TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AGENDA ITEM REQUEST

for State Implementation Plan Adoption

AGENDA REQUESTED: February 26, 2014

DATE OF REQUEST: February 7, 2014

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

CAPTION: Docket No. 2013-0595-SIP. Consideration of the adoption of the 2014 Five-Year Regional Haze State Implementation Plan (SIP) Revision.

The 2014 Five-Year Regional Haze SIP revision satisfies the federal regional haze rule, which requires states to submit progress reports for each mandatory Class I federal area in the state in the form of SIP revisions every five years [40 CFR §51.308(g)]. According to the rule, the deadline for Texas to submit a five-year regional haze SIP revision is March 19, 2014, five years after submittal of the initial regional haze SIP revision. The report must evaluate improvement towards the reasonable progress goal for each mandatory Class I federal area located within and outside the state that may be affected by emissions from Texas. The state is required to compare certified data from the baseline years (2000 through 2004) to the most current five years (2005 through 2011) provided by the Interagency Monitoring of Protected Visual Environments network. (Margaret Earnest, John Minter) (Non-Rule Project No. 2013-013-SIP-NR)

Steve Hagle, P.E.
Deputy Director

Kim Herndon for 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: February 7, 2014

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

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

Docket No.: 2013-0595-SIP

Subject: Commission Approval for Adoption of the 2014 Five-Year Regional Haze State Implementation Plan (SIP) Revision

2014 Five-Year Regional Haze SIP Revision
Non-Rule Project No. 2013-013-SIP-NR

Background and reason(s) for the SIP revision:
The Federal Clean Air Act (FCAA), §169A and B requires the United States Environmental Protection Agency (EPA) to adopt regulations and states to submit state implementation plan (SIP) revisions to reduce visibility impairment resulting "from man-made air pollution," known as regional haze, in 156 mandatory Class I federal areas (Class I areas). The FCAA requires each regional haze SIP revision to include control measures, including Best Available Retrofit Technology (BART), to make reasonable progress toward the national goal of natural visibility conditions at all Class I areas. The two Class I areas in Texas are Big Bend and Guadalupe Mountains National Parks. Each state bordering Texas has one or more Class I areas designated for visibility protection (see attached map). Texas' regional haze SIP revision must examine the need to include measures to reduce visibility impacts in Texas' Class I areas and other states' Class I areas that Texas may impact.

The EPA adopted the regional haze rule (the Rule) in 40 Code of Federal Regulations (CFR) Part 51, Subpart P, on July 1, 1999 and adopted amendments to Subpart P and a new Appendix Y (BART guidelines) to Part 51 on July 6, 2005. The Rule encourages states to work together in regional partnerships to reduce haze. There are five regional planning organizations in the United States. Texas is a member of the Central States Air Resource Agencies (CenSARA), which includes eight states: Texas, Louisiana, Oklahoma, Arkansas, Kansas, Missouri, Nebraska, and Iowa. In preparing the 2009 regional haze SIP submittal, Texas coordinated with these states through the Central States Regional Air Planning Association (CENRAP). CENRAP subsequently ceased to function, and Texas now communicates with these states through CenSARA. Texas also consulted Federal Land Managers (FLM) located within the state and the surrounding states in developing the 2009 regional haze SIP revision and the 2014 Five-Year Regional Haze SIP Revision. The Rule requires that the FLMs are provided a sixty day period to review and comment on regional haze SIP revisions.

The Rule requires states to submit progress reports for each Class I area in the state in the form of SIP revisions every five years [40 CFR §51.308(g)]. The state is required to compare certified data from the baseline years (2000 through 2004) to the most current

available five years (2005 through 2011) provided by the Interagency Monitoring of Protected Visual Environments network. According to the Rule, the deadline for Texas to submit a five-year regional haze SIP revision is March 19, 2014, five years after submittal of the initial regional haze SIP revision. Section 51.308(g) provides that the report must evaluate "progress towards the reasonable progress goal for each Class I area located within the state and in each Class I area outside the state which may be affected by emissions from within the state." The Rule requires the revision to contain seven minimum elements (see *Scope of the SIP revision item B.*). On April 12, 2013, the EPA released a guidance document to assist states in addressing the requirements for a five-year regional haze SIP revision named *General Principles for the 5-Year Regional Haze Progress Reports for the Initial Regional Haze State Implementation Plans (Intended to Assist States and EPA Regional Offices in Development and Review of the Progress Reports).*

The Texas 2009 regional haze SIP revision relied on Clean Air Interstate Rule (CAIR) nitrogen oxides (NO_X) and sulfur dioxide (SO_2) emission reductions, which the EPA determined were "better than BART" for emissions reductions from electric generating units (EGU). The 2009 regional haze SIP revision projects that the two Class I areas in Texas will not meet the 2064 federal goal for visibility due to emissions from other areas in the United States and international sources. However, the regional haze SIP revision projects that Texas will meet its own established reasonable progress goals for 2018 for all Class I areas it affects. The EPA has not fully acted on Texas' regional haze SIP revision submission. According to an amended consent decree, the EPA must make a final determination on the Texas 2009 regional haze SIP revision by December 13, 2014.

On December 30, 2011, the EPA issued notice to Texas (and other states) that because the states' regional haze SIP revisions relied on CAIR to satisfy certain emission reduction requirements, the EPA was proposing a limited disapproval of the states' SIP revisions and a federal implementation plan (FIP) to replace reliance on CAIR with reliance on the Cross-State Air Pollution Rule (CSAPR). On June 7, 2012, the EPA published final, limited disapproval for the part of the Texas 2009 regional haze SIP revision that relied on CAIR but did not simultaneously finalize a FIP that would have replaced CAIR with CSAPR for Texas. The FIP was not finalized to allow the EPA more time to assess the full Texas 2009 regional haze SIP revision. On August 21, 2012, the United States Court of Appeals for the District of Columbia vacated CSAPR and determined that CAIR will remain in place until the EPA develops a valid replacement rule. The EPA issued a memo on November 19, 2012 to assist states and the EPA regional offices in determining how the court-ordered vacatur of CSAPR will impact the EPA's proposed limited disapproval and FIP for regional haze. With respect to the disapproval for Texas' regional haze SIP revision, the memo states the EPA plans to "await the decision on [the] petition for rehearing," rather than make a decision to "revisit" its decision. The EPA's memo also suggested states and the agency move forward as if a federal trading program will be functioning after court suits are settled. The EPA subsequently requested a rehearing *en banc*, which the D.C. Circuit denied on January 24, 2013. On March 29, 2013, the EPA filed a petition for certiorari with the Supreme Court seeking review of the D.C. Circuit's opinion, and on June 24, 2013 the

court granted certiorari. Oral arguments before the Supreme Court were held on December 10, 2013. In addition to CSAPR, the EPA also issued a separate rule to replace CAIR with CSAPR as "better than BART" (77 FR 33642, June 7, 2012). The rule removed the provision in the Rule that allowed CAIR to be substituted as better than BART, and replaced it with CSAPR. As part of this rulemaking, the EPA also issued a limited disapproval of the portion of the Texas 2009 regional haze SIP revision that relied on CAIR as better than BART. On August 6, 2012, Texas filed suit against the EPA challenging this rule, and the lawsuit is currently in abeyance pending final resolution of the lawsuits on CSAPR.

Scope of the SIP revision:
Section 169A of the FCAA established a national goal of remedying existing visibility impairment from man-made emissions in Class I areas. This section and the Rule require states to make reasonable progress toward the national goal of natural visibility conditions at all Class I areas.

Section 51.308(g) of the Rule requires each state to submit progress reports for each Class I area in the state in the form of SIP revisions every five years and also provides that the report must evaluate "progress towards the reasonable progress goal for each mandatory Class I area located within the state and in each Class I area outside the state which may be affected by emissions from within the state."

In 2012 phone consultations with CenSARA, the EPA and National Park Service stated that no new modeling was required for a five-year regional haze SIP revision. Both federal agencies agreed that including current Interagency Monitoring of Protected Visual Environments (IMPROVE) data and updated emissions inventories in this five-year regional haze SIP revision will suffice. The National Park Service is the FLM for the two Texas Class I areas. The Fish and Wildlife Service and the Forest Service are FLMs representing Class I areas in the states surrounding Texas.

Section 51.308(h) requires the progress report to include a negative declaration that further revision of the regional haze SIP revision is not needed at this time, if it is determined that the existing plan requires no further substantive revision to achieve established goals for visibility improvement and emissions reductions. If progress is inadequate, then the regional haze SIP revision must be revised to address deficiencies.

A.) Summary of what the SIP revision will do:
This SIP revision tracks progress toward reasonable progress goals.

B.) Scope required by federal regulations or state statutes:
The progress report must contain at a minimum: 1) the status of control measures included in the SIP; 2) a summary of emissions reductions achieved from the plan; 3) an assessment of visibility conditions and changes for each Class I area in Texas and that Texas may impact; 4) an analysis of emissions reductions by pollutant, identified by source or activity;

5) an assessment of any significant changes in anthropogenic emissions; 6) an assessment of whether the current plan is sufficient to meet established reasonable progress goals; and 7) a review of Texas' visibility monitoring strategy and any necessary modifications [40 CFR §51.308(g)(1)-(7)].

C.) Additional staff recommendations that are not required by federal rule or state statute:
None

Statutory authority:
Texas Health and Safety Code (THSC), §382.002, Policy and Purpose; §382.011, General Powers and Duties; §382.012, State Air Control Plan; FCAA, §§110(a)(2)(D)(i)(II); 169A and 169B [42 U.S.C., §§7410(a)(2)(D)(i)(II); 7491 and 7492].

Effect on the:

A.) Regulated community:
None.

B.) Public:
Continued visibility improvement is anticipated in Texas Class I areas and other states' Class I areas that Texas may impact.

C.) Agency programs:
None

Public involvement:
Texas was required to consult with the FLMs and the EPA. FLM consultation calls were held after proposal and after the 60-day FLM review period. A public hearing was offered and a 30-day public comment period was provided after the 60-day FLM review. The Rule requires that the public have access to the FLMs' comments.

Public comment:
The EPA, the National Park Service, the United States Fish and Wildlife Service, the United States Forest Service, the National Park Conservation Association, and the Sierra Club were concerned that Texas is not doing the state's share of reductions of visibility impairing emissions for Class I areas in and outside the state. The commenters especially mentioned several older coal powered electric generating units with significant sulfur dioxide emissions. The commenters were disappointed that Texas would not be reaching natural conditions until after the EPA goal of 2064 and urged the state to consider more controls.

Re: Docket No. 2013-0595-SIP

Significant changes from proposal:
In response to several comments, additional figures, tables, and explanation in the text were added for clarification and to provide greater detail of the on-going work Texas is doing to reduce emissions.

Potential controversial concerns and legislative interest:
The EPA may propose action on the Texas 2009 regional haze SIP revision before the 2014 Five-Year Regional Haze SIP Revision is adopted. If the 2009 regional haze SIP revision is disapproved, it is unclear if the 2014 Five-Year Regional Haze SIP Revision could be approved. The Rule triggers submittal of the five-year progress report SIP revision on the initial SIP revision submittal date. If the TCEQ were to wait for further EPA action on the 2009 regional haze SIP revision before submitting this progress report to the EPA, Texas would not meet the March 19, 2014 federal deadline for the five-year review submittal.

Does this SIP revision affect any current policies or require development of new policies?
None

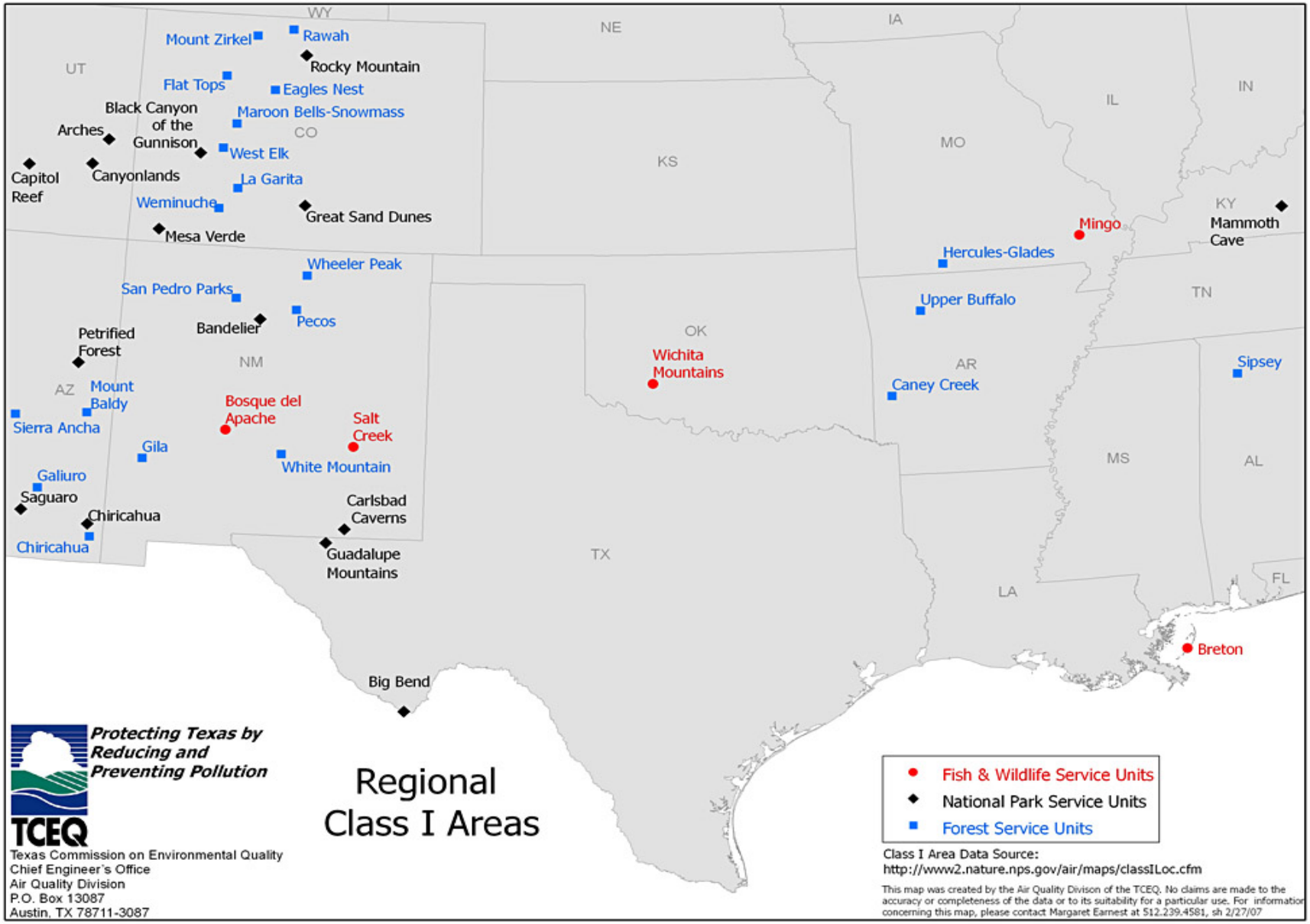
What are the consequences if this SIP revision does not go forward? Are there alternatives to SIP revision?
Not adopting and submitting this SIP revision to the EPA could lead to a finding of failure to submit by the EPA and could lead to federal sanctions such as emission offsets, highway funding sanctions, or a FIP if the TCEQ does not correct the deficiency. Since the regional haze SIP revision includes the entire state, penalties could occur statewide.

Key points in the adoption SIP revision schedule:
***Texas Register* hearing notice publication date:** August 23, 2013
EPA due date: March 19, 2014

Agency contacts:
Margaret Earnest, SIP Project Manager, 239-4581, Office of Air
John Minter, Staff Attorney, 239-0663

Attachments
Map of regional Class I areas

cc: Chief Clerk, 2 copies
Executive Director's Office
Marshall Coover
Tucker Royall
John Bentley
Office of General Counsel
Margaret Earnest
John Minter



Texas Commission on Environmental Quality
Chief Engineer's Office
Air Quality Division
P.O. Box 13087
Austin, TX 78711-3087

REVISIONS TO THE STATE OF TEXAS AIR QUALITY
IMPLEMENTATION PLAN CONCERNING
REGIONAL HAZE

FIVE-YEAR REGIONAL HAZE PROGRESS REPORT

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

2014 FIVE-YEAR REGIONAL HAZE STATE IMPLEMENTATION PLAN REVISION

Project Number 2013-013-SIP-NR

Adoption
February 26, 2014

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EXECUTIVE SUMMARY

The Federal Clean Air Act (FCAA), §§169A and B requires the United States Environmental Protection Agency (EPA) to adopt regulations and states to submit state implementation plan (SIP) revisions to reduce visibility impairment resulting "from man-made air pollution," known as regional haze, in 156 mandatory Class I federal areas (Class I areas). The FCAA requires each regional haze SIP revision include control measures, including Best Available Retrofit Technology (BART), to make reasonable progress toward the national goal of natural visibility conditions at all Class I areas by 2064. The two Class I areas in Texas are Big Bend and Guadalupe Mountains National Parks. Each state bordering Texas has one or more Class I areas designated for visibility protection. Texas' regional haze SIP must examine measures to reduce Texas' visibility impacts in Class I areas in other states.

The EPA adopted Regional Haze Regulations (the Rule) in 40 Code of Federal Regulations (CFR) Part 51, Subpart P, on July 1, 1999 and adopted amendments to Subpart P and a new Appendix Y (BART guidelines) to Part 51 on July 6, 2005. The Rule encourages states to work together in regional partnerships to reduce haze. There are five regional planning organizations in the United States. Texas is a member of the Central States Air Resource Agencies (CenSARA), which currently includes eight states: Texas, Louisiana, Oklahoma, Arkansas, Kansas, Missouri, Nebraska, and Iowa. In preparing its 2009 regional haze SIP revision, Texas coordinated with the states in the Central States Regional Air Planning Association (CENRAP), formerly an affiliate of CenSARA. At the time the 2009 regional haze SIP revision was adopted, CENRAP included Minnesota; however, Minnesota subsequently left CENRAP and joined the Lake Michigan Air Directors Consortium. CENRAP has subsequently ceased to function and Texas is communicating through CenSARA with the remaining states that previously comprised CENRAP.

The Rule requires states to submit progress reports for each Class I area in the state in the form of SIP revisions every five years [40 CFR §51.308(g)(1)-(7)]. According to the Rule, the deadline for Texas to submit a five-year regional haze SIP revision is March 19, 2014, five years after submittal of the initial regional haze SIP revision. Section 51.308(g) provides that the report must evaluate "progress towards the reasonable progress goal for each Class I area located within the state and in each Class I area outside the state which may be affected by emissions from within the state." The Rule requires the revision to contain seven minimum elements: 1) the status of control measures included in the plan; 2) a summary of emissions reductions achieved from the plan; 3) an assessment of visibility conditions and changes for each Class I area in Texas and that Texas may impact; 4) an analysis of emissions reductions by pollutant, identified by source or activity; 5) an assessment of any significant changes in anthropogenic emissions; 6) an assessment of whether the current plan is sufficient to meet established reasonable progress goals; and 7) a review of Texas' visibility monitoring strategy and any necessary modifications. On April 12, 2013, the EPA released a guidance document to assist states in addressing the requirements for a five-year regional haze SIP revision [*General Principles for the 5-Year Regional Haze Progress Reports for the Initial Regional Haze State Implementation Plans (Intended to Assist States and EPA Regional Offices in Development and Review of the Progress Reports)*].

The Texas 2009 regional haze SIP revision relied on Clean Air Interstate Rule (CAIR) nitrogen oxides (NO_X) and sulfur dioxide (SO_2) emission reductions that the EPA determined were "better than BART" for emissions reductions from electric generating units (EGU). Texas' 2009 regional haze SIP revision projected that the two Class I areas in Texas will not meet the federal goal of natural visibility conditions by 2064 largely because of international transport of

visibility impairing pollutants into Texas across its southern border. However, Texas projects that it will meet the established reasonable progress goals set by the state for 2018 for all Class I areas it affects. The EPA has not fully acted on Texas' regional haze SIP revision submission. According to an amended consent decree, the EPA must make a final determination on the Texas 2009 regional haze SIP revision by December 13, 2014.

On December 30, 2011, the EPA issued notice to Texas (and other states) that because the states' regional haze SIP revisions relied on CAIR to satisfy certain emission reduction requirements, the EPA was proposing a limited disapproval of the states' SIP revisions and a federal implementation plan (FIP) to replace reliance on CAIR with reliance on the Cross-State Air Pollution Rule (CSAPR). On June 7, 2012, the EPA published final, limited disapproval for the part of the Texas 2009 regional haze SIP revision that relied on CAIR but did not simultaneously finalize a FIP that would have replaced CAIR with CSAPR for Texas (77 *Federal Register* 33642). The FIP was not finalized to allow the EPA more time to assess the full Texas 2009 regional haze SIP revision. On August 21, 2012, the United States Court of Appeals for the District of Columbia vacated CSAPR and determined that CAIR will remain in place until the EPA develops a valid replacement rule. The EPA issued a memo on November 19, 2012 to assist states and the EPA regional offices in determining how the court-ordered vacatur of CSAPR will impact the EPA's limited disapproval and FIPs for regional haze. With respect to the disapproval for Texas' regional haze SIP revision, the memo states the EPA plans to "await the decision on [the] petition for rehearing," rather than make a decision to "revisit" its decision. The EPA's memo also suggested states and the agency move forward as if a federal trading program will be functioning after court suits are settled. Therefore, Texas will continue to apply EPA's technical determination that CAIR is "better than BART." The EPA subsequently requested a rehearing *en banc*, which the D.C. Circuit denied on January 24, 2013. On March 29, 2013, the EPA filed a petition for certiorari with the Supreme Court seeking review of the D.C. Circuit's opinion, and on June 24, 2013 the court granted certiorari. Oral arguments before the Supreme Court were held on December 10, 2013.

The EPA also issued a separate rule to replace CAIR with CSAPR as "better than BART" (77 FR 33642, June 7, 2012). CSAPR removed the provision in the Rule that allowed CAIR to be substituted as better than BART, and replaced it with CSAPR. As part of this rulemaking, the EPA also issued a limited disapproval of the portion of the Texas 2009 regional haze SIP revision that relied on CAIR as better than BART. On August 6, 2012, Texas filed suit against the EPA challenging this rule, and the lawsuit is currently in abeyance pending final resolution of the lawsuits on CSAPR.

Section 51.308(h) requires the progress report to include a negative declaration that further revision of the existing SIP is not needed at this time, if it is determined that the existing plan requires no further substantive revision to achieve established goals for visibility improvement and emissions reductions. If progress is inadequate, then the regional haze SIP revision must be revised to address deficiencies.

Based on the analyses conducted, Texas has determined that the existing regional haze SIP revision is adequate for continued progress toward the established reasonable progress goals for the Class I areas in Texas and for Class I areas in other states impacted by Texas emissions. Texas has determined that revisions of the existing regional haze SIP are not needed at this time to meet the requirements of the Rule. The state will continue implementation of control measures included in the 2009 regional haze SIP revision. The next scheduled regional haze SIP revision is due by July 31, 2018.

Per the Rule requirements, Texas submits a negative declaration, which determines that its regional haze SIP is sufficient, based on the evidence in this SIP revision and the federal analysis documented in the 2011 Interagency Monitoring of Protected Visual Environments report. Texas also determines that no additional controls are necessary based on this five-year progress report.

However, improvements in visibility at Big Bend and Guadalupe Mountains National Parks are substantially dependent upon reducing emissions from Mexico and Central America. The TCEQ, in its 2009 regional haze SIP submittal, specifically asked the EPA for federal efforts to reduce the international transport impacts on regional haze coming into the United States across Texas' southern border. Modeling estimates indicate that 52% of the visibility impairment at Big Bend National Park and 20% of the visibility impairment at Guadalupe Mountains National Park on the 20% of days with the greatest visibility impairment comes from international transport. The preamble to the July 1, 1999 issuance of the Rule clearly says that states are not required to carry out compensatory over control to make up for the lack of progress in reducing the impacts of international transport. In this SIP submittal, the TCEQ reiterates its request to the EPA to initiate efforts to secure international emission reductions to reduce visibility impairment at Texas' Class I areas.

SECTION V-A: LEGAL AUTHORITY

A. 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. The 82nd Texas Legislature, 2011, Regular Session, 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.

B. 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	June 24, 2010
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	May 2, 2013
Chapter 106: Permits by Rule, Subchapter A	May 15, 2011
Chapter 111: Control of Air Pollution from Visible Emissions and Particulate Matter	February 16, 2012
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	September 13, 2012
Chapter 115: Control of Air Pollution from Volatile Organic Compounds	November 14, 2013
Chapter 116: Permits for New Construction or Modification	August 16, 2012
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	December 11, 2002
Chapter 122: §122.215: Minor Permit Revisions	June 3, 2001
Chapter 122: §122.216: Applications for Minor Permit Revisions	June 3, 2001
Chapter 122: §122.217: Procedures for Minor Permit Revisions	December 11, 2002
Chapter 122: §122.218: Minor Permit Revision Procedures for Permit Revisions Involving the Use of Economic Incentives, Marketable Permits, and Emissions Trading	June 3, 2001

SECTION VI: CONTROL STRATEGY

A. Introduction (No change)
B. Ozone (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 (Revised)

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LIST OF ACRONYMS

AD	Attainment Demonstration
AFFP	Alternative Fueling Facilities Program
ARD	Acid Rain Database
ARRA	American Recovery and Reinvestment Act
BART	Best Available Retrofit Technology
CAIR	Clean Air Interstate Rule
CEED	Center for Energy and Economic Development
CENRAP	Central Regional Air Planning Association
CenSARA	Central States Air Resource Agencies
CFR	Code of Federal Regulations
CNG	Compressed natural gas
CO	Carbon monoxide
CSAPR	Cross State Air Pollution Rule
CSN	Chemical Speciation Network
CTT	Clean Transportation Triangle
D.C.	District of Columbia
DERI	Diesel Emissions Reduction Incentive Program
DFW	Dallas-Fort Worth
dv	deciview
EGU	Electric generating unit
EI	Emissions inventory
EIA	Energy Information Administration
EIQ	Emissions inventory questionnaires
ENVIRON	ENVIRON International Corporation
EPA	United States Environmental Protection Agency
ERIG	Emissions Reduction Incentive Grants Program
ESL	Energy Systems Laboratory at Texas A&M University
ESP	Electrostatic precipitator
FCAA	Federal Clean Air Act
FDG	Flue gas desulfurization
FIP	Federal implementation plan
FLM	Federal Land Manager
FMVCP	Federal Motor Vehicle Control Program

FS	Forest Service, United States Department of Agriculture
FWS	Fish and Wildlife Service, United States Department of Interior
FY	Fiscal Year
g/hp-hr	grams per horsepower-hour
HAP	Hazardous air pollutants
HB	House Bill
HGB	Houston-Galveston-Brazoria
hp	horsepower
IECC	International Energy Conservation Code
IMPROVE	Interagency Monitoring of Protected Visual Environments
LADCO	Lake Michigan Air Directors Consortium
lb/MMBtu	pound per million British thermal units
LIRAP	Low Income Vehicle Repair Assistance, Retrofit, and Accelerated Vehicle Retirement Program
LNB	Low-NO_X burner
LNBO	LNB with OFA
LNC1	LNB with close-coupled OFA
LNC2	LNB with separated OFA
LNC3	LNB with both close-coupled and separated OFA
LNG	Liquefied natural gas
MANE-VU	Mid-Atlantic/Northeast Visibility Union
MARAMA	Mid-Atlantic Regional Air Management Association
MATS	Mercury And Air Toxics Standards Rule
MECT	Mass Emissions Cap and Trade
MJO	Multi-Jurisdictional Organization
MOVES	Motor Vehicle Emission Simulator model
MRPO	Midwest Regional Planning Organization
NAAQS	National Ambient Air Quality Standard
NEI	National Emissions Inventory
NESCAUM	Northeast States for Coordinated Air Use Management
NESHAP	National Emission Standards for Hazardous Air Pollutant
NH_3	Ammonia
NLEV	National Low Emission Vehicle
NO_2	Nitrogen dioxide
NO_X	Nitrogen oxides

NPS	National Park Service, United States Department of Interior
NTIG	New Technology Implementation Grants Program
NTRD	New Technology Research and Development Program
OFA	Over-fire air
PEI	Periodic emissions inventory
PM	Particulate matter
PM_{10}	Particulate matter with diameter of 10 micrometers or less
$PM_{2.5}$	Particulate matter with diameter of 2.5 micrometers or less or fine PM
ppb	parts per billion
ppm	parts per million
PUC	Public Utility Commission
RFG	Reformulated gasoline
RPG	Reasonable progress goal
RPO	Regional Planning Organization
SB	Senate Bill
SCR	Selective catalytic reduction
SECO	State Energy Conservation Office
SESARM	Southeastern States Air Resource Managers
SIP	State implementation plan
SLAMS	State and local air monitoring station
SNC	Selective non-catalytic reduction
SO_2	Sulfur dioxide
SOFA	Separated over-fire air
STN	Speciation Trends Network
TAC	Texas Administrative Code
TACB	Texas Air Control Board
TCAA	Texas Clean Air Act
TCEQ	Texas Commission on Environmental Quality (commission)
TEOM	Tapered element oscillating microbalance
TERP	Texas Emission Reduction Plan
TexN	Texas NONROAD model
TNGVGP	Texas Natural Gas Vehicle Grants Program
TNRCC	Texas Natural Resource Conservation Commission
TOG	Total organic gas
tpd	tons per day

tpy	tons per year
TUC	Texas Utilities Code
TxDOT	Texas Department of Transportation
TxLED	Texas Low Emission Diesel
U.S.C.	United States Code
URP	Uniform rate of progress
VIEWS	Visibility Information Exchange Web System
VISTAS	Visibility Improvement State and Tribal Association of the Southeast
VOC	Volatile organic compounds
WESTAR	Western States Air Resource Council
WRAP	Western Regional Air Partnership
$\mu g/m^3$	microgram per cubic meter

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CHAPTER 1: FEDERAL REGIONAL HAZE PROGRAM REQUIREMENTS

1.1 BACKGROUND

In amendments to the Federal Clean Air Act (FCAA) in 1977, Congress added §169 [42 United States Code (U.S.C.) 7491] setting forth the following national visibility goal of restoring pristine conditions in national parks and wilderness areas:

> "Congress hereby declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from man-made air pollution."

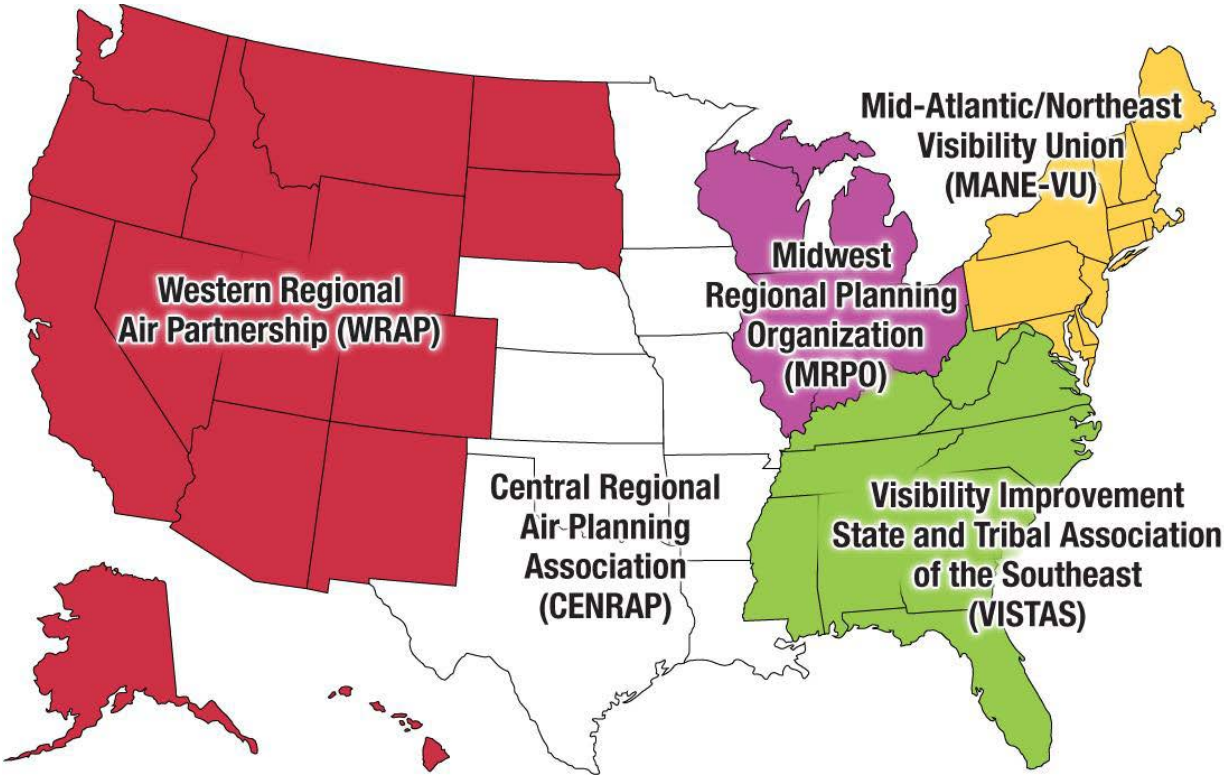
When the FCAA was amended in 1990, Congress added §169B (42 U.S.C. 7492), authorizing further research and regular assessments of the progress to improve visibility in the mandatory Class I federal areas (Class I areas). Figure 1-1: *Map of 156 Mandatory Class I Federal Areas* shows the location of the Class I areas of concern and which federal land manager (FLM) is responsible for each area around the nation. For Texas and surrounding states, the three FLMs are the National Park Service (NPS), the Fish and Wildlife Service (FWS), and the Forest Service (FS).

Note: NPS – National Park Service, FWS –Fish and Wildlife Service, FS – Forest Service
Source: www.epa.gov/visibility/program.html

Figure 1-1: Map of 156 Mandatory Class I Federal Areas

1.2 REGIONAL PLANNING

Following the United States Environmental Protection Agency's (EPA) adoption of its regional haze rule (Rule) in July 1999, the EPA designated five Regional Planning Organizations (RPO) to assist with the coordination and cooperation states and tribes needed to address the visibility issue. Figure 1-2: *Map of the Regional Planning Organizations* shows the locations of the five RPOs.



Source: www.epa.gov/visibility/regional.html

Figure 1-2: Map of the Regional Planning Organizations

Using federal funds available to them, the RPOs developed a wide array of technical products for their member and non-member states, including updated emissions inventories, additional monitoring to help answer questions related to visibility impacts, and modeling to help determine which pollutants should be the focus for control measures. The RPOs were also key to coordination and consultation efforts among states, tribes, FLMs, and the EPA. The products and efforts of the RPOs culminated in the state implementation plans (SIP) submitted to the EPA. RPO funding ceased in 2011 and multi-jurisdictional organizations (MJO), such as the Central States Air Resource Agencies (CenSARA), currently manage and coordinate multi-state air quality technical projects. Because of directed funding, tribes and FLMs are not members of MJOs, though communication and coordination with these entities is still an important component of regional haze work.

The EPA's Regional Haze Program has been the subject of litigation, making it difficult to determine what control measures could be included in SIPs and to complete the initial SIPs in a timely manner. On May 24, 2002, the United States Court of Appeals for the District of Columbia (D.C.) Circuit issued a ruling vacating the Rule in part and sustaining it in part, based

on a finding that EPA's prescribed methods for determining Best Available Retrofit Technology (BART) were inconsistent with the FCAA [*American Corn Growers Ass'n v. EPA*, 291 F.3d 1 (D.C. Cir. 2002)]. On February 18, 2005, the D.C. Circuit decided another case dealing with BART and a BART alternative program, *Center for Energy and Economic Development (CEED) v. EPA*, 398 F.3d 653, (D.C. Cir., 2005). CEED affirmed EPA's interpretation of FCAA 169A (b)(2) as allowing for non-BART alternatives where those alternatives make greater progress than BART. The EPA promulgated a rule on July 6, 2005, entitled *Regional Haze Regulations and Guidelines for BART Determinations* (70 *Federal Register* (FR) 39104) to assist states in identifying which of their BART-eligible sources should undergo a BART analysis (i.e., which are sources subject to BART) and select appropriate controls (the BART determination).

Around the same time, the EPA issued the Clean Air Interstate Rule (CAIR) on May 12, 2005, (70 FR 25162), which states could implement in lieu of BART. The rule affected 28 states and the District of Columbia and included a cap and trade program targeting sulfur dioxide (SO_2) and nitrogen oxides (NO_X). In July 2008, the Court found CAIR and EPA's CAIR federal implementation plans, or FIPs, unlawful [*North Carolina v. EPA*, 531 F.3d 896 (D.C. Cir. 2008)], and modified on rehearing [*North Carolina v. EPA*, 550 F.3d 1176, 1178 (D.C. Cir. 2008)]. The ruling remanded CAIR to the EPA, though leaving existing CAIR programs in place while directing EPA to replace them as rapidly as possible with a new rule consistent with the FCAA.

The new rule, the Cross State Air Pollution Rule (CSAPR), was proposed July 6, 2010. The program applied to 31 states and the District of Columbia. Some states were included for ozone season via NO_X or particulate matter with diameter of 2.5 micrometers or less ($PM_{2.5}$) via SO_2 and NO_X or both ozone and $PM_{2.5}$. CSAPR was finalized on July 6, 2011. CSAPR was scheduled to replace CAIR starting January 1, 2012.

On December 30, 2011, the EPA issued notice to Texas (and other states) that because the states' regional haze SIP revisions relied on CAIR to satisfy certain emission reduction requirements, the EPA was proposing a limited disapproval of the states' SIP revisions and a federal implementation plan (FIP) to replace reliance on CAIR with reliance on the CSAPR. On June 7, 2012, the EPA published final, limited disapproval for the part of the Texas 2009 regional haze SIP revision that relied on CAIR but did not simultaneously finalize a FIP that would have replaced CAIR with CSAPR for Texas (77 FR 33642). The FIP was not finalized to allow the EPA more time to assess the full Texas 2009 regional haze SIP revision. On August 21, 2012, the United States Court of Appeals for the District of Columbia vacated CSAPR and determined that CAIR will remain in place until the EPA develops a valid replacement rule. The EPA issued a memo on November 19, 2012 to assist states and the EPA regional offices in determining how the court-ordered vacatur of CSAPR will impact the EPA's proposed limited disapproval and FIP for regional haze. With respect to the disapproval for Texas' regional haze SIP revision, the memo states the EPA plans to "await the decision on [the] petition for rehearing," rather than make a decision to "revisit" its decision. The EPA's memo also suggested states and the agency move forward as if a federal trading program will be functioning after court suits are settled. Therefore, Texas will continue to apply EPA's technical determination that CAIR is "better than BART." The EPA subsequently requested a rehearing *en banc*, which the D.C. Circuit denied on January 24, 2013. On March 29, 2013, the EPA filed a petition for certiorari with the Supreme Court seeking review of the D.C. Circuit's opinion, and on June 24, 2013 the court granted certiorari. Oral arguments before the Supreme Court were heard December 10, 2013.

The EPA also issued a separate rule to replace CAIR with CSAPR as "better than BART" (77 FR 33642, June 7, 2012). CSAPR removed the provision in the Rule that allowed CAIR to be substituted as better than BART, and replaced it with CSAPR. As part of this rulemaking, the

EPA also issued a limited disapproval of the portion of the Texas 2009 regional haze SIP revision that relied on CAIR as better than BART. On August 6, 2012, Texas filed suit against the EPA challenging this rule, and the lawsuit is currently in abeyance pending final resolution of the lawsuits on CSAPR.

The EPA is scheduled to propose action on the Texas 2009 regional haze SIP revision in May 2014 and make a final determination on the 2009 SIP by December 13, 2014.

1.3 REQUIREMENTS FOR PERIODIC REPORTS

Pursuant to the requirements of 40 Code of Federal Regulations (CFR) §51.308(g), (h), and (i), Texas submits this five-year progress report as a SIP revision, after notice and comment, and as adopted by the Texas Commission on Environmental Quality (TCEQ). Texas submits this SIP revision in accordance with state laws and rules.

The progress report must contain at a minimum: 1) the status of control measures included in the plan; 2) a summary of emissions reductions achieved from the plan; 3) an assessment of visibility conditions and changes for each Class I area in Texas and that Texas may impact; 4) an analysis of emissions reductions by pollutant, identified by source or activity; 5) an assessment of any significant changes in anthropogenic emissions; 6) an assessment of whether the current plan is sufficient to meet established reasonable progress goals; and, 7) a review of Texas' visibility monitoring strategy and any necessary modifications [40 CFR §51.308(g)(1)-(7)].

1.4 PUBLIC HEARINGS

Per 40 CFR §51.308(g), this submittal also complied with 40 CFR §51.102 and §51.103 and offered the public the opportunity for a hearing and comment on this SIP revision. The commission offered a public hearing for this SIP revision on September 24, 2013 at 2:00 p.m. in Austin. The hearing was not opened because no party signed in to provide oral comment.

Written comments were accepted via mail, fax, and through the eComments system (http://www5.tceq.texas.gov/rules/ecomments) from August 23, 2013 through October 1, 2013. Five comment submissions were received from the EPA, the NPS, the FS, the FWS, and one combined comment package from the National Park Conservation Association and the Sierra Club. Summaries of those comments along with the commission's responses are provided in the Appendix B: *Response to Comments*. An electronic version of this SIP revision can be found on the TCEQ's SIP Revision: Regional Haze Web page (http://www.tceq.texas.gov/airquality/sip/bart/haze_sip.html).

Between August 21 through 23, 2013, the notice of public hearing for this SIP revision was published in the *Texas Register* and six local papers: the *Alpine Avalanche*, the *Austin American-Statesman*, the *Fort Worth Star-Telegram*, the *El Paso Times* (both English and Spanish versions), the *Midland Reporter-Telegram*, and the *Houston Chronicle*.

Chapter 8: *Consultation with Federal Land Managers* of this SIP describes the consultation process with other federal agencies and states that were additionally required for the regional haze SIP. In accordance with the Rule, FLMs were required a 60-day review period for this SIP revision before it went for public review (see Appendix A: *Regional Haze Rule*). FLM review was scheduled from June to August 2013. FLMs' comments were posted to the TCEQ website for the public to review on August 22, 2013 (see Appendix B). Notice of availability of the FLMs' comments was provided via the TCEQ's SIP Hot Topics listserv (https://public.govdelivery.com/accounts/TXTCEQ/subscriber/new). Written hearing notices were also mailed to the EPA, six surrounding state environmental agencies (Oklahoma,

Louisiana, Arkansas, New Mexico, Colorado, Missouri) and approximately 15 Councils of Government and municipalities on August 23, 2013 (see Appendix C: *Hearing Notices*). Texas sent the proposed SIP revision electronically to neighboring states and also mailed comment and hearing notices, but no comments were received in regards to any of the surrounding states' Class I areas.

CHAPTER 2: STATUS OF CONTROL MEASURES AND EMISSIONS REDUCTIONS – 40 CFR §51.308(g)(1) AND (2)

2.1 INTRODUCTION

The regional haze rule (Rule) in 40 Code of Federal Regulations (CFR) §51.308(g) requires states to submit a report to the United States Environmental Protection Agency (EPA) evaluating progress towards the reasonable progress goals for mandatory Class I federal areas (Class I areas) located both within and outside of the state. 40 CFR §51.308(g)(1) requires a description of the status of implementation of control measures included in the Texas 2009 Revisions to the State Implementation Plan (SIP) Concerning Regional Haze, or 2009 regional haze SIP revision, for achieving reasonable progress goals for Class I areas both within and outside the state. 40 CFR §51.308(g)(2) requires a summary of the emissions reductions achieved from implementing the control measures in the 2009 regional haze SIP revision. This chapter provides the updates for 40 CFR §51.308(g)(1) and (2).

In this chapter, Texas includes updates on sulfur dioxide (SO_2), nitrogen oxides (NO_X), and particulate matter (PM) emissions reductions programs in the state since the 2009 regional haze SIP revision. Data periods vary from program to program so some data were available through 2011 and some through 2013. Except for the Clean Air Interstate Rule (CAIR) program, in which the EPA allocates allowances into the future, the Texas Commission on Environmental Quality (TCEQ) did not attempt to make assumptions about future controls; Texas' assumptions would not be enforceable.[1] However, although there is uncertainty about business decisions that industry will make regarding the tightening of the SO_2 and particulate matter with diameter of 2.5 micrometers or less ($PM_{2.5}$) National Ambient Air Quality Standard (NAAQS), most analysts expect further emissions reductions due to the implementation of these standards and other anticipated regulations.

2.2 BEST AVAILABLE RETROFIT TECHNOLOGY POSTSCRIPT

The EPA's 1999 Rule required the installation of Best Available Retrofit Technology (BART) or equivalent emission controls for emission sources constructed before 1977 that were not regulated under subsequent provisions of the Federal Clean Air Act (FCAA) (EPA 2005a). The 2009 regional haze SIP revision described the TCEQ's evaluation of the 26 stationary point sources that may be subject to the BART requirements (Secretary of State 2007). Texas chose to participate in the EPA's CAIR is "better than BART" option (EPA 2005b). The EPA guidance identifies CAIR emissions reductions as greater than BART for electric generating units (EGU), therefore relieving EGUs from a BART analysis for SO_2 and NO_X.

After potential sources completed a BART survey, Texas ascertained approximately 125 potential sources that were BART-eligible (www.tceq.texas.gov/assets/public/implementation/air/sip/haze/App9_3_bartsurvey.pdf). Approximately 70 sources modeled out of BART through TCEQ group modeling. Modeling analyses were used to screen out sources that were shown to contribute less than 0.5 deciview of visibility impact at nearby Class I areas. These sources were required to certify that the TCEQ data were accurate. Approximately 20 potentially BART-eligible sources changed their emission rate inputs in the BART survey; five sources changed their permits and reduced their potential

[1] On page 2-13, information has been provided about two announced and planned for shutdowns. One of these shutdowns is part of a consent decree, while the other has been announced by the company. These announced shutdowns have not yet resulted in enforceable reductions, however, they will likely result in future reductions that can be accounted for in future regional haze planning periods.

to emit below the threshold, and four sources shut down their older BART equipment (see the following list). Approximately 35 potentially BART-eligible sources were required by the BART rule to do further modeling; none of the individual modeling reports were above the 0.5 deciview BART-eligible threshold (TCEQ 2013a). As part of the 2009 regional haze SIP revision, the TCEQ concluded that no sources in Texas were subject to BART requirements. The 2009 regional haze SIP revision Chapter 9: *Best Available Retrofit Technology* provides a discussion on this conclusion and Table 9-9: *Post-BART Emissions Reductions at Texas Sources*, page 9-21 provides details; the following list includes the source name and reason for reductions in Table 9-9 (TCEQ 2009).

Source	**Reason for Reduction**
• Capitol Cement	Shutdown wet kiln
• Dow/Celanese	NSP permit and transfer of ownership
• ExxonMobil Oil	Permit revision
• Norit Americas Inc.	Permit revision
• Regency Tilden Gas (formerly Enbridge Pipeline)	Permit revision
• Targa (formerly Dynegy Midstream Services)	Shutdown all BART equipment
• The Goodyear Tire and Rubber Co	Permit revision
• Valence Midstream Ltd	Shutdown
• Vetrotex America St. Gobain	Shutdown

2.3 FEDERAL CONSENT DECREES

The TCEQ considered unit specific requirements from several federal consent decrees applicable to refineries, EGUs and other sources. The decrees that follow are in addition to the 2009 federal agreements that were included in the previous modeling for the 2009 regional haze SIP revision, which did not include the coal-fired power plant consent decrees or the settlement with Owens-Brockway Glass Container, Inc.

Additionally, national reductions of visibility-impairing pollutants are a co-benefit of these multi-pollutant reductions by numerous federal initiatives. Texas anticipates improvement in its Class I areas as well as in the Class I areas of surrounding states due to these federal decrees.

2.3.1 Reductions under the EPA Coal-Fired Power Plant Consent Decrees

The EPA coal-fired power plant enforcement initiative addressed both SO_2 and NO_X. The EPA has provided specifics of the SO_2 and NO_X reductions by emission point for coal-fired power plants. Although the enforcement initiative did not target any coal-fired power plants in Texas, it did address one non-utility source category site in Texas. In 2003, Alcoa Inc. entered into an agreement with the EPA for its Rockdale facility to address SO_2 and NO_X emissions from its three coal-fired electric generating industrial boilers that support the smelter operations at Rockdale. Table 2-1: *Annual SO_2 and NO_X Emissions at Coal-Fired Power Plants Consent Decree Affected Sources* shows annual emission reductions in tons per year (tpy) resulting from implementation of the federal decree.

Table 2-1: Annual SO_2 and NO_X Emissions at Coal-Fired Power Plants Consent Decree Affected Sources

Site	NO_X Reduction (tpy)	Year to Initiate NO_X Reductions	SO_2 Reductions (tpy)	Year to Initiate SO_2 Reductions
Rockdale Facility	15,480	2009	52,900	2012

Source: www.epa.gov/compliance/resources/cases/civil/caa/alcoa.html

2.3.2 National SO_2 Reductions under the EPA Refinery Consent Decrees

The EPA's National Petroleum Refinery Initiative has resulted in multi-issue settlement agreements with the nation's major petroleum refineries. As of April 2012, over 100 United States 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 92,000 tpy of NO_X emission reductions nationwide. The EPA has provided specifics of the SO_2 reductions by emission point for refineries. Since the TCEQ's new and modified source permitting requirements prohibit an increase in allowable emissions without a construction permit, which requires use of Best Available Control Technology, the projected emission increases between 2002 and 2018 may be considerably over estimated. Still, 2002 pre-decree levels compared to 2018 post-decree levels are substantial.

Table 2-2: *Annual SO_2 Emissions at Refinery Consent Decree Impacted Sources* shows annual emissions reductions resulting from implementation of the federal decrees for all refineries in Texas as well as one large sulfuric acid plant at the western end of the Houston Ship Channel (see Appendix D: *Petroleum Refinery Consent Decree Emission Reduction Assessment for Ozone and Regional Haze SIPs*). The growth projected from 2002 through 2018 is an estimate from the Central Regional Air Planning Association's emission inventory contractor (Pechan 2005a-e).

Table 2-2: Annual SO_2 Emission at Refinery Consent Decree Impacted Sources

SO_2 Emissions	2002 (tpy)	2018 (tpy)
Pre-decree Levels	48,868	62,229
Reduction Estimate*	45,453	56,433
Difference (remaining emissions)	3,415	5,796

*Reductions estimate applied to 2002 actual emissions to show theoretical impact. Controls will be in place before 2018. Sources: www.epa.gov/compliance/resources/cases/civil/caa/oil/ and ENVIRON 2007

2.3.3 Owens-Brockway Glass Container Inc.

The EPA and the Oklahoma Department of Environmental Quality filed a complaint seeking civil penalties and injunctive relief from Owens-Brockway Glass Container Inc. (Owens) for alleged violations of the FCAA, with respect to emissions of NO_X, SO_2, and particulate matter (PM) at five of its glass container manufacturing facilities in Oklahoma, Georgia, Texas, and Pennsylvania (EPA 2012a).

On November 30, 2012, an EPA Notice and Finding of Violation was issued to Owens for violations at its container glass manufacturing plant located in McLennan County. Specifically, Owens violated the Prevention of Significant Deterioration and the New Source Review permitting requirements of the Texas SIP at its Waco, Texas facility. The three tables that follow show the emission controls and dates of compliance for the emissions of NO_X, SO_2, and PM (see

Table 2-3: *NO_X Emission Control Installation and Compliance Schedule for Owens*; Table 2-4: *SO_2 Emission Control Installation and Compliance Schedule for Owens*; and Table 2-5*: PM Emission Control Installation and Compliance Schedule for Owens*).

Table 2-3: NO_X Emission Control Installation and Compliance Schedule for Owens

Facility and Furnace	Control	Final NO_X Emission Limit (lb NO_X/ton glass pulled)	Compliance Deadline
Waco Furnace A	Selective Catalytic Reduction (SCR)	1.20	May 1, 2014
Waco Furnace B	SCR	1.20	May 1, 2015
Waco Furnace D	SCR	1.20	June 1, 2013

Note: Each SCR must be designed to achieve a removal efficiency of at least 90%.

Table 2-4: SO_2 Emission Control Installation and Compliance Schedule for Owens

Facility and Furnace	Control	Final SO_2 Emission Limit (lb SO_2/ton glass pulled)	Compliance Deadline
Waco Furnace A	Dry Scrubber System	0.80	May 1, 2014
Waco Furnace B	Dry Scrubber System	0.80	May 1, 2015
Waco Furnace D	Dry Scrubber System	0.80	June 1, 2013

Table 2-5: PM Emission Control Installation and Compliance Schedule for Owens

Facility and Furnace	Control	Final PM Emission Limits (lb PM/ton glass pulled)	Compliance Deadline
Waco Furnace A	Electrostatic Precipitator (ESP)	Filterable PM: 0.20	May 1, 2014
Waco Furnace B	ESP	Filterable PM: 0.20	May 1, 2015
Waco Furnace D	ESP	Filterable PM: 0.20	June 1, 2013

No estimate of daily or annual emissions reductions in Texas was obvious in the consent decree or other reviewed EPA documentation. The Owens consent decree also required reductions from its Oklahoma facility that will help reduce NO_X, SO_2, and PM emissions in that state and reduce visibility impairing pollutants for the region.

2.4 FEDERAL MERCURY AND AIR TOXICS STANDARDS RULE

On February 16, 2012, the EPA published in the *Federal Register* (FR) the National Emission Standards for Hazardous Air Pollutants rule for coal and oil-fired electric utility steam generating units in 40 CFR Part 63, Subpart UUUUU, also referred to as the Mercury and Air Toxics Standards (MATS) rule (EPA 2012b). The MATS rule establishes Maximum Achievable Control Technology emission standards for hazardous air pollutants (HAP). For coal-fired EGUs, emission standards are established for mercury, acid gases, and non-mercury metal HAPs. The acid gas HAP emission standard for coal-fired EGUs is hydrogen chloride; however, units equipped with flue gas desulfurization (FGD) controls can choose to comply with an alternate SO_2 surrogate emission standard. For the non-mercury metal HAPs, coal-fired EGUs must meet one of three options, a surrogate filterable PM emissions standards, a total non-

mercury metal HAP standard, or a suite of speciated non-mercury metal HAP standards. Existing EGUs have until April 16, 2015 to comply with the MATS rule; however, the TCEQ or the EPA can grant an additional one year for compliance if additional time is needed to install controls.

The TCEQ understands that most of the coal-fired EGUs in Texas are already meeting the filterable PM surrogate standard in the MATS rule. Therefore, any PM emission reductions from Texas coal-fired EGUs resulting from the MATS rule are expected to be minimal. Many of Texas' coal-fired EGUs already meet the hydrogen chloride standard or the alternate SO_2 standard, for those facilities equipped with FGD. However, some EGUs are anticipated to need additional acid gas controls to comply with the MATS rule. Even if these facilities install controls to reduce hydrogen chloride to meet the acid gas standard under MATS, such as dry sorbent injection, some ancillary reductions in SO_2 emissions would also occur. While the reductions cannot be quantified at this time, the TCEQ anticipates that some reductions in SO_2 emissions from Texas coal-fired EGUs will occur as a result of the MATS rule.

Throughout the United States, the EPA is predicting improved visibility due to the MATS rule since power plant emissions of SO_2 also can form fine particle pollution that reduces visibility (EPA 2012b). MATS emission reductions from surrounding states may help reduce visibility impairing pollutants impacting Texas' two Class I areas as well as Class I areas in states surrounding Texas.

2.5 FEDERAL PROGRAMS THAT REDUCE MOBILE SOURCE EMISSIONS

The Federal Motor Vehicle Control Program (FMVCP) has produced and is continuing to produce large reductions in motor vehicle emissions of NO_X, PM, and volatile organic compounds (VOC). The increasingly lower federal limits on sulfur content for gasoline and diesel fuel are continuing to reduce the sulfur input to total sulfur emissions from internal combustion engines. Reduced sulfur limits are enabling lower NO_X, PM, and VOC emission limits for on-road motor vehicles, both diesel and gasoline, as well as for non-road engines. The lower sulfur fuel content is also enabling implementation of lower emission limits on new on-road and non-road engines. In March 2013, the EPA proposed a rule designed to reduce air pollution from passenger cars and trucks. If adopted, starting in 2017 Tier 3 would set new vehicle emissions standards and lower the sulfur content of gasoline.

The following lists several significant mobile source emissions reduction programs:

Federal On-Road Measures

- Federal Phase II reformulated gasoline Dallas-Fort Worth (DFW) and Houston-Galveston-Brazoria (HGB)
- Tier 2 vehicle emission standards and federal low-sulfur gasoline
- National low emissions vehicle standards
- Heavy-duty diesel standards

Federal Non-Road Measures

- Lawn and garden equipment
- Tier 2 heavy-duty diesel equipment
- Locomotive engine standards
- Compression ignition standards for vehicles and equipment
- Recreational marine engine standards

2.6 EMISSION REDUCTIONS FOR ELECTRIC GENERATING UNITS

Texas is not covered under the CAIR for the 1997 eight-hour ozone NAAQS, but is included for the 1997 $PM_{2.5}$ NAAQS. In addition to the annual NO_X reductions from the CAIR program, in 1999 the state implemented a strategy in the eastern part of Texas to reduce NO_X emissions from EGUs. The control strategies specific to EGUs include:

- electric utility generation in ozone nonattainment areas;
- electric utility generation in east and central Texas; and
- Texas-specific legislation from the 1999 76th session in Senate Bill (SB) 7 that requires NO_X reductions through a regional cap and trade program.

These strategies have resulted in significant NO_X emissions reductions from EGUs. These rules are summarized in Section 2.6.2: *Electric Utility Generation in Ozone Nonattainment Areas*, Section 2.6.3: *Electric Utility Generation in East and Central Texas*, and Section 2.6.4: *SB 7, 76th Texas Legislature* of this five-year progress report. (Chapter 4: *Emissions Inventory Development and Comparison* of this five-year progress report also contains additional details. Figure 4-2: *Actual and Projected Emissions Trends for Electric Power Generation* shows the NO_X and SO_2 emissions reductions from EGUs from 2002 through 2011. Emissions of NO_X have decreased 44% from 2002 through 2011. Sulfur dioxide emissions have decreased 23% during the same period.)

2.6.1 CAIR and Cross State Air Pollution Rule

In March 2005, the EPA issued CAIR to address EGU emissions that transport from one state to another (70 FR 25162). The rule incorporates the use of three cap and trade programs to reduce 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.

Texas was not included in the ozone season NO_X program because Texas was not found to contribute to nonattainment or interfere with maintenance for ozone, but the state was included for the annual NO_X and SO_2 programs for $PM_{2.5}$. As such, Texas must make necessary reductions in annual SO_2 and NO_X emissions from new and existing EGUs. 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 TCEQ adopted a SIP revision to address how the state would meet the emissions allowance allocation budgets for NO_X and SO_2 established by the EPA to meet the federal obligations under CAIR. The TCEQ 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.

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 Cross State Air Pollution Rule (CSAPR) to meet 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.

On August 21, 2012, the United States Court of Appeals for the District of Columbia Circuit vacated CSAPR. Under the court's ruling, CAIR will remain in place until the EPA develops a valid replacement. Therefore, all the requirements in CAIR are federally enforceable and all

sources that are covered by CAIR must continue to comply with the requirements of the program.

Phase I of CAIR became effective in 2009 for NO_X and in 2010 for SO_2. Phase II of CAIR will become effective in 2015. Table 2-6: *Annual Emissions Cap for EGUs under CAIR* shows the cap (total emission allowances for EGUs in Texas) decreasing under the CAIR program in tpy.

Table 2-6: Annual Emissions Cap for EGUs under CAIR

Pollutant	2003 Acid Rain Emissions Inventory (tpy)	CAIR Phase I Cap (tpy)	2015 CAIR Phase II Cap (tpy)
NO_X	211,000	181,014 (2009)	150,845
SO_2	578,000	320,946 (2010)	224,662

Source: EPA

Sources of NO_X meeting certain applicability criteria and located in the DFW 1997 eight-hour ozone nonattainment area must meet emission specifications for attainment demonstration; the DFW counties include Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant. Sources of NO_X meeting certain applicability criteria and located in the Beaumont-Port Arthur (BPA) 1997 eight-hour ozone maintenance area must meet emission specifications for reasonably available control technology or emission specifications for attainment demonstration; the BPA counties include Hardin, Jefferson, and Orange Counties. Additionally, sources in the HGB 1997 eight-hour ozone nonattainment area satisfying applicability criteria must comply with the Mass Emissions Cap and Trade (MECT) program; the HGB counties include Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller.

When comparing the federal standards allowed in CAIR to the state NO_X emission specifications listed in Chapter 117 for these ozone nonattainment and maintenance areas, CAIR NO_X limitations are superseded by more stringent nonattainment NO_X rules in Chapter 117, although all EGU emissions must fit under the CAIR cap and absorb a share of the CAIR cap. Additionally, the MECT program is more restrictive than CAIR (lower controlled allowable emission rate, ignoring trading) because MECT applies to almost all of the NO_X sources at an EGU account, and MECT defines a lower NO_X standard that must be met. Additional information is provided in Section 2.7.1: *HGB Area MECT Program*. For the attainment counties in the state, CAIR may be more restrictive and thus the limiting control.

The TCEQ retrieved emissions data for both SO_2 and NO_X from the EPA's Air Markets Program Database (AMPD) for Reporting Year (RY) 2012 for all EGUs in Texas that are participating in CAIR. The TCEQ sorted this information based on actual annual emissions of SO_2 for RY 2012 and created a list of the top 20 EGU sites based on SO_2 emissions. These same 20 sites were also analyzed for their actual annual NO_X emissions for RY 2012. Table 2-7: *Texas Fossil Fuel-Fired EGUs and Existing Controls* lists these 20 fossil fuel-fired EGU sites and provides details on existing abatement systems, and where possible the control system online year, at a unit-by-unit level for SO_2, NO_X, and PM. Abatement system information was retrieved from the EPA's AMPD RY 2012, the National Electric Energy Data System database (from the EPA's Integrated Planning Model, Base Case v. 4.10), and the Energy Information Administration's database sets on electric power generation systems.

Table 2-7: Texas Fossil Fuel-Fired EGUs and Existing Controls

Facility Name	Unit ID	County	SO_2 Scrubber	Scrubber Online Year	NO_X Control	SCR*/ SNCR* Online Year	PM Control
Big Brown	1	Freestone			LNB* w/ SOFA*, SNCR	2008	Baghouse, ESP*
Big Brown	2	Freestone			LNB w/ SOFA, SNCR	2008	Baghouse, ESP
Martin Lake	1	Rusk	Wet Limestone	1977	LNB w/ SOFA		ESP
Martin Lake	2	Rusk	Wet Limestone	1978	LNB w/ SOFA		ESP
Martin Lake	3	Rusk	Wet Limestone	1979	LNB w/ SOFA		ESP
WA Parish	WAP5	Fort Bend			SCR	2000	Baghouse
WA Parish	WAP6	Fort Bend			SCR	2000	Baghouse
WA Parish	WAP7	Fort Bend			SCR	1999	Baghouse
WA Parish	WAP8	Fort Bend	Wet Lime FGD*	1982	SCR	2000	Baghouse
Monticello	1	Titus			LNB w/ SOFA, SNCR	2009	Baghouse, ESP
Monticello	2	Titus			LNB w/ SOFA, SNCR	2008	Baghouse, ESP
Monticello	3	Titus	Wet Limestone	1978	LNB w/ OFA*, SNCR	2008	ESP
Welsh Power	1	Titus			LNB w/ OFA		ESP
Welsh Power	2	Titus			LNB w/ OFA		ESP
Welsh Power	3	Titus			LNB w/ OFA		ESP

Facility Name	Unit ID	County	SO_2 Scrubber	Scrubber Online Year	NO_X Control	SCR*/ SNCR* Online Year	PM Control
Sandow	4	Milam	Wet Limestone	1981	LNB w/ SOFA, SCR	2010	ESP
Limestone	LIM1	Limestone	Wet Limestone	1985	OFA		ESP
Limestone	LIM2	Limestone	Wet Limestone	1986	OFA		ESP
Tolk Station	171B	Lamb			LNB w/ SOFA		Baghouse
Tolk Station	172B	Lamb			OFA		Baghouse
Coleto Creek	1	Goliad			LNB w/ Closed-coupled SOFA		Baghouse
Harrington Station	061B	Potter			LNB w/ SOFA		ESP
Harrington Station	062B	Potter			LNB w/ Closed-coupled SOFA		Baghouse
Harrington Station	063B	Potter			LNB w/ Closed-coupled SOFA		Baghouse
San Miguel	SM-1	Atascosa	Wet Limestone	1982	LNB w/ OFA		ESP, Wet Scrubber
J.T. Deely	1	Bexar			LNB w/ Closed-coupled SOFA		Baghouse
J. T. Deely	2	Bexar			LNB w/ Closed-coupled SOFA		Baghouse
Oak Grove	1	Robertson	Wet Limestone	2009	LNB w/ SOFA, SCR	2009	Baghouse
Oak Grove	2	Robertson	Wet Limestone	2009	LNB w/ SOFA, SCR	2009	Baghouse
Sandy Creek Energy Station	S01	McLennan	Dry Lime FGD		SCR		Baghouse

Facility Name	Unit ID	County	SO_2 Scrubber	Scrubber Online Year	NO_X Control	SCR*/ SNCR* Online Year	PM Control
(Optim Energy) Twin Oaks	U1	Robertson	Fluidized Bed Limestone Injection	1987			Baghouse
(Optim Energy) Twin Oaks	U2	Robertson	Fluidized Bed Limestone Injection	1987			Baghouse
HW Pirkey Power	1	Harrison	Wet Limestone	1985	LNB w/OFA		ESP
Oklaunion Power	1	Wilbarger	Wet Limestone	1986	LNB		ESP
Sandow Station	5A	Milam	Dry Lime FGD	2009	SNCR	2009	Baghouse
Sandow Station	5B	Milam	Dry Lime FGD	2009	SNCR	2009	Baghouse
J.K. Spruce	BLR1	Bexar	Wet Limestone	1992	LNB w/ Closed-coupled SOFA		Baghouse
J.K. Spruce	BLR2	Bexar	Wet Limestone	2009	SCR	2009	Baghouse
Sam Seymour	1	Fayette	Wet Limestone	2011	LNB w/ Closed-coupled SOFA		ESP
Sam Seymour	2	Fayette	Wet Limestone	2011	LNB w/ Closed-coupled SOFA		ESP
Sam Seymour	3	Fayette	Wet Limestone	1988	LNB w/ Closed-coupled SOFA		ESP

Source: EPA and Energy Information Administration (EIA)

Notes: * SCR = selective catalytic reduction; SNCR = selective non-catalytic reduction; ESP = electrostatic precipitator; FGD = flue gas desulfurization; OFA = over-fire air; SOFA = separated over-fire air; LNB = low-NO_X burner; LNBO = LNB with OFA; LNC1 = LNB with close-coupled OFA; LNC2 = LNB with separated OFA; and LNC3 = LNB with both close-coupled and separated OFA.

To assess the overall effectiveness of the CAIR NO_X and SO_2 limits on fossil fuel-fired EGUs in Texas, the TCEQ compared the year-by-year NO_X and SO_2 allowances for a set of fossil fuel-fired EGUs to the annual NO_X and SO_2 emissions from these EGUs. This set of EGUs, represented in Appendix E: *CAIR Allowances and Emissions for Texas EGUs* is the same set of 20 sites used to evaluate existing pollution control systems for the control of SO_2, NO_X, and PM in Table 2-7. Allowance allocations represent those allocated and not the total allowances held in the account at the trading deadline. Actual annual emissions are from the EPA's AMPD for RY 2003 through RY 2012. Final CAIR NO_X allowance allocations are from the TCEQ's Emissions Banking and Trading Program from 2009 through 2017. Final CAIR SO_2 allowance allocations are from the EPA's AMPD for RY 2010 through RY 2012. Oak Grove, Sandow Station, and J.K. Spruce Unit 2 are new units so there are data blanks until the plants began operation. After operational issues in 2011, Sandy Creek Energy Station did not become fully operational until 2012. The TCEQ notes in Figure 2-1: *Aggregate Texas CAIR EGU NO_X Allowances vs. NO_X Emissions* and in Figure 2-2: *Aggregate Texas CAIR EGU SO_2 Allowances vs. SO_2 Emissions* that the total actual annual NO_X and SO_2 emissions, respectively, for these 20 fossil fuel-fired EGUs illustrate a trend of decreasing NO_X and SO_2 emissions from 2003 through 2012, with the exception of RY 2010. RY 2013 data are predicted to trend with decreasing emissions. However, the TCEQ elected to omit RY 2013 data because quality-assured data will not be available in time to be included in this SIP revision. For CAIR NO_X allowance allocations, the future years represent predicted allocations and may change pursuant to economic and regulatory reasons.

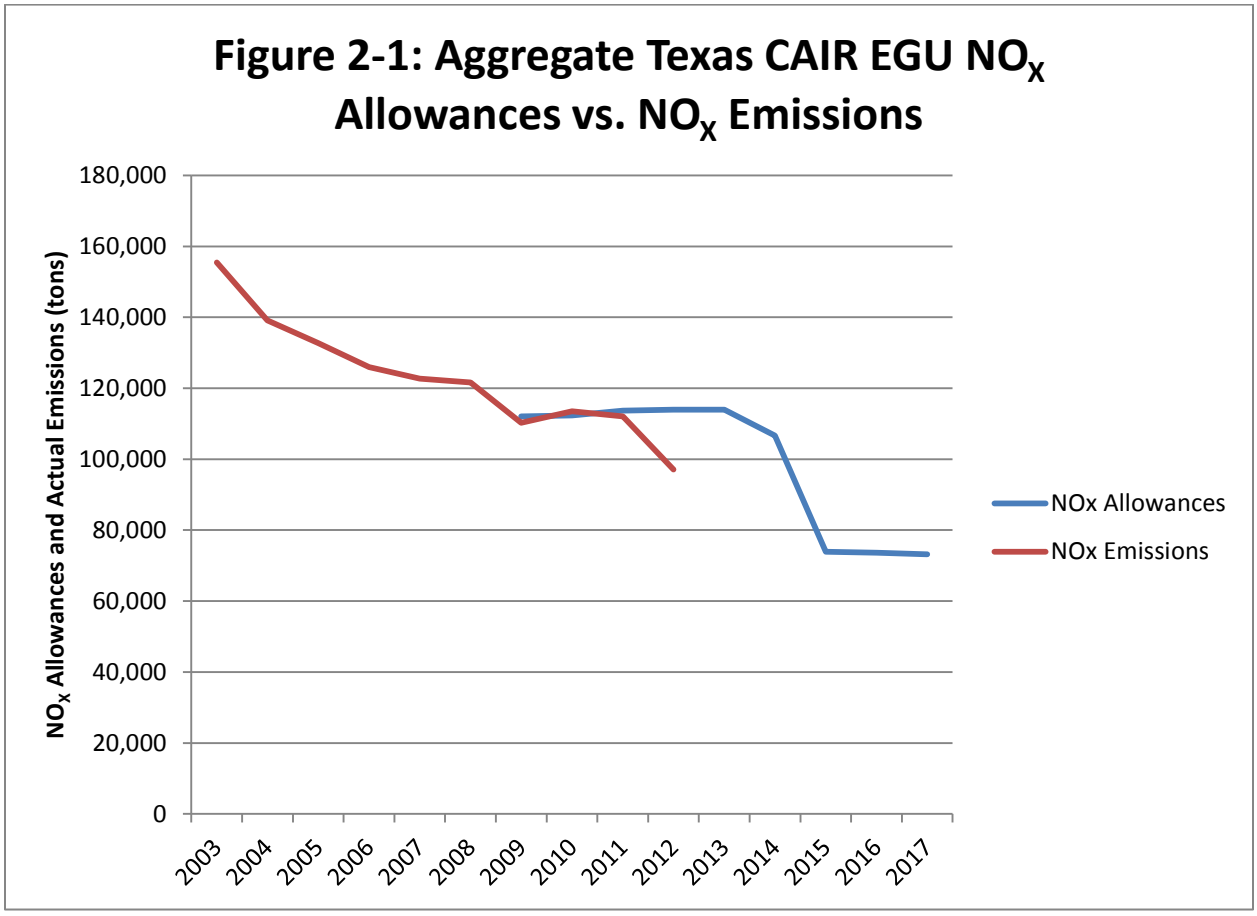


Figure 2-1: Aggregate Texas CAIR EGU NO_X Allowances vs. NO_X Emissions

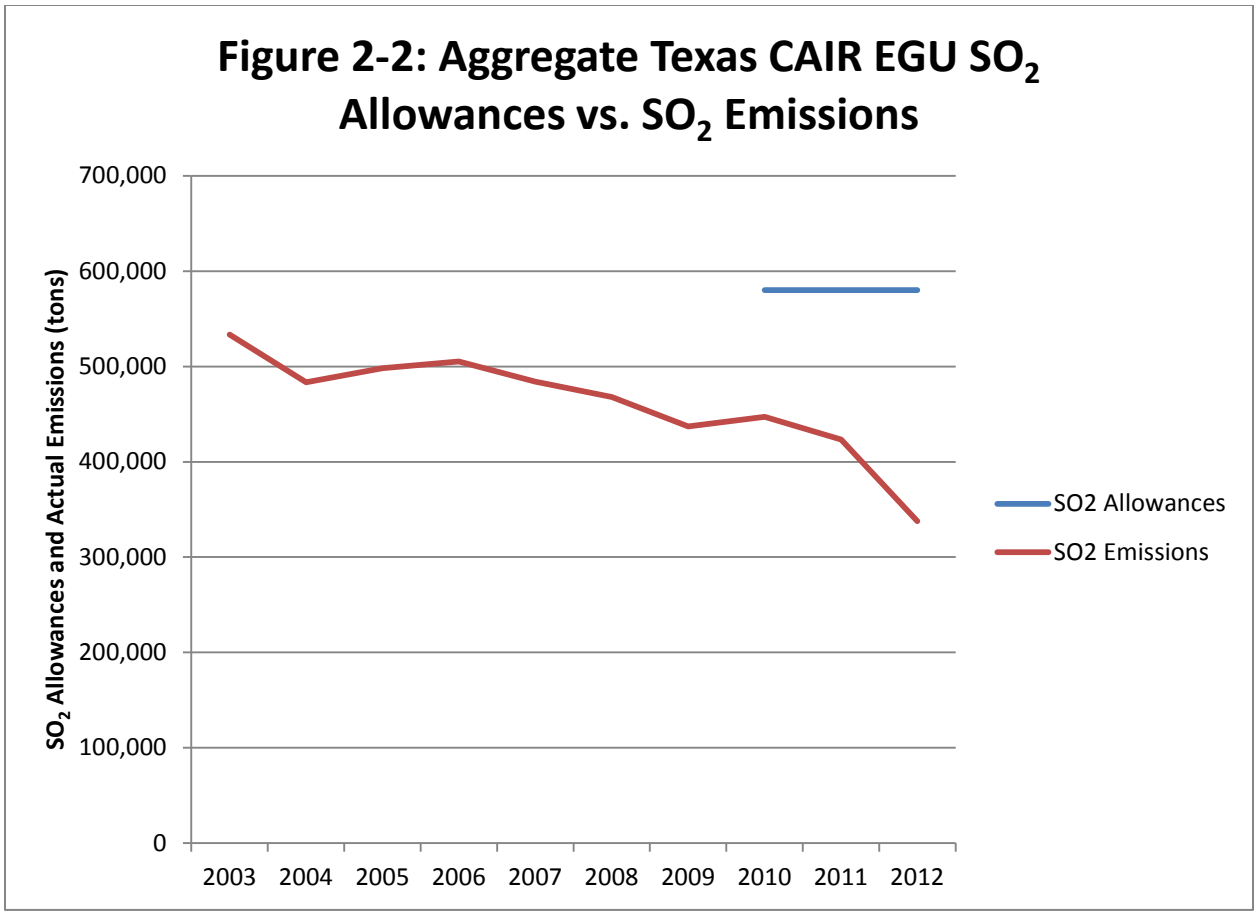


Figure 2-2: Aggregate Texas CAIR EGU SO_2 Allowances vs. SO_2 Emissions

2.6.2 Electric Utility Generation in Ozone Nonattainment Areas

The rules in 30 TAC Chapter 117, Subchapter C establish NO_X emission specifications for electric utility generation for the BPA 1997 eight-hour ozone maintenance area; the HGB 1997 eight-hour ozone nonattainment area; and the DFW 1997 eight-hour ozone nonattainment area in Texas. These rules apply to each electric generating facility that generates electric energy for compensation, or are owned or operated by a municipality or Public Utility Commission (PUC) of Texas regulated utility or any of its successors, regardless of whether the successor is a municipality or is regulated by the PUC.

In the HGB 1997 eight-hour ozone nonattainment area, the owner or operator of each affected utility boiler, auxiliary steam boiler, or stationary gas turbine must demonstrate compliance with the NO_X emission specifications through a system cap and participation in the HGB area MECT Program. Affected sources were required to comply with the MECT Program rules beginning January 1, 2002 and comply with the system cap requirements by March 31, 2004. Additional information about the MECT Program is available in Section 2.7.1.

In the DFW 1997 eight-hour ozone nonattainment area, each utility boiler that is part of a large system must meet a NO_X emission rate of 0.033 pound per million British thermal units (lb/MMBtu) heat input, and each utility boiler that is part of a small system must meet a NO_X emission rate of 0.06 lb/MMBtu heat input. Compliance with the NO_X emission rates may be demonstrated on a daily average basis, a system-wide heat input weighted average basis for

utility boilers that are part of a large system, or through the use of emission credits. Affected sources were required to comply with the rules by March 1, 2009.

In the BPA 1997 eight-hour ozone maintenance area, each utility boiler must meet a NO_X emission rate of 0.10 lb/MMBtu heat input. Compliance with the NO_X emission rates must be demonstrated on a daily average, through the use of a system cap, or through the use of emission credits. Affected sources were required to comply with the rules by May 1, 2005.

2.6.3 Electric Utility Generation in East and Central Texas

The rules in 30 TAC Chapter 117, Subchapter E, Division 1 limit NO_X emissions from electric utility generation in Atascosa, Bastrop, Bexar, Brazos, Calhoun, Cherokee, Fannin, Fayette, Freestone, Goliad, Gregg, Grimes, Harrison, Henderson, Hood, Hunt, Lamar, Limestone, Marion, McLennan, Milam, Morris, Nueces, Parker, Red River, Robertson, Rusk, Titus, Travis, Victoria, and Wharton Counties. The rules apply to each electric utility power boiler and stationary gas turbine (including duct burners used in turbine exhaust ducts) that generate electric energy for compensation; is owned by an electric cooperative, independent power producer, municipality, river authority, or public utility; and was placed into service before December 31, 1995. Electric utility power boilers must meet a NO_X emission rate of 0.14 lb/MMBtu for gas-fired units and 0.165 lb/MMBtu for coal-fired units. Stationary gas turbines (including duct burners used in turbine exhaust ducts) must meet an annual average NO_X emission rate of 0.14 lb/MMBtu for units subject to Texas Utilities Code (TUC), §39.264 [except §39.264(i)] or 0.15 lb/MMBtu for units not subject to TUC, §39.264 and units designated in accordance with TUC, §39.264(i). Compliance with the NO_X emission rates is based on average heat input for a calendar year. Affected sources were required to comply with the rules by May 1, 2005.

2.6.4 SB 7, 76th Texas Legislature

SB 7, 76th Texas Legislature, requires a cap and trade program for previously grandfathered, or unpermitted, EGUs and other electric generating facilities that choose to participate in the cap and trade program. SB 7 requires a 50% reduction in NO_X emissions and a 25% reduction in SO_2 emissions from the 1997 emission levels. The NO_X allowances were determined using a NO_X rate of 0.14 lb/MMBtu for grandfathered facilities in the East Texas region and a NO_X rate of 0.195 lb/MMBtu for the grandfathered facilities in the West Texas and El Paso regions. The SO_2 allowances were determined using an SO_2 rate of 1.38 lb/MMBtu for grandfathered facilities in the East Texas region. There are no coal-fired electric generating facilities located in the West Texas and El Paso regions that are subject to the Emissions Banking and Trading Allowances Program. The SB 7 requirements were implemented through rules in 30 TAC Chapter 101, Subchapter H, Division 2 published in the *Texas Register* on January 7, 2000. The initial control period for this program began on May 1, 2003.

2.6.5 Announced Shutdowns of Welsh and Deely EGU Boilers

In 2012, American Electric Power (AEP) announced plans to retire the Welsh No. 2 coal-fired unit at the Welsh Power Plant in Titus County (RN100213370). The announcement was included in AEP's 2013 Corporate Accountability Report www.aepsustainability.com/performance/environmental/FleetTransformation.aspx. In fall 2013, the EPA's Air Markets Program Data (AMPD) website listed Welsh Boiler No. 2 as having actual 2009 emissions of SO_2 as 9,400 tpy and NO_X emissions as 3,3oo tpy. This retirement will impact the first 10-year regional haze planning period that ends in 2018 but not the current period from 2009 through 2014 that this SIP revision covers. The retirement of Welsh Boiler No. 2 is part of a court-ordered consent decree. The following is an excerpt from an AEP news release dated March 22, 2012:

Welsh 2 will retire as soon as December 31, 2014, but no later than December 31, 2016, under terms of court-ordered consent decrees related to separate actions.

In 2011, City Public Service (CPS) announced plans to retire both J T Deely coal-fired units No.1 and 2 in Bexar County by 2018 (RN100217975). This retirement will not impact the first regional haze planning period that ends in 2018, but may help with reductions in the 2019 through 2028 regional haze planning period. In fall 2013, the EPA's AMPD website listed Deely Boiler No. 1 as having actual 2009 emissions of SO_2 as 8,400 tpy and NO_X emissions as 1,7oo tpy. Deely Boiler No. 2 was listed as having actual 2009 emissions of SO_2 as 8,600 tpy and NO_X emissions as 1,8oo tpy. Additionally, CPS received authorization for installation of selective catalytic reduction (SCR) for NO_X control on J T Deely No. 2 at the Calaveras Plant. Based on emissions data from EPA's AMPD, the SCR on J T Deely Boiler No. 2 became operational in 2011, resulting in some NO_X emission reductions that will benefit the current five-year planning period.

2.7 EMISSION REDUCTIONS FROM OTHER SOURCES

Texas has implemented numerous control measures to reduce ozone precursor emissions from a variety of sources. Reducing NO_X, a precursor of ozone and particulate matter, may have a co-benefit of reducing visibility-impairing pollutants. Section2.7: *Emissions Reductions from Other Sources* details some of the controls for major stationary sources and regional controls implemented as part of the state's strategy.

2.7.1 HGB Area MECT Program

The MECT Program rules in 30 TAC Chapter 101, Subchapter H, Division 3 established a mandatory annual NO_X emission cap on all existing stationary sources in the HGB 1997 eight-hour ozone nonattainment area that emit at least 10 tpy of NO_X and are subject to the NO_X emission specifications in 30 TAC Chapter 117, Subchapter B, Division 3 and Subchapter C, Division 3. Affected units include: utility boilers, auxiliary steam boilers, or stationary gas turbines; industrial, commercial, or institutional boilers and process heaters; stationary gas turbines; stationary internal combustion engines; fluid catalytic cracking units (including carbon monoxide boilers, carbon monoxide furnaces, and catalyst regenerator vents); boilers and industrial furnaces that were regulated as existing facilities by the EPA under 40 CFR Part 266, Subpart H (as in effect on June 9, 1993); duct burners used in turbine exhaust ducts; pulping liquor recovery furnaces; lime kilns; lightweight aggregate kilns; heat treating furnaces and reheat furnaces; magnesium chloride fluidized bed dryers; and incinerators.

The MECT program cap is enforced by the allocation, trading, and banking of allowances. An allowance is the equivalent of one ton of NO_X emissions. The MECT program cap was implemented on January 1, 2002, at historical emission levels, with mandatory NO_X reductions increasing over time until achieving the final cap by April 1, 2007. All new or modified sources in the HGB 1997 eight-hour ozone nonattainment area must obtain unused allowances from other sources already participating in the MECT program to offset any increased NO_X emissions.

For sources in the HGB 1997 eight-hour ozone nonattainment area, MECT is more restrictive than CAIR (lower controlled allowable emission rate, ignoring trading), since MECT applies to almost all of the NO_X sources at an EGU account, and MECT defines a lower NO_X standard that must be met. Table 2-7: *Allocated NO_X Allowances and Emissions under the MECT Program* and Figure 2-1: *Allocated NO_X Allowances versus Emissions under MECT* show a comparison of allocated NO_X allowances and actual NO_X emissions for controls periods 2002 through 2012. As Figure 2-1 shows, MECT allocations and NO_X emissions have decreased significantly.

Table 2-8: Allocated NO_X Allowances and Emissions under the MECT Program

MECT Control Period	Allocated NO_X Allowances	NO_X Emissions
2002	231,104	107,629
2003	209,345	90,796
2004	139,372	74,337
2005	86,232	61,162
2006	63,631	51,914
2007	49,711	38,997
2008	44,859	32,622
2009	43,837	31,996
2010	43,549	30,475
2011	42,010	31,606
2012	40,963	29,401

Source: www.tceq.texas.gov/airquality/banking/mass_ect_prog.html

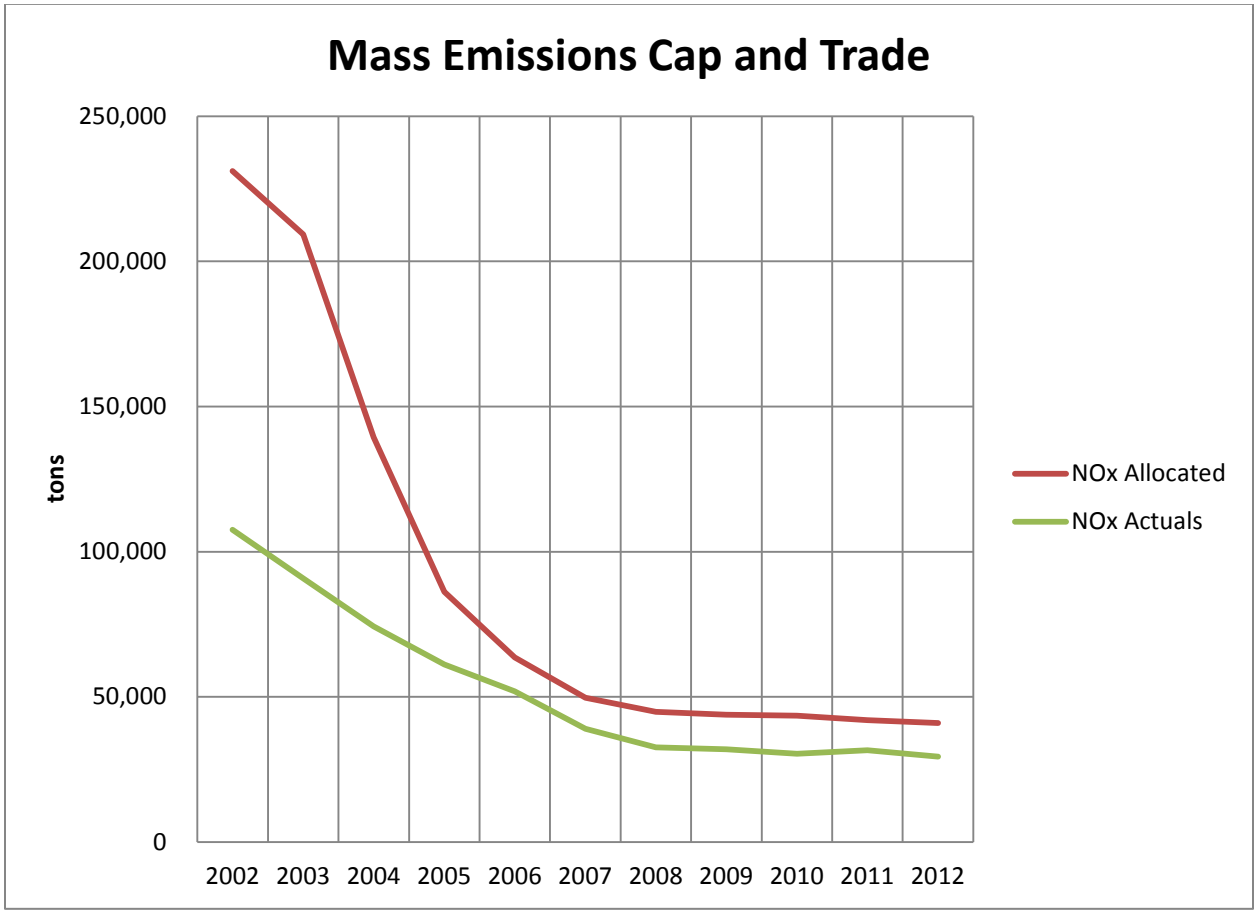


Figure 2-3: Allocated NO_X Allowances versus Emissions under MECT

2.7.2 Cement Kilns

The rules in 30 TAC Chapter 117, Subchapter E, Division 1 limit NO_X emissions from cement kilns in Bexar, Comal, Ellis, Hays, and McLennan Counties. Affected sources were required to comply with the rules by May 1, 2005. The cap limits NO_X emissions from dry kilns to no more than 1.7 lb/ton of clinker and limits NO_X emissions from wet kilns to no more than 3.4 lb/ton of clinker. Emissions from any kilns installed after 2005 must be offset with emission reductions at the site or through emission reduction credits. Affected sources were required to comply with the rules by March 1, 2009. When the rule was adopted, the TCEQ estimated that it would result in approximately 9.69 tons per day (tpd) of NO_X emission reductions (see *Texas Register* June 8, 2007). The Ellis County cement kiln cap is part of the 2007 DFW Attainment Demonstration (AD) SIP Revision adopted May 23, 2007 (http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=5&ti=30&pt=1&ch=117&sch=E&div=2&rl=Y).

2.7.3 East Texas Engines

The rules in 30 TAC Chapter 117, Subchapter E, Division 4 limit NO_X emissions from certain engines located in Anderson, Brazos, Burleson, Camp, Cass, Cherokee, Franklin, Freestone, Gregg, Grimes, Harrison, Henderson, Hill, Hopkins, Hunt, Lee, Leon, Limestone, Madison, Marion, Morris, Nacogdoches, Navarro, Panola, Rains, Robertson, Rusk, Shelby, Smith, Titus, Upshur, Van Zandt, and Wood Counties (http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=5&ti=30&pt=1&ch=117&sch=E&div=4&rl=Y). The rules apply to stationary, gas-fired, reciprocating internal combustion engines rated 240 horsepower (hp) and larger. Rich-burn gas-fired internal combustion engines rated less than 500 hp must limit NO_X emissions to 1.0 gram per horsepower-hour (g/hp-hr). Rich-burn engines rated 500 hp or greater must limit NO_X emissions to 0.60 g/hp-hr for landfill gas-fired engines or 0.50 g/hp-hr for all other rich-burn engines. Affected sources were required to comply with the rules by March 1, 2010.

Using photochemical modeling sensitivity studies, the TCEQ estimated that implementation of the rules results in an overall reduction of approximately 22.4 tpd of NO_X emissions in the 33 counties subject to the rules by March 1, 2010. The TCEQ estimated the rules benefit the DFW 1997 eight-hour ozone nonattainment area by reducing ozone by an average of approximately 0.1 to 0.2 parts per billion. The DFW Eight-Hour Ozone AD SIP Revision adopted May 23, 2007 provides a discussion on this conclusion (see *Texas Register* June 8, 2007).

2.8 TEXAS VEHICLE INSPECTION AND MAINTENANCE PROGRAMS

Since 2005, the TCEQ has implemented programs that reduce Texas' regional haze impact at Class I areas in Texas and in surrounding states. Appendix F: *Mobile Source Control Programs Applicable to Texas* contains an updated list (March 2011) of federal on-road and non-road mobile sources and state rule revisions that regulate NO_X and PM emissions into at least 2018. Motor vehicle inspection and maintenance programs are in place to maintain the effectiveness of the FMVCP in the HGB 1997 eight-hour ozone nonattainment area consisting of previously mentioned eight counties; the DFW 1997 eight-hour ozone nonattainment area consisting of previously mentioned nine counties; the Austin-Round Rock area consisting of Travis and Williamson Counties; and the El Paso area consisting of only El Paso County. The Texas Department of Public Safety administers the programs and the TCEQ maintains oversight of the programs, including collecting and analyzing data directly from the equipment at the inspection stations.

2.8.1 Air Check Texas Repair and Replacement Assistance Program

The TCEQ established a financial assistance program for qualified owners of vehicles that fail the emissions test. The purpose of this voluntary program is to remove older, more polluting vehicles from Texas eligible roadways in certain counties with high ozone (see map on page 2-20, Figure 2-4: *TERP Eligible Counties and Designated Highways and Roadways*). The Low Income Vehicle Repair Assistance, Retrofit, and Accelerated Vehicle Retirement Program (LIRAP) provisions of House Bill (HB) 2134, 77th Texas Legislature 2001, created the program. In 2005, the 79th Texas Legislature modified the program. The LIRAP applies only to counties that implement a vehicle inspection and maintenance program and have elected to implement LIRAP fee provisions. The counties included in LIRAP are Brazoria, Fort Bend, Galveston, Harris, Montgomery, Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, Travis, and Williamson.

SB 12, 80th Texas Legislature 2007, expanded LIRAP participation criteria by increasing the income eligibility to 300% of the federal poverty rate and increasing the amount of assistance toward the replacement of a retired vehicle. HB 3272, 82nd Texas Legislature 2011, Regular Session, expanded the class of vehicles eligible for a $3,500 voucher to include hybrid, electric, natural gas, and federal Tier 2, Bin 3 or cleaner vehicles. The program provides $3,500 for a replacement hybrid, electric, natural gas, and federal Tier 2, Bin 3 or cleaner vehicle of the current model year or the previous three model years; $3,000 for cars of the current or three model years; and $3,000 for trucks of the current or previous two model years. The retired vehicle must be 10-years old or older or have failed an emissions test. In Brazoria, Fort Bend, Galveston, Harris, and Montgomery Counties from December 12, 2007 through August 31, 2013 the program has retired and replaced 21,680 vehicles at a cost of $65,094,813. An additional 14,735 vehicles have had emissions-related repairs at a cost of $8,184,641.

The total repair and retirement/replacement expenditure for Brazoria, Fort Bend, Galveston, Harris, and Montgomery Counties from December 12, 2007 through August 31, 2013 is $73,279,454. HB 1, General Appropriations Bill, 82nd Texas Legislature 2011, Regular Session, continued program funding but at a reduced level. HB 1 appropriated $5.58 million for fiscal year (FY) 2012 and FY 2013 to continue this clean air strategy in the 16 participating counties. Brazoria, Fort Bend, Galveston, Harris, and Montgomery were allocated approximately $2.5 million for FY 2012 and FY 2013. Accelerated retirement of older, higher polluting vehicles will reduce NO_X, $PM_{2.5}$, and VOC emissions.

2.8.2 Texas Low Emissions Diesel Program

The goal of the Texas Low Emissions Diesel (TxLED) program is to lower emissions of NO_X and other pollutants from diesel-powered motor vehicles and non-road equipment. Since diesel contains PM, reductions may co-benefit decreases of PM and therefore visibility impairing pollutants at Class I areas. It applies to diesel fuel producers, importers, common carriers, distributors, transporters, bulk terminal operators, and retailers. The rules cover 110 counties in eastern Texas, including the 1997 and 2008 eight-hour ozone nonattainment areas of DFW and HGB, and the 1997 eight-hour ozone maintenance area of BPA. The rules require that diesel fuel as defined under 30 TAC §114.6 produced for delivery and ultimate sale to the consumer for both on- and non-road use must contain less than 10% by volume of aromatic hydrocarbons and have a cetane number of 48 or greater. The rules, which took effect October 1, 2005, allow some compliance options (30 TAC Chapter 114, Subchapter A, §114.6 and Subchapter H, Division 2, §§114.312 - 114.319). The TCEQ has submitted these rules to the EPA as revisions to the Texas SIP. The EPA approved the TxLED rules on October 6, 2005 and revisions to the rules on October 24, 2008. The TCEQ revised the rules again in August 2012 and submitted the rule

revisions to the EPA for approval. The EPA approved the revised TxLED rules as revisions to the Texas SIP on May 6, 2013 (78 FR 26255).

2.9 THE TEXAS EMISSIONS REDUCTION PLAN

The Texas Emissions Reduction Plan (TERP) was established by the 77th Texas Legislature in 2001, through the enactment of SB 5. The legislation defines the program's objective to reduce NO_X emissions from older heavy-duty, on-road vehicles and non-road equipment by providing grants and rebates for voluntary upgrades and replacements. NO_X is a precursor to the formation of ground-level ozone, so the TERP program targets 42 counties in Texas designated as nonattainment for ground-level ozone under the FCAA and other areas. The TERP-eligible counties are shown listed and on the map in Figure 2-4 on page 2-20. NO_X is also a precursor of secondary particulate matter, which is a visibility-impairing pollutant. Therefore, reductions in NO_X for ozone may also benefit regional haze. Reductions of diesel emissions also have the co-benefit of reducing PM, also reducing haze.

From FY 2002 through FY 2013, the TCEQ has issued over $930 million under the primary TERP Diesel Emissions Reduction Incentive (DERI) Program, representing a total of 9,500 projects, or 15,746 individual pieces of equipment and/or vehicles. Appendix G: *TERP Report to the 83rd Texas Legislature, 2011 through 2012* gives a detailed overview of the programs up to 2012. The current numbers for TERP have been updated with 2013 data from the TERP program. From FY 2002 through FY 2013, this level of activity represents a projected reduction of 175,032 tons of NO_X. Table 2-9: *TERP DERI Projects Funded from FY 2002 through FY 2013 by Emission Source* categorizes emission sources into five types and estimates 62.5 tpd, or approximately 17,000 tpy, of reduced NO_X in FY 2013. The emissions reductions are estimated based on what the projects funded through FY 2013 are projected to achieve over the period the grant recipient commits to use the grant-funded vehicle or equipment in the eligible areas. The commitment period for most grants is five to seven years, while some projects extend through 10 years or more.

Table 2-9: TERP DERI Projects Funded from FY 2002 through FY 2013 by Emission Source

Emission Source	Number of Projects	Total NO_X Reduced (tons)	Grant Amount (dollars)	Cost Per Ton (dollars)	Estimated NO_X Reduced 2013 (tpd)
Non-Road	5,147	41,915	$306,416,188	$7,310	19.1
On-Road	4,155	52,156	$353,499,619	$6,778	22.4
Marine	74	13,718	$44,181,589	$3,221	4.0
Stationary	74	4,329	$13,755,025	$3,177	1.7
Locomotive	50	62,914	$212,910,443	$3,384	15.3
Totals	9,500	175,032	$930,762,864	$5,318	62.5

TERP DERI projects have typically included:

- purchases of new, low-emission equipment and vehicles;
- replacement of old, high-emission equipment and vehicles with more efficient, less-polluting models;
- retrofit and add-on devices designed to reduce NO_X emissions from equipment and vehicles; and

- infrastructure to support qualifying fuels, electrification, and reduced idling.

Since the creation of the TERP in 2001, there have been several key legislative enhancements, additions, and revisions.

In 2003, HB 1365, 78th Texas Legislature, Regular Session, established a new revenue source of vehicle title fee increases under Texas Transportation Code 501.138(a–b) to replace the original $225 out-of-state vehicle registration fee. In addition, under Texas Tax Code 151.0515 the existing surcharge on the sale, lease, or rental of new or used off-road equipment increased from 1 to 2%. A 1% surcharge was added for the sale, lease, or use of model 1997 and later heavy-duty diesel on-road vehicles.

In 2005, HB 2481, 79th Texas Legislature, Regular Session, established cost-effectiveness limits for locomotive and marine vessel grants. The bill also directed the TCEQ to implement a new Rebate Grants program under the TERP incentive programs.

Also in 2005, HB 3469 79th Texas Legislature, Regular Session, added Texas Health and Safety Code Chapter 390 authorizing the TCEQ to create and implement a new Texas Clean School Bus Program to provide grants for technologies that reduce diesel-exhaust emissions inside the cabin of a school bus. Approved technologies include closed crankcase filtration systems, diesel particulate filters, and diesel oxidation catalysts. Over 6,950 Texas school buses have been retrofitted from FY 2008 through FY 2013.

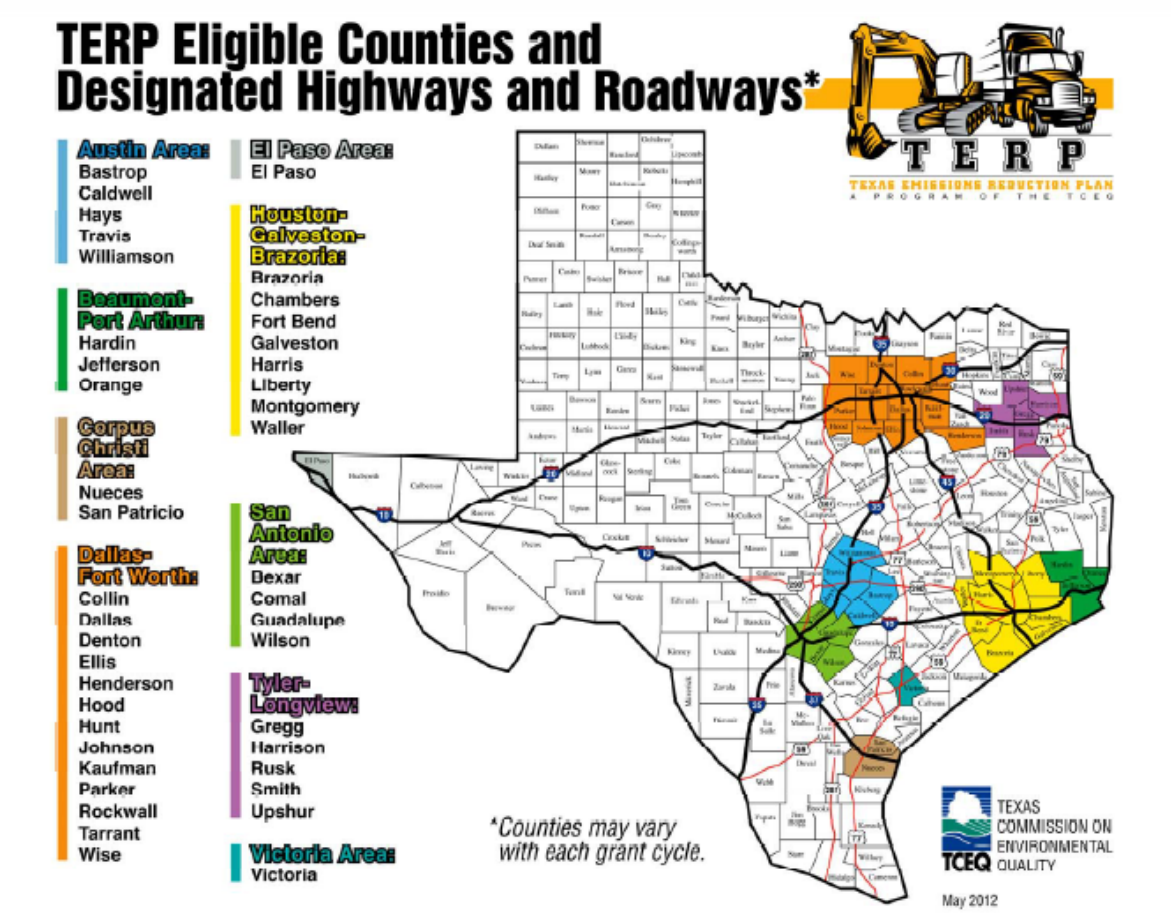


Figure 2-4: TERP Eligible Counties and Designated Highways and Roadways

In 2007, SB 12, 80th Texas Legislature, Regular Session, amended the TERP program. The bill raised the maximum cost-effectiveness of a grant project from $13,000 to $15,000 per ton of NO_X reduced. In addition, SB 12 added marine vessels to the list of vehicles and equipment for which an electrification or idle-reduction infrastructure project may be funded. The bill authorized the TCEQ to fund other state agencies to lease, purchase, or install idle-reduction infrastructure at rest areas and other public facilities located on major highway transportation routes in eligible nonattainment areas and affected counties.

Also in 2007, HB 160 added "rail relocation and improvement" as a new category to the list of infrastructure projects that may be funded under the TERP. The new project category was designed to fund rail relocation and improvement projects at major rail intersections in the eligible counties to reduce emissions from locomotive and vehicle engine idling.

In 2009, the 81st Texas Legislature, Regular Session, modified some existing TERP programs and added new TERP programs through SB 1759 and HB 1796. SB 1759 established the Texas Clean Fleet Program to provide incentives for owners of large vehicle fleets in Texas to replace diesel vehicles with alternative fuel or hybrid vehicles. This program is authorized through August 2017. HB 1796 established the New Technology Implementation Grant Program to provide incentives for advanced clean energy projects, new technology projects, and electricity storage projects at facilities and stationary sources. In addition, the bill included a new

definition of stationary engines under the TERP criteria to authorize grant funding for projects involving gas turbine engines. It also added "Location of use" provisions for projects involving non-road equipment used for natural gas recovery, and extended the TERP program authorization and fee sources through August 2019.

In 2011, the 82nd Texas Legislature, Regular Session, modified existing TERP programs. HB 3399 modified some of the criteria applying to the TERP Emissions Reduction Incentive Grants Program, Small Business and Rebate Grants Programs, Third-Party Grants Program, and the Texas Clean Fleet Program. Changes and additions to the program eligibility criteria included: changes to the period over which a grant-funded vehicle must be operated to either five years or 400,000 miles, whichever occurs earlier; more specific criteria for decommissioning a vehicle or vehicle engine under the program; and provisions to allow a vehicle that has been leased or otherwise commercially financed to be replaced under the program.

SB 385 and SB 20 established the same new programs, with SB 385 serving as the controlling legislation since it was enacted last. The additional programs include the following:

- the Alternative Fueling Facilities Program (AFFP);
- the Clean Transportation Triangle (CTT) Program; and
- the Texas Natural Gas Vehicle Grant Program (TNGVGP).

The AFFP was established to fund fueling facilities for alternative fuels in the state's nonattainment areas. The CTT provides funding for fueling facilities specifically for compressed natural gas (CNG) and liquefied natural gas (LNG) within three miles of the interstate highways connecting the Houston, Dallas, Fort Worth, and San Antonio areas. The TNGVGP provides grant funding for replacing medium and heavy-duty on-road vehicles with vehicles fueled by CNG or LNG. Vehicles funded under the TNGVGP must be operated at least 75% of the annual miles in the state's nonattainment areas and along the interstate highways designated under the CTT Program. SB 527 revised the allocation percentages for use of the TERP Fund, eliminated the New Technology Research Development Program, and established a new program for monitoring air quality in the North Texas region.

In 2013, the 83rd Texas Legislature, Regular Session, enacted SB 1727, raising the criteria for several existing TERP programs and adding additional programs.

- A new Drayage Truck Incentive Program was established under Texas Health and Safety Code Chapter 386, Subchapter D-1. This program funds replacement of drayage trucks transporting a load to or from a seaport or rail yard located in a nonattainment area.
- The Light-Duty Motor Vehicle Purchase or Lease Incentive Program authorized under Texas Health and Safety Code Chapter 386, Subchapter D, was revised and the funding allocation to the program was restored. The original program was established in 2001 to provide rebates for the purchase of new light-duty motor vehicles that were certified to certain low-emission standards. The rebate awards were to be administered by the Texas Comptroller of Public Accounts (CPA). Although funding was authorized for the program, it was never implemented because the revenue into the TERP Fund was not at anticipated levels and, therefore, the share of the revenue allocated to this program was not sufficient to start the program. Funding authorization for the program was removed by the Texas Legislature in 2003. The recent revisions to the program authorized rebates for the purchase of light-duty motor vehicles powered by natural gas, propane, or electricity. The administration of the rebates was transferred by the CPA to the TCEQ. The Texas Legislature also authorized funding for the program.

- The DERI Program established under Texas Health and Safety Code Chapter 386, Subchapter C, was revised to remove the maximum limit on the cost-effectiveness of a project funded under the program. The TCEQ may now establish higher limits, as needed to ensure effective implementation of the program. The TCEQ is also authorized to consider systems for converting a diesel engine to dual-fuel operation using both diesel and natural gas, including provisions for establishing a lower minimum standard for the percentage reduction in NO_X emissions than for the other projects and to consider test data and other information in determining the emissions reductions that can be attributed to the conversion of an engine.
- The Texas Clean Fleet Program established under Texas Health and Safety Code Chapter 392 was revised. The limits on the percentage of incremental costs that may be covered by a grant were simplified to just require that for any grant, the grant amount may not exceed 80% of the costs. Previously, different percentage limits were set according to the model year of the vehicle and engine being replaced. Also, alternative criteria were established authorizing the TCEQ to allow projects involving trucks used to transport raw agricultural products from the point of production to certain eligible counties that travel less than 75% of annual mileage in the eligible counties to be eligible for a grant.
- The maximum grant amount authorized for the Alternative Fueling Facilities Program established under Texas Health and Safety Code Chapter 393 was changed from $500,000 to $600,000.
- The eligible counties under the Texas Clean Transportation Triangle Program established under Texas Health and Safety Code Chapter 394 were expanded to include the counties designated as Affected Counties under Texas Health and Safety Code 386.001(2) and the counties located within the triangular area between the Houston, Dallas-Fort Worth, and San Antonio areas. The maximum grant awards were also increased: funding for stations providing compressed natural gas was increased from $100,000 to $400,000; funding for stations providing liquefied natural gas was increased from $250,000 to $400,000; and funding for stations provision both compressed and liquefied natural gas was increased from $400,000 to $600,000.
- The Texas Natural Gas Vehicle Incentive Grant Program established under Texas Health and Safety Code Chapter 394 was also revised to expand the counties in which grant-funded vehicles may travel to correspond to the expansion of the Texas Clean Fleet Program counties. Also, alternative criteria were established authorizing the TCEQ to allow projects involving trucks used to transport raw agricultural products from the point of production to certain eligible counties that travel less than 75% of annual mileage in the eligible counties to be eligible for a grant.

The TERP revenue is allocated through appropriations from the state legislature. Table 2-10: *TERP Funding* shows the TERP funding allocations to the TCEQ for FY 2010 through FY 2015.

Table 2-10: TERP Funding

Fiscal Year	2010	2011	2012	2013	2014	2015
TCEQ Allocation (includes funding for administration	$81,132,849	$67,519,624	$65,165,047	$65,165,047	$77,596,164	$77,596,163

2.9.1 New Technology Research and Development Program

The administration of the New Technology Research and Development (NTRD) Program was transferred back from the Texas Environmental Research Consortium to the TCEQ in 2010. The TCEQ received 44 NTRD applications under its first application period in FY 2010 and awarded eight grants for approximately $6 million. Under its second NTRD application period in FY

2011, the TCEQ received 35 project applications and awarded six grants for approximately $6 million. Examples of the type of NTRD projects funded include:

- the testing and developing of hydrogen and electric tractors;
- a demonstration of a hydrogen bus and fueling system, in addition to demonstrations of electric-powered medium-duty delivery trucks; and
- the development and verification/certification testing for a selective catalytic reduction system for locomotives and marine engines.

This program was discontinued by the Texas Legislature in 2011.

2.9.2 New Technology Implementation Grants (NTIG) Program

The initial NTIG Program application round opened in August 2010. The TCEQ reviewed three proposals for electricity storage projects and awarded two projects in FY 2011: a thermal storage system (in Floyd County) and an energy storage system for compressed air (in Gaines County), both capturing wind energy. No additional grants have been awarded through FY 2013. The program has been allocated $2.3 million per year for the 2014 through 2015 fiscal biennium. With new funding allocated by the Texas Legislature, a new grant application period is expected to be opened in early 2014.

2.9.3 Texas Natural Gas Vehicle Grant Program

As of August 31, 2013, the TCEQ selected 31 projects for funding under the TNGVGP. These projects will replace 477 vehicles with new natural gas vehicles, for a total funding amount of $25,789,500. This program has been allocated $12.4 million per year for the 2014 through 2015 fiscal biennium.

2.9.4 Texas Clean Transportation Triangle Grant Program

The CTT Program was implemented in FY 2012. From the beginning of the program through FY 2013, the TCEQ has issued 18 grants for natural gas fueling stations located in the CTT for $3,900,000. The CTT has been allocated $3.8 million per year for the 2014 through 2015 fiscal biennium. The original CTT criteria required that eligible stations be located within three miles of an interstate highway connecting Houston, Dallas, Fort Worth, and San Antonio. Changes by the Texas Legislature in 2013 expanded the eligible areas to include the counties in and between the Houston, San Antonio, and DFW areas, the state's nonattainment areas, and other counties designated as affected counties under Texas Health and Safety Code, §386.001.

2.9.5 Texas Alternative Fueling Facilities Program

The AFFP was also implemented in FY 2012. Through FY 2013, the TCEQ issued four grants for natural gas fueling stations in the nonattainment areas totaling $1,786,602. The AFFP has also been allocated $3.8 million per year for the FY 2014 through FY 2015 fiscal biennium.

2.9.6 Texas Clean School Bus (TCSB) Program

Over the 2012 through 2013 fiscal biennium, the legislature appropriated $2,239,602 for FY 2012 and $2,239,602 for FY 2013 for the TCSB Program to install retrofit devices to reduce diesel exhaust emissions from school buses throughout Texas. The TCEQ supplemented state funding with federal funding, including $203,968 in federal Clean Diesel funds allocated to the state by the EPA in FY 2012 and $241,295 in FY 2013. Reductions of diesel emissions have the co-benefit of reducing particulate matter, which is a visibility-impairing pollutant. As of November 5, 2013, the TCEQ had reimbursed a total of $22,772,592, including $18,556,578 in state funds and $4,216,014 in federal funds from FY 2008 through FY 2013, to 186 school

districts. During this time period, 6,951 school buses were retrofitted with 9,803 individual devices. The TCSB Program has been allocated $3.1 million per year for the 2014 through 2015 fiscal biennium.

2.9.7 Diesel Emissions Reduction Incentive (DERI) Program

From FY 2002 through FY 2013, the TCEQ has awarded approximately 3,645 grants under the DERI Program for $703,415,842. The combined DERI projects are currently estimated to reduce a total of 146,467 tons of NO_X emissions over the life of the each project. Each project may include multiple activities for the replacement, repower, or retrofit of on-road vehicles, non-road equipment, locomotives, marine vessels, and stationary equipment. Some projects may also include infrastructure for alternative fuel or electricity, or to reduce idling of vehicles and equipment. The DERI Program includes the Emissions Reduction Incentive Grants (ERIG) Program, Rebate Grants Program, and Third-Party Grants Program. The DERI Program has been allocated a total of $34.2 million per year for the 2014 through 2015 fiscal biennium.

2.9.7.1 Rebate Grants Program

The DERI Program totals include funding for Rebate Grants. The Rebate Grants Program has been in place since April 2006. The TCEQ has awarded 2,428 rebate grants for a total of $158,237,238. The rebate grant projects are currently projected to reduce a total of 19,496 tons of NO_X emissions.

2.9.7.2 American Recovery and Reinvestment Act (ARRA) Rebate Grants Program

The DERI Program totals include funding for grants using federal funds. The federal stimulus moneys for the TERP-ARRA Rebate Grants Program rebate grants included $12,632,318 awarded under a special round of rebate grants during 2010. A total of 234 ARRA rebate grants were awarded under this special federal stimulus program. The ARRA rebate grants are currently projected to reduce a total of 1,322 tons of NO_X emissions.

2.9.7.3 Third-Party Grants Program

The DERI Program totals include funding to third parties to provide pass-through subgrants for projects that meet the overall grant requirements. From FY 2004 through FY 2013, the TCEQ awarded third-party grants to the Railroad Commission of Texas, North Central Texas Council of Governments, Texas General Land Office, and Houston-Galveston Area Council, for a total of $69,109,783. The subgrants awarded by these entities are currently projected to reduce a total of 9,264 tons of NO_X emissions, which are included under the totals for the ERIG program.

2.9.8 Texas Clean Fleet Program (TCFP)

From FY 2011 through FY 2013 the TCEQ awarded 12 grants for $23,606,444 for replacement of diesel vehicles with alternative fuel vehicles under the TCFP. These grants are currently projected to reduce NO_X emissions by a total of 314 tons of NO_X. The TCFP has been allocated $3.8 million per year for the 2014 through 2015 fiscal biennium.

2.9.9 Drayage Truck Incentive Program (DTIP)

The DTIP was established by SB 1727 in 2013 to fund replacement of drayage trucks operating at seaports and rail yards in the state's air quality nonattainment areas. The DTIP will be implemented in 2014 and has been allocated $1.5 million per year for the 2014 through 2015 fiscal biennium.

2.9.10 Light-Duty Motor Vehicle Purchase or Lease Incentive Program

The Light-Duty Motor Vehicle Purchase or Lease Incentive Program was revised by SB 1727 in 2013 to provide rebates of $2,500 for the purchase of light-duty natural gas, propane, and plug-in electric vehicles. This program will be implemented in 2014 and is allocated $3.8 million per year for the 2014 through 2015 fiscal biennium.

2.9.11 Energy-Efficiency Grants Program

The Public Utility Commission (PUC) of Texas had jurisdiction for the Energy-Efficiency Grants Program established under Texas Health and Safety Code, Chapter 386, Subchapter E using money from the TERP Fund. However, the funding for that program was only provided from 2001 through 2002 before the Texas Legislature eliminated the funding in 2003. The PUC is also responsible for administering the energy efficiency incentive program for electric utilities under Texas Utilities Code, Section 39.905. The PUC is required to report the reductions of energy demand, peak loads, and associated emissions achieved by the utilities through the incentive programs implemented by the utilities. The latest reporting year is calendar year 2012. The Transmission and Distribution Utilities (TDU), which are responsible for implementing the energy-efficiency program, exceeded their demand reduction goals by 265%, and saved nearly 483,208 megawatt-hours per year of energy. To implement energy-efficient measures, the TDU spent a total of $119,747,851 during year 2012.

Based on estimates from the Energy Systems Laboratory (ESL) at the Texas Engineering Experiment Station of the Texas A&M University system, the annual integrated savings from the PUC's energy-efficiency programs from a base year of 2008 through the latest reporting year of 2012 were 1,831,318 megawatt-hours per year.

2.9.12 Texas Building Energy Performance Standards

The ESL also assesses energy savings in nonattainment and affected counties for energy-compliant new construction. The ESL reports an estimated annual integrated electricity savings from a base year of 2008 through 2012 for these programs of 498,883 megawatt-hours per year.

2.9.13 Energy-Efficiency Programs in Certain Political Subdivisions

The State Energy Conservation Office (SECO) within the Texas Comptroller of Public Accounts works with state and local governmental entities in nonattainment areas to establish and implement goals to reduce electrical consumption by 5% per year for 10 years beginning September 1, 2011. Additionally, the ESL assists these local governments and submits reports on the estimated energy savings and reductions in NO_X emissions. The ESL estimates that the annual integrated energy savings from energy efficiency commitments from a base year of 2008 could be as high as 909,903 megawatt-hours per year in 2013.

2.10 OTHER STATE ENERGY EFFICIENCY AND RENEWABLE ENERGY MEASURES

In 2005, 79th First Special Session, the Texas Legislature adopted SB 20 to expand Texas' target for renewable energy originally established in SB 7 in 1999, 76th Regular Session. Under SB 20, multiple milestones for installed renewable energy capacity were established through 2025 (Haberl, J. et al. 2012). The final target milestone in January 2025 was 10,000 megawatts (MW) of installed renewable capacity. Texas surpassed the 2025 target of 10,000 MW in 2010, primarily through wind generation. Additional information regarding Texas' progress with implementation of renewable energy may be found in annual reports (*Statewide Air Emissions Calculations from Wind and Other Renewables*) issued under contract with the TCEQ by the

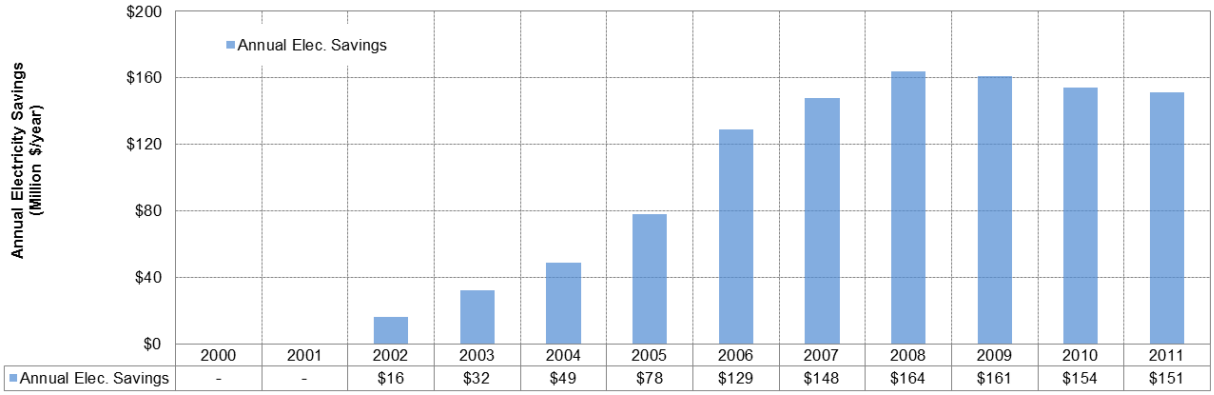
ESL, Texas A & M Engineering Experiment Station, Texas A & M University System, at the following site: http://esl.tamu.edu/terp/reports.

In 2007, 80th Regular Session, SB 12 expanded the requirement in the Texas Health and Safety Code §388.005 for certain political subdivisions to set a goal of a reduction of 5% per year in electrical consumption to include institutions of higher education and state agencies. SB 898 in 2011, 82nd Regular Session, extended this requirement for an additional ten years beginning 2011.

The July 2013 report from ESL on *Statewide Electricity and Demand Capacity Savings from the International Energy Conservation Code Adoption for Single-Family Residences in Texas (2002 through 2011)* is the continuation of the previous 2011 Statewide Electricity Savings report from code-compliant, single-family residences built between 2002 through 2009 (ESL 2013). Statewide electricity and electric demand savings achieved from the adoption of the different International Energy Conservation Code (IECC) versions for single-family residences in Texas and the corresponding construction cost increases over the ten-year period from 2002 through 2011 are presented in this report. Using the ESL International Code Compliance Calculator simulation program, the annual electricity savings in 2011 are estimated to be $151 million, and the demand reductions in 2011 are estimated to be 834 MW for the summer and 929 MW for the winter periods.

The cumulative statewide electricity and electric demand savings over the ten year period from 2002 through 2011 are approximately $2.2 billion for the summer ($1.1 billion from electricity savings and $1.1 billion from demand savings) and approximately $2.3 billion for the winter periods ($1.1 billion from electricity savings and $1.21 billion from demand savings).

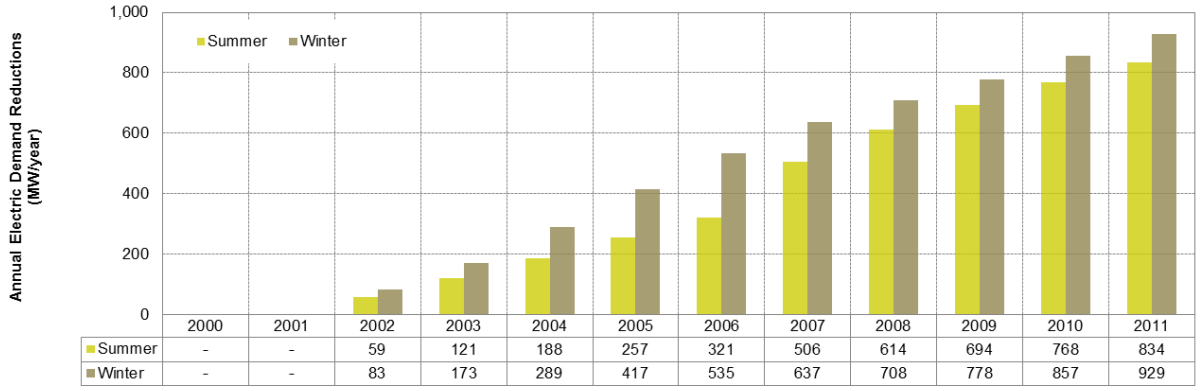
The total increased costs are estimated to be $724 million. Figure 2-5: *Annual Statewide Electricity Savings from the IECC Code Adoption for New Single-Family Residences in Texas: 2002 through 2011* and Figure 2-6: *Annual Statewide Electric Demand Reductions from the IECC Code Adoption for New Single-Family Residences in Texas: 2002 through 2011* show the annual statewide electricity savings and demand reductions. Figure 2-7: *Cumulative Increased Costs, Statewide Electricity and Electric Demand Savings Associated with the IECC Code Adoption for Single-Family Residences in Texas: 2002 through 20111* shows the cumulative statewide increased costs with the cumulative statewide electricity and demand savings from code-compliant, single-family residences built between 2002 and 2011.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Annual Elec. Savings	-	-	$16	$32	$49	$78	$129	$148	$164	$161	$154	$151

Source: Statewide IECC Electricity Savings Report (2002 through 2011), p.iii

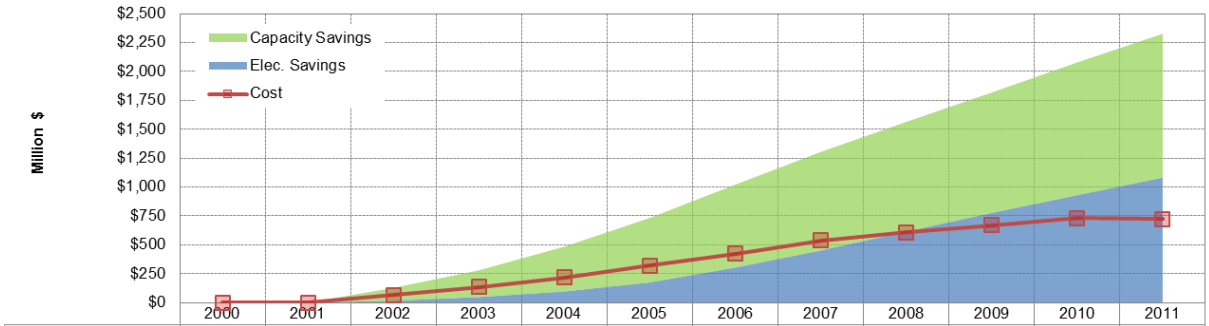
Figure 2-5: Annual Statewide Electricity Savings from the IECC Code Adoption for New Single-Family Residences in Texas: 2002 through 2011



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Summer	-	-	59	121	188	257	321	506	614	694	768	834
Winter	-	-	83	173	289	417	535	637	708	778	857	929

Source: Statewide IECC Electricity Savings Report (2002 through 2011), p.iii

Figure 2-6: Annual Statewide Electric Demand Reductions from the IECC Code Adoption for New Single-Family Residences in Texas: 2002 through 2011



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Capacity Savings	-	-	$111	$232	$387	$558	$717	$853	$949	$1,042	$1,148	$1,245
Elec. Savings	-	-	$16	$48	$97	$175	$304	$451	$615	$776	$930	$1,082
Cost	-	-	$64	$136	$218	$321	$422	$536	$610	$669	$729	$724

1 For electric demand savings, the estimation for the winter periods ($1.2 billion, cumulative) was displayed instead of summer ($1.1 billion, cumulative).
Source: Statewide IECC Electricity Savings Report (2002 through 2011), p.iii

Figure 2-7: Cumulative Increased Costs, Statewide Electricity and Electric Demand Savings Associated with the IECC Code Adoption for Single-Family Residences in Texas: 2002 through 2011

2.11 SO_2 EMISSIONS REDUCTIONS RESULTING FROM SHUTDOWN

In 2011, the TCEQ sent an SO_2 special inventory request to owners and operators of SO_2 emission sources in Texas. The special inventory request resulted in information about which emission sources of SO_2 across the state owners and operators had retired and those that continued to operate and under what authorization. As part of continued progress toward reducing regional haze, the TCEQ considered those SO_2 emission sources that owners or operators had retired and the permanent reductions in SO_2 that accompanied the shutdown.

The shutdown of various units at different source categories in Texas has resulted in approximately 4,700 tpy of actual emission reductions in SO_2 as shown in following Table 2-11: *Texas SO2 Special Inventory*. Emission reductions are based on 2009 actual emissions reported to the TCEQ as part of a 2011 SO_2 special inventory request. The TCEQ considered data from 2009 through 2013 to coincide with this five-year report and the period after Texas submitted the 2009 regional haze SIP revision. No facilities reported expected shutdowns for 2013 in the SO_2 special inventory request, and the TCEQ excluded those scheduled for 2014 since those could not yet be confirmed in a permit or some other permanent, enforceable mechanism. The Emission Point Name (EPN) is a facility identifier created by the site owner/operator and is unique to the emissions sources at the site.

Table 2-11: Texas SO_2 Special Inventory

Regulated Entity Number	County	Standard Industrial Classification (SIC)	Emission Point Number (EPN)*	EPN Name	Actual 2009 Emissions (tpy)	Shutdown Year	Comment
RN100210517	MOORE	2911	B-3	STACK	0.16	2010	Decommissioned December 2010.
RN100210517	MOORE	2911	B-5	STACK	0.01	2010	Decommissioned
RN100211408	PECOS	1321	WAU24	ENGINE 24	0.33	2010	Removed from site
RN100211663	NUECES	2911	COGEN-1	EAST COGENERATION UNIT	0.01	2010	No longer in service
RN100211663	NUECES	2911	COGEN-2	WEST COGENERATION UNIT	0.1	2010	No longer in service
RN100211879	HARRIS	2911	PORTA-COMP	PORTACOMP: PORTABLE AIR COMPRE	0.83	2010	Shutdown
RN100213941	EL PASO	3312	MISCHTR	MISC. HEATERS VENT	0.02	2010	Shutdown
RN100214873	FREESTONE	1311	10B	AMINE REBOILER / INCINERATOR	80.82	2010	Shutdown end of first quarter 2009.
RN100216621	MCMULLEN	1321	TBS-1	STACK	0.03	2010	Unit deleted and removed from site. Standard permit 85028 revision February 2010.
RN100218080	DALLAS	3253	KS-3	KILN STACK	0.15	2011	Removed January 2011.
RN100218684	ANDREWS	1321	COMSTK-38	ENGINE STACK	0.01	2010	Unit no longer in existence.
RN100218684	ANDREWS	1321	HOHSTK-A	HEATER A	0.03	2009	
RN100218684	ANDREWS	1321	HOHSTK-B	HEATER B	0.03	2009	
RN100219351	GALVESTON	2869	E01A048	DIST_EPT_VAPOR INCINERATOR-E01	0.01	2009	
RN100222330	ECTOR	1321	STK-20R-2	ENGINE STACK	0.02	2009	Not in service
RN100222330	ECTOR	1321	STK-22R-1	ENGINE STACK	0.01	2009	Not in service

Regulated Entity Number	County	Standard Industrial Classifica-tion (SIC)	Emission Point Number (EPN)*	EPN Name	Actual 2009 Emissions (tpy)	Shutdown Year	Comment
RN100222330	ECTOR	1321	TUR-B2 STK	TURBINE STACK	0.06	2009	Not in service
RN100224104	BOWIE	9711	1025-01ARE	E.P.N. 128	0.11	2011	Closed June 2011
RN100224104	BOWIE	9711	1025-02ARE	OPEN BRNNG. SMKLSS. PWDR.	0.12	2011	Closed June 2011
RN100224104	BOWIE	9711	1025-03ARE	SMOKELESS POWDER BURN	0.05	2011	Closed June 2011
RN100227016	HARRIS	2869	49MN294-ST	ACETIC ACID LOADING INC.	0.31	2010	EPN has been removed and is no longer in service.
RN100227016	HARRIS	2869	49MN294-ST	ACETIC ACID LOADING INC.	0.31	2010	EPN has been removed and is no longer in service.
RN100227289	HEMPHILL	4922	AGI	ACID GAS INCINERATOR	218.29	2011	EPN AGI was removed from permit in 2011 amendment.
RN100227289	HEMPHILL	4922	BE3	BROACH HEATER STACKS	4.08	2010	Shutdown
RN100227289	HEMPHILL	4922	BE3A	BROACH HEATER STACK	4.08	2010	Shutdown
RN100227792	CARSON	1311	11	WHITE SUPERIOR "12G825"	0.01	2010	Removed from site in 2010.
RN100238385	GALVESTON	2911	EB-28	PACKAGE BOILER STACK	2.16	2009	Boiler 28 has been permanently shutdown.
RN100250869	HOWARD	2911	24TEMP-4BLR	NS WABASH BOILER	2.3	2010	Temporary boiler. Shutdown June 18, 2010.
RN101621944	HARRIS	2874	BLRV001	NATIONWIDE BOILER	0.01	2010	No longer in operation.

Regulated Entity Number	County	Standard Industrial Classifica-tion (SIC)	Emission Point Number (EPN)*	EPN Name	Actual 2009 Emissions (tpy)	Shutdown Year	Comment
RN101621944	HARRIS	2874	TEMPBOIL	CISCO BOILER	0.01	2011	No longer in operation.
RN101634368	HALE	2011	B1	#1 BOILER STACK	0.07	2010	Boiler was removed from service November 12, 2010.
RN101634368	HALE	2011	B2	#2 BOILER STACK	0.01	2010	Boiler was removed from service July 12, 2010.
RN101634368	HALE	2011	B3	#3 BOILER STACK	20.64	2010	Boiler was removed from service July 22, 2010.
RN102166964	CASS	1321	BLRS-1	BOILER STACK NO. 1	0.04	2010	Shutdown
RN102166964	CASS	1321	BLRS-2	BOILER STACK NO. 2	0.03	2010	Shutdown
RN102166964	CASS	1321	BLRS-3	BOILER STACK NO. 3	0.03	2010	Shutdown
RN102166964	CASS	1321	INCIN-1	INCINERATOR EMISSIONS	880.97	2010	Shutdown
RN102166964	CASS	1321	RFCS-1	REFRG. COMPRESSOR STACK 1	0.01	2010	Shutdown
RN102166964	CASS	1321	RFCS-2	REFRIG. COMPRESSOR STACK	0.01	2010	Shutdown
RN102166964	CASS	1321	TCS-1	TURBINE COMPRESSOR STACK	0.01	2010	Shutdown
RN102166964	CASS	1321	TCS-2	TURBINE COMPRESSOR STACK	0.02	2010	Shutdown
RN102166964	CASS	1321	TCS-3	TURBINE COMPRESSOR STACK	0.01	2010	Shutdown
RN102320850	HUTCHINSON	2869	M2A	FLAKER VENT	0.01	2009	Shutdown
RN102522539	REEVES	4922	INCIN-1	INCINERATOR	3473.57	2010	Source no longer in service. Amendment finalized August 2010.

Regulated Entity Number	County	Standard Industrial Classifica-tion (SIC)	Emission Point Number (EPN)*	EPN Name	Actual 2009 Emissions (tpy)	Shutdown Year	Comment
RN102535077	GALVESTON	2911	CONENG1	CONENG1 STACK	0.13	2010	Engine removed from site in first quarter 2010.
RN102535077	GALVESTON	2911	CONENG2	CONENG2 STACK	0.37	2010	Engine removed from site in first quarter 2010.
RN102535077	GALVESTON	2911	CONENG3	CONENG3 STACK	0.1	2010	Engine removed from site in first quarter 2010.
RN102579307	HARRIS	2911	TEMPBLR1	TEMP BOILER 1	0.01	2010	Shutdown
RN102579307	HARRIS	2911	TEMPBLR2	TEMP BOILER 2	0.01	2010	Shutdown
RN102579307	HARRIS	2911	TEMPBLR3	TEMP BOILER 3	0.01	2010	Shutdown
RN102579307	HARRIS	2911	TEMPBLR4	TEMP BOILER 4	0.01	2010	Shutdown
RN102579307	HARRIS	2911	TEMPBLR5	TEMP BOILER 5	0.01	2010	Shutdown
RN102579307	HARRIS	2911	TEMPBLR6	TEMP BOILER 6	0.01	2010	Shutdown
RN103363826	WILLACY	1311	FLAR1	FLARE # 1	52.75	2010	Facility ceased operation on September 11, 2010. Standard permit cancelled in March 2011.
					Sum=4,743.31		

Source: TCEQ

2.12 SUMMARY

The emissions TCEQ assessed were not all encompassing but focused on major visibility impairing sources like EGUs and other SO_2 source shutdowns, as SO_2 is one of the key pollutants impacting Texas' Class I areas. Details of the TERP program were expanded on in this SIP revision to emphasize the large investment that the state has made in the last five years and anticipates to continue dependent upon legislative appropriations. TERP has directly reduced mobile source NO_X emissions, a precursor to PM, as well as mobile source direct PM emissions and therefore impacts potential visibility improvement. Most of the TERP incentive programs are authorized by the Texas Legislature to continue through 2019. Several Texas agencies have spent the last five to ten years working to improve energy efficiency in the state and, as state funding allows, will be continuing. Texas considers this demonstration of reductions adequate for sufficient progress towards the 2018 goals and anticipates continuing to reduce its visibility impairing pollutants.

CHAPTER 3: ASSESSMENT OF VISIBILITY – 40 CFR §51.308(g)(3)

3.1 INTRODUCTION

40 Code of Federal Regulations (CFR) §51.308(g)(3) of the regional haze rule (the Rule) requires for each Class I area in the state, an assessment of the following visibility conditions and changes, with values for most impaired and least impaired days expressed in terms of five year averages of these annual values:

- current visibility conditions for the most and least impaired days (2007 through 2011);
- difference between current visibility conditions (2007 through 2011) and baseline visibility conditions (2000 through 2004) for the most impaired and least impaired days; and
- change in visibility impairment for the most impaired and least impaired days over the past five years, from (2002 through 2006) to (2007 through 20011).

The goal of the Rule is to restore natural visibility conditions by 2064 to the mandatory Class I federal areas. Section 51.301 defines natural conditions as “naturally occurring phenomena that reduce visibility as measured in terms of light extinction, visual range, contrast, or coloration.” The regional haze SIP must contain measures that make "reasonable progress" toward this goal by reducing anthropogenic emissions that cause haze. Chapter 5: *Assessment of Reasonable Progress Goals* of this document will address Texas’ reasonable progress in detail. For each Class I area, there are three metrics of visibility that are part of the determination of reasonable progress:

- baseline conditions;
- natural conditions; and
- current conditions.

Each of the three metrics includes the concentration data of the visibility impairing pollutants as different terms in the light extinction equation, with respective extinction coefficients and relative humidity factors. The Rule stipulates use of the Interagency Monitoring of Protected Visual Environments (IMPROVE) algorithm for calculating light extinction in Class I areas. The algorithm uses measured ambient concentrations of light scattering aerosols and humidity to estimate the light extinction. The 2011 IMPROVE report describes in detail how visibility impairment is calculated (IMPROVE 2011; see Appendix H: *IMPROVE Data Results by State*). Total light extinction when converted to deciviews is calculated for the average of the 20% least impaired and 20% most impaired visibility days.

The primary system used to measure air quality improvements for visibility purposes is the IMPROVE program, a cooperative effort between the United States Environmental Protection Agency (EPA), federal land management agencies, and state agencies. Air quality measurements in the IMPROVE network began in 1988; as of June 2011, there were 212 sites (170 current and 42 discontinued). In addition, the EPA’s Speciation Trends Network (STN) of 84 sites was originally included to expand the spatial and seasonal aerosol and reconstructed light extinction coefficient trends to include urban areas and to investigate the differences in urban and rural aerosol concentrations. The STN was later transitioned into the Chemical Speciation Network (CSN) with 50 long-term trend sites and approximately 150 sites operated by state, local, and tribal agencies, primarily in urban/suburban settings.

For this SIP revision, the comparison of the average of the IMPROVE/CSN monitoring data for 2000 through 2004 is considered the baseline. The average of the IMPROVE/CSN monitoring data for 2007 through 2011 is considered current visibility conditions.

3.2 ASSESSMENT OF VISIBILITY CONDITIONS

"Visual range and extinction measurements are nonlinear with respect to human perception of visual scene changes caused by haze. The haziness index expressed in deciview units was developed such that a one deciview change would be a small but likely perceptible change in uniform haze conditions, regardless of the baseline visibility" (Pitchford and Malm 1994). When looking at the change in visibility extinction expressed in deciviews from an earlier period of time to a later one, an increase (i.e., positive change) in deciview number means there is degradation, a decrease (i.e., negative change) in deciview number means there is improvement.

Table 3-1: *Visibility at Texas Class I Areas on 20% Most Impaired Days* and Table 3-2: *Visibility at Texas Class I Areas on 20% Least Impaired Days* present the visibility conditions for the Texas Class I areas, Big Bend National Park (NP) and Guadalupe Mountains NP. Texas used the Western Regional Air Partnership Technical Support System (WRAP TSS, http://vista.cira.colostate.edu/tss/Results/HazePlanning.aspx) or the IMPROVE ftp site (ftp://vista.cira.colostate.edu/Public/IMPROVE_RHR_Budgets) to obtain the data presented in the tables and figures used in this chapter.

Tables 3-1 and 3-2 respectively show the baseline five-year average for years 2000 through 2004 in deciviews, the previous five-year average for years 2002 through 2006, the current five-year average for years 2007 through 2011, the difference between the baseline and current averages and the difference between the current and previous five-year average. A negative value for the difference between baseline and current values indicates an improvement in visibility. A negative value for the difference between the previous five-year average and the current five-year average indicates an improvement in visibility. Therefore, Tables 3-1 and 3-2 show improvement in visibility from the base period to the current five-year average for which data are available.

Table 3-1: Visibility at Texas Class I Areas on 20% Most Impaired Days

Class I Area	Monitor	Baseline 5-Year Average 2000 through 2004 in deciviews (dv)	Previous 5-Year Average 2002 through 2006 (dv)	Current 5-Year Average 2007 through 2011 (dv)	Current Minus Baseline (dv)	Current Minus Previous 5-Year Average (dv)
Big Bend NP	BIBE	17.3	17.4	16.7	-0.6	-0.7
Guadalupe Mountains NP	GUMO	17.2	17.0	15.3	-1.9	-1.7

Table 3-2: Visibility at Texas Class I Areas on 20% Least Impaired Days

Class I Area	Monitor	Baseline 5-Year Average 2000 through 2004 (dv)	Previous 5-Year Average 2002 through 2006 (dv)	Current 5-Year Average 2007 through 2011 (dv)	Current Minus Baseline (dv)	Current Minus Previous 5-Year Average (dv)
Big Bend NP	BIBE	5.8	5.7	5.6	-0.2	-0.1
Guadalupe Mountains NP	GUMO	5.9	5.8	4.9	-1.0	-0.9

Figure 3-1: *Annual Average Visibility at Big Bend National Park for the 20% Most Impaired Days* shows the annual average visibility conditions at Big Bend NP for the 20% most impaired days. Figure 3-2: *Annual Average Visibility at Big Bend National Park for the 20% Least Impaired Days* shows the annual average visibility conditions at Big Bend NP for the 20% least impaired days. There is substantial year-to-year variation in each of these metrics. For this reason the five-year average is used to try to elucidate trends that may not be obvious in the year-to-year data.

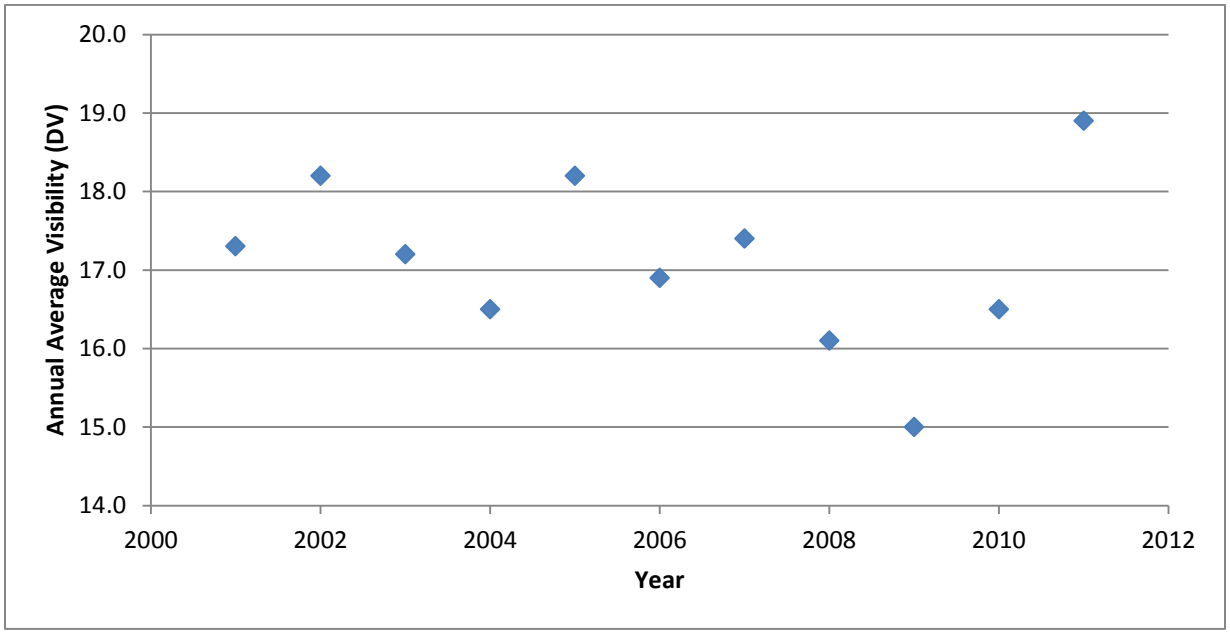


Figure 3-1: Annual Average Visibility at Big Bend National Park for the 20% Most Impaired Days

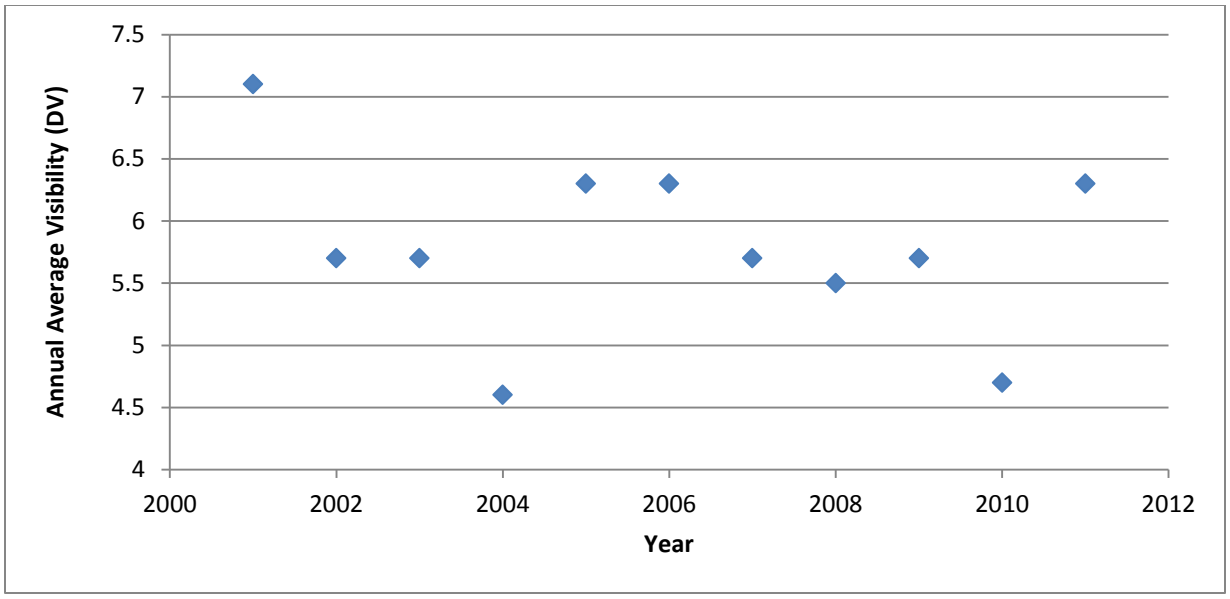


Figure 3-2: Annual Average Visibility at Big Bend National Park for the 20% Least Impaired Days

Figure 3-3: *Annual Average Visibility at Big Bend National Park for the 20% Least Impaired Days* shows the individual pollutant contributions to light extinction at Big Bend NP on the 20% least impaired days. Sulfate, the largest single contributor to visibility impairment at Big Bend NP on both the most impaired and least impaired days, has been decreasing with the exception of 2011, which was a year of unusually high temperatures, low rainfall, and high fire activity.

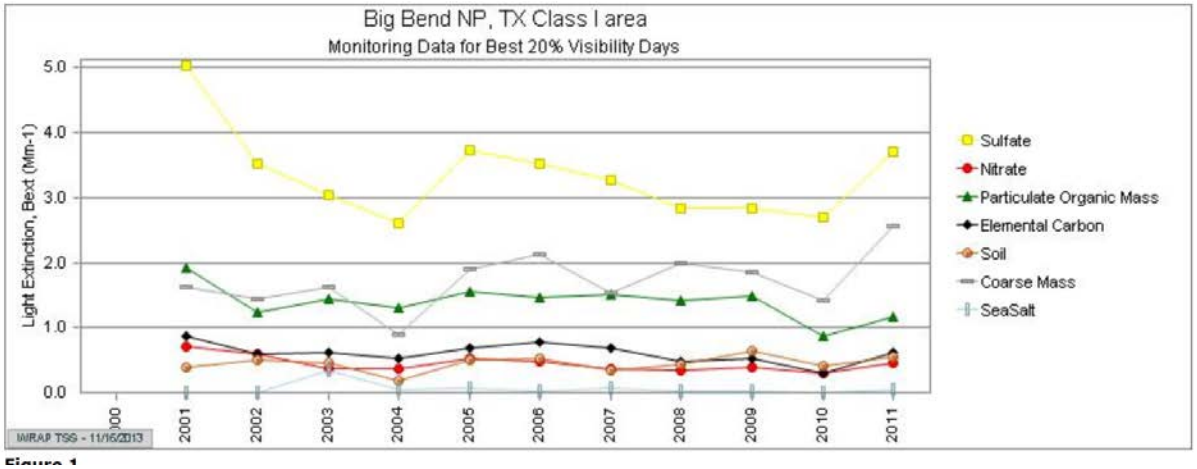


Figure 3-3: Annual Average Visibility at Big Bend National Park for the 20% Least Impaired Days

Figure 3-4: *Annual Average Visibility at Big Bend National Park for the 20% Most Impaired Days* shows the individual pollutant contributions to light extinction at Big Bend NP. Sulfate, the largest single contributor to visibility impairment at Big Bend NP, has been decreasing and continued to decrease in 2011 unlike the change in sulfate on the 20% least impaired days.

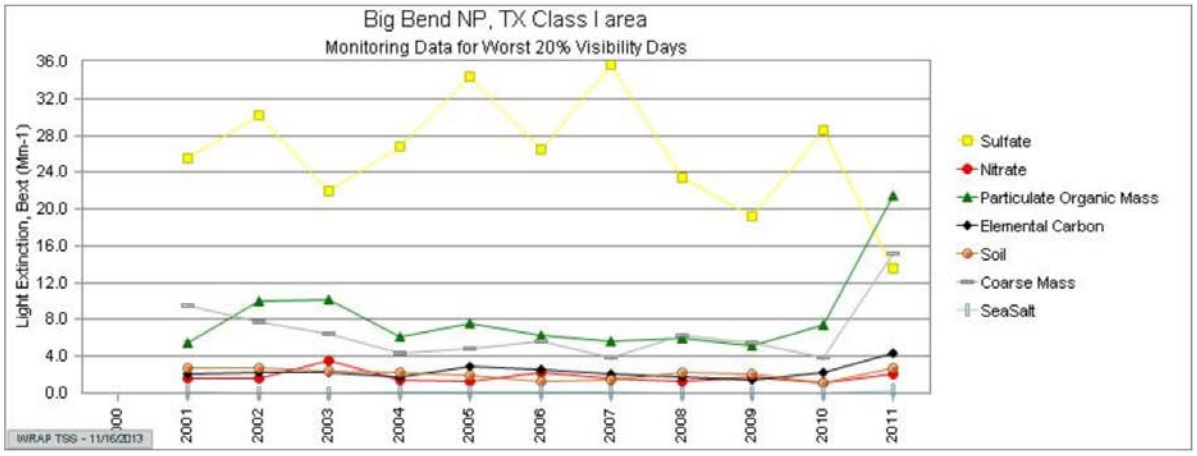


Figure 3-4: Annual Average Visibility at Big Bend National Park for the 20% Most Impaired Days

Figure 3-5: *Annual Average Visibility at Guadalupe Mountains National Park for the 20% Least Impaired Days* shows the individual pollutant contributions to light extinction at Guadalupe Mountains NP, which also represents air quality at Carlsbad Caverns NP, New Mexico (NM). Sulfate, the largest single contributor to visibility impairment at Guadalupe Mountains NP and Carlsbad Caverns NP, has been decreasing on the 20% least impaired days.

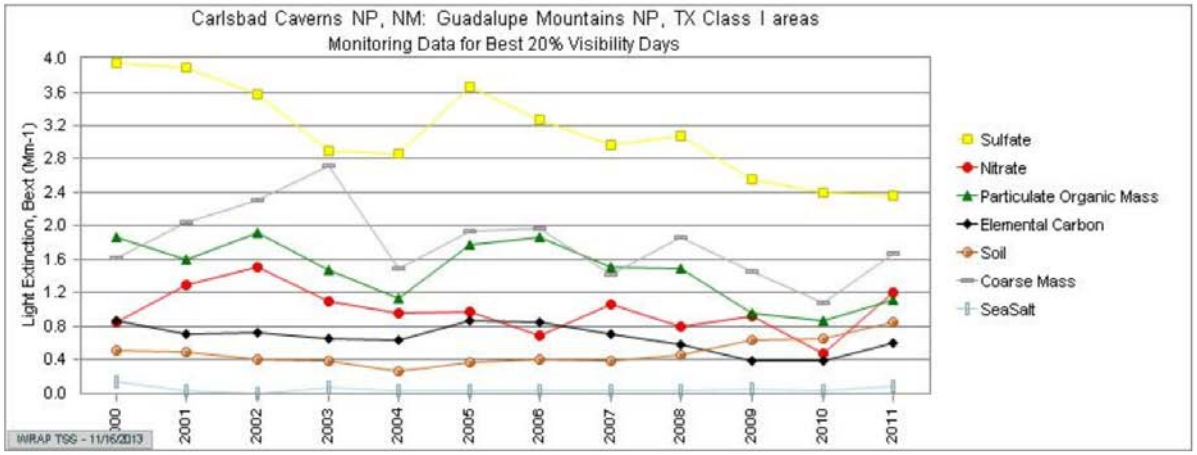


Figure 3-5: Annual Average Visibility at Guadalupe Mountains National Park for the 20% Least Impaired Days

Figure 3-6: *Annual Average Visibility at Guadalupe Mountains National Park for the 20% Most Impaired Days* shows the individual pollutant contributions to light extinction at Guadalupe Mountains NP and Carlsbad Caverns NP on the 20% most impaired days. Sulfate, a large, mainly anthropogenic contributor to impairment at Guadalupe Mountains NP and Carlsbad Caverns NP on these days, has been decreasing.

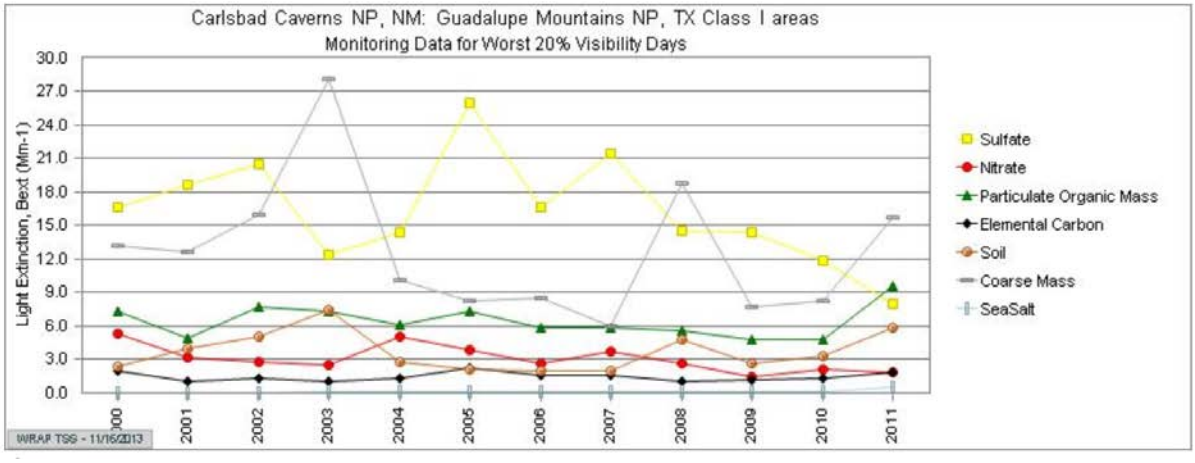


Figure 3-6: Annual Average Visibility at Guadalupe Mountains National Park for the 20% Most Impaired Days

Table 3-3: *Visibility at Nearby Class I Areas on 20% Most Impaired Days* and Table 3-4: *Visibility at Nearby Class I Areas on 20% Least Impaired Days* presents the IMPROVE data for these nearby Class I areas. The only area showing positive differences is the White Mountain Wilderness Area in New Mexico and only for the 20% most impaired days. All 12 areas referenced in Table 3-3 show improvement for the 20% least impaired days. No visibility data is readily available after 2004 for Breton Wilderness Area as the area has been affected by hurricanes in recent years; the restoration of monitoring operations in this area is uncertain.

Table 3-3: Visibility at Nearby Class I Areas on 20% Most Impaired Days

Class I Area	Monitor	Baseline 5-Year Average 2000 through 2004 in deciviews (dv)	Previous 5-Year Average 2002 through 2006 (dv)	Current 5-Year Average 2007 through 2011 (dv)	Current Minus Baseline (dv)	Current Minus Previous 5-Year Average (dv)
Caney Creek Wilderness Area, Arkansas	CACR	26.4	26.8	23.0	-3.4	-3.8
Upper Buffalo Wilderness Area, Arkansas	UPBU	26.3	27.1	24.1	-2.2	-3.0
Great Sand Dunes Wilderness Area, Colorado	GRSA	12.8	12.5	11.4	-1.4	-1.1
Breton Wilderness Area, Louisiana	BRET	25.7	unavailable	unavailable	unavailable	unavailable
Hercules-Glades Wilderness Area, Missouri	HEGL	26.7	27.1	24.5	-2.2	-2.6
Mingo Wilderness Area, Missouri	MING	28.4	27.3	26.4	-2.0	-0.9
Bosque del Apache Wilderness Area, New Mexico	BOAP	13.8	13.9	13.1	-0.7	-0.8
Carlsbad Caverns NP, New Mexico	GUMO	17.2	17.0	15.3	-1.9	-1.7
Salt Creek Wilderness Area, New Mexico	SACR	18.0	18.2	17.3	-0.7	-0.9
Wheeler Peak Wilderness Area, New Mexico	WHPE	10.4	10.1	9.6	-0.8	-0.5
White Mountain Wilderness Area, New Mexico	WHIT	13.7	13.5	13.9	**0.2**	**0.4**
Wichita Mountains Wilderness, Oklahoma	WIMO	23.8	23.8	22.2	-1.6	-1.6

Table 3-4: Visibility at Nearby Class I Areas on 20% Least Impaired Days

Class I Area	Monitor	Baseline 5-Year Average 2000 through 2004 in deciviews (dv)	Previous 5-Year Average 2002 through 2006 (dv)	Current 5-Year Average 2007 through 2011 (dv)	Current Minus Baseline (dv)	Current Minus Previous 5-Year Average (dv)
Caney Creek Wilderness Area, Arkansas	CACR	11.2	11.8	9.9	-1.3	-1.9
Upper Buffalo Wilderness Area, Arkansas	UPBU	11.7	12.1	10.9	-0.8	-1.2
Great Sand Dunes Wilderness Area, Colorado	GRSA	4.5	4.1	3.5	-1.0	-0.6
Breton Wilderness Area, Louisiana	BRET	13.1	unavailable	unavailable	unavailable	unavailable
Hercules-Glades Wilderness Area, Missouri	HEGL	12.8	13.1	11.7	-1.1	-1.4
Mingo Wilderness Area, Missouri	MING	14.3	14.2	13.5	-0.8	-0.7
Bosque del Apache Wilderness Area, New Mexico	BOAP	6.3	6.2	5.5	-0.8	-0.7
Carlsbad Caverns NP, New Mexico	GUMO	6	5.8	4.9	-1.1	-0.9
Salt Creek Wilderness Area, New Mexico	SACR	7.8	7.9	6.9	-0.9	-1
Wheeler Peak Wilderness Area, New Mexico	WHPE	1.2	1.1	0.9	-0.3	-0.2
White Mountain Wilderness Area, New Mexico	WHIT	3.6	3.4	3.3	-0.3	-0.1
Wichita Mountains Wilderness, Oklahoma	WIMO	9.8	9.9	9.6	-0.2	-0.3

Figure 3-7: *Annual Average Visibility at Caney Creek Wilderness Area for the 20% Least Impaired Days* shows the individual pollutant contributions to light extinction at Caney Creek Wilderness Area in Arkansas (AR). Sulfate, the largest single contributor to visibility impairment, has been decreasing on the 20% least impaired days.

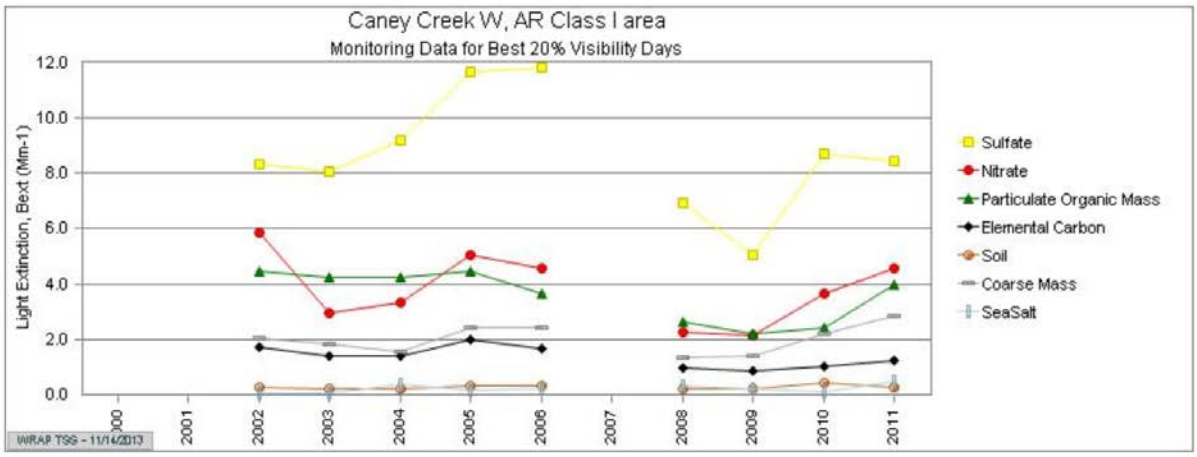


Figure 3-7: Annual Average Visibility at Caney Creek Wilderness Area for the 20% Least Impaired Days

Figure 3-8: *Annual Average Visibility at Caney Creek Wilderness Area for the 20% Most Impaired Days* shows the individual pollutant contributions to light extinction at Caney Creek Wilderness Area. Sulfate, the largest single contributor to visibility impairment, has been decreasing on the 20% most impaired days.

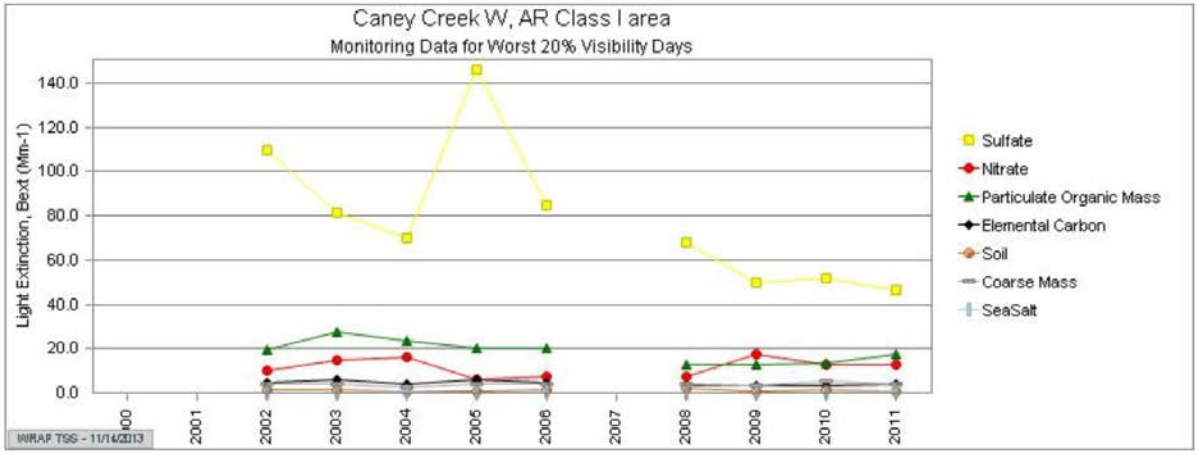


Figure 3-8: Annual Average Visibility at Caney Creek Wilderness Area for the 20% Most Impaired Days

Figure 3-9: *Annual Average Visibility at Wichita Mountains Wilderness for the 20% Least Impaired Days* shows the individual pollutant contributions to light extinction at Wichita Mountains Wilderness in Oklahoma (OK). Sulfate, the largest single contributor to visibility impairment, has been decreasing on the 20% least impaired days.

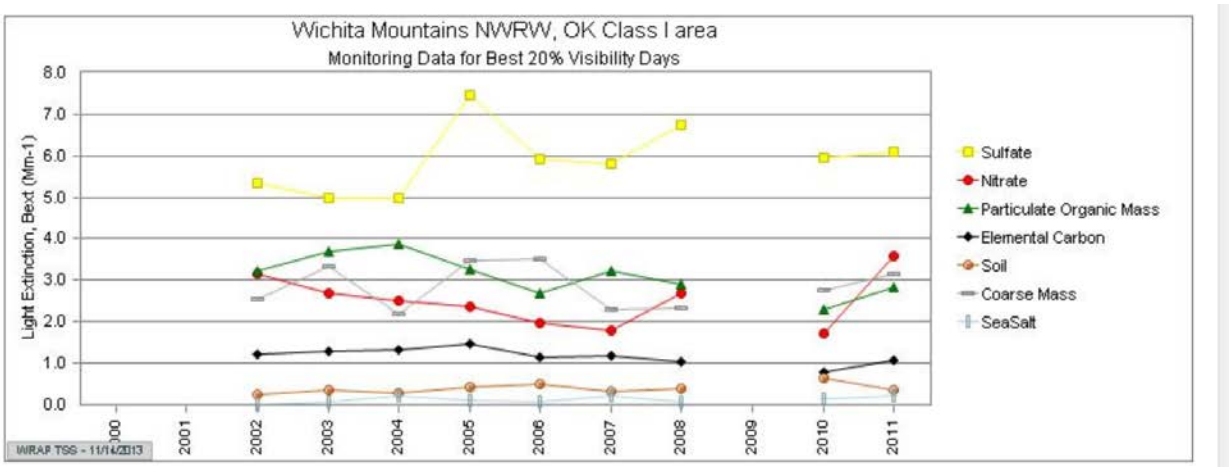


Figure 3-9: Annual Average Visibility at Wichita Mountains Wilderness for the 20% Least Impaired Days

Figure 3-10: *Annual Average Visibility at Wichita Mountains Wilderness for the 20% Most Impaired Days* shows the individual pollutant contributions to light extinction at Wichita Mountains Wilderness. Sulfate, the largest single contributor to visibility impairment, has been decreasing on the 20% most impaired days.

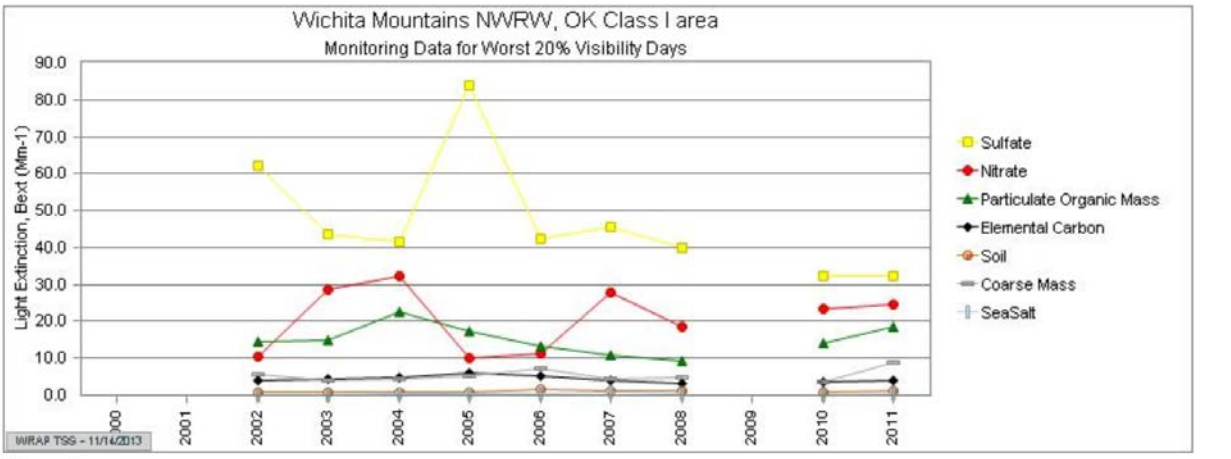


Figure 3-10: Annual Average Visibility at Wichita Mountains Wilderness for the 20% Most Impaired Days

Figure 3-11: *Annual Average Visibility at White Mountain Wilderness Area for the 20% Least Impaired Days* shows the individual pollutant contributions to light extinction at White Mountain Wilderness Area in NM. Sulfate, the largest single contributor to visibility impairment, has been decreasing on the 20% least impaired days.

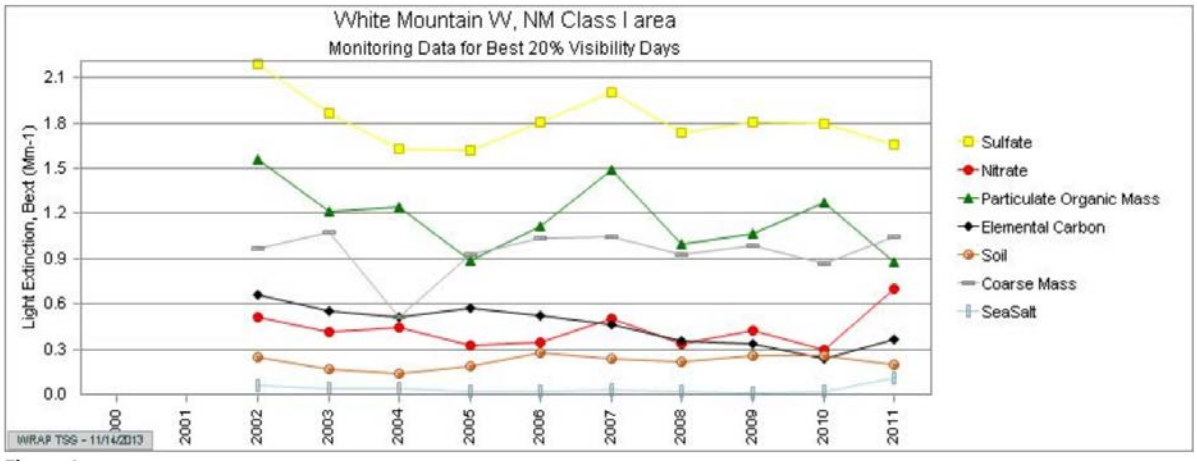


Figure 3-11: Annual Average Visibility at White Mountain Wilderness Area for the 20% Least Impaired Days

Figure 3-12: *Annual Average Visibility at White Mountain Wilderness Area for the 20% Most Impaired Days* shows the individual pollutant contributions to light extinction at White Mountain Wilderness Area in NM. Course mass, the largest contributor to visibility impairment at White Mountain Wilderness area in 2011, has been increasing on the 20% most impaired days. The visibility impairment from coarse mass has been higher for the most recent four years than it was in any of the previous six years. Wind-blown dust events are likely responsible for the significant upward trend in coarse mass at White Mountain Wilderness Area. (New Mexico Environment Department, March 2013). The contribution of sulfate, for most years the largest contributor to visibility impairment at White Mountain Class I area, has been varying around 12 inverse megameters.

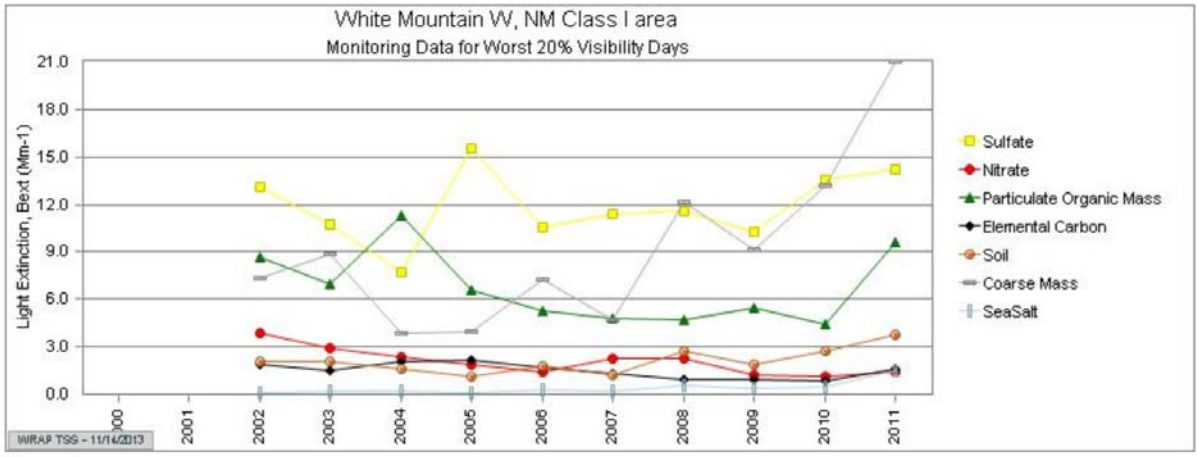


Figure 3-12: Annual Average Visibility at White Mountain Wilderness Area for the 20% Most Impaired Days

3.3 SUMMARY

The data assembled in Chapter 3 show broad-scale improvement in visibility across the Class I areas affected by emissions from Texas. The improvement in visibility on the 20% most impaired days at Carlsbad Caverns NP, Bosque del Apache Wilderness Area and Salt Creek Wilderness Area in southeast and central New Mexico suggest that any increase in visibility impairment at White Mountain Wilderness Area is not likely to have been due to Texas' emissions.

CHAPTER 4: EMISSIONS INVENTORY DEVELOPMENT AND COMPARISON – 40 CFR §51.308(g) (4) and (5)

The regional haze rule (the Rule) 40 Code of Federal Regulations (CFR) §51.308(g)(4) requires an analysis tracking the change for the past five years in emissions of pollutants contributing to visibility impairment from all sources and activities within the state. Emissions changes should be identified by type of source or activity.

40 CFR §51.308(g)(5) requires an assessment of any significant changes in anthropogenic emissions within the state that have occurred over the past five years that have limited or impeded progress in reducing pollutant emissions and improving visibility.

4.1 BACKGROUND

The 1990 Federal Clean Air Act Amendments require that emissions inventories (EI) be prepared statewide for point, nonpoint (area), on-road, and non-road mobile emissions categories statewide. The Texas Commission on Environmental Quality (TCEQ) maintains an EI of up-to-date information on emissions of sulfur dioxide (SO_2), volatile organic compounds (VOC), carbon monoxide (CO), nitrogen oxides (NO_X), lead and lead compounds, ammonia (NH_3) particulate matter less than 2.5 micrometers ($PM_{2.5}$), and particulate matter less than 10 micrometers (PM_{10}). The EI identifies the types of emissions sources present in an area, the amount of each pollutant emitted, and the types of process and control devices employed at each plant or source category. The EI provides data for a variety of air quality planning tasks, including establishing baseline emission levels, calculating emission reduction targets, control strategy development for reducing emissions, emission inputs into air quality simulation models, and tracking actual emissions. These EIs are critical for the efforts of state, local, and federal agencies to demonstrate attainment of the National Ambient Air Quality Standards.

This chapter discusses general EI development for each of the anthropogenic source categories and compares actual emissions trends with modeled projections for the state and electric generating utilities.

4.2 INDUSTRIAL POINT SOURCES

Stationary point source emissions data are collected annually from sites that meet the reporting requirements of 30 Texas Administrative Code (TAC) §101.10. These sites include, but are not limited to, refineries, chemical plants, bulk terminals, and utilities. To collect the data, the TCEQ sent EI questionnaires (EIQ) to all sites identified as meeting the reporting requirements. Companies were 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 was also required. All data submitted in the EIQ were reviewed for quality assurance purposes and then stored in the State of Texas Air Reporting System database. At the end of the annual reporting cycle, point source emissions data are reported each year to the United States Environmental Protection Agency (EPA) for inclusion in the National Emissions Inventory (NEI).

4.3 AREA SOURCE

Stationary sources that do not meet the reporting requirements for point sources are classified as area sources. Area sources are small-scale industrial, commercial, and residential sources that use materials or perform processes that generate emissions. Area sources can be characterized by the mechanism in which emissions are released into the atmosphere: evaporative or combustion. Evaporative emission sources include the following: oil and gas production facilities, printing processes, industrial coating and degreasing operations, gasoline service

station underground tank filling, and vehicle refueling operations. Combustion sources include the following small facilities with less than 100 tons per year of emissions: oil and gas production facilities, stationary source fossil fuel combustion at residences and businesses, outdoor burning, structural fires, and wildfires.

Emissions are calculated as county-wide totals rather than as individual facilities. The emissions from area sources may be calculated by applying an EPA-established emission factor (emissions per unit of activity) to the appropriate activity or activity surrogate responsible for generating emissions. Examples of activity or activity surrogate data include the following: population, crude oil and gas production, the amount of gasoline sold in an area, employment by industry type, and acres of crop land. The activity data are obtained via surveys, research, and/or investigations. The air emissions data from the different area source categories are collected, reviewed for quality assurance, stored in the Texas Air Emissions Repository database system, and compiled to develop the statewide area source EI. Area source periodic emissions inventory (PEI) is reported every third year (triennially) to the EPA for inclusion in the NEI.

During consultation with Federal Land Managers (FLM) and the EPA, oil and gas emissions were discussed due to activity in the Barnett Shale and Eagle Ford Shale. FLMs were interested in the latest research projects with which Texas was involved.

Significant resources have been expended 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 compressors engines, condensate and oil storage tanks, loading operations, heaters, and dehydrators. 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. A summary of the activities include:

- 2010 through 2011 Barnett Shale Special Oil and Gas Inventory – A two phase inventory project that obtained detailed equipment information and emissions data on oil and gas sources in the 23 county Barnett Shale formation area (http://www.tceq.texas.gov/assets/public/implementation/air/ie/pseiforms/Barnett%20Shale%20Area%20Special%20Inventory.pdf). This information was used to identify and analyze appropriate regulatory activities such as developing strategic plans to address air quality concerns and improving the oil and gas inventory.

- 2010 Dallas-Fort Worth (DFW) Compressor Engine Project – The TCEQ sponsored a University of Texas at Austin project to sample ambient emissions primarily downwind of gas compressor engines and develop typical compressor engines ambient signatures. Project focus was on Parker and Wise Counties.

- 2010 Oil and Gas Platform Inventory Improvement Project – This project was designed to improve TCEQ information on the specific number of platforms, operational type (oil, gas, or oil and gas), location, and configuration of oil and gas platforms found in Texas state waters up to 10 miles from the shoreline (www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/ei/5820784003FY1025-20100816-ergi-Offshore_Oil_Gas_Platform.pdf).

- 2010 Oil and Gas Model Evaluation – This project used multiple studies [Western Regional Air Partnership, TCEQ, Central Regional Air Planning Association (CENRAP), etc.] to evaluate existing methods and models for estimating oil and gas production emissions for sources such as compressor engines, heater-treaters, storage tanks, well completions, pneumatic devices, fugitives, and dehydrators. This project identified the most appropriate method to calculate Texas emissions for each source type on a county basis. A Texas-specific spreadsheet calculator capable of generating future area source inventories was also developed.

- 2010 Produced Water Storage Tank Project – This project estimated VOC emissions from the storage of water produced during upstream oil and gas activities.

- 2010 Upstream Oil and Gas Tank Emission Measurements – This study directly measured emissions from storage tanks at approximately 10 sites selected from the data collected by the 2007 Remote Sensing Survey Project, ambient monitoring trips, and the 2010 DFW IR Survey. The field work was conducted during spring/summer 2010 with a report by August 2010 (http://www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/ei/58 20784004FY1025-20100830-environ-Oil_Gas_Tank_Emission_Measurements.pdf).

- 2008 Flash Emissions Model Evaluation – The TCEQ conducted a research project in 2008 to identify the most representative calculation methodologies for upstream oil and gas storage tank emissions. The results of the report were used by the TCEQ to improve agency guidance and policy on calculating upstream oil and gas tank emissions.

- 2008 Drilling Rig Emissions Project – Eastern Research Group developed a drilling rig engine emissions inventory that improved on previous work by developing drilling rig engine emissions profiles, improved well activity data, and using improved NONROAD model developed emission factors. The activity data and emissions characterization data were then used to develop the drilling rig engine emissions inventory development (http://www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/ei/58 20783985FY0901-20090715-ergi-Drilling_Rig_EI.pdf).

- 2007 Southeast Texas Compressor and Dehydrator Survey – Data were collected from 13 counties in southeast Texas from natural gas production sites to determine equipment counts of compressors and dehydrators.

- 2007 Engine Fleet DFW Nonattainment Area Survey – This survey characterized the DFW nonattainment area engine fleet by type, load, and horsepower rating, as well as estimating nitrogen oxides emissions to evaluate the effectiveness of different control strategies.

- 2005 Upstream Oil and Gas Tank Project – The TCEQ provided technical guidance to the Texas Environmental Research Consortium's project that directly measured speciated VOC emissions from oil and condensate storage tanks at wellhead and gathering site tank batteries. As a result, new emissions factors were developed for upstream oil and gas storage tanks. The TCEQ used these factors to revise the 2005 area source EI for VOC, adding approximately 700,000 tons per year statewide.

Since 2009, approximately 10 research reports related to oil and gas emissions inventories have been commissioned by the TCEQ. More reports are available on the TCEQ's website http://www.tceq.texas.gov/airquality/airmod/project/pj_report_ei.html.

4.4 ON-ROAD MOBILE

On-road mobile sources consist of passenger cars, passenger trucks, motorcycles, buses, heavy-duty trucks, and other motor vehicles traveling on public roadways. Combustion-related emissions are estimated for vehicle engine exhaust, and evaporative hydrocarbon emissions are estimated for the fuel tank and other non-tailpipe sources from the vehicle. To calculate pollution from on-road mobile sources, emission rates are estimated as a function of county, vehicle type, roadway type, hour, and operating speed. These rates are then matched with appropriate activity from transportation data sources such as vehicle miles traveled (VMT), number of vehicles parked, hours spent in extended idle mode, etc.

Emission factors were developed using the latest version of the EPA's on-road model, which is the Motor Vehicle Emissions Simulator 2010a (MOVES2010a). Various inputs are provided to MOVES2010a to simulate the vehicle fleet in each nonattainment area such as vehicle speeds, vehicle age distributions, local meteorological conditions, type of Inspection and Maintenance Program, and local fuel properties. Separate gasoline and diesel fuel emission factors are developed for the thirteen MOVES2010a vehicle types.

For major metropolitan areas, a significant source of vehicle activity is typically the local travel demand model, which is run by the Texas Transportation Institute, the Texas Department of Transportation, or the regional metropolitan planning organization.

4.5 NON-ROAD MOBILE

Non-road mobile sources include vehicles, engines, and equipment used for construction, agriculture, transportation, recreation, and many other purposes. Non-road vehicles are also referred to as off-road or off-highway vehicles that do not normally operate on roads or highways. This broad category is composed of a diverse collection of machines, many of which are powered by diesel engines. Examples of non-road mobile sources include, but are not limited to: agricultural equipment, commercial and industrial equipment, construction and mining equipment, lawn and garden equipment, aircraft, locomotives, and commercial marine vessels.

A Texas specific version of the EPA NONROAD 2008a model, called the Texas NONROAD (TexN) model, was used to calculate emissions from all non-road mobile equipment and recreational vehicles except aircraft, ground support equipment, and locomotives. While the TexN model utilizes input files and post-processing routines to estimate Texas specific emissions estimates, it retains the EPA NONROAD 2008a model to conduct the basic emissions estimation calculations. Several input files provide necessary information to calculate and allocate emission estimates. The inputs used in the TexN model include emission factors, base year equipment population, activity, load factor, meteorological data, average lifetime, scrappage function, growth estimates, emission standard phase-in schedule, and geographic and temporal allocation.

Emissions for the source categories that are not in the EPA NONROAD 2008a model are estimated using other EPA-approved methods and guidance documents. Airport emissions are calculated using the Federal Aviation Administration’s Emissions and Dispersion Modeling System, version 5.1. Locomotive emission estimates for Texas are based on specific fuel usage data derived from railway segment level gross ton mileage activity (line-haul locomotives) and hours of operation (yard locomotives) provided directly by the Class I railroad companies operating in Texas.

4.6 EMISSIONS DATA

Emissions summary data from the 2009 regional haze SIP revision are included in this report for purposes of comparison only. These values are shown in Table 4-1: *Texas Modeled Emissions Inventory Summary for 2002* and Table 4-5: *Texas Projected Emissions Inventory Summary for 2018*. As noted in the 2009 regional haze SIP revision, area source SO_2 emissions from industrial and residential coal combustion were included in the model by CENRAP in error. The correct 2002 value of 15,663 tons was reported to the EPA. The TCEQ notified CENRAP of the error after CENRAP's modeling for the 2009 regional haze SIP was nearing completion. The error could not be corrected at that time. No additional modeling has occurred since that date. At such time as that model is re-used, future emissions, including those over-reported SO_2 emissions will be readdressed. Please note that the area SO_2 emissions inventory's for 2005, 2008, and 2011 show actual, not modeled or projected, summaries of 17,924 tpy, 12,047 tpy, and 8,749 tpy, respectively.

Emissions data for 2005, 2008, and 2011 are listed below in Table 4-2: *Updated Texas Emissions Inventory Summary for 2005*, Table 4-3: *Texas Emissions Inventory Summary for 2008*, and Table 4-4: *Texas Emissions Inventory Summary for 2011*. The 2011 data represents the most current emissions data. The 2005 data were reported in Appendix 7-1: *Texas Emissions Inventory Development: Base Year 2002 and Projected Year 2018* of the 2009 regional haze state implementation plan (SIP) revision in Table 7-4: *Texas Emissions Inventory Summary for 2005*. There are corrections and updates to that table listed below in Table 4-1. The NO_X amount reported in the 2009 regional haze SIP revision was truncated in error. Corrections to PM_{10} emissions were also corrected and listed in Table 4-1 for the area source category. Because unpaved road fugitives were not estimated in 2005, the reported 2008 unpaved road fugitive emission values were backcast to estimate the 2005 values. The backcasting resulted in an increase of 1,445,135 tons per year (tpy) for PM_{10} and 143,912 tpy for $PM_{2.5}$.

Table 4-1: Texas Modeled Emissions Inventory Summary for 2002

Category	SO_2 (tpy)	NO_X (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Point	821,961	600,725	80,947	46,789
Area	111,863*	280,811	1,552,824	347,490
On-road Mobile	18,814	664,163	15,476	11,275
Non-road Mobile	21,828	242,551	15,556	15,089
Total	974,457	1,788,250	1,664,803	420,642

Note: * The correct area source SO_2 value is 15,663 tpy.

Table 4-2: Updated Texas Emissions Inventory Summary for 2005

Category	SO_2 (tpy)	NO_X (tpy)	CO (tpy)	VOC (tpy)	NH_3 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Point	758,168	453,665	485,037	144,378	3,466	65,433	34,701
Area	17,924	250,336	895,966	746,900	412,764	2,484,513	350,609
On-road Mobile	12,307	651,415	3,148,686	233,243	24,935	15,611	10,874
Non-road Mobile	2,268	135,341	1,106,191	123,756	3,518	13,433	12,906
Total	790,667	1,490,757	5,635,880	1,248,277	444,683	2,578,990	409,090

Data are current as of February 27, 2013.

Table 4-3: Texas Emissions Inventory Summary for 2008

Category	SO_2 (tpy)	NO_X (tpy)	CO (tpy)	VOC (tpy)	NH_3 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Point	601,768	372,464	402,224	117,737	3,106	64,008	35,043
Area	12,047	281,390	731,727	1,783,937	312,885	2,310,297	325,488
On-road Mobile	2,975	438,006	2,682,762	193,040	25,816	12,120	7,532
Non-road Mobile	31,756	275,724	1,086,157	130,916	6,522	21,674	20,336
Total	648,546	1,367,584	4,902,870	2,225,630	348,329	2,408,099	388,399

Data are current as of November 9, 2012.

Table 4-4: Texas Emissions Inventory Summary for 2011

Category	SO_2 (tpy)	NO_X (tpy)	CO (tpy)	VOC (tpy)	NH_3 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Point	512,261	323,056	310,954	101,942	3,467	57,710	33,667
Area	8,749	225,984	300,126	1,374,269	309,124	2,266,223	312,371
On-road Mobile	1,987	468,480	1,820,081	148,386	8,667	21,547	16,722
Non-road Mobile	6,667	261,130	874,247	109,319	769	17,794	16,995
Total	529,664	1,278,650	3,305,408	1,733,916	322,027	2,363,274	379,755

Data are current as of February 27, 2013.

Table 4-5: Texas Projected Emissions Inventory Summary for 2018

Category	SO_2 (tpy)	NO_X (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Point	625,068	525,174	121,733	80,577
Area	114,138*	274,663	1,557,089	354,712
On-road Mobile	2,925	148,387	5,337	5,337
Non-road Mobile	6,988	167,451	11,498	10,588
Total	749,119	1,115,676	1,695,657	451,214

Note: * This value was modeled by CENRAP and erroneously includes industrial and residential coal combustion.

4.7 STATEWIDE EMISSIONS DATA COMPARISON

For the 2009 regional haze SIP revision, actual 2002 inventory data was forecast to 2018. These emissions data and the approach used to develop the projections are summarized in 2009 regional haze SIP revision; the EI data were in Chapter 7: *Emissions Inventory* and modeling was summarized in Chapter 8: *Modeling Assessment*. The regional haze inventory used modeling inventory data including total organic gas (TOG) rather than VOC. TOG includes total hydrocarbons and should not be compared with the VOC in the 2005, 2008, and 2011 inventories listed in Tables 4-2, 4-3, and 4-4.

CENRAP sponsored regional haze SIP modeling predicted that emissions of NH_3, TOG, and particulates (both PM_{10} and $PM_{2.5}$) would increase between 2002 the projected 2018 inventory. Decreases in statewide emissions were also predicted between 2005 and 2018 for NO_X, SO_2, and CO. These predicted trends are generally supported between reported 2005 and 2011 inventory data except for the decreases in NH_3.

Changes were seen in the on-road mobile source inventory between 2008 and 2011 as result of the transition from the EPA's MOBLE6 to MOVES model for estimating emissions. Increases in on-road mobile source PM_{10} and $PM_{2.5}$ emissions have been documented (EPA 2009) as part of the new model's estimation methodology. In spite of this increase, reductions in the other categories resulted in state-wide reductions in estimated PM_{10} and $PM_{2.5}$.

Ammonia emissions estimates decreased significantly between 2008 and 2011 in the on-road and non-road mobile source categories as a result of the transition from MOBILE6 to MOVES. Catalytic NO_X reduction implemented on vehicles beginning in the early 1980s led to increases in ammonia emission rates up until phase in of National Low Emissions Vehicle (NLEV) and Tier 2 emission standards. As emissions standards continued to drop and vehicle emission control technology continued to improve, ammonia emissions fell to nearly the levels observed prior to the introduction of the three-way catalyst. Since the NLEV program started in 2001 and Tier 2 started in 2004, the effects of these two programs were greater in 2011 than 2008. Additionally, as the early 1980s vehicles aged, NO_X emissions rose with catalyst deterioration, and ammonia levels dropped proportionately. This aging effect was modeled in MOVES more accurately based on more current information.

Non-road emissions increased between 2002 and 2005 for several reasons. The inventory was improved with more precise data and accurate emissions factors. Additionally, a different model was used for the 2008 inventory; the NONROAD2005 model was used for 2005 inventory and NONROAD2008a was used for the 2008 EI development. Input data was improved for the more recent inventory. Several survey studies were conducted to improve model input data

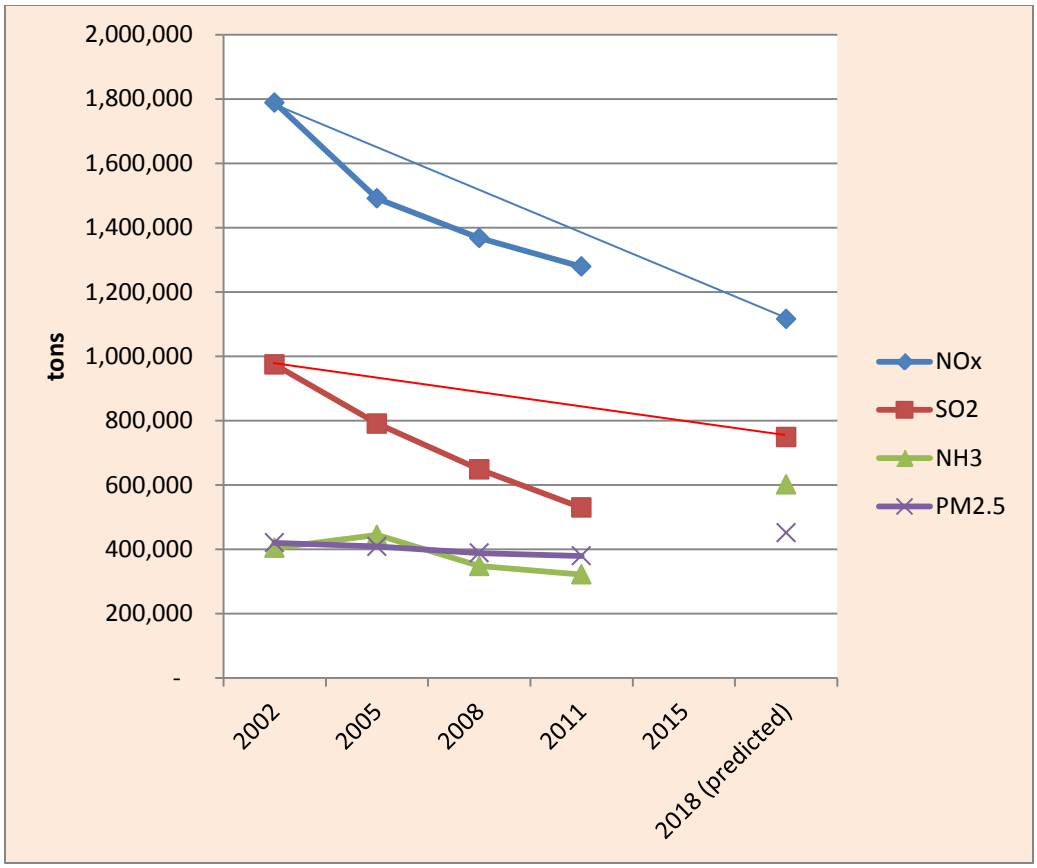
(including activity, population, engine horsepower information) for the 2008 EI. There were also updated models and improved EI methodologies for airport, locomotive, commercial marine vessels, and drilling diesel engines.

The 2008 area source inventory was enhanced with additional categories as part of the commission's initiative to improve inventory estimations. In 2005, limited categories were used for the oil and gas inventory. The 2008 inventory was expanded with emissions estimates from additional oil and gas categories and improved fertilizer and livestock categories. These improvements combined with an increase in oil and gas activity increased the 2008 VOC emissions estimates. The improved agricultural estimates resulted in a decrease in the ammonia estimates.

Significant reductions in CO emissions were listed in the 2011 area source inventory because wildfires were not included. Wildfires comprised 414,736 tpy of CO in 2008. For the 2011 EI, Texas used the EPA default values that were published in the NEI General Public Release version 1.0 that were available in July 2013. Additionally, updated methodology was used for combustion calculations, resulting in some changes in the emissions estimates.

The SO_2 emissions decreased between 2005 and 2011 because of phasing in of low sulfur [500 parts per million (ppm)] and ultra-low sulfur (15 ppm) fuels for non-road, locomotive, and marine engines beginning in 2007. These lower fuel requirements, coupled with advanced emission control technologies, are expected to decrease emissions from these engines by more than 90% between 2007 and 2014.

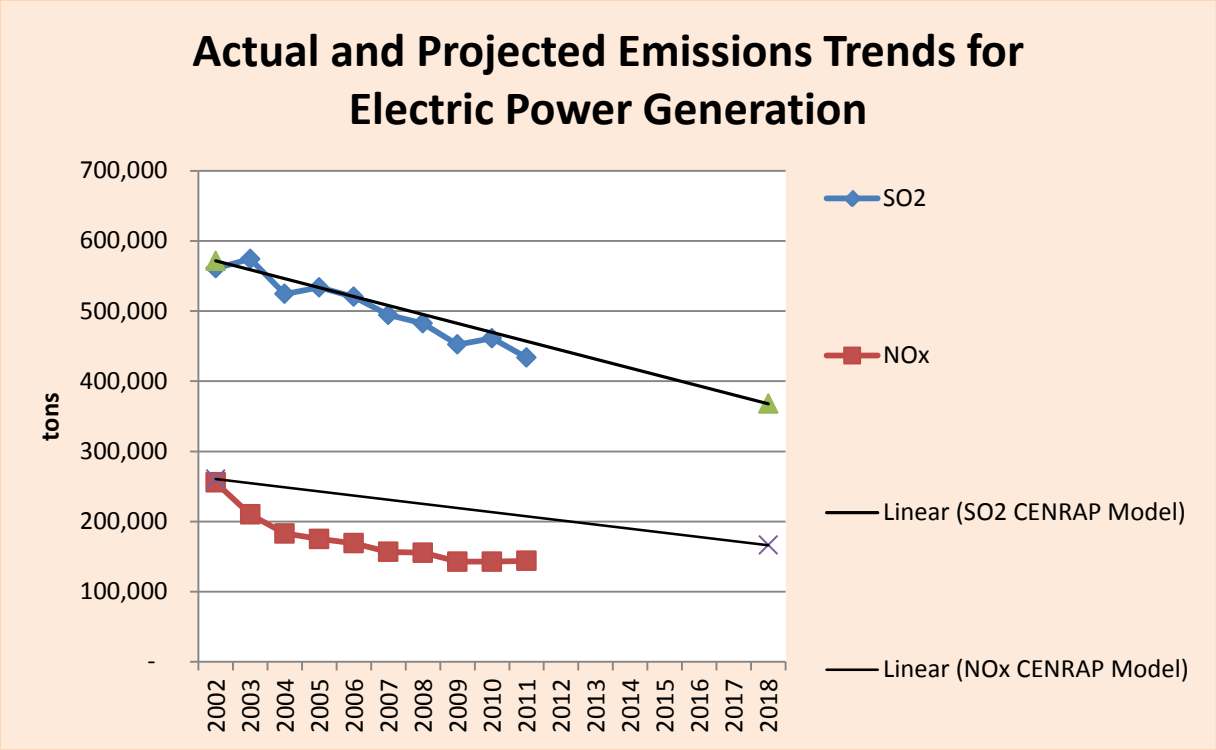
Statewide trends for NO_X, SO_2, NH_3, and $PM_{2.5}$ as compared with the modeling projections for 2018 are shown in Figure 4-1: *Actual and Projected Statewide Emissions Trends for Select Pollutants*. Actual emissions have remained below the projected modeling projections (shown as a straight line between 2002 and 2018) for all pollutants. Although not shown on the graph, CO emissions are also well below the projected 2018 value. VOC emissions are not included because a trend analysis with the projected amount was not possible for this pollutant; 2002 and the projected 2018 are represented as TOG and actual data are VOC emissions. Total industrial point source, area, on-road mobile, and non-road mobile state-wide emissions are compared with the projected trends from the CENRAP modeling.



Data are current as of February 27, 2013.

Figure 4-1: Actual and Projected Statewide Emissions Trends for Select Pollutants

Figure 4-2: *Actual and Projected Emissions Trends for Electric Power Generation* shows the downward trends for NO_X and SO_2 for all electric generating units (EGU) in Texas. Values are for all point sources with a standard industrial classification of 4911 (Electric Services). The actual emissions for the periodic years from 2002 through 2011 are compared against a linear change between 2002 actual emissions and 2018 modeled emissions. Actual emissions remain below predicted values for NO_X, SO_2, NH_3, and $PM_{2.5}$. The category includes all the EGUs that were considered potentially Best Available Retrofit Technology (BART)-eligible. SO_2 is the most significant visibility-impairing pollutant emitted in Texas and EGUs are most significant SO_2 emitters in Texas.



Data are current as of January 30, 2013.

Figure 4-2: Actual and Projected Emissions Trends for Electric Power Generation

Emissions of NO_X decreased 44% from 255,556 tons in 2002 to 143,782 tons in 2011. Sulfur dioxide emissions decreased 23% from 560,860 tpy to 433,782 tpy during the same period. Emissions have trended downward better than or as predicted in the CENRAP modeling projections. It is noted that an earlier, more rapid decrease in NO_X emissions occurred and the 2011 level of 143,782 tpy is below the projected value for 2018 of 166,253 tpy.

4.8 SUMMARY

As required in 40 CFR 51.308(g)(4), Texas analyzed changes in emissions of pollutants contributing to visibility impairment from sources within the state and determined the major visibility impairing pollutants – SO_2, NO_X, PM_{10}, and $PM_{2.5}$ – are decreasing. Electric power industry emissions, a major source of SO_2 in Texas, was analyzed and showed a continued downward trend from 533,650 tpy in 2005 to 433,782 tpy in 2011, a decrease of approximately 99,870 tpy in seven years.

To address 40 CFR 51.308(g)(5), Texas is explicitly indicating there are no significant changes in the anthropogenic emissions of concern that have limited or impeded progress in reducing pollutant emissions and improving visibility.

CHAPTER 5: ASSESSMENT OF REASONABLE PROGRESS GOALS – 40 CFR §51.308(g)(6)

5.1 INTRODUCTION

40 Code of Federal Regulations (CFR) §51.308(g)(6) of the regional haze rule (the Rule) requires an assessment of whether the current implementation plan elements and strategies are sufficient to enable the state, or other states with Class I areas affected by emissions from that state, to meet all established reasonable progress goals (RPG).

The Texas Commission on Environmental Quality (TCEQ) has assessed the current state implementation plan (SIP) elements and strategies and determined that they are sufficient to enable Texas and other states with Class I areas affected by emissions from Texas to meet all established RPGs.

The revisions to the SIP concerning regional haze adopted by the commission on February 25, 2009 requested that the United States Environmental Protection Agency (EPA) initiate and pursue federal efforts to reduce international transport of visibility impairing pollutants into Texas. The TCEQ reaffirms that request. As discussed in the 2009 regional haze SIP revision Chapter 11: *Long-term Strategy to Reach Reasonable Progress Goals*, modeling attributed more than half of the visibility impairment at Big Bend National Park (NP) on the 20% most impaired days to pollution originating outside the United States. As the 2009 regional haze SIP revision noted, it will not be possible for the two Class I areas in Texas to approach natural conditions without large reductions in the visibility impairing pollution impacting them from sources outside the United States.

5.2 CONTROL MEASURES IN THE 2009 REGIONAL HAZE SIP REVISION

The control measures contained in the Texas 2009 regional haze SIP revision all remain in force and are being implemented. The significant increases in fossil fueled electric generating units (EGU) that was predicted by Integrated Planning Model runs has not occurred. A new measure that may significantly constrain or prevent the construction of new Texas fossil fueled EGUs is the EPA's 2010 sulfur dioxide (SO_2) one-hour National Ambient Air Quality Standard (NAAQS). The addition of this measure may further strengthen the package of control measures enumerated in Texas' 2009 regional haze SIP revision.

5.3 VISIBILITY IMPROVEMENTS AT CLASS I AREAS IMPACTED BY TEXAS

Figure 5-1: *Visibility Improvement at Big Bend National Park for 20% Most Impaired Days* shows the five-year average of the current visibility (2007 through 2011) at Big Bend NP compared to the five-year average of baseline visibility (2000 through 2004) along with the 2018 RGP established in the 2009 regional haze SIP revision and the five-year average for the previous five-year period (2002 through 2006). In the analyses Central Regional Air Planning Association (CENRAP) carried out to assist states in projecting the year in which visibility improvement would reach the level of natural conditions, the 2000 through 2004 base period five-year average visibility in deciviews (dv) is plotted at the middle year, 2002. Following this precedent, the later five-year average visibility values are plotted at the middle year in each five-year period.

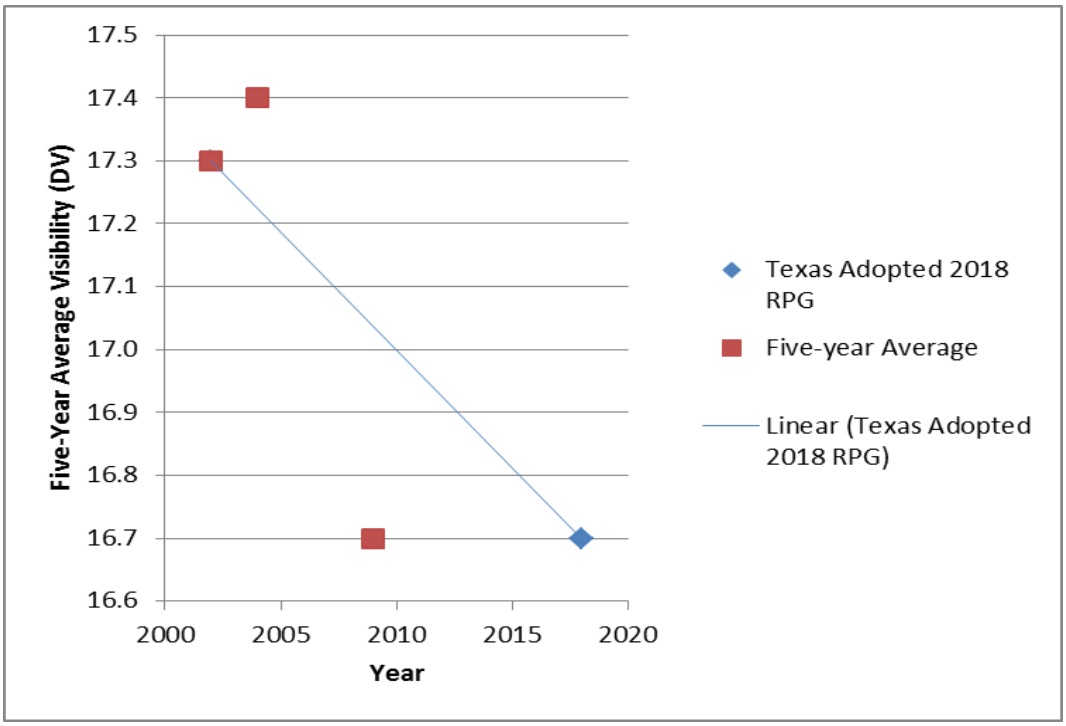


Figure 5-1: Visibility Improvement at Big Bend National Park for 20% Most Impaired Days

Figure 5-2: *Visibility Improvement at Guadalupe Mountains National Park for 20% Most Impaired Days* shows the five-year average of the current visibility (2007 through 2011) at Guadalupe Mountains NP compared to the five-year average of baseline visibility (2000 through 2004), the five-year average for the previous five-year period (2002 through 2006), and the RPG established in the 2009 regional haze SIP revision. The regional haze rule requirement is to reach the 2018 RPG by that date. There is not a requirement to be below the straight line interpolation from the 2002 base period to the 2018 RPG at intermediate dates between 2002 and 2018. Therefore, Figure 5-2 illustrates that Big Bend NP reached the level of the 2018 RPG during the 2007 through 2011 period, a number of years before 2018.

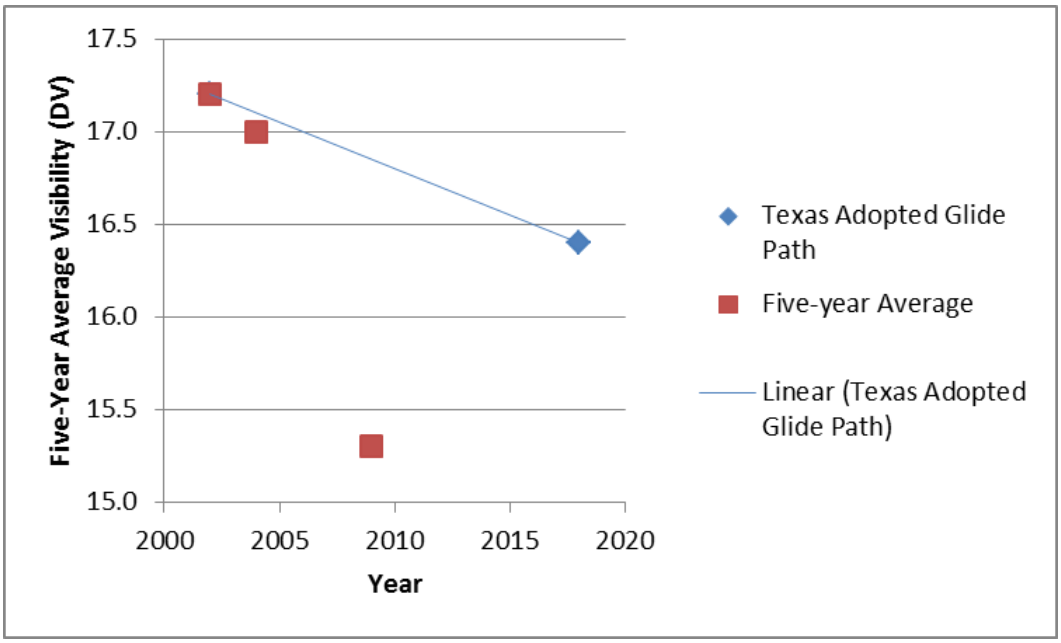


Figure 5-2: Visibility Improvement at Guadalupe Mountains National Park for 20% Most Impaired Days

Figure 5-3: *Visibility at Big Bend National Park for 20% Least Impaired Days* shows the five-year average of the current visibility (2007 through 2011) at Big Bend NP compared to the five-year average of baseline visibility (2000 through 2004) and the five-year average for the previous five-year period (2002 through 2006).

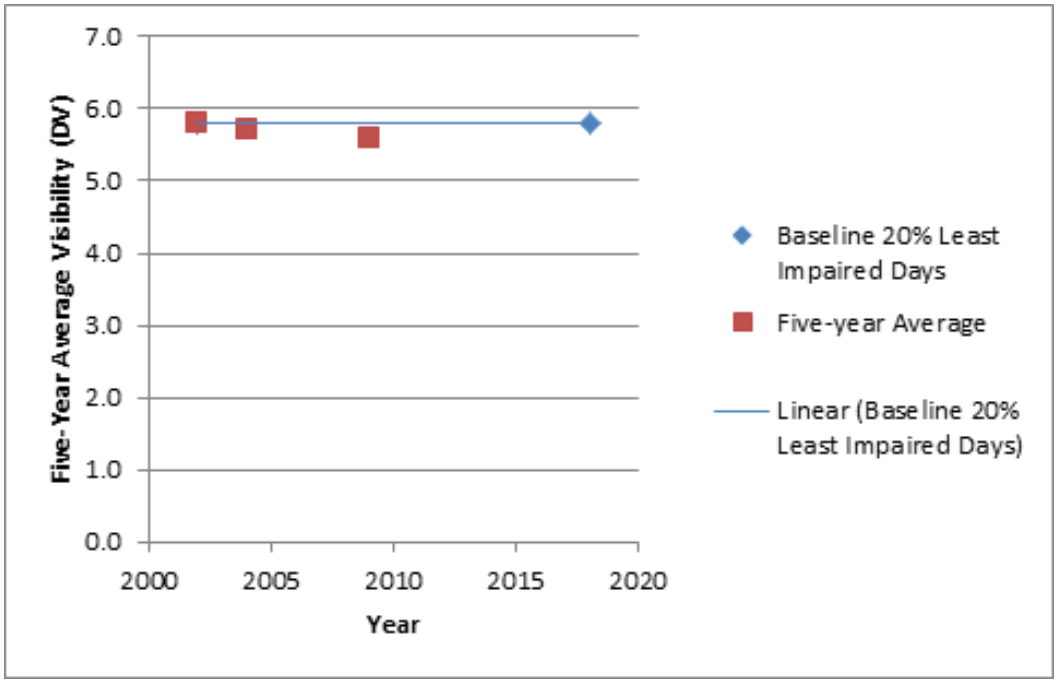


Figure 5-3: Visibility at Big Bend National Park for 20% Least Impaired Days

Figure 5-4*: Visibility at Guadalupe Mountains National Park for 20% Least Impaired Days* shows the five-year average of the current visibility (2007 through 2011) at Guadalupe Mountains NP compared to the five-year average of baseline visibility (2000 through 2004) and the five-year average for the previous five-year period (2002 through 2006).

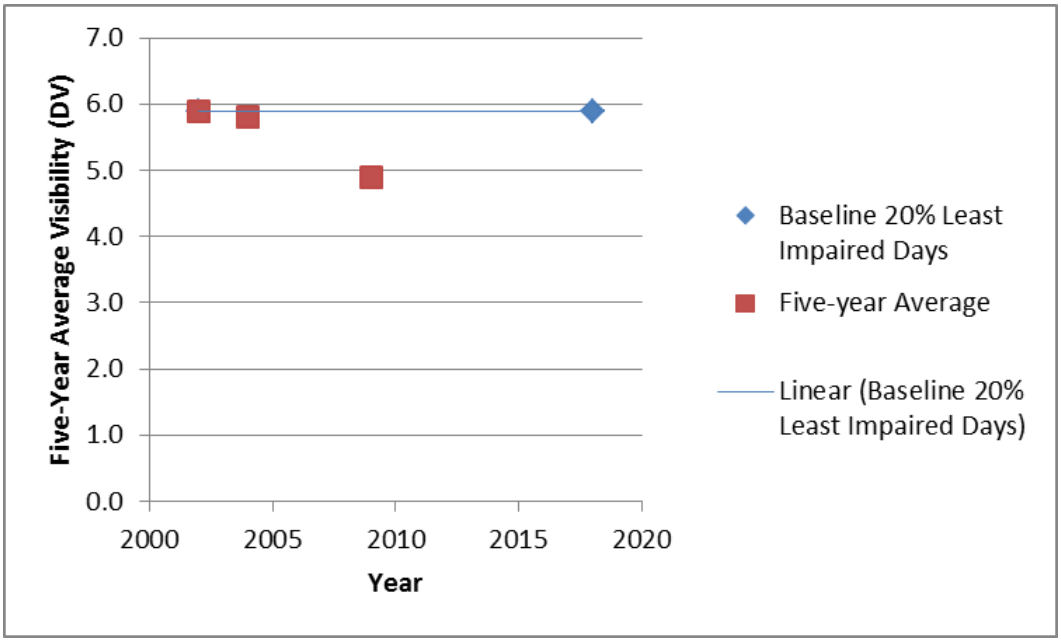


Figure 5-4: Visibility at Guadalupe Mountains National Park for 20% Least Impaired Days

Table 5-1: *Visibility for Class I Areas on 20% Most Impaired Days* and Table 5-2*: Visibility for Class I Areas on 20% Least Impaired Days* present the Interagency Monitoring of Protected Visual Environments (IMPROVE) data for Texas Class I areas and the nearby Class I areas that CENRAP modeling for the 2009 regional haze SIP revision indicates that Texas' emissions affect.

For the current, 2007 through 2011 average visibility impairment compared to the straight line drawn from the base period (2000 through 2004) average visibility impairment in deciviews to the 2018 RPG, only one of the nearby Class I areas, the White Mountain Wilderness Area in New Mexico (NM), to the west of Texas is above the straight line for the average impairment for the 2007 through 2011 five-year period. The other three nearby Class I areas to the west and northwest of Texas, Carlsbad Caverns NP in NM, Bosque del Apache Wilderness Area in NM, and Salt Creek Wilderness Area in NM are below the straight lines from their respective base period values to their respective 2018 RPGs.

As discussed in Chapter 3: *Assessment of Visibility*, Figure 3-12: *Annual Average Visibility at White Mountain Wilderness Area for the 20% Most Impaired Days* shows the individual pollutant contributions to light extinction at White Mountain Wilderness Area in NM. Coarse mass, the largest contributor to visibility impairment at White Mountain Wilderness Area in 2011, has been increasing on the 20% most impaired days. The visibility impairment from coarse mass has been higher for the most recent four years than it was in any of the previous six years. Wind-blown dust events are likely responsible for the significant upward trend in coarse mass at White Mountain Wilderness Area (NMED 2013). The contribution of sulfate, for most years the largest contributor to visibility impairment at White Mountain Wilderness Area has

been varying around 12 inverse megameters. The visibility improvement at the other four Class I areas assessed to the west and northwest of Texas suggests that it is unlikely that anthropogenic emissions from Texas are the cause of the less than straight line progress at the White Mountain Wilderness Area. The requirement in the Rule is to assess the progress by 2018. There is not a requirement to be on or below the straight line interpolated between 2002 and 2018.

Table 5-1 and Table 5-2 compare the average visibility impairment for the most recent five year period with available IMPROVE data (2007 through 2011) to the straight line interpolation from the 2000 through 2004 base period to the 2018 RPG for each area. As discussed, only the White Mountain Wilderness Area's most impaired 20% day average is not below the line.

Table 5-1: Visibility for Class I Areas on 20% Most Impaired Days

Class I Area	Baseline5-Year Average 2000 through 2004 in deciviews (dv)	Previous 5-Year Average 2002 through 2006 (dv)	Current 5-Year Average 2007 through 2011 (dv)	2018 RPG (dv)	2009 Value on Straight Line from 2002 Baseline Avg. to 2018 RPG (dv)	Current Visibility Above or Below Straight Line from 2002 Baseline Avg. to 2018 RPG (dv)
Big Bend NP, Texas	17.3	17.4	16.7	16.7	17.0	-0.3
Guadalupe Mountains NP, Texas	17.2	17.0	15.3	16.4	16.9	-1.6
Caney Creek Wilderness Area, Arkansas	26.4	26.8	23.0	22.5	24.7	-1.7
Upper Buffalo Wilderness Area, Arkansas	26.3	27.1	24.1	22.5	24.6	-0.5
Great Sand Dunes Wilderness Area, Colorado	12.8	12.5	11.4	12.2	12.5	-1.1
Breton Wilderness Area, Louisiana	25.7	unavailable	unavailable	22.7	24.4	unavailable
Hercules-Glades Wilderness Area, Missouri	26.7	27.1	24.5	23.1	25.1	-0.6
Mingo Wilderness Area, Missouri	28.4	27.3	26.4	23.7	26.3	0.1

Class I Area	Baseline5-Year Average 2000 through 2004 in deciviews (dv)	Previous 5-Year Average 2002 through 2006 (dv)	Current 5-Year Average 2007 through 2011 (dv)	2018 RPG (dv)	2009 Value on Straight Line from 2002 Baseline Avg. to 2018 RPG (dv)	Current Visibility Above or Below Straight Line from 2002 Baseline Avg. to 2018 RPG (dv)
Bosque del Apache Wilderness Area, New Mexico	13.8	13.9	13.1	17.3	15.3	-2.2
Carlsbad Caverns NP, New Mexico	17.2	17.0	15.3	16.9	17.1	-1.8
Salt Creek Wilderness Area, New Mexico	18.0	18.2	17.3	17.3	17.7	-0.4
Wheeler Peak Wilderness Area, New Mexico	10.4	10.1	9.6	10.2	10.3	-0.7
White Mountain Wilderness Area, New Mexico	13.7	13.5	13.9	13.3	13.5	0.4
Wichita Mountains Wilderness, Oklahoma	23.8	23.8	22.2	21.5	22.8	-0.6

Table 5-2: Visibility for Class I Areas on 20% Least Impaired Days

Class I Area	Baseline 5-Year Average 2000 through 2004 in deciviews (dv)	Previous 5-Year Average 2002 through 2006 (dv)	Current 5-Year Average 2007 through 2011 (dv)	Current Minus Baseline (dv)	Current Minus Previous 5-Year Average (dv)
Big Bend NP, Texas	5.8	5.7	5.6	-0.2	-0.1
Guadalupe NP, Texas	5.9	5.8	4.9	-1.0	-0.9
Caney Creek Wilderness Area, Arkansas	11.2	11.8	9.9	-1.3	-1.9
Upper Buffalo Wilderness Area, Arkansas	11.7	12.1	10.9	-0.8	-1.2
Great Sand Dunes Wilderness Area, Colorado	4.5	4.1	3.5	-1.0	-0.6
Breton Wilderness Area, Louisiana	13.1	unavailable	unavailable	unavailable	unavailable
Hercules-Glades Wilderness Area, Missouri	12.8	13.1	11.7	-1.1	-1.4
Mingo Wilderness Area, Missouri	14.3	14.2	13.5	-0.8	-0.7
Bosque del Apache Wilderness Area, New Mexico	6.3	6.2	5.5	-0.8	-0.7
Carlsbad Caverns NP, New Mexico	6	5.8	4.9	-1.1	-0.9

Class I Area	Baseline 5-Year Average 2000 through 2004 in deciviews (dv)	Previous 5-Year Average 2002 through 2006 (dv)	Current 5-Year Average 2007 through 2011 (dv)	Current Minus Baseline (dv)	Current Minus Previous 5-Year Average (dv)
Salt Creek Wilderness Area, New Mexico	7.8	7.9	6.9	-0.9	-1.0
Wheeler Peak Wilderness Area, New Mexico	1.2	1.1	0.9	-0.3	-0.2
White Mountain Wilderness Area, New Mexico	3.6	3.4	3.3	-0.3	-0.1
Wichita Mountains Wilderness, Oklahoma	9.8	9.9	9.6	-0.2	-0.3

5.4 CHANGES IN EMISSIONS INVENTORY

As required in 40 CFR 51.308(g)(4), Texas analyzed changes in emissions of pollutants contributing to visibility impairment from all sources within the state and determined the major visibility impairing pollutants – SO_2, NO_X, coarse particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$) – are decreasing. Figure 5-5: *Actual and Projected Statewide Emissions Trends for Select Pollutants* shows the decrease in inventoried statewide emissions for carbon monoxide (CO), SO_2, NO_X, and $PM_{2.5}$. The graph shows the straight line projection from the 2002 base period and the 2018 prediction at the end of the first planning period and date by which the first RPGs are to be met. All these pollutants are below the straight line projection from the base period to the projected 2018 emission rate. SO_2, $PM_{2.5}$, and CO were in 2011 already below the projected 2018 level, on which the 2018 RPGs for the Class I areas were, in part, based.

Figure 4-2: *Actual and Projected Emissions Trends for Electric Power Generation* shows a straight line rate of decrease in NO_X and SO_2 from the 2002 base inventory to the 2018 statewide emission levels for EGUs in Texas projected for the modeling conducted by CENRAP to provide the basis for states to project 2018 visibility impairment on the average of the 20% most impaired days and the 20% least impaired days. The statewide Texas EGU NO_X emissions in 2011 were already below the projected 2018 emissions for meeting the 2018 RPG. The statewide Texas EGU SO_2 emissions are below the straight line rate of decrease between the 2002 base period SO_2 emissions and the 2018 statewide EGU SO_2 emissions consistent with meeting the 2018 RPGs.

The analysis of the emissions inventory changes against the CENRAP projections supports the adequacy of the current strategy for meeting the RPGs for the Class I areas in Texas and the Class I areas that emissions from Texas impact in other states.

5.5 ASSESSMENT OF ANTHROPOGENIC EMISSIONS IMPEDING VISIBILITY

40 CFR 51.308(g)(5) requires that the periodic five-year assessment include an assessment of any significant changes in anthropogenic emissions within or outside the state that have occurred over the past five years that have limited or impeded progress in reducing pollutant emissions and improving visibility.

To address 40 CFR 51.308(g)(5), Texas is explicitly stating that Texas has no evidence that, within the United States, there have been significant changes in the anthropogenic emissions of concern within or outside the state that have limited or impeded progress in reducing pollutant emissions and improving visibility. Texas does not have sufficient recent information on changes in emissions in Mexico to assess whether emission changes there may or may not limit or impede progress in reducing pollutant emissions and improving visibility.

However, improvements in visibility at Big Bend and Guadalupe Mountains NPs are substantially dependent upon reducing emissions from Mexico and Central America. The TCEQ, in its 2009 regional haze SIP submittal, specifically asked the EPA for federal efforts to reduce the international transport impacts on regional haze coming into the United States across Texas' southern border. Modeling estimates indicate that 52% of the visibility impairment at Big Bend NP and 20% of the visibility impairment at Guadalupe Mountains NP on the 20% of days with the greatest visibility impairment comes from international transport. The preamble to the July 1, 1999, issuance of the Rule clearly says that states are not required to carry out compensatory over control to make up for the lack of progress in reducing the impacts of international transport. In this SIP submittal, the TCEQ reiterates its request to the EPA to initiate efforts to secure international emission reductions to reduce visibility impairment at Texas' Class I areas.

The following paragraphs and figures in this subsection provide evidence that weighs against the presence of significant emission increases that have limited or impeded progress in reducing pollutant emissions and improving visibility.

Figure 3-1: *Absolute Change in Deciviews from the Baseline Years Through Current Period for the 20% Most Impaired Visibility Days* shows the change in visibility impairment in deciviews from the base period of 2000 through 2004 to the next five-year period, which is 2005 through 2009. For the states of New Mexico, Colorado, and Wyoming east to the Atlantic Ocean (with the exception of sites near the Canadian border) all IMPROVE sites in Class I areas show reductions in visibility impairment on the 20% most impaired days. The broad area of the continental United States this includes encompasses all the states that have a significant impact on regional haze conditions in Texas as well as all the states with Class I areas affected by emissions from Texas. The absence of Class I areas with degradation in average visibility for the 20% most impaired days is consistent with the absence of significant emissions changes that have limited or impeded progress in improving visibility.

Figure 5-5: *Radar Plot Showing Average Contribution of Ammonium Sulfate to the Concentration of $PM_{2.5}$ in $\mu g/m^3$ at the Clinton Drive Monitoring Site in Houston, Texas for Two Periods: 2006 through 2008 and 2009 through 2011* shows the reduction from the period 2006 through 2008 to the period 2009 through 2011 in incoming visibility impairing pollution associated with ammonium sulfate to the Houston region. This analysis shows the reduction in ammonium sulfate, the most significant anthropogenic visibility-reducing pollutant, from

Central, North, and East Texas and from the states to the northeast and east of Texas. These are key source areas contributing to ammonium sulfate transport into the two Class I areas in West Texas, and to transport from Texas into Oklahoma. The reductions over this short three-year period also show a reduction in source strength in the parts of Texas with the most important SO_2 source areas of Texas. These reductions also reduce Texas' visibility impairment impact on Class I areas in Oklahoma and in Arkansas and Missouri when they are downwind of Texas.

Ammonium sulfate is a major component of continental haze in the central and eastern United States. Positive Matrix Factorization applied to special study $PM_{2.5}$ chemical speciation data from the Clinton Drive monitoring site in Houston identified the ammonium sulfate-associated factor as the largest contributor to $PM_{2.5}$ mass and to visibility impairing pollution at this site. The figure shows the decrease in the average concentration of the ammonium sulfate factor from the 2006 through 2008 three-year period to the 2009 through 2011 period. On directions from the west-northwest clockwise through the east-southeast the figure shows reductions from one three-year period of 1 microgram per cubic meter ($\mu g/m^3$) or more from most directions. These directions are predominantly influenced by interstate transport of air from the continental United States. There are also reductions in the incoming ammonium sulfate associated aerosol from the southwest clockwise through the north, which are the directions of the majority of coal and lignite fired EGUs in Texas, as well as other ammonia and sulfate sources in the area. The reductions documented from one three-year period to the next are consistent with the projections of reduced impacts from sulfur dioxide emissions in Texas on ammonium sulfate aerosol and the consequent reduction of the impact of Texas emissions on visibility impairment at Class I areas in Texas and surrounding states.

Figure 5-5 is a radar plot of the average concentration in $\mu g/m^3$ of ammonium sulfate in $PM_{2.5}$ in air from each of the indicated sectors arriving at the Clinton Drive monitoring site in Houston (Sullivan 2012; Sullivan et al. 2013). The concentrations of ammonium sulfate are shown for the averaging periods 2006 through 2008 and 2009 through 2011. In general, the concentration of ammonium sulfate is lower for the later set of years indicating a decrease in this most important visibility impairing pollutant arriving at this monitor from the upwind directions shown in the plot.

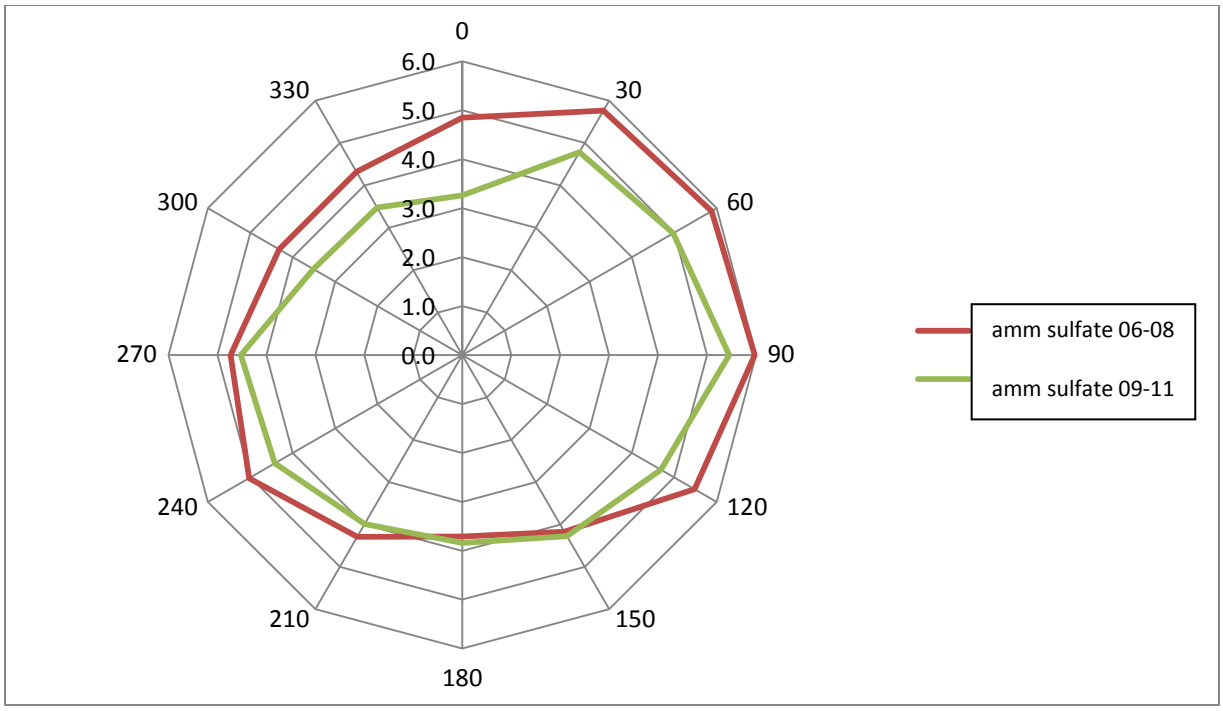


Figure 5-5: Showing Average Contribution of Ammonium Sulfate to the Concentration of $PM_{2.5}$ in µg/m³ at the Clinton Drive Monitoring Site in Houston, Texas for Two Periods: 2006 through 2008 and 2009 through 2011

5.6 SUMMARY ASSESSMENT

Texas concludes that the current SIP elements and strategies are sufficient to enable Texas and other states with Class I areas affected by emissions from the state to meet all established RPGs. The ammonium sulfate is the most significant anthropogenic contributor to visibility impairment in Texas. As shown in Figure 5-5, the contribution of regional transport of ammonium sulfate associated mass to $PM_{2.5}$ being transported into the Houston region from Central and East Texas and from the states to the northeast and east of Texas has been reduced by approximately 1 µg/m³ from the 2006 through 2008 period to the 2009 through 2011 period. This reduction adds significant weight of evidence that the current SIP elements and strategies are effective in reducing anthropogenic contributions to visibility from sources in Central and East Texas and in states to the northeast and east of Texas. Based on evaluation of the information discussed in this SIP revision, the TCEQ concludes that the current strategy is adequate for Class I areas in Texas and in areas affected by Texas to meet all established RPGs.

CHAPTER 6: MONITORING STRATEGY REVIEW – 40 CFR §51.308(g)(7)

6.1 INTRODUCTION

40 Code of Federal Regulations (CFR) §51.308(g)(6), of the regional haze rule (the Rule) requires a review of the state's visibility monitoring strategy and any modifications to the strategy as necessary. The Texas Commission on Environmental Quality (TCEQ) has reviewed Texas' visibility monitoring strategy and has determined that no revisions to it are necessary.

6.2 MONITORING AT CLASS I AREAS IN TEXAS

Currently, the Interagency Monitoring of Protected Visual Environments (IMPROVE) program provides an IMPROVE monitor at each of the two Class I areas in Texas, Big Bend and Guadalupe Mountains National Parks (NP). Because of their location, the monitors are appropriate for determining progress in reducing visibility impairment in the Texas Class I areas. The TCEQ's monitoring strategy relies on continuation of IMPROVE monitoring at these sites. The TCEQ plans to continue to participate in the IMPROVE network through the financial support of the United States Environmental Protection Agency (EPA). No additional monitoring beyond the IMPROVE network is required or necessary for assessing visibility conditions at the two Class I areas in Texas or at the Class I areas that Texas' emissions affect in other states.

Continued IMPROVE monitoring at all current Class I IMPROVE sites that Texas' emissions impact is centrally important to the effort to monitor reductions in anthropogenic haze impacts at these sites. If funding for these IMPROVE sites is threatened, the TCEQ plans to work closely with the EPA, the federal land managers (FLM), and neighboring states to attempt to find the funding to continue the current Class I IMPROVE monitoring for these sites.

The TCEQ currently has a tapered element oscillating microbalance (TEOM) continuous monitor for fine particulate matter ($PM_{2.5}$) at Big Bend NP. The monitor is not required or used to judge progress in reducing anthropogenic visibility impairment. That purpose is met entirely by the IMPROVE monitor at each Class I area in Texas. The data are, however, useful as supplemental information to aid in the analysis of dust storms impacts on visibility impairment at Big Bend NP.

6.3 REPORTING VISIBILITY MONITORING DATA TO THE EPA

The TCEQ does not directly collect or handle IMPROVE data. The IMPROVE program makes its data available to the public, states, and the EPA. The TCEQ's support will be through requesting that both the EPA and other agencies that support it continue to do so.

If Texas collects any visibility-related monitoring data through the state and local air monitoring station (SLAMS) air quality monitoring network, the TCEQ will report those data to the EPA as specified under the Performance Partnership Grant agreement negotiated with the EPA Region 6. All validated data and data analysis results from any TCEQ visibility-related special studies are public information. The TCEQ plans to continue its practice of sharing the data and information with the EPA, the FLMs, and the public.

The data from the $PM_{2.5}$ TEOM monitor at Big Bend NP are available from the TCEQ. The TCEQ reports the hourly average $PM_{2.5}$ concentrations measured by the Big Bend TEOM to the EPA's Air Quality System national air quality database. Additionally, the TCEQ hosts the National Park Service's Big Bend ozone data on the TCEQ website (http://www.tceq.texas.gov/cgi-bin/compliance/monops/daily_summary.pl?cams=691).

CHAPTER 7: ADEQUACY OF CURRENT REGIONAL HAZE SIP –40 CFR §51.308(h)

7.1 INTRODUCTION

In the regional haze rule (the Rule), 40 Code of Federal Regulations (CFR) §51.308(h) requires during the five-year progress report to United State Environmental Protection Agency (EPA) in accordance with paragraph (g) of this section, the state must also take the following actions based upon the information presented in the progress report:

- provide to the EPA a negative declaration which concludes that further revision of the existing state implementation plan (SIP) is not needed at this time;
- if the state determines that the SIP is or may be inadequate to ensure reasonable progress, the state must provide notification to the EPA and to the other states that participated in the regional planning process must also collaborate with its regional planning partners in developing additional strategies to address the plan's deficiencies;
- the implementation plan is or may be inadequate due to emissions from sources in another county, the state shall provide notification, along with available information, to the EPA; or
- where the state determines that the implementation plan is or may be inadequate to ensure reasonable progress due to emissions from sources within the state, the state shall revise its implementation plan to address the plan's deficiencies within one year.

7.2 NEGATIVE DECLARATION

Based on the analyses conducted, Texas has determined that the existing regional haze SIP revision is adequate for continued progress toward the established reasonable progress goals for the Class I areas in Texas and for Class I areas in other states impacted by Texas emissions. Texas has determined that revisions of the existing regional haze SIP are not needed at this time to meet the requirements of the Rule. The state will continue implementation of control measures included in the 2009 regional haze SIP revision. The next scheduled regional haze SIP revision is due by July 31, 2018.

Per the Rule requirements, Texas submits a negative declaration, which determines that its regional haze SIP is sufficient, based on the evidence in this SIP revision and the federal analysis documented in the 2011 Interagency Monitoring of Protected Visual Environments (IMPROVE) report. Texas also determines that no additional controls are necessary based on this five-year progress report.

CHAPTER 8: CONSULTATION WITH FEDERAL LAND MANAGERS – 40 CFR §51.308(i)

8.1 INTRODUCTION

According to the regional haze rule (the Rule), 40 Code of Federal Regulations (CFR) §51.308(i) requires state and federal land manager (FLM) coordination. The state must identify in writing to the FLM the title of the official to which the FLM of any Class I area can submit any recommendations on the implementation of this subpart including, but not limited to identification of: impairment of visibility in any Class I areas; and elements for inclusion in the visibility monitoring strategy required by §51.305 and this section.

The Rule requires states to consult with FLMs during development and review of the five-year regional haze state implementation plan (SIP) revision. In development of this report, Central States Air Resource Agencies (CenSARA) coordinated communications between states and the FLMs in the following ways:

- A conference call was held on December 16, 2011, with the National Park Service (NPS), a federal land manager representative to discuss the FLMs expectation for the five-year progress report.
- A conference call was held on February 27, 2012, for CenSARA member states for an initial planning session.

Texas consulted with FLMs after the SIP proposal was approved by the commission on June 19, 2013. The state sent the proposed SIP revision to the FLMs and the United States Environmental Protection Agency (EPA) in June 2013. The Texas Commission on Environmental Quality (TCEQ) made the FLMs and the EPA comments publicly available prior to the beginning of the public comment period as required by the Rule. Texas sent the proposed SIP revision to FLMs and the EPA 60 days prior to the public comment period. Texas notified FLMs and the EPA of the public hearing held on September 26, 2013. Texas considered and responded to all comments of FLMs, the EPA, and the public as reflected in Appendix B: *Response to Comments*.

Texas will continue to coordinate and consult with FLMs on future SIP revisions, including progress reports, as well as during the implementation of programs having the potential to contribute to visibility impairment in the Class I areas.

8.2 CONSULTATIONS

In 2011, the TCEQ had one consultation with the NPS FLM for Big Bend and Guadalupe Mountains National Parks. CenSARA arranged for the central states to teleconference with the NPS FLM who would be reviewing the five-year regional haze SIPs; the FLM offered suggestions on the content of the five-year SIP revisions as no further guidance had been provided by the EPA since the 1999 Rule at the time of this document development. The NPS FLM representative suggested that states focus on the data in the 2011 Interagency Monitoring of Protected Visual Environments (IMPROVE) report, which analyzed the Class I area network data for five years, charted trends for each Class I area, and presented national trends. On April 12, 2013, the EPA released a guidance document to assist states in addressing the requirements for a five-year regional haze SIP revision [*General Principles for the 5-Year Regional Haze Progress Reports for the Initial Regional Haze State Implementation Plans (Intended to Assist States and EPA Regional Offices in Development and Review of the Progress Reports)*].

The Rule required this SIP revision be reviewed by the appropriate FLMs and EPA before the SIP went to public comment. The rule required FLMs were given 60 days to comment on Texas' SIP and that these comments were available to the public during the public comment period. The FLM comment period was from June 19, 2013 to August 20, 2013 and comments were posted to the TCEQ website in August 2013.

In October and November 2013, the TCEQ held two consultation calls with the FLMs and the EPA. The consultation summary is provided in Appendix I: *Consultation Summary*. Participants reviewed the comments the agencies submitted, asked for clarification and discussed the state's effort to provide additional information the federal agencies' thought was most important (see Appendix B: *Response to Comments*).

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Appendices Available Upon Request

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RESPONSE TO COMMENTS REGARDING THE
2014 FIVE-YEAR REGIONAL HAZE STATE
IMPLEMENTATION PLAN REVISION

The Texas Commission on Environmental Quality (TCEQ or commission) offered a public hearing for this 2014 Five-Year Regional Haze State Implementation Plan (SIP) Revision on September 24, 2013 at 2:00 p.m. in Austin at the TCEQ headquarters. The hearing was not opened because no party signed in to provide oral comment.

In accordance with the federal regional haze rule, Federal Land Managers (FLM) were provided a 60-day review period for this SIP revision before it went for public review. The FLM reviews were scheduled from June 19 through August 20, 2013 and were posted to the TCEQ website for the public to review on August 22, 2013. The public comment period was opened August 23, 2013 through October 1, 2013. The commission received written comments from the United States Environmental Protection Agency (EPA), the National Park Service (NPS), the Fish and Wildlife Service (FWS), and the Forest Service (FS), while Earthjustice submitted the combined comments of the National Park Conservation Association (NPCA) and the Sierra Club.

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GENERAL COMMENTS

The FWS commented that overall the proposed SIP revision and appendices included most of the information and necessary elements needed to adequately address regional haze progress.

The commission appreciates the comment. Some challenges were encountered in developing this 2014 Five-Year Regional Haze SIP Revision as official EPA guidance for the five-year progress SIP revision was not available until after the proposed Texas 2014 Five-Year Regional Haze SIP Revision was complete. However, the commission has attempted to fill in gaps of required information for the adopted final SIP revision. Consultations with the FLMs and the EPA were a benefit to the development of the final document.

The NPS commented that speciated Interagency Monitoring of Protected Visual Environments (IMPROVE) data from the Guadalupe Mountains National Park (NP) showed high contributions of coarse mass. Coarse mass events were intermittent and higher in the 2000 through 2004 baseline than subsequent years. The NPS expects another big challenge for the 2018 regional haze SIP revision will be how to improve estimates of natural conditions when wildfire or dust events are major contributors in some years but not others. “Hopefully EPA will be working with states and FLM on improving estimates of natural conditions for the 2018 SIPs.”

The commission appreciates that the NPS understands the difficulty that western states are having with dust events and haze. Since Big Bend and Guadalupe Mountains NPs are both in the Chihuahuan Desert, along with Class I areas in New Mexico, controlling these natural events is infeasible.

CONTROLS AND EMISSION REDUCTIONS

The NPS commented that Chapter 2: *Status of Control Measures and Emission Reductions* should be updated to include the latest EPA and court actions on the Clean Air Interstate Rule (CAIR) and the Cross-State Air Pollution Rule (CSAPR).

The commission has added text in Chapter 2 in response to this comment.

On behalf of the NPCA and the Sierra Club, Earthjustice submitted comments that Texas sources cannot rely on CAIR, and must instead complete Best Available Retrofit Technology (BART) analysis, given that CAIR has been ruled unlawful by the District of Columbia (D.C.) Circuit. Although CAIR is currently in place and being implemented by the EPA, the NPCA and the Sierra Club commented that CAIR is temporary and cannot be relied on in place of BART.

The NPCA and the Sierra Club further commented that because the CAIR replacement, CSAPR, has also been ruled unlawful and vacated by the D.C. Circuit, Texas cannot wait on the EPA to promulgate a new replacement for CAIR and that BART should be required. Because the Federal Clean Air Act (FCAA) and federal regional haze rule require source-by-source BART reviews regardless of the status of CAIR or CSAPR, and because BART is a mandatory measure that must be implemented to achieve reasonable progress toward restoring Class I areas to natural visibility conditions, Texas must implement BART in the absence of final, effective better-than-BART rules.

CAIR is currently in place, is federally enforceable, and Texas sources are required to meet their CAIR obligations. CAIR was determined by the EPA to be "better than BART" and states subject to CAIR, like Texas, were entitled to rely on CAIR as better than BART in their regional haze SIPs. Although the EPA replaced CAIR with CSAPR, including the replacement of CAIR in the "better than BART" portion of the federal regional haze rule, the EPA did not invalidate its previous modeling that states meeting CAIR requirements already had requirements in place that are better than BART. Therefore, so long as a state is meeting CAIR, the EPA modeling demonstrates that requirements are already in place that impose requirements for electric generating units (EGU) that are better than BART. Such is the case in Texas. Although the EPA has issued a limited disapproval of this portion of the Texas 2009 regional haze SIP revision, that disapproval was solely limited to the need to replace CAIR with CSAPR. With CSAPR vacated by the court, CAIR and its requirements remain effective and in place in Texas.

Although the EPA is expected to replace CAIR with other requirements to address the need to control interstate transport of pollutants, it is impossible to foresee when and what form such a replacement may take. However, the reductions already in place from CAIR are unlikely to be significantly reduced, given that the FCAA requirement to reduce transported emissions remains. If a future EPA rulemaking replaces CAIR with new requirements for a better-than-BART determination, or if such rules are ultimately found to be unneeded, then it may be

necessary in the future for Texas to implement new rules in response. However, Texas' original 2009 regional haze SIP revision and this 2014 Five-Year Regional Haze SIP Revision currently rely on the EPA's determination that CAIR is better than BART, as was demonstrated in the EPA's original rulemaking that established CAIR as better than BART. No changes were made in response to these comments.

The EPA commented that it would be helpful if Texas presented a unit-by-unit summary of the impact of CAIR on the emissions in the state. Such a summary could include a summary of which units included in CAIR reduced their sulfur dioxide (SO_2) and nitrogen oxides (NO_X) emissions and which units acquired allowances. The EPA would also like Texas to provide details of any future controls it knows will be installed by CAIR sources. The EPA further commented that in order to assess the reductions and visibility improvements due to reductions made in response to CAIR, it would be useful for Texas to do a unit-by-unit analysis of reductions due to CAIR compliance and for Texas to do a comparison of actual reductions and planned reductions to the Central Regional Air Planning Association (CENRAP) predictions. The EPA commented that it would also be helpful in understanding the impact of the various state programs cited by Texas if Texas estimated the tonnage of emission reductions achieved from these programs. The EPA requested that Texas provide a summary of the emissions reductions achieved throughout Texas through implementation of the measures included in this 2014 Five-Year Regional Haze SIP Revision. The NPS requested additional source-specific information as to when sources installed controls or will install controls in the future. The NPS found it difficult to tell if Texas was on track to meet the EGU reductions included in the CENRAP and Western Regional Air Partnership (WRAP) modeling used to establish reasonable progress goals in Texas and in neighboring states.

The commission considers these requests for information to be outside the scope of the requirements for the analyses required by the federal regional haze rule for preparation and submittal of this 2014 Five-Year Regional Haze SIP Revision. However, in response to the EPA's requests for unit-by-unit analysis, the TCEQ has added some additional information to Chapter 2, Section 2.6.1 of this SIP revision. To assess the overall effectiveness of the CAIR NO_X and SO_2 limits on fossil fuel-fired EGUs in Texas, the TCEQ has compared the year-by-year NO_X and SO_2 allowances for a set of fossil fuel-fired EGUs to the annual NO_X and SO_2 emissions from these EGUs. This set of EGUs, represented in Appendix E: *CAIR Allowances and Emissions for Texas EGUs*, is the same set of 20 sites used to evaluate existing pollution control systems for the control of haze-causing emissions in Table 2-7. Actual annual emissions are from the EPA's AMPD for RY 2006 through RY 2012. Final CAIR NO_X allowance allocations are from the TCEQ's Emissions Banking and Trading Program from 2009 through 2017. Final CAIR SO_2 allowance allocations are from the EPA's AMPD for RY 2010 through RY 2012. Oak Grove, Sandow Station, and J.K. Spruce Unit 2 are new units. Sandy Creek Energy Station did not become operational until 2012. The TCEQ notes in Chapter 2, Figure 2-1: *Aggregate Texas CAIR EGU NO_X Allowances vs. NO_X Emissions* and in Chapter 2, Figure 2-2: *Aggregate Texas CAIR EGU SO_2 Allowances vs. SO_2 Emissions* that the total actual annual NO_X and SO_2 emissions, respectively, for these 20 solid fossil fuel-fired EGUs illustrate a trend of decreasing NO_X and SO_2 emissions from 2006 through 2012, with the exception of RY 2010. If RY 2013 data were also included, the trend of decreasing emissions would continue. However, the RY 2013 quality-assured data were not available in time to be included in this SIP revision. For

CAIR NO_X allowance allocations, the future years represent predicted allocations and may change pursuant to economic and regulatory reasons.

The TCEQ does not have easily accessible information on the specific regulatory requirements driving emission reductions at each source or unit. Many sources are subject to multiple requirements on the same pollutants. For EGUs, for example, there are emissions restrictions derived from CAIR, from various state-initiated emission reduction requirements such as the Mass Emissions Cap and Trade Program, from MATS requirements, and, for some units, federal consent decrees and state and federal new source review (NSR) permitting requirements. For programs like CAIR that include cap and trade limitations, the methods by which a source complies with the limitations may change over time. For the requirements that the TCEQ enforces, the TCEQ tracks compliance with each program's requirements, but it does not track for each unit which limitation is controlling or when the limitation that is controlling for each pollutant changes from one program to another.

Regarding future controls, it is unlikely companies would commit to their strategy for future controls during this period of regulatory uncertainty concerning the status of CAIR and CSAPR, the EPA's Mercury and Air Toxics Standards (MATS), greenhouse gases (GHG), new source performance standards, and the tightening of the SO_2 and fine particulate matter ($PM_{2.5}$) National Ambient Air Quality Standards (NAAQS). Making assumptions about a company's future controls would not be enforceable. Therefore, the TCEQ did not include future controls in Table 2-7. However, the following two EGUs have publicly announced some future unit retirements, which are not yet enforceable or permanent.

- **In 2012, American Electric Power (AEP) announced plans to retire the Welsh No. 2 coal-fired unit at the Welsh Power Plant in Titus County (RN100213370). The announcement was included in AEP's 2013 Corporate Accountability Report www.aepsustainability.com/performance/environmental/FleetTransformation.aspx. In fall 2013, the EPA's Air Markets Program Data (AMPD) website listed Welsh Boiler No. 2 as having actual 2009 emissions of SO_2 as 9,400 tons per year (tpy) and NO_X emissions as 3,3oo tpy. This retirement will impact the first 10-year regional haze planning period that ends in 2018 but not the current period from 2009 through 2014 that this SIP revision covers. The retirement of Welsh Boiler No. 2 is part of a court-ordered consent decree. The following is an excerpt from an AEP news release dated March 22, 2012:**

  > **... Welsh 2 will retire as soon as December 31, 2014, but no later than December 31, 2016, under terms of court-ordered consent decrees related to separate actions.**

- **In 2011, City Public Service (CPS) announced plans to retire both J T Deely Coal-Fired Units No.1 and 2 in Bexar County by 2018 (RN100217975). This retirement will not impact the first regional haze planning period that ends in 2018, but may help with reductions in the 2019 through 2028 regional haze planning period. In fall 2013, the EPA's AMPD website listed Deely Boiler No. 1**

as having actual 2009 emissions of SO_2 as 8,400 tpy and NO_X emissions as 1,7oo tpy. Deely Boiler No. 2 was listed as having actual 2009 emissions of SO_2 as 8,600 tpy and NO_X emissions as 1,8oo tpy. Additionally, CPS received authorization for installation of selective catalytic reduction (SCR) for NO_X control on J T Deely No. 2 at the Calaveras Plant. Based on emissions data from EPA's AMPD, the SCR on J T Deely Boiler No. 2 became operational in 2011, resulting in some NO_X emission reductions that may benefit the current planning period.

The commission agrees with the NPS that it is difficult to assess whether source-specific reductions are effective. However, Chapter 4: *Emissions Inventory Development and Comparison*, Figure 4-2: *Actual and Projected Emissions Trends for Electric Power Generation* shows actual downward trends for all Texas EGUs as a group. Additionally, the federally funded 2011 IMPROVE Report and actual monitoring data through 2011 show downward trends in sulfate on the 20% most impaired days at all of Texas' and most nearby Class I areas in surrounding states (http://vista.cira.colostate.edu/improve/Publications/Reports/2011/2011.htm; Hand et al. 2011). Since there is no fixed rate of progress, the TCEQ considers the downward emissions trends meet the reasonable progress goals.

The EPA, the NPCA, and the Sierra Club requested that Texas include a discussion on the results of any additional analysis on the technical feasibility and cost-effectiveness of emission controls for oil and gas production. The NPCA and the Sierra Club also suggested Texas look at other sources such as refineries, cement kilns, and chemical processing facilities that are likely to provide similar opportunities to significantly reduce haze-causing air pollution through readily-available reasonable progress controls.

In the 2009 regional haze SIP revision, Chapter 10: *Reasonable Progress Goals*, paragraph four on page 10-2 , the TCEQ included a discussion of oil and gas NO_X emissions and a grant program that retrofitted gas-fired, rich-burn compressor engines. As part of Senate Bill (SB) 2000, the 80th Texas Legislature approved a grant program to assist facilities in reducing emissions of NO_X from stationary gas-fired, rich-burn compressor engines by installing nonselective catalytic reduction systems or other commission-approved control systems. The TCEQ approved approximately $600,000 to this specific grant program. A total of 86 engines were partially or fully retrofitted. The grant complemented the East Texas combustion rules discussed in this 2014 Five-Year Regional Haze SIP Revision on page 2-10 in Chapter 2, Section 2.7.3 *East Texas Engines*, which estimated approximately 8,000 tons per year of NO_X reductions by 2010 in the 33 East Texas counties subject to those rules.

As addressed in Chapter 5: *Assessment of Reasonable Progress Goals*, the TCEQ determined that the current SIP elements and strategies are sufficient to enable Texas to meet all established reasonable progress goals and to not prevent other states that have Class I areas affected by emissions from Texas from meeting their established reasonable progress goals.

When making this conclusion, current emissions inventories that include the recent growth in oil and gas activity were used. Current inventories were compared with what now appears to be conservative estimations of 2018 inventories and demonstrate that the original emission estimates used in the CENRAP modeling are higher than more recent emission estimates. Data from the 2011 IMPROVE report, developed using data from Class I area IMPROVE program monitors, was reviewed and discussed in Chapter 5. The IMPROVE data also indicate that the current SIP elements and strategies are effective for reducing anthropogenic contributions to visibility impairment.

The NPCA and the Sierra Club stated that through the CAIR/CSAPR programs, power plants can opt to purchase emission allowances from other power plants in lieu of reducing emissions to meet source allocations, causing disproportionately high levels of pollution and visibility hot spots near Class I areas. Additionally, the 2009 regional haze SIP revision provides an inadequate assessment of reasonable and readily-available controls and upgrades for EGUs that would significantly improve visibility.

The NPS, the FWS and the FS commented that the proposed 2014 Five-Year Regional Haze SIP Revision calls for no additional controls. The FS stated that very few of its significant concerns with the 2009 regional haze SIP revision have been addressed. While there have been some improvements to air quality, the FS does not agree with the reasonable progress goals that Texas set. Since the EPA has not taken action on Texas' 2009 regional haze SIP revision, the NPS does not know if the EPA accepts that Texas is implementing all reasonable control measures.

The commission has determined that additional controls are not appropriate at this time. Visibility impairment (measured in inverse megameters) at two nearby Class I areas (Wichita Mountains and Caney Creek) is projected to drop by 24% and 34%, respectively, between the base period (2000 through 2004), to the date of the first RPG (2018). Texas did consider additional emission reductions as described in Appendix 10-1: *Analysis of Control Strategies RPG* of the 2009 regional haze SIP revision. Following the analysis steps prescribed in the federal regional haze rule, Texas determined that during the first planning period additional controls were not reasonable (for more details see Chapter 10: *Reasonable Progress Goals* along with Appendix 10-2: *Estimating Visibility Impacts from Additional Point Source Controls*, both in the 2009 regional haze SIP revision).

Further, the TCEQ's responsibility is to meet the rule requirements in a cost effective manner rather than to implement any and all controls possible.

The commission agrees that since the EPA has not acted on Texas' 2009 regional haze SIP revision, the FLMs and the state do not know if the EPA accepts the 2009 regional haze SIP revision. The level of analysis required for the five-year progress report is not adequate to fully determine the reasons for visibility improvement on the 20% most impaired days at Big Bend, Guadalupe Mountains, Wichita Mountains, and Caney Creek Class I areas and is not contained in this 2014 Five-Year Regional Haze SIP Revision. A more detailed analysis would be appropriate for developing the 2018 regional haze SIP revision. However, SO_2 and NO_X emissions reductions from all sources in Texas (shown in Chapter 4, Figure 4-1:

Actual and Projected Statewide Emissions Trends for Select Pollutants **and SO_2 and NO_X emissions reductions from EGUs in Texas (shown in Chapter 4, Figure 4-2: *Actual and Projected Emissions Trends for Electric Power Generation*) together with the resulting reductions in visibility impairment at these Class I areas, particularly from sulfate, are consistent with a reduction in the impact of emissions from Texas. Further, the reasonable progress goals set in the 2009 regional haze SIP revision are for 2018 and there is no requirement for straight line reductions in emissions from the 2002 base year to 2018.**

The NPS, the Sierra Club and the NPCA commented that TCEQ should have considered the cumulative impacts of their sources and used a lower threshold to consider controls for an individual source. The NPS also commented that Texas has not demonstrated that it is requiring all reasonable controls necessary to address its contribution to visibility impairment at Class I areas in neighboring states. The FS commented that no analysis of area of influence for Class I areas affected by Texas was performed in order to form the basis of an adequate four factor analysis in support of the reasonable progress goals (RPG) set by states with Class I areas impacted by Texas sources. The Sierra Club and the NPCA commented that this 2014 Five-Year Regional Haze SIP Revision should have considered various control scenarios and mentioned that Oklahoma's 2010 regional haze SIP employed a cost threshold of $5,000 per ton rather than the $2,700 per ton used by Texas.

The cost threshold and cumulative visibility benefit comments are not within the scope of this 2014 Five-Year Regional Haze SIP Revision. The TCEQ did consider the cumulative impacts of multiple sources and reported the results of this consideration in Chapter 10: *Reasonable Progress Goals*, pages 10-4 through 10-9, of the 2009 regional haze SIP revision. The TCEQ used areas of influence and used the $2,700 per ton reasonableness threshold used in the BART and CAIR procedures to select the additional controls that would be the most cost-effective and effective for producing additional visibility improvement. The TCEQ determined in the 2009 SIP submittal that over $300 million in additional control costs to produce less than 0.5 deciview of improvement at each Class I area, which is imperceptible to the human eye, would not be reasonably cost-effective. A perceptible change in scene visibility should be approximately a one or two deciview change in the deciview scale (i.e., a 10% to 20% fractional change) (http://vista.cira.colostate.edu/improve/publications/NewsLetters/apr_93.pdf).

The NPS asked what additional emission reductions were included in the CENRAP modeling that are enforceable but have not been implemented.

The commission is aware of some emissions reductions accounted for in the CENRAP modeling for 2018 that are legally enforceable with compliance dates between 2013 and 2018. The commission is aware of additional legally enforceable emission reductions not accounted for in the CENRAP modeling for 2018. Some of these additional reductions are already in force and some will occur between 2013 and 2018, but assembling the information to answer this request is beyond the requirements for the five-year progress report. Further reductions will occur before 2018 as a result of the requirements of CAIR or any eventual successor and as a result of the MATS requirements, but the units that will have emission

reductions under these requirements are not yet known, so it is not possible to prepare a complete and accurate response to this request.

The NPS requested that Texas discuss the pollutant contributions to visibility impairment and how those contributions have changed over the decade. The NPS also requested the TCEQ establish which pollutants are most important to control to improve visibility on the 20% worst days and which pollutants are responsible for the slight degradation on the 20% best days at Big Bend NP.

The TCEQ considers that detailed source apportionment analysis is appropriate in preparation for the major, 10-year regional haze SIP revisions but not for the five year progress reports as long as a negative declaration is made through the determination required under 40 Code of Federal Regulations (CFR) §308(h)(1) that further revision of the existing implementation plan is not needed at this time.

VISIBILITY

The EPA and the NPS requested that the TCEQ add and discuss IMPROVE data through 2011. The NPS submitted graphics showing pollutant specific light extinction trends for Big Bend, Guadalupe Mountains, Wichita Mountains, and Caney Creek. The NPS generated the graphics using the WRAP Technical Support System which can be found at http://vista.cira.colostate.edu/tss/Results/HazePlanning.aspx.

The commission appreciates the suggestions. In response to this comment, the TCEQ has included the IMPROVE data through 2011 and has added discussion of the visibility impacts of specific pollutants to the discussion in Chapter 3: *Assessment of Visibility*.

The EPA and NPS commented that Texas indicated in the 2009 regional haze SIP revision that the component that most likely needs improved estimation is organic carbon, and there is significant regulatory uncertainty with regard to what prescribed fires should or should not be considered as natural. "When the EPA revises the *Interim Air Quality Policy on Wildland and Prescribed Fires*, it is expected such issues will be clarified." The EPA and the NPS asked if Texas had any new analysis to evaluate and refine estimates of natural conditions for the Texas Class I areas.

The estimate of the amount of visibility impairment that would exist under natural conditions does not affect the selection of reasonable progress goals or the assessment of progress toward the reasonable progress goals established in the first round of regional haze SIP submittals. The TCEQ anticipates that consultation with the FLMs on natural conditions estimates will occur at the latest during consultations on the 2018 regional haze SIP revision. Therefore, no changes were made in response to this comment.

The NPCA and the Sierra Club commented that the Big Bend Regional Aerosol and Visibility Observational Study (BRAVO) study found that sulfate emissions caused over 50% of the visibility impairment at Big Bend NP, and sulfate emissions during peak particulate sulfate episodes were largely from sources in east Texas.

The commission notes that the CENRAP modeling for the full 2002 calendar year is much more robustly representative of the causes of visibility impairment at Big Bend NP than the BRAVO study. The TCEQ notes that both the analysis of the 2000 through 2004 IMPROVE data and the CENRAP 2002 Particulate Matter Source Apportionment (PSAT) modeling agree that that sulfate aerosol does contribute more than 50% of the visibility impairment at Big Bend NP. The TCEQ disagrees with the implication that emissions from Texas contribute a majority of either the sulfate aerosol or the total extinction to Big Bend NP on the 20% most impaired of days. On those days the PSAT analysis finds that Texas contributes less than 25% of the extinction from sulfate aerosol and approximately 25% of the total extinction. The modeling shows that more than 50% of the extinction on the 20% of days with the most visibility impairment comes from international transport into Texas.

The NPS requested that Texas discuss the pollutant contributions to visibility impairment and how those contributions have changed over the decade. The TCEQ needs to establish which pollutants are most important to control to improve visibility on the 20% worst days, and which pollutants are responsible for the slight degradation on the 20% best days at Big Bend NP. The NPS noted that the IMPROVE report of 2005 through 2009 data was included as an appendix. The NPS asked the TCEQ to discuss in the progress report the pollutant contributions for the Class I areas in Texas and other areas impacted by Texas emissions.

The commission considers that pollutant contributions and visibility impairment was well covered in the 2009 SIP and beyond the scope of this SIP revision. However, the commission has added graphs in Chapter 3 on pages 3-4 through 3-11, to clarify and aid in understanding the data included in this 2014 Five-Year Regional Haze SIP Revision by showing the pollutant-by-pollutant impact at Big Bend, Guadalupe Mountains/Carlsbad Caverns, Wichita Mountains, Caney Creek, and White Mountain Class I areas. Since sulfate, the visibility impairing product of atmospheric oxidation of SO_2, is the main anthropogenic cause of visibility impairment on the 20% most impaired days at all four of these IMPROVE monitors, it is the main focus of the discussion that has been added.

EMISSIONS INVENTORY

The NPS requested 2002 and 2018 inventory data tables from the 2009 regional haze SIP revision be provided in this 2014 Five-Year Regional Haze SIP Revision so that the reader can compare previous and current inventory projections.

The commission has added two tables to Chapter 4 in response to the comment. Since 2009, approximately 20 research reports have been developed to help improve the emissions inventory (EI) of Texas. For individual reports, please see the following TCEQ website http://www.tceq.texas.gov/airquality/airmod/project/pj_report_ei.html.

The NPS agreed that the assumptions made in the inventory between CENRAP-developed 2002 and 2018 inventories used in the model and the actual inventory between 2005 and 2011 made comparisons difficult and requested that assumptions be identified. The NPS requested additional explanation on the reductions of area source volatile organic compounds (VOC) and NO_X emissions between 2008 and 2011.

Emissions inventories are not static and the commission continuously assesses and improves emissions estimates over time. As a result, emissions estimates may change as a result of the updated methodology. This historical data represents the best estimate of emissions at that time.

The reduction of VOC emissions in the area source inventory is attributed to many emissions factors being updated. Changes were incorporated into the inventory because the commission updated its method for estimating the emissions from combustion categories. Area source NO_X emissions reductions are attributed to reductions in allowed NO_X emissions for stationary, gas fired, reciprocating internal combustion engines (ICE) per 30 Texas Administrative Code 117. The compliance date for these rules was March 2005 for the Houston-Galveston-Brazoria 1997 eight-hour ozone nonattainment area (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties). For the Dallas-Fort Worth (DFW) 1997 eight-hour ozone nonattainment area (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant Counties), the compliance date was March 2009 for rich-burn and March 2010 for lean-burn ICE and larger engines in Anderson, Brazos, Burleson, Camp, Cass, Cherokee, Franklin, Freestone, Gregg, Grimes, Harrison, Henderson, Hill, Hopkins, Hunt, Lee, Leon, Limestone, Madison, Marion, Morris, Nacogdoches, Navarro, Panola, Rains, Robertson, Rusk, Shelby, Smith, Titus, Upshur, Van Zandt, and Wood Counties.

Additionally, major drops in reported area source VOC emissions for the 2011 EI were a result of new emission factors for condensate storage for the oil and gas category based on an Environ study (http://www.tceq.texas.gov/airquality/airmod/project/pj_report_ei.html). There were also decreases in emissions in the solvents category as a result of updates in its emissions estimation methodology.

The 2002 emissions were grown to 2018 emission estimates using Economic Growth Analysis System (EGAS5). Other changes in assumptions that complicate comparisons were summarized in this 2014 Five-Year Regional Haze SIP Revision under Chapter 4, Section 4.7 *Statewide Emissions Data Comparison*. These include new categories not previously inventoried in the area source oil and gas categories, changes in the mobile source model (Mobile 6 to MOVES), and improved EI estimation methodologies used for some source categories such as locomotives and marine vessels. No change was made as a result of this comment.

The EPA commented that Texas should explain which estimates are significantly different from CENRAP estimates. The EPA noted an apparent very large adjustment to PM estimates due to changes in the treatment of fugitive road dust. The EPA asked whether this was factored into CENRAP estimates and how might it be expected to change the projections for visibility improvements.

Fugitive road dust was not factored into the CENRAP estimate. Changes in the inventory that occurred for the 2005, 2007, or 2011 inventories did not impact the CENRAP-developed inventories because these changes (such as the treatment of road dust) occurred after the CENRAP developed 2002 and 2018 inventories.

Specifically, the 2018 inventory is based on grown 2002 inventory and did not include input from the intervening inventories because they did not yet exist.

Of significance, the difference between the CENRAP-developed inventories and the TCEQ's 2005, 2007, or 2011 inventories was the inclusion of coal burning in the small industrial and residential fuel area source categories for 2002 and 2018. This inclusion was in error because Texas does not have coal burning for these categories. As discussed elsewhere, this erroneous inclusion in the 2002 inventory was grown to estimated 2018 emissions. Other differences are noted in Chapter 4, Section 4.7 *Statewide Emissions Data Comparison*. Changes that occurred for a specific year, such as use of more precise non-road emissions data in 2005, were not incorporated into the already existing modeling inventory developed by CENRAP.

Because the SO_2 emissions from area sources were overestimated in the base period and these emissions were used to estimate the 2018 emissions, removal of the overestimated SO_2 emissions in 2002 and the 2018 SO_2 emissions would lead to 2018 projection of more reduction in ammonium sulfate visibility impairment than was projected by the CENRAP modeling. Thus, the projected improvement would be greater than the CENRAP modeling projected. This is another reason that the TCEQ concludes that the current strategy is adequate to meet the reasonable progress goals that were set by Texas and surrounding states based on the CENRAP modeling.

For the Texas Class I areas, the projections for future impact of fugitive dust (i.e., fine soil and coarse mass) were established based on the conclusion that the sources of fine soil and coarse mass impacting Texas' two Class I areas are predominantly natural. For this reason, the modeling projection used a relative response factor of one for both fine soil and coarse mass. Since the projected future concentrations of fine soil and coarse mass are obtained by multiplying the measured base period concentrations by the relative response factor, the concentrations are projected to be unchanged. Changes in fugitive source emissions inventory estimates for fugitive dust would, therefore, not affect projected future fine soil and coarse mass impacts on visibility at the two Texas Class I areas.

The NPS suggested deleting the CO from Chapter 4, Figure 4-1: *Actual and Projected Statewide Emissions Trends for Select Pollutants* and suggested showing ammonia emission trends as background ammonia concentration is a factor in particle formation. The NPS included an example of the figure with corrected estimates for area source SO_2 and ammonia (NH_3) emissions instead of CO, indicating that actual emissions are tracking below the future projections.

In response to this comment, Chapter 4, Figure 4-1 was changed in this 2014 Five-Year Regional Haze SIP Revision by removing CO and adding NH_3. The SO_2 was not changed because the comparison is between the actual and the modeled inventory.

The NPS quoted the 2009 regional haze SIP revision: "The CAIR cap is the total allowable emissions of SO_2 from EGUs in Texas under CAIR. The IPM model analysis used by CENRAP predicts that by 2018 EGUs in Texas will purchase approximately 125,000 tons per year of emissions allowances from out of state. The TCEQ requested that key EGUs in Texas review and comment on the predictions of the IPM model. However, no EGU made an enforceable commitment to any particular pollution control strategy and preferred to retain the flexibility offered by the CAIR program. In the five-year periodic progress report required by 40 CFR §51.308(g), the TCEQ plans to review emissions inventory and permit information to evaluate the accuracy of the predicted emissions used in the CENRAP modeling." The NPS and the EPA requested discussion of the findings of the state's review of EI and permits in this 2014 Five-Year Regional Haze SIP Revision.

The actual EGU emissions were compared to the predicted emissions in developing this five-year SIP revision. For electric utility trends, the commission refers the commenters to Chapter 4, Figure 4-2: *Actual and Projected Emissions Trends for Electric Power Generation*. This figure compares SO_2 and NO_X emissions trends for the state's EGUs with CENRAP's modeling values. The comparison is between a trend using a best estimate of emissions in 2018 and actual emissions. A straight line projection was made between the 2002 and 2018 CENRAP modeled values. For both pollutants, the emissions trends are downward and remain at or below the projected emissions trend line between 2002 and 2011.

Emissions were also compared for the non-EGU sources in Chapter 4, Figure 4-1. The actual emissions for the periodic inventory years from 2002 through 2011 are compared against a linear change between 2002 actual emissions and 2018 modeled emissions. Carbon monoxide is not shown on this graph as a result of a comment by the NPS because its emission quantity is large enough to compress the vertical axis, making the trends for the smaller emitting pollutants not as visible. However, the carbon monoxide emissions of approximately 3.3 million tons per year for 2011 remain significantly below the projected amount of approximately 6.0 million tons per year for 2018 emissions. Changes were made in response to this comment.

The validity of enforceable commitments needed from EGUs versus the flexibility of CAIR was not considered to be within the scope of this 2014 Five-Year Regional Haze SIP Revision.

The NPS questioned why the overestimated SO_2 emissions from the regional haze SIP are included in Chapter 4, Figure 4-1 for 2002 and 2018 in this 2014 Five-Year Regional Haze SIP Revision. The NPS noted that the Texas 2009 regional haze SIP stated that CENRAP modeled an overestimated amount of SO_2 for the 2002 and 2018 inventories. Because the overestimated amount accounts for almost 10% of the overall SO_2 inventory, the NPS requested correction of the over-reported area source SO_2 emissions as shown in Chapter 4, Figure 4-1. The NPS estimated a corrected amount of area source emissions by growing the corrected (value reported to the EPA) 2002 emissions to 2018 at the same rate as the uncorrected value. The NPS concluded that the SO_2 will remain below the projected modified 2018 SO_2 emissions. The EPA requested a comparison between the more recent SO_2 estimates and the CENRAP estimate.

The EI values from 2002 and 2018 are reported in the 2009 regional haze SIP revision and were not changed because they represent the values that were modeled in the 2009 regional haze SIP revision. The line for the modeling inventory is included in the comparison in Chapter 4, Figure 4.1 to indicate that the actual emissions from 2005, 2008, and 2011 inventories are below the values that were modeled. The updated 2002 values were reported to the EPA for the NEI. The overestimated amount is 10% of the overall SO_2 for 2002. The statewide estimate of 529,664 tons for SO_2 in 2011 is 29% below the projected state-wide SO_2 emissions of 749,119 for 2018 and consequently the impact from erroneous SO_2 values does not change the commission's conclusion that that SO_2 emissions continue to decrease and remain within the modeling projections.

The 2018 values are developed using growth estimates from the 2002 inventory. Correctly removing the overestimated amount in the future inventory would require developing a new inventory using a growth model, as not all sectors or categories are grown at the same rate. Because modeling was not required as part of the five-year SIP revision, these 2018 values were not updated.

As discussed above, the over-representation did not impact control strategy analysis and, as such, updating the estimates was not performed. No changes were made as a result of these comments.

The commission has concerns that removing the emissions mathematically based on simple ratios or projections for the entire area source category rather than by developing a modeling inventory could impact other area source emissions incorrectly. Not all sources are grown at the same rate and using an across-the-board ratio treats them all identically. However, this approach can be used to show that the impact from erroneous SO_2 values does not change the commission's conclusion that that SO_2 emissions continue to decrease and remain within the modeling projections for the state even with this alternative approach.

Sulfur dioxide emissions values used in Chapter 4, Figure 4-1 can be modified to show rough estimates of a removal of the over-reported amount in the projected 2018 inventory. The removal is made by estimating the actual incorrectly reported amount (based on a percentage) from 2002 remains the same in 2018. The over-reported amount in the 2002 inventory was 96,220 tons which was 86% of the reported area source number of 111,853 tons. The correct value reported to the EPA's national database is 15,663 tons. The projected 2018 area source SO_2 is 114,138 tons. Removing 86% of this value leaves 15,952 tons.

Actual SO_2 emissions for 2002, 2005, 2008, and 2011 were compared against the projected, modified trend. Although rising in 2005 above the trend line, the emissions fall after this peak and the emissions remain below the modified projection level, as shown in Figure A: *Area Source SO_2 Emissions* that follows. The statewide area source emissions were estimated to be 2% of the overall inventory in 2005 and this brief rise in their emissions did not result in the SO_2 exceeding the overall projected level.

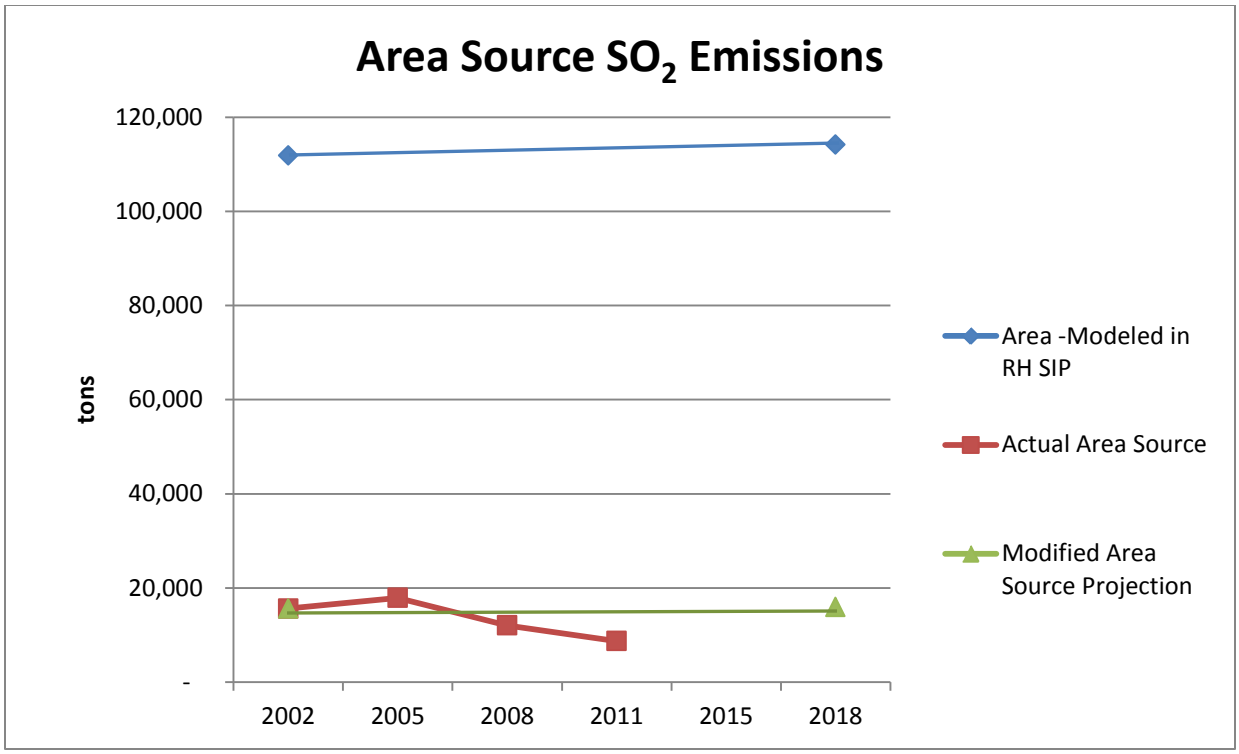

Figure A: Area Source SO_2 Emissions

The impact of changes in the area source emissions are shown on the total EI in the following graph, Figure B: *Area Source and Total Emissions Inventory SO_2 Trends*. The overall SO_2 emissions remain below the projected 2018 emissions. This is the case for both the modified and the unchanged 2018 SO_2 emissions.

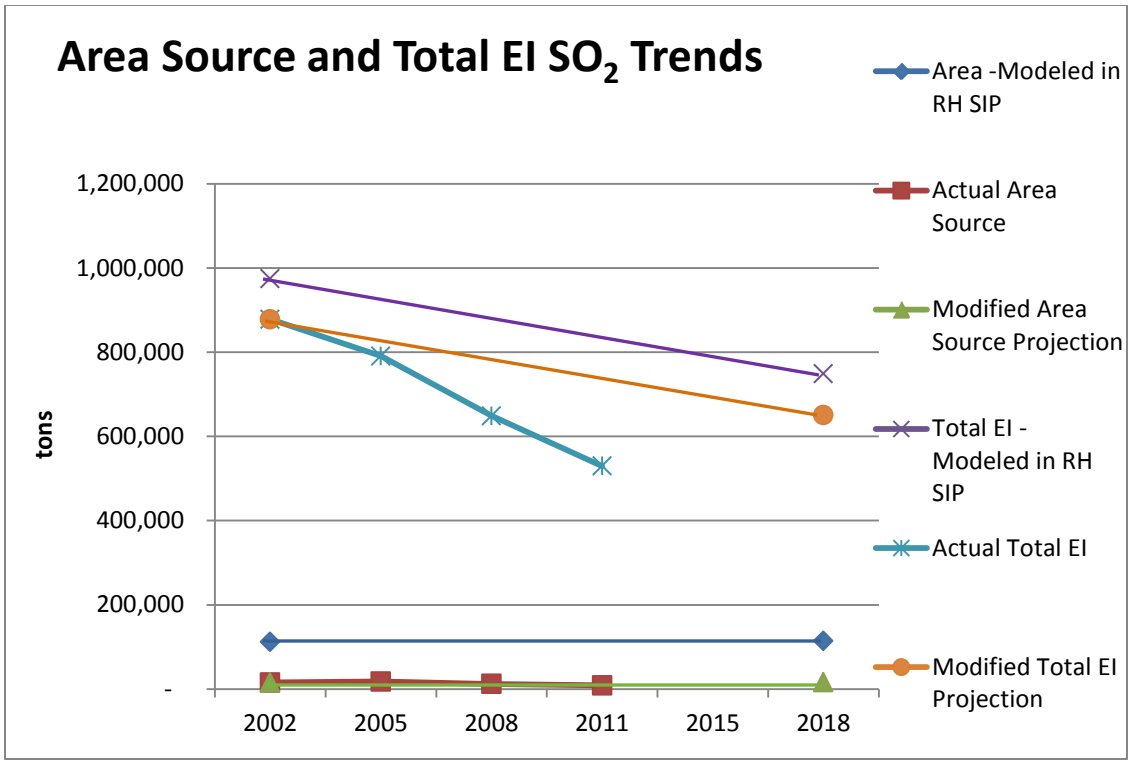

Figure B: Area Source and Total Emissions Inventory SO_2 Trends

The NPS requested that Texas provide support for its assumptions that, "The erroneously modeled industrial and residential coal combustion sources are typically individually smaller and distant from Class I areas. As a result, their representation in the model does not significantly detrimentally affect visibility estimates or model conclusions."

As discussed in the previous response, removing the overestimated SO_2 emissions from the area source inventory would reduce the ammonium sulfate visibility impairment that was projected by CENRAP modeling.

The NPS requested an update on the TCEQ's work with CENRAP to update the over-reported area source SO_2 emissions for future modeling.

The commission notified CENRAP of the error after CENRAP's modeling for the 2009 regional haze SIP was nearing completion. The error could not be corrected at that time. No additional CENRAP modeling has occurred since that date. At such time as that model is re-used, future emissions, including those over-reported SO_2 emissions will be readdressed. A more detailed explanation has been added to Chapter 4, Section 4.6: *Emission Data* in response to this comment.

The EPA commented that Texas should include a detailed discussion of emissions inventory development for oil and gas production since the CENRAP emissions inventories were developed, as well as a comparison of current oil and gas emission estimates to those included in the 2002 and 2018 CENRAP emissions inventories.

The projected NO_X and VOC emissions used in the CENRAP modeling estimates are greater than the most current overall area source category emissions even with the increased activity in oil and gas activity. Texas projects less anthropogenic visibility impairment in 2018 than the CENRAP modeling projected; therefore, Texas considers the current long-range strategy to achieve the 2018 RPGs is adequate. The TCEQ will continue to monitor this activity and incorporate the most current data available into its inventory estimate.

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 compressors engines, condensate and oil storage tanks, loading operations, heaters, and dehydrators. 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. A summary of the activities include:

- **2010 through 2011 Barnett Shale Special Oil and Gas Inventory – A two phase inventory project that obtained detailed equipment information and emissions data on oil and gas sources in the 23 county Barnett Shale formation area (http://www.tceq.texas.gov/assets/public/implementation/air/ie/pseiforms/Barnett%20Shale%20Area%20Special%20Inventory.pdf). This information was used to identify and analyze appropriate regulatory activities such as developing strategic plans to address air quality concerns and improving the oil and gas inventory.**

- **2010 DFW Compressor Engine Project – The TCEQ sponsored a University of Texas at Austin project to sample the ambient impact primarily downwind of gas compressor engines and develop typical compressor engines ambient signatures. These ambient signatures provided the TCEQ the ability to identify days when oil and gas compressor engines influence ozone levels in the DFW area.**

- **2010 Oil and Gas Platform Inventory Improvement Project – This project was designed to improve TCEQ information on the specific number of platforms, operational type (oil, gas, or oil and gas), location, and configuration of oil and gas platforms found in Texas state waters up to 10 miles from the shoreline (www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/ei/582078400 3FY1025-20100816-ergi-Offshore_Oil_Gas_Platform.pdf).**

- **2010 Oil and Gas Model Evaluation – This project used multiple studies (WRAP, TCEQ, CENRAP, etc.) to evaluate existing methods and models for estimating oil and gas production emissions for sources such as compressor engines, heater-treaters, storage tanks, well completions, pneumatic devices, fugitives, and dehydrators. This project identified the most appropriate method to calculate Texas emissions for each source type on a county basis. A Texas-**

specific spreadsheet calculator capable of generating future area source inventories was also developed.

- **2010 Produced Water Storage Tank Project – This project estimated VOC emissions from the storage of water produced during upstream oil and gas activities.**

- **2010 Upstream Oil and Gas Tank Emission Measurements – This study directly measured emissions from storage tanks at approximately 10 sites selected from the data collected by the 2007 Remote Sensing Survey Project, ambient monitoring trips, and the 2010 DFW IR Survey. The field work was conducted during spring/summer 2010 with a report by August 2010 (http://www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/ei/5820784004FY1025-20100830-environ-Oil_Gas_Tank_Emission_Measurements.pdf).**

- **2008 Flash Emissions Model Evaluation – The TCEQ conducted a research project in 2008 to identify the most representative calculation methodologies for upstream oil and gas storage tank emissions. The results of the report were used by the TCEQ to improve agency guidance and policy on calculating upstream oil and gas tank emissions.**

- **2008 Drilling Rig Emissions Project – Eastern Research Group developed a drilling rig engine emissions inventory that improved on previous work by developing drilling rig engine emissions profiles, improved well activity data, and using improved NONROAD model developed emission factors. The activity data and emissions characterization data were then used to develop the drilling rig engine emissions inventory development (http://www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/ei/5820783985FY0901-20090715-ergi-Drilling_Rig_EI.pdf).**

- **2007 Southeast Texas Compressor and Dehydrator Survey – Data were collected from 13 counties in southeast Texas from natural gas production sites to determine equipment counts of compressors and dehydrators.**

- **2007 Engine Fleet DFW Nonattainment Area Survey – This survey characterized the nonattainment DFW area engine fleet by type, load, and horsepower rating, as well as estimating nitrogen oxides emissions to evaluate the effectiveness of different control strategies.**

- **2005 Upstream Oil and Gas Tank Project – The TCEQ provided technical guidance to the Texas Environmental Research Consortium's project that directly measured speciated VOC emissions from oil and condensate storage tanks at wellhead and gathering site tank batteries. As a result, new emissions factors were developed for upstream oil and gas storage tanks. The TCEQ used these factors to revise the 2005 area source EI for VOC, adding approximately 700,000 tons per year statewide.**

Since 2009, approximately 10 research reports related to oil and gas emissions inventories have been commissioned by the TCEQ. For individual reports, please see the following TCEQ website http://www.tceq.texas.gov/airquality/airmod/project/pj_report_ei.html.

Clarifications were made in response to this comment.

The NPS suggested reporting oil and gas emissions separately and requested clarification if the refinery consent decree was accounted for in the oil and gas data.

For purposes of comparison with the regional haze SIP, the agency opted to remain with the same categories used in the 2009 regional haze SIP revision. The reporting was based on sector (area, on-road and off-road mobile, and industrial point). Only the electric generating units were subdivided out for comparison because of their emission characteristics and their specific treatment from CAIR regulations and BART.

The consent decree was for refineries and not the upstream oil and gas exploration and production sites or the midstream facilities. The refinery emissions as well as the largest upstream and midstream oil and gas sites are reported in the industrial point source inventory. Emission reductions associated with refinery consent decrees would be reflected in reported emission inventory estimates. Future emission reductions from these agreements have not been accounted for in this SIP revision. Oil and gas emissions from the numerous smaller sites associated with exploration and production are estimated based on production and well counts in the area source category.

REASONABLE PROGRESS GOALS

The NPS commented that Chapter 10, Table 10-2: *Reasonable Progress Goals for Class I Areas (Worst 20% Days)* in the 2009 regional haze SIP revision shows 0.7 deciview improvement at Big Bend NP and 0.9 deciview improvement at Guadalupe Mountains NP by 2018, while Appendix 8-1: *Technical Support Document for CENRAP Emissions and Air Quality Modeling to Support Regional Haze SIP*, (Appendix D) of the 2009 regional haze SIP revision predicts 16.69 deciviews at Big Bend NP and 16.35 deciviews at Guadalupe Mountains NP by 2018. (In the 2009 SIP, Chapter 10, Figures 10-1: *Glide Path for Big Bend Worst 20% Days* and 10-2: *Glide Path for Guadalupe Mountains Worst 20% Days* these 2018 estimates are truncated to 16.6 deciviews at Big Bend NP and 16.3 deciviews at Guadalupe Mountains NP.) The NPS also pointed out that the resulting improvement is 0.61 deciview (0.04 deciview/year) at Big Bend NP and 0.83 deciview (0.06 deciview/year) at Guadalupe Mountains NP by 2018.

The NPS is correct in pointing out that the RPGs for Big Bend NP and Guadalupe Mountains NP for 20% most impaired days were set by truncating the numbers instead of rounding them. The negative declaration in Chapter 7, Section 7.2 *Negative Declaration* makes revisiting the 2018 RPGs outside the scope for this 2014 Five-Year Regional Haze SIP Revision.

The NPCA and the Sierra Club commented that Texas' projected dates for reaching natural conditions are beyond 2064 and are flawed because the state used a novel methodology to calculate natural visibility impairment that departs from EPA's guidance. They commented that

Texas significantly underestimates the time it will take to achieve natural visibility levels in Big Bend and Guadalupe Mountains NPs. By departing from the EPA's methodology for calculating natural visibility conditions and that the proposed SIP overestimates the true level of natural visibility impairment. As a result, the 2155 and 2081 projected dates for Texas Class I areas to reach natural conditions do not reflect the return to true natural visibility conditions that the F requires (64 *Federal Register* 35714 and 35729). The NPS disagreed with Texas' projections that Big Bend and Guadalupe Mountains NPs will achieve natural conditions in 2155 and 2081, respectively. The NPS projected that using Texas' approach the state will not meet visibility goals until much later. The FS, the FWS, and the NPS requested Texas include the EPA's default glide path in the SIP.

The commenters correctly note that the estimates of natural conditions affect the years in which the straight line projection from the base period visibility (in deciviews) through the 2018 reasonable progress goal reaches the estimated level of natural visibility conditions. However, in Texas' 2009 regional haze SIP revision, the TCEQ did follow the required methodology for developing reasonable progress goals, including the required evaluation of the reasonableness of additional controls (Section 10.3: *Consideration of Additional Pollution Control* and 10.4: *Four Factor Analysis* of Chapter 10: *Reasonable Progress Goals*).

All estimates of natural visibility conditions are, in fact, estimates. The default estimates suggested by the EPA are estimates. They do not represent "true" natural visibility conditions. The estimates of natural conditions developed in preparing the Texas 2009 regional haze SIP revision were based on analysis of the conditions and influences affecting Big Bend and Guadalupe Mountains NPs rather than analysis for broad areas of the United States. The commenters did not note that the federal regional haze rule (40 CFR §51.308(d)(3)) places with each state the ultimate responsibility for calculating natural conditions for Class I areas within the state. The EPA default glide path is available in Appendix 8-1: *Technical Support Document for CENRAP Emissions and Air Quality Modeling to Support Regional Haze SIP,* (Appendix D) of the 2009 SIP (www.tceq.texas.gov/assets/public/implementation/air/sip/haze/TSD_APPEND_D.pdf).

Texas did use the required methodology for projecting the dates to reach natural conditions. The TCEQ notes that the federal regional haze rule-required methodology does not consider impacts from international transport, which is beyond both Texas' and the EPA's authority or ability to practically control.

Finally, the EPA has approved regional haze SIP revisions from California, Colorado, and South Dakota, which each set 2018 RPGs leading to projected achievement of natural conditions in years beyond 2064: California's Desolation Wilderness Area's goal to reach natural conditions is the year 2307 (76 FR 13944); Colorado's Black Canyon of the Gunnison National Park's goal to reach natural conditions is the year 2119; and South Dakota's Badlands' goal is the year 2265. At least 15 Class I areas are projected to reach natural conditions after the target date of 2064 (76 FR 13944). The NPCA website, reviewed in January 2014, shows an interactive US map that if you hoover over each site, you can get the projected date the state has calculated natural conditions (or "projected clean air date"). To get more details, the right border of the NPCA web page has links to fact sheets on 10

national parks that give details like EPA approval of plans and *Federal Register* notices (http://www.npca.org/protecting-our-parks/air-land-water/clean-air/cleanair4parks.html). No changes were made in response to these comments.

ADEQUACY

The NPCA and the Sierra Club stated that available data indicated that Texas's power plants will continue to cause visibility hot spots at multiple Class I areas even if power plants reduce their emissions to the allocations allowed under CAIR/CSAPR. In July 2013, the TCEQ was informed the EPA had an analysis done that showed 38 Texas point sources were responsible for a high level of the visibility impairment at Big Bend, Guadalupe Mountains, Wichita Mountains, and Caney Creek Class I areas. The EPA's analysis showed that even when CAIR reductions were accounted for, these power plants continued to impair visibility at the Class I areas. Controls like wet flue gas desulfurization, selective catalytic reduction, and various scrubber upgrades would improve visibility. The NPS, the NPCA and the Sierra Club commented the TCEQ should evaluate pollution controls and the corresponding cumulative visibility benefits for each of these sources and require appropriate reasonable progress controls.

The commission appreciates these comments but considers them outside of the scope for this 2014 Five-Year Regional Haze SIP Revision. As long as the determination required under 40 CFR §308(h) (64 FR 35769) is a negative declaration, further revision of the existing implementation plan is not needed at this time. As shown in this SIP revision in Chapter 7: *Adequacy of Current Regional Haze SIP,* the TCEQ has determined that further revisions to the existing SIP were not needed at this time for Texas or other states with Class I areas affected by emissions from Texas to meet all established reasonable progress goals.

In the 2009 regional haze SIP revision, the TCEQ did consider the cumulative impacts of multiple sources and reported the results of this consideration in Chapter 10 of the 2009 regional haze SIP revision. The TCEQ used areas of influence and used the $2,700 per ton reasonableness threshold used in the BART procedures to select the additional controls that would be the most cost-effective and effective for producing additional visibility improvement. The TCEQ determined in the 2009 regional haze SIP revision that over $300 million in additional control costs but producing less than 0.5 deciview of improvement at each Class I area would be unreasonable.

The NPS disagreed with Chapter 5, Section 5.6 *Summary Assessment* that the TCEQ demonstrated that the state's current strategy was adequate for Class I areas in Texas and outside Texas to meet all established reasonable progress goals. The NPCA and the Sierra Club commented that the proposed 2014 Five-Year Texas Regional Haze SIP Revision fails to comply with the federal regional haze rule because: 1) no Texas sources had to install equipment due to regional haze rule, but nearby states must; 2) Texas sources disproportionately impair visibility in Oklahoma and Arkansas; and 3) Texas fails to meet RPG by 2064.

The NPCA and the Sierra Club commented the TCEQ's approach to the five-year review is not acceptable in regards to Wichita Mountains, Caney Creek, and Upper Buffalo, where Texas power plants are the predominant contributor to regional haze and responsible for more haze pollution than Oklahoma and Arkansas point sources. The NPCA and the Sierra Club agreed

with the NPS comments that it was difficult to believe that Texas power plants cumulative emissions do not impair visibility in Class I areas in Texas and nearby states. The commenters contended that EGU sources in Texas, like Martin Lake and Big Brown, by themselves emit almost as much as the ten plants in Arkansas and Oklahoma. They further contended that Texas power plants have at least as much or more emissions per distance (Q/d) ratios to both Wichita Mountains and Caney Creek than do Oklahoma or Arkansas power plants. The NPCA and the Sierra Club commented that Texas sources cause or contribute to visibility impairment at many other out-of-state Class I areas.

The commission disagrees with the comment that no Texas sources have had to reduce emissions because of the federal regional haze rule. A number of Texas sources shutdown BART units while others chose to reduce emissions by dropping below the threshold impact for conducting a full BART review rather than carrying out a BART analysis (specific sources are listed in Table 9-9: *Post-BART Emissions Reductions at Texas Sources*, page 9-21 in the 2009 regional haze SIP revision and in the follow table). The details are in Chapter 9: *Best Available Retrofit Technology* of the Texas' 2009 regional haze SIP revision.

Regarding EGUs, CAIR is being implemented in Texas. CAIR is a cap and trade rule and EGUs are subject to caps, which step down significantly in 2015. EGUs are also subject to EPA's Mercury and Air Toxics Standards (MATS) requirements and it is not yet known which units will choose which controls or other means of compliance with CAIR, MATS, and other applicable requirements including consent decrees.

The commission notes that neither the federal regional haze rule nor the EPA has defined what amount of impairment in inverse megameters or what percentage of total measured impairment constitutes a significant contribution to visibility impairment at a Class I area.

Table 9-9: Post-BART Emissions Reductions at Texas Sources[1]

Regulated Entity Number	Source	Reason[2]	Account[3]	NO_X Reduced from Baseline 2002 (tpy)	SO_2 Reduced From Baseline 2002 (tpy)	PM Reduced from Baseline 2002 (tpy)
RN100211507	Capitol Cement	Shutdown wet kiln	BG0045E	1,328	1,193	100
RN100227016	Dow/Celanese	NSP permit and transfer of ownership	HG0126Q	694	0	0
RN102450756	ExxonMobil Oil[4]	Permit revision	JE0067I	2.7	290	0
RN102609724	Norit Americas Inc	Permit revision	HH0019H4[5]	16.6	5.4	0
RN100216621	Regency Tilden Gas (formerly Enbridge Pipeline)	Permit revision	MC0002H	2	2,276	0.2
RN102551785	Targa (formerly Dynegy Midstream Services)	Shutdown all BART equipment	CY0019H	336	0.3	0.5
RN102561925	The Goodyear Tire and Rubber Co	Permit revision	JE0039N	89.1	11.3	2.9
RN100213685	Valence Midstream Ltd	Shutdown	HR0018T	247.1	2,742.5	5.6
RN100218601	Vetrotex America St. Gobain	Shutdown	WH0014S	62.6	16.4	59.0
	Total=9,785.2 tpy			2,778.1	6,535.9	168.2

1. This table was created for use in the Texas 2009 regional haze SIP revision.
2. Further details can be found in Appendix 9-11: *Documentation of Emission Reductions* at http://www.tceq.texas.gov/assets/public/implementation/air/sip/haze/App9_11_rev.pdf
3. The first two letters in account number are the abbreviation for the source's county location.
4. ExxonMobil estimates are based on reductions from the 2002 EI and pre- and post-BART hourly emissions.
5. Company has permit limiting combined SO_2 and NO_X to 841 tpy on previously grandfathered BART sources. This limit is lower than actual emissions in previous years. For example, the facility emitted 1,266 tpy of NO_X and SO_2 in 1990.

The NPCA and the Sierra Club commented that this five-year progress report demonstrated that Texas violates 40 C.F.R. § 51.308(d)(1) because visibility conditions at Big Bend NP degraded by 0.1 deciview on the least impaired days from baseline period to the 2005 through 2009 period. The NPCA and the Sierra Club disagreed with Chapter 3: *Assessment of Visibility* that there was a lack of statistically significant change in visibility impairment on the 20% least impaired days at Big Bend NP. The EPA commented that after incorporating more recent data if Texas confirms that Big Bend NP still experiences a slight degradation on the 20% best days, Texas should include this in conclusion under section 51.308(g)(6) and (h) regarding Big Bend NP.

The commission notes that for the latest five-year period, 2007 through 2011, the average visibility impairment on the 20% least impaired days is 5.6 deciviews, which is less impaired than the average impairment on the 20% least impaired days during the 2000 through 2004 base period. The TCEQ disagrees with the comment that the statistical significance of a change is not pertinent. The variation of five-year averages between slight degradation and slight improvement for the 20% least impaired days is to be expected because of the relatively large year-to-year fluctuation in annual deciview levels. For the most recent period with available data, 2007 through 2011, the visibility for the 20% least impaired days at Big Bend NP was improved from the base period, 2000 through 2004, by 0.2 deciview.

The EPA and the NPS commented that Texas should further evaluate the visibility conditions observed on the 20% worst days and identify the changes in contributions to visibility impairment for each species that impacts visibility. They provided as an example the difference in visibility impact from sulfate should be assessed to provide an understanding of how reductions in sulfate emissions are affecting visibility. A similar analysis should be performed for the 20% best days. The NPS commented that Texas should provide similar charts for Class I areas outside its borders.

The commission does not agree that the suggested level of analysis is required for the five-year progress report in this 2014 Five-Year Regional Haze SIP Revision, but Texas has included discussion and some figures, in Chapter 3, Section 3.2: *Assessment of Visibility Conditions* that track pollutant contributions to regional haze at Big Bend, Guadalupe Mountains, Carlsbad Caverns, Wichita Mountains, Caney Creek and White Mountains Class I areas. The decreases in sulfate, the largest contributor to visibility impairment on the 20% most impaired days at these Class I areas, are consistent with the decreases in SO_2 emissions in Texas and other areas subject to CAIR or BART. Changes were made in response to this comment.

The EPA and the NPS suggested that Texas and New Mexico should consult one another to establish consistent natural condition estimates for Carlsbad Caverns and Guadalupe Mountains NPs.

The commission disagrees with the implied suggestion that Texas' best estimate of natural conditions for Guadalupe Mountains Class I Area and New Mexico's choice of natural conditions estimates for Carlsbad Caverns Class I area need to be reconciled. Each state is responsible for choosing the best estimate of natural conditions for its Class I areas (64 FR 35766):

(2) Calculations of baseline and natural visibility conditions. For each mandatory Class I Federal area located within the State, the State must determine the following visibility conditions (expressed in deciviews)... (iii) Natural visibility conditions for the most impaired and least impaired days. Natural visibility conditions must be calculated by estimating the degree of visibility impairment existing under natural conditions for the most impaired and least impaired days, based on available monitoring information and appropriate data analysis techniques ...

For these reasons, no changes were made as a result of this comment.

The NPCA and the Sierra Club commented Texas power plants emit far greater quantities of SO_2 and NO_X pollution than Oklahoma and Arkansas power plants. The commenters stated that Texas power plants emitted more than 25% more NO_X pollution than all the power plants in Oklahoma and Arkansas combined, and Texas emitted more than double the amount of SO_2 pollution than both those states combined. As the NPS explained in its comments, given the large quantities of NO_X and SO_2 pollution from Texas's power plants, the commenter considers it difficult to believe that these cumulative emissions do not impair visibility in Class I areas in Texas and nearby states. They further state the two largest sources in Texas - Martin Lake and Big Brown plants - emit almost as much as the ten plants in Arkansas and Oklahoma. Texas power plants have equivalent or larger emissions per distance (Q/d) ratios to Wichita Mountains and Caney Creek than Oklahoma and Arkansas power plants.

The commission documented in Chapter 11: *Long-Term Strategy to Reach Reasonable Progress Goals* of the 2009 regional haze SIP revision the results of the CENRAP modeling analysis for 2002 and 2018, which did the best apportionment available of Texas' contributions to PM components and visibility impairment at the Class I areas affected by emissions from Texas. The TCEQ notes that the 2018 projections show that Texas' impacts at Wichita Mountains and Caney Creek will be reduced in proportion to the reductions in impacts from all other sources. The TCEQ notes that power plants in Texas have been subject to state requirements for NO_X and SO_2 reductions since May 1, 2003 - long before the first phase of CAIR requirements came into effect in 2009 and 2010. The second phase of CAIR requirements should result in substantial emission reductions when CAIR, or a subsequent program, goes into effect in 2015. The power plants in Oklahoma were not subject to CAIR requirements, so Oklahoma's EGUs were subject to BART requirements.

The NPCA and the Sierra Club commented that the TCEQ attempted to undervalue the IMPROVE monitoring data by claiming year-to-year variation, international emissions, dust storms, or transport of dust from dry lake beds in Mexico could have produced the slight increase in visibility impairment. While these hypotheticals may contribute to visibility degradation at Big Bend NP, the proposed SIP's failure to require any pollution controls could also be the cause of this visibility degradation. The commenters understood the five-year average of annual visibility impairment from 2005 through 2009 was designed to reduce unusual annual fluctuations. The commenters disagreed with the state's suggested causes of the visibility degradation. The commenters stated that RPGs must provide for improvement in visibility on the most impaired days and ensure that visibility is not degraded on the best days.

The commission disagrees with these comments. IMPROVE data for 2010 and 2011 are now available for analysis, and the data show that the most recent five-year average visibility impairment for the 20% least impaired days is improved compared to the base period. The TCEQ notes that the result of random year-to-year variation does lead to some random variation in five-year average visibility impairment but that the random variation in five-year averages is smaller than the year-to-year variation.

The NPCA and the Sierra Club commented that Texas needs a valid and legally-defensible regional haze SIP in place by the end of 2014 to comply with the requirements of the regional haze program. The commenters think Texas' proposed SIP revision violates the federal regional haze rule; for example, Texas does not meet natural conditions by EPA's default year of 2064, and the SIP does not have any BART sources. The commenters requested TCEQ withdraw this 2014 Five-Year Regional Haze SIP Revision as the groups consider the plan inadequate.

The commission disagrees with this comment. As discussed in response to similar individual comments, the 2009 regional haze SIP revision and this 2014 Five-Year Regional Haze SIP Revision both meet the requirements of the federal regional haze rule. The commission considers that the commenter has misinterpreted the requirements of that rule in reaching the conclusion that Texas' regional haze SIP provisions do not meet the regional haze rule requirements. The federal regulations give each state the prerogative to determine natural conditions and BART following legal guidelines as noted in the following two citations.

- **Each state is responsible for determining natural conditions. The EPA supplies a default natural condition; however, if the state chooses to, each state may calculate the natural conditions for each site. Texas has calculated the natural conditions for each Class I area in Texas and will not be using the EPA recommended default of natural conditions. Each state is responsible for choosing the best estimate of natural conditions for its Class I areas (64 FR 35766):**

  > **(2) Calculations of baseline and natural visibility conditions. For each mandatory Class I Federal area located within the State, the State must determine the following visibility conditions (expressed in deciviews)... (iii) Natural visibility conditions for the most impaired and least impaired days. Natural visibility conditions must be calculated by estimating the degree of visibility impairment existing under natural conditions for the most impaired and least impaired days, based on available monitoring information and appropriate data analysis techniques ...**

- **Each state is responsible for its own BART determinations. Texas determined that the state has no BART sources, and Texas is a CAIR state and is relying on CAIR to be better than BART for EGUs in Texas. 40 CFR 51.308(e) includes the Best Available Retrofit Technology requirements for regional haze visibility impairment:**

  > **The State must submit an implementation plan containing emission limitations representing BART and schedules for compliance with BART for**

each BART-eligible source that may reasonably be anticipated to cause or contribute to any impairment of visibility in any mandatory Class I Federal area, unless the State demonstrates that an emissions trading program or other alternative will achieve greater reasonable progress toward natural visibility conditions.

The NPS requested that the TCEQ discuss in Chapter 5: *Assessment of Reasonable Progress Goals* the CENRAP air quality modeling using the particulate source apportionment test (PSAT), which estimated states' contributions to sulfate and nitrate at each Class I area. The commenter noted that Texas contributed up to 28% of the sulfate at neighboring Class I areas and included charts apportioning contributions to visibility impairment at Big Bend and Guadalupe Mountains NPs. The NPS requested that Texas provide similar charts for Class I areas outside of the state. The FS requested that the impacts from Texas sources, which are still divided into three separate areas, be combined in new charts to show Texas full impact compared to the impacts of other states.

The commission appreciates this request but considers that discussion of Particulate Matter Source Apportionment Technology (PSAT) modeling in Chapter 8: *Modeling Assessment* of Texas' 2009 regional haze SIP revision was adequate. No changes were made in response to these comments.

The NPS requested additional discussion of Texas' contribution to Class I areas outside Texas. The NPS, the NPCA and the Sierra Club disagreed that the TCEQ has demonstrated that the existing SIP was adequate for continued progress toward established reasonable progress goals in other states. The NPCA and the Sierra Club commented that the TCEQ should revise the SIP so Texas and other states Texas impacts will be on the glide path by 2064.

The NPS requested that TCEQ compare current visibility conditions to the 2018 goals for Class I areas in Texas and those Class I areas impacted by Texas to show that reductions are sufficient and on track to meet reasonable progress goals by 2018. The NPS requested that the four figures in Chapter 5 of the proposed SIP revision include the full glide paths to natural visibility conditions out to 2064 and not just the last 10 years; also, the NPS requested Texas use the same vertical axis for the 20% worst and 20% best visibility days and show the average deciview for the 20% worst days for each year and rolling five-year averages.

These comments may be based on the assumption that the federal regional haze rule requires straight line improvement in visibility from the base period to the 2018 RPGs for each affected Class I area. Instead, the appropriate test is whether visibility in 2018 at each Class I area meets the reasonable progress goal set for it and, if the visibility fails to meet the 2018 RPG, whether the emissions from a state had a greater contribution to visibility impairment at the Class I area than the contribution projected when the RPG was set.

There is considerable year-to-year variation in the five-year average visibility impairment at each Class I area, and, because of this variation, each Class I area may have its five-year visibility average (both 20% most impaired days and 20% least impaired days) move from one side to the other of the straight line interpolated from the base-period visibility impairment to the 2018 RPG for the most and 20% least impaired days. While it is tempting for the EPA and others to

compare the year-by-year values for average five-year average visibility impairment to the straight line drawn from the base period visibility to the 2018 RPG, no such straight line reduction is required by the federal regional haze rule. The requirement for the five-year progress report is to assess whether the 2018 RPGs set by the states for their Class I areas will be met. Texas has addressed that requirement in this 2014 Five-Year Regional Haze SIP Revision. Substantial additional reductions in EGU NO_X and SO_2 emissions are required by CAIR for 2015. Also, the EPA MATS rule requirements take effect April 16, 2015 (or 2016 if companies are granted a one-year extension). The MATS rule emission limitations are new requirements that were not used to project progress to 2018 or to set RPGs for the CENRAP states. The requirements include an acid gas emissions limit. Where hydrochloric acid gas emissions exceed the MATS limit, some EGUs may choose control by dry sorbent injection, which would also accomplish partial SO_2 removal. It is not possible to reliably predict how EGU owners will choose to meet the MATS or other overlapping requirements, including consent decree requirements. Because federal regional haze rule requirements are not needed for reductions at this time and the non-linear nature of reductions per year in emissions allowable for EGUs (the source of most SO_2 emissions in Texas), it is neither legally required nor technically appropriate to judge the adequacy of the Texas regional haze SIP provisions by comparing visibility improvement at affected Class I areas to a straight line (drawn in deciview space) from the base period visibility in 2002 to the 2018 reasonable progress goal for each Class I area. The TCEQ notes, however, that for each Class I area affected by Texas' emissions, it has included the 2007 through 2011 average five-year average visibility impairment values for the 20% most impaired days in Chapter 5 of this 2014 Five-Year Regional Haze SIP Revision. For the 2007 through 2011 period, out of the four Class I areas to the northeast of Texas that had 2005 through 2009 average values above the straight line from 2002 impairment to the respective 2018 RPGs, three of the four areas had 2007 through 2011 averages below the interpolation line. The average for one Class I area in New Mexico - White Mountain - went from 0.4 deciview below the line for 2005 through 2009 to 0.4 deciview above the line for the 2007 through 2011 average. Because of the substantial variation in year-to-year values of the five-year averages for the 20% most impaired days and the 20% least impaired days, one would expect that with a linear decrease in visibility impairment, and being on schedule to meet 2018 RPGs, about half of the Class I areas would be below and the other half above the straight line interpolation from the base period represented by 2002 to 2018 reasonable progress goal set by the state. For an example, see Chapter 5, Figure 5-1: *Visibility Improvement at Big Bend National Park for 20% Most Impaired Days* in the final version of the Texas 2014 Five-Year Regional Haze SIP Revision.

There is no requirement for straight line linear decrease in visibility impairment for meeting 2018 RPGs. However, the 20% most impaired days for 11 of the 13 Class I areas affected by Texas have data that are below the straight extrapolation line adds to weight of evidence that Texas regional haze SIP provisions are adequate. The additional, enforceable emission reductions documented in Chapter 2 of this 2014 Five-Year Regional Haze SIP Revision that go beyond those included in Texas' 2009 regional haze SIP revision add further weight of evidence

for the adequacy of Texas' SIP provisions to allow each Class I area Texas' emissions impact to reach its 2018 RPGs.

The commission considers that the 2009 regional haze SIP revision and the every-10-year major regional haze SIP revisions that set RPGs for the next 10 years are the place to display the glide paths to 2064 natural conditions and the extrapolated lines from base period visibility conditions through the next 10-year RPGs with extrapolations to the year in which the extrapolated line would reach natural conditions.

The NPCA and the Sierra Club made several references to Dr. Thompson's modeling report, noting that large selected Texas sources do impact visibility at Big Bend, Guadalupe Mountains, Wichita Mountains, and Caney Creek Class I areas. The Thompson report concluded that eliminating several large sources would reduce visibility impairment impacts at the nearby Class I areas.

The Thompson report discussed modeling of the CSAPR, a possible CAIR replacement program. The Thompson report's purpose was to estimate the impacts of emissions associated with four coal-fired EGUs located in Texas, on visibility at four Class I areas in Texas, Arkansas and Oklahoma. The report suggested Texas EGUs make greater emissions reductions specifically at Welsh, Monticello, Big Brown, and Martin Lake.

The commission considers that the CAIR program is an appropriate mechanism for determining requirements for emissions reductions and a cost-effective way of making decisions about reductions in the visibility impairing pollutants SO_2 and NO_X from EGUs for the progress of regional haze. It is possible that the EPA will propose and adopt a replacement for CAIR in the future; regardless, all states, including Texas will continue to be required to address the issue of transported emissions, including visibility impairing pollutants SO_2 and NO_X. The TCEQ appropriately considered in its 2009 regional haze SIP revision the reasonableness of requiring additional emission reductions beyond those required by CAIR, BART for non-EGU source, other EPA emission reduction programs, and previously TCEQ adopted emission reduction requirements.

In Chapter 2, page 2-13, information has been added about two announced and planned for EGU shutdowns. Welsh Unit 2 shutdown is part of a consent decree, while the Deely Boiler shutdown has been announced by the company. These announced shutdowns have not yet resulted in enforceable reductions; however, they will likely result in future reductions that can be accounted for in future regional haze planning periods.

The EPA, the NPCA and the Sierra Club commented that visibility at Wichita Mountains in Oklahoma has degraded by 0.1 deciview on the least impaired days, according to Chapter 5 of this 2014 Five-Year Regional Haze SIP Revision. They suggest that the TCEQ attempts to downplay such degradation by claiming the change is statically insignificant based on the t-test, to which they disagree. The EPA commented that Texas sources impact visibility at the Wichita Mountains more than Oklahoma sources. The EPA stated the Oklahoma SIP predicts improvement on the 20% best days for the Wichita Mountains if Texas were to adopt the

controls discussed in the 2009 regional haze SIP revision. The EPA suggested that Texas should consider these controls again for sections 51.308(g)(6) and (h) regarding the Wichita Mountains.

The commission disagrees with the comment that the t-test is not appropriate for determining whether two averages are statistically different. As stated in this 2014 Five-Year Regional Haze SIP Revision, there is variation from year-to-year in the five-year average visibility impairment for the 20% least impaired days. The five-year average for the most recent five-year period (2007 through 2011) shows improved visibility for both Big Bend NP and Wichita Mountains compared to the five-year base period (2000 through 2004).

The FS commented that reductions stated in the proposed revision vary for each area, leading to pollutant control inconsistencies and a level of reductions lower than would otherwise be made. If one section can reduce emissions to a particular level they should all be able to reduce emissions to that same level, and not allow some areas to have higher emission levels.

The emissions limitations on sources in East Texas are more stringent due to more ozone nonattainment areas in that geographic area. West Texas only has one nonattainment area in one county. The TCEQ is not aware of a requirement in the federal regional haze rule that the whole state must limit emissions in the same way.

CONSULTATION

The FS commented that Texas failed to adequately consult with the FS per the consultation with FLMs provisions in 40 CFR §51.3-8 (i).

Commission staff contacted Bret Anderson, the designated FS contact for the Texas region, as instructed. Texas did not intend to leave out any FLM, and followed the FS chain of command as was understood in developing the progress report shown in this 2014 Five-Year Regional Haze SIP Revision. The TCEQ added Forest Service staff Judy Logan and Charles Sams for further outreach and both were present for the two FLM consultation calls regarding this SIP revision.

ORDER ADOPTING
REVISION TO THE STATE IMPLEMENTATION PLAN

Docket No. 2013-0595-SIP
Project No. 2013-013-SIP-NR

On February 26, 2014, the Texas Commission on Environmental Quality (Commission), during a public meeting, considered adoption of the 2014 Five-Year Regional Haze State Implementation Plan (SIP) Revision. The Commission adopts this revision to the SIP to satisfy the requirements of federal Regional Haze Regulations, 40 Code of Federal Regulations (CFR) § 51.308, that states submit a progress report for each Class 1 area in the state in the form of a SIP revision every five years. Section 51.308(g) provides that the report must evaluate "progress towards the reasonable progress goal for each Class I area located within the state and in each Class I area outside the state which may be affected by emissions from within the state." The state is required to compare data from the baseline years (2000 through 2004) to the most current available five years (2005 through 2009) provided by the Interagency Monitoring of Protected Visual Environments network. The deadline for Texas to submit a five-year regional haze SIP revision is March 19, 2014, five years after submittal of the initial regional haze SIP revision. Under Tex. Health & Safety Code Ann. §§ 382.011, 382.012, and 382.023 (Vernon 2011), the Commission has the authority to control the quality of the state's air and to issue orders consistent with the policies and purposes of the Texas Clean Air Act, Chapter 382 of the Tex. Health & Safety Code. Notice of the proposed SIP revision was published for comment in the August 23, 2013 issue of the *Texas Register* (38 TexReg 5567).

Pursuant to 40 Code of Federal Regulations § 51.102 and after proper notice, the Commission offered a public hearing to consider revision to the SIP. Proper notice included prominent advertisement in the areas affected at least 30 days prior to the date of the hearing. A public hearing was offered in Austin on September 24, 2013.

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 revision, either orally or in writing, at the hearing, 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 Web site.

Data, views, and recommendations of interested persons regarding the proposed SIP revision were submitted to the Commission during the comment period, and were considered by the Commission as reflected in the analysis of testimony incorporated by reference to this Order. The Commission finds that the analysis of testimony includes the names of all

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

IT IS THEREFORE ORDERED BY THE COMMISSION that the revision to the SIP 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

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Bryan W. Shaw, Ph.D., Chairman