment year emissions inventories reflect the 2020 roadway network, with 2020 VMT and speeds. A summary of the uncontrolled on-road mobile EI, the on-road mobile control reductions, and the resulting controlled on-road mobile EI for the attainment year are summarized in Table 2-3 for the HGB area. For complete documentation of the development of the DFW and HGB emissions inventories and details on MOVES2014a model inputs, refer to Appendix 13 and Appendix 14, respectively.

**Table 2-3: 2020 DFW RFP Ozone Season Weekday On-Road Mobile Source NO<sub>x</sub> and VOC Emissions and Control Strategy Reductions**

Emissions Inventory and Control Strategy Description	NO <sub>x</sub> (tons per day)	VOC (tons per day)
2020 Uncontrolled Inventory	957.90	370.27
Post-1990 FMVCP	796.66	290.23
On-road RFG/East Texas Regional Low RVP/Low Sulfur/federal ultra-low sulfur diesel	54.23	15.17
Inspection and Maintenance Program	6.87	8.14
On-road TxLED	2.65	0.00
2020 Controlled Inventory	97.49	56.73

**Table 2-4: 2020 HGB RFP Ozone Season Weekday On-Road Mobile Source NO<sub>x</sub> and VOC Emissions and Control Strategy Reductions**

Emissions Inventory and Control Strategy Description	NO <sub>x</sub> (tons per day)	VOC (tons per day)
2020 Uncontrolled Inventory	750.39	322.18
Post-1990 FMVCP	561.84	245.62
On-road RFG with Tier 3 sulfur, and federal ultra-low sulfur diesel	101.55	16.96
Inspection and Maintenance Program	5.13	7.39
On-road TxLED	2.39	0.00
2020 Controlled Inventory	79.48	52.21

Quantification of specific control reductions is documented in Chapter 4. Motor vehicle emissions budget (MVEB) calculations for the attainment year are documented in Chapter 5: *Motor Vehicle Emissions Budgets*.

## 2.6 BIOGENIC SOURCES

Biogenic sources include VOC emissions from crops, lawn grass, and trees as well as small amounts of NO<sub>x</sub> from soils and other sources. Previously, under the Consolidated Emissions Reporting Rule (June 2002) and earlier emissions reporting rules, biogenic sources were required to be reported along with point, nonpoint, on-road mobile, and non-road mobile sources. Beginning with the AERR rule (December 2008), the emissions required to be reported to the EPA no longer include emissions from biogenic sources. Therefore, as of the 2011 reporting year, the TCEQ's comprehensive triennial EI no longer includes emissions from biogenic sources. Biogenic inventories may still be developed for air quality modeling purposes, as necessary.

The RFP demonstrations are based upon the emissions from anthropogenic sources only. The guidance for RFP calculations shows the first step is to subtract the emissions from biogenic sources from the total base year emissions to obtain the total anthropogenic emission inventory. As of 2011, under the AERR rule, the base year emissions do not include biogenic sources and already represent the total anthropogenic emissions. In this case, step one of the RFP process is not needed, and the inclusion of emissions from biogenic sources is unnecessary. Therefore, this DFW and HGB RFP SIP revision does not include quantification of emissions from biogenic sources.

## 2.7 EMISSIONS SUMMARY

Uncontrolled and controlled base year NO<sub>x</sub> and VOC emissions for each RFP source category are summarized in Tables 2-5, 2-6, 2-7, and 2-8.<sup>7</sup>

For the 2020 attainment year, the uncontrolled and controlled NO<sub>x</sub> and VOC emissions for each RFP source category and analysis year are summarized in Tables 2-9 and 2-10.

Between 1990 and 2011, substantial emissions reductions have occurred in all EI source categories (stationary sources as well as mobile sources) due to regulations implemented at the federal, state, and local levels and innovative programs implemented by the TCEQ. As noted in Section 2.1, the uncontrolled 2011 EI for stationary sources includes all controls and associated reductions implemented by the end of the 2011 base year. No additional stationary source controls are quantified for this DFW and HGB RFP SIP revision; therefore, the 2011 controlled stationary source EI is equivalent to the 2011 uncontrolled stationary source EI.

Similarly, the 2020 attainment year inventory reflects: 1) all controls and associated reductions implemented by the end of the projection base EI year and 2) growth from the projection base EI. Where there is no difference between the uncontrolled and controlled emissions for the base year or the attainment year, there were no controls quantified for the projected source inventories.

**Table 2-5: Nine-County<sup>1</sup> DFW RFP Summary of the 2011 Base Year Average Summer Weekday NO<sub>x</sub> and VOC Emissions (tons per day)**

Emissions Inventory Source	Uncontrolled NO <sub>x</sub>	Controlled NO <sub>x</sub>	Uncontrolled VOC	Controlled VOC
Non-Road Mobile Sources	231.95	86.08	141.05	40.28
On-Road Mobile Sources	749.37	231.83	296.35	100.19
Area Sources	37.69	37.69	262.35	262.35
Point Sources	31.34	31.34	27.54	27.54
Total of All Sources	1,050.35	386.94	727.29	430.36

Note 1: The nine-county DFW Area includes the nine DFW counties previously designated nonattainment under the one-hour and/or the 1997 eight-hour ozone NAAQS: Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant Counties.

**Table 2-6: One-County<sup>1</sup> DFW RFP Summary of the 2011 Base Year Average Summer Weekday NO<sub>x</sub> and VOC Emissions (tons per day)**

Emissions Inventory Source	Uncontrolled NO <sub>x</sub>	Controlled NO <sub>x</sub>	Uncontrolled VOC	Controlled VOC
Non-Road Mobile Sources	13.74	5.96	4.35	1.21
On-Road Mobile Sources	18.39	7.24	4.80	2.05
Area Sources	13.29	13.29	28.95	28.95
Point Sources	8.61	8.61	2.35	2.35
Total of All Sources	54.03	35.10	40.45	34.56

<sup>7</sup> Wise County is the only county in the DFW 10-county area designated as nonattainment under the 2008 eight-hour ozone NAAQS but not previously designated as nonattainment under a prior ozone NAAQS (i.e., one-hour or 1997). The timing of Wise County's designation impacts certain RFP requirements and therefore Wise County is grouped separately, when appropriate.

Note 1: The one-county DFW Area includes the one DFW county newly designated nonattainment under the 2008 eight-hour ozone NAAQS: Wise County.

**Table 2-7: 10-County<sup>1</sup> DFW RFP Summary of the 2011 Base Year Average Summer Weekday NO<sub>x</sub> and VOC Emissions (tons per day)**

Emissions Inventory Source	Uncontrolled NO <sub>x</sub>	Controlled NO <sub>x</sub>	Uncontrolled VOC	Controlled VOC
Non-Road Mobile Sources	245.69	92.04	145.40	41.49
On-Road Mobile Sources	767.76	239.07	301.15	102.24
Area Sources	50.98	50.98	291.30	291.30
Point Sources	39.95	39.95	29.89	29.89
Total of All Sources	1,104.38	422.04	767.74	464.92

Note 1: The 10-county DFW Area includes all 10 counties designated nonattainment under the 2008 NAAQS: Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise Counties.

**Table 2-8: HGB RFP Summary of the 2011 Base Year Average Summer Weekday NO<sub>x</sub> and VOC Emissions (tons per day)**

Emissions Inventory Source	Uncontrolled NO <sub>x</sub>	Controlled NO <sub>x</sub>	Uncontrolled VOC	Controlled VOC
Non-Road Mobile Sources	242.73	144.84	116.94	50.11
On-Road Mobile Sources	536.68	168.60	239.63	80.45
Area Sources	21.15	21.15	308.53	308.53
Point Sources	108.33	108.33	95.97	95.97
Total of All Sources	908.89	442.92	761.07	535.06

**Table 2-9: 10-County DFW RFP Summary of the 2020 Attainment Year Average Summer Weekday NO<sub>x</sub> and VOC Emissions (tons per day)**

Emissions Inventory Source	Uncontrolled NO <sub>x</sub>	Controlled NO <sub>x</sub>	Uncontrolled VOC	Controlled VOC
Non-Road Mobile Sources	264.51	70.03	162.12	36.58
On-Road Mobile Sources	957.90	97.49	370.27	56.73
Area Sources	38.69	38.69	299.22	299.22
Point Sources	46.83	46.83	24.35	24.35
Total of All Sources	1307.93	253.04	855.96	416.88

**Table 2-10: HGB RFP Summary of the 2020 Attainment Year Average Summer Weekday NO<sub>x</sub> and VOC Emissions (tons per day)**

Emissions Inventory Source	Uncontrolled NO <sub>x</sub>	Controlled NO <sub>x</sub>	Uncontrolled VOC	Controlled VOC
Non-Road Mobile Sources	254.17	77.44	136.26	31.49
On-Road Mobile Sources	750.39	79.48	322.18	52.21
Area Sources	30.04	30.04	310.98	310.98
Point Sources	131.06	131.06	85.23	85.23
Total of All Sources	1165.66	318.02	854.65	479.91

## CHAPTER 3: PROGRESS TOWARD MEETING TARGET EMISSIONS LEVELS

### 3.1 INTRODUCTION

#### 3.1.1 General RFP Requirements

This chapter describes how the Dallas-Fort Worth (DFW) and the Houston-Galveston-Brazoria (HGB) reasonable further progress (RFP) demonstrations are calculated, documents the RFP calculations, and provides a summary of the DFW and HGB RFP demonstrations for all RFP analysis years. Based upon the United States Environmental Protection Agency's (EPA) *Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule* (2008 eight-hour ozone standard state implementation plan (SIP) requirements rule), published in the *Federal Register* (FR) on March 6, 2015 (80 FR 12264), the attainment date for serious nonattainment areas is July 20, 2021, with an attainment year of 2020.

For this DFW and HGB RFP SIP revision, a base year of 2011 was used to harmonize the RFP base year with the triennial reporting requirement of the Air Emissions Reporting Requirements (AERR) rule and for consistency with previous DFW and HGB 2008 eight-hour ozone National Ambient Air Quality Standards (NAAQS) SIP revisions. The required emissions reductions for RFP, as detailed below, are calculated as a percentage of the base year (2011) emissions inventory (EI) and must occur no later than the required timeframe.

The RFP requirements for this DFW and HGB RFP SIP revision are to demonstrate:

- a 9% emissions reduction for the three-year period from January 1, 2018 through December 31, 2020 for the 10-county DFW nonattainment area;
- a 3% emissions reduction for the one-year period between January 1, 2021 through December 31, 2021 as attainment year RFP contingency for the 10-county DFW nonattainment area;
- a 9% emissions reduction for the three-year period from January 1, 2018 through December 31, 2020 for the eight-county HGB nonattainment area; and
- a 3% emissions reduction for the one-year period between January 1, 2021 through December 31, 2021 as attainment year RFP contingency for the eight-county HGB nonattainment area.

For RFP and contingency analyses, the requirement to calculate and account for the non-creditable emissions reductions due to pre-1990 Federal Motor Vehicle Control Program (FMVCP) reductions was removed under the 2008 eight-hour ozone standard SIP requirements rule. The RFP analyses presented in this DFW and HGB RFP SIP revision does not include any of the RFP elements or non-creditable effects related to the pre-1990 FMVCP.

#### 3.1.2 Fifteen Percent Emissions Reduction Requirement

The 2008 eight-hour ozone standard SIP requirements rule requires states with serious nonattainment areas to submit an RFP plan with a 15% emissions reduction from the RFP base year to the first RFP analysis year, and an average 3% reduction per year from the first RFP analysis year to an area's attainment year. In accordance with the 2008 eight-hour ozone standard SIP requirements rule, if a state chooses 2011 as a base year

for a serious area designated nonattainment in 2012, the 15% reduction requirement covers the period from January 1, 2012 through December 31, 2017.

The first 15% RFP reduction achieved by an area must be from volatile organic compounds (VOC) emissions. In subsequent RFP demonstrations, this reduction requirement can be fulfilled with a combination of nitrogen oxides (NO<sub>x</sub>) and VOC emissions. The EPA previously approved demonstrations of the 15% VOC-only reduction requirements for all counties within the HGB and DFW 2008 ozone nonattainment areas, as noted in Table 3-1: *EPA Approval of 15% VOC-Only RFP SIP Revision for HGB and DFW Ozone Nonattainment Areas*.

**Table 3-1: EPA Approval of 15% VOC-Only RFP SIP Revision for HGB and DFW Ozone Nonattainment Areas**

Area	County or Counties	Ozone NAAQS	Date of EPA Approval	Federal Register Notice Citation
HGB	Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller	One-hour	November 14, 2001	66 FR 57160
DFW	Collin, Dallas, Denton, and Tarrant	One-hour	April 12, 2005	70 FR 18993
DFW	Ellis, Johnson, Kaufman, Parker, and Rockwall	1997 eight-hour	October 7, 2008	73 FR 58475
DFW	Wise	2008 eight-hour	December 7, 2016	81 FR 88124

For the 2008 eight-hour ozone NAAQS, the TCEQ previously adopted moderate classification RFP SIP revisions for the DFW and HGB areas to address the 15% emissions reduction requirement in VOC only (if not already satisfied) or in NO<sub>x</sub> and/or VOC for the six-year period from January 1, 2012 through December 31, 2017. The DFW RFP SIP revision adopted on June 3, 2015, demonstrated a 15% emissions reduction in VOC only from the 2011 base year through the 2017 attainment year for the newly designated one-county portion of the DFW moderate nonattainment area (Wise County) and a 15% emissions reduction in NO<sub>x</sub> and/or VOC from the 2011 base year through the 2017 attainment year for the previously designated nine-county portion of the DFW moderate nonattainment area (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant Counties). The HGB RFP SIP Revision adopted on December 15, 2016 demonstrated a 15% emissions reduction in NO<sub>x</sub> and/or VOC from the 2011 base year through the 2017 attainment year for the eight-county HGB moderate nonattainment area (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties). The EPA approved the DFW RFP SIP revision on December 7, 2016 (81 FR 88124) and approved the HGB RFP SIP revision on February 13, 2019 (84 FR 3708).

### 3.1.3 Additional Emissions Reduction Requirements

To demonstrate RFP for the DFW and HGB serious ozone nonattainment areas for the 2008 eight-hour ozone NAAQS, an additional 9% emissions reduction is required for the three-year period from January 1, 2018 to December 31, 2020. A combination of VOC and NO<sub>x</sub> emissions reductions may be used to achieve the 9% reduction requirements.<sup>8</sup>

For certain source categories, 2017 was used as the projection base year to forecast 2020 attainment year emissions. However, 2017 is not an analysis year for this SIP revision because the RFP requirement to demonstrate a 15% emissions reduction from January 1, 2012 through December 31, 2017 was previously submitted to the EPA and approved, as noted in Section 3.1.2: *Fifteen Percent Emissions Reduction Requirement*.

### 3.1.4 Contingency Demonstration

The RFP requirements also include a 3% contingency demonstration for the one-year period after each RFP analysis year and the attainment year. A combination of VOC and NO<sub>x</sub> emissions reductions may be used to achieve the 3% contingency reduction requirements.

With a 2020 attainment year under the serious classification, this DFW and HGB RFP SIP revision includes a 3% post-attainment year contingency for DFW and HGB for the one-year period from January 1, 2021 through December 31, 2021. Under the former moderate classification, a 2017 attainment year contingency requirement for the one-year period from January 1, 2018 through December 31, 2018 was demonstrated and approved in previous DFW and HGB RFP SIP revisions. The emissions reductions required to account for the 2018 RFP contingency year continue to be reserved out of the creditable reductions used between 2011 and 2020 to assure reductions are not double counted.

### 3.1.5 RFP Demonstration Method

Required serious nonattainment area RFP demonstration elements for the 10-county DFW and the eight-county HGB ozone nonattainment areas include:

- the 2011 base year emissions;
- 2020 target levels;
- 2020 projected emissions, with growth; and
- individually quantified emissions reductions from control measures for 2020.

Progress toward the 2020 attainment year 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 and control reductions are developed for each analysis year. Second, the target level of emissions is calculated for each analysis year. Third, the RFP control measure reductions for each analysis year are subtracted from the uncontrolled or existing controlled EI for the corresponding analysis year. The difference includes growth from

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<sup>8</sup> NO<sub>x</sub> may be substituted for VOC under conditions defined in the EPA's December 1993 [NO<sub>x</sub> Substitution Guidance](https://www3.epa.gov/ttn/naaqs/aqmguid/collection/cp2_old/19931201_oaqps_nox_substitution_guidance.pdf) (https://www3.epa.gov/ttn/naaqs/aqmguid/collection/cp2\_old/19931201\_oaqps\_nox\_substitution\_guidance.pdf).

the base year to the selected analysis year. When the combined uncontrolled and existing controlled projected inventory for each analysis year minus the RFP controls is less than or equal to the target level of emissions for VOC and/or NO<sub>x</sub>, the RFP requirement has been met.

### 3.2 TARGET LEVEL METHODOLOGY

EPA guidance specifies the method that should be used to calculate the maximum amount of emissions a nonattainment area can emit for each RFP analysis year. Those RFP target levels of emissions are calculated using a three-step process, which is used for this DFW and HGB RFP SIP revision. The two steps previously required to account for pre-1990 non-creditable reductions are no longer required and are not included. The three steps used to calculate the RFP targets are listed below.

1. Determine the 2011 RFP base year EI.
2. Calculate the required 15% and 9% emissions reduction amounts between 2011 and 2020.
3. Calculate the 2020 emissions target levels for NO<sub>x</sub> and VOC.

Each of these steps is explained in more detail in Section 3.3: *Calculation of Target Emissions Levels*.

### 3.3 CALCULATION OF TARGET EMISSIONS LEVELS

A summary of the three-step process described above for target calculations for 2020 is presented in:

- Table 3-2: *Summary of the Calculation Process for 2020 DFW RFP Target Levels*; and
- Table 3-3: *Summary of the Calculation Process for 2020 HGB RFP Target Levels*.

The 2020 DFW and HGB attainment year VOC and NO<sub>x</sub> target levels are found in Line 11 of Table 3-2: *Summary of the Calculation Process for 2020 DFW RFP Target Levels*, and, Line 7 of Table 3-3: *Summary of the Calculation Process for 2020 HGB RFP Target Levels*. In these tables, VOC and NO<sub>x</sub> target levels are expressed in tons per day (tpd) unless a percent reduction (%) is specified.

**Table 3-2: Summary of the Calculation Process for 2020 DFW RFP Target Levels**

Line	Description	NO <sub>x</sub> (tpd or %)	VOC (tpd or %)
Line 1	Step 1A: 2011 base year (BY) EI for one DFW newly designated county (See Table 2-6)	35.10	34.56
Line 2	15% VOC reduction requirement for one DFW newly designated county	N/A	15%
Line 3	Step 1B: 2011 BY EI for nine DFW previously designated counties (See Table 2-5)	386.94	430.36
Line 4	Percent of NO <sub>x</sub> (PN) and VOC (PV) to meet 15% reduction requirement for nine DFW previously designated counties, PN plus PV = 15	14%	1%
Line 5	Step 1C: 2011 BY EI for 10 DFW counties (Equals Line 1 plus Line 3, See Table 2-7)	422.04	464.92
Line 6	PN and PV to meet 9% reduction requirement, PN plus PV = 9	8%	1%



Line	Description	NO <sub>x</sub> (tpd or %)	VOC (tpd or %)
Line 7	Step 2A: Calculate the 2011-to-2017 15% VOC reduction requirement for one DFW newly designated county (set to zero for NO <sub>x</sub> , and Line 1 multiplied by Line 2 for VOC)	0.00	5.18
Line 8	Step 2B: Calculate the 2011-to-2017 15% NO <sub>x</sub> and VOC reduction requirement for nine DFW previously designated counties (Line 3 multiplied by Line 4)	54.17	4.30
Line 9	Step 2C: Calculate the 2017-to-2020 9% reduction requirement for 10 DFW counties (Line 5 multiplied by Line 6)	33.77	4.65
Line 10	Step 2D: Calculate the total 2011-to-2020 percent reduction requirement (Line 7 plus Line 8 plus Line 9)	87.94	14.13
Line 11	Step 3: Calculate the 2020 target level of emissions for 10 DFW counties (Line 5 minus Line 10)	334.10	450.79

**Table 3-3: Summary of the Calculation Process for 2020 HGB RFP Target Levels**

Line	Description	NO <sub>x</sub> (tpd or %)	VOC (tpd or %)
Line 1	Step 1: 2011 BY EI for HGB (see Table 2-8)	442.92	535.06
Line 2	PN and PV to meet 15% reduction requirement (PN plus PV = 15)	10%	5%
Line 3	PN and PV to meet 9% reduction requirement (PN plus PV = 9)	6.2%	2.8%
Line 4	Step 2A: Calculate the 15% NO <sub>x</sub> and VOC reduction requirement between 2011 and 2017 (Line 1 multiplied by Line 2)	44.29	26.75
Line 5	Step 2B: Calculate the 9% NO <sub>x</sub> and VOC reduction requirement between 2017 and 2020 (Line 1 multiplied by Line 3)	27.46	14.98
Line 6	Step 2C: Calculate the total NO <sub>x</sub> and VOC reduction requirement between 2011 and 2020 (Line 4 plus Line 5)	71.75	41.73
Line 7	Step 3: Calculate the 2020 target level of emissions for the HGB counties (Line 1 minus Line 6)	371.17	493.33

Step one of the RFP target calculation process involves the development of the 2011 base year EI, which represents the total anthropogenic emissions for the area. EPA guidance specifies the methodology that must be used to develop the base year EI and all other SIP emissions inventories.<sup>9</sup> Details of the development of the 2011 DFW and HGB base year emissions inventories are discussed in Chapter 2: *Emissions Inventories*. Summaries for the 2011 DFW and HGB base year NO<sub>x</sub> and VOC emissions inventories are presented in Table 2-5: *Nine-County DFW RFP Summary of the 2011 Base Year Average Summer Weekday NO<sub>x</sub> and VOC Emissions (tons per day)*, Table 2-6: *One-County DFW RFP Summary of the 2011 Base Year Average Summer Weekday NO<sub>x</sub> and VOC Emissions (tons per day)*, Table 2-7: *Ten-County DFW RFP Summary of the 2011*

<sup>9</sup> References for guidance documents used for EI development in this SIP revision are listed in the *References for Guidance Documents* section at the end of this document.

*Base Year Average Summer Weekday NO<sub>x</sub> and VOC Emissions (tons per day)*, and Table 2-8: *HGB RFP Summary of the 2011 Base Year Average Summer Weekday NO<sub>x</sub> and VOC Emissions (tons per day)*.

Step two of the RFP target calculation process, calculating the emissions reduction amount required for each analysis year, is accomplished by multiplying the RFP base year EI values by the percent reduction needed to meet RFP requirements. For the DFW and HGB nonattainment areas, the first requirement is to reduce emissions by 15% between 2011 and 2017. The post-2017 requirement is to reduce emissions by 3% per year from January 1, 2018 to the end of the attainment year. Since the attainment year for the DFW and HGB areas for the 2008 eight-hour ozone NAAQS is 2020, a 9% reduction in emissions is required from the end of 2017 through 2020.

The EPA's final 2008 eight-hour ozone standard SIP requirements rule allows ozone nonattainment areas to substitute NO<sub>x</sub> reductions for VOC reductions, but the use of NO<sub>x</sub> emissions reductions must meet the criteria in §182(c)(2)(C) in the Federal Clean Air Act (FCAA). The eight-county HGB area, which was previously designated nonattainment under the one-hour ozone NAAQS and the 1997 eight-hour ozone NAAQS, has already satisfied the 15% VOC emissions reduction requirement; therefore, all eight HGB nonattainment counties may substitute NO<sub>x</sub> reductions for VOC under the conditions detailed in the EPA's NO<sub>x</sub> substitution guidance.<sup>10</sup> Nine of the 10 DFW counties were originally designated nonattainment under the one-hour ozone standard and/or the 1997 eight-hour ozone NAAQS and have already satisfied the 15% VOC-only requirement prior to designation under the 2008 eight-hour ozone NAAQS; therefore, an equivalent percentage of NO<sub>x</sub> reductions may be substituted for VOC reductions requirements in those counties between 2011 and 2017. For the one county (Wise) added to the DFW nonattainment area under the 2008 eight-hour ozone NAAQS, the 15% reduction requirement from 2011 through 2017 must be all VOC.

For the DFW area, the 2011 through 2017 VOC-only reduction requirement was met for the one DFW nonattainment county (Wise) added under the 2008 eight-hour ozone standard through a 15% VOC emissions reduction. The 2011 through 2017 reduction requirement was met for the nine previously designated nonattainment counties through a 14% NO<sub>x</sub> reduction and 1% VOC reduction. After 2017, all 10 DFW nonattainment counties may substitute NO<sub>x</sub> reductions for VOC under the conditions of the EPA's NO<sub>x</sub> substitution guidance.<sup>11</sup> For the 10 DFW counties for the 2020 attainment year, the 9% reduction requirement between the end of 2017 and 2020 for this RFP SIP revision is satisfied by taking an 8% reduction from NO<sub>x</sub> emissions and a 1% reduction from VOC for the 10 DFW nonattainment counties. Equation 3-1 describes the method to calculate the percentage of NO<sub>x</sub> emissions substituted for VOC emissions for the previous 2017 RFP analysis year. Equation 3-2 describes the method to calculate the percentage of NO<sub>x</sub> emissions substituted for VOC emissions for the 2020 RFP attainment year.

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<sup>10</sup> NO<sub>x</sub> may be substituted for VOC under conditions defined in the EPA's December 1993 [NO<sub>x</sub> Substitution Guidance](https://www3.epa.gov/ttn/naaqs/aqmguidance/collection/cp2_old/19931201_oaqps_nox_substitution_guidance.pdf) (https://www3.epa.gov/ttn/naaqs/aqmguidance/collection/cp2\_old/19931201\_oaqps\_nox\_substitution\_guidance.pdf).

<sup>11</sup> See footnote 10.

Equation 3-1: 
$$N_{AY} = 15 - V_{AY}$$

where:

AY = First RFP analysis year

$N_{AY}$  = percentage NO<sub>x</sub> reductions for year AY

$V_{AY}$  = percentage VOC reductions for year AY

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

where:

AY = RFP analysis year

AY - 1 = previous RFP analysis year

$N_{AY}$  = percentage NO<sub>x</sub> reductions for year AY

CY = calendar year

$V_{AY}$  = percentage VOC reductions for year AY

For the HGB area, the 15% reduction requirement for 2011 through 2017 was met for the eight HGB counties through a 10% NO<sub>x</sub> reduction and 5% VOC reduction. For the eight HGB counties for the 2020 attainment year, the 9% reduction requirement between the end of 2017 and 2020 for this RFP SIP revision is satisfied by taking a 6.2% reduction from NO<sub>x</sub> emissions and a 2.8% reduction from VOC. As with DFW, Equations 3-1 and 3-2 describe the method to calculate the percentage of NO<sub>x</sub> emissions substituted for VOC emissions for the previous 2017 RFP analysis years and the 2020 RFP attainment year.

Emissions reduction percentages are multiplied by their corresponding NO<sub>x</sub> and VOC base year emissions inventories to calculate the required NO<sub>x</sub> and VOC emissions reductions for each RFP analysis year. Tables 3-2: *Summary of the Calculation Process for 2020 DFW RFP Target Levels* and 3-3: *Summary of the Calculation Process for 2020 HGB RFP Target Levels* provide a summary of the NO<sub>x</sub> and VOC reductions needed to satisfy the initial 15% and the subsequent 3% per year requirement for all RFP analysis years. The equations for calculating the 9% required reductions for NO<sub>x</sub> and VOC are shown in Equations 3-3A and 3-3B. Summaries of the NO<sub>x</sub> and VOC reductions needed to satisfy the 15% and post-2017 3% per year requirements for the RFP attainment year are provided for the DFW area in Lines 7, 8 and 9 of Table 3-2, and, for the HGB area in Lines 4 and 5 of Table 3-3.

Equation 3-3A:  $RPR_{AY, VOC} = [ BY_{2011, VOC} ] \times PV_{AY}$

and

Equation 3-3B:  $RPR_{AY, NOx} = [ BY_{2011, NOx} ] \times PN_{AY}$

where:

AY = RFP analysis year

$RPR_{AY, VOC}$  = required VOC emission reductions between 2011 and AY

$RPR_{AY, NOx}$  = required NO<sub>x</sub> emission reductions between 2011 and AY

$BY_{2011, VOC}$  = 2011 base year EI for VOC

$BY_{2011, NOx}$  = 2011 base year EI for NO<sub>x</sub>

$PV_{AY}$  = percentage VOC reductions for year AY

$PN_{AY}$  = percentage NO<sub>x</sub> reductions for year AY

Step three of the RFP target calculation process, calculating RFP target levels of emissions, is accomplished by subtracting the required emissions reductions (step two) from the 2011 base year EI. The target level represents the level of emissions for each RFP analysis year, for each county group, for the HGB and DFW nonattainment areas to meet their 2008 eight-hour ozone standard RFP requirements. The method for calculating the target levels of emissions for the DFW and HGB RFP analysis years is shown in Equation 3-4.

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

where:

AY = RFP analysis year

AY - 1 = previous RFP analysis year

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

$TL_{(AY-1), X}$  = target level of emissions for the previous RFP analysis year (Note: For 2017, the target level of emissions for the previous RFP analysis year is equal to the 2011 base year EI.)

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

X = either VOC or NO<sub>x</sub>

The calculations of the target values for the RFP attainment year for the DFW and HGB RFP demonstrations are documented in Appendix 1: *DFW Reasonable Further Progress Demonstration Spreadsheet* and Appendix 2: *HGB Reasonable Further Progress*

*Demonstration Spreadsheet.* Table 3-2 and Table 3-3 provide a step-by-step summary of the calculation of the 2020 DFW and HGB RFP target levels of VOC and NO<sub>x</sub> emissions.

In Section 3.5: *RFP Demonstration*, the target levels are integrated into the RFP demonstration.

### **3.4 GROWTH**

This DFW and HGB RFP SIP revision must account for any growth in emissions between the RFP base year (2011) and the attainment year (2020). For future analysis years, the uncontrolled (for mobile sources) or existing controlled (for stationary sources) NO<sub>x</sub> and VOC emissions inventories are developed by applying the appropriate projection methodologies to the most recent EI estimates, emissions factors, and/or to activity-level estimates. The resulting emissions inventories include any growth between 2011 and 2020.

The projection methodology for the uncontrolled or existing controlled RFP EI excludes changes in the emissions 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 or existing controlled projected emissions inventories that include growth, the result will be the forecasted 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.<sup>12</sup> The development of the uncontrolled or existing controlled projected EI is documented in Chapter 2: *Emissions Inventories*. The development of the projected control reductions is documented in Chapter 4: *Control Measures to Achieve Target Levels*.

### **3.5 RFP DEMONSTRATION**

The EPA's final 2008 eight-hour ozone standard SIP requirements rule requires the RFP control strategy plan to show ozone precursor (NO<sub>x</sub> and VOC) emissions reductions that will reduce controlled RFP analysis year emissions to values equal to or less than the emissions target values. To demonstrate RFP, the creditable RFP control reductions are subtracted from the uncontrolled or existing controlled forecast EI for each RFP analysis year. The contingency reductions for the one-year period from January 1, 2018 through December 31, 2018 set aside under the previous moderate nonattainment SIP revisions for the 2008 eight-hour ozone NAAQS are reserved to avoid double-counting these reductions. The RFP requirement is met for each analysis year if the resulting controlled RFP EI forecast is less than the target level of emissions. The following two sections provide the DFW and HGB RFP demonstrations for this RFP SIP revision.

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<sup>12</sup> 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.

### 3.5.1 DFW RFP Demonstration

The RFP demonstration calculations were completed for the 2020 DFW attainment year. A summary of the 2020 DFW RFP demonstration is provided in Table 3-4: *Summary of the 2020 DFW RFP Demonstration (tons per day)*. As concluded in the final row of the table, the 10-county DFW area demonstrates the required RFP emission reductions for 2020. All RFP calculations, including the required reductions 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 2020 are documented in Chapter 4 and summarized in Table 4-1: *Summary of DFW RFP NO<sub>x</sub> and VOC Cumulative Emissions Reductions from Control Strategies for 2011 through 2020 (tons per day)*.

**Table 3-4: Summary of the 2020 DFW RFP Demonstration (tons per day)**

Line	Description	NO <sub>x</sub>	VOC
Line 1	Uncontrolled or existing controlled 10-county DFW 2020 emissions forecast with growth	1307.94	855.96
Line 2	Creditable 10-county DFW RFP control reductions between 2011 and 2020	1023.27	432.82
Line 3	Controlled 10-county DFW 2020 RFP emissions forecast (Line 1 minus Line 2)	284.67	423.14
Line 4	Amount of creditable reductions reserved for 2017 to 2018 RFP milestone contingency	8.44	4.65
Line 5	Controlled 10-county DFW 2020 RFP emission forecast with 2018 contingency (Line 3 plus Line 4)	293.11	427.79
Line 6	Amount of NO <sub>x</sub> reduction substitution (see Sheet 9)	0.00	0.00
Line 7	Controlled 10-county DFW 2020 RFP forecast without reductions reserved for contingency and accounting for NO <sub>x</sub> substitution (Line 5 plus Line 6)	293.11	427.79
Line 8	10-county DFW 2020 RFP target level of emissions	334.10	450.79
Line 9	Excess (+) / Shortfall (-) (Line 8 minus Line 7)	+ 40.99	+ 23.00
Line 10	Is controlled RFP EI less than target level of emissions?	Yes	Yes

### 3.5.2 HGB RFP Demonstration

The RFP demonstration calculations were completed for the 2020 HGB attainment year. A summary of the 2020 HGB RFP demonstration is provided in Table 3-5: *Summary of the 2020 HGB RFP Demonstration (tons per day)*. As concluded in the final row of the table, the eight-county HGB area demonstrates the required RFP emission reductions for 2020. All RFP calculations, including the required reductions and the target emissions levels, are calculated and shown in Appendix 2. Details of the emissions reductions used to calculate the creditable RFP control reductions for 2020 are documented in Chapter 4 and summarized in Table 4-2: *Summary of HGB NO<sub>x</sub> and VOC Cumulative Emissions Reductions from Control Strategies for 2011 through 2020 (tons per day)*.

**Table 3-5: Summary of the 2020 HGB RFP Demonstration (tons per day)**

<b>Line</b>	<b>Description</b>	<b>NO<sub>x</sub></b>	<b>VOC</b>
Line 1	Uncontrolled or existing controlled eight-county HGB 2020 emissions forecast with growth	1165.66	854.65
Line 2	Creditable RFP control reductions between 2011 and 2020	821.70	370.04
Line 3	Controlled eight-county HGB 2020 RFP emissions forecast (Line 1 minus Line 2)	343.96	484.61
Line 4	Amount of creditable reductions reserved for 2017-to-2018 RFP milestone contingency	13.29	0.00
Line 5	Controlled eight-county HGB 2020 RFP emission forecast accounting for 2018 contingency (Line 3 plus Line 4)	357.25	484.61
Line 6	Amount of NO <sub>x</sub> reduction substitution	0.00	0.00
Line 7	Controlled 2020 RFP forecast without reductions reserved for contingency and accounting for NO <sub>x</sub> substitution (Line 5 plus Line 6)	357.25	484.61
Line 8	2020 RFP target level of emissions	371.17	493.33
Line 9	Excess (+) / Shortfall (-) (Line 8 minus Line 7)	+13.92	+8.72
Line 10	Is controlled RFP EI 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<sub>x</sub>) required to demonstrate reasonable further progress (RFP) for both the Dallas-Fort Worth (DFW) 2008 eight-hour ozone nonattainment area (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise Counties) and the Houston-Galveston-Brazoria (HGB) 2008 eight-hour ozone nonattainment area (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller 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 and requirements for the DFW and HGB areas. Only the controls used to meet the DFW and HGB RFP requirements for the 2020 attainment year are presented in Table 4-1: *Summary of DFW RFP NO<sub>x</sub> and VOC Cumulative Emissions Reductions from Control Strategies for 2011 through 2020 (tons per day)* and Table 4-2: *Summary of HGB RFP NO<sub>x</sub> and VOC Cumulative Emissions Reductions from Control Strategies for 2011 through 2020 (tons per day)*.

Individual and total values shown in the summary tables have been extracted from the spreadsheets in Appendix 1: *DFW Reasonable Further Progress Demonstration Spreadsheet* and Appendix 2: *HGB Reasonable Further Progress Demonstration Spreadsheet*.

**Table 4-1: Summary of DFW RFP NO<sub>x</sub> and VOC Cumulative Emissions Reductions from Control Strategies for 2011 through 2020 (tons per day)**

Control Strategy Description	NO <sub>x</sub> Reduction	VOC Reduction
Chapter 117 NO <sub>x</sub> controls <sup>1</sup>	0.00	0.00
Chapter 115 storage tank rules	0.00	0.00
Coating / printing rules	0.00	0.00
Portable fuel containers <sup>1</sup>	0.00	0.00
Federal Motor Vehicle Control Program (FMVCP)	796.66	290.23
Reformulated Gasoline (RFG) <sup>2</sup> /East Texas Regional Low RVP/Low Sulfur Gasoline/Ultra-Low Sulfur Diesel	54.23	15.17
Inspection and Maintenance (I/M)	6.87	8.14
On-road Texas Low Emissions Diesel (TxLED)	2.65	0.00
Tier I and II locomotive NO <sub>x</sub> standards	19.15	0.74
Small non-road spark ignition (SI) engines (Phase I) <sup>3</sup>	-3.88	33.19
Heavy duty non-road engines	37.44	14.79
Tiers 2 and 3 non-road diesel engines	38.06	3.15
Small non-road SI engines (Phase II)	2.71	32.19
Large non-road SI and recreational marine	36.77	16.48
Non-road TxLED	3.89	0.00
Non-road RFG	0.01	0.49
Tier 4 non-road diesel engines	25.93	1.14
Diesel recreational marine	0.00	0.00



Control Strategy Description	NO <sub>x</sub> Reduction	VOC Reduction
Small SI (Phase III)	2.47	16.99
Chapter 117 NO <sub>x</sub> area source engine controls <sup>1</sup>	0.00	0.00
Drilling rigs: federal engine standards and TxLED	0.31	0.11
<b>Sum of reductions from projected uncontrolled or existing controlled emissions</b>	1,023.27	432.82

Note 1: These rules had compliance deadlines before 2011 in the DFW area. The 2011 base year emissions inventory (EI) includes the effect of the control. No additional emissions reductions beyond 2011 are claimed.

Note 2: The 10-county DFW area includes counties with federal RFG and counties with Texas Regional Low RVP. The four counties with federal RFG are: Collin, Dallas Denton and Tarrant. The six counties with Texas Regional Low RVP are: Ellis, Johnson, Kaufman, Parker, Rockwall, and Wise.

Note 3: The small SI Phase 1 rule is shown to provide a substantial reduction in VOC emissions. A slight increase in NO<sub>x</sub> emissions is due to the engine modifications required to meet the VOC and CO standards of the Small SI Phase 1.

**Table 4-2: Summary of HGB RFP NO<sub>x</sub> and VOC Cumulative Emissions Reductions from Control Strategies for 2011 through 2020 (tons per day)**

Control Strategy Description	NO <sub>x</sub> Reduction	VOC Reduction
Chapter 117 NO <sub>x</sub> controls	0.00	0.00
Chapter 115 Storage Tank Rule	0.00	0.00
Coating / printing rules	0.00	0.00
Portable fuel containers	0.00	0.00
FMVCP	561.84	245.62
RFG/Low Sulfur Gasoline/Ultra-Low Sulfur Diesel	101.55	16.96
I/M	5.13	7.39
On-road TxLED	2.39	0.00
Tier I and II locomotive NO <sub>x</sub> standards	21.02	0.81
Small non-road SI engines (Phase I) <sup>1</sup>	-3.17	25.60
Heavy duty non-road engines	26.71	13.71
Tiers 2 and 3 non-road diesel engines	30.22	2.62
Small non-road SI engines (Phase II)	2.22	23.67
Large non-road SI and recreational marine	37.37	16.51
Non-road TxLED	1.36	0.00
Non-road RFG	0.01	0.73
Tier 4 non-road diesel engines	17.70	0.78
Diesel recreational marine	0.00	0.00
Small SI (Phase III)	2.16	15.43
Chapter 117 NO <sub>x</sub> area source engine controls	0.00	0.00
Drilling rigs: federal engine standards and TxLED	0.43	0.09
Commercial marine vessel engine certification standards and fuel programs	14.76	0.12
<b>Sum of reductions from projected uncontrolled or existing controlled emissions</b>	821.70	370.04

Note 1: The small SI Phase 1 rule is shown to provide a substantial reduction in VOC emissions. A slight increase in NO<sub>x</sub> emissions is due to the engine modifications required to meet the VOC and CO standards of the Small SI Phase 1.

## 4.2 POINT SOURCE CONTROLS

Specific point source controls required by state rules and the associated emissions reductions were incorporated into the 2011 base year inventory and the 2020

attainment-year inventory, as appropriate, according to compliance deadlines. These controls include Title 30 Texas Administrative Code (TAC) Chapter 117 reductions of NO<sub>x</sub> emissions from cement plants, electric generating units, internal combustion engines, and heaters and 30 TAC Chapter 115 reductions of VOC emissions, which had compliance deadlines before 2011. Point source emissions for attainment year 2020 are summarized in Table 4-3: *DFW RFP 2020 Point Source Emissions and Reductions for NO<sub>x</sub> and VOC (tons per day)* and Table 4-4: *HGB RFP 2020 Point Source Emissions and Reductions for NO<sub>x</sub> and VOC (tons per day)*.

**Table 4-3: DFW RFP 2020 Point Source Emissions and Reductions Summary for NO<sub>x</sub> and VOC (tons per day)**

Emissions	NO <sub>x</sub>	VOC
Existing controlled emissions (specified controls implemented as of 2011)	46.83	24.35
RFP point source reduction	0.00	0.00
RFP post-2011 controlled emissions	46.83	24.35

**Table 4-4: HGB RFP 2020 Point Source Emissions and Reductions Summary for NO<sub>x</sub> and VOC (tons per day)**

Emissions	NO <sub>x</sub>	VOC
Existing controlled emissions (specified controls implemented as of 2011)	131.06	85.23
RFP point source reduction	0.00	0.00
RFP post-2011 controlled emissions	131.06	85.23

### 4.3 AREA SOURCE CONTROLS

Area source controls required by state and federal rules and the associated emissions reductions were incorporated into the 2011 base year inventory and the 2020 attainment year inventory, as appropriate, according to compliance deadlines. These controls include 30 TAC Chapter 117 reductions of NO<sub>x</sub> emissions from internal combustion engines in the HGB and DFW areas, which had compliance deadlines before 2011; and the federal portable fuel containers rule, which also had compliance deadlines prior to 2011. Other reductions, including Federal New Source Performance Standards Subpart OOOO emissions reductions, are included in the projection base year EI (2017) for this state implementation plan (SIP) revision and are included in the 2020 attainment year EI.

Area source emissions for attainment year 2020 are summarized in Table 4-5: *DFW RFP 2020 Area Source Emissions and Reductions Summary for NO<sub>x</sub> and VOC (tons per day)* and Table 4-6: *HGB RFP 2020 Area Source Emissions and Reductions Summary of NO<sub>x</sub> and VOC (tons per day)*.

**Table 4-5: DFW RFP 2020 Area Source Emissions and Reductions Summary for NO<sub>x</sub> and VOC (tons per day)**

<b>Emissions</b>	<b>NO<sub>x</sub></b>	<b>VOC</b>
Existing controlled emissions (specified controls implemented as of 2011)	38.69	299.22
RFP area source reduction	0.00	0.00
RFP post-2011 controlled emissions	38.69	299.22

**Table 4-6: HGB RFP 2020 Area Source Emissions and Reductions Summary for NO<sub>x</sub> and VOC (tons per day)**

<b>Emissions</b>	<b>NO<sub>x</sub></b>	<b>VOC</b>
Existing controlled emissions (specified controls implemented as of 2011)	30.04	310.98
RFP area source reduction	0.00	0.00
RFP post-2011 controlled emissions	30.04	310.98

#### 4.4 NON-ROAD MOBILE SOURCE CONTROLS

Non-road mobile source controls required by state and federal rules and the associated emissions reductions were incorporated into the 2011 base year inventory and the 2020 attainment year inventory, as appropriate, according to compliance deadlines. Emissions reductions were calculated as detailed in the following sections. Summaries of all non-road mobile source RFP emissions inventories and control strategy reductions are presented in Table 4-7: *DFW RFP 2020 Non-Road Mobile Source Emissions and Reductions Summary for NO<sub>x</sub> and VOC (tons per day)* and Table 4-8: *HGB RFP 2020 Non-Road Mobile Source Emissions and Reductions Summary for NO<sub>x</sub> and VOC (tons per day)*.

**Table 4-7: DFW RFP 2020 Non-Road Mobile Source Emissions and Reductions Summary for NO<sub>x</sub> and VOC (tons per day)**

<b>Emissions</b>	<b>NO<sub>x</sub></b>	<b>VOC</b>
Uncontrolled emissions	264.52	162.12
RFP non-road source reduction	162.86	119.28
RFP controlled (post-control) emissions	101.66	42.84

**Table 4-8: HGB RFP 2020 Non-Road Mobile Source Emissions and Reductions Summary for NO<sub>x</sub> and VOC (tons per day)**

<b>Emissions</b>	<b>NO<sub>x</sub></b>	<b>VOC</b>
Uncontrolled emissions	254.17	136.26
RFP non-road source reduction	150.79	100.07
RFP controlled (post-control) emissions	103.38	36.19

##### 4.4.1 NONROAD Model Categories

For this DFW and HGB RFP SIP revision, the Texas NONROAD Model (TexN) 1.7.2 model was run using county-specific population and activity files, where available. 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 applicable federal and state rules that were modeled are located in Section 4.1: *Overview of Control Measures*. The emissions inventories developed include county-level ozone season daily controlled and uncontrolled emissions estimates for the 2011 and 2020 analysis years for the DFW and HGB nonattainment areas.

Emissions reductions from individual federal and state controls for non-road equipment were calculated by subtracting the controlled (post-control) emissions estimates from the uncontrolled emissions estimates.

#### **4.4.2 Non-Road Categories Not Included in the EPA NONROAD Model**

Emissions from the non-road mobile sources that are not estimated using the TexN model include commercial marine vessels (CMV), locomotives, aircraft, auxiliary power units (APU), and ground support equipment (GSE), and drilling rigs used in upstream oil and gas exploration activities. Emissions for those source categories were calculated using alternate United States Environmental Protection Agency (EPA)-approved methods and guidance.

##### 4.4.2.1 Drilling Rigs

The 2011 emissions were developed by using 2011 drilling activity data combined with the 2011 year-specific controlled and uncontrolled emission factors from Appendix 8: *2014 Statewide Drilling Rig Emissions Inventory with Updated Trends Inventories*. A 2020 EI for drilling rigs was developed using 2017 drilling activity data and the 2020 year-specific controlled and uncontrolled emission factors from Appendix 8. Because future drilling activity is difficult to predict, the 2017 drilling activity data were held constant to the attainment year since those were the most current data available. Emissions reductions from individual federal and state controls for these specific types of non-road equipment were calculated by subtracting the controlled (post-control) emissions estimates from the uncontrolled emissions estimates.

##### 4.4.2.2 Commercial Marine Vessels and Locomotives

Controlled emissions for CMV were based on emissions factors developed by Eastern Research Group, Inc. (ERG) with guidance from the EPA, which took into account fleet turnover and the implementation of state and federal regulatory programs.

Uncontrolled emissions were based on a separate set of emissions factors that excluded adjustments for fleet turnover and the implementation of state and federal regulatory programs. Documentation of methods and procedures used in developing the CMV emissions inventories can be found in Appendix 9: *2014 Texas Statewide Commercial Marine Vessel Emissions Inventory and 2008 through 2040 Trend Inventories*.

The locomotive EI was developed from a Texas Commission on Environmental Quality (TCEQ)-commissioned study using EPA-accepted EI development methods. The locomotive EI includes line haul and yard emissions activity data from all Class I, II, and III locomotive activity and emissions by rail segment. Controlled emissions for locomotive sources were determined by applying activity adjustment factors by source classification code and emissions rate adjustment factors. The emissions rate adjustment factors were obtained from the EPA's [Emission Factors for Locomotives](#)

[Fact Sheet](https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100500B.TXT) (https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100500B.TXT).

Documentation of methods and procedures used by ERG in developing the locomotive emissions inventories can be found in Appendix 10: *2014 Texas Statewide Locomotive Emissions Inventory and 2008 through 2040 Trend Inventories*. The emissions inventories developed include county-level ozone season day controlled and uncontrolled emissions estimates for 2011 and 2020.

#### 4.4.2.3 Airports

Emissions for aircraft, APU and GSE were calculated using the Federal Aviation Administration's Aviation Environmental Design Tool (AEDT). The updated controlled analysis year emissions for the airports were calculated based on the information provided by ERG in Appendix 11: *Development of the Statewide Aircraft Inventory for 2011* and Appendix 12: *Development of the Statewide Aircraft Inventory for 2020*. Control strategies for airport emissions included emission reductions from GSE and APU electric conversions.

### **4.5 ON-ROAD MOBILE SOURCE CONTROLS**

The on-road mobile source emissions inventories and the corresponding on-road mobile source control strategy reductions for this DFW and HGB RFP SIP revision were developed using the Motor Vehicle Emissions Simulator (MOVES) 2014a model. The TCEQ recently completed development of 2011, 2020, and 2021 on-road emission inventories for the DFW and HGB areas. The inventories were completed under contract with the North Central Texas Council of Governments (NCTCOG) and the Texas A&M Transportation Institute for the DFW and HGB areas, respectively.

For RFP analyses, the requirement to calculate and account for non-creditable emissions reductions due to pre-1990 FMVCP reductions was removed under the EPA's *Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule*. The RFP analyses presented in this DFW and HGB RFP SIP revision do not include any of the RFP elements or non-creditable effects related to the pre-1990 FMVCP. The on-road mobile control strategy reduction summaries and documentation do not include quantification of the pre-1990 FMVCP as a separate reduction.

#### **4.5.1 DFW RFP On-Road Mobile Source Control Strategies**

The on-road mobile emissions inventories were developed using emissions factors that reflect creditable control strategies for each analysis year. The controls that were modeled include: pre-1990 FMVCP, post-1990 FMVCP, ultra-low sulfur diesel, summer RFG, the East Texas Regional Low RVP Gasoline Program, the vehicle I/M program, Tier 3 FMVCP, the lower sulfur gasoline associated with Tier 3 FMVCP, and TxLED. A summary of the DFW on-road mobile source control strategies used for the DFW RFP demonstration is presented in Table 4-9: *Summary of DFW On-Road Mobile Control Strategies*.

**Table 4-9: Summary of DFW On-Road Mobile Control Strategies**

Control Program Description	Additional Information	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. Collin, Dallas, Denton and Tarrant Counties: Maximum Reid Vapor Pressure of 7.8 pounds per square inch Ellis, Johnson, Kaufman, Parker, Rockwall and Wise: Maximum Reid Vapor Pressure of 9.0 pounds per square inch	1992	No
Anti-Tampering Program (Dallas and Tarrant counties only)	According to Section 2.8.9.3 of the MOBILE6.2 User's Guide, "the mere presence of an I/M program is expected to act as a deterrent to tampering... All 1996 and newer model year vehicles are assumed to have negligible tampering effects. As a result, there is no tampering reduction benefit associated with the 1996 and newer vehicles." Section 5.2 of the MOBILE6.2 User's Guide elaborates further by stating that "with the introduction of the phase 2 of the onboard diagnostic (OBD) electronics in 1996, the explicit modeling of the effects of tampering on vehicle emissions will phase out because OBD vehicles are assumed to have negligible tampering rates." Year 1995-and-older vehicles are currently a very small portion of the fleet, and their total number will continue to decline with fleet turn-over.	1986	No
I/M Program (Dallas and Tarrant counties only)	None	1990	Yes
Tier 1, FMVCP	None	1994	Yes
Reformulated Gasoline	Collin, Dallas, Denton and Tarrant Counties only	1995 for phase one, 2000 for phase two	Yes

Control Program Description	Additional Information	Year Control Program Started	Creditable for RFP
East Texas Regional Low RVP Gasoline Program	Ellis, Johnson, Kaufman, Parker, Rockwall and Wise Counties	2000	Yes
National Low Emission Vehicle Program	None	2001	Yes
Expanded I/M and ATP	Expanded to Collin, Denton counties	2002	Yes
Expanded I/M and ATP	Expanded to Ellis, Johnson, Kaufman, Parker, and Rockwall Counties	2003	Yes
Tier 2, FMVCP	Phase in from 2004 to 2009	2004	Yes
TxLED	15 parts per million maximum sulfur content. Low aromatic hydrocarbon and high cetane number to control NO <sub>x</sub>	2006	Yes
Ultra-Low-Sulfur Diesel	15 parts per million maximum sulfur content	2006	Yes
2007 Heavy duty FMVCP	Phase in from 2007 to 2010	2007	Yes
Tier 3, FMVCP	Phase in from 2017 to 2025	2017	Yes
I/M Program (Dallas and Tarrant counties only)	None	1990	Yes

#### 4.5.2 HGB RFP On-Road Mobile Source Control Strategies

The on-road mobile emissions inventories were developed using emission factors that reflect all creditable control strategies for each analysis year. The controls that were modeled include: pre-1990 FMVCP, post-1990 FMVCP, summer RFG, the HGB vehicle I/M program, the lower sulfur gasoline associated with Tier 3 FMVCP, ultra-low sulfur diesel, and TxLED. A summary of the HGB on-road mobile source control strategies used for the HGB RFP demonstration is presented in Table 4-10: *Summary of HGB On-Road Mobile Control Strategies*.

**Table 4-10: Summary of HGB On-Road Mobile Control Strategies**

Control Program Description	Additional Information	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
I/M Program	Brazoria, Fort Bend, Galveston, Harris, and Montgomery Counties	1997	Yes
Tier 1, FMVCP	Included in MOVES post-1990 FMVCP	1994	Yes

Control Program Description	Additional Information	Year Control Program Started	Creditable for RFP
RFG	Eight HGB counties	1995 for phase one, 2000 for phase two	Yes
National Low Emission Vehicle Program	Included in MOVES post-1990 FMVCP	2001	Yes
Tier 2, FMVCP	Phased in from 2004 to 2009. Included in MOVES post-1990 FMVCP.	2004	Yes
TxLED	15 parts per million (ppm) maximum sulfur content. Low aromatic hydrocarbon and high cetane number to control NO <sub>x</sub> .	2006	Yes
Ultra-Low-Sulfur Diesel	15 ppm maximum sulfur content	2006	Yes
2007 Heavy Duty FMVCP	Phased in from 2007 to 2010. Included in MOVES post-1990 FMVCP.	2007	Yes
Tier 3, FMVCP	Phased in from 2017 to 2025. Included in MOVES post-1990 FMVCP.	2017	Yes
Tier 3, Low Sulfur Gasoline	A part of the Tier 3 FMVCP lowers the limit on gasoline sulfur content; also improves the performance of Tier 2 equipment	2017	Yes

#### 4.5.3 On-Road Mobile Source Control Strategy Reductions

The projected mobile source emissions inventories documented in Appendix 13: *Dallas-Fort Worth MOVES2014a-Based Reasonable Further Progress On-road Inventories and Control Strategy Reductions for 2011, 2017, 2018, 2020, and 2021* and Appendix 14: *Production of HGB Reasonable Further Progress On-Road Mobile Emissions Inventories* include quantification of emissions reductions for all federal and state on-road mobile source control rules for the attainment year for the DFW and HGB nonattainment areas. A summary of the on-road mobile control scenarios included in the 2011, 2020, and 2021 RFP emissions inventories is presented in Table 4-11: *DFW Control Programs Modeled for each RFP Control Scenario* and Table 4-12: *HGB Control Programs Modeled for each RFP Control Scenario*. The summary of 2020 uncontrolled emissions, control program reductions, and controlled (post-control) emissions for on-road mobile sources in the DFW and HGB nonattainment areas may be found in Table 4-13: *DFW RFP 2020 On-Road Mobile Source Emissions and Reductions Summary for NO<sub>x</sub> and VOC (tons per day)* and Table 4-14: *HGB RFP 2020 On-Road Mobile Source Emissions and Reductions Summary for NO<sub>x</sub> and VOC (tons per day)* for the DFW and HGB areas, respectively.



**Table 4-11: DFW Control Programs Modeled for each RFP Control Scenario**

<b>Control Scenario Description</b>	<b>Controls Modeled</b>
Control Scenario 1 Pre-1990 Controls Only (for RFP purposes, this is the uncontrolled emissions inventory)	Pre-1990 FMVCP and 1992 federal controls on gasoline volatility
Control Scenario 2	Add: Post-1990 FMVCP (Tier 1 FMVCP, Tier 2 FMVCP, 2007 heavy duty diesel FMVCP, Tier 3 FMVCP)
Control Scenario 3	Add: Federal RFG with Tier 3 sulfur levels (Collin, Dallas, Denton and Tarrant Counties) and East Texas Regional Low RVP Gasoline Program with Tier 3 sulfur levels (Ellis, Johnson, Kaufman, Parker, Rockwall, and Wise Counties)  and  ultra-low sulfur diesel (All DFW counties)
Control Scenario 4	Add: DFW I/M program: modeled for Dallas, Collin, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant Counties
Control Scenario 5 RFP Post-Control Emissions	Add: TxLED program, 15 ppm maximum sulfur content, low aromatic hydrocarbons, and high cetane number to control NO <sub>x</sub>

**Table 4-12: HGB Control Programs Modeled for each RFP Control Scenario**

<b>Control Scenario Description</b>	<b>Controls Modeled</b>
Control Scenario 1 Pre-1990 Controls Only (for RFP purposes, this is the uncontrolled emissions inventory)	Pre-1990 FMVCP and 1992 federal controls on gasoline volatility
Control Scenario 2	Add: Federal RFG with Tier 3 sulfur levels and ultra-low sulfur diesel
Control Scenario 3	Add: Post-1990 FMVCP (Tier 1 FMVCP, Tier 2 FMVCP, 2007 heavy duty diesel FMVCP, Tier 3 FMVCP)
Control Scenario 4	Add: HGB I/M program: modeled for Brazoria, Fort Bend, Galveston, Harris, and Montgomery Counties

Control Scenario Description	Controls Modeled
Control Scenario 5 RFP Post-Control Emissions	Add: TxLED program, 15 ppm maximum sulfur content, low aromatic hydrocarbons, and high cetane number to control NO <sub>x</sub>

**Table 4-13: DFW RFP 2020 On-Road Mobile Source Emissions and Reductions Summary for NO<sub>x</sub> and VOC (tons per day)**

Inventory or Control Strategy Description	NO <sub>x</sub>	VOC
2020 uncontrolled emissions	957.90	370.27
Post-1990 FMVCP	796.66	290.23
On-road RFG with Tier 3 sulfur and ultra-low sulfur diesel	54.23	15.17
DFW I/M program	6.87	8.14
On-road TxLED	2.65	0.00
2020 RFP controlled (post-control) emissions	97.49	56.73

**Table 4-14: HGB RFP 2020 On-Road Mobile Source Emissions and Reductions Summary for NO<sub>x</sub> and VOC (tons per day)**

Inventory or Control Strategy Description	NO <sub>x</sub>	VOC
2020 uncontrolled emissions	750.39	322.18
Post-1990 FMVCP	561.84	245.62
On-road RFG with Tier 3 sulfur and ultra-low sulfur diesel	101.55	16.96
HGB I/M program	5.13	7.39
On-road TxLED	2.39	0.00
2020 RFP controlled (post-control) emissions	79.48	52.21

#### 4.6 VEHICLE MILES TRAVELED DEMONSTRATION

Transportation control measures (TCM) are required to offset growth in vehicle miles traveled (VMT) that result in an increase in vehicle emissions for nonattainment areas classified as serious under the National Ambient Air Quality Standards (NAAQS). There is growth in VMT for the DFW and HGB ozone nonattainment areas for the years between the RFP base year of 2011 and the attainment year, 2020, as illustrated in Figure 4-1: *2011 and 2020 DFW and HGB RFP VMT Trends (miles per day)*. However, the growth in VMT for both areas is more than offset by control measures that reduce the per-mile emission rates, resulting in a decrease in emissions of both VOC and NO<sub>x</sub> for the same time period, as shown in Figure 4-2: *DFW 2011 and 2020 RFP NO<sub>x</sub> and VOC Emissions (tons per day)* and Figure 4-3: *HGB 2011 and 2020 RFP NO<sub>x</sub> and VOC Emissions (tons per day)*. The increase in VMT and decrease in vehicle emissions for the RFP time period are summarized in Table 4-15: *DFW RFP On-Road Mobile Controlled NO<sub>x</sub> Emissions, VOC Emissions, and Vehicle Miles Traveled* and Table 4-16: *HGB RFP On-Road Mobile Controlled NO<sub>x</sub> Emissions, VOC Emissions, and Vehicle Miles Traveled*. A list of the DFW and HGB on-road mobile source control measures used to demonstrate RFP in this SIP revision are provided in Tables 4-9 and Table 4-10. Since vehicle emissions

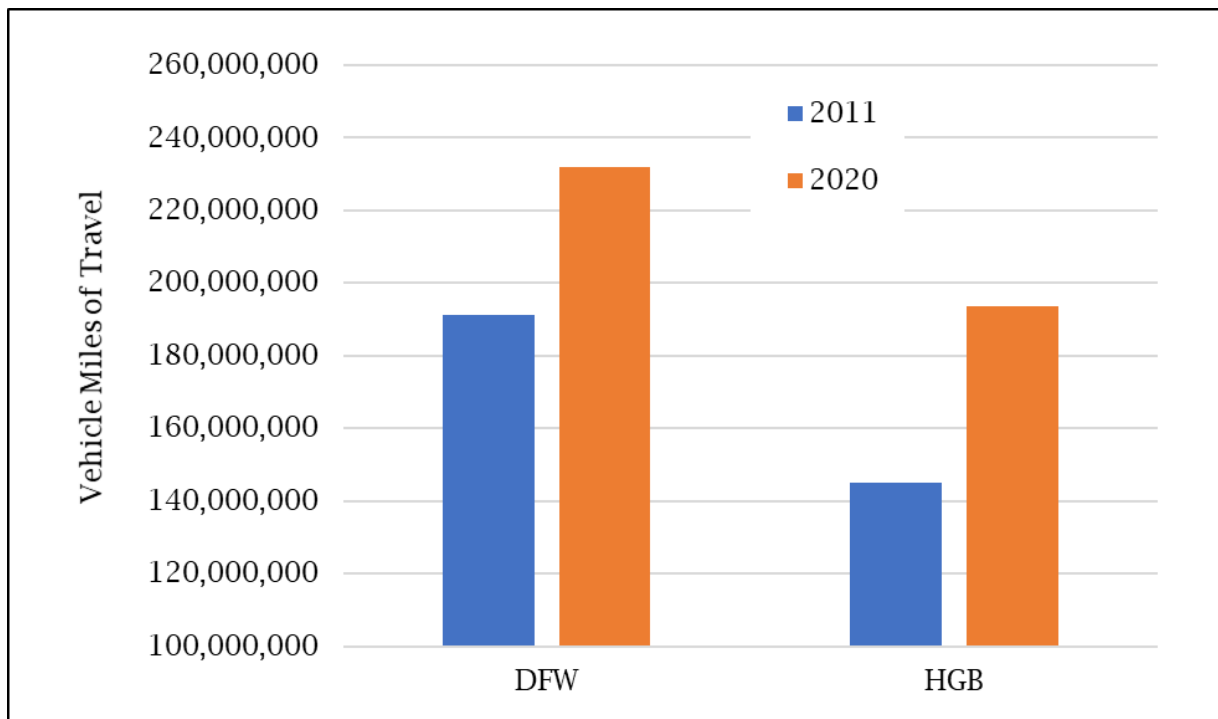
are decreasing with the current list of controls, no additional controls from TCMs are required.

**Table 4-15: DFW RFP On-Road Mobile Controlled NO<sub>x</sub> Emissions, VOC Emissions, and Vehicle Miles Traveled**

RFP Analysis Year	NO <sub>x</sub> (tons per day)	VOC (tons per day)	VMT (miles per day)
2011 Base Year	239.07	102.24	191,251,636
2020 Attainment Year	97.49	56.73	231,949,231

**Table 4-16: HGB RFP On-Road Mobile Controlled NO<sub>x</sub> Emissions, VOC Emissions, and Vehicle Miles Traveled**

RFP Analysis Year	NO <sub>x</sub> (tons per day)	VOC (tons per day)	VMT (miles per day)
2011 Base Year	168.60	80.45	145,136,623
2020 Attainment Year	79.48	52.21	193,683,005



**Figure 4-1: 2011 and 2020 DFW and HGB RFP VMT Trends (miles per day)**

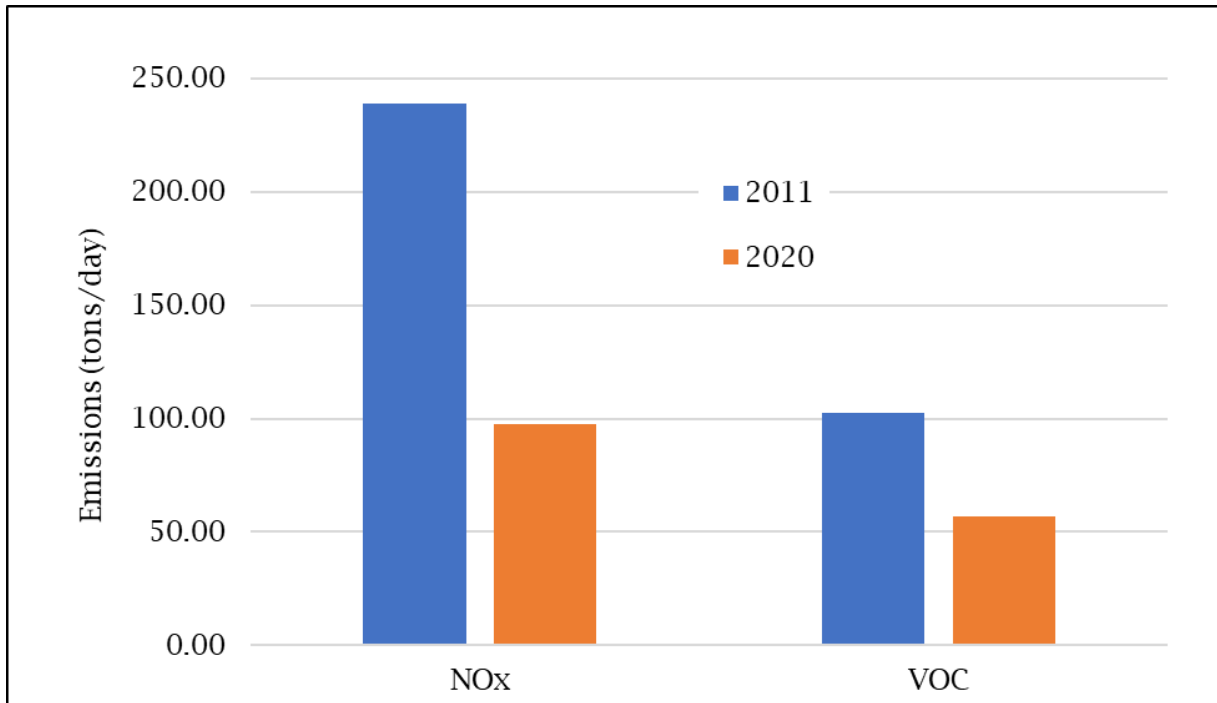


Figure 4-2: DFW 2011 and 2020 RFP NO<sub>x</sub> and VOC Emissions (tons per day)

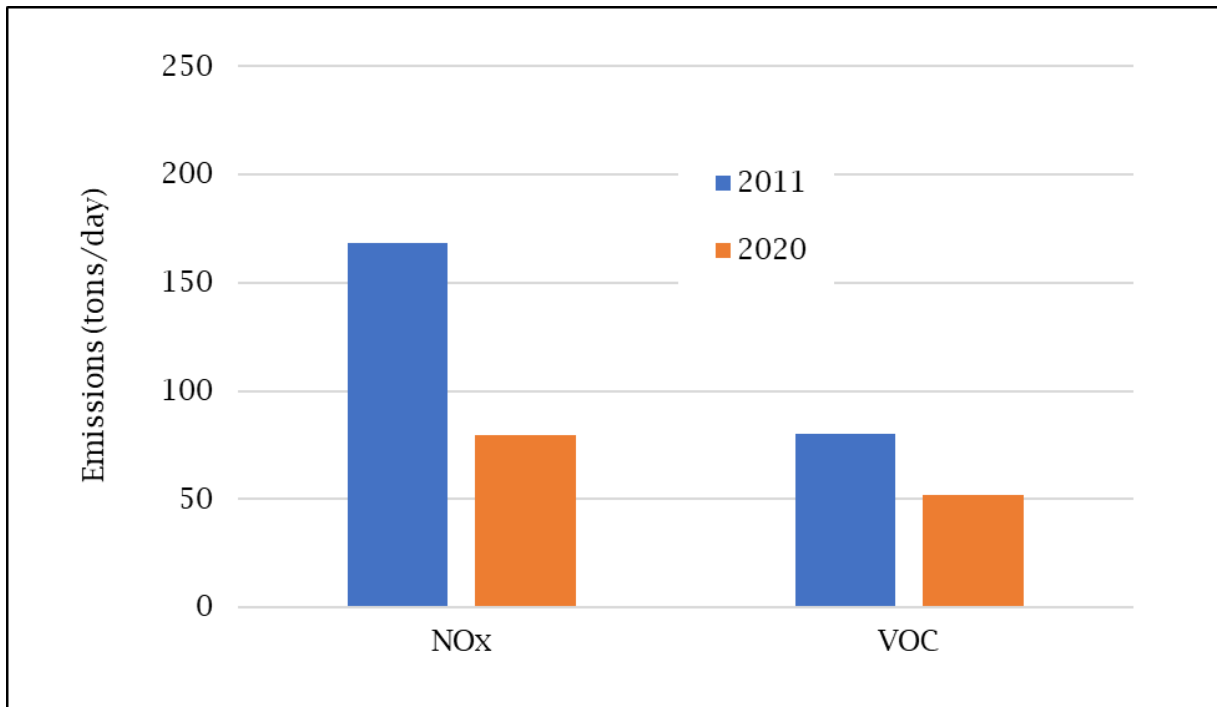


Figure 4-3: HGB 2011 and 2020 RFP NO<sub>x</sub> and VOC Emissions (tons per day)

#### 4.7 CONTINGENCY MEASURES

The RFP requirements include a 3% contingency demonstration for the one-year period after each RFP analysis year and the one-year period after the attainment year. In the

event an RFP requirement is not met, the contingency control measures will provide the required emissions reduction. For this DFW and HGB RFP SIP revision, the only RFP analysis year is the attainment year. As with the 3% per year reduction requirement, the 3% contingency requirement is based on the RFP base year EI and may be met using VOC and/or NO<sub>x</sub> reductions. This section contains an attainment year RFP contingency demonstration based on the 2020 attainment year.

The 3% attainment year RFP contingency analysis is based on a 2% reduction in NO<sub>x</sub> and a 1% reduction in VOC for the DFW area and a 3% reduction in NO<sub>x</sub> only (no VOC reduction) for the HGB area to be achieved for the one-year period from January 1, 2021 through December 31, 2021. EI analyses were performed for fuel control programs and for the fleet turnover effects for the federal emissions certification programs for on-road and non-road vehicles. The emissions reductions for the year between 2020 and 2021 were estimated for those programs in both the DFW and HGB areas. Controlled (post-control) emissions reductions not previously used in the 2020 RFP demonstration may also be used to satisfy contingency requirements, so the excess emissions reductions from the 2020 RFP demonstration are included in the contingency analysis. This DFW and HGB RFP SIP revision provides for a motor vehicle emissions budget (MVEB) safety margin using some of the excess emissions reductions from the 2020 RFP demonstration; those emissions are subtracted from the amount available to demonstrate RFP contingency for the 2020 attainment year. The MVEB safety margin has been set to use 23.8% of the excess NO<sub>x</sub> reductions and 24.7% of the excess VOC reductions in the DFW area and 59% of the excess NO<sub>x</sub> reductions and 63% of the excess VOC reductions in the HGB area and is reflected in the contingency calculation. Summaries of the 2020 attainment year RFP contingency analyses for DFW and HGB are provided in Table 4-17: *DFW RFP Contingency Demonstration for the 2020 Attainment Year (tons per day unless otherwise noted)* and Table 4-18: *HGB RFP Contingency Demonstration for the 2020 Attainment Year (tons per day unless otherwise noted)*.

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 and HGB areas.

**Table 4-17: DFW RFP Contingency Demonstration for the 2020 Attainment Year (tons per day unless otherwise noted)**

<b>Line</b>	<b>Contingency Demonstration Description</b>	<b>NO<sub>x</sub></b>	<b>VOC</b>
Line 1	2011 base year (BY) emissions inventory	422.04	464.92
Line 2	Percent for 2020 attainment year contingency calculation (total of 3%)	2.00	1.00
Line 3	Required contingency reductions between 2020 and 2021 (BY emissions inventory multiplied by contingency percent: Line 1 multiplied by Line 2)	8.44	4.65
	<b>Control reductions to meet contingency requirements</b>	<b>NO<sub>x</sub></b>	<b>VOC</b>
Line 4	Excess reductions from 2020 RFP demonstration (from Table 3-4: <i>Summary of the 2020 DFW RFP Demonstration [tons per day]</i> )	40.99	23.00

Line	Contingency Demonstration Description	NO <sub>x</sub>	VOC
Line 5	Subtract 2020 RFP demonstration MVEB safety margin from excess reductions from 2020 RFP demonstration (see Appendix 1: <i>DFW Reasonable Further Progress Demonstration Spreadsheet</i> , Sheet 6)	-9.76	-5.68
Line 6	2020 to 2021 emission reductions due to FMVCP, (I/M, RFG/East Texas Regional Low RVP, 2017 low sulfur gasoline standard on-road TxLED, and Ultra-Low Sulfur Diesel (ULSD) (Note: The 10-county DFW area includes counties with federal RFG and counties with Texas Regional Low RVP. The four counties with RFG are: Collin, Dallas Denton and Tarrant. The six counties with Texas Regional Low RVP are: Ellis, Johnson, Kaufman, Parker, Rockwall and Wise)	24.69	9.12
Line 7	2020 to 2021 emission reductions due to federal non-road mobile new vehicle certification standards, non-road RFG, and non-road TxLED	2.75	2.48
Line 8	Total RFP demonstration contingency reductions (sum of Line 4, Line 5, Line 6, and Line 7)	58.67	28.92
Line 9	<b>Contingency Excess (+) or Shortfall (-) (Line 8 minus Line 3)</b>	+ 50.23	+ 24.27

**Table 4-18: HGB RFP Contingency Demonstration for the 2020 Attainment Year (tons per day unless otherwise noted)**

Line	Contingency Demonstration Description	NO <sub>x</sub>	VOC
Line 1	2011 base year (BY) emissions inventory	442.92	535.06
Line 2	Percent for 2020 attainment year contingency calculation (total of 3%)	3.00	0.00
Line 3	Required contingency reductions between 2020 and 2021 (BY emissions inventory multiplied by contingency percent: Line 1 multiplied by Line 2)	13.29	0.00
	<b>Control reductions to meet contingency requirements</b>	<b>NO<sub>x</sub></b>	<b>VOC</b>
Line 4	Excess reductions from 2020 RFP demonstration (from Table 3-5: <i>Summary of the 2020 HGB RFP Demonstration [tons per day]</i> )	13.92	8.72
Line 5	Subtract 2020 RFP demonstration MVEB safety margin from excess reductions from 2020 RFP demonstration (see Appendix 2: <i>HGB Reasonable Further Progress Demonstration Spreadsheet</i> , Sheet 6)	-8.21	-5.49
Line 6	2020 to 2021 emission reductions due to FMVCP, (I/M, RFG, 2017 low sulfur gasoline standard on-road TxLED, and ULSD	24.19	13.05
Line 7	2020 to 2021 emission reductions due to federal non-road mobile new vehicle certification standards, non-road RFG, and non-road TxLED	4.59	2.29
Line 8	Total RFP demonstration contingency reductions (sum of Line 4, Line 5, Line 6, and Line 7)	34.49	18.57
Line 9	<b>Contingency Excess (+) or Shortfall (-) (Line 8 minus Line 3)</b>	+21.20	+18.57

## CHAPTER 5: MOTOR VEHICLE EMISSIONS BUDGET

### 5.1 INTRODUCTION

The Dallas-Fort Worth (DFW) and Houston-Galveston-Brazoria (HGB) 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 and HGB 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 inventories. Local transportation planning organizations use applicable 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 (40 Code of Federal Regulations (CFR) Part 93, Subpart A).

The on-road mobile source emissions inventories and the corresponding MVEBs for this DFW and HGB RFP SIP revision were developed using the latest major revision to the United States Environmental Protection Agency's (EPA) mobile source emission model, the Motor Vehicle Emission Simulator (MOVES) 2014 model, MOVES2014a.<sup>13</sup> The Texas Commission on Environmental Quality (TCEQ), working with the North Central Texas Council of Governments (NCTCOG), and the Texas A&M Transportation Institute (TTI), recently completed development of 2011, 2020, and 2021 on-road emission inventories using MOVES2014a for the DFW and HGB areas, respectively. The planning assumptions, fleet characteristics, and vehicle miles traveled estimates were updated to incorporate the latest available information at the time the inventories and MVEBs were developed.

### 5.2 OVERVIEW OF METHODOLOGIES AND ASSUMPTIONS

The TCEQ developed updated on-road mobile source emissions inventories and control strategy reduction estimates using the latest planning assumptions and the EPA's MOVES2014a emissions factor model. Updated emissions inventory (EI) development included development of a 2011 base year EI, uncontrolled emissions inventories for 2020 and 2021, controlled emissions inventories for 2020 and 2021, and control strategies reduction estimates for 2020 and 2021. The TCEQ contracted NCTCOG and TTI to develop the RFP emissions inventories and control strategies reductions for the DFW and HGB areas, respectively. Detailed documentation of the on-road mobile EI development is provided in the contractor reports:

- Appendix 13: *Dallas-Fort Worth MOVES2014a-Based Reasonable Further Progress On-road Inventories and Control Strategy Reductions for 2011, 2017, 2018, 2020, and 2021*; and
- Appendix 14: *Production of HGB Reasonable Further Progress On-Road Mobile Emissions Inventories*.

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<sup>13</sup> For on-road EI development, MOVES2014a is technically the most recent on-road release. The more recent MOVES2014b update only impacts non-road model components and does not change the on-road portion of the model.

### 5.3 MOTOR VEHICLE EMISSIONS BUDGETS FOR RFP ANALYSIS YEARS

The RFP MVEBs use the on-road mobile source emissions inventories for RFP analysis 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. However, the amount of the safety margin cannot exceed the nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOC) emissions reductions required for the RFP demonstration. This ensures that even if the safety margin is used for a transportation conformity determination, the DFW and HGB 2008 eight-hour ozone nonattainment areas will meet the 2008 eight-hour ozone standard RFP requirements. Summaries of the MVEB calculations for 2020 are presented in:

- Table 5-1: 2020 RFP MVEBs for the DFW 10-County Ozone Nonattainment Area (tons per day); and
- Table 5-2: 2020 RFP MVEBs for the HGB Eight-County Ozone Nonattainment Area (tons per day).

Details for MVEB calculations are documented in Appendix 1: *DFW Reasonable Further Progress Demonstration Spreadsheet* for the DFW area and in Appendix 2: *HGB Reasonable Further Progress Demonstration Spreadsheet* for the HGB area. The RFP control strategies produce more than the required emissions reductions for the 2020 attainment year in both the DFW and HGB nonattainment areas. Some of the excess in emissions reductions for the 2020 attainment years is used to provide MVEB safety margins. In the DFW area, these MVEB safety margins are 10.01% for NO<sub>x</sub> and 10.01% for VOC. The DFW percentage safety margins represent 23.8% of the excess NO<sub>x</sub> reductions and 24.7% of the excess VOC reductions. In the HGB area, these MVEB safety margins are 10.33% for NO<sub>x</sub> and 10.52% for VOC. The HGB percentage safety margins represent 59% of the excess NO<sub>x</sub> reductions and 63% of the excess VOC reductions. These safety margins are less than the total emissions reductions needed for the RFP demonstration in both the DFW and HGB areas. Therefore, even if this safety margin is used, the DFW and HGB areas will still demonstrate RFP for 2020.

**Table 5-1: 2020 RFP MVEBs for the DFW 10-County Ozone Nonattainment Area (tons per day)**

Control Strategy Description	NO <sub>x</sub>	VOC
2020 on-road emissions projection without post-1990 Federal Clean Air Act (FCAA) controls	957.90	370.27
Federal Motor Vehicle Control Program (FMVCP), inspection and maintenance (I/M), reformulated gasoline (RFG), East Texas Regional Low Reid Vapor Pressure Gasoline Program, on-road Texas low emission diesel (TxLED), and ultra-low sulfur diesel (ULSD).	860.41	313.54
2020 on-road emissions projection with post-1990 FCAA controls (uncontrolled emissions inventory minus control reductions)	97.49	56.73
Add transportation conformity safety margin	9.76	5.68
<b>2020 DFW RFP MVEBs with safety margin</b>	<b>107.25</b>	<b>62.41</b>



**Table 5-2: 2020 RFP MVEBs for the HGB Eight-County Ozone Nonattainment Area (tons per day)**

<b>Control Strategy Description</b>	<b>NO<sub>x</sub></b>	<b>VOC</b>
2020 on-road emissions projection without post-1990 FCAA controls	750.39	322.18
FMVCP, I/M, RFG, on-road TxLED, and ULSD	670.91	269.97
2020 on-road emissions projection with post-1990 FCAA controls (uncontrolled emissions inventory minus control reductions)	79.48	52.21
Add transportation conformity safety margin	8.21	5.49
<b>2020 HGB RFP MVEBs with safety margin</b>	<b>87.69</b>	<b>57.70</b>

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*Appendices Available Upon Request*

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**RESPONSE TO COMMENTS RECEIVED CONCERNING THE  
DALLAS-FORT WORTH (DFW) AND HOUSTON-  
GALVESTON-BRAZORIA (HGB) SERIOUS CLASSIFICATION  
REASONABLE FURTHER PROGRESS (RFP) STATE  
IMPLEMENTATION PLAN (SIP) REVISION FOR THE 2008  
EIGHT-HOUR OZONE NATIONAL AMBIENT AIR QUALITY  
STANDARDS (NAAQS)**

The Texas Commission on Environmental Quality (commission or TCEQ) offered two public hearings; one in Houston on October 14, 2019, at 2:00 p.m. and the other in Arlington on October 17, 2019, at 2:00 p.m. TCEQ staff were present and ready to open both hearings for public comment; however, no attendees arrived to make comments on the record at either hearing. Therefore, the public hearings were not formally opened for comment. During the comment period, which closed on October 28, 2019, the commission received a comment from Earthjustice on behalf of Achieving Community Tasks Successfully, Air Alliance Houston, Earthjustice, Sierra Club, and Texas Environmental Justice Advocacy Services (Earthjustice).

In this response to comments, the commission uses “HGB area” to refer to the 2008 eight-hour ozone nonattainment area, consisting of Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties, unless otherwise specified.

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General Comments

**GENERAL COMMENTS**

Earthjustice commented that 2014 vehicle registration data were used to calculate RFP for the HGB area and that the vehicle registration data used to develop the HGB area on-road emissions inventories should be based on a more recent calendar year than 2014. Earthjustice noted that the vehicle registration database is updated on a daily basis.

**The TCEQ agrees that, in most circumstances, using the most recent, Texas-specific, quality-assured vehicle registration data is the best approach when developing representative age distribution inputs for future year on-road emissions inventories. The on-road emissions inventories for this DFW and HGB RFP SIP revision were under development in late 2018 and early 2019. During the development of the RFP on-road inventories, the TCEQ evaluated the results of 2018 registration database queries. A quality assurance review of the data queried identified problems, including significant errors in vehicle counts, trailers identified as on-road vehicles, and potential data duplication that prevented the development of representative vehicle population and age distribution inputs. Since registration database queries are “snapshots” taken at a point in time, a retroactive 2018 mid-year query could not be performed. This left the 2014 Texas-specific registration data as the most recent, quality-assured data; therefore, the TCEQ elected to use the 2014 data for this DFW and HGB RFP SIP revision.**

# Texas Commission on Environmental Quality



## ORDER ADOPTING REVISIONS TO THE STATE IMPLEMENTATION PLAN

**Docket No. 2019-0660-SIP  
Project No. 2019-079-SIP-NR**

On March 4, 2020, the Texas Commission on Environmental Quality (Commission), during a public meeting, considered adoption of the Dallas-Fort Worth (DFW) and Houston-Galveston-Brazoria (HGB) Serious Classification Reasonable Further Progress (RFP) State Implementation Plan (SIP) Revision for the 2008 Eight-Hour Ozone Standard. The commission adopts the DFW and HGB 2008 Eight-Hour Ozone Serious Classification RFP SIP Revision. This RFP SIP revision demonstrates that the DFW and HGB 2008 eight-hour ozone nonattainment areas will achieve emissions reductions in ozone precursors (volatile organic compounds (VOC) and/or nitrogen oxides (NO<sub>x</sub>) consistent with the serious ozone nonattainment area requirements of FCAA, §182(c)(2)(B) and the 2008 eight-hour ozone standard SIP requirements rule according to the following increments: a 9% emissions reduction in NO<sub>x</sub> and/or VOC for all counties in each area for the three-year period from January 1, 2018 through December 31, 2020; and a 3% emissions reduction in NO<sub>x</sub> and/or VOC for the one-year period from January 1, 2021 through December 31, 2021 for all counties in each area as an attainment year RFP contingency. This SIP revision also provides motor vehicle emissions budgets (MVEB) for the 2020 attainment year. This SIP revision demonstrates RFP for the DFW and HGB serious nonattainment areas for the 2020 attainment year as well as the 2021 contingency year. Under Tex. Health & Safety Code Ann. §§ 382.011, 382.012, and 382.023 (West 2016), the Commission has the authority to control the quality of the state's air and to issue orders consistent with the policies and purposes of the Texas Clean Air Act, Chapter 382 of the Tex. Health & Safety Code. Notice of the proposed SIP revision was published for comment in the September 27, 2019, issue of the *Texas Register* (44 TexReg 5658).

Pursuant to Tex. Health & Safety Code Ann. § 382.017 (West 2016), Tex. Gov't Code Ann., Chapter 2001 (West 2016), and 40 Code of Federal Regulations § 51.102, and after proper notice, the Commission offered public hearings to consider the revisions to the SIP. Proper notice included prominent advertisement in the areas affected at least 30 days prior to the dates of the hearings. Public hearings were offered in Houston on October 14, 2019 and in Arlington on October 17, 2019.

The Commission circulated hearing notices of its intended action to the public, including interested persons, the Regional Administrator of the EPA, and all applicable local

air pollution control agencies. The public was invited to submit data, views, and recommendations on the proposed SIP revisions, either orally or in writing, at the hearings or during the comment period. Prior to the scheduled hearings, copies of the proposed SIP revisions were available for public inspection at the Commission's central office and on the Commission's website.

Data, views, and recommendations of interested persons regarding the proposed SIP revisions were submitted to the Commission during the comment period and were considered by the Commission as reflected in the analysis of testimony incorporated by reference to this Order. The Commission finds that the analysis of testimony includes the names of all interested groups or associations offering comment on the proposed SIP revisions and their position concerning the same.

IT IS THEREFORE ORDERED BY THE COMMISSION that the DFW and HGB 2008 Eight-Hour Ozone Serious Classification RFP SIP Revision, incorporated by reference to this Order are hereby adopted. The Commission further authorizes staff to make any non-substantive revisions to the rules necessary to comply with *Texas Register* requirements. The adopted revisions to the SIP are incorporated by reference in this Order as if set forth at length verbatim in this Order.

IT IS FURTHER ORDERED BY THE COMMISSION that on behalf of the Commission, the Chairman should transmit a copy of this Order, together with the adopted revisions to the SIP, to the Regional Administrator of EPA as a proposed revision to the Texas SIP pursuant to the Federal Clean Air Act, codified at 42 U.S. Code Ann. §§ 7401 - 7671q, as amended.

This Order constitutes the Order of the Commission required by the Administrative Procedure Act, Tex. Gov't Code Ann., Chapter 2001 (West 2016).

If any portion of this Order is for any reason held to be invalid by a court of competent jurisdiction, the invalidity of any portion shall not affect the validity of the remaining portions.

TEXAS COMMISSION ON  
ENVIRONMENTAL QUALITY

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Jon Niermann, Chairman

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Date Signed