TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AGENDA ITEM REQUEST

for State Implementation Plan Revision Adoption

AGENDA REQUESTED: July 1, 2015

DATE OF REQUEST: June 12, 2015

INDIVIDUAL TO CONTACT REGARDING CHANGES TO THIS REQUEST, IF NEEDED: Joyce Spencer-Nelson, (512) 239-5017

CAPTION: Docket No. 2014-1248-SIP. Consideration of the adoption of the State Implementation Plan (SIP) Revision for the Houston-Galveston-Brazoria (HGB) Area Redesignation Substitute for the One-Hour Ozone National Ambient Air Quality Standard (NAAQS).

The redesignation substitute satisfies the anti-backsliding obligations for the revoked one-hour ozone NAAQS and ensures that the substance of the redesignation requirements is met for the HGB area. The HGB area includes: Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties. The redesignation substitute takes the place of a redesignation request and maintenance plan, which the United States Environmental Protection Agency normally requires under a standard that has not been revoked. (Melanie Rousseau, John Minter) (Non-Rule Project No. 2014-011-SIP-NR)

Steve Hagle, P.E.
Deputy Director

David Brymer
Division Director

Joyce Nelson
Agenda Coordinator

Copy to CCC Secretary? NO X YES

Texas Commission on Environmental Quality
Interoffice Memorandum

To: Commissioners **Date:** June 12, 2015

Thru: Bridget C. Bohac, Chief Clerk
Richard A. Hyde, P.E., Executive Director

From: Steve Hagle, P.E., Deputy Director
Office of Air

Docket No.: 2014-1248-SIP

Subject: Commission Approval for Adoption of the Houston-Galveston-Brazoria (HGB) Area Redesignation Substitute for the One-Hour Ozone National Ambient Air Quality Standard (NAAQS) State Implementation Plan (SIP) Revision

HGB Redesignation Substitute SIP Revision
Non-Rule Project No. 2014-011-SIP-NR

Background and reason(s) for the rulemaking:
The HGB area is classified as severe nonattainment for the one-hour and the 1997 eight-hour ozone NAAQS. For the 2008 eight-hour ozone standard, the area is classified as marginal. While the one-hour ozone NAAQS was revoked in the June 15, 2005 *Federal Register* (69 FR 23951), the HGB area is still subject to anti-backsliding requirements. The HGB one-hour ozone nonattainment area includes Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties. On May 30, 2014, the United States Environmental Protection Agency (EPA) verified that the 2013 ambient air monitoring data for ozone met all data quality requirements for attaining the one-hour ozone standard. This redesignation substitute (RS) SIP revision is a follow-up to that data and the redesignation substitute report that was submitted in July 2014.

The EPA set the one-hour ozone standard at 0.12 parts per million (ppm) or 124 parts per billion (ppb) in the February 8, 1979 *Federal Register* (44 FR 4202). Under a severe classification, the HGB area was given until November 15, 2007 to attain the one-hour ozone NAAQS; however, the area did not monitor attainment by that date. The EPA published a proposed determination that the HGB area did not attain the one-hour NAAQS by its attainment date in the February 1, 2012 *Federal Register* (77 FR 36400).

In 1997, the one-hour ozone NAAQS was replaced by the eight-hour ozone NAAQS. Although the one-hour ozone standard has been revoked, states must continue to meet one-hour ozone anti-backsliding requirements described in 40 Code of Federal Regulations §51.905(a).

The three anti-backsliding requirements that apply to the HGB severe one-hour ozone nonattainment area are contingency measures, a penalty fee provision, and new source review (NSR) permitting requirements for severe nonattainment areas.[1] The anti-

[1] South Coast v. EPA, 472 F.3d 882 (D.C. Cir. 2006), directed the EPA to provide one-hour ozone NAAQS anti-backsliding requirements for nonattainment NSR, §185 fees, and §172(c)(9) and §182(c)(9) contingency

backsliding requirement for contingency measures under Federal Clean Air Act (FCAA), §172(c)(9) and §182(c)(9) has already been implemented in the HGB area,[2] and a final determination of failure to attain does not trigger additional emission reductions. The anti-backsliding requirement to implement a penalty fee program under FCAA, §182(d)(3) and §185 was triggered with the EPA's failure-to-attain determination, and it continues to apply to the HGB one-hour ozone nonattainment area unless the obligation is terminated. On May 22, 2013, the commission adopted rules under 30 TAC Chapter 101, Subchapter B to implement these FCAA provisions.

As part of its 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 Texas Commission on Environmental Quality (TCEQ) requested that the EPA render 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.[3] Consequently, on May 22, 2013, the commission adopted the Severe Ozone Nonattainment Area Failure to Attain Fees rulemaking (Rule Project No. 2009-009-101-AI) to implement the §185 penalty fee.

The 2011 through 2013 average exceedances of the 0.12 ppm one-hour ozone NAAQS for each monitor in the HGB area was less than 1.0 days per year, and therefore, the area is attaining the one-hour ozone standard. On March 7, 2014, the TCEQ submitted to the EPA a certification evaluation and concurrence report for early certification of 2013 ambient air monitoring data for ozone along with a request for a finding of attainment for the HGB area for the revoked one-hour ozone NAAQS. On May 30, 2014, the EPA concurred that the data submitted met all the quality requirements, and that the HGB area meets the one-hour ozone standard.[4] The HGB area continued to monitor attainment of the standard in 2014. As of May 1, 2015, the HGB area continues to monitor attainment of the one-hour ozone standard.

The EPA has published determinations of attainment (or clean data determinations) for areas that were nonattainment when a standard was revoked and for which attainment of that revoked standard was subsequently achieved, including the four-county Dallas-Fort Worth one-hour ozone nonattainment area in 2008. However, a clean data determination would only suspend planning requirements and would not suspend or lift anti-backsliding obligations.

---

measures for failure to attain the one-hour ozone NAAQS by the applicable attainment date or to make reasonable further progress toward attainment of that standard.

[2] The EPA-approved one-hour ozone attainment demonstration and Rate of Progress SIP revisions included contingency measures (71 FR 52670, 70 FR 7407, 66 FR 57195, and 66 FR 20750).

[3] On July 1, 2011, the District Court of Columbia Circuit Court of Appeals vacated EPA's memorandum "Guidance on Developing Fee Programs Required by Clean Air Act Section 185 for the one-hour ozone NAAQS," ruling that EPA's suggested alternative relating to attainment of the eight-hour ozone standard was not consistent with the FCAA.

[4] Mark Hansen, Acting Associate Director for Air Programs, EPA. Letter to Richard A. Hyde, Executive Director, TCEQ. 30 May 2014.

Re: Docket No. 2014-1248-SIP

The EPA's *Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule* (2008 ozone standard SIP requirements rule), published in the *Federal Register* on March 6, 2015 (80 FR 12264), includes a mechanism for lifting anti-backsliding obligations under a revoked ozone NAAQS. According to the EPA's rule, a state can provide a showing, termed a "redesignation substitute," based on FCAA, §107(d)(3)(E) redesignation criteria to demonstrate that an area qualifies for lifting anti-backsliding obligations under a revoked standard. The EPA's approval of the showing would have the same effect on the area's nonattainment anti-backsliding obligations as would a redesignation to attainment for the revoked standard.

The EPA did not finalize a proposed NSR anti-backsliding rule for the one-hour ozone NAAQS and has indicated that it does not intend to do so. Instead, in its 2008 ozone standard SIP requirements rule, the EPA addresses all outstanding NSR anti-backsliding issues for both the one-hour and 1997 eight-hour ozone NAAQS. At this time, the EPA indicated that areas like HGB that are designated nonattainment for the 2008 eight-hour ozone NAAQS must continue to implement the most stringent NSR requirement that applied to the area (whether under the one-hour standard, the 1997 eight-hour standard, or the 2008 eight-hour standard) to which the area is still subject. Because the HGB area is also classified as severe nonattainment for the 1997 eight-hour ozone NAAQS, severe area NSR permitting requirements would still apply if this redesignation substitute is approved by the EPA. To terminate severe area NSR permitting requirements altogether, the area would have to monitor attainment of the 1997 eight-hour ozone NAAQS and a redesignation substitute would have to be approved by the EPA for that standard or, potentially, a later standard. However, the §182(d)(3) and §185 penalty fee requirement for the one-hour ozone NAAQS would be terminated.

Scope of the SIP revision:

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

The redesignation substitute satisfies the anti-backsliding obligations for the revoked one-hour ozone NAAQS and ensures that the substance of the redesignation requirements is met for the HGB area. The redesignation substitute takes the place of a redesignation request and maintenance plan, which the EPA normally requires under a standard that has not been revoked.

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

According to the EPA's 2008 ozone standard SIP requirements rule, the redesignation substitute is based on FCAA, §107(d)(3)(E) redesignation criteria with the exception of certain elements. While the 2008 ozone standard SIP requirements rule does not require formal SIP submission procedures for the redesignation substitute process, the EPA will conduct notice-and-comment rulemaking on the state's submittal. The redesignation substitute includes the following:

- monitoring data showing attainment of the revoked one-hour ozone NAAQS;
- a showing that attainment was due to permanent and enforceable emissions reductions; and

- a demonstration that the area can maintain the standard over the next 10 years.

The HGB area is monitoring attainment of the one-hour ozone NAAQS. The redesignation substitute provides verification of continued attainment of the one-hour ozone standard through 2026 (based on estimated EPA approval no later than 2016) via emissions inventory trends, 2011 attainment inventory, and future emissions.

C.) Additional staff recommendations that are not required by federal rule or state statute:
Although the EPA's 2008 ozone standard SIP requirements rule indicates that public notice and comment are not required, staff recommends following the formal SIP notice and comment process should submittal be necessary.

A redesignation substitute demonstration for the HGB area was sent to the EPA in July 2014 in the form of a letter and attached report.

Statutory authority:
The redesignation substitute would be adopted under Texas Health and Safety Code, §382.002, Policy and Purpose; and §382.012, State Air Control Plan. The redesignation substitute would also be adopted under the commission's general authority under Texas Water Code, §5.102, General Powers; and §5.103, General Jurisdiction of Commission.

Effect on the:
A.) Regulated community:
If this redesignation substitute is approved by the EPA, anti-backsliding obligations under the revoked one-hour ozone NAAQS, including the §182(d)(3) and §185 fee programs, would be lifted for the HGB area.

B.) Public:
The public would benefit from continued maintenance of air quality.

C.) Agency programs:
If this redesignation substitute is approved by the EPA, staff resources would no longer be needed to maintain the §182(d)(3) and §185 fee programs.

Stakeholder meetings:
Because there were no new rules associated with the redesignation substitute, no stakeholder meetings were held.

Public comment:
A public hearing was held on January 6, 2015 at the Texas Department of Transportation District Office Auditorium located at 7600 Washington Avenue, Houston, TX 77007. The hearing was not opened because there were no attendees who signed in to speak. Public hearing notices for this HGB RS SIP revision were published in the *Texas Register,* the *Houston Chronicle,* and the *Austin American Statesman.*

Re: Docket No. 2014-1248-SIP

The public comment period opened on December 5, 2014 and was originally scheduled to close on January 9, 2015. However, a supplement to the proposed HGB RS SIP revision was issued by the TCEQ on December 18, 2014 to provide supplemental information regarding MOVES2014 model-based on-road mobile source emissions estimates that became available after the SIP revision was approved for proposal by the commission on November 19, 2014. Due to the supplemental technical information, the comment period for the proposed SIP revision was extended to January 18, 2015 to allow a full 30-day comment period for all components of the proposed SIP package.

During the comment period, staff received comments from Texas Oil and Gas Association and Baker Botts L.L.P. on behalf of the Section 185 Working Group. Generally, the comments stated support for the HGB RS SIP; additional comments discussed the pending exceptional event request previously submitted to the EPA, and the burdens imposed by anti-backsliding requirements such as NSR and penalty fee provisions.

Significant changes from proposal:
The HGB RS SIP revision was proposed with on-road mobile source emissions inventories developed using the Motor Vehicle Emission Simulator (MOVES) 2010b model. During the public comment period, the TCEQ took comment on using the EPA's MOVES2014 model. Between proposal and adoption, a final on-road mobile source emissions inventory was completed using the MOVES2014 model. The final MOVES2014-based on-road mobile source emissions inventories were used to develop the analysis presented in this SIP revision.

As a result of the update to MOVES2014, on-road emissions inventories now include the effects of the Tier 3 Federal Motor Vehicle Control Program and the associated lower sulfur gasoline in the on-road mobile control strategies that were previously not available in MOVES2010b.The net change includes additional decreases in emissions of VOC and NO_X due to the substitution of the MOVES2010b-based emissions calculations with MOVES2014-based emissions calculations. All redesignation substitute requirements continue to be met with the inclusion of MOVES2014-based emissions calculations.

Potential controversial concerns and legislative interest:
If the HGB area were to violate the one-hour ozone NAAQS prior to the EPA reviewing the redesignation substitute, it may not be approvable by the EPA, and the anti-backsliding requirements would still apply.

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 adopt the redesignation substitute SIP revision, in which case the one-hour ozone anti-backsliding requirements may continue to apply and fee programs under §182(d)(3) and §185 would potentially need to be submitted to the

EPA. However, the EPA has recently indicated an intention to act on the redesignation substitute letter and report submitted in July 2014, and may do so as early as May 2015.[5] In the event that the EPA approves the letter and report, submittal of this SIP revision may no longer be required in order to remove anti-backsliding requirements under the one-hour ozone standard.

Agency contacts:
Melanie Rousseau, SIP Project Manager, (512) 239-0707, Air Quality Division
John Minter, Staff Attorney, (512) 239-0469
Joyce Spencer-Nelson, Division Liaison, (512) 239-5017

cc: Chief Clerk, 2 copies
Executive Director's Office
Marshall Coover
Pattie Burnett
Stephen Tatum
Office of General Counsel
Melanie Rousseau
Joyce Spencer-Nelson

[5] Wren Stenger, Director of Multimedia Planning and Permitting Division, EPA. Letter to Steve Hagle, P.E., Deputy Director for the Office of Air, TCEQ. 20 November 2014.

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

HOUSTON-GALVESTON-BRAZORIA ONE-HOUR OZONE STANDARD NONATTAINMENT AREA

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

HOUSTON-GALVESTON-BRAZORIA AREA REDESIGNATION SUBSTITUTE FOR THE ONE-HOUR OZONE NATIONAL AMBIENT AIR QUALITY STANDARD STATE IMPLEMENTATION PLAN REVISION

2014-011-SIP-NR

Adoption
July 1, 2015

This page intentionally left blank

EXECUTIVE SUMMARY

The Houston-Galveston-Brazoria (HGB) area (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties) was classified as a severe nonattainment area in 1990 for the one-hour ozone National Ambient Air Quality Standard (NAAQS), which was revoked on June 15, 2005 (69 *Federal Register* (FR) 23951). The one-hour ozone standard was set at 0.12 parts per million (ppm) or 124 parts per billion (ppb) in 1979 (44 FR 4202). Under a severe classification, the HGB area was given until November 15, 2007 to attain the one-hour ozone NAAQS; however, the area did not monitor attainment by that date. The United States Environmental Protection Agency (EPA) published a proposed determination that the HGB area did not attain the one-hour NAAQS by its attainment date in the February 1, 2012 *Federal Register* (77 FR 36400). Subsequently the HGB area began monitoring attainment of the one-hour ozone NAAQS in 2013.

In 1997, the one-hour ozone NAAQS was replaced by the eight-hour ozone NAAQS. Although the one-hour standard has been revoked, states must continue to meet one-hour ozone anti-backsliding requirements described in 40 Code of Federal Regulations §51.905(a).[1]

The three anti-backsliding requirements that apply to the HGB severe one-hour ozone nonattainment area are contingency measures, a penalty fee provision, and new source review (NSR) permitting requirements for severe nonattainment areas.[2] The anti-backsliding requirement for contingency measures under Federal Clean Air Act (FCAA), §172(c)(9) and §182(c)(9) has already been achieved in the HGB area,[3] and a final determination of failure to attain does not trigger additional emission reductions. The anti-backsliding requirement to implement a penalty fee program under FCAA, §182(d)(3) and §185 was triggered with the EPA's failure-to-attain determination, and it continues to apply to the HGB one-hour ozone nonattainment area unless the obligation is terminated. On May 22, 2013, the commission adopted rules under 30 Texas Administrative Code Chapter 101, Subchapter B to implement the FCAA penalty fee provisions.

As part of its transition from 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 Texas Commission on Environmental Quality (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.[4] As a result, on May 22, 2013, the commission adopted the Severe Ozone

---

[1] South Coast v. EPA, 472 F.3d 882 (D.C. Cir. 2006), directed the EPA to provide one-hour ozone NAAQS anti-backsliding requirements for nonattainment NSR, §185 fees, and §172(c)(9) and §182(c)(9) contingency measures for failure to attain the one-hour ozone NAAQS by the applicable attainment date or to make reasonable further progress toward attainment of that standard.

[2] South Coast v. EPA, 472 F.3d 882 (D.C. Cir. 2006), directed the EPA to provide one-hour ozone NAAQS anti-backsliding requirements for nonattainment NSR, §185 fees, and §172(c)(9) and §182(c)(9) contingency measures for failure to attain the one-hour ozone NAAQS by the applicable attainment date or to make reasonable further progress toward attainment of that standard.

[3] The EPA-approved one-hour ozone attainment demonstration and Rate of Progress SIP revisions included contingency measures (71 FR 52670, 70 FR 7407, 66 FR 57195, and 66 FR 20750).

[4] On July 1, 2011, the District Court of Columbia Circuit Court of Appeals vacated EPA's memorandum "Guidance on Developing Fee Programs Required by Clean Air Act Section 185 for the one-hour ozone

Nonattainment Area Failure to Attain Fees rulemaking (Rule Project No. 2009-009-101-AI) to implement the §185 penalty fee.

Based on 2011 through 2013 monitoring data, the average number of exceedances of the 0.12 ppm one-hour ozone NAAQS for each monitor in the HGB area is less than 1.0 days per year, and therefore, the area is attaining the one-hour ozone standard. On March 7, 2014, the TCEQ submitted to the EPA a certification evaluation and concurrence report for early certification of 2013 ambient air monitoring data for ozone along with a request for a finding of attainment for the HGB area for the revoked one-hour ozone NAAQS. On May 30, 2014, the EPA verified that the 2013 ambient air monitoring data for ozone met all data quality requirements for attaining the one-hour ozone standard[5]. The HGB area continued to monitor attainment of the standard in 2014. As of May 1, 2015, the HGB area continues to monitor attainment of the one-hour ozone standard.

The EPA has published determinations of attainment (or clean data determinations) for areas that were nonattainment when a standard was revoked and for which attainment of that revoked standard was subsequently achieved, including the four-county Dallas-Fort Worth one-hour ozone nonattainment area in 2008. However, a clean data determination would only suspend planning requirements and would not suspend or lift anti-backsliding obligations.

The EPA's *Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule* (2008 ozone standard SIP requirements rule), published in the *Federal Register* on March 6, 2015 (80 FR 12264), includes a mechanism for lifting anti-backsliding obligations under a revoked ozone NAAQS. According to the EPA's proposal, a state can provide a showing, termed a redesignation substitute, based on FCAA, §107(d)(3)(E) redesignation criteria to demonstrate that an area qualifies for lifting anti-backsliding obligations under a revoked standard. The EPA's approval of the showing would have the same effect on the area's nonattainment anti-backsliding obligations as would a redesignation to attainment for the revoked standard.

The EPA did not finalize a proposed NSR anti-backsliding rule for the one-hour ozone NAAQS, and has indicated that it does not intend to do so. Instead, in its 2008 ozone standard SIP requirements rule, the EPA addresses all outstanding NSR anti-backsliding issues for both the one-hour and 1997 eight-hour ozone NAAQS. At this time, the EPA has indicated that areas like HGB that are designated nonattainment for the 2008 eight-hour ozone NAAQS must continue to implement the most stringent NSR requirement that applied to the area (whether under the one-hour standard, the 1997 eight-hour standard, or the 2008 eight-hour standard) to which the area is still subject. Because the HGB area is also classified as severe nonattainment for the 1997 eight-hour ozone NAAQS, severe area NSR permitting requirements would still apply if this redesignation substitute is approved by the EPA. To terminate severe area NSR permitting requirements altogether, the area would have to monitor attainment of the 1997 eight-hour ozone NAAQS and a redesignation or redesignation substitute would have to be approved by the EPA for that standard or potentially a later standard. However, the §182(d)(3) and §185 penalty fee requirement for the one-hour ozone NAAQS would be terminated upon approval of a redesignation substitute.

NAAQS," ruling that the EPA's suggested alternative relating to attainment of the eight-hour ozone standard was not consistent with the FCAA.

[5] Mark Hansen, Acting Associate Director for Air Programs, EPA. Letter to Richard A. Hyde, Executive Director, TCEQ. 30 May 2014.

The HGB redesignation substitute (RS) satisfies the EPA's requirements 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.

The HGB RS SIP revision was proposed with on-road mobile source emissions inventories determined using the Motor Vehicle Emission Simulator (MOVES) 2010b model. During the public comment period, the TCEQ took comment on using the EPA's MOVES2014 model. Between proposal and adoption, a final on-road mobile source emissions inventory was completed using the MOVES2014 model. The final MOVES2014-based on-road mobile source emissions inventories were used to develop the analysis presented in this SIP revision. The revised MOVES2014 emissions estimates do not impact the demonstration that the HGB area will continue to attain the one-hour ozone NAAQS. The results for all maintenance analysis years continue to project a decrease of volatile organic compounds (VOC) and nitrogen oxides (NOx) from the 2011 base year. Between the maintenance base year, 2011, and the maintenance horizon year, 2026, there is an additional decrease in emissions of 3.62 tons per day (tpd) for VOC and 11.06 tpd for NO_X using MOVES2014 results.

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, and 2013. In 1989, the TCAA was codified as Chapter 382 of the Texas Health and Safety Code.

Originally, the TCAA stated that the Texas Air Control Board (TACB) is the state air pollution control agency and is the principal authority in the state on matters relating to the quality of air resources. In 1991, the legislature abolished the TACB effective September 1, 1993, and its powers, duties, responsibilities, and functions were transferred to the Texas Natural Resource Conservation Commission (TNRCC). With the creation of the TNRCC, the authority over air quality is found in both the Texas Water Code and the TCAA. Specifically, the authority of the TNRCC is found in Chapters 5 and 7. Chapter 5, Subchapters A - F, H - J, and L, include the general provisions, organization, and general powers and duties of the TNRCC, and the responsibilities and authority of the executive director. Chapter 5 also authorizes the TNRCC to implement action when emergency conditions arise and to conduct hearings. Chapter 7 gives the TNRCC enforcement authority. In 2001, the 77th Texas Legislature continued the existence of the TNRCC until September 1, 2013, and changed the name of the TNRCC to the TCEQ. In 2009, the 81st Texas Legislature, during a special session, amended section 5.014 of the Texas Water Code, changing the expiration date of the TCEQ to September 1, 2011, unless continued in existence by the Texas Sunset Act. In 2011, the 82nd Texas Legislature continued the existence of the TCEQ until 2023.

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

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

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

Applicable Law

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

Statutes

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

TEXAS HEALTH & SAFETY CODE, Chapter 382	September 1, 2013
TEXAS WATER CODE	September 1, 2013

Chapter 5: Texas Natural Resource Conservation Commission
- Subchapter A: General Provisions
- Subchapter B: Organization of the Texas Natural Resource Conservation Commission
- Subchapter C: Texas Natural Resource Conservation Commission
- Subchapter D: General Powers and Duties of the Commission
- Subchapter E: Administrative Provisions for Commission
- Subchapter F: Executive Director (except §§5.225, 5.226, 5.227, 5.2275,5.231, 5.232, and 5.236)
- Subchapter H: Delegation of Hearings
- Subchapter I: Judicial Review
- Subchapter J: Consolidated Permit Processing
- Subchapter L: Emergency and Temporary Orders (§§5.514, 5.5145, and 5.515 only)
- Subchapter M: Environmental Permitting Procedures (§5.558 only)

Chapter 7: Enforcement
- Subchapter A: General Provisions (§§7.001, 7.002, 7.0025, 7.004, and 7.005 only)
- Subchapter B: Corrective Action and Injunctive Relief (§7.032 only)
- Subchapter C: Administrative Penalties
- Subchapter D: Civil Penalties (except §7.109)
- Subchapter E: Criminal Offenses and Penalties: §§7.177, 7.179-7.183

Rules

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

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

Chapter 39: Public Notice, §§39.402(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 39.601 - 39.605	April 17, 2014
Chapter 55: Requests for Reconsideration and Contested Case Hearings; Public Comment, §§55.150, 55.152(a)(1), (2), (5), and (6) and (b), 55.154(a), (b), (c)(1) - (3), and (5), and (d) - (g), and 55.156(a), (b), (c)(1), (e), and (g)	June 24, 2010
Chapter 101: General Air Quality Rules	April 17, 2014
Chapter 106: Permits by Rule, Subchapter A	April 17, 2014
Chapter 111: Control of Air Pollution from Visible Emissions and Particulate Matter	February 6, 2014
Chapter 112: Control of Air Pollution from Sulfur Compounds	July 16, 1997
Chapter 113: Standards of Performance for Hazardous Air Pollutants and for Designated Facilities and Pollutants	May 14, 2009
Chapter 114: Control of Air Pollution from Motor Vehicles	May 21, 2014
Chapter 115: Control of Air Pollution from Volatile Organic Compounds	October 2, 2014
Chapter 116: Permits for New Construction or Modification	July 31, 2014
Chapter 117: Control of Air Pollution from Nitrogen Compounds	May 2, 2013
Chapter 118: Control of Air Pollution Episodes	March 5, 2000
Chapter 122: §122.122: Potential to Emit	April 17, 2014
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

A. Introduction (No change)
B. Ozone (Revised)
   1. Dallas-Fort Worth (No change)
   2. Houston-Galveston-Brazoria (Revised)
      Chapter 1: General
      Chapter 2: Air Quality Data
      Chapter 3: Permanent and Enforceable Emissions Reductions
      Chapter 4: Maintenance Demonstration
   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)
J. Mobile Sources Strategies (No change)
K. Clean Air Interstate Rule (No change)
L. Transport (No change)
M. Regional Haze (No change)

TABLE OF CONTENTS

Executive Summary
Section V-A: Legal Authority
Section VI: Control Strategy
List of Acronyms
List of Tables
List of Figures
List of Appendices
Chapter 1: General
- 1.1 Background
- 1.2 Purpose
- 1.3 One-Hour Ozone NAAQS History
- 1.4 Public Hearing and Comment Information
- 1.5 Social and Economic Considerations
- 1.6 Fiscal and Manpower Resources

Chapter 2: Air Quality Data
- 2.1 Monitoring Network and Reporting Requirements
- 2.2 Ozone Data
- 2.3 Ozone Trend Analysis
- 2.4 Trend Analysis for Ozone Precursors
- 2.5 Ozone Data Summary

Chapter 3: Permanent and Enforceable Emissions reductions
- 3.1 Control Measures
- 3.2 List of Existing Control Measures
  - 3.2.1 Control of Volatile Organic Compounds Emissions from Storage Tanks
  - 3.2.2 Mass Emissions Cap and Trade Program
  - 3.2.3 Tier 3 Motor Vehicle Emission and Fuel Standards
  - 3.2.4 New International Marine Diesel Engine and Marine Fuel Standards for Oceangoing Vessels and Emissions Control Areas
- 3.3 Additional Measures
  - 3.3.1 SmartWay Transport Partnership and the Blue Skyways Collaborative
  - 3.3.2 American Waterways Operators Tank Barge Emissions Best Management Practices
  - 3.3.3 Consent Decrees with Refineries
  - 3.3.4 Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
  - 3.3.5 Energy Efficiency and Renewable Energy Measures
    - 3.3.5.1 Renewable Energy
    - 3.3.5.2 Residential and Commercial Building Codes and Programs

3.3.5.3 Federal Facility Energy Efficiency and Renewable Energy Projects
3.3.5.4 Political Subdivisions Projects
3.3.5.5 Electric Utility Sponsored Programs
3.3.5.6 Energy Efficiency Programs
3.3.6 Clean Air Interstate Rule and Cross-State Air Pollution Rule
3.3.7 Clean School Bus Program
3.3.8 Texas Emission Reduction Plan
3.3.9 83rd Texas Legislature
3.3.10 Local Initiative Projects
3.3.11 Other Local Programs
3.4 Control Strategies Summary
Chapter 4: Maintenance Demonstration
4.1 General
4.2 Emissions Inventory Trends
4.3 2011 Attainment Inventory
4.4 Future Emissions and Verification of Continued Attainment
4.4.1 Area Sources
4.4.1.1 Updated 2011 Base Year Inventories
4.4.1.2 Updated Milestone Years Inventories
4.4.1.3 Area Source Emissions Inventories
4.4.2 On-Road Mobile Sources
4.4.2.1 On-Road Mobile Source Emissions Inventories
4.4.2.2 On-Road Mobile Source Control Strategies
4.4.2.3 On-Road Mobile Source Control Strategy Reductions
4.4.3 Non-Road Mobile Sources
4.4.3.1 Updated 2011 Base Year Inventories
4.4.3.2 Updated Milestone Years Inventories
4.4.3.3 Non-Road Mobile Source Emissions Inventories
4.4.4 Stationary Point Sources
4.4.4.1 Emissions Inventory Development
4.4.4.2 Updated 2011 Base Year Inventory
4.4.4.3 Updated Milestone Year Inventories
4.5 Emissions Summary
4.6 Maintenance Demonstration Conclusion

LIST OF ACRONYMS

AD	Attainment Demonstration
AERR	Air Emissions Reporting Requirements
AFFP	Alternative Fueling Facilities Program
Auto GC	Automated Gas Chromatograph
AWO	American Waterways Operators
BMP	best management practices
CAIR	Clean Air Interstate Rule
CDB	county database
CEMS	Continuous Emissions Monitoring System
CFR	Code of Federal Regulations
CMV	commercial marine vessels
CSAPR	Cross-State Air Pollution Rule
CTAC	Chemical Transportation Advisory Committee
CTT	Clean Transportation Triangle
D.C.	District of Columbia
DERC	Discrete Emissions Reduction Credit Program
DERI	Diesel Emissions Reduction Incentive Program
DTIP	Drayage Truck Incentive Program
ECA	emissions control area
EDMS	Emissions and Dispersion Modeling System
EE/RE	energy efficiency/renewable energy
EGU	electric generating unit
EI	Emissions Inventory
EIA	United States Energy Information Administration
EIQ	emissions inventory questionnaire
ENVIRON	ENVIRON Corporation
ERC	Emissions Reduction Credit Program
ERG	Eastern Research Group
ESL	Energy Systems Laboratory
EPA	United States Environmental Protection Agency
FCAA	Federal Clean Air Act
FMVCP	Federal Motor Vehicle Control Program
FR	*Federal Register*

GIS	geographic information system
HB	House Bill
HECT	Highly Reactive Volatile Organic Compound Emissions Cap and Trade
H-GAC	Houston-Galveston Area Council
HGB	Houston-Galveston-Brazoria
HOT	high-occupancy toll
HOV	high-occupancy vehicle
HRM	Houston Regional Monitoring Corporation
HPMS	Highway Performance Monitoring System
HRVOC	highly reactive volatile organic compounds
I/M	Inspection and Maintenance Program
IMO	International Maritime Organization
LDEQ	Louisiana Department of Environmental Quality
LDPLI	Light-Duty Motor Vehicle Purchase or Lease Incentive Program
LIP	Local Initiatives Projects Program
LIRAP	Low-Income Vehicle Repair Assistance, Retrofit, and Accelerated Vehicle Retirement Program
MARPOL	Annex VI of the International Convention for the Prevention of Pollution from Ships
MCR	mid-course review
MECT	Mass Emissions Cap and Trade
MOBILE	MOBILE Vehicle Emission Modeling Software
MOVES	Motor Vehicle Emissions Simulator
MVEB	motor vehicle emissions budget
NAAQS	National Ambient Air Quality Standard
NEI	National Emissions Inventory
NMOG	non-methane organic gases
NMOG+NO_x	non-methane organic gases and nitrous oxides
NO_X	nitrogen oxides
NSR	New Source Review
OGV	ocean-going vessel
PEI	periodic emissions inventory
ppb	parts per billion
ppbC	parts per billion carbon
PM	particulate matter

$PM_{2.5}$	particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
ppm	parts per million
PUCT	Public Utility Commission of Texas
RFG	reformulated gasoline
RFP	Reasonable Further Progress
ROP	rate of progress
RS	Redesignation Substitute
SB	Senate Bill
SECO	State Energy Conservation Office
SEER	Seasonal Energy Efficiency Ratio
SIP	State Implementation Plan
SO_2	sulfur dioxide
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)
TCFP	Texas Clean Fleet Program
TDM	travel demand model
TERP	Texas Emissions Reduction Plan
THSC	Texas Health and Safety Code
tpd	tons per day
TTI	Texas Transportation Institute
TUC	Texas Utilities Code
TVGVGP	Texas Natural Gas Vehicle Grant Program
TxLED	Texas Low Emission Diesel
U.S.	United States
USCG	United States Coast Guard
VMT	vehicle miles traveled
VOC	volatile organic compounds

LIST OF TABLES

Table 2-1: Number of Days per Year with One-Hour Ozone Expected Exceedances by Monitor

Table 3-1: Existing Ozone Control Measures Applicable to the HGB Eight-County Nonattainment Area

Table 4-1: HGB 2011 Area Source NO_X and VOC Emissions (tons per day)

Table 4-2: HGB VMT (miles per average summer day)

Table 4-3: HGB Average Summer Weekday NO_X and VOC Emissions for On-Road Mobile Sources (tons per day)

Table 4-4: HGB On-Road Mobile Control Strategies Summary

Table 4-5: Estimated Reductions from 2011 Baseline Due to FMVCP, I/M, RFG, and TxLED (tons per day)

Table 4-6: Estimated Percent Reductions from 2011 Baseline Due to FMVCP, I/M, RFG, and TxLED

Table 4-7: HGB 2011 NO_X Emissions for Non-Road EI Categories (tons per day)

Table 4-8: HGB 2011 VOC Emissions for Non-Road EI Categories (tons per day)

Table 4-9: HGB Point Source NO_X and VOC Emissions (tons per day)

Table 4-10: HGB NO_X Emissions by Source Category (tons per day)

Table 4-11: HGB VOC Emissions by Source Category (tons per day)

LIST OF FIGURES

Figure 2-1: One-Hour Ozone Design Values for the HGB Area

Figure 2-2: One-Hour Ozone Expected Exceedance Statistics for All Monitors in the HGB Area

Figure 2-3: Annual Maxima, 90th Percentile and Average of Daily Peak NO_X Values (ppb) in the HGB Area, 2000 through 2014

Figure 2-4: Yearly Geometric Mean Ethylene Concentrations (ppbC) at the Eight Houston Ship Channel Monitors, 2000 through 2014

Figure 2-5: Yearly Geometric Mean Propylene Concentrations (ppbC) at the Eight Houston Ship Channel Monitors, 2000 through 2014

Figure 4-1: HGB Eight-County Nonattainment Area Historical NO_X Emissions Trends

Figure 4-2: HGB Eight-County Nonattainment Area Historical VOC Emissions Trends

LIST OF APPENDICES

Appendix A	*Projection Factors for Point and Area Sources*
Appendix B	*Characterization of Oil and Gas Production Equipment and Develop a Methodology to Estimate Statewide Emissions*
Appendix C	*Condensate Tank Oil and Gas Activities*
Appendix D	*Development of MOVES2014 On-Road Emission Inventories for the Years 2011, 2014, 2017, 2020, 2023, and 2026*
Appendix E	*Development of Statewide Annual Emissions Inventory and Activity Data for Airports*
Appendix F	*2011 Texas Railroad Emission Inventory Report*
Appendix G	*Development of 2011 Statewide Toxics and Actual Annual and Ozone Season Weekday Emissions Inventories for Commercial Marine Vessels*
Appendix H	*Development of Texas Statewide Drilling Rigs Emissions Inventories for the Years 1990, 1993, 1996, and 1999 through 2040*
Appendix I	*Development of Locomotive and Commercial Marine Emissions Inventory - 1990 to 2040*
Appendix J	*Preliminary MOVES2014 Supplement and Attachment A*

CHAPTER 1: GENERAL

1.1 BACKGROUND

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

1.2 PURPOSE

This redesignation substitute (RS) SIP revision for the Houston-Galveston-Brazoria (HGB) one-hour ozone nonattainment area fulfills the requirements described in the EPA's *Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule* (2008 ozone standard SIP requirements rule), published in the *Federal Register* (FR) on March 6, 2015 (80 FR 12264). Data for 2011 through 2013 show that the HGB area is monitoring attainment of the one-hour ozone National Ambient Air Quality Standard (NAAQS). The HGB area continued to monitor attainment of the standard in 2014. The HGB area includes Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties. On March 7, 2014, the Texas Commission on Environmental Quality (TCEQ) submitted to the EPA certified ambient air monitoring data along with a request for a finding of attainment for the HGB area for the revoked one-hour ozone NAAQS. On May 30, 2014, the EPA verified that the 2013 ambient air monitoring data for ozone met all data quality requirements for attaining the one-hour ozone standard.

The EPA's 2008 ozone standard SIP requirements rule includes a mechanism for lifting anti-backsliding obligations under a revoked ozone NAAQS. According to the EPA's 2008 ozone standard SIP requirements rule, a state can provide a showing, termed a redesignation substitute, based on Federal Clean Air Act (FCAA), §107(d)(3)(E) redesignation criteria to demonstrate that an area qualifies for lifting anti-backsliding obligations under a revoked standard.

An HGB RS was submitted to the EPA on July 22, 2014 to fulfill the EPA's requirements 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. Data for 2011 through 2013 demonstrate that the HGB area is monitoring attainment of the one-hour ozone NAAQS. This HGB RS SIP revision further demonstrates that attainment is due to permanent and enforceable emission reductions.

According to the EPA's 2008 ozone standard SIP requirements rule, this HGB RS SIP revision is based on FCAA redesignation criteria with the exception of certain elements. Per EPA guidance, this HGB RS SIP revision includes the following elements:

Monitoring data showing attainment of the revoked one-hour ozone NAAQS
Chapter 2: *Air Quality Data* includes monitoring network and reporting requirements as well as ozone data and trend analyses. The 2011 through 2013 monitoring data demonstrate that the expected exceedances of the 0.12 parts per million (ppm) one-hour ozone NAAQS in the HGB area is 0.7 days per year. Ozone concentrations have decreased dramatically in the HGB area since the 1990s. Examination of the trends in one-hour ozone design values and the number of expected exceedances reveals substantial downward trends.

Showing that attainment was due to permanent and enforceable emissions reductions
Chapter 3: *Permanent and Enforceable Emissions Reductions* identifies permanent and enforceable control measures that have resulted in reductions in nitrogen oxides (NO_X) and volatile organic compounds (VOC) emissions, and air quality improvements in the HGB one-hour ozone nonattainment area. The 30 Texas Administrative Code (TAC) Chapter 115, Control of Air Pollution from Volatile Organic Compounds and 30 TAC Chapter 117, Control of Air Pollution from Nitrogen Compounds regulations along with implementation of the Mass Emissions Cap and Trade (MECT) program and the Highly-Reactive Volatile Organic Compounds Emissions Cap and Trade (HECT) program have significantly reduced overall ozone precursor emissions at both major and minor stationary sources in the HGB ozone nonattainment area. The HGB area has attained the one-hour ozone NAAQS as the result of implemented federal, state, and local controls. These enforceable measures will remain in place to ensure continued maintenance of the one-hour ozone NAAQS in the HGB area.

Demonstration that the area can maintain the standard over the next 10 years
Chapter 4: *Maintenance Demonstration* provides emissions inventory trends, the 2011 attainment inventory, and future emissions and verification of continued attainment of the one-hour ozone standard through 2026. Trend analysis using the 2026 future-year emissions shows an overall decrease of 191.08 tons per day (tpd) in combined NO_X and VOC emissions for the HGB area. This net change includes a projected 22.11 tpd decrease in VOC and a 168.97 tpd decrease in NO_X from 2011 to 2026. The net change includes an additional decrease in emissions of 3.62 tpd for VOC and 11.06 tpd for NO_X due to the substitution of the EPA's Motor Vehicle Emission Simulator (MOVES) 2010b-based emissions with MOVES2014-based emissions. Based on emissions projections and previous photochemical analysis, continued attainment of the one-hour ozone standard is shown for the HGB area through 2026.

1.3 ONE-HOUR OZONE NAAQS HISTORY

In 1971, the EPA established the 0.08 ppm one-hour ozone NAAQS (36 FR 8186). The EPA revised the one-hour ozone standard to 0.12 ppm in 1979 (44 FR 4202). In 1990, the eight-county HGB one-hour ozone nonattainment area, defined as Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties, was classified as severe-17 according to the FCAA. At that time, the FCAA also required submission of a SIP revision describing actions to be taken to reduce NO_X and VOC by November 1996. Before that deadline, however, modeling showed uncertainties in the actual impact that NO_X reductions would have on ground-level ozone formation. The HGB area was therefore granted a temporary exemption until December 1997 to fulfill its NO_X control requirements after which the HGB area was given a new attainment deadline of November 15, 2007. In 1997, the EPA promulgated the more stringent eight-hour ozone NAAQS.

The HGB One-Hour Ozone Attainment Demonstration and Post-1999 Rate of Progress (ROP) SIP Revision was adopted on December 6, 2000. The attainment demonstration portion of the submittal contained numerous air pollution control measures resulting in an overall 90% reduction in point source NO_X emissions. Despite this reduction, a modeling analysis included in the SIP revision indicated a shortfall in NO_X emissions reductions necessary for an approvable attainment demonstration. To address this shortfall, the SIP revision also contained enforceable commitments to implement further measures in support of the attainment demonstration and to submit a mid-course review (MCR) to the EPA. The ROP plan portion of the December 2000 SIP revision submittal provided emissions inventories, ROP analyses for milestone years 2002, 2005, and 2007, and motor vehicle emissions budgets (MVEB) for NO_X 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 detailed the MCR process, which 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 published approval of both the December 2000 and September 2001 SIP revisions (66 FR 57159).

The Business Coalition for Clean Air Appeal Group and several regulated companies challenged the December 2000 HGB SIP revision and the 90% NO_X reduction requirement from stationary sources. In 2001, the Texas Natural Resource Conservation Commission, now the TCEQ, was required to performed an independent and thorough analysis of the causes of rapid ozone formation events and to identify potential mitigating measures not yet included in the HGB attainment demonstration.

On December 13, 2002, the commission adopted the One-Hour Ozone Attainment Demonstration Follow-Up SIP Revision that addressed the agreements contained in the June 8, 2001 consent order. This SIP revision also incorporated energy efficiency measures and the Texas Emissions Reduction Plan (TERP) protocol. The December 2002 SIP revision replaced 10% of industrial point source NO_X emissions reductions with industrial source, highly reactive volatile organic compounds (HRVOC) controls. The result was an industrial source ozone control strategy that relied on an 80% reduction in NO_X emissions through 30 TAC Chapter 117 and the MECT program, and HRVOC rules in 30 TAC Chapter 115 that better quantified and reduced emissions of HRVOC from four key industrial sources: fugitives, flares, process vents, and cooling tower heat exchange systems.

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 milestone years 2002, 2005, and 2007 and revised MVEB for the HGB area based on new models for estimating on-road and non-road mobile emissions sources. This SIP revision replaced the previous versions of the Post-1999 ROP that the EPA approved in November 2001. On February 14, 2005, the EPA published approval of this SIP revision (70 FR 7407).

On December 1, 2004, the commission adopted the HGB One-Hour Ozone Attainment Demonstration MCR SIP Revision reflecting a strategy based on reducing NO_X and point source HRVOC rather than NO_X alone. This SIP revision changed a number of NO_X control strategies and added the HRVOC emission reduction requirements. The results of photochemical modeling and technical documentation included in this SIP revision demonstrated attainment of the one-hour ozone standard by the November 15, 2007 deadline. The one-hour ozone SIP revision commitments addressed in this revision included: completion of a one-hour ozone MCR; adoption of measures sufficient to address the shortfall in NO_X reductions; adoption of measures sufficient to demonstrate attainment; MVEB updates using EPA's MOBILE6 model; and changes to voluntary mobile emissions reduction program measures.

On September 6, 2006, the EPA published approval of the HGB area's one-hour ozone attainment demonstration and associated rules (71 FR 52656). The approval was published in six parts covering the rules for the control of HRVOC, the one-hour ozone attainment plan, the HECT program for HRVOC, the MECT program for NO_X, the Emissions Credit Banking and Trading Program, and the Discrete Emissions Credit Banking and Trading Program.

The HGB area failed to attain the one-hour ozone standard by the November 15, 2007 attainment deadline, and the EPA published a failure-to-attain determination on June 19, 2012 based on air quality monitoring data for 2005 through 2007 (77 FR 36400). Although the EPA revoked the one-hour ozone NAAQS in June 2005, former one-hour ozone nonattainment areas remain subject to certain anti-backsliding requirements. The three anti-backsliding requirements that apply to the HGB severe one-hour ozone nonattainment area are contingency measures, new source review (NSR) permitting requirements for severe nonattainment areas, and a penalty fee provision. The anti-backsliding requirement for contingency measures under FCAA, §172(c)(9) and §182(c)(9) has already been achieved in the HGB area, and a final determination of failure to attain does not trigger additional emission reductions. The NSR permitting requirements would apply for the one-hour ozone NAAQS until the RS request is approved by the EPA, after which Prevention of Significant Deterioration permitting requirements would apply. However, because the HGB area is also classified as severe nonattainment for the 1997 eight-hour ozone NAAQS, severe area NSR permitting requirements would still apply whether or not this HGB RS SIP revision is approved by the EPA. The anti-backsliding requirement to implement a penalty fee program under FCAA, §182(d)(3) and §185 was triggered with the EPA's failure-to-attain determination, and it continues to apply to the HGB one-hour ozone nonattainment area unless the obligation is terminated. On May 22, 2013, the commission adopted rules under 30 TAC Chapter 101, General Air Quality Rules, Subchapter B to implement these FCAA provisions.

1.4 PUBLIC HEARING AND COMMENT INFORMATION

The commission held a public hearing for the proposed HGB RS SIP revision on January 6, 2015 at 2:00 p.m. in Houston at the Texas Department of Transportation District Office. The hearing was not opened because there were no attendees who signed in to speak.

Public hearing notices for the HGB RS SIP revision were published in the *Texas Register*, the *Houston Chronicle*, and the *Austin American Statesman*.

The public comment period opened on December 5, 2014 and was originally scheduled to close on January 9, 2015. However, a supplement to the proposed HGB RS SIP revision was issued by the TCEQ on December 18, 2014 to provide supplemental information regarding MOVES2014-based on-road mobile source emissions estimates that became available after the SIP revision was approved for proposal by the commission on November 19, 2014.[6] Due to the supplemental technical information, the comment period for the proposed SIP revision was extended to January 18, 2015 to allow a full 30-day comment period for all components of the proposed SIP package.

During the comment period, staff received comments from the Texas Oil and Gas Association and Baker Botts L.L.P. on behalf of the Section 185 Working Group. Summaries of public comments and TCEQ responses are included as part of this SIP revision.

An electronic version of the proposed HGB RS SIP revision and appendices, as well as the MOVES2014 supplement and attachment, were made available at the TCEQ's SIP Hot Topics Web page (http://www.tceq.texas.gov/airquality/sip/Hottop.html). Notice of the extended comment period was also posted on this Web page, and sent to subscribers via GovDelivery (https://service.govdelivery.com/accounts/TXTCEQ/subscriber/new).

---

[6] See Appendix J: *Preliminary MOVES2014 Supplement and Attachment A*

1.5 SOCIAL AND ECONOMIC CONSIDERATIONS

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

1.6 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: AIR QUALITY DATA

2.1 MONITORING NETWORK AND REPORTING REQUIREMENTS

The method chosen to verify continued attainment of the one-hour ozone National Ambient Air Quality Standard (NAAQS) is the ambient air quality monitoring network, which will be used to track changes in the ambient air quality.

The Houston-Galveston-Brazoria (HGB) area monitoring network in 2014 consisted of 21 regulatory ambient air ozone monitors located in Brazoria, Galveston, Harris, and Montgomery Counties, Texas. The City of Houston operates eight of the monitors: Clinton (C403/C113/C304); Houston North Wayside (C405); Houston Monroe (C406); Lang (C408); Houston Croquet (C409); Houston Westhollow (C410); Houston Texas Avenue (C411); and Park Place (C416). The Texas Commission on Environmental Quality (TCEQ) operates the remaining 13 ozone monitors: Houston East (C1); Houston Aldine (C8/C108/C150); Channelview (C15/C115); Northwest Harris County (C26), Houston Deer Park #2 (C35/C139), Seabrook Friendship Park (C45); Houston Bayland Park (C53); Conroe Relocated (C78); Manvel Croix Park (C84); Lynchburg Ferry (C1015); Lake Jackson (C1016); Baytown Garth (C1017); and Galveston 99th Street (C1034).

The monitors are managed in accordance with 40 Code of Federal Regulations (CFR) Part 58 to verify the attainment status of the area. The TCEQ commits to keep in operation an appropriate air monitoring network in the HGB area and will continue to work with the United States Environmental Protection Agency (EPA) through the air monitoring network review process, as required by 40 CFR Part 58, to determine: the adequacy of the ozone monitoring network; if additional monitoring is needed; and when monitoring can be discontinued. Air monitoring data from these monitors will continue to be quality assured according to the requirements in EPA's regulations until the end of the maintenance period (2026) and reported to the EPA on the schedule required by 40 CFR Part 58.

2.2 OZONE DATA

This section provides an analysis of air quality observational data in the HGB area. While the ozone NAAQS is expressed in units of parts per million (ppm), the familiar convention of expressing concentrations in parts per billion (ppb) is also used in this section. Data for ozone and nitrogen oxides (NO_X) were retrieved from EPA's Air Quality System (AQS) database, and volatile organic compounds (VOC) data were retrieved from TCEQ's automated gas chromatograph (auto-GC) database. Analyses of ozone data from federal reference method monitors and federal equivalent method monitors, those used by the EPA to compare to the NAAQS, are included in this section.

2.3 OZONE TREND ANALYSIS

Trends in ozone are used to demonstrate the substantial progress the HGB area has made in improving air quality. The trend in design values for the one-hour ozone NAAQS in the HGB area is seen in Figure 2-1: *One-Hour Ozone Design Values for the HGB Area*. Although the HGB area exceeded the one-hour ozone NAAQS at of the end of 2012, the HGB area monitored only 1 ppb greater than the value of the one-hour NAAQS of 0.12 ppm (or 124 ppb) in both 2011 and 2012 at a single monitor. The design value for one-hour ozone standard is the fourth highest value given three years of complete data. A complete year of data must include at least three valid quarters of data, a valid quarter must contain at least two months of valid data, a valid month must have at least 75% of days with valid data, and finally, a valid day must have at least 18 hours with valid one-hour ozone concentrations. If out of the three-year span, one year does not meet the completeness requirements, then the design value will be the third highest value of

the three-year span. Similarly, if two years do not meet the data completeness requirements, then the design values will be the second highest values of the three-year span. In 2014, the HGB area was in attainment of the one-hour ozone NAAQS following another attainment year in 2013. The one-hour ozone design value in the HGB area has decreased nearly 50% over the past 24 years, from a design value of 220 ppb in 1990 to a design value of 111 ppb in 2014.

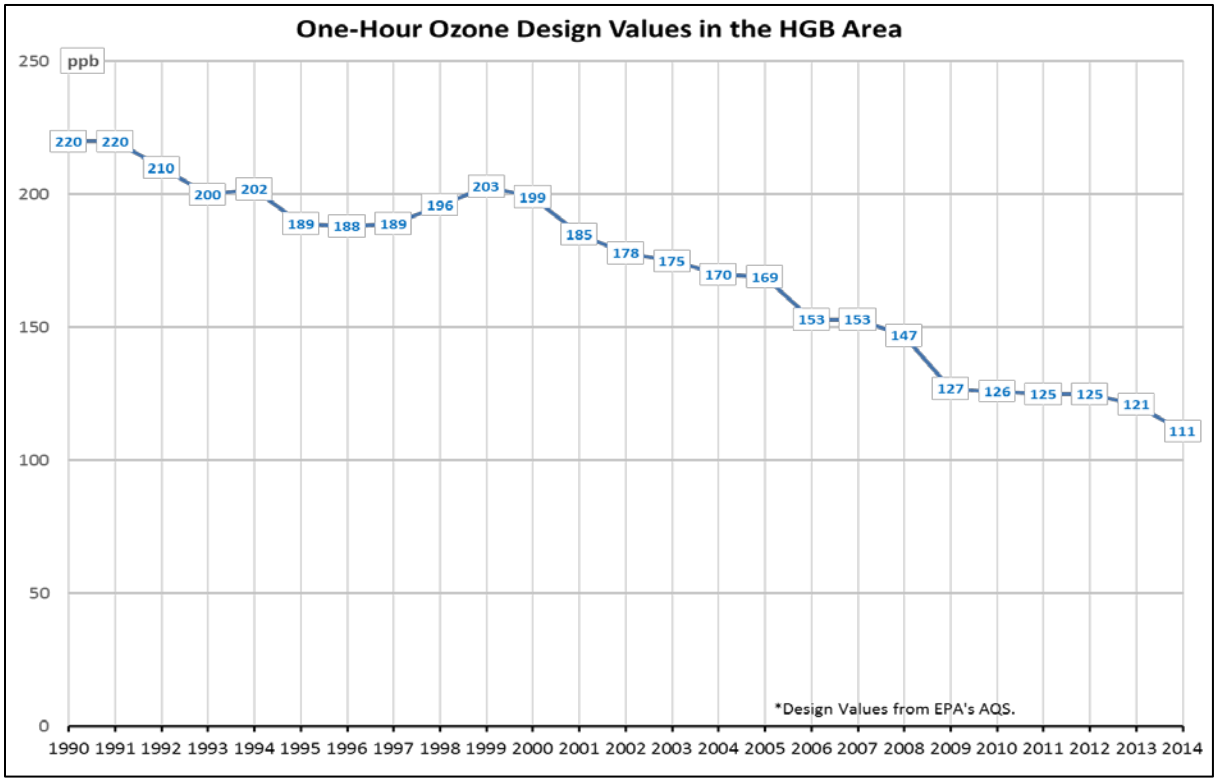


Figure 2-1: One-Hour Ozone Design Values for the HGB Area

For the one-hour ozone NAAQS, the design value was used to determine the classification of a nonattainment area but was not used for designating an area as attainment or otherwise. Designation is based on the maximum number of expected exceedances over all the monitors in an area[7]. To show that the HGB area no longer violates the one-hour ozone NAAQS, the remainder of this section will be based on expected exceedances, calculated as per 40 CFR Part 50, Appendix H.

The expected number of exceedances of record in a metropolitan area is the maximum expected number of exceedances of all the area's regulatory monitors' individual expected number of

[7] The expected exceedances for a monitor is defined as the number of exceedances that occurred in the calendar year plus an increment that accounts for missing data, averaged across three consecutive years (for example, expected exceedances for 2013 is averaged across 2011, 2012, and 2013). The increment is calculated by finding the number of days without an associated ozone measurement that may not be assumed to be less than the standard, multiplied by the number of observed exceedances, then divided by the number of observations. This is done for each year and then averaged across three years to get the expected exceedances for that individual monitor.

exceedances. Because ozone concentrations vary spatially, it is also prudent to investigate trends at all regulatory monitors in an area. Table 2-1: *Number of Days per Year with One-Hour Ozone Expected Exceedances by Monitor* contains one-hour ozone expected number of exceedances at all regulatory monitors in the HGB area from 2000 through 2013. In Table 2-1, "NA" indicates that the monitor was either not active and did not record ozone data or has been deactivated and no longer records ozone data. In that same table, "INC" indicates that the monitor was activated in that year although it did not have a complete year of data. More monitors than those listed in Table 2-1 operate in the HGB area, but expected number of exceedances at those additional monitors are not appropriate for compliance determinations because the monitors' data do not meet EPA's quality assurance criteria and cannot be used for regulatory purposes. In 2013, all regulatory monitors in the HGB area had expected exceedances less than the threshold of 1.0 per year and only one monitor in the HGB area, the Houston East monitor (C1), had more than 1.0 expected exceedance in 2011 and 2012.

Table 2-1: Number of Days per Year with One-Hour Ozone Expected Exceedances by Monitor

Site Name	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Manvel Croix Park C84	NA	INC	1.7	2.0	2.7	2.7	3.4	2.1	1.4	0.7	0.3	0.7	0.7	0.7	0.7
Houston East C1	10.0	9.5	7.4	6.0	4.7	3.4	1.7	0.7	0.7	0.0	0.7	1.3	1.3	0.7	0.0
Northwest Harris County C26	7.1	6.8	5.2	4.1	2.4	1.7	1.7	2.0	1.3	1.4	0.7	0.7	0.7	0.7	0.7
Houston Bayland Park C53	14.4	12.2	7.1	6.4	4.4	5.4	5.1	3.7	1.7	0.3	0.3	0.7	0.7	0.7	0.3
Houston Monroe C406	8.2	7.2	5.4	4.4	3.4	3.4	3.4	2.7	1.0	0.3	0.3	0.3	0.7	0.7	0.7
Seabrook Friendship Park C45	NA	INC	3.7	5.4	4.0	3.7	2.7	2.0	1.0	0.3	0.0	0.0	0.3	0.7	0.7
Galveston 99th St C1034	NA	NA	NA	NA	NA	NA	NA	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.0
Park Place C416	NA	NA	NA	NA	NA	NA	INC	2.7	3.4	1.0	1.3	0.7	0.7	0.3	0.3
Houston Aldine C8/C108/C150	11.6	10.9	8.4	5.0	3.0	3.4	1.4	0.7	0.0	0.0	0.3	0.7	0.7	0.3	0.0
Houston Croquet C409	10.9	8.3	5.2	4.4	4.3	4.0	3.0	1.7	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Houston Texas Avenue C411	NA	INC	2.2	4.9	3.7	3.7	1.4	0.7	0.7	0.7	0.3	0.3	0.3	0.3	0.3

Site Name	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Clinton C403/C113/C 304	10.2	9.9	6.2	5.5	3.7	3.1	1.0	0.3	0.0	0.3	0.3	0.3	0.3	0.3	0.3
Houston North Wayside C405	9.3	6.9	4.8	2.4	2.7	2.4	0.7	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.0
Houston Regional Office C81	INC	5.4	6.5	5.1	3.1	3.0	2.0	1.7	0.7	0.0	0.0	0.3	0.3	0.3	0.0
Channelview C15/C115	INC	INC	2.5	4.5	4.3	3.3	2.0	1.7	1.0	0.7	0.7	0.7	0.4	0.0	0.0
Lynchburg Ferry C1015	NA	NA	NA	INC	6.8	8.8	4.7	2.4	0.3	0.0	0.4	0.4	0.4	0.0	0.0
Houston Deer Park 2 C35/C139	11.6	11.2	8.2	6.2	5.8	5.2	4.1	2.4	1.7	1.1	1.1	0.7	0.0	0.0	0.0
Lang C408	6.2	4.5	3.9	2.4	2.7	2.0	1.3	0.0	0.0	0.3	0.3	0.3	0.0	0.0	0.0
Lake Jackson C1016	NA	NA	NA	INC	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Houston Westhollow C410	7.7	7.9	4.5	3.4	2.1	1.7	2.4	2.0	1.7	0.3	0.0	0.0	0.0	0.0	0.0
Conroe Relocated C78	NA	INC	0.3	1.0	1.3	1.3	1.3	1.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0
Galveston Airport C34/C109	5.7	3.7	1.4	1.1	1.4	1.4	0.3	0.0	NA	NA	NA	NA	NA	NA	NA
Texas City C10	4.4	3.4	1.0	0.3	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Clute C11	2.4	2.0	1.4	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Conroe C65	3.1	4.0	2.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Houston Crawford C407	8.4	4.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Number of regulatory monitors	16	17	20	20	21	20	20	22	21	21	21	21	21	21	21

Figure 2-2: *One-Hour Ozone Expected Exceedance Statistics for All Monitors in the HGB Area* displays the statistically summarized maximum, median, and minimum one-hour ozone expected number of exceedances averaged across three years computed across all monitors in the HGB area. Figure 2-2 shows the range of expected number of exceedances averaged across three consecutive years observed at all regulatory monitors as well as how these distributions changed over time. The one-hour ozone expected number of exceedances exhibited a noticeable downward trend from 1990 until about 1994, and again after 1999. Before 2002, no monitors in

the HGB area met the one-hour ozone NAAQS; since then, the area has seen a steady increase in the number of monitors attaining the standard. Since 2013, all monitors in the HGB area have been below the one-hour ozone NAAQS expected number of exceedances of 1.0 days per year.

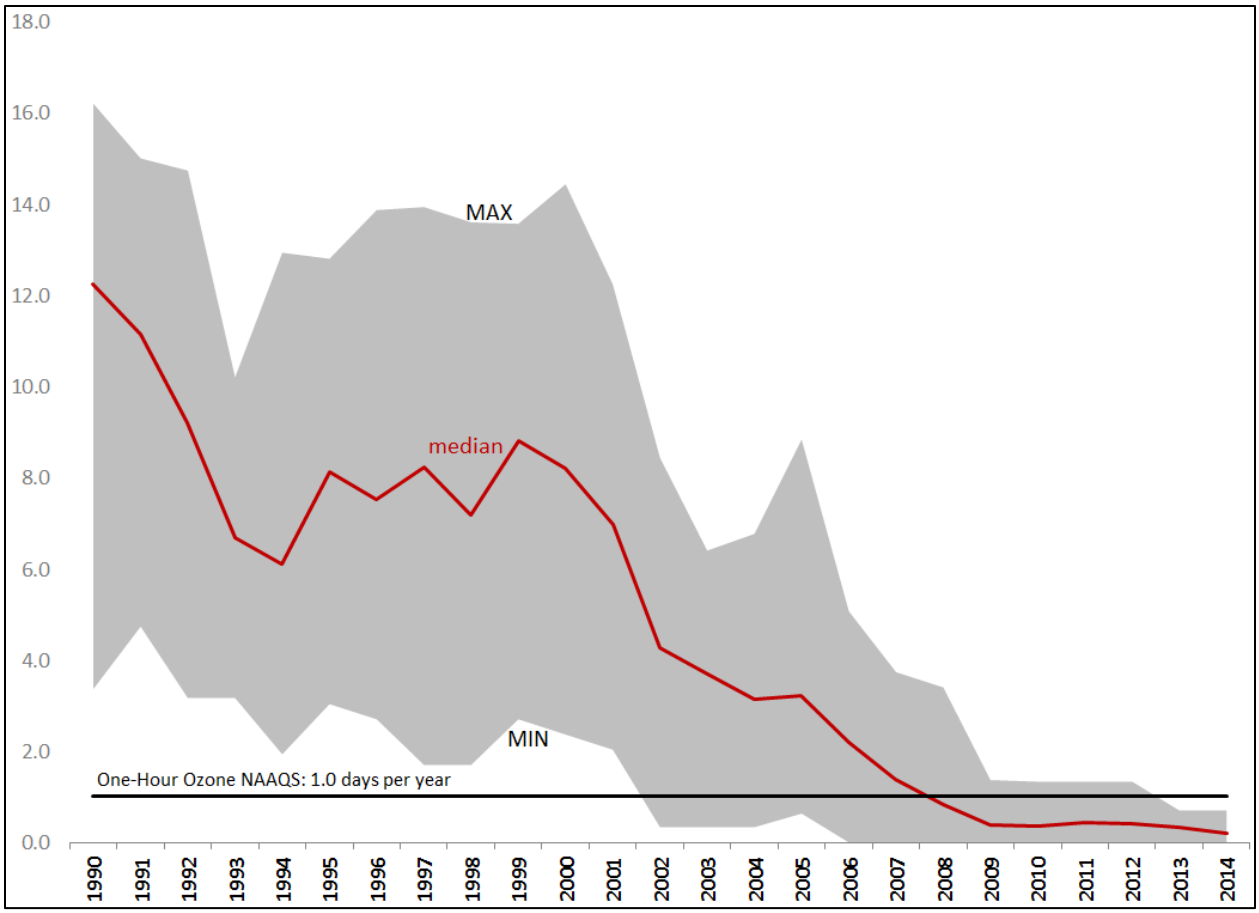


Figure 2-2: One-Hour Ozone Expected Exceedance Statistics for All Monitors in the HGB Area

2.4 TREND ANALYSIS FOR OZONE PRECURSORS

Decreases in NO_X and VOC, precursors to ozone formation, demonstrate the effectiveness of control measures in reducing emissions; however, ozone concentrations may not always exhibit trends identical to the concentrations of its precursors due to other variables such as meteorological conditions. This section evaluates trends in concentrations of NO_X and VOC. Only data that met data completeness checks are used in this section. To meet the completeness check, each day must contain at least 18 valid hours of data, each month must contain at least 75% of days with data, each quarter must have at least two months of data, and each year must contain at least three quarters of data.

NO_X are a variable mixture of nitric oxide and nitrogen dioxide and are critical precursors to ozone formation. As NO_X emissions decrease, ambient concentrations of these compounds should also decrease. NO_X are primarily created by fossil fuel combustion, lightning, biomass burning, and microbial action in soil.

Annual maxima, annual 90th percentile, and annual average daily peak one-hour NO_X values observed in the HGB area are plotted in Figure 2-3: *Annual Maxima, 90th Percentile and Average of Daily Peak NOx Values (ppb) in the HGB Area, 2000 through 2014*. The figure uses

a logarithmic scale so that all three statistics are visible, and a linear regression line was added to each statistic. The linear regression line of the yearly maximum shows a negative slope of 20.5 ppb per year with a correlation coefficient (r^2) of 0.65, and the regression line of the yearly 90th percentile shows a negative slope of 3.6 ppb per year with an r^2 of 0.80. The linear regression line of the yearly average shows a negative slope of 1.7 ppb per year with an r^2 of 0.82. All three measures decreased markedly over the period from 2000 through 2014, falling 40% (maximum), 29% (90th percentile), and 27% (mean). Strong downward trends in ambient NO_X concentrations are evidence of the effectiveness of the emission controls depicted in the emission-trend data.

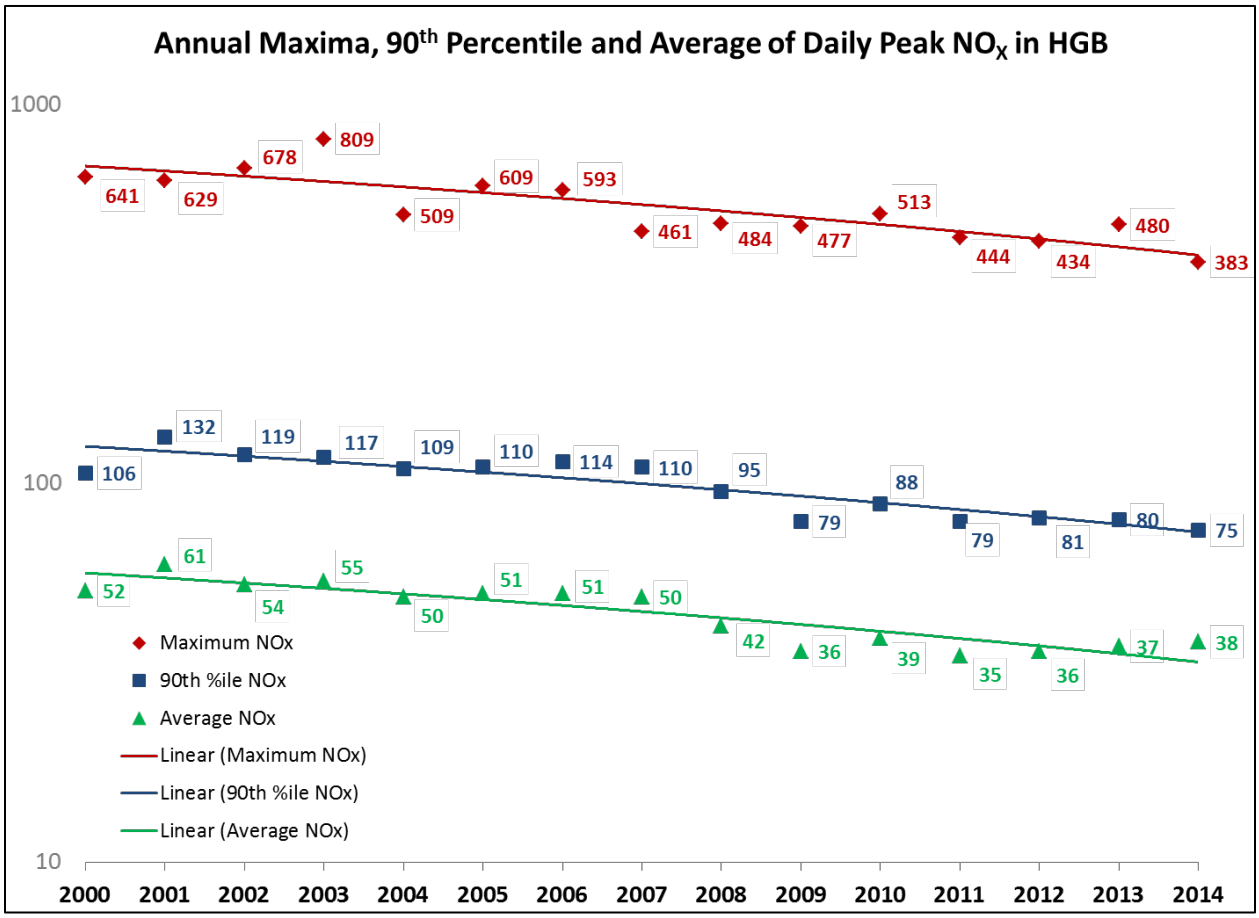


Figure 2-3: Annual Maxima, 90th Percentile and Average of Daily Peak NO_X Values (ppb) in the HGB Area, 2000 through 2014

The other major class of ozone precursors is VOC. Since the mid-1990s, the TCEQ has collected 40-minute measurements, on an hourly basis, of over 40 species of VOC using auto-GC instruments. This section focuses on two prevalent compounds, ethylene and propylene, that are associated with rapid and efficient ozone formation. Since the majority of the petrochemical industry with VOC production in the HGB area are located along the Houston Ship Channel, the eight auto-GC instruments near the area were examined. Yearly geometric means were computed from valid ambient hourly measurements. A geometric mean was calculated by taking the natural logarithm of each measurement, averaging these logs, and then calculating the antilog of this mean log value. The geometric mean is a preferable statistic to median or arithmetic (ordinary) mean for evaluating the central tendency of data when the data are skewed, i.e., when the data are not symmetrically, or normally, distributed, but instead clustered

around extreme high or low values. A geometric mean is more robust than an ordinary average, in that its value is not greatly influenced by one or a few very high or very low values. Many distributions of pollutant measurements, especially VOC, in the HGB area are skewed.

The annual geometric mean of ethylene concentrations in parts per billion carbon (ppbC) is shown in Figure 2-4: *Yearly Geometric Mean Ethylene Concentrations (ppbC) at the Eight Houston Ship Channel Monitors, 2000 through 2014*. Prior to 2004, only three of the eight monitors had enough valid data to calculate annual geometric mean ethylene. Generally, the geometric mean ethylene concentrations at all of the auto-GC monitors have decreased. While trends are variable from year to year, generally, the geometric mean ethylene concentrations at all of the auto-GC monitors have decreased. Ethylene at the Channelview monitor observed an increase from 2012 to 2013, then a decrease from 2013 to 2014. Concentrations at 50% of the monitoring sites studied (Clinton, Deer Park, Lynchburg and Cesar Chavez monitors) saw small increases from 2013 to 2014; however, the overall trend from 2000 through 2014 is decreasing.

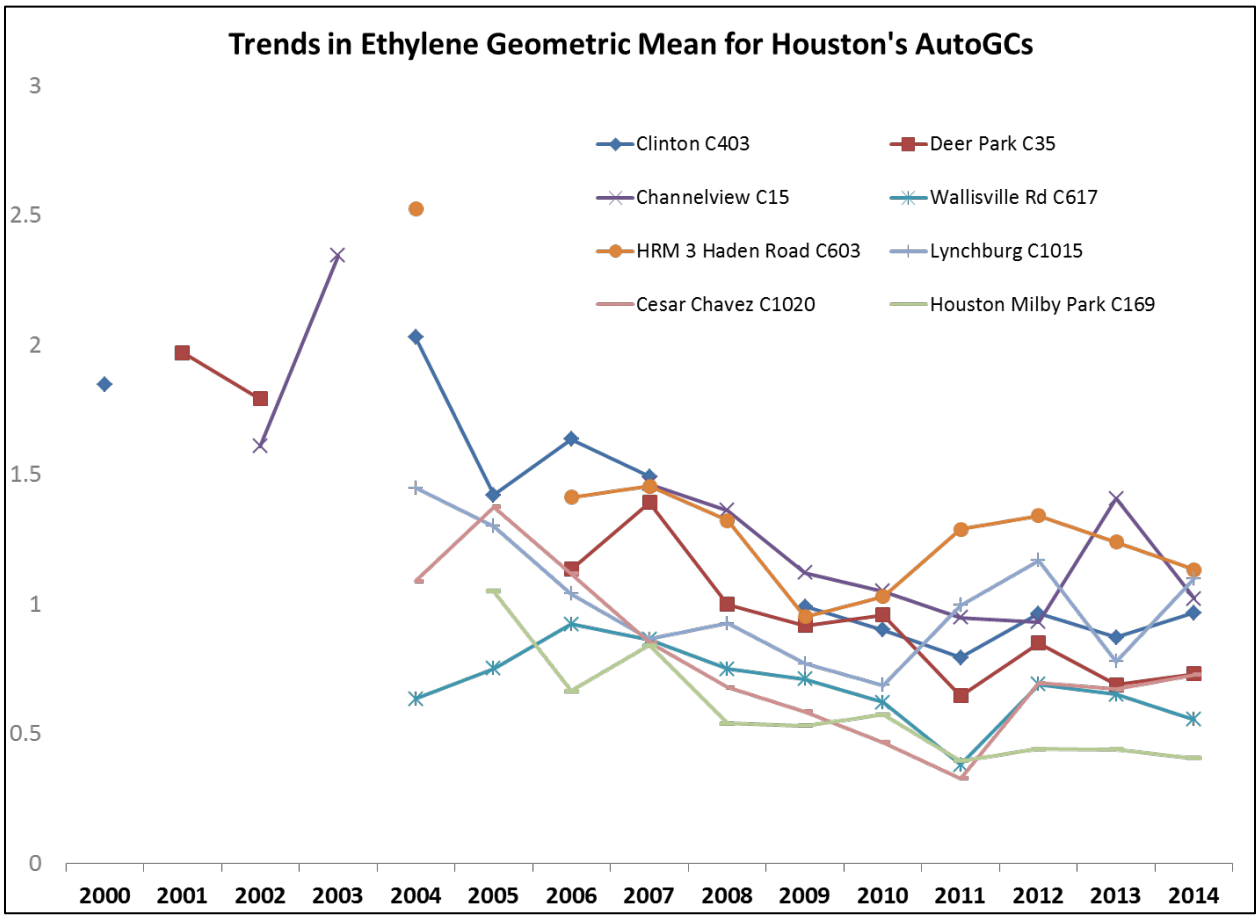
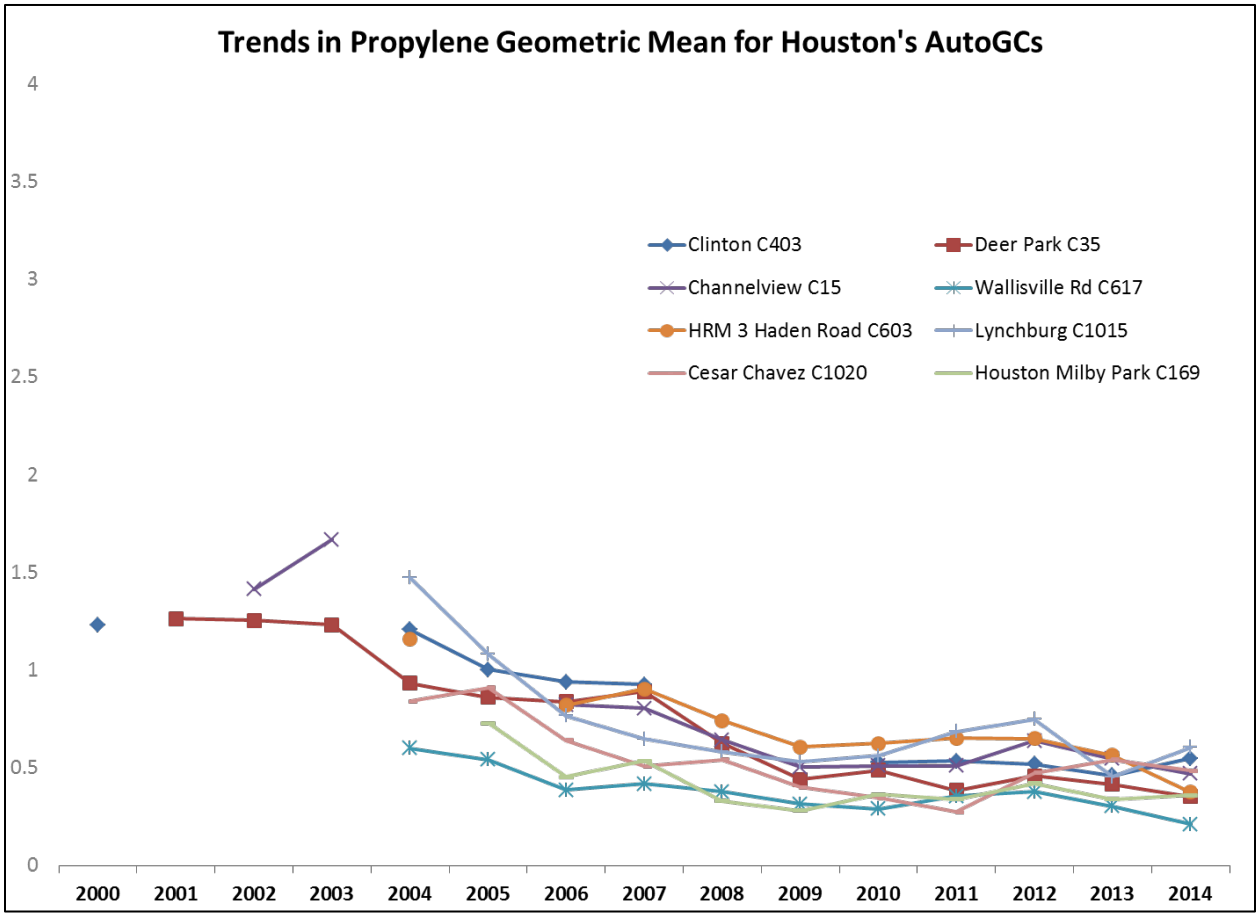


Figure 2-4: Yearly Geometric Mean Ethylene Concentrations (ppbC) at the Eight Houston Ship Channel Monitors, 2000 through 2014

Figure 2-5: *Yearly Geometric Mean Propylene Concentrations (ppbC) at the Eight Houston Ship Channel Monitors, 2000 through 2014* shows the annual geometric mean for propylene. Like ethylene, only three of the eight monitors had enough data to calculate annual geometric mean propylene prior to 2004. Note that the y-axis in this figure is the same as in Figure 2-5.

The geometric means for propylene are lower than the geometric means for ethylene for all the years. All monitors showed a steady decrease in geometric mean propylene from 2000 through 2014, although three of the eight monitors, including Clinton, Lynchburg and Houston Milby Park, saw increases in 2014. Though decreasing at different rates, these long-term decreases in ambient concentrations of ethylene and propylene suggest overall industrial emissions of these compounds have decreased considerably since 2000.



Note: Certified 2014 Auto GC data is pending EPA validation.

Figure 2-5: Yearly Geometric Mean Propylene Concentrations (ppbC) at the Eight Houston Ship Channel Monitors, 2000 through 2014

2.5 OZONE DATA SUMMARY

Ozone concentrations have decreased dramatically in the HGB area since the 1990s. In 2014, the three-year average expected number of exceedances met the one-hour ozone standard of 1.0 or fewer days per year. Examination of the trends in one-hour ozone three-year average expected number of days where the one-hour ozone exceeded 0.12 ppm reveals substantial downward trends. Evaluation of local changes of ozone precursors showed similar significant downward trends. These results suggest that the significant ozone reductions achieved in the HGB area are primarily due to local emission reductions.

CHAPTER 3: PERMANENT AND ENFORCEABLE EMISSIONS REDUCTIONS

3.1 CONTROL MEASURES

The Houston-Galveston-Brazoria (HGB) nonattainment area for the one-hour ozone National Ambient Air Quality Standard (NAAQS), which consists of Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties, includes some of the most comprehensively controlled industrial sources in the world. The Texas Commission on Environmental Quality (TCEQ) has developed stringent and innovative regulations that address nitrogen oxides (NO_X), volatile organic compounds (VOC), and highly reactive volatile organic compounds (HRVOC).

3.2 LIST OF EXISTING CONTROL MEASURES

Over decades of air quality planning to improve ozone levels in the HGB area, a broad range of control measures have been implemented for each emission source category. Table 3-1: *Existing Ozone Control Measures Applicable to the HGB Eight-County Nonattainment Area* lists the existing ozone control strategies that have been implemented for the one-hour and 1997 eight-hour ozone standards in the HGB area. The measures listed in Table 3-1 are permanent and enforceable and are included in the applicable implementation plan in accordance with Federal Clean Air Act (FCAA), §107(d)(3)(E)(iii).

Table 3-1: Existing Ozone Control Measures Applicable to the HGB Eight-County Nonattainment Area

Measure	Description	Start Date(s)
NO_X Mass Emissions Cap and Trade (MECT) Program 30 Texas Administrative Code (TAC) Chapter 101, Subchapter H, Division 3	Overall 80% NO_X reduction from existing industrial sources and utility power plants, implemented through a cap and trade program Affects utility boilers, gas turbines, heaters and furnaces, stationary internal combustion engines, industrial boilers, and many other industrial sources	April 1, 2003 and phased in through April 1, 2007
HRVOC Rules and Highly Reactive Volatile Organic Compounds Emissions Cap and Trade (HECT) Program 30 TAC Chapter 101, Subchapter H, Division 6	Affects cooling towers, process vents, and flares, and establishes an annual emissions limit with a cap and trade for each applicable site in Harris County Seven perimeter counties subject to permit allowable limits and monitoring requirements	Monitoring requirements began January 31, 2006 Cap and trade program implemented January 1, 2007 HECT cap incrementally stepped-down from 2014 through 2017 for a total 25% cap reduction

Measure	Description	Start Date(s)
HRVOC Fugitive Rules 30 TAC Chapter 115, Subchapter D, Division 3	More stringent leak detection and repair (LDAR) requirements for components in HRVOC service Additional components included in LDAR program: more stringent repair times, lower leak detection, and third-party audit requirements	March 31, 2004
VOC Control Measures – Storage Tanks 30 TAC Chapter 115, Subchapter B, Division 1	Requires controls for slotted guide poles and more stringent controls for other fittings on floating roof tanks, and control requirements or operational limitations on landing floating roof tanks Eliminates exemption for storage tanks for crude oil or natural gas condensate, and regulates flash emissions from these tanks	January 1, 2009 Compliance with revised monitoring and testing requirements required by March 1, 2013
VOC Control Measures – Degassing Operations 30 TAC Chapter 115, Subchapter F, Division 3	Requires vapors from degassing to be vented to a control device for a longer time period, and removes exemption from degassing to control for tanks with capacity of 75,000 to 1,000,000 gallons Clarification of rule and monitoring and testing requirements, additional control options, and notification requirements	January 1, 2009 February 17, 2011
NO_X Emission Standards for Nitric Acid and Adipic Acid Manufacturing 30 TAC Chapter 117, Subchapter F	NO_X emission standards for nitric acid and adipic acid manufacturing facilities in the HGB area	November 15, 1999
Utility Electric Generation in East and Central Texas 30 TAC Chapter 117, Subchapter E, Division 1	NO_X control requirements (approximately 55 %) on utility boilers and stationary gas turbines at utility electric generation sites in East and Central Texas	May 1, 2003 through May 1, 2005

Measure	Description	Start Date(s)
VOC Control Measures 30 TAC Chapter 115	Additional control technology requirements for batch processes and bakeries by December 31, 2002 Additional VOC measures adopted earlier for reasonably available control technology (RACT) purposes: general vent gas control, industrial wastewater, loading and unloading operations, general VOC LDAR, solvent using process, etc. (see Appendix D: *Reasonably Available Control Technology Analysis* of the Houston-Galveston-Brazoria Attainment Demonstration (AD) State Implementation Plan Revision for the 1997 Eight-Hour Ozone Standard adopted March 10, 2010 (2010 HGB AD State Implementation Plan(SIP) Revision) for more details)	December 31, 2002 and earlier
VOC Control Measures – Offset Lithographic Printers 30 TAC Chapter 115, Subchapter E, Division 4	Additional control technology requirements for offset lithographic printers Revised in 2010 to limit VOC content of solvents used by offset lithographic printing facilities and to include smaller sources in rule applicability (see Appendix D of the 2010 HGB AD SIP Revision for more details)	December 31, 2002 March 1, 2011 for major sources March 1, 2012 for minor sources
VOC Control Measures – Solvent-Using Processes 30 TAC Chapter 115, Subchapter E	Revised in 2011 to implement RACT requirements per control technique guidelines published by the United States Environmental Protection Agency (EPA) Seven emission source categories in the HGB area: industrial cleaning solvents; flexible package printing; paper, film, and foil coatings; large appliance coatings; metal furniture coatings; miscellaneous metal and plastic parts coatings; and miscellaneous industrial adhesives (see Houston-Galveston-Brazoria Reasonably Available Control Technology Analysis Update State Implementation Plan Revision for the 1997 Eight-Hour Ozone Standard adopted December 7, 2011 for more details)	March 1, 2013
Refueling – Stage I 30 TAC Chapter 115, Subchapter C, Division 2	Captures gasoline vapors that are released when gasoline is delivered to a storage tank Vapors returned to the tank truck as the storage tank is being filled with fuel, rather than released into the ambient air	1990

Measure	Description	Start Date(s)
Refueling – Stage II 30 TAC Chapter 115, Subchapter C, Division 4	Captures gasoline vapors when a vehicle is being fueled at the pump Vapors returned through the pump hose to the petroleum storage tank, rather than released into the air	1992 A SIP revision authorizing the decommissioning of Stage II vapor control equipment was submitted to the EPA on October 31, 2013. Facilities may continue operating Stage II until August 31, 2018.
Federal Area/Non-Road Measures	Series of emissions limits, implemented by the EPA, for area and non-road sources Examples: diesel and gasoline engine standards for locomotives and leaf-blowers	Phase in through 2018
Texas Emissions Reduction Plan (TERP) 30 TAC Chapter 114, Subchapter K	Provides grant funds for on-road and non-road heavy-duty diesel engine replacement/retrofit	January 2002
California Standards for Certain Gasoline Engines	California standards for non-road gasoline engines 25 horsepower and larger	May 1, 2004
Stationary Diesel Engines 30 TAC Chapter 117, Subchapter B, Division 3	Prohibition on operating stationary diesel and dual-fuel engines for testing and maintenance purposes between 6:00 a.m. and noon	April 1, 2002
Natural Gas-Fired Small Boilers, Process Heaters, and Water Heaters 30 TAC Chapter 117, Subchapter E, Division 3	NO_X emission limits on small-scale residential and industrial boilers, process heaters, and water heaters equal to or less than 2.0 million British thermal units per hour	2002
Minor Source NO_X Controls for Non-MECT Sites 30 TAC Chapter 117, Subchapter D, Division 1	NO_X emission limits on boilers, process heaters, stationary engines, and turbines at minor sites not included in the MECT program (uncontrolled design capacity to emit less than 10 tons per year)	March 31, 2005
Texas Low Emission Diesel (TxLED) 30 TAC Chapter 114, Subchapter H, Division 2	Requires all diesels for both on-road and non-road use to have a lower aromatic content and a higher cetane number	October 31, 2005 and phased in through January 31, 2006

Measure	Description	Start Date(s)
TxLED for Marine Fuels 30 TAC Chapter 114, Subchapter H, Division 2	Adds marine distillate fuels X and A, commonly known as DMX and DMA, or Marine Gas Oil, into the definition of diesel fuels, requiring them to be TxLED compliant	October 1, 2007 and phased in through January 1, 2008
Texas Low Reid Vapor Pressure (RVP) Gasoline 30 TAC Chapter 114, Subchapter H, Division 1	Requires all gasoline for both on-road and non-road use to have a RVP of 7.8 pounds per square inch or less from May 1 through October 1 each year	April 2000
Voluntary Mobile Emission Reduction Program	Voluntary measures administered by the Houston-Galveston Area Council (H-GAC) (see Appendix F: *Evaluation of Mobile Source Control Strategies for the Houston-Galveston-Brazoria State Implementation Plan (With Detailed Strategies)*, prepared for H-GAC by ENVIRON International Corporation, of the 2010 HGB AD SIP Revision)	Phase in through 2018
Federal On-Road Measures	Series of emissions limits, implemented by the EPA, for on-road vehicles Examples: Tiers 1, 2, and 3 vehicle standards, low sulfur diesel standards, National Low Emission Vehicle standards, and reformulated gasoline	Phase in through 2025
Vehicle Inspection/ Maintenance 30 TAC Chapter 114, Subchapter C	Yearly dynomometer testing for pre-1996 vehicles and computer checks for 1996 and newer vehicles	May 1, 2002 in Harris County May 1, 2003 in Brazoria, Fort Bend, Galveston, and Montgomery Counties
Speed Limit Reduction 43 TAC Chapter 25, Subchapter B	Five miles per hour (mph) below what was posted before May 1, 2002, on roadways where speeds were 65 mph or higher	September 2003
Transportation Control Measures	Various measures in H-GAC's long-range transportation plans (see Appendix F of the 2010 HGB AD SIP Revision for more details)	Phase in through 2018
Voluntary Energy Efficiency/Renewable Energy	Energy efficiency and renewable energy projects encouraged by Senate Bill (SB) 7, 76th Texas Legislature, 1999 and SB 5, 77th Texas Legislature, 2001	September 1, 1999 and September 1, 2001
Automotive Windshield Washer Fluid 30 TAC Chapter 115, Subchapter G, Division 1	VOC content limitation on automotive windshield washer fluid sold, supplied, distributed, or manufactured for use in Texas	January 1, 1995

The following control measures being implemented in the HGB area are permanent and enforceable, but the emissions reductions from these control measures were not included in previous one-hour and 1997 eight-hour HGB attainment demonstration (AD) SIP revisions.

3.2.1 Control of Volatile Organic Compounds Emissions from Storage Tanks

In May 2007, the commission adopted revisions to the rules in 30 Texas Administrative Code (TAC) Chapter 115, Subchapter B, Division 1 for VOC storage tanks located in the HGB ozone nonattainment area. The revised requirements reduce uncontrolled VOC flash emissions at oil and gas exploration and production sites and other VOC emissions from storage tanks. These amendments to Chapter 115 are described in more detail in the preamble of the adopted rule (32 TexReg 3178) (http://www.tceq.texas.gov/assets/public/implementation/air/rules/texas-register/32-texreg-3178.pdf).

Although these rules resulted in actual reductions in flash emissions, no credit was claimed in the 2010 HGB AD SIP Revision. At the time the rules were adopted, it was unknown how many affected sites would be required to install controls. In 2010, ENVIRON International Corporation (ENVIRON) Project 06-17477T quantified the VOC emission reductions resulting from the implementation of these Chapter 115 requirements to control VOC flash emissions from crude oil and condensate storage tanks in the HGB ozone nonattainment area. Based upon area source emissions inventory development methods at the time of publication, ENVIRON Project 06-17477T estimated that the Chapter 115 rules would result in 10,683 tons of VOC reductions per year (29.3 tons of VOC reductions per day) in the HGB area. More information on ENVIRON Project 06-17477T can be found on the TCEQ website (http://www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/ei/5820784005FY1022-20100831-environ-flash_emission.pdf).

3.2.2 Mass Emissions Cap and Trade Program

The Mass Emissions Cap and Trade (MECT) program uses an annual cap to limit the amount of NO_X emissions from all applicable sources in the HGB area. The MECT program allocated NO_X allowances to applicable facilities in the HGB area based on actual levels of activity from the years 1997 through 1999. These allowances are referred to as actual allowances. The program also allocated allowances to certain applicable facilities based on their permit limit. These allowances are referred to as allowable allowances and were allocated to facilities that had not yet been built or had not been operational long enough to establish baseline data. Applicable facilities that do not meet the criteria for receiving an allocation of actual or allowable allowances must acquire allowances from facilities in the program that receive an allocation of actual allowances. Additionally, facilities that were allocated allowable allowances are required to revise their allocation to be based on actual operating data after an operational baseline period has been established. Participation in the MECT program is mandatory for all applicable sources.

The photochemical modeling for the 2010 HGB AD SIP Revision included 120.0 tons per day (tpd) of NO_X emissions in 2018 based on the October 2009 MECT cap. The modeled MECT cap is a function of the actual allowance allocations, allowable allowance allocations, and the conversion of emission reduction credits to allowance allocations. The projected 2018 MECT cap, as of March 2014 is 109.9 tpd of NO_X emissions, which is a reduction of 10.1 tpd of NO_X emissions from the modeled MECT cap. This reduction can be attributed to facilities revising allowance allocations based on permit limits to allocations based on actual operating data since typically most facilities operate below their permit limits. Further MECT cap reductions are expected in the future due to sources that have yet to convert their allowable allowances into

actual allowances and companies that choose to permanently retire allowances to comply with the requirements of other air quality programs.

3.2.3 Tier 3 Motor Vehicle Emission and Fuel Standards

Tier 3 emission standards will apply to new, light-duty motor vehicles, light-duty trucks, and medium-duty passenger vehicles beginning model year 2017 and will be fully phased in by model year 2025. Tier 3 emission standards will also apply to chassis-certified Class 2b and Class 3 heavy-duty vehicles beginning model year 2018 and will be fully phased in by model year 2022. The Tier 3 emission standards also extend the regulatory useful life period during which the standards apply from 120,000 miles to 150,000 miles.

When fully implemented, the Tier 3 exhaust emission standards for light-duty vehicles will provide approximately an 80% reduction in non-methane organic gases (NMOG) and NO_X (NMOG+NO_X) standards and a 70% reduction in per-vehicle particulate matter (PM) standards when compared to the current fleet average. The Tier 3 exhaust standards for heavy-duty vehicles provide about a 60% reduction in both fleet average NMOG+NO_X standards and per-vehicle PM standards when compared to the current standards.

Tier 3 fuel standards will limit gasoline sulfur to no more than 10 parts per million (ppm) of sulfur on an annual average basis beginning January 1, 2017, a reduction of approximately 66% when compared to the current standard. The current gasoline sulfur standards specifying an 80 ppm refinery gate cap and 95 ppm downstream cap are maintained under the new Tier 3 fuel standards. Removing sulfur from gasoline allows a vehicle's catalyst to work more efficiently. The Tier 3 gasoline sulfur standard will make emission control systems more effective for both existing and new vehicles, and will enable automobile manufacturers to meet the more stringent Tier 3 vehicle emissions standards.

3.2.4 New International Marine Diesel Engine and Marine Fuel Standards for Oceangoing Vessels and Emissions Control Areas

In March 2009, the United States (U.S.) government submitted a request to the International Maritime Organization (IMO) for the creation of an emissions control area (ECA) around the nation's coastlines. The request was granted and the North American ECA was officially designated by the IMO on March 26, 2010 and became enforceable in August 2012. All marine diesel fuels used by oceangoing vessels (OGV) in the North American ECA were limited to a maximum sulfur content of 1,000 ppm beginning January 1, 2015, and all new engines on OGV operating in these areas must use emission controls that achieve an 80% reduction in NO_X emissions beginning January 1, 2016.

The EPA regulations for marine diesel fuel and new marine engines less than 30 liters per cylinder displacement and the new International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI standards for marine residual fuels and new marine diesel engines above 30 liters per cylinder displacement will apply to all OGV flagged and registered in the U.S. The EPA's regulations for new Category 3 marine engines and new sulfur limits for marine diesel fuel will also apply to all OGV flagged and registered in the U.S. In addition, the new MARPOL Annex VI standards will apply to all new marine diesel engines and fuels on foreign marine vessels that operate near U.S. coasts and ports.

The new marine diesel engine and fuel standards will provide a 96% reduction in sulfur in marine diesel fuels, as well as an 85% reduction in PM emissions and an 80% reduction in NO_X emissions, when compared to current standards.[8]

Cumulatively, these new marine diesel engine and fuel standards are estimated by the EPA to result in a 0.5 to 1.0 parts per billion (ppb) reduction of ozone in the ambient air of the HGB ozone nonattainment area by 2020.[9]

3.3 ADDITIONAL MEASURES

Additional air quality improvement measures being implemented in the HGB area are described in this section. These additional measures are beneficial toward reducing ozone and assure that the HGB area will continue to maintain the one-hour ozone standard.

3.3.1 SmartWay Transport Partnership and the Blue Skyways Collaborative

Among its various efforts to improve air quality in Texas, the TCEQ continues to promote two voluntary programs in cooperation with the EPA: SmartWay Transport Partnership and Blue Skyways Collaborative.

The SmartWay Transport Partnership is a market-driven partnership aimed at helping businesses move goods in the cleanest most efficient way possible. This program is a voluntary EPA program primarily for the freight transport industry that promotes strategies and technologies to help improve fleet efficiency while also reducing air emissions.

There are over 3,000 SmartWay partners in the U.S., including most of the nation's largest truck carriers, all the Class 1 rail companies, and many of the top Fortune 500 companies. Since its founding, SmartWay has reduced oil consumption by 120.7 million barrels and prevented the release of 738,000 tons of NO_X and 37,000 tons of PM into the atmosphere.[10] Ports in the U.S. rely on SmartWay's Port Drayage Truck program to help reduce pollution in and around major national ports. The Port of Houston Authority's (PHA) partnership with the Environmental Defense Fund and the Houston-Galveston Area Council (H-GAC) in the Port Drayage Truck Bridge Loan Program received $9 million from the EPA's Diesel Emission Reduction Act SmartWay Program in 2009. On average, four trucks a month, or about 50 trucks a year, were approved for replacement funding. Several workshops have been sponsored by the PHA for trucking companies and independent owner/operators to learn about funding opportunities.

Approximately 160 Texas companies are SmartWay partners. The SmartWay Transport Partnership will continue to benefit the HGB area by reducing emissions as more companies and affiliates join, and additional idle reduction, trailer aerodynamic kits, low-rolling resistance tire, and retrofit technologies are incorporated into SmartWay-verified technologies.

The Blue Skyways Collaborative was created to encourage voluntary air emission reductions by planning or implementing projects that use innovations in diesel engines, alternative fuels, and

---

[8] EPA, 2009. Oceangoing Vessels, Emission Control Area Designation, http://www.epa.gov/otaq/oceanvessels.htm#emissioncontrol, Office of Transportation and Air Quality.
[9] EPA, 2009. Regulatory Announcement: Proposal of Emission Control Area Designation for Geographic Control of Emissions from Ships, EPA-420-F-09-015, Figure 4: Potential Benefits of U.S. ECA Ozone Reductions in 2020, March 2009.
[10] EPA, 2014. SmartWay Program Highlights 2014, EPA-420-F-14-003, February 2014.

renewable energy technologies applicable to on-road and non-road sources. The Blue Skyways Collaborative partnerships include international, federal, state, and local governments, non-profit organizations, environmental groups, and private industries.

3.3.2 American Waterways Operators Tank Barge Emissions Best Management Practices

Using infrared gas imaging technology in field studies conducted in the summer of 2005, the TCEQ detected inadvertent VOC emissions from tank barges operating in the HGB area. The Louisiana Department of Environmental Quality (LDEQ) also detected inadvertent emissions from tank barges in similar field studies conducted in the same time period. In response to these field studies, the American Waterways Operators (AWO) voluntarily developed industry Best Management Practices (BMP) to reduce VOC emissions from tank barges. The BMP includes procedures to reduce VOC emissions from equipment and operations on tank barges. The recommendations are a combination of inspection, corrective action, preventative maintenance, and operational, procedural, and training practices.

The BMP was reviewed by the Chemical Transportation Advisory Committee (CTAC), United States Coast Guard (USCG), LDEQ, and the TCEQ. The BMP was distributed to AWO members in 2006 for implementation on a voluntary basis. While the BMP is a voluntary measure and does not impose an enforceable commitment on AWO members, the implementation of the BMP, where applicable, may contribute to reducing inadvertent VOC emissions from barges during dock operations and during transit, which will help improve the air quality in the HGB area. A copy of the 2006 BMP document is provided in Appendix J: *Recommendations for Best Management Practices to Control and Reduce Inadvertent Cargo Vapor Emissions in the Tank Barge Community* of the 2010 HGB AD SIP Revision.

3.3.3 Consent Decrees with Refineries

The EPA's National Petroleum Refinery Initiative[11] has resulted in multi-issue settlement agreements with the nation's major petroleum refineries. As of March 2014, 109 refineries representing more than 90% of total domestic refining capacity are under settlement, and negotiations are underway with other refiners not currently under settlement. The EPA consent decrees limit emissions from fluidized catalytic cracking units, sulfur recovery units, heaters and boilers, and flares. The EPA estimates that full implementation of the current settlements will result in more than 93,000 tons per year of NO_X emission reductions. The EPA also anticipates VOC emission reductions will result from consent decree requirements that reduce hydrocarbon flaring including:

- installing continuous emissions monitoring systems (CEMS) or predictive emissions monitoring systems;
- operating a flare gas recovery system to control continuous or routine flaring;
- limiting flaring to only process upset gases, fuel gas released as a result of relief valve leakage, or gas released due to a malfunction; and
- eliminating the routes of generated fuel gases and monitoring the flare with CEMS or a flow meter.

Although some of the estimated NO_X and VOC emission reductions may have occurred prior to 2006, full implementation of the settlements is not expected until the end of 2015. Since

[11] http://www2.epa.gov/enforcement/petroleum-refinery-national-case-results

approximately 14% of the nation's petrochemical refining capacity is located in the HGB area,[12] the commission expects the HGB area will benefit from the NO_X and VOC emission reductions required by these settlements.

3.3.4 Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

The TCEQ previously adopted NO_X emission standards for stationary diesel reciprocating internal combustion engines in 30 TAC Chapter 117 for the HGB area. The NO_X emission standards for stationary diesel engines in §117.310 and §117.2010 are used in conjunction with the MECT program for sources subject to MECT. For sources subject to §117.2010 that are not in MECT, the NO_X emission standards apply on a unit-by-unit basis. Additionally, the TCEQ adopted requirements in the exemption criteria for stationary diesel reciprocating internal combustion engines in §117.303 and §117.2003 that require engines installed, modified, reconstructed, or relocated on or after October 1, 2001 to meet the corresponding emission standards for non-road engines in 40 Code of Federal Regulations (CFR) Part 89, §89.112(a), Table 1 to be in effect at the time of the installation, modification, reconstruction, or relocation of the engine. The combination of the emission standards, the MECT program, and the provisions to meet EPA's Tier standards (Tiers 1, 2, and 3) in 40 CFR Part 89 to qualify for exemption makes the Chapter 117 requirements for stationary diesel reciprocating internal combustion engines equivalent to, or more stringent than, most of the requirements in EPA's New Source Performance Standards in 40 CFR Part 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. However, the NO_X emission standards in 40 CFR §60.4204(c)(3) for large-cylinder non-emergency stationary compression ignition internal combustion engines (i.e., diesel-fired engines) installed on or after January 1, 2016 are more stringent than the lowest NO_X emission standards for stationary diesel reciprocating internal combustion engines in §117.310 and §117.2010 and 40 CFR Part §89.112(a), Table 1. The exact amount of NO_X reductions resulting from 40 CFR §60.4204(c)(3) will be dependent on the turnover of existing engines and new installations after 2015 and cannot be estimated at this time. However, the requirements for new non-emergency stationary diesel-fired engines in the large-cylinder category starting in 2016 should ultimately result in additional NO_X reductions beyond that already relied upon in the 2010 HGB AD SIP Revision.

3.3.5 Energy Efficiency and Renewable Energy Measures

Energy efficiency (EE) measures are typically programs that reduce the amount of electricity and natural gas consumed by residential, commercial, industrial, and municipal energy consumers. Examples of EE measures include increasing insulation in homes, installing compact fluorescent light bulbs, and replacing motors and pumps with high efficiency units. Renewable energy (RE) measures include programs that generate energy from resources that are replenished or are otherwise not consumed as with traditional fuel-based energy production. Examples of RE include wind energy and solar energy projects.

Emission reductions resulting from these programs were not explicitly included in the photochemical modeling for the 2010 HGB AD SIP Revision because local efficiency efforts may not result in local emissions reductions or may be offset by increased demand in electricity. The complex nature of the electrical grid makes accurately quantifying emission reductions from EE/RE measures difficult. At any given time, it is impossible to determine exactly where a

---

[12] U.S. Energy Information Administration. *Refinery Capacity Report*. June 21, 2013. http://www.eia.gov/petroleum/refinerycapacity/

specific user's electricity was produced. The electricity for a user in the HGB area could be generated by a power plant in West Texas, in a nearby attainment county, or within the nonattainment area. If electrical demand is reduced in the HGB area due to these local efficiency measures, then emission reductions from power generation facilities may occur in any number of locations around the state.

The Texas Legislature has enacted a number of EE/RE measures and programs. The following is a summary of Texas EE/RE legislation since 1999.

- 76th Texas Legislature, 1999
  - Senate Bill (SB) 7
  - House Bill (HB) 2492
  - HB 2960
- 77th Texas Legislature, 2001
  - SB 5
  - HB 2277
  - HB 2278
  - HB 2845
- 78th Texas Legislature, 2003
  - HB1365 (Regular Session)
- 79th Texas Legislature, 2005
  - SB 20 (First Called Session)
  - HB 2129 (Regular Session)
  - HB 2481 (Regular Session)
- 80th Texas Legislature, 2007
  - HB 66
  - HB 3070
  - HB 3693
  - SB 12
- 82nd Texas Legislature, 2011
  - SB 898 (Regular Session)
  - SB 924 (Regular Session)
  - SB 981 (Regular Session)
  - SB 1125 (Regular Session)
  - SB 1150 (Regular Session)
  - HB 51 (Regular Session)

3.3.5.1 Renewable Energy

SB 5, 77th Texas Legislature, 2001, set goals for political subdivisions in affected counties to implement measures to reduce energy consumption from existing facilities by 5% each year for five years from January 1, 2002 through January 1, 2006. In 2007, the 80th Texas Legislature passed SB 12, which extended the timeline set in SB 5 through 2007 and made the annual 5% reduction a goal instead of a requirement. The State Energy Conservation Office (SECO) is charged with tracking the implementation of SB 5 and SB 12. Also during the 77th Texas Legislature, the Energy Systems Laboratory (ESL), part of the Texas Engineering Experiment Station, Texas A&M University System, was mandated to provide an annual report on EE/RE efforts in the state as part of Texas Emissions Reduction Plan (TERP) under Texas Health and Safety Code (THSC), §388.003(e).

The 79th Texas Legislature, 2005, Regular and First Called Sessions, amended SB 5 through SB 20, HB 2129, and HB 2481 to add, among other initiatives, renewable energy initiatives that

require: 5,880 megawatts of generating capacity from renewable energy by 2015; the TCEQ to develop a methodology for calculating emission reductions from renewable energy initiatives and associated credits; the ESL to assist the TCEQ in quantifying emissions reductions from EE/RE programs; and the Public Utility Commission of Texas (PUCT) to establish a target of 10,000 megawatts of installed renewable technologies by 2025.

Wind power producers in Texas have exceeded the renewable energy generation target by installing over 10,000 megawatts of wind electric generating capacity by 2010 and total capacity should exceed 14,600 megawatts by December 2014.

HB 2129, 79th Texas Legislature, 2005, Regular Session, directed the ESL to collaborate with the TCEQ to develop a methodology for computing emission reductions attributable to use of renewable energy and for the ESL to annually quantify such emission reductions. HB 2129 directed the Texas Environmental Research Consortium to use the Texas Engineering Experiment Station to develop this methodology. With the TCEQ's guidance, the ESL produces an annual report, *Statewide Air Emissions Calculations from Energy Efficiency, Wind and Renewables,* detailing these efforts.

In addition to the programs discussed and analyzed in the ESL report, local governments may have enacted measures beyond what has been reported to SECO and the PUCT. The TCEQ encourages local political subdivisions to promote EE/RE measures in their respective communities and to ensure these measures are fully reported to SECO and the PUCT.

SB 981, 82nd Texas Legislature, 2011, Regular Session, allows a retail electric customer to contract with a third party to finance, install, or maintain a distributed renewable generation system on the customer's side of the electric meter, regardless of whether the customer owns the installed system. SB 981 also prohibits the PUCT from requiring registration of the system as an electric utility if the system is not projected to send power to the grid.

3.3.5.2 Residential and Commercial Building Codes and Programs

THSC, Chapter 388, Texas Building Energy Performance Standards, as adopted in SB 5 of the 77th Texas Legislature, 2001, states in §388.003(a) that single-family residential construction must meet the energy efficiency performance standards established in the energy efficiency chapter of the International Residential Code. The Furnace Pilot Light Program includes energy savings accomplished by retrofitting existing furnaces. Also included is a January 2006 federal mandate raising the minimum Seasonal Energy Efficiency Ratio (SEER) for air conditioners in single-family and multi-family buildings from 10 to 13.

THSC, Chapter 388, as adopted in SB 5 of the 77th Texas Legislature, 2001, states in §388.003(b) that non-single-family residential, commercial, and industrial construction must meet the energy efficiency performance standards established in the energy efficiency chapter of the International Energy Conservation Code.

3.3.5.3 Federal Facility Energy Efficiency and Renewable Energy Projects

Federal facilities are required to reduce energy use by Presidential Executive Order 13123 and the Energy Policy Act of 2005 (Public Law 109-58 EPACT20065). The ESL compiled energy reductions data for the federal EE/RE projects in Texas.

3.3.5.4 Political Subdivisions Projects

SECO funds loans for energy efficiency projects for state agencies, institutions of higher education, school districts, county hospitals, and local governments. Political subdivisions in

nonattainment and affected counties are required by SB 5, 77th Texas Legislature, 2001, to report EE/RE projects to SECO. These projects are typically building systems retrofits, non-building lighting projects, and other mechanical and electrical systems retrofits such as municipal water and waste water treatment systems.

3.3.5.5 Electric Utility Sponsored Programs

Utilities are required by SB 7, 76th Texas Legislature, 1999, and SB 5, 77th Texas Legislature, 2001, to report demand-reducing energy efficiency projects to the PUCT (see THSC, §386.205 and Texas Utilities Code (TUC), §39.905). These projects are typically air conditioner replacements, ventilation duct tightening, and commercial and industrial equipment replacement.

SB 1125, 82nd Texas Legislature, 2011, Regular Session, amended the TUC, §39.905 to require energy efficiency goals to be at least 30% of annual growth beginning in 2013. The metric for the energy efficiency goal remains at 0.4% of peak summer demand when a utility program accrues that amount of energy efficiency. SB 1150, 82nd Texas Legislature, 2011, Regular Session, extended the energy efficiency goal requirements to utilities outside the Electric Reliability Council of Texas area.

3.3.5.6 Energy Efficiency Programs

HB 3693, 80th Texas Legislature, 2007, amended the Texas Education Code, Texas Government Code, THSC, and TUC. The bill:

- requires state agencies, universities, and local governments to adopt energy efficiency programs;
- provides additional incentives for electric utilities to expand energy conservation and efficiency programs;
- includes municipal-owned utilities and cooperatives in efficiency programs;
- increases incentives and provides consumer education to improve efficiency programs; and
- supports other programs such as revision of building codes and research into alternative technology and renewable energy.

HB 51, 82nd Texas Legislature, 2011, Regular Session, requires new state buildings and major renovations to be constructed to achieve certification under an approved high-performance design evaluation system.

HB 51 also requires, if practical, that certain new and renovated state-funded university buildings comply with approved high-performance building standards.

SB 898, 82nd Texas Legislature, 2011, Regular Session, extended the existing requirement for state agencies, state-funded universities, local governments, and school districts to adopt energy efficiency programs with a goal of reducing energy consumption by at least 5% per state fiscal year (FY) for 10 state FYs from September 1, 2011 through August 31, 2021.

SB 924, 82nd Texas Legislature, 2011, Regular Session, requires all municipally-owned utilities and electric cooperatives that had retail sales of more than 500,000 megawatt hours in 2005 to report each year to SECO information regarding the combined effects of the energy efficiency activities of the utility from the previous calendar year, including the utility's annual goals, programs enacted to achieve those goals, and any achieved energy demand or savings goals.

3.3.6 Clean Air Interstate Rule and Cross-State Air Pollution Rule

In March 2005, the EPA issued the Clean Air Interstate Rule (CAIR) to address electric generating utility (EGU) emissions that transport from one state to another. The rule incorporates the use of three cap and trade programs to reduce sulfur dioxide (SO_2) and NO_X: the ozone-season NO_X trading program, the annual NO_X trading program, and the annual SO_2 trading program.

For CAIR, Texas was not included in the ozone season NO_X program but was included for the annual NO_X and SO_2 programs. As such, Texas must make necessary reductions in annual SO_2 and NO_X emissions from new and existing EGUs to demonstrate that emissions from Texas do not contribute to nonattainment or interfere with maintenance of the 1997 particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$) NAAQS in another state. CAIR consists of two phases for implementing necessary NO_X and SO_2 reductions. Phase I addresses required reductions from 2009 through 2014. Phase II addresses reductions in 2015 and thereafter.

In July 2006, the commission adopted a SIP revision to address how the state would meet emissions allowance allocation budgets for NO_X and SO_2 established by the EPA to meet the federal obligations under CAIR. The commission adopted a second CAIR-related SIP revision in February 2010. This revision incorporated various federal rule revisions that the EPA had promulgated since the TCEQ's initial submittal. It also incorporated revisions to 30 TAC Chapter 101 resulting from legislation during the 80th Texas Legislature, 2007.

A December 2008 court decision found flaws in CAIR but kept CAIR requirements in place temporarily while directing the EPA to issue a replacement rule. In July 2011, the EPA finalized the Cross-State Air Pollution Rule (CSAPR) to meet Federal Clean Air Act (FCAA) requirements and respond to the court's order to issue a replacement program. Texas was included in CSAPR for ozone season NO_X, annual NO_X, and annual SO_2 due to the EPA's determination that Texas significantly contributes to nonattainment or interferes with maintenance of the 1997 eight-hour ozone NAAQS and the 1997 and 2006 $PM_{2.5}$ NAAQS in other states. As a result of numerous EGU emission reduction strategies already in place in Texas, the annual and ozone season NO_X reduction requirements from CSAPR were relatively small but still significant. CSAPR required an approximate 7% reduction in annual NO_X emissions and less than 5% reduction in ozone season NO_X emissions.

On August 21, 2012, the U.S. Court of Appeals for the District of Columbia (D.C.) Circuit vacated the CSAPR. Under the D.C. Circuit Court's ruling, CAIR will remain in place until the EPA develops a valid replacement. On October 5, 2012, the EPA filed a petition seeking an *en banc* rehearing of the U.S. Court of Appeals' decision regarding CSAPR, but the appeal was denied.

The EPA and various environmental groups petitioned the Supreme Court of the United States to review the D.C. Circuit Court's decision on CSAPR. On June 24, 2013, the Supreme Court granted the petitions and heard oral arguments on December 10, 2013. On April 29, 2014, a decision by the Supreme Court reversed the D.C. Circuit Court's decision and remanded the case. On June 26, 2014, the EPA filed a motion with the U.S. Court of Appeals for the D.C. Circuit to lift the stay of the CSAPR, which was granted on October 23, 2014. On November 21, 2014, the EPA issued rulemaking, which shifted the effective dates of CSAPR requirements to account for the time that had passed after the rule was stayed in 2011. As a result, the EPA is implementing the CSAPR federal implementation plan for Texas. Phase 1 of CSAPR took effect January 1, 2015 and Phase 2 is scheduled to begin January 1, 2017. Oral arguments on the remanded case were held on February 25, 2015.

3.3.7 Clean School Bus Program

HB 3469, 79th Texas Legislature, 2005, established the Clean School Bus Program, which provides monetary incentives for school districts in the state for reducing emissions of diesel exhaust from school buses. As of May 2015, the TCEQ Clean School Bus Program has reimbursed approximately $28.5million in grants for over 7200 school buses across the state, with $6.9 million being used for 2,535 school buses in the HGB area.

3.3.8 Texas Emission Reduction Plan

The TERP program was created in 2001 by the 77th Texas Legislature to provide grants to offset the incremental costs associated with reducing NO_X emissions from high-emitting heavy-duty internal combustion engines on heavy-duty vehicles, non-road equipment, marine vessels, locomotives, and some stationary equipment.

The majority of emissions reduction incentives have been awarded under the Diesel Emissions Reduction Incentive Program (DERI). The DERI incentives are awarded to projects to replace, repower, or retrofit eligible vehicles and equipment to achieve NO_X emission reductions in Texas ozone nonattainment areas and other counties identified as affected counties under the TERP where ground-level ozone is a concern. From 2001 through August 2014, $905 million in DERI grants were awarded for projects estimated to help reduce 160,836 tons of NO_X. Over $383 million in DERI grants were awarded to projects in the HGB area, with a projected 71,211 tons of NO_X reduced. These projects are estimated to reduce up to 20.5 tpd of NO_X in the HGB areas during 2015. Of the $383 million, $11 million were awarded to H-GAC through third-party grants to administer subgrants in the HGB area. H-GAC has used this funding to target the replacement of drayage trucks operating in and from the Port of Houston with newer models with lower emission ratings. Grant selections totaling approximately $60 million under the latest grant application period are pending, with final awards and contract execution expected by July 2015.

Three other incentive programs under the TERP will result in a quantifiable reduction in NO_X emissions in the HGB area. The Texas Clean Fleet Program (TCFP) was established in 2009 to provide grants for the replacement of light-duty and heavy-duty diesel vehicles with vehicles powered by alternative fuels, including: natural gas, liquefied petroleum gas, hydrogen, methanol (85% or more by volume), or electricity. This program is for larger fleets, with a requirement that an applicant apply for replacement of at least 20 vehicles at a time. From 2009 through August 2014, over $23.6 million in TCFP grants were awarded for projects to reduce an estimated 314.5 tons of NO_X. Almost $6.8 million in TCFP grants were awarded to projects in the HGB area, with a projected 61.9 tons of NO_X reduced. These projects are estimated to reduce up to 0.05 tpd of NO_X in the HGB area during2015. An additional $8.5 million in grant awards are pending final contract execution and are expected to be finalized by July 2015.

The Texas Natural Gas Vehicle Grant Program (TNGVGP) was established in 2011 to provide grants for the replacement of medium-duty and heavy-duty diesel vehicles with vehicles powered by natural gas. This program may include grants for individual vehicles or multiple vehicles. The majority of the vehicle operation must occur in the Texas nonattainment areas, other counties designated as affected counties under the TERP, and the counties in and between the triangular area between Houston, San Antonio, Dallas, and Fort Worth. From 2011 through August 2014, almost $26 million in TNGVGP grants were awarded for projects to help reduce a projected 816 tons of NO_X. Over $9.5 million in TNGVGP grants were awarded to projects where the applicant indicated the primary operation of the vehicle would occur in and around the HGB area, with a projected 266 tons of NO_X reduced. These projects are expected to begin reducing

0.29 tpd of NO_X in the HGB area in 2015. An additional $14.4 million in TNGVGP grants have been awarded or are expected to be finalized by July 2015.

A new Drayage Truck Incentive Program (DTIP) was established in 2013 to provide grants for the replacement of drayage trucks operating in and from seaports and rail yards located in nonattainment areas. The first grant application period for this program opened September 22, 2014. Grants totaling almost $4 million are expected to be finalized by May 2015.

The TERP is currently authorized through 2019, which will result in continued reductions in the significant emissions source categories of heavy-duty on-road and non-road engines. TERP projects require reporting and documentation of emissions reductions over a five- to seven-year activity life or, in some cases, an even longer period. Projects funded in a particular year will continue to report emissions reductions achieved over the activity-life commitment period for each project.

3.3.9 83rd Texas Legislature

Summaries of the bills passed during the 83rd Texas Legislature, 2013, Regular Session, that have the potential to impact the HGB area are discussed in this section. For legislative updates regarding EE/RE measures and programs, see Section 3.3.5: *Energy Efficiency and Renewable Energy Measures.*

Senate Bill 1727

SB 1727 revised some of the criteria for the existing TERP incentive programs and established several new programs. The bill also revised the funding allocation formula for the various TERP programs.

The existing TERP programs that were revised include: the DERI, the TCFP, and the TNGVGP. A new program, the DTIP, was also established.

SB 1727 removed the maximum limits on the cost-effectiveness of a project funded under the DERI and authorized the TCEQ to fund projects to convert on-road and non-road diesel engines to a dual-fuel configuration using diesel and natural gas. Changes were also made to the TCFP to simplify the requirements on the percentage of costs that may be covered by a grant, and to authorize the TCEQ to allow trucks used to transport raw agricultural products that are replaced under this program to operate a lesser percentage of annual mileage in designated counties than is required for other TCFP projects.

The TNGVGP was affected by changes to the Clean Transportation Triangle (CTT) program, which provides grants for infrastructure to provide natural gas fueling in designated areas. SB 1727 expanded the eligible areas under the CTT. The original areas included nonattainment areas and counties along the interstate highways connecting the cities of Houston, Dallas, Fort Worth, and San Antonio. The expanded areas include other counties designated as affected counties under the TERP and the counties located within the triangle formed by the previously designated interstate highways. The TNGVGP provides grants for replacement of heavy-duty and medium-duty vehicles that travel at least 75% of their annual mileage in the CTT designated areas. Thus, the expansion of the CTT areas also expands the eligible areas of travel under the TNGVGP. The bill also authorized the TCEQ to allow trucks used to transport raw agricultural products that are replaced under this program to operate a lesser percentage of annual mileage in designated counties than is required for other TNGVGP projects.

SB 1727 also established the new DTIP to provide grants for replacement of drayage trucks operating at seaports and rail yards located in a nonattainment area. The replacement trucks must continue to operate at designated seaports and rail yards and must also operate at least 50% of annual mileage within a maximum distance from the seaports and rail yards as defined by the TCEQ.

Other TERP programs not specifically included as weight of evidence strategies, but which are expected to have beneficial impacts on reducing emissions in nonattainment areas and other areas, were also revised. The maximum grant amounts for the CTT program and the Alternative Fueling Facilities Program (AFFP), which provides grants for infrastructure to provide fueling for a range of alternative fuels, were increased to a maximum of $600,000. The TERP Light-Duty Motor Vehicle Purchase or Lease Incentive (LDPLI) Program, which was established under the original TERP legislation in 2001 but never implemented, was also revised and restarted. Under the new program criteria, the TCEQ provides grants of up to $2,500 for the purchase or lease of vehicles under 10,000 pounds gross vehicle weight rating that are powered by natural gas, liquefied petroleum gas, or electricity (including plug-in hybrid vehicles). The LDPLI program will be available statewide.

To implement SB 1727, the commission adopted revisions to 30 TAC §§114.622, 114.629, 114.650, 114.653, and 114.656 and new 30 TAC §§114.680 - 114.682 on April 9, 2014. The commission adopted revisions to 30 TAC §§114.610 - 114.612 and 114.616 and the repeal of 30 TAC §114.619 on April 30, 2014.

House Bill 2859

HB 2859 increased the funding allocated to the TCEQ's Local Initiatives Projects (LIP) Program, which is available to counties that participate in the Low-Income Vehicle Repair Assistance, Retrofit, and Accelerated Vehicle Retirement Program (LIRAP), from $5 million to $7 million per year. The funding for LIRAP is a separate fee collected in conjunction with the state's I/M program. In addition, the bill limits $2 million of the funding to projects for coordinating with local law enforcement officials to reduce the use of counterfeit state inspection stickers. This bill became effective September 1, 2013.

3.3.10 Local Initiative Projects

Funds are provided to counties participating in LIRAP for implementation of air quality improvement strategies through local projects and initiatives. In the HGB area, LIP funding is available to the five counties participating in LIRAP: Brazoria; Fort Bend; Galveston; Harris; and Montgomery.

Brazoria, Fort Bend, and Galveston Counties used LIP funds to purchase buses and initiate a new park-and-ride transit service in 2010. LIP continues to maintain the park-and-ride funding as of 2013. The transit service links county residents with the Texas Medical Center area and creates immediate and long-term benefits for reducing emissions and congestion by supporting approximately 8,000 commuter trips per month.

Harris County used LIP funds in 2010 to establish the Harris County Clean Air Emissions Task Force and initiate an emissions enforcement program. The enforcement program targets high-emitting vehicles, smoking vehicles, and suspicious vehicles to verify that the state safety and emissions inspection windshield certificates on these vehicles are legitimate and in compliance with air quality standards. The task force's objective is to reduce the number of fraudulent, fictitious, or improperly issued safety and emissions inspection windshield certificates. The task force partners with local and state agencies to enforce state laws, codes, rules, and regulations

regarding air quality and mobile emissions in Harris County. The citizens of Harris County and the entire southeast Texas region stand to benefit from this program as a result of the reduction in NO_X emissions from each vehicle brought into emissions compliance.

Montgomery County used LIP funds for signal light synchronization projects in FY 2010 and 2012. Synchronizing traffic signalization reduces idling by decreasing the number of times a vehicle must stop at a traffic light. The "Exhaust Phase" of an engine emits the most emissions during starting, idling, and breaking stationary inertia. Synchronizing traffic signalization reduces both idling and the number of times a vehicle must resume travel, i.e., break stationary inertia. The project increases the emissions reduction benefits by synchronizing the traffic signalization upon real-time traffic flow instead of a stagnate model to better manage peak-hour congestion, while minimizing cross-traffic congestion, and reducing emissions.

3.3.11 Other Local Programs

In the 2010 HGB AD SIP Revision, H-GAC submitted the following programs that were not committed to as either transportation control measures or Voluntary Mobile Emission Reduction Program measures but may be implemented locally in the HGB area. Updates to these programs were included in the Houston-Galveston-Brazoria 1997 Eight-Hour Ozone Standard Nonattainment Area Motor Vehicle Emissions Budgets Update State Implementation Plan Revision adopted in April 2013 (2013 MVEB SIP Revision). For a detailed analysis of these programs, see Appendix F of the 2010 HGB AD SIP Revision, and Section 5.4.3.13: *Other Local Programs* and Section 5.4.3.14: *Additional Strategies Not Included in the 2010 HGB AD SIP Revision* of the 2013 MVEB SIP Revision.

- Scrappage and Buy-Back Plan
- Limitations on Heavy-Duty Vehicles Idling; Creation of Regional Government Idling Restrictions
- Encourage/Mandate Livable Centers
- Enhanced Enforcement of Smoking Vehicles
- Limitation on Idling of Heavy-Duty Construction Equipment
- Airport Emission Reduction Strategy
- Congestion Pricing/High-Occupancy Vehicle (HOV) Lanes and High-Occupancy Toll (HOT) Lane Conversion
- Flextime
- Parking Pricing
- PHA Automated Gate Systems
- Third-Party TERP Grants

3.4 CONTROL STRATEGIES SUMMARY

The permanent and enforceable VOC and NO_X control measures contained in Section 3.2: *List of Existing Control Measures* have resulted in air quality improvement in the HGB area. These enforceable measures will remain in place to ensure continued maintenance of the one-hour ozone NAAQS in the HGB area. In addition, Section 3.3: *Additional Measures* lists control measures that may not meet all of the EPA's standard tests of SIP creditability (permanent, enforceable, surplus, and quantifiable) but are crucial to the success of the air quality plan in the HGB area. Implementation of these control measures will contribute to the continued maintenance of the one-hour ozone NAAQS and attainment of the 1997 and 2008 ozone NAAQS. The TCEQ continues to seek innovative air quality improvement measures and technologies to implement in the HGB area.

CHAPTER 4: MAINTENANCE DEMONSTRATION

4.1 GENERAL

The redesignation substitute (RS) state implementation plan (SIP) revision demonstrates that the Houston-Galveston-Brazoria (HGB) area will remain in attainment of the one-hour ozone National Ambient Air Quality Standard (NAAQS) for the 10-year period following the date that anti-backsliding obligations under the revoked standard would be lifted. Since removing anti-backsliding obligations is contingent upon the United States Environmental Protection Agency's (EPA) approval, the Texas Commission on Environmental Quality (TCEQ) has set a horizon year of 2026. This 10-year period also aligns with the EPA's requirement of maintenance plans to demonstrate attainment for a 10-year period following the date of redesignation.

The most current emissions inventory (EI) data were analyzed as part of this maintenance demonstration. The 2011 periodic inventory was chosen as the starting point for the analyses presented in this section since it was the most recent periodic inventory year with complete, quality assured data. Additionally, the 10 years prior to monitoring attainment of the one-hour ozone NAAQS (2002 through 2011) were analyzed to develop trend data. During this time, the HGB area EI showed a significant decrease in ozone precursor emissions from all source categories, which contributed to the attainment of the one-hour ozone NAAQS. These reductions were accomplished through a variety of federal, state, and local regulations and programs as detailed below.

4.2 EMISSIONS INVENTORY TRENDS

From 2002 to 2011, overall anthropogenic ozone precursor emissions in the HGB nonattainment area declined substantially as a result of regulations implemented at the federal, state, and local levels and innovative programs implemented by the TCEQ. As demonstrated in Figure 4-1: *HGB Eight-County Nonattainment Area Historical NO_X Emissions Trends* and Figure 4-2: *HGB Eight-County Nonattainment Area Historical VOC Emissions Trends*, anthropogenic volatile organic compounds (VOC) emissions have decreased 30%, and anthropogenic nitrogen oxides (NO_X) emissions have decreased 46%. Both 30 Texas Administrative Code (TAC) Chapter 115: *Control of Air Pollution from Volatile Organic Compounds* and 30 TAC Chapter 117: *Control of Air Pollution from Nitrogen Compounds* regulations along with implementation of the Mass Emissions Cap and Trade (MECT) program have significantly reduced overall ozone precursor emissions at both major and minor (point and area) industrial, commercial, and institutional sources in the HGB ozone nonattainment area. Innovative emissions reduction programs such as the Texas Emissions Reduction Plan and the AirCheckTexas Drive a Clean Machine program in 30 TAC Chapter 114: *Control of Air Pollution from Motor Vehicles* have also reduced mobile source emissions, the primary source of NO_X emissions in the HGB area.

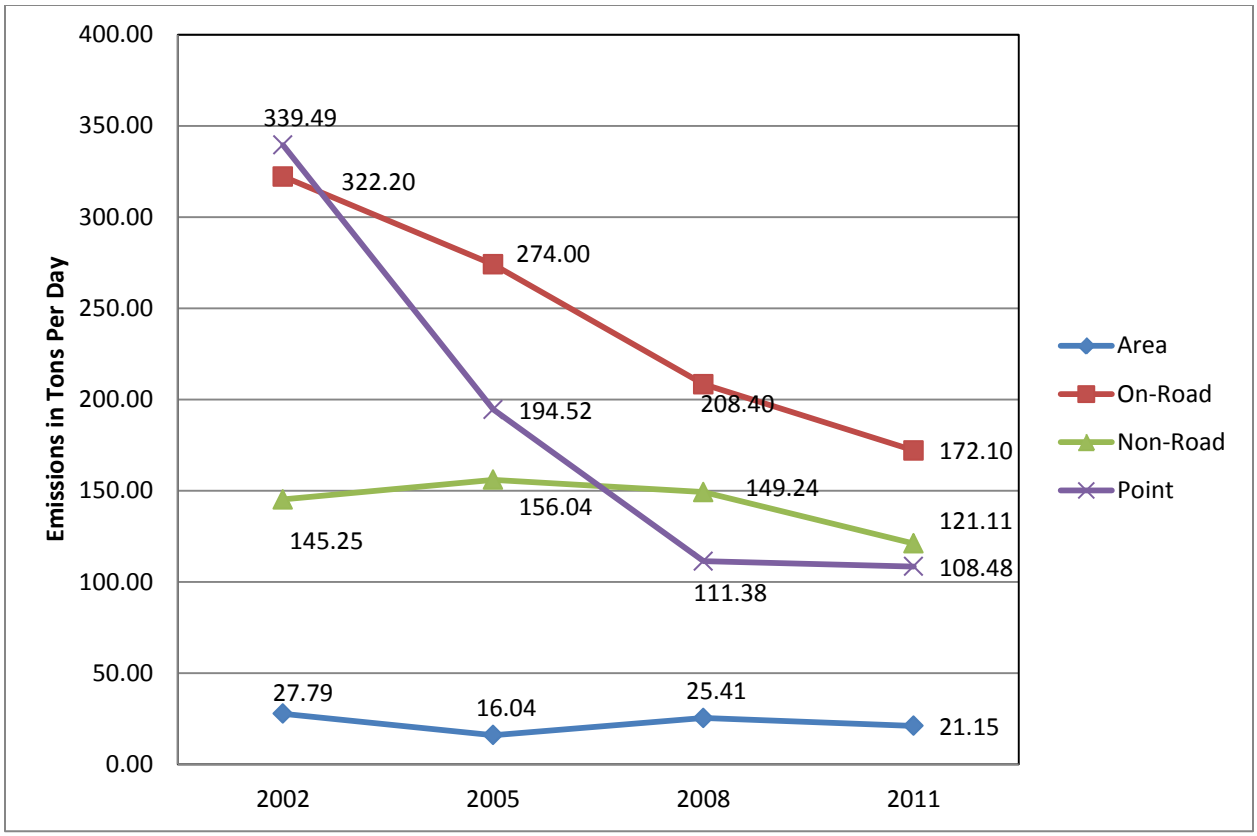


Figure 4-1: HGB Eight-County Nonattainment Area Historical NO_X Emissions Trends

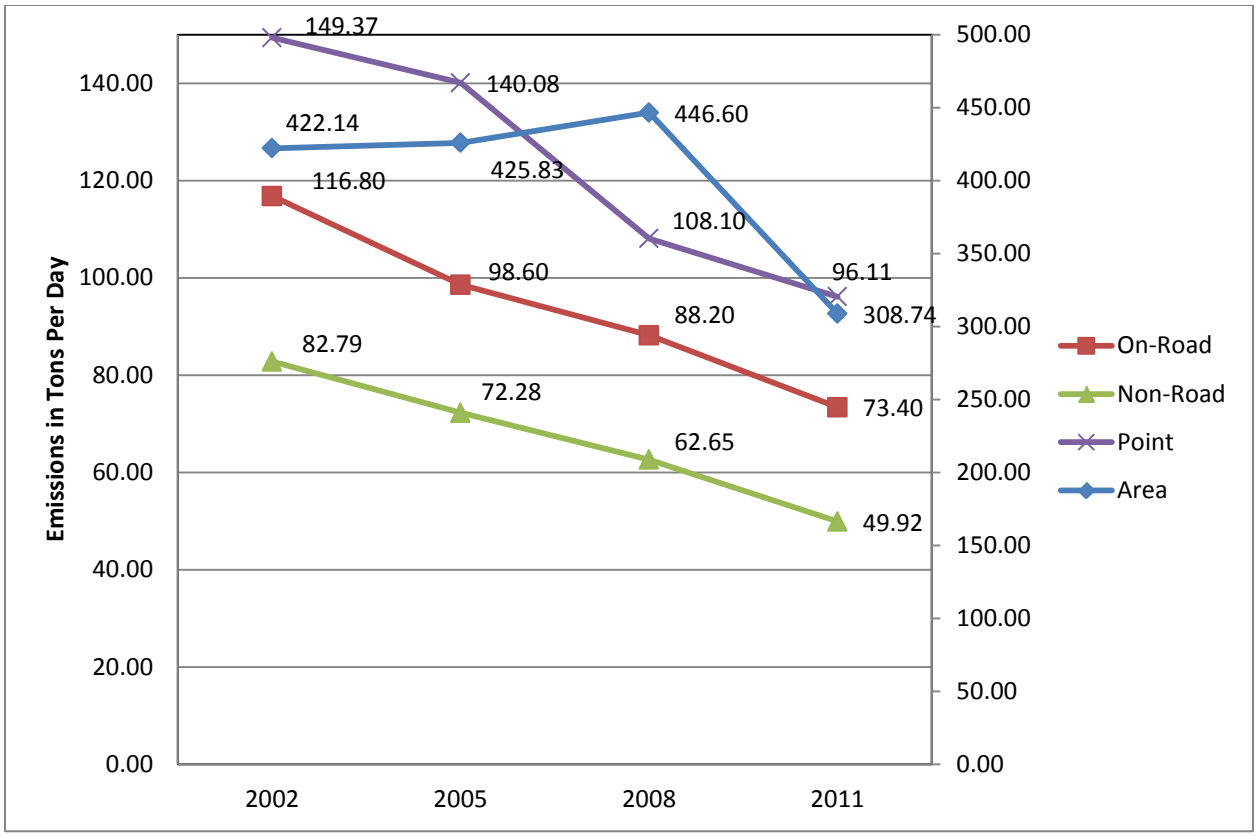


Figure 4-2: HGB Eight-County Nonattainment Area Historical VOC Emissions Trends

4.3 2011 ATTAINMENT INVENTORY

The 1990 Federal Clean Air Act (FCAA) Amendments require that EIs be prepared for ozone nonattainment areas. Because ozone is photochemically produced in the atmosphere when VOC mixes with NO_X in the presence of sunlight, the TCEQ must compile information on the sources of these precursor pollutants. The EI must identify the source types present in an area, the amount of each pollutant emitted, and the types of processes and control devices employed at stationary sources or other source categories. The EI provides data for a variety of air quality planning tasks, including establishing baseline emission levels, calculating reduction targets, control strategy development for achieving the required emission reductions, emission inputs into air quality simulation models, and tracking actual emission reductions against the established emissions growth and control budgets.

The attainment inventory for the HGB area is based on the VOC and NO_X emissions that occur on a typical summer weekday. Consistent with a September 4, 1992 EPA memorandum entitled *Procedures for Processing Requests to Redesignate Areas to Attainment*, the attainment EI base year may be any one of the three years used to determine the design value for the attainment year. For this HGB RS SIP revision, the attainment EI base year is 2011 because it is the year of the most recent periodic emissions inventory (PEI) and one of the three years used to determine the design value for the 2013 attainment year. The total VOC and NO_X EI for the area is summarized from the estimates developed for four general categories of anthropogenic emissions sources, which are each explained in Section 4.4.1: *Area Sources*, Section 4.4.2: *On-Road Mobile Sources*, Section 4.4.3: *Non-Road Mobile Sources*, and Section

4.4.4: *Stationary Point Sources*. Summaries of the 2011 VOC and NO_X emissions by source type are provided in Section 4.5: *Emissions Summary*.

4.4 FUTURE EMISSIONS AND VERIFICATION OF CONTINUED ATTAINMENT

To track progress of the HGB area toward continued attainment of the one-hour ozone NAAQS, the TCEQ will develop and submit periodic EIs to the EPA every three years as required by the federal Air Emissions Reporting Requirements (AERR) rule. The 2011 inventory was the first PEI submitted under the AERR. Per the AERR, the 2011 PEI was reported to the EPA's National Emissions Inventory (NEI) as a comprehensive and detailed estimate of air emissions, including ozone precursors (NO_X and VOC). As directed by the AERR, the 2011 Texas PEI includes annual emissions for the entire state and summer weekday emissions for the 2008 eight-hour ozone nonattainment areas in Texas, including the HGB area. States can rely on periodic AERR EI submittals to satisfy ongoing SIP EI submission requirements every three years. The periodic EI SIP revision submission requirements would occur in the same years as the AERR submittals.

Because the EPA has not made guidance available for how to demonstrate verification of continued attainment in an RS SIP revision, the TCEQ is using the method outlined in the EPA's redesignation guidance[13]. Future emissions for the HGB area were projected from the base year inventory (2011) to a future year (horizon year) of 2026. Projecting emissions to 2026 aligns with the EPA's requirement of maintenance plans to demonstrate attainment for a 10-year period following the date of redesignation. The requirement for verification of continued attainment is satisfied when the state demonstrates that future VOC and NO_X emissions levels are not expected to result in exceedances of the one-hour ozone NAAQS.

Future emissions were projected to the horizon year 2026 using three-year intervals. A summary of the base year inventory and the future year inventories for ozone precursor emissions is presented in Section 4.5: *Emissions Summary*.

4.4.1 Area Sources

Stationary source emissions data from sites and processes that do not meet the reporting requirements for point sources are classified as area sources. Area sources are small-scale industrial, commercial, and residential sources that generate emissions. Emissions are calculated and reported at the county level. Examples of area sources include: printing operations; industrial coatings; degreasing solvents; house paints; gasoline service station underground tank filling; vehicle refueling operations; stationary source fossil fuel combustion; outdoor refuse burning; and structural fires. With some exceptions, area source emissions are 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 sources. Other activity data include the amount of gasoline sold in an area, employment by industry type, and crude oil and natural gas production.

4.4.1.1 Updated 2011 Base Year Inventories

The 2011 area source inventory was developed per the AERR reporting requirements. The 2011 inventory was created using a combination of methodologies and data: EPA-generated EIs;

---

[13] Memorandum from John Calcagni, Director of Air Quality Management Division, September 4, 1992, *Procedures for Processing Requests to Redesignate Areas to Attainment*. EPA Office of Air Quality Planning and Standards.

TCEQ-contracted projects; TCEQ staff projects; and categories grown from the 2008 EI using factors derived from study data compiled by Eastern Research Group (ERG), the Economic and Consumer Credit Analytics 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 factors can be found in Appendix A: *Projection Factors for Point and Area Sources.*

The EPA developed EIs for states to use for many source categories as part of the NEI. The states access these individual inventories through the EPA's NEI 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: storage tanks; structural fires; dry cleaners; and automobile fires.

In particular, the TCEQ expended significant resources to improve the oil and gas area source inventory production categories for the 2011 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 B: *Characterization of Oil and Gas Production Equipment and Develop a Methodology to Estimate Statewide Emissions*. A significant improvement made to the oil and gas calculator for the 2011 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 C: *Condensate Tank Oil and Gas Activities*.

For those area source categories affected by TCEQ rules, rule effectiveness factors are applied to the baseline or uncontrolled 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 separate category is current and valid. Data such as current population figures, fuel usage, and material usage were updated and the EPA guidance on emission factors was used. Other routine efforts such as checking calculations for errors and conducting reasonableness and completeness checks were implemented.

4.4.1.2 Updated Milestone Years Inventories

The updated milestone year inventories for the area source categories were developed using factors derived from Appendix A, the Economic and Consumer Credit Analytics website (http://www.economy.com/default.asp), and the EIA's annual energy outlook publication. The ERG-derived factors contain individual growth factors for each category and for each forecasting year. This projection method is the EPA standard and accepted method for developing future year EIs.

4.4.1.3 Area Source Emissions Inventories

The 2011 area source NO_X and VOC emissions totals for the eight-county HGB 2008 eight-hour ozone nonattainment area are presented in Table 4-1: *HGB 2011 Area Source NO_X and VOC Emissions (tons per day).*

Table 4-1: HGB 2011 Area Source NO_X and VOC Emissions (tons per day)

Pollutant	2011	2014	2017	2020	2023	2026
NO_X	21.15	22.19	22.90	23.28	23.17	23.23
VOC	308.74	321.92	332.43	339.67	342.58	346.13

4.4.2 On-Road Mobile Sources

On-road mobile emission sources consist of automobiles, trucks, motorcycles, and other motor vehicles traveling on public roadways. On-road mobile source emissions are usually categorized as either combustion-related emissions or evaporative hydrocarbon emissions. Combustion-related emissions are estimated for vehicle engine exhaust. Evaporative hydrocarbon emissions are estimated for the fuel tank and other evaporative-leak sources on the vehicle. To calculate emissions, both the rate of emissions per unit of activity (emissions factors) and the number of units of activity must be determined. The emissions factors for on-road mobile sources are determined using models developed and approved by the EPA. The models allow for input of local conditions and vehicle characteristics. The activity information corresponding to the emissions factors is obtained using local travel demand models (TDM), the output from the highway performance monitoring system, and speed models.

In March 2010, the EPA released the Motor Vehicle Emissions Simulator (MOVES) as the official emissions factor model for developing on-road mobile source category EIs. Although MOVES represented a new approach to assessing on-road emissions, the sources are the same, and the opportunity to use local inputs for meteorological conditions, control programs, and fleet characteristics remains. When using MOVES in emission-rates mode, emission rates are produced for subsets of the on-road fleet, and the emission rates are multiplied by the activity level of each vehicle type or source-use type to calculate emissions.

The HGB RS SIP revision was proposed with on-road mobile source emissions inventories developed using the EPA's MOVES2010b model. The EPA initially made MOVES2014 available on July 31, 2014 and officially released the MOVES2014 version of the model as a replacement to MOVES2010b for SIP applications on October 7, 2014 (70 FR 60343). An update was released on October 27, 2014. Due to the delay of the MOVES2014 model finalization, the SIP development schedule did not allow time for inclusion of link-based MOVES2014 inventory values in the proposed version of this SIP revision. The TCEQ, working with the Texas Transportation Institute (TTI), recently completed MOVES2014-based 2011, 2014, 2017, 2020, 2023, and 2026 on-road emission inventories for the HGB area. These inventories replace the MOVES2010b-based inventories and control reductions in the proposed HGB RS SIP revision.[14] The planning assumptions, fleet characteristics and vehicle miles traveled (VMT) estimates were updated to incorporate the latest available information at the time the inventories were developed. Using MOVES2014, the on-road emissions results for all maintenance analysis years continue to demonstrate a decrease in both VOC and NO_X from the 2011 base year.

To estimate on-road mobile source emissions, emissions rates calculated by the MOVES model must be multiplied by the level of vehicle activity. On-road mobile source emissions factors are

[14] See Appendix D: *Development of MOVES2014 On-Road Emission Inventories for the Years 2011, 2014, 2017, 2020, 2023, and 2026*, which replaces the proposed Appendix D: *MOVES2010b-based On-Road Inventories in Support of the HGB Ozone Nonattainment Area Redesignation Substitute Analysis.*

expressed in units of grams per mile; therefore, the activity information that is required to complete the inventory calculation is VMT in units of miles per day. The level of vehicle travel activity is developed using a TDM run by the Texas Department of Transportation or by the local metropolitan planning organization. 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 and reporting inventories, VMT estimates are calibrated against outputs from the federal highway performance monitoring system, a model built from a different set of traffic counters.

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

4.4.2.1 On-Road Mobile Source Emissions Inventories

The 2011, 2014, 2017, 2020, 2023, and 2026 on-road mobile source EIs for the HGB RS SIP revision were developed using the latest available data, current emissions factors and models, and the most current planning assumptions. The inventories include the eight HGB-area counties designated as nonattainment for the one-hour ozone NAAQS. On-road inventory estimates were developed under contract by TTI. Consistent with on-road inventory development procedures for reporting requirements and rate of further progress, the on-road inventories for each of these calendar years are based on VMT estimates and emission rates for an average summer work weekday. MOVES2014, which is the latest available version of the EPA's MOVES model, was used to estimate the summer weekday emission rates in units of grams per mile for NO_X and VOC. The roadway link-level VMT estimates were obtained from travel demand modeling for the eight-county HGB area for each analysis year. A summary of the on-road mobile source VMT used to develop the various NO_X and VOC emissions levels is presented in Table 4-2: *HGB VMT (miles per average summer day)*. The HGB on-road mobile source 2011, 2014, 2017, 2020, 2023, and 2026 EIs for NO_X and VOC are summarized in Table 4-3: *HGB Average Summer Weekday NO_X and VOC Emissions for On-Road Mobile Sources (tons per day)*. Using MOVES2014, there is a net change in milestone year on-road emissions ranging from minus 0.43 tpd to minus 13.62 tpd for NO_X and plus 2.58 to minus 4.45 tpd for VOC. Although the individual milestone year changes vary, the results for all maintenance analysis years continue to demonstrate decreases in both VOC and NO_X from the 2011 base year after MOVES2014 results were incorporated. For complete documentation of the development of the on-road mobile source EIs for this HGB RS SIP revision including the inventory development methods, MOVES inputs, and the results, refer to Appendix D: *Development of MOVES2014 On-Road Emission Inventories for the Years 2011, 2014, 2017, 2020, 2023, and 2026*. The complete set of input and output files are available from the Emissions Assessment Section of the TCEQ Air Quality Division upon request.

Table 4-2: HGB VMT (miles per average summer day)

Description	2011	2014	2017	2020	2023	2026
Vehicle Miles Traveled	152,651,488	144,546,685	156,018,423	167,051,752	178,917,689	190,707,272

Table 4-3: HGB Average Summer Weekday NO_X and VOC Emissions for On-Road Mobile Sources (tons per day)

Pollutant	2011	2014	2017	2020	2023	2026
NO_X	178.72	127.27	84.47	62.14	49.78	40.89

Pollutant	2011	2014	2017	2020	2023	2026
VOC	80.09	63.01	48.60	41.44	37.04	32.48

4.4.2.2 On-Road Mobile Source Control Strategies

The on-road mobile EIs for each HGB RS SIP revision analysis year were developed using MOVES2014 emission factors that reflect all control strategies used to demonstrate maintenance of the one-hour ozone standard. The controls that were modeled include: pre-1990 Federal Motor Vehicle Control Program (FMVCP), fleet turnover to Tier 1 of the FMVCP, fleet turnover to Tier 2 of the FMVCP, the 2007 heavy-duty diesel FMVCP, fleet turnover to Tier 3 of the FMVCP, the lower sulfur gasoline associated with Tier 3 FMVCP, summer reformulated gasoline (RFG), the HGB vehicle inspection and maintenance (I/M) program, the HGB anti-tampering program, and Texas Low Emission Diesel (TxLED). A summary of the HGB on-road mobile source control strategies used for the HGB RS SIP revision are presented in Table 4-4: *HGB On-Road Mobile Control Strategies Summary*.

Table 4-4: HGB On-Road Mobile Control Strategies Summary

Control Program Description	Year Control Program Started	Control Scenario Notes
Pre-1990 FMVCP	Pre-1990	Included for 2011, 2014, 2017, 2020, 2023, and 2026
Anti-Tampering Program	1986	Included for 2011, 2014, 2017, 2020, 2023, and 2026
1992 Federal Controls on Gasoline Volatility	1992	Maximum Reid Vapor Pressure of 7.8 pounds per square inch Included for 2011, 2014, 2017, 2020, 2023, and 2026
Tier 1 FMVCP	1994	Included for 2011, 2014, 2017, 2020, 2023, and 2026
RFG Phase 1	1995 for Phase One	Superseded by RFG Phase 2
I/M Program	1997	Included for 2011, 2014, 2017, 2020, 2023, and 2026
RFG Phase 2	2000 for Phase Two	Included for 2011, 2014, 2017, 2020, 2023, and 2026
National Low Emission Vehicle (NLEV) Program	2001	Included for 2011, 2014, 2017, 2020, 2023, and 2026
Tier 2 FMVCP	2004	Phase in 2004 to 2009 Included for 2011, 2014, 2017, 2020, 2023, and 2026
TxLED	2006	Low aromatic hydrocarbon and high cetane number to control NO_X Included for 2011, 2014, 2017, 2020, 2023, and 2026
Federal Low-Sulfur Highway Diesel	2006	15 parts per million maximum sulfur content Included for 2011, 2014, 2017, 2020, 2023, and 2026
2007 Heavy Duty FMVCP	2007	Phase in 2007 to 2010 Included for 2011, 2014, 2017, 2020, 2023, and 2026
Tier 3 FMVCP	2017	Phase-in from 2017 to 2025
Lower sulfur gasoline associated with Tier 3 FMVCP	2017	10 parts per million maximum for sulfur

4.4.2.3 On-Road Mobile Source Control Strategy Reductions

Due to the on-road mobile source control programs in place for each analysis year, the on-road NO_X and VOC emissions are steadily decreasing from the base year of 2011 to each milestone year and the 2026 horizon year despite growth in VMT. A summary of the tons per day (tpd) change from the 2011 base year to each milestone year and the horizon year are summarized in Table 4-5: *Estimated Reductions from 2011 Baseline Due to FMVCP, I/M, RFG, and TxLED (tons per day)*. The results in Table 4-5 are between 3.41 tpd lower and 11.06 tpd higher due to using MOVES2014, depending on the pollutant and the milestone year. The results for all maintenance analysis years continue to demonstrate a decrease in both VOC and NO_X from the 2011 base year after MOVES2014 results were incorporated. A summary of the percent change in NO_X and VOC from the 2011 base year to each milestone year and the horizon year are summarized in Table 4-6: *Estimated Percent Reductions from 2011 Baseline Due to FMVCP, I/M, RFG, and TxLED*.

Table 4-5: Estimated Reductions from 2011 Baseline Due to FMVCP, I/M, RFG, and TxLED (tons per day)

Inventory Year	NO_X	VOC
2011	0	0
2014	-51.45	-17.08
2017	-94.25	-31.49
2020	-116.58	-38.65
2023	-128.94	-43.05
2026	-137.83	-47.61

Table 4-6: Estimated Percent Reductions from 2011 Baseline Due to FMVCP, I/M, RFG, and TxLED

Inventory Year	NO_X	VOC
2011	0.0	0.0
2014	-28.8	-21.3
2017	-52.7	-39.3
2020	-65.2	-48.3
2023	-72.1	-53.8
2026	-77.1	-59.4

4.4.3 Non-Road Mobile Sources

Non-road vehicles do not typically operate on roads or highways and are often referred to as off-road or off-highway vehicles. The non-road source category is composed of a diverse collection of equipment. Non-road emissions sources include but are not limited to: agricultural equipment; construction and mining equipment; lawn and garden equipment; aircraft and airport equipment; locomotives; commercial marine vessels (CMV); and drilling rigs. EIs for non-road sources developed as subcategories include: NONROAD model categories; airports; CMVs; drilling rigs; and locomotives. The following sections describe the emissions calculation methods used for the non-road mobile source subcategories.

4.4.3.1 Updated 2011 Base Year Inventories

A Texas-specific version of the EPA's latest NONROAD 2008a model, called the Texas NONROAD (TexN) model, was used to calculate emissions for all non-road mobile source equipment and recreational vehicles, with the exception of airports, locomotives, CMVs, and drilling rigs. Several equipment survey studies have been conducted that focused on various equipment categories operating in different areas in Texas. The resulting survey data are used as inputs to the TexN model to more accurately estimate non-road emissions for the State of Texas. The 2011 EI development used the meteorological data, and fuel data collected for the calendar year 2011.

The 2011 airport emission sources include aircraft engines, auxiliary power units, and ground support equipment. The United States Federal Aviation Administration's Emissions and Dispersion Modeling System, Version 5.1.3 (EDMS) was used to calculate airport source emissions. To estimate the 2011 emissions from the airport sources, a survey was conducted by ERG under contract with the TCEQ to collect updated information on aircraft activity, fleet mix, and EDMS model input parameters. Documentation of methods and procedures used in developing HGB area 2011 airport EI can be found in Appendix E: *Development of Statewide Annual Emissions Inventory and Activity Data for Airports*.

The 2011 Texas locomotive EI includes Class I, II, and III locomotive activity and emissions by rail segment for all counties within Texas. Locomotive line-haul and yard activity data were compiled from companies operating in Texas to create a county-level Class I line-haul inventory. Data developed by 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 used 2008 activity and emissions profiles for Class II and Class III railroads. To calculate annual gallons of fuel used by railroads, 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, were used. Based on the EIA's latest annual energy outlook publication, 2008 fuel usage values were grown to estimate 2011 emissions. Documentation of methods and procedures used in developing the locomotive EIs can be found in Appendix F: *2011 Texas Railroad Emission Inventory Report*.

The 2011 CMV EI was based on 2011 activity data compiled using local port data and data from the United States Department of Transportation Maritime Administration. The EPA's updated 2011 emissions factors were used to account for vessel turnover and compliance with marine vessel air quality regulations. The emissions factors were applied to the 2011 activity values to calculate 2011 emissions. The emissions were spatially allocated to geographic information system (GIS) shapefiles. Documentation of methodologies and procedures used in developing the CMV EIs can be found in Appendix G: *Development of 2011 Statewide Toxics and Actual Annual and Ozone Season Weekday Emissions Inventories for Commercial Marine Vessels.*

The 2011 inventory for the drilling rig diesel engines was developed based on a statewide EI improvement study and updated with 2011 activity data. A survey of oil and gas exploration and production companies was used to develop improved drilling rig emissions characterization profiles. Documentation of methods and procedures used in developing the drilling rig diesel engine EIs can be found in Appendix H: *Development of Texas Statewide Drilling Rigs Emissions Inventories for the Years 1990, 1993, 1996, and 1999 through 2040* or online at http://www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/ei/5821199776FY1105-20110815-ergi-drilling_rig_ei.pdf. The drilling rig emissions characterization profiles from this study were combined with 2011 drilling activity data obtained from the Railroad Commission of Texas (RRC) to develop the 2011 inventory.

4.4.3.2 Updated Milestone Years Inventories

The updated milestone year inventories for the NONROAD model categories were developed using the most recent TexN/NONROAD2008a model. The TexN model runs were performed for the analyses years 2014, 2017, 2020, 2023, and 2026 to estimate the ozone season daily emissions for the NONROAD model categories. Unlike the NONROAD 2008a model that uses one state-level population file, the TexN model contains unique population files for all 254 Texas counties. Population files in TexN have been developed for every possible analysis year (1970 to 2050) within the TexN model, utilizing county and source category classification-specific growth factors. Due to fluctuations in engine activity and their associated surrogates, the TexN population files are periodically updated using the most recent growth factors such as those available on the Economic and Consumer Credit Analytics (https://www.economy.com) to allow for more accurate forecasting and back-casting of emissions.

The updated milestone year inventories for the airport sources were based on the study *Projection Factors for Point and Area Sources* developed by ERG (see Appendix A), the 2011 airport EI data, and projections using Federal Aviation Association's Terminal Area Forecast data.

The updated milestone year inventories for locomotives were based on the data developed by ERG in the final version of the 2011 NEI. The emissions rate adjustment factors used for projections by source classification code can found in the EPA's fact sheet, Emission Factors for Locomotives (http://www.epa.gov/otaq/regs/nonroad/locomotv/420f09025.pdf).

The updated milestone year inventories for CMV sources were based on the data developed by ERG in the final version of the 2011 NEI and projections using trend data developed by E.H. Pechan & Associates, Inc. found in Appendix I: *Development of Locomotive and Commercial Marine Emissions Inventory - 1990 to 2040*.

The updated milestone year inventories for drilling rigs were based on the 2011 inventory developed using the drilling rig emissions characterization profiles from the ERG report in Appendix H combined with 2011 drilling rig activity data from the RRC. The 2011 inventory was then projected to future years using growth factors. Documentation on the development of growth factors can be found in Appendix A.

4.4.3.3 Non-Road Mobile Source Emissions Inventories

The 2011 non-road category source NO_X and VOC emissions totals for the eight-county HGB area are presented in Table 4-7: *HGB 2011 NO_X Emissions for Non-Road EI Categories (tons per day)* and Table 4-8: *HGB 2011 VOC Emissions for Non-Road EI Categories (tons per day)*.

Table 4-7: HGB 2011 NO_X Emissions for Non-Road EI Categories (tons per day)

Category	2011	2014	2017	2020	2023	2026
NONROAD Model	57.20	44.53	34.51	27.28	23.14	20.92
Airport	8.66	9.45	10.30	11.22	12.25	13.38
Locomotive	18.03	16.10	14.99	14.30	13.19	11.32
Commercial Marine Vessels	36.74	36.44	34.71	30.40	26.46	22.86
Drilling Rigs	0.48	0.47	0.48	0.50	0.50	0.50
Total	121.11	106.99	94.99	83.70	75.54	68.98

Table 4-8: HGB 2011 VOC Emissions for Non-Road EI Categories (tons per day)

Category	2011	2014	2017	2020	2023	2026
NONROAD Model	45.63	34.24	29.17	26.58	25.66	25.43
Airport	1.88	1.80	1.95	2.10	2.30	2.49
Locomotive	1.04	0.85	0.75	0.67	0.61	0.52
Commercial Marine Vessels	1.33	1.40	1.43	1.46	1.49	1.53
Drilling Rigs	0.04	0.04	0.04	0.05	0.05	0.05
Total	49.92	38.33	33.34	30.86	30.11	30.02

4.4.4 Stationary Point Sources

4.4.4.1 Emissions Inventory Development

Stationary point source emissions data are collected annually from sites that meet the reporting requirements of 30 TAC §101.10. 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.

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

4.4.4.2 Updated 2011 Base Year Inventory

The TCEQ extracted the 2011 point source inventory data from STARS on February 13, 2014. The extracted data included reported annual and ozone season daily emissions of NO_X and VOC for each site in the HGB area for which a 2011 EIQ was submitted and reflected revisions made on or before the extract date. The TCEQ designated the 2011 inventory as the base year because it was the most recent NEI year available.

4.4.4.3 Updated Milestone Year Inventories

In the development of the milestone year inventories, the TCEQ projected 2012 emissions and then applied unused emissions reductions credits to the inventories.

The TCEQ designated the 2012 inventory as the starting point for projections because it was the most recent finalized point source EI data available. The TCEQ extracted the 2012 point source inventory data from STARS on February 18, 2014. The extracted data included reported annual and ozone season daily emissions of NO_X and VOC for each site in the HGB area that submitted a 2012 EIQ and reflected revisions made on or before the extract date.

NO_X emissions from sites containing equipment applicable to the MECT program were projected using MECT data. MECT data were reviewed to identify sites with applicable units. For each of these sites, it was assumed that the significant majority of NO_X emissions are from MECT applicable units. Since the MECT cap is an annual value, it was prorated by the ratio of the aggregate of the 2012 ozone season daily emissions to the aggregate of the 2012 annual emissions for applicable sites to project future daily emissions for the HGB area. To maintain a

conservative approach, the entire cap was applied to the aggregate of the site emissions in the first milestone year inventory.

VOC emissions from sites identified as major sources of VOC emissions were projected using the major modification threshold for severe ozone nonattainment areas. Title V operating permit data from 2012 were reviewed to identify major sources of VOC emissions. For each site, the annual 25-ton major modification threshold was prorated by the site-wide ratio of ozone season to annual emissions to provide a one-time growth limit added to the site's 2012 emissions. To maintain a conservative approach, all growth was taken into account for the first milestone year inventory.

NO_X emissions from sites not listed in the MECT and VOC emissions from sources not identified as major sources of VOC emissions were projected using emissions trend data and growth factors. Emission trends for each site were established using 2009 through 2012 annual emissions data. For sites with decreasing emission trends, milestone year inventories were set equal to the 2012 baseline inventory. For sites with increasing emission trends, milestone year inventories were determined by applying growth factors to the 2012 baseline inventory. The growth factor information can be found in Appendix A. To maintain a conservative approach, any growth factors that projected a decrease in future emissions were modified so that emissions for these source categories remained constant through future years.

Finally, the milestone year inventories were adjusted to account for emissions credits. Emissions credits are banked emissions reductions that may return to the air shed in the future. To account for the possible use of the banked NO_X and VOC emissions, available Emissions Reduction Credit (ERC) and Discrete Emissions Reduction Credit (DERC) data were applied to the inventories.

Banked ERC use was determined based on New Source Review permitting offsets with a severe nonattainment offset ratio of 1.3 to 1 applied to such credits. ERCs listed in the Emissions Banking and Trading database as of February 24, 2014 were used. All of the banked ERCs were assumed to be allocated by 2017. The ERC transactions from 2008 to 2014 were also applied.

Banked DERCs were projected based on historical data with a 10% environmental contribution deduction under the assumption that DERCs will be used to meet 30 TAC Chapter 115 and/or Chapter 117 emissions standards. Available credits were averaged over the projected timespan. This approach is conservative and simplified; historical use has been considerably less[15]. DERCs listed in the Emissions Banking and Trading database as of February 18, 2014 were used. Past DERC transactions were not considered because of the short-term nature of DERCs.

A summary of the point source inventories is presented in Table 4-9*: HGB Point Source NO_X and VOC Emissions (tons per day).*

[15] Texas Commission on Environmental Quality. "Discrete Emission Credit Banking and Trading Program Audit." Accessed March 6, 2014. http://www.tceq.texas.gov/assets/public/implementation/air/banking/reports/2013decprogramaudit.pdf.

Table 4-9: HGB Point Source NO_X and VOC Emissions (tons per day)

Pollutant	2011	2014	2017	2020	2023	2026
NO_X	108.48	126.31	126.82	127.01	127.20	127.39
VOC	96.11	100.81	102.86	103.29	103.71	104.12

4.5 EMISSIONS SUMMARY

The 2011 base year and the 2014, 2017, 2020, 2023, and 2026 future year EI summaries by source categories for the HGB area are shown in Table 4-10: *HGB NO_X Emissions by Source Category (tons per day)* and Table 4-11: *HGB VOC Emissions by Source Category (tons per day)*. Contributions from biogenic emissions are not included in the summary because this analysis is limited to anthropogenic sources. As previously stated, the on-road mobile source category emissions inventories for this HGB RS SIP revision were developed using the updated MOVES2014 model. Using MOVES2014, there is a net change in on-road and the corresponding total emissions ranging from minus 0.43 tpd to minus 13.62 tpd for NO_X and plus 2.58 tpd to minus 4.45 tpd for VOC. The results for all maintenance analysis years continue to demonstrate a decrease in both VOC and NO_X from the 2011 base year after MOVES2014 results were incorporated.

Table 4-10: HGB NO_X Emissions by Source Category (tons per day)

Category	2011	2014	2017	2020	2023	2026
Point Sources	108.48	126.31	126.82	127.01	127.20	127.39
Area Sources	21.15	22.19	22.90	23.28	23.17	23.23
On-Road Mobile Sources (MOVES2014)	178.72	127.27	84.47	62.14	49.78	40.89
Non-Road Mobile Sources	121.11	106.99	94.99	83.70	75.54	68.98
Total	429.46	382.76	329.18	296.13	275.69	260.49

Table 4-11: HGB VOC Emissions by Source Category (tons per day)

Category	2011	2014	2017	2020	2023	2026
Point Sources	96.11	100.81	102.86	103.29	103.71	104.12
Area Sources	308.74	321.92	332.43	339.67	342.58	346.13
On-Road Mobile Sources (MOVES2014)	80.09	63.01	48.60	41.44	37.04	32.48
Non-Road Mobile Sources	49.92	38.33	33.34	30.86	30.11	30.02
Total	534.86	524.07	517.23	515.26	513.44	512.75

4.6 MAINTENANCE DEMONSTRATION CONCLUSION

Trend analysis using the 2026 future year emissions shows an overall decrease of 191.08 tpd in combined NO_X and VOC emissions for the HGB area. This net change includes a projected 22.11 tpd decrease in VOC and a 168.97 tpd decrease in NO_X. The net change includes an additional decrease in emissions of 3.62 tpd for VOC and 11.06 tpd for NO_X due to the substitution of the MOVES2010b-based emissions calculations with MOVES2014-based emissions calculations.

Previous photochemical modeling analysis for the HGB area shows that reducing NO_X emissions is expected to be more effective in reducing the ozone design value than VOC reductions. Therefore, the projected 168.97 tpd decrease of NO_X will reduce ozone design values more effectively than the smaller 22.11 tpd decrease in VOC emissions. Based on future trends and previous photochemical analysis, the HGB area is projected to show continued attainment of the one-hour ozone standard through 2026.

Appendices Available Upon Request

Melanie Rousseau
SIP Project Manager
melanie.rousseau@tceq.texas.gov
512.239.0707

RESPONSE TO COMMENTS RECEIVED REGARDING THE HOUSTON-GALVESTON-BRAZORIA (HGB) AREA REDESIGNATION SUBSTITUTE FOR THE ONE-HOUR OZONE NATIONAL AMBIENT AIR QUALITY STANDARD (NAAQS) STATE IMPLEMENTATION PLAN (SIP) REVISION

The Texas Commission on Environmental Quality (TCEQ or commission) offered a public hearing for this SIP revision on January 6, 2015 at 2:00 p.m. in Houston at the Texas Department of Transportation Auditorium. The public hearing was not opened because there were no attendees who signed in to speak.

The comment period opened December 5, 2014 and closed January 18, 2015. The TCEQ received written comments from the Texas Oil and Gas Association (TXOGA) and Baker Botts L.L.P., on behalf of the Section 185 Working Group (The Group).

TABLE OF CONTENTS

Table of Contents 1
General Comments 1
Support for the SIP Revision 1
Exceptional Events 1
Anti-Backsliding Provisions 2

GENERAL COMMENTS

Support for the SIP Revision

The Group and TXOGA supported the proposed HGB Redesignation Substitute SIP Revision. The Group also concurred that the proposal meets the United States Environmental Protection Agency (EPA) standards as published in the *Federal Register* (78 FR 34178).

The TCEQ appreciates the support.

Exceptional Events

The Group stated that the HGB area has met the one-hour ozone standard over two consecutive averaging periods, 2011 through 2013 and 2012 through 2014, and that if exceptional events are taken into account, the HGB area would have also demonstrated attainment over the 2009 through 2011 and 2010 through 2012 averaging periods.

On September 30, 2014, the TCEQ submitted an exceptional event technical support document to the EPA Region 6 office in Dallas, Texas. This document supports the commission's conclusion that large wildfires in the northwestern and southeastern United States caused an exceedance of the one-hour ozone NAAQS on August 26, 2011 at the Houston East (CAMS 1) monitoring site. The EPA has not yet concurred with the technical demonstration, but if this exceptional event is taken into account, the HGB area would demonstrate attainment of the one-hour ozone NAAQS for the averaging periods of 2009 through 2011, 2010 through 2012, and 2011 through 2013. No changes were made in response to this comment.

Anti-Backsliding Provisions

The Group commented that control measures related to the HGB area's severe nonattainment classification, including New Source Review (NSR) permitting and 30 Texas Administrative Code Chapter 101 fees, are financially burdensome to The Group's members and pose regulatory uncertainty for continued operations and future or modified facilities. The Group further commented that those burdens and uncertainties are no longer justified by HGB's air quality, which has improved due to well-planned emission control strategies.

Although the one-hour ozone standard has been revoked, Texas must continue to meet anti-backsliding requirements described in 40 Code of Federal Regulations §51.905(a), including a penalty fee provision under Federal Clean Air Act (FCAA), §182(d)(3) and §185 and NSR permitting requirements, for the HGB one-hour ozone severe nonattainment area.

The EPA's 2008 ozone standard SIP requirements rule[1] includes a mechanism for lifting anti-backsliding obligations under a revoked ozone NAAQS. The redesignation substitute satisfies the EPA's requirements by ensuring that specific redesignation requirements are met for the HGB area. Anti-backsliding requirements would apply for the one-hour ozone NAAQS until the redesignation substitute is approved by the EPA, at which time the FCAA, §182(d)(3) and §185 penalty fee requirement for the one-hour ozone NAAQS would be terminated. No changes were made in response to this comment.

1 *Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule* published in the *Federal Register* on March 6, 2015 *(80 FR 12264).*

ORDER ADOPTING
REVISIONS TO THE STATE IMPLEMENTATION PLAN

Docket No. 2014-1248-SIP
Project No. 2014-011-SIP-NR

On July 1, 2015, the Texas Commission on Environmental Quality (Commission), during a public meeting, considered adoption of the Houston-Galveston-Brazoria (HGB) Area Redesignation Substitute for the One-Hour Ozone National Ambient Air Quality Standard (NAAQS) State Implementation Plan (SIP) Revision.

This redesignation substitute SIP revision satisfies the anti-backsliding obligations for the revoked one-hour ozone NAAQS and ensures that the substance of the redesignation requirements found in FCAA, §107(d)(3)(E) are met for the HGB area. Under Tex. Health & Safety Code Ann. §§ 382.011, 382.012, and 382.023 (West 2010), 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 HGB Area Redesignation Substitute for the One-Hour Ozone National Ambient Air Quality Standard (NAAQS) SIP Revision was published for comment in the December 5, 2014, issue of the *Texas Register* (39 TexReg 9624).

Pursuant to 40 Code of Federal Regulations § 51.102 and after proper notice, the Commission conducted 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 hearing. A public hearing was offered in Houston on January 6, 2015.

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 hearing, copies of the proposed SIP revision 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 revision was 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

DRAFT

the names of all interested groups or associations offering comment on the SIP revision and their position concerning the same.

IT IS THEREFORE ORDERED BY THE COMMISSION that the HGB Area Redesignation Substitute for the One-Hour Ozone NAAQS SIP Revision incorporated by reference to this Order is hereby adopted. The adopted revision to the SIP is 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 revision 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.

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.

Date issued:

TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY

_____

Bryan W. Shaw, Ph.D., P.E., Chairman

DRAFT