

Revisions to the State Implementation Plan (SIP)
for the Control of Ozone Air Pollution

HOUSTON-GALVESTON-BRAZORIA EIGHT-HOUR OZONE NONATTAINMENT AREA

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

Adopted
May 23, 2007

PROJECT NO. 2006-027-SIP-NR
DOCKET NO. 2006-1874-SIP

EXECUTIVE SUMMARY

The Environmental Protection Agency (EPA) designated the eight-county Houston-Galveston-Brazoria (HGB) metropolitan area as nonattainment and classified it as “moderate” for the eight-hour ozone National Ambient Air Quality Standard (NAAQS) on June 15, 2004. On June 15, 2005, EPA revoked the one-hour ozone NAAQS, which preceded the eight-hour ozone standard (69 FR 23951). The Federal Clean Air Act (FCAA), 42 USC, § 7401 et seq., requires states to submit State Implementation Plan (SIP) revisions for the eight-hour ozone standard by June 15, 2007.

The HGB eight-hour ozone nonattainment area is unique and includes one of the most comprehensively-controlled industrial complexes in the world. The Texas Commission on Environmental Quality (TCEQ) has developed extensive regulations that address nitrogen oxides (NO_x), volatile organic compounds (VOC), and the sources of the most reactive ozone precursors in the HGB area, highly reactive volatile organic compounds (HRVOC).

The substance of the existing plan to control ozone formation in the HGB area centers on the following key measures.

- Approximately 80% NO_x emission reductions from point sources through the Mass Emission Cap and Trade (MECT) program.
- NO_x emission reductions from on-road and non-road sources through the vehicle inspection and maintenance (I/M) program, the Texas Emission Reduction Plan (TERP), and the Texas Low Emission Diesel (TxLED) program.
- HRVOC controls through the associated HRVOC Emission Cap and Trade (HECT) program.
- VOC controls.

(See pages 4-1 to 4-7 for a complete list of existing control measures.)

The EPA approved the one-hour ozone attainment demonstration SIP and rules including these components in the September 6, 2006, Federal Register (71 FR 52656). Rapid economic and population growth continue to create air quality challenges for the HGB area, even as the key ozone-targeting regulatory programs have reduced the number and magnitude of ozone exceedances, the area of exceedance, and the population exposed to exceedances.

This SIP revision is the first step in addressing the TCEQ’s efforts to attain the eight-hour ozone standard in the HGB area and represents the TCEQ’s best effort considering the time constraints for planning for attainment of the eight-hour ozone standard due to EPA’s delay of adoption of the implementation rules.

This revision also contains the Reasonably Available Control Technology (RACT) Analysis, Texas 2002 Periodic Emissions Inventory for the Houston-Galveston-Brazoria Ozone Nonattainment Area (EI), and additional voluntary mobile source emissions reduction (VMEP) commitments. Water heater rule amendment offsets, which are part of revisions to 30 TAC Chapter 117, are also included. The TCEQ is committed to attaining the standard as expeditiously as practicable. The TCEQ will continue developing the HGB Eight-Hour Ozone Attainment Demonstration SIP.

As a part of developing the HGB Eight-Hour Ozone Attainment Demonstration SIP revision, the TCEQ is developing a new photochemical modeling episode, which will help determine appropriate emission reductions of NO_x and/or VOC from appropriate source categories. A reasonably available control measure analysis will also be performed and all control strategies will be considered. The TCEQ

continues to evaluate potential options to further reduce precursor pollutant emissions in the HGB area. The TCEQ will also continue to work with EPA and the HGAC to assure that transportation conformity commitments can be fulfilled in a timely manner to avoid loss of transportation project funding.

This submittal contains three new control measures, summarized below in Table ExSum 1: *Eight-Hour Ozone Control Strategies for the HGB Ozone Nonattainment Area*. The first control measure, revises rules in 30 TAC Chapter 114 to add certain marine fuels to the TxLED rules. The second control measure revises rules in 30 TAC Chapter 115, to address under-estimated, unreported, or under-reported VOC emissions from storage tank floating roof landings, flash emissions, and from degassing storage tanks, transport vessels, and marine vessels with liquid heels. The Houston-Galveston Area Council (H-GAC) also committed to 2.82 tons per day (tpd) of NO_x reductions from VMEP.

Table ExSum1: Eight-Hour Ozone Control Strategies for the HGB Ozone Nonattainment Area

Measure	Description	Area(s) Affected	Start Date(s)
TxLED Marine	Adds marine distillate fuels commonly known as DMX and DMA, or Marine Gas Oil (MGO), into the definition of diesel fuels, requiring them to be TxLED compliant.	8-county area	June 24, 2007
VOC Rules on Storage and Degassing Operations	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. 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 75,000 to 1,000,000 gallons.	8-county area	January 1, 2009
VMEP	Local programs to reduce on-road emissions. See Appendix A for a full listing.	8-county area	By January 1, 2009

The TCEQ continues to use the latest technology and science to direct improvements in HGB air quality but acknowledges that the state regulatory agencies do not have legal authority to set emission standards for on-road and non-road engines. In an effort to provide innovative solutions to these significant emission sources, to date, the Texas Legislature has committed more than \$413 million to TERP, of which over \$204 million has been awarded to the HGB area, to reduce emissions by more than 22 tpd.

The TCEQ is developing new modeling episodes from 2005 and 2006. The new ozone modeling episodes will incorporate currently available EIs (e.g., 2005) and a larger quantity of ambient monitoring data from automated gas chromatographs (auto-GC) and the Texas Air Quality Study II (TexAQS II) study.

The TCEQ is committed to developing and applying the best science and technology towards addressing and reducing ozone formation in HGB and other nonattainment areas in Texas. As part of this commitment, the TCEQ, in conjunction with other state and federal organizations, conducted an exhaustive field study of ozone formation, TexAQS II, from June 2005 through September 2006. TexAQS II findings will be incorporated into SIP planning as the data is analyzed.

The TCEQ also continues to use new technology, such as infrared VOC imaging to identify and control unaddressed or under-addressed pollution sources, to investigate possible NO_x emission reduction strategies including the routine marine vessel study, and other practical methods to continue making progress in air quality improvement.

Overall, this plan revision includes the three control strategies in Table ExSum1, details regarding progress that the HGB area has made toward attainment, VOC and NO_x RACT analyses, water heater amendments and offsets, the baseline emissions inventory and ongoing efforts described in Chapter 5, the development of a new modeling episode, the continued implementation of increasingly lower engine emission levels for on-road and non-road mobile sources, and further research and consideration of additional control strategies. These efforts and realizing the full effects of implementation of the one-hour ozone control measures, will assist in developing an attainment demonstration for the eight-hour ozone standard in the HGB area.

SECTION V: LEGAL AUTHORITY

A. General

The TCEQ has the legal authority to implement, maintain, and enforce the national ambient air quality standards.

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, and 2005. In 1989, the TCAA was codified as Chapter 382 of the Texas Health & Safety Code.

Originally, the TCAA stated that the Texas Air Control Board (TACB) is the state air pollution control agency and is 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, and 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. This Chapter 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 Texas Commission on Environmental Quality (TCEQ).

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 F, G, and H of the TCAA authorize the TCEQ to establish low emission vehicle requirements for mass transit authorities, local government fleets, and private fleets; create a mobile emissions reduction credit program; establish vehicle inspection and maintenance programs in certain

areas of the state, consistent with the requirements of the federal Clean Air Act; establish gasoline volatility and low emission diesel standards; and fund and authorize participating counties to implement low-income vehicle repair assistance, retrofit, and accelerated vehicle retirement programs.

B. Applicable Law

The following statutes and rules provide necessary authority to adopt and implement the SIP.

Statutes

TEXAS HEALTH & SAFETY CODE, Chapter 382 September 1, 2005

TEXAS WATER CODE September 1, 2005

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

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, 5.232, 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)

Chapter 7: Enforcement

Subchapter A: General Provisions (§§ 7.001, 7.002, 7.0025, 7.004, 7.005 only)

Subchapter B: Corrective Action and Injunctive Relief (§ 7.032 only)

Subchapter C: Administrative Penalties

Subchapter E: Criminal Offenses and Penalties: §§ 7.177, 7.179-7.181

Rules

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

Chapter 7, Memoranda of Understanding, §§ 7.110 and 7.119 May 2, 2002

Chapter 35, Subchapters A-C, K: Emergency and Temporary Orders and Permits; Temporary Suspension or Amendment of Permit Conditions December 10, 1998

Chapter 39, Public Notice, §§ 39.201; 39.401; 39.403(a) and (b)(8)-(10); 39.405(f)(1) and (g); 39.409; 39.411 (a), (b)(1)-(6) and (8)-(10) and (c)(1)-(6) and (d); 39.413(9), (11), (12) and (14); 39.418(a) and (b)(3) and (4); 39.419(a), (b),(d) and (e); 39.420(a), (b) and (c)(3) and (4); 39.423 (a) and (b); 39.601; 39.602; 39.603; 39.604; and 39.605 August 15, 2002

Chapter 55, Request for Contested Case Hearings; Public Comment, §§ 55.1; 55.21(a) - (d), (e)(2), (3) and (12), (f) and (g); 55.101(a), (b), (c)(6) - (8); 55.103; 55.150; 55.152(a)(1), (2) and (6) and (b); 55.154; 55.156; 55.200; 55.201(a) - (h); 55.203; 55.205; 55.206; 55.209 and 55.211	August 29, 2002
Chapter 101: General Air Quality Rules	June 23, 2005
Chapter 106: Permits by Rule, Subchapter A	June 30, 2004
Chapter 111: Control of Air Pollution from Visible Emissions and Particulate Matter	November 18, 2004
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	June 15, 2005
Chapter 114: Control of Air Pollution from Motor Vehicles	May 19, 2005
Chapter 115: Control of Air Pollution from Volatile Organic Compounds	May 5, 2005
Chapter 116: Permits for New Construction or Modification	June 15, 2005
Chapter 117: Control of Air Pollution from Nitrogen Compounds	May 19, 2005
Chapter 118: Control of Air Pollution Episodes	March 5, 2000
Chapter 122, § 122.122: Potential to Emit	December 11, 2002

SECTION VI. CONTROL STRATEGY

A. Introduction (No change)

B. Ozone (Revised)

1. *Dallas-Fort Worth* (Revised May 2007)

2. *Houston-Galveston-Brazoria* (Revised May 2007)

Chapter 1: Background and Introduction

Chapter 2: (No change from the December 2004 One-Hour Ozone Attainment Demonstration)

Chapter 3: (No change from the December 2004 One-Hour Ozone Attainment Demonstration)

Chapter 4: Control Strategies and Required Elements

Chapter 5: Ongoing Work and Future Initiatives

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)

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)

LIST OF ACRONYMS

ACT -- alternative control techniques
AF -- air-to-fuel
APU -- auxiliary power units
ARPDB -- Acid Rain Program Data Base
ATCM -- airborne toxic control measure
auto-GC -- automated gas chromatograph
BACT -- Best Available Control Technology
BCCA-AG -- Business Coalition for Clean Air-Appeal Group
BMP -- best management practices
BPA -- Beaumont-Port Arthur
Btu/hr -- British thermal units per hour
Btu/scf -- British Thermal Units per Standard Cubic Feet
CAE -- Cetane Additive Enhanced Diesel Fuel
CAIR -- Clean Air Interstate Rule
CAMx -- Comprehensive Air Model with Extensions
CARB -- California Air Resources Board
CBD -- Houston's Central Business District
CFR -- Code of Federal Regulations
CMAQ -- Congestion Mitigation and Air Quality
CO -- carbon monoxide
CTG -- Control Technique Guidelines
DECS -- Diesel Emission Control Strategy
DERC -- Discrete Emission Reduction Credits
DFW -- Dallas-Fort Worth
DPM -- Diesel Particulate Matter
DRRP -- Diesel Risk Reduction Program
DV -- design value
DVc -- current design value
DVf -- future design value
EAC -- Early Action Compact
EDMS -- Emissions and Dispersion Modeling System
E-GRID-2007 -- Emissions and Generation Resource Integrated Database
EE/RE -- Energy Efficiency/Renewable Energy
EGAS -- Economic Growth Analysis System
EGF -- electric generating facilities
EGU -- electric generating units
EI -- emissions inventory
EPA -- United States Environmental Protection Agency
EPS3 -- Emissions Processing System, version 3
ERC -- Emission Reduction Credits
ERCOT -- Electric Reliability Council of Texas
ESAD -- Emission Specification for Attainment Demonstration
ESL -- Energy Systems Laboratory, the Texas A&M University System
F -- Fahrenheit
FAA -- Federal Aviation Administration
FCAA -- Federal Clean Air Act
FCV -- fuel cell vehicle

FGR -- flue gas recirculation
FHWA -- Federal Highway Administration
FR -- Federal Register
FT -- Fischer-Tropsch Diesel Fuel
GIS -- Geographic Information System
GloBEIS -- Global Biosphere Emissions and Interactions System
gpm -- gallons per minute
GTM -- gross ton mile
HAP -- hazardous air pollutant
HARC -- Houston Advanced Research Center
HC -- hydrocarbon
HDT -- heavy-duty truck
HDDV -- heavy-duty diesel vehicle
HECT -- Highly Reactive Volatile Organic Compound Emissions Cap and Trade Program
HGB -- Houston-Galveston-Brazoria
H-GAC -- Houston-Galveston Area Council
HOV -- high occupancy vehicle
hp -- horsepower
HPMS -- Highway Performance Monitoring System
HRVOC -- highly reactive volatile organic compound
HSC -- Houston Ship Channel
IC -- internal combustion
ICI -- industrial, commercial, and institutional
IECC -- International Energy Conservation Code
I/M -- inspection and maintenance
km -- kilometer
K_{vs} -- vertical exchange coefficient
LAER -- Lowest Achievable Emission Rate
lb/MMBtu -- pound per million British thermal units
LDAR -- Leak Detection and Repair
LIDAR -- Light Detection and Ranging
LDEQ -- Louisiana Department of Environmental Quality
LDGV -- light-duty gasoline vehicle
LDT -- light-duty truck
LDV -- light-duty vehicle
LED -- low emission diesel
LEV -- low emission vehicle
LEV II -- California's Low Emission Vehicle II Program
LIRAP -- Low Income Repair and Assistance Program
LNB -- low nitrogen oxides (NO_x) burners
LNC -- low nitrogen oxides (NO_x) combustors
LNG -- liquefied natural gas
LTO -- landing and take-off
MACT -- Maximum Achievable Control Technology
Mcf -- thousand cubic feet
MCR -- mid-course review
MDPV -- medium-duty passenger vehicle
MECT -- Mass Emissions Cap and Trade Program
MM5 -- Fifth Generation Meteorological Model
MMBtu/hr -- million British thermal units per hour
MMcf -- million cubic feet

MMS -- Minerals Management Service
MOA -- Memorandum of Agreement
MON -- Miscellaneous Organic National Emission Standards for Hazardous Air Pollutants (NESHAP)
mph -- miles per hour
MVEB -- Motor Vehicle Emissions Budget
MW -- megawatts
MY -- model year
NAAQS -- National Ambient Air Quality Standard
NEGU -- non-electric generating units
NEI -- National Emissions Inventory
NESHAP -- National Emission Standards for Hazardous Air Pollutants
ng/J -- nanogram per joule
NMIM -- National Mobile Inventory Model
NOAA -- National Oceanic and Atmospheric Administration
NO_x -- nitrogen oxides
NO_y -- nitrogen species
NSCR -- non-selective catalytic reduction
NTRD -- New Technology Research and Development Program
O₃ -- ozone
OGV -- ocean-going vessel
PAYD -- pay as you drive
PBL -- planetary boundary layer
PEI -- periodic emissions inventory
PERP -- Portable Engine Registration Program
PiG -- plume-in-grid
PM -- particulate matter
PM_{2.5} -- particulate matter less than 2.5 microns
ppb -- parts per billion
ppbC -- parts per billion carbon
ppbv -- parts per billion by volume
ppm -- parts per million
PSCF -- potential source contribution factors
PSDB -- point source database
psia -- pounds per square inch absolute
PUC -- Public Utility Commission
RACT -- Reasonably Available Control Technology
RACM -- Reasonably Available Control Measure
RFP -- Reasonable Further Progress
RMSE -- root mean square error
ROP -- Rate-of-Progress
RRF -- relative reduction factor
SB -- Senate Bill
SCAQMD -- South Coast Air Quality Management District
scfm -- standard cubic feet per minute
SCR -- selective catalytic reduction
SEP -- supplemental environmental programs
SETPMTC -- Southeast Texas Photochemical Modeling Technical Committee
SIC -- Standard Industrial Classification
SIP -- State Implementation Plan
SNCR -- selective non-catalytic reduction

SOV -- single occupancy vehicle
STP -- Surface Transportation Program
SWCV -- solid waste collection vehicle
TAC -- Texas Administrative Code
TACB -- Texas Air Control Board
TCAA -- Texas Clean Air Act
TCEQ -- Texas Commission on Environmental Quality (commission)
TCM -- transportation control measure
TDM -- travel demand model
TERP -- Texas Emission Reduction Plan
TexAQS 2000 -- Texas Air Quality Study 2000
TexAQS II -- Texas Air Quality Study 2006
TKE -- turbulent kinetic energy
TNMHC -- total nonmethane hydrocarbon
TNRCC -- Texas Natural Resource Conservation Commission
tpd -- tons per day
tpy -- tons per year
TSE -- truck stop electrification
TTI -- Texas Transportation Institute
TUC -- Texas Utility Code
TxDOT -- Texas Department of Transportation
TxLED -- Texas Low Emission Diesel
USC -- United States Code
VMEP -- Voluntary Mobile Source Emissions Reduction Program
VMT -- vehicle miles traveled
VOC -- volatile organic compound
VRU -- vapor recovery unit
ZEB -- zero emission bus
ZEV -- zero emissions vehicle

HOUSTON-GALVESTON-BRAZORIA EIGHT-HOUR OZONE SIP REVISION
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