

# Regional Haze Five Year Progress Report

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**For Request of Public Comment**

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## 1 Federal Regional Haze Requirements

In conformance with Sections 169A and 169B of the federal Clean Air Act, codified in Sections 7491 and 7492 of Title 42 in the United States Code (“U.S.C.”), the Administrator of the U.S. Environmental Protection Agency (EPA) promulgated the regional haze regulations, effective 30 August 1999, to address visibility impairment in mandatory Class I areas (42 U.S.C. §§ 7491-7492 (2012); 40 C.F.R. §§51.301-51.309 (2015)). The U.S. Fish and Wildlife Service manages the Wichita Mountains Wilderness Area (“Wichita Mountains”) in Comanche County, the only Class I area located in Oklahoma. The Oklahoma Department of Environmental Quality (DEQ) functions as the official air pollution control agency for the State of Oklahoma. Alongside its other responsibilities, DEQ develops implementation plans, and when finalized, these plans are submitted to EPA for approval.

### 1.1 Previous Regional Haze Implementation Plans

In accordance with 40 C.F.R. § 51.308, Oklahoma must address regional haze at the Wichita Mountains and at each mandatory Class I area located outside Oklahoma that may be affected by emissions generated within Oklahoma. In February 2010, Oklahoma submitted a state implementation plan (SIP) revision specifically for regional haze that identified natural visibility conditions and set reasonable progress goals at the Wichita Mountains Class I area. That implementation plan revision also laid out a long-term strategy addressing regional haze visibility impairment for the Wichita Mountains and all Class I areas located outside Oklahoma that may be affected by emissions generated within Oklahoma.

That regional haze SIP revision evaluated numerous sources for applicability of best available retrofit technology (BART) and included determinations for six electric generating facilities, requiring them to install, operate, and maintain BART. While approving many aspects of that SIP revision, EPA disapproved DEQ’s BART determinations for SO<sub>2</sub> emissions from six coal-fired electric generating units located at three facilities. Therefore, EPA issued a federal implementation plan (FIP), revising SO<sub>2</sub> BART emission limits on coal-fired electric generating units at those three facilities (76 Federal Register 81727 (28 December 2011), codified at 40 C.F.R. § 52.1923). The FIP affects two units at American Electric Power/Public Service Company of Oklahoma’s (AEP/PSO’s) Northeastern Power Station in Rogers County. The FIP also affects units at two facilities owned and operated by Oklahoma Gas and Electric Company (OG&E): Muskogee Generating Station in Muskogee County and Sooner Generating Station in Noble County. On 20 June 2013, following a settlement agreement among EPA (alongside the federal Department of Justice), DEQ, and AEP/PSO, Oklahoma submitted, and EPA approved another SIP revision to replace the FIP as it related to the AEP/PSO facility ([79 Federal Register 12944, 12954](#) (7 March 2014), codified at 40 C.F.R. §§ 52.1920(e) and 52.1928(c) & (d)). However, the FIP still applies unaltered to the units at the Oklahoma Gas and Electric facilities.

Oklahoma’s initial SIP revision for regional haze, submitted in February 2010, documented that the majority of visibility impairment at the Wichita Mountains results from emissions generated in Texas. The effect of these emissions limits the reasonable progress goals and long-term strategy for visibility improvement at the Wichita Mountains. EPA disapproved portions of Texas’s implementation plan for regional haze related to the effects of its emissions at the Wichita Mountains and other Class I areas.

EPA also disapproved a portion of Oklahoma's regional haze SIP revision, the reasonable progress goals at the Wichita Mountains and its reasonable progress consultation with Texas. EPA promulgated simultaneously a FIP for Texas, which requires additional reductions from eight coal-fired electric power plants ([81 Federal Register 295](#) (5 January 2016), codified at 40 C.F.R. §52.2302). EPA also calculated new (numerical) reasonable progress goals at the Wichita Mountains. EPA's action did not include any additional requirements on emission sources within Oklahoma. Texas on 29 February 2016 filed a petition for review of this regulation in the United States Court of Appeals for the Fifth Circuit in New Orleans. On 18 March 2016, Texas filed a request for a stay of the FIP. On 15 July 2016, the court issued a stay of the FIP, including the emission control requirements. The reasonable progress goal at the Wichita Mountains presumably depends on the outcome of this litigation.

DEQ submits this progress report to EPA as a SIP revision for regional haze, in fulfillment of the requirement in 40 C.F.R. § 51.308(g). This report evaluates progress toward the reasonable progress goals for the Wichita Mountains and for each mandatory Class I federal area outside Oklahoma that emission sources within Oklahoma may affect. The final section of this progress report documents the report's compliance with 40 C.F.R. § 51.102, 40 C.F.R. § 51.103, and any other applicable procedural requirements.

## 1.2 Legal Authority

Section 2-5-105 of Title 27A of the Oklahoma Statutes ("O.S.") designates DEQ as the administrative agency for the Oklahoma Clean Air Act (27A O.S. §2-5-105 (2011)). The Air Quality Division (AQD) of DEQ has the authority to carry out all duties, requirements, and responsibilities necessary and proper for the implementation of the Oklahoma Clean Air Act and the fulfillment of the requirements of the federal Clean Air Act. (27A O.S. § 1-3-101(B)(8) (2011); 27A O.S. § 2-3-101(E)(1) (2011); 27A O.S. § 2-5-105 (2011)). Section I-D and Appendix 1-1 of Oklahoma's original Regional Haze SIP revision contain a more complete description of AQD's legal authority. Appendix I of this progress report provides much of this information and relevant updates.

## 2 Major Stationary Sources and Best Available Retrofit Technology

### 2.1 Best Available Retrofit Technology: Initial Implementation Plan

The BART rule in Oklahoma, codified in the Oklahoma Administrative Code (“OAC”) in 252:100, Subchapter 8, Part 11, Visibility Protection Standards, implements the requirements of regional haze regulations promulgated by EPA, and incorporates 40 C.F.R. Part 51, Appendix Y by reference (OAC 252:100-8-72 (2011)). In accordance with §169A of the federal Clean Air Act, added on 7 August 1977, BART-eligible sources must meet several criteria. BART-eligible sources belong to one of 26 industry source categories, have the potential to emit 250 tons per year or more of any regulated visibility-impairing air pollutant, began operation after 7 August 1962, and existed on 7 August 1977 (42 U.S.C. §7491 (2012)). DEQ identified 140 BART-eligible emission units located at 20 facilities in Oklahoma. Any BART-eligible source determined to cause or to contribute to visibility impairment at the Wichita Mountains or at any other mandatory Class I area must install, operate, and maintain BART. The Oklahoma BART rule also provides for the incorporation of the applicable source-specific requirements into an air quality permit for each source.

### 2.2 Eligibility Status of Sources

Chapter VI of Oklahoma’s initial SIP revision for regional haze described the BART requirements in Oklahoma in more depth. Table 2-1 lists the emission units ultimately determined to meet the category, size, age, and emissions criteria to constitute “BART-eligible” sources.

Table 2-1: Facilities with best available retrofit technology eligible units in Oklahoma

Source category	Facility name	County	Number of units	Applicability status
Hydrofluoric, sulfuric, and nitric acid plants	Koch Fertilizer Enid LLC Enid Nitrogen Plant	Garfield	7	Granted waiver from BART based on dispersion modeling pursuant to 40 C.F.R. Part 51, Appendix Y, and the BART rule; contributes < 0.5 deciview to visibility impairment at Wichita Mountains or any other mandatory Class I area.
	Terra International Oklahoma Inc. Woodward Nitric Acid, Ammonia, and Urea Production Facility	Woodward	11	
	Terra Nitrogen LP Verdigris Plant	Rogers	12	
Petroleum refineries	Holly Refining & Marketing (formerly Sinclair Tulsa Refining Company) Tulsa East Refinery	Tulsa	7	
	Holly Refining and Marketing – Tulsa LLC	Tulsa	25	

Source category	Facility name	County	Number of units	Applicability status
	(formerly Sunoco) Holly Tulsa West Refinery			
	Wynnewood Refining Company, LLC Wynnewood Refinery	Garvin	14	
	Valero Refining Company – Oklahoma Valero Refinery Valero Ardmore Refinery	Carter	24	
Portland cement plants	Tulsa Cement LLC dba Central Plains Cement Co (formerly Lafarge Building Materials Incorporated) Portland Cement Manufacturing Facility	Rogers	10	
Fossil fuel-fired steam electric plants > 250 million British thermal units per hour heat input	Oklahoma Gas & Electric Company (OG&E), Horseshoe Lake Generating Station	Oklahoma	2	BART-subject (will install, operate, and maintain BART)
	Public Service Company of Oklahoma (PSO) Riverside Jenks Power Station	Tulsa	2	
	Western Farmers Electric Cooperative Mooreland Station	Woodward	3	
	OG&E Muskogee Generating Station	Muskogee	2	
	OG&E Seminole Generating Station	Seminole	3	
	OG&E Sooner Generating Station	Noble	2	
	American Electric Power (AEP)/PSO Comanche Power Station	Comanche	2	
	AEP/PSO Northeastern Power Station	Rogers	3	
	PSO Southwestern Power Station	Caddo	1	
	Western Farmers Elec-	Caddo	3	

Source category	Facility name	County	Number of units	Applicability status
	tric Cooperative Anadarko Power Plant			on reductions in potential emissions and updated dispersion modeling pursuant to 40 C.F.R. Part 51, Appendix Y, and the BART rule; after specified modifications, will contribute < 0.5 deciview visibility impairment at Wichita Mountains or any other mandatory Class I area.
Fossil fuel-fired boilers > 250 million British thermal units per hour heat input	Georgia Pacific Consumer Products (formerly Fort James Operating) Muskogee Mill	Muskogee	2	
Kraft pulp mill	International Paper (formerly Weyerhaeuser) Valliant Paper Mill	McCurain	5	

## 2.3 Waivers for BART-eligible Units

As indicated under the “Applicability status” column of Table 2-1 above, BART-eligible units at 11 facilities demonstrated a contribution of less than 0.5 deciviews to visibility impairment at the Wichita Mountains and at all other nearby Class I areas, based upon screening or refined dispersion modeling. DEQ required none of these units to install BART and granted them waivers that required no additional facility or permitting action.

Initial modeling results for the other BART-eligible sources indicated a contribution greater than 0.5 deciviews of visibility impairment at one or more mandatory Class I areas under then-permitted operations. However, three of the facilities (Georgia-Pacific Consumer Products LP – Muskogee Mill, International Paper – Valliant Paper Mill, and Western Farmers Electric Cooperative – Anadarko Power Plant) identified available reductions in potential emissions. Updated source-specific analyses, taking into account these reductions in potential emissions, demonstrated that each of these three facilities would contribute less than 0.5 deciviews to visibility impairment on a 98th percentile basis with the aforementioned available reductions in place. Accordingly, each of these facilities applied for and received a permit modification to implement federally enforceable limits on potential emissions within five years after EPA’s approval of the regional haze implementation plan (i.e., by 27 January 2017) and received waivers from installing BART.

### 2.3.1 Georgia Pacific

Georgia-Pacific Consumer Products LP – Muskogee Mill in Muskogee County accepted a requirement to meet a lower NO<sub>x</sub> emission limit of 744 pounds per day (a limit consistent with installation of low-NO<sub>x</sub> burners) for its BART-eligible units by 27 January 2017. DEQ Air Quality Permit No. 99-113-

TV (M-5), issued on 5 January 2011 as a Tier II<sup>1</sup> significant modification to the facility's Part 70 operating permit, added appropriate specific conditions to implement the new limit. Muskogee Mill currently operates under DEQ Air Quality Permit No. 2010-278-TVR, which inherited the appropriate specific conditions from the previous permit, and thereby continues to impose the new emission limit at the facility.

### 2.3.2 International Paper

The International Paper – Valliant Paper Mill in McCurtain County accepted requirements to meet reduced fuel oil sulfur content limits and corresponding lower sulfur emission limits for its BART-eligible unit by 27 January 2017. DEQ Air Quality Permit Nos. 97-057-TV (M-7) and 97-057-TV (M-10), issued on 25 March 2010 as Tier II significant modifications to the facility's Part 70 operating permit, added appropriate specific conditions to implement the new limits. Valliant Paper Mill currently operates under DEQ Air Quality Permit No. 2013-0465-TVR, which inherited the appropriate specific conditions from the previous permits, and thereby continues to impose the new emission limits at the facility.

### 2.3.3 Western Farmers Electric Cooperative Anadarko Power Plant

The Western Farmers Electric Cooperative - Anadarko Power Plant accepted a requirement to meet lower NO<sub>x</sub>, SO<sub>2</sub>, and PM<sub>10</sub> emission limits on its BART-eligible Units 4, 5, and 6 by 27 January 2017. DEQ Air Quality Permit No. 2005-037-TVR (M-1), issued on 13 July 2010 as a Tier II significant modification to the facility's Part 70 operating permit, added appropriate specific conditions to implement the new limits. Western Farmers Electric Cooperative completed installation of low-NO<sub>x</sub> burners in December 2014. Anadarko Power Plant currently operates under DEQ Air Quality Permit No. 2010-020-TVR2 (M-1), which inherited the appropriate specific conditions from the previous permit, and thereby continues to impose the new emission limits at the facility.

## 2.4 BART-subject Units

Of the facilities in Oklahoma with BART-eligible units, Oklahoma's initial SIP revision for regional haze identified six "BART-subject" facilities with a combined total of 13 units that must install, operate, and maintain BART. That set of BART-subject facilities in Oklahoma consists of six fossil-fuel fired steam electric generating plants, each with heat input exceeding 250 million British thermal units per hour and with total generating capacity exceeding 750 MW. DEQ therefore used guidelines in 40 C.F.R. Part 51, Appendix Y, to prepare BART determinations for each of these BART-eligible facilities. DEQ issued enforceable administrative orders to the owners and operators of each these facilities, requiring the installation, operation, and maintenance of BART and the achievement of the associated emission limitations within five years after EPA approval of Oklahoma's initial regional haze SIP revision. EPA approved the

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<sup>1</sup> As outlined in OAC 252:4-7 Parts 1 and 3, Oklahoma uses a 3-tiered permitting process that provides public participation opportunities and management decision-making level according to the complexity, potential environmental risk, and level of public interest involved in the Air Quality permit action. Tier II requires public notice of permitting actions.

relevant portions of Oklahoma's SIP revision (and issued a FIP providing revised SO<sub>2</sub> BART emission limits for units at three of the subject facilities) on 27 January 2012, thus requiring that the installation and commencement of operation and maintenance of BART be completed by 27 January 2017, unless an alternative timetable is specified. The administrative orders also required each subject source to obtain the necessary permit modifications, which include requirements, a schedule, and procedures to ensure that the source properly installs, operates, and maintains the required control equipment. This progress report describes the status of these sources circa June 2016; some sources may continue to make more or less rapid progress toward regular compliance.

#### **2.4.1 OG&E Seminole Generating Station**

Oklahoma Gas & Electric Company (OG&E) - Seminole Generating Station is located in Seminole County, Oklahoma. All three BART-subject units at the facility fire natural gas as their primary fuel, and therefore, BART does not require SO<sub>2</sub> or particulate matter (PM) emission control systems. Thus, DEQ Air Quality Permit No. 2003-400-TVR (M-1), issued on 5 May 2010 as a Tier II significant modification to the facility's Part 70 operating permit, only incorporated a requirement for the three BART-subject units to meet new NO<sub>x</sub> emission limits by 27 January 2017, with those limits based on installation of combustion controls, including low-NO<sub>x</sub> burners with over-fire air and flue gas recirculation. DEQ Air Quality Permit No. 2010-594-C (M-2) PSD, issued on 5 May 2015 as a Tier II construction permit for a significant modification, authorized installation of the low-NO<sub>x</sub> burners. Installation has been completed on two of the units, while the completion of installation on the third is expected by the January 2017 deadline. OG&E Seminole currently operates under DEQ Air Quality Permit Number 2010-594-TVR2 (M-1), which inherited the appropriate specific conditions from the previous permits and thereby continues to impose the new emission limits at the facility.

#### **2.4.2 AEP/PSO Comanche Power Station**

American Electric Power (AEP)/Public Service Company of Oklahoma (PSO) - Comanche Power Station is located in Comanche County, Oklahoma. Both of the facility's BART-subject units fire natural gas as their primary fuel, and therefore, BART includes no requirements for SO<sub>2</sub> or PM emission control systems. Thus, DEQ Air Quality Permit No. 2010-496-TVR2 (M-1), issued on 26 March 2013 as a Tier I minor modification to the facility's Part 70 operating permit, incorporated a requirement for the two BART-subject units to meet new NO<sub>x</sub> emission limits by 27 January 2017, with those limits based on installation of combustion controls, including dry low-NO<sub>x</sub> burners. DEQ Air Quality Permit No. 2010-496-C (M-2) PSD, issued on 8 October 2015 as a Tier II construction permit for a significant modification, authorized installation of the low-NO<sub>x</sub> burners, which has been completed. Comanche Power Station currently operates under DEQ Air Quality Permit No. 2010-496-TVR2 (M-1).

#### **2.4.3 AEP/PSO Southwestern Power Station**

AEP/PSO - Southwestern Power Station is located in Caddo County, Oklahoma. The facility's BART-subject unit fires natural gas as its primary fuel, and therefore, BART includes no requirements for SO<sub>2</sub> or PM emission control systems. Thus, DEQ Air Quality Permit No. 2011-228-C (M-2) PSD, issued on 31 March 2014 as a Tier II construction permit for a significant modification to the facility, only incorporated a requirement for the BART-subject unit to meet a lower NO<sub>x</sub> emission limit by 27 January 2017,

with those limits based on installation of combustion controls, including low-NO<sub>x</sub> burners with over-fire air. The same permit, DEQ Air Quality Permit No. 2011-228-C (M-2) PSD, authorized the installation of the low-NO<sub>x</sub> burners. AEP/PSO completed construction to install the low-NO<sub>x</sub> burners in May 2014. Southwestern Power Station currently operates under DEQ Air Quality Permit No. 2011-228-TPR2 (M-2), which inherited the appropriate specific conditions from the PSD construction permit, and thereby continues to impose the new emission limits at the facility.

#### 2.4.4 OG&E Sooner Generating Station

OG&E - Sooner Generating Station is located in Noble County, Oklahoma. Both of the facility's BART-subject units fire coal as their primary fuel. In accordance with the submitted and approved portions of Oklahoma's SIP revision for regional haze, DEQ Air Quality Permit No. 2010-338-C (M-1), issued on 17 January 2013 as a Tier II construction permit for a significant modification to the facility, incorporated a requirement for the BART-subject units to meet lower NO<sub>x</sub> emission limits by 27 January 2017, with those limits based on installation of combustion controls, including low-NO<sub>x</sub> burners with over-fire air. DEQ Air Quality Permit No. 2010-338-C (M-1) also incorporated a requirement for the BART-subject units to meet lower PM emission limits, with those limits based on existing controls, including electrostatic precipitator(s). Finally, the same permit, DEQ Air Quality Permit No. 2010-338-C (M-1), also authorized the installation of the low-NO<sub>x</sub> burners. OG&E completed installation of the low-NO<sub>x</sub> burners for Units 1 and 2 in March 2014 and April 2013, respectively.

In its action, effective 27 January 2012, EPA approved these NO<sub>x</sub> and PM BART determinations made by DEQ for this facility (76 Federal Register 81727 (28 December 2011) (codified at 40 C.F.R. pt. 52)). However, EPA disapproved Oklahoma's SO<sub>2</sub> BART determinations and issued a FIP covering the BART-subject units at the facility (40 C.F.R. §52.1923 (2015)). Under this FIP, each unit must meet lower SO<sub>2</sub> emission limits of 0.06 lb/MMBtu, with those limits based on installation of emission controls, including dry flue gas desulfurization. Due to litigation over EPA's decision, the deadline by which these units are required to meet their new SO<sub>2</sub> emission limits contained in the FIP is 4 January 2019. DEQ Air Quality Permit No. 2010-338-C (M-3), issued on 15 December 2014 as a Tier II construction permit for a significant modification to the facility, incorporated a requirement for the BART-subject units to meet lower SO<sub>2</sub> emission limits by 4 January 2019, with those limits based on the installation of emission controls, including dry gas desulfurization. The same permit, DEQ Air Quality Permit No. 2010-338-C (M-3), authorized installation of these controls. Construction to install the dry gas desulfurization began in June 2016. Sooner Generating Station currently operates under DEQ Air Quality Permit No. 2010-338-TPR2 (M-2), which inherited the appropriate specific conditions from the previous permits, including the new SO<sub>2</sub> emission limit, as well as the NO<sub>x</sub> and PM emission reductions discussed in the next preceding paragraph, and thereby continues to impose these new emission limits at the facility.

#### 2.4.5 OG&E Muskogee Generating Station

OG&E - Muskogee Generating Station is located in Muskogee County, Oklahoma. Both of the facility's BART-subject units fire coal as their primary fuel. In accordance with the submitted and approved portions of Oklahoma's SIP revision for regional haze, DEQ Air Quality Permit No. 2005-271-C (M-5) PSD, issued on 30 January 2013 as a Tier II construction permit for a significant modification to the facility,

incorporated several BART requirements. This permit incorporated a requirement for the BART-subject units to meet lower NO<sub>x</sub> emission limits by 27 January 2017, with those limits based on installation of combustion controls, including low-NO<sub>x</sub> burners with over-fire air. DEQ Air Quality Permit No. 2005-271-C (M-5) PSD also incorporated a requirement for the BART-subject units to meet lower particulate matter emission limits, with those limits based on existing controls, including electrostatic precipitator(s). Finally, the same permit, DEQ Air Quality Permit No. 2005-271-C (M-5) PSD, also authorized the installation of the low-NO<sub>x</sub> burners. OG&E completed installation of the low-NO<sub>x</sub> burners for the facility's BART-subject units, Units 4 and 5, in June 2015 and December 2013, respectively.

In its action, effective 27 January 2012, EPA approved these NO<sub>x</sub> and PM BART determinations made by DEQ for this facility (76 Federal Register 81727 (28 December 2011) (codified at 40 C.F.R. pt. 52)). However, EPA disapproved Oklahoma's SO<sub>2</sub> BART determinations and issued a FIP covering the BART-subject units at the facility (40 C.F.R. §52.1923 (2015)). Under this FIP, each unit must meet lower SO<sub>2</sub> emission limits of 0.06 lb/MMBtu, with those limits based on installation of emission controls, including dry flue gas desulfurization. Litigation over EPA's decision resulted in the extension until 4 January 2019 of the deadline for these units to meet the SO<sub>2</sub> emission limits contained in the FIP. In January 2015, OG&E withdrew DEQ Air Quality Permit Application No. 2014-0304-C (M-1) for a construction permit to install dry gas desulfurization on its BART-subject units, Units 4 and 5, and, instead, committed to convert those units to use natural gas as their primary fuel before the FIP compliance deadline of 4 January 2019. Muskogee Generating Station currently operates under DEQ Air Quality Permit No. 2005-271-TVR (M-7), which includes a requirement for OG&E to apply for a modified operating permit to incorporate applicable BART requirements for SO<sub>2</sub> (i.e. to meet SO<sub>2</sub> emission limits based on converting its BART-subject units to natural gas). This DEQ Air Quality Permit No. 2005-271-TVR (M-7) also inherited the appropriate specific conditions from the facility's previous permits, requiring the reduction in NO<sub>x</sub> and PM emissions discussed in the next preceding paragraph; and thereby continues to impose those new emission limits at the facility.

#### 2.4.6 AEP/PSO Northeastern Power Station

AEP/PSO - Northeastern Power Station is located in Rogers County, Oklahoma. The facility's Unit 2, a BART-subject unit, fires natural gas as its primary fuel, and therefore, BART requires neither SO<sub>2</sub> nor PM emission control systems for Unit 2. DEQ Air Quality Permit No. 2003-410-C (M-4) PSD, issued on 16 July 2013 as a Tier II construction permit for a significant modification to the facility, incorporated a requirement for the BART-subject unit to meet a lower NO<sub>x</sub> emission limit by 27 January 2017, with those limits based on installation of combustion controls, including low-NO<sub>x</sub> burners with over-fire air. The same permit, DEQ Air Quality Permit No. 2003-410-C (M-4) PSD, authorized the installation of these controls. AEP/PSO completed installation of the low-NO<sub>x</sub> burners for Unit 2 in March 2014. DEQ Air Quality Permit No. 2012-918-TVR2 inherited the appropriate specific conditions from the facility's previous permits requiring the NO<sub>x</sub> emission reductions for Unit 2, and thereby continues to impose the new NO<sub>x</sub> emission limit at the facility. In its action, effective 27 January 2012, EPA approved Oklahoma's BART determinations for Northeastern Power Station's Unit 2 (76 Federal Register 81727 (28 December 2011) (codified at 40 C.F.R. pt. 52)).

Northeastern Power Station's Units 3 and 4 both fire coal as their primary fuel. In its action, effective 27 January 2012, EPA also approved Oklahoma's NO<sub>x</sub> and PM BART determinations for the facility's other BART-subject units, Units 3 and 4 (76 Federal Register 81727 (28 December 2011) (codified at 40 C.F.R. pt. 52)). The approved NO<sub>x</sub> BART determinations included requirements for Units 3 and 4 to meet lower NO<sub>x</sub> emission limits, with those limits based on installation of combustion controls, including low-NO<sub>x</sub> burners with over-fire air, by 27 January 2017. The approved PM BART determinations also included requirements for Units 3 and 4 to meet lower PM emission limits, with those limits based on existing controls, including electrostatic precipitator(s), by 27 January 2017. However, EPA disapproved Oklahoma's SO<sub>2</sub> BART determinations for Units 3 and 4 at the facility and issued a FIP covering these units. Subsequently, DEQ developed and submitted, and EPA approved, a revision to the Oklahoma regional haze SIP, which replaced the FIP as it related to EPA's SO<sub>2</sub> BART requirements for Units 3 and 4, as well as revised Oklahoma's original NO<sub>x</sub> BART requirements for Units 3 and 4 (79 Federal Register 12944 (7 March 2014) (codified at 40 C.F.R. pt. 52)). Under the revision, each unit instead must meet interim NO<sub>x</sub> and SO<sub>2</sub> emission limits until 16 April 2016. The facility then must shut down either Unit 3 or Unit 4, and the remaining coal-fired unit must meet lower SO<sub>2</sub> and NO<sub>x</sub> emission limits. The lower SO<sub>2</sub> emission limits are based on installation of emission controls, including dry sorbent injection technology, and the lower NO<sub>x</sub> emission limits are based on the installation of combustion controls, including low-NO<sub>x</sub> burners with separated over-fire air, and further control system tuning. The facility must then incrementally decrease capacity utilization for the remaining coal-fired unit between 2021 and 2026, and must completely shut down this unit and cease coal combustion at the facility by 31 December 2026. DEQ issued Air Quality Permit No. 2003-410-TVR (M-3) on 8 March 2012 as a Tier I minor modification to the Part 70 operating permit of the facility, and DEQ Air Quality Permit No. 2003-410-C (M-4) PSD on 31 March 2014 as a Tier II construction permit for a significant modification to the facility. These permits incorporated the appropriate specific conditions to implement the stated requirements, and authorized installation or construction of necessary controls. AEP/PSO completed installation of the low-NO<sub>x</sub> burners for Units 3 and 4 in April and May 2012, respectively. Modifications to install SO<sub>2</sub> controls for Unit 3 have been completed. AEP/PSO retired Unit 4 as of April 16, 2016. Northeastern Power Station currently operates under DEQ Air Quality Permit No. 2012-918-TVR2, which inherited the appropriate specific conditions from the facility's previous permits, thereby requiring the installation of NO<sub>x</sub> and SO<sub>2</sub> controls, and the retirement of Unit 4. DEQ Air Quality Permit No. 2012-918-TVR2 also inherited the appropriate specific conditions from the facility's previous permits, requiring the original PM emission reductions for Units 3 and 4; and this permit thereby continues to impose those new emission limits at the facility.

### **3 Status of Other Oklahoma Control Measures**

As part of the original regional haze SIP revision of Oklahoma, DEQ developed a long-term strategy for remedying existing visibility impairment at the Wichita Mountains and at Class I areas in other states. This long-term strategy relies on the continued implementation of DEQ's various air quality rules and programs. These programs include comprehensive permitting, compliance and enforcement programs, an emissions inventory system, and a statewide ambient monitoring network. These programs evolve to accommodate various federal and state measures to maintain the national ambient air quality standards (NAAQS). As a result, visibility at Class I areas should continue to improve as emissions that contribute to visibility impairment continue to decline.

#### **3.1 Air Quality Permits Program**

DEQ issues construction and operating permits to both major sources and minor facilities in Oklahoma and performs regular inspections to ensure compliance with permit requirements and applicable statutes, rules, and regulations. DEQ also implements new source performance standards (NSPS) and national emission standards for hazardous air pollutants (NESHAP) in Oklahoma, primarily through its permitting, compliance, and enforcement programs.

#### **3.2 Prevention of Significant Deterioration**

OAC 252:100, Subchapter 8, Part 7, Prevention of Significant Deterioration (PSD) Requirements for Attainment Areas, addresses visibility impairment through the PSD permitting process for new or modified major stationary sources. These rules serve to limit the establishment of sources of air pollution that may contribute to visibility impairment and other air pollution problems. In conformance with 40 C.F.R. §51.307(a), Oklahoma's original regional haze SIP revision described the required review of proposed new major stationary sources and major modifications to existing major stationary sources under the PSD program. Whenever DEQ receives an application for a permit to construct a major stationary source under the PSD program, DEQ ensures that the source accurately evaluates its potential effect on visibility at the Wichita Mountains and at any other nearby mandatory Class I area. In conformance with 40 C.F.R. §51.307(a)(1) and OAC 252:100-8-36, within 30 days after DEQ receives such an application, DEQ provides written notification of the application to the U.S. Secretary of the Interior (or Secretary of Agriculture, or both) for review in their capacity as affected federal land manager (or managers). This notice, submitted at least 60 days before DEQ conducts any public hearing on the application, includes an analysis of the anticipated effects on visibility at the Wichita Mountains and at any other nearby mandatory Class I area.

#### **3.3 Compliance and Enforcement**

DEQ actively pursues compliance and enforcement actions as appropriate to address violations of its rules. These actions result in emissions reductions that contribute to visibility improvements at the Wichita Mountains and other nearby mandatory Class I areas and otherwise help to preserve air quality in Oklahoma and surrounding areas.

### 3.4 Mobile Emissions

DEQ relies upon federal regulations on new motor vehicles to limit air pollutant emissions from on-road mobile sources. EPA continues to tighten these standards incrementally. Moreover, data from the Federal Highway Administration suggest that nationally, annual vehicle miles traveled per capita peaked around 2004. Ongoing economic weakness and improved vehicle reliability, however, have contributed to a notable decline in the fleet turnover rate. Nevertheless, DEQ finds a slow decline in motor-vehicle emissions likely to continue in the future.

### 3.5 Cross State Air Pollution Regulation

Because a majority of visibility impairment at the Wichita Mountains originates from emissions in Texas and other states, DEQ previously relied on emission reductions under EPA's clean air interstate regulation ("CAIR") for a considerable portion of its anticipated improvement in visibility, as stated in its original SIP revision for regional haze. EPA promulgated CAIR to enforce the "good neighbor" provision of the federal Clean Air Act, §110(a)(2)(D)(i)(1), for the 1997 national ambient air quality standards ("NAAQS") for ozone and PM<sub>2.5</sub> (40 C.F.R. pts. 96,97 (2005)). EPA intended CAIR to control the interstate transport of ozone, fine particulates, and their precursors. This regulation did not affect directly sources in Oklahoma but promised significant reductions in emissions of SO<sub>2</sub> and NO<sub>x</sub> from electric generating utilities in Texas and most eastern states. These emissions contribute to the formation of sulfurous and nitrate PM, which together comprise a majority of visibility impairment at the Wichita Mountains. On 23 December 2008, in the case of *State of North Carolina v. Environmental Protection Agency*, the federal Court of Appeals for the District of Columbia Circuit remanded (but ultimately did not vacate) CAIR to EPA for reformulation (*North Carolina v. E.P.A.*, 531 F.3d 896 (D.C. Cir. 2008)). Therefore, the regulation went into effect and required a series of modifications to electric generating utilities in many eastern states. Moreover, Texas and numerous other states proposed to rely on their participation in CAIR to meet their BART obligations.

On 8 August 2011, EPA promulgated the cross-state air pollution regulation (CSAPR) as a replacement for CAIR (76 Federal Register 48207 (8 August 2011) (codified at 40 C.F.R. pts. 51, 52, 72, 78, 97)). The Supreme Court of the United States on 29 April 2014 generally upheld the regulation and remanded the case to the federal Court of Appeals for the District of Columbia Circuit for further proceedings consistent with its decision (*E.P.A. v. EME Homer City Generation*, 134 S.Ct. 1584 (2014)). The D.C. Circuit subsequently issued a decision limiting the applicability of the regulation and extent of required emissions reductions in some states (*EME Homer City Generation v. E.P.A.*, 795 F.3d 118 (D.C. Cir. 2015)). Although legal proceedings may continue beyond the date of submission of this progress report, EPA began implementation of CSAPR in 2015. This regulation, to the extent that it continues in effect, will likely lead to significant reductions in emissions from electric generating units in Oklahoma and other upwind states in the coming years.

EPA is currently in the process of developing an update to CSAPR to address interstate transport for the 2008 ozone NAAQS. This regulation may lead to additional reductions in emissions that contribute to visibility impairment from sources in Oklahoma, Texas, and various other upwind states. DEQ in-

tends to consider any related reductions and their effects in any succeeding SIP revision for regional haze.

### 3.6 Other Oklahoma Measures

Oklahoma adopted a voluntary smoke management plan on 28 February 2013. Moreover, recently revised DEQ rules restrict open burning from certain land-clearing operations in several metropolitan counties. These rules (OAC 252:100-13) require use of air-curtain incinerators and prohibit some burning on ozone-watch and PM-watch days. DEQ works in conjunction with local fire departments to maintain compliance.

Additionally, DEQ has made various other updates and modifications to its rules, which may produce indirect benefits for visibility. These updates include incorporation by reference of the latest changes and additions to the federal NSPSs and NESHAPs, updates to minor-facility and major-source permitting requirements, and updates to OAC 252:100, Subchapter 31, Control of Emission of Sulfur Compounds. DEQ previously submitted many of these rules to EPA for approval as revisions to Oklahoma's SIP.

## 4 Additional Air Pollution Emission Reductions

In addition to those measures described earlier in this report, numerous regulatory and economic developments contributed to reduced emission of pollutants nationally since the preparation of the initial Oklahoma SIP revision for regional haze. For purposes of this progress report, DEQ undertook no technical analyses to quantify the visibility benefits of these developments, although they likely contributed considerably to observed visibility improvement.

### 4.1 National Ambient Air Quality Standard for Ozone

As mentioned previously in this report, implementation of CSAPR and EPA actions on Texas's regional haze implementation plan may cause visibility improvement at the Wichita Mountains. DEQ anticipates additional visibility improvement at the Wichita Mountains as Dallas and Houston make progress toward attainment of the 1997 and 2008 ozone NAAQS. The prevailing winds often blow from these ozone nonattainment areas of Dallas and Houston to the Wichita Mountains. As demonstrated in the initial Oklahoma regional haze SIP revision, Texas contributes most to visibility impacts and air pollution at the Wichita Mountains. NO<sub>x</sub> and volatile organic compounds act as precursors for both invisible ozone and visibility-impairing fine PM. Moreover, measures to control ozone precursors generally result in reductions in other visibility-impairing emissions as well.

Under its responsibility to complete a thorough review of each NAAQS every five years, EPA on 1 October 2015 promulgated a new ground-level ozone standard of 70 parts per billion ("ppb") in the same form as the two previous ozone NAAQS (80 Federal Register 65292 (1 October 2015) (to be codified at 40 C.F.R. pts. 50, 51, 52, 53, 58)). This 2015 ozone NAAQS, more stringent than those of 85 ppb and 75 ppb, issued in 1997 and 2008, respectively, likely will necessitate further emission reductions throughout much of the eastern and southwestern United States.

### 4.2 Economic Conditions

The widespread economic downturn of the last decade has resulted in a temporary national decrease in emissions of pollutants that contribute to visibility impairment. Marketplace changes because of the downturn and subsequent weak recovery may affect long-term emission trends.

### 4.3 Sulfur Dioxide Regulations and Shift from Coal to Natural Gas

Current economic, regulatory, and cultural conditions are contributing to a trend toward use of cleaner fuels. This progress report attempts no technical analyses or quantification of the direct effect of this trend on visibility at the Wichita Mountains. DEQ, however, expects the resulting lower emissions, particularly of SO<sub>2</sub>, to result in progress towards the goal of a return to natural visibility conditions.

Because of the availability of coal at lower cost than other fuels, people historically preferred it as a fuel for many industrial operations and particularly for electrical generating units. However, combusting coal typically results in significant emissions of SO<sub>2</sub> and other pollutants of concern, such as mer-

cury. In addition, coal combustion produces electricity less efficiently than combined-cycle natural gas combustion and results in much higher emissions of CO<sub>2</sub> and other regulated combustion products. Numerous newly effective, proposed, and anticipated federal regulations may require or result in significant SO<sub>2</sub> emissions reductions, which will supplement BART and other measures discussed earlier in this report, intended for the control of regional haze, to continue to improve visibility over the next several years. Additionally, EPA promulgated mercury and air toxics standards, subject to *Michigan et al. v. Environmental Protection Agency et al.* that may prompt ongoing emissions reductions in multiple pollutants, regardless of the ultimate outcome of this litigation, further contributing to visibility improvement.

More importantly, EPA revised the NAAQS for SO<sub>2</sub> in 2010 and more recently issued the corresponding Data Requirements Rule (DRR) to accompany said standard (40 C.F.R. §50.17; 40 C.F.R. Part 50, Appendix T; [80 Federal Register 51052](#) (21 August 2015) (to be codified at 40 C.F.R. pt. 51)). Implementation of this standard ultimately will result in some existing sources reducing emissions to the extent necessary to ensure that surrounding areas can attain the new NAAQS.

Additionally, over the past decade, technological advances in natural gas and petroleum extraction have led to an increase in supply and lower per-unit cost of natural gas in North America. Although air pollution emissions related to natural gas and petroleum extraction and related industries has increased considerably, pipeline-quality natural gas in particular burns cleaner in new, modern, lower-polluting equipment than other fuels burn in older but still functional equipment.

Taking into account all of the foregoing, many facilities, including electric utilities in Oklahoma, may choose to retire their coal combustion units or switch their fuel to natural gas as a more cost-effective measure for carrying on operations and for complying with the SO<sub>2</sub> NAAQS, the mercury air toxics standard, and other applicable regulations than installation of desulfurization scrubbers. Resulting reductions in sulfurous emissions at individual sources may not produce a discernible improvement in visibility at the Wichita Mountains; however, certain sources switching from coal to natural gas and numerous other sources choosing to install controls instead may result collectively in very significant visibility improvement over the forthcoming decade.

#### 4.4 Climate Shift at the Wichita Mountains

In addition to the changes in emissions across the U.S., climate shifts and other natural factors may modulate visibility at the Wichita Mountains. During the evaluation period of 2010-2014, the Wichita Mountains experienced a dramatically drier climate than that which prevailed during the baseline period of 2002-2004. These drier climatic conditions perhaps correlate with cleaner air masses passing over the Wichita Mountains during that time. Despite a somewhat dry period in 2005 and 2006, frequent heavy rains in 2007 made that year the wettest ever measured at the Wichita Mountains, and several wet years followed.

In contrast, a drought developed in late 2010 and intensified in 2011. The three-month period of June, July, and August 2011 brought intense, persistent, unbroken heat - the summer ranked as the hottest ever recorded in any state. The dry conditions and intense heat resulted in an increase in coarse PM from dust storms. Fires of unusual intensity and duration also occurred in Oklahoma and Texas through-

out much of 2011. These fires contributed to occasional episodes of elevated organic carbon and elemental carbon concentrations. By its close, the year 2011 also ranked among the driest ever recorded in much of western Oklahoma, including the Wichita Mountains.

The drought lessened somewhat in intensity in and after 2012, but continued largely unabated in much of western Oklahoma into early 2015. The ongoing five-year evaluation period consequently corresponds to the first drought of such duration and intensity in several decades. Meanwhile, a dearth in tropical-cyclone development in the North Atlantic Ocean, also occurring during this time, coincides with an increase in Saharan air and fine soil reaching the Wichita Mountains. Therefore, during the drought years (which also, interestingly, occurred during the ongoing national economic weakness), the Wichita Mountains experienced a dramatic decline in sulfurous particulate. Part of this decline perhaps resulted not only from emission reductions but also from these climatic trends, which resulted in a change in the air masses reaching the Wichita Mountains.

## 5 Emissions of Visibility-impairing Pollutants

Oklahoma's original SIP revision for regional haze included a detailed emission inventory for VOCs, NO<sub>x</sub>, fine particulates (i.e., PM<sub>2.5</sub>), coarse particulates (i.e., PM<sub>10</sub> - PM<sub>2.5</sub>), ammonia (NH<sub>3</sub>), and SO<sub>2</sub>, for the baseline year of 2002. Table 5-1 summarizes this information.

Table 5-1: Oklahoma emission inventory summary for 2002 (tons per year)

	VOC	NO <sub>x</sub>	PM <sub>2.5</sub>	PM <sub>10</sub> - PM <sub>2.5</sub>	NH <sub>3</sub>	SO <sub>2</sub>
<b>Point</b>	37,794	158,818	8,636	8,026	24,102	148,761
<b>Area</b>	201,758	115,407	109,279	304,560	114,363	11,779
<b>On-road mobile</b>	99,924	142,592	2,459	879	4,434	4,708
<b>Non-road mobile</b>	47,863	49,396	4,580	433	280	4,773
<b>Biogenic</b>	988,314	35,909	0	0	0	0
<b>TOTAL</b>	<b>1,375,653</b>	<b>502,122</b>	<b>124,954</b>	<b>313,898</b>	<b>143,179</b>	<b>170,021</b>

The latest Oklahoma emission inventory available for this progress report includes data already available in the national emission inventory for point, area, biogenic, on-road mobile, and non-road mobile emissions in 2011. For point sources, specifically electric generating units, the latest updated national emission inventory includes any known continuous emissions monitoring (CEM) data. Table 5-2 summarizes this inventory for 2011, and shows the change from 2002 to 2011. Table 5-3 summarizes projected emissions for 2018, as estimated in the February 2010 RH SIP submittal.

Table 5-2: Oklahoma emission inventory summary for 2011 (tons per year)

	VOC	NO <sub>x</sub>	PM <sub>2.5</sub>	PM <sub>10</sub> - PM <sub>2.5</sub>	NH <sub>3</sub>	SO <sub>2</sub>
<b>Point</b>	48,559	162,222	8,600	5,266	6,500	118,992
<b>Area</b>	284,354	103,506	89,167	554,650	103,782	4,078
<b>On-road mobile</b>	54,975	115,105	3,555	3,011	1,918	516
<b>Non-road mobile</b>	27,815	24,650	2,316	107	30	63
<b>Biogenic</b>	1,185,031	42,428	0	0	0	0
<b>TOTAL</b>	<b>1,600,734</b>	<b>447,911</b>	<b>103,638</b>	<b>563,034</b>	<b>112,230</b>	<b>123,649</b>
<b>2011-2002</b>	<b>225,081</b>	<b>-54,211</b>	<b>-21,316</b>	<b>249,136</b>	<b>-30,949</b>	<b>-46,372</b>

Table 5-3: Estimate of emissions from Oklahoma sources in 2018 (tons per year)

	VOC	NO <sub>x</sub>	PM <sub>2.5</sub>	PM <sub>10</sub> - PM <sub>2.5</sub>	NH <sub>3</sub>	SO <sub>2</sub>
<b>Point</b>	125,648	140,298	13,989	8,935	35,215	106,701
<b>Area</b>	400,056	128,257	127,018	275,844	141,532	12,374
<b>On-road mobile</b>	39,281	39,397	953	0	5,818	545
<b>Non-road mobile</b>	28,489	25,387	292	2,914	40	156
<b>Biogenic</b>	988,314	35,909	0	0	0	0
<b>TOTAL</b>	<b>1,581,788</b>	<b>369,248</b>	<b>142,252</b>	<b>287,693</b>	<b>182,605</b>	<b>119,776</b>

## 6 Changes in Visibility at the Wichita Mountains

The initial Oklahoma SIP revision for regional haze contained an extensive discussion of natural visibility conditions at the Wichita Mountains. The regional haze regulation requires DEQ to evaluate its progress toward achieving natural visibility conditions.

### 6.1 Monitoring Strategy Review

The Interagency Monitoring of Protected Visual Environments (IMPROVE) program began as a cooperative effort between EPA, federal land management agencies, and air-pollution control agencies. This program uniquely provides observational data essential to the development of any implementation plan for regional haze. Measurements at the Wichita Mountains began in March 2001. The initial Oklahoma regional haze SIP revision thoroughly summarizes the IMPROVE protocol.

The IMPROVE program has made minor adjustments to its protocol through the years but has maintained protocols that result in comparable data for most essential elements, ions, and other constituents of PM. The monitoring strategy continues to rely upon participation in the IMPROVE network. For this SIP revision, DEQ considers the IMPROVE site at the Wichita Mountains essential and critical to visibility assessment.

U.S. Fish and Wildlife Service personnel send the filter samples from the Wichita Mountains to the Crocker Nuclear Laboratory at the University of California in Davis for analysis. The [IMPROVE web-site](#) and the Visibility Information Exchange Web System ([VIEWS](#)) at Colorado State University make the data publicly available. Further, EPA's Air Quality System (AQS) database includes these data. DEQ relies on these data to fulfill its monitoring obligations under the regional haze regulation and currently lacks any alternative suitable for assessing visibility conditions at the Wichita Mountains.

DEQ also operated a monitor in Ellis County with EPA financial support. Due to the distance separating Ellis County from the Wichita Mountains, however, this monitor could not provide backup data on days with unavailable data at the Wichita Mountains. EPA recently ceased its financial support for monitoring in Ellis County, and DEQ consequently ceased such monitoring in autumn 2015.

### 6.2 Monitoring Results

The determination of reasonable progress at the Wichita Mountains takes three metrics of visibility into account: baseline conditions, natural conditions, and current conditions. The initial Oklahoma SIP revision for regional haze includes an extensive critical discussion of natural conditions at the Wichita Mountains. This progress report/SIP revision uses the strictest natural conditions estimate, intended to represent clean conditions in the American West without fires, as discussed in Oklahoma's original regional haze SIP revision. DEQ, however, expects to use a more refined estimate in the future, classifying a greater proportion of PM as natural. Such refined estimate may take into account a considerable proportion of PM at the Wichita Mountains that arises from natural events, fires, dust storms, and emis-

sions outside the U.S. and thus not under the regulatory purview of any domestic air pollution control agency.

Significant improvement during the worst quintile of days without degradation during the best quintile of days during each year generally indicates some degree of compliance with the regional haze regulation. The tables contained hereafter in this progress report show best and worst quintiles and show annual averages for comparison.

### 6.2.1 Rayleigh Scatter

The IMPROVE protocol represents Rayleigh scattering as a constant, contributing  $11 \text{ Mm}^{-1}$  to visibility degradation at the Wichita Mountains on account of their elevation. Rayleigh scattering results from the interaction of light and the molecules of the atmosphere as therefore a natural occurrence.

### 6.2.2 Saline Particulate

The IMPROVE protocol approximates saline particulate with chloride and chlorine measurements. The protocol assumes that saline particulate arises exclusively from natural sources, generally from breaking ocean waves. Because the Wichita Mountains lie a significant distance from the nearest ocean, saline PM rarely contributes noticeably to visibility degradation. The apparent decline in saline PM in Table 6-1 may reflect refinements and changes in analytical methods rather than an actual phenomenon.

Table 6-1: Saline Particulate at the Wichita Mountains

Year	Best Quintile		Annual Average		Worst Quintile	
	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$
2001			.11	.6		
2002	.05	.3	.06	.31	.07	.4
2003	.11	.6	.10	.5	.10	.6
2004	.046	.25	.071	.38	.080	.43
2005	.023	.12	.040	.22	.038	.20
2006	.016	.09	.040	.21	.081	.42
2007	.037	.20	.063	.33	.104	.56
2008	.05	.28	.066	.35	.09	.5
2009			.040	.21		
2010	.034	.18	.040	.21	.042	.23
2011	.039	.21	.067	.36	.094	.51
2012	.015	.08	.0603	.313	.065	.35
2013	.013	.07	.051	.274	.086	.47
Baseline	.07	.4	.083	.45	.08	.5
2009-13	.025	.14	.052	.273	.072	.39
Natural	.07	.4	.083	.45	.08	.5

### 6.2.3 Coarse Particulate

IMPROVE monitors include a  $PM_{10}$  module, which samples PM with aerodynamic diameter less than 10  $\mu\text{m}$ , and a  $PM_{2.5}$  module, which samples PM with aerodynamic diameter less than 2.5  $\mu\text{m}$ . The protocol includes gravimetric analysis of both samples; coarse particulate describes the difference between the masses of these two samples. A failure of the  $PM_{10}$  module during most of autumn 2009 prevented the identification of a best and worst quintile for that year. The increase in coarse PM during 2011 and 2012, shown in Table 6-2, resulted from an increased prevalence of dust storms, associated with drought.

Table 6-2: Coarse Particulate Matter at the Wichita Mountains

Year	Best Quintile		Annual Average		Worst Quintile	
	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$
2001			8.2	4.9		
2002	4.25	2.5	7.3	4.4	9.2	5.5
2003	5.57	3.3	7.4	4.5	7.0	4.2
2004	3.8	2.3	6.3	3.8	7.1	4.3
2005	5.9	3.6	7.4	4.5	9.1	5.4
2006	5.85	3.5	8.5	5.1	12.1	7.3
2007	3.83	2.3	6.6	4.0	7.3	4.4
2008	3.91	2.3	7.0	4.2	7.8	4.7
2009			7.1	4.3		
2010	4.60	2.8	7.5	4.5	6.5	3.9
2011	5.25	3.2	10.9	6.6	14.9	8.9
2012	6.31	3.8	10.05	6.0	13.4	8.0
2013	4.01	2.4	7.3	4.4	10.7	6.4
Baseline	4.6	2.73	7.3	4.39	7.7	4.6
2009-13	5.04	3.02	8.58	5.15	11.35	6.8
Natural	1.9	1.1	3.0	1.8	3.	2.0

### 6.2.4 Fine Soil Particulate

The IMPROVE protocol estimates fine-soil particulate from Al, Si, Ca, Fe, and Ti measurements from the  $PM_{2.5}$  module. Considerable fine soil arrives at the Wichita Mountains via intercontinental transport from the Sahara, especially during the spring and summer months. Fine soil particulate increased notably in 2012, a year with numerous such dust storms persisting well into the summer despite several early tropical storms, as Table 6-3 shows.

Table 6-3: Fine Soil Particulate Matter at the Wichita Mountains

Year	Best Quintile		Annual Average		Worst Quintile	
	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$

Year	Best Quintile		Annual Average		Worst Quintile	
	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$
2001			.98	.98		
2002	.261	.261	.79	.79	.787	.79
2003	.375	.38	.849	.85	.86	.86
2004	.299	.299	.82	.82	.717	.72
2005	.438	.44	.65	.65	.718	.72
2006	.516	.52	.98	.98	1.51	1.51
2007	.330	.330	.87	.87	1.09	1.09
2008	.388	.39	.994	.99	1.30	1.30
2009			.877	.88		
2010	.632	.63	1.00	1.00	.868	.87
2011	.342	.342	.94	.94	1.04	1.04
2012	.527	.53	1.33	1.33	1.13	1.13
2013	.242	.242	.86	.86	1.40	1.40
Baseline	.312	.312	.860	.86	.789	.79
2009-13	.436	.436	1.000	1.000	1.11	1.11
Natural	.19	.19	.50	.50	.5	.5

### 6.2.5 Elemental Carbonaceous Particulate

The IMPROVE protocol uses a thermal-optical reflectance method to differentiate between elemental carbon and organic carbon. Elemental carbon enters the atmosphere almost exclusively because of combustion. Table 6-4 illustrates the considerable decline in elemental carbonaceous particulate from the baseline period of 2002-2004.

Table 6-4: Elemental Carbonaceous Fine Particulate Matter at the Wichita Mountains

Year	Best Quintile		Annual Average		Worst Quintile	
	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$
2001			.26	2.6		
2002	.12	1.2	.23	2.3	.40	4.0
2003	.13	1.3	.289	2.9	.44	4.4
2004	.13	1.3	.25	2.5	.43	4.3
2005	.16	1.6	.33	3.3	.60	6.0
2006	.13	1.3	.27	2.7	.52	5.2
2007	.13	1.3	.25	2.5	.42	4.2
2008	.12	1.2	.22	2.2	.32	3.2
2009			.202	2.02		
2010	.083	.83	.207	2.07	.362	3.6
2011	.110	1.10	.229	2.29	.403	4.0
2012	.080	.80	.192	1.92	.327	3.27

Year	Best Quintile		Annual Average		Worst Quintile	
	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$
<b>2013</b>	.074	.74	.164	1.64	.256	2.56
<b>Baseline</b>	<b>.128</b>	<b>1.28</b>	<b>.259</b>	<b>2.59</b>	<b>.42</b>	<b>4.2</b>
<b>2009-13</b>	<b>.087</b>	<b>.87</b>	<b>.199</b>	<b>1.99</b>	<b>.337</b>	<b>3.37</b>
<b>Natural</b>	<b>.010</b>	<b>.10</b>	<b>.02</b>	<b>.20</b>	<b>.034</b>	<b>.34</b>

### 6.2.6 Organic Carbonaceous Particulate

Organic carbonaceous particulate arises from a variety of sources, including natural biological processes, fires, and petrochemical industries. Concentrations at the Wichita Mountains declined in the past few years, possibly because of lesser biological activity due to the ongoing drought. Excessive wetness on the High Plains contributed to the higher organic carbonaceous fine PM in 2004, and extensive fires contributed to the elevated concentrations and consequent visibility impairment in 2011. Table 6-5 shows the trends in this component of visibility degradation.

Table 6-5: Organic Carbonaceous Particulate Matter at the Wichita Mountains

Year	Best Quintile		Annual Average		Worst Quintile	
	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$
<b>2001</b>			1.34	8.2		
<b>2002</b>	.61	3.3	1.22	7.3	2.30	14.7
<b>2003</b>	.69	3.8	1.50	9.2	2.26	15.0
<b>2004</b>	.71	3.9	1.55	9.9	3.13	22.8
<b>2005</b>	.63	3.4	1.37	8.3	2.59	17.3
<b>2006</b>	.52	2.8	1.14	6.8	2.06	13.5
<b>2007</b>	.64	3.5	1.14	6.6	1.79	11.0
<b>2008</b>	.56	3.0	1.16	6.8	1.55	9.5
<b>2009</b>			1.04	6.21		
<b>2010</b>	.49	2.64	1.181	7.3	2.07	15.0
<b>2011</b>	.582	3.14	1.379	8.64	2.64	18.8
<b>2012</b>	.432	2.30	1.025	5.86	1.432	8.4
<b>2013</b>	.445	2.37	.925	5.27	1.427	8.5
<b>Baseline</b>	<b>.67</b>	<b>3.67</b>	<b>1.40</b>	<b>8.62</b>	<b>2.56</b>	<b>17.5</b>
<b>2009-13</b>	<b>.488</b>	<b>2.61</b>	<b>1.110</b>	<b>6.66</b>	<b>1.893</b>	<b>12.7</b>
<b>Natural</b>	<b>.16</b>	<b>.8</b>	<b>.33</b>	<b>1.8</b>	<b>.6</b>	<b>3.3</b>

### 6.2.7 Nitrate Particulate

The IMPROVE protocol uses a special module to capture ions, particularly nitrate. Nitrate constitutes a considerable proportion of PM at the Wichita Mountains, primarily on cold, dark, humid win-

ter days. Some improvement in recent years, shown in Table 6-6, may reflect a relative lack of such meteorological conditions in addition to emissions reductions.

**Table 6-6: Nitrate Particulate Matter at the Wichita Mountains**

Year	Best Quintile		Annual Average		Worst Quintile	
	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$
<b>2001</b>			.95	9.3		
<b>2002</b>	.334	3.16	.905	8.89	1.02	10.3
<b>2003</b>	.293	2.70	1.054	10.9	2.58	28.5
<b>2004</b>	.268	2.52	1.10	11.8	2.72	32.4
<b>2005</b>	.260	2.36	.82	8.2	1.00	10.3
<b>2006</b>	.208	1.97	.71	7.0	1.10	11.3
<b>2007</b>	.197	1.80	1.00	10.7	2.34	27.9
<b>2008</b>	.292	2.70	.77	7.8	1.74	18.7
<b>2009</b>			.64	6.2		
<b>2010</b>	.192	1.72	.79	8.0	2.19	23.5
<b>2011</b>	.382	3.62	.87	8.9	2.28	24.8
<b>2012</b>	.209	1.97	.69	6.9	1.75	18.7
<b>2013</b>	.251	2.44	.77	7.7	1.86	20.0
<b>Baseline</b>	<b>.299</b>	<b>2.80</b>	<b>1.00</b>	<b>10.2</b>	<b>2.11</b>	<b>23.7</b>
<b>2009-13</b>	<b>.259</b>	<b>2.44</b>	<b>.75</b>	<b>7.5</b>	<b>2.022</b>	<b>21.8</b>
<b>Natural</b>	<b>.023</b>	<b>.21</b>	<b>.08</b>	<b>.7</b>	<b>.16</b>	<b>1.5</b>

### 6.2.8 Sulfureous Particulate

The IMPROVE protocol measures the sulfur content of fine PM. Sulfur particulate generally enters the atmosphere from the sulfur content of combusted fuels. Coal contains varying proportions of sulfur, so the shift away from coal likely has contributed to the drastic reduction in monitored sulfureous PM at the Wichita Mountains. Moreover, EPA mandated lower sulfur content in diesel fuel and gasoline throughout the U.S. The ongoing drought and shift to a drier climate, however, also may allow cleaner source regions of air masses reaching the Wichita Mountains, corresponding to these reductions in monitored sulfureous particulate. DEQ intends to review future data more thoroughly to assess whether different prevailing weather patterns may bring more or less sulfureous PM to the Wichita Mountains. Table 6-7 shows that the best quintile days show no reduction in sulfureous particulate.

**Table 6-7: Sulfureous Particulate Matter at the Wichita Mountains**

Year	Best Quintile		Annual Average		Worst Quintile	
	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$
<b>2001</b>			.74	22.3		
<b>2002</b>	.193	5.35	.79	24.4	1.83	62.2
<b>2003</b>	.185	4.98	.738	22.3	1.32	43.4

Year	Best Quintile		Annual Average		Worst Quintile	
	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$	$\mu\text{g m}^{-3}$	$\text{Mm}^{-1}$
<b>2004</b>	.183	4.97	.711	21.3	1.28	41.6
<b>2005</b>	.280	7.4	.99	32.0	2.32	84.
<b>2006</b>	.213	5.91	.70	20.7	1.34	42.5
<b>2007</b>	.220	5.82	.68	20.4	1.40	45.4
<b>2008</b>	.247	6.73	.661	19.7	1.24	40.0
<b>2009</b>			.573	16.9		
<b>2010</b>	.222	5.96	.592	17.3	1.02	32.0
<b>2011</b>	.220	6.13	.585	16.9	1.051	32.3
<b>2012</b>	.160	4.35	.528	15.12	.873	26.0
<b>2013</b>	.150	4.15	.483	13.8	.859	25.9
<b>Baseline</b>	<b>.187</b>	<b>5.10</b>	<b>.744</b>	<b>22.6</b>	<b>1.478</b>	<b>49.1</b>
<b>2009-13</b>	<b>.1881</b>	<b>5.14</b>	<b>.552</b>	<b>15.99</b>	<b>.950</b>	<b>29.0</b>
<b>Natural (Western)</b>	<b>.007</b>	<b>.19</b>	<b>.029</b>	<b>.76</b>	<b>.06</b>	<b>1.5</b>

### 6.2.9 Deciview Visibility Index

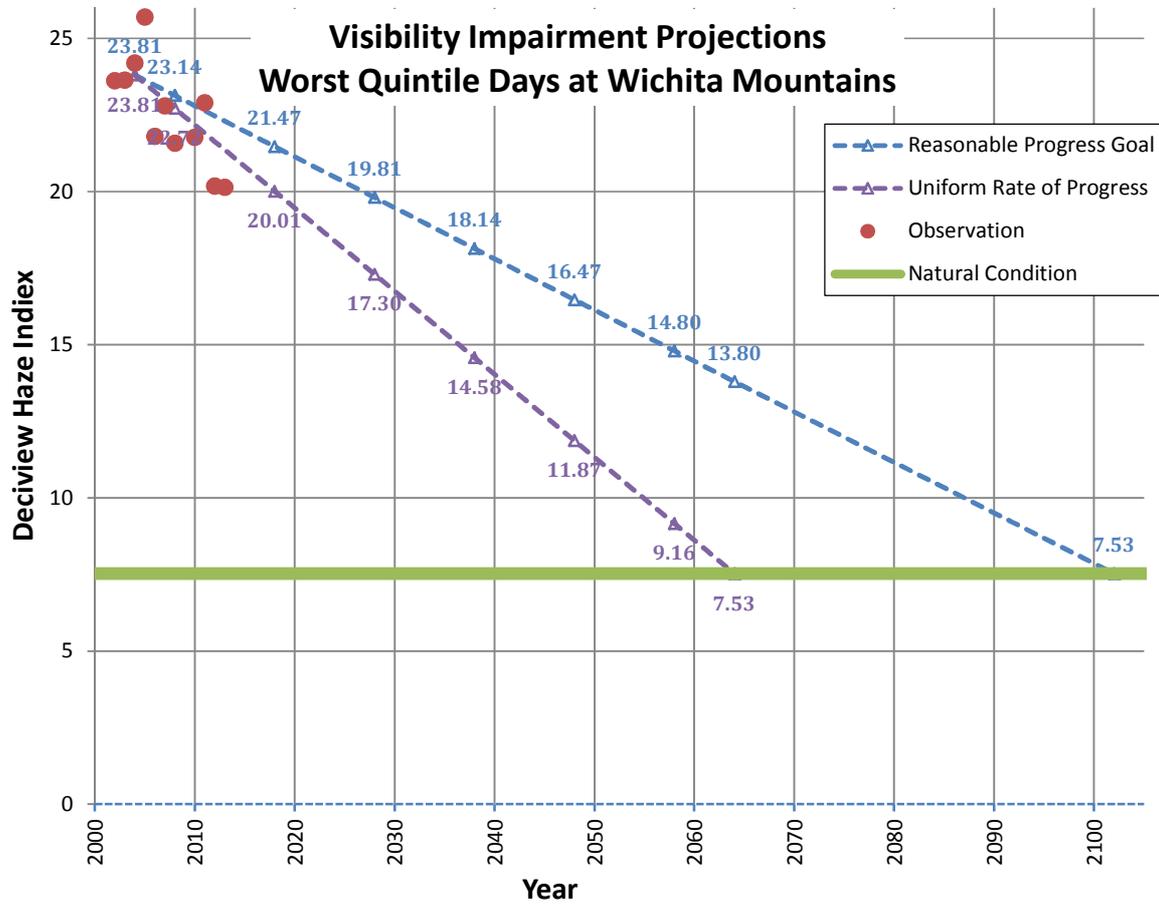
Federal regulations call for analysis of reasonable progress in terms of a regulatory unit called the deciview, a logarithmic function of the additive extinction factors in  $\text{Mm}^{-1}$ . Table 6-8 applies this regulatory unit to assess total visibility degradation at the Wichita Mountains. The reasonable progress goals at the Wichita Mountains for 2018, listed in this table, reflect the revised reasonable progress goals that EPA included in the regulation and implementation plan on 5 January 2016. The outcome of litigation regarding the Cross State Air Pollution Rule and the federal implementation plans for Texas may require some slight alteration of the reasonable progress goal.

Table 6-8: Deciview visibility index at the Wichita Mountains

Year	Best Quintile		Annual Average		Worst Quintile	
	deciview	$\text{Mm}^{-1}$	deciview	$\text{Mm}^{-1}$	deciview	$\text{Mm}^{-1}$
<b>2001</b>			16.9	60.		
<b>2002</b>	9.9	27.1	16.60	59.3	23.62	109.
<b>2003</b>	10.2	28.1	17.20	62.0	23.64	108.
<b>2004</b>	9.6	26.6	16.83	61.6	24.2	118.
<b>2005</b>	10.7	29.9	17.9	68.1	25.7	135.
<b>2006</b>	9.8	27.0	16.0	54.4	21.8	93.
<b>2007</b>	9.5	26.2	16.1	56.4	22.8	106.
<b>2008</b>	10.0	27.6	15.80	53.0	21.58	88.8
<b>2009</b>			14.68	47.7		
<b>2010</b>	9.3	25.7	15.41	51.4	21.77	90.1
<b>2011</b>	10.38	28.7	16.19	55.6	22.90	101.3
<b>2012</b>	8.9	24.8	15.01	48.5	20.18	76.9

Year	Best Quintile		Annual Average		Worst Quintile	
	deciview	Mm <sup>-1</sup>	deciview	Mm <sup>-1</sup>	deciview	Mm <sup>-1</sup>
<b>2013</b>	8.4	23.4	14.17	44.9	20.14	76.2
<b>Baseline (2000-04)</b>	<b>9.92</b>	<b>27.3</b>	<b>16.89</b>	<b>60.7</b>	<b>23.83</b>	<b>111.4</b>
<b>2009-2013</b>	<b>9.25</b>	<b>25.7</b>	<b>15.09</b>	<b>49.6</b>	<b>21.25</b>	<b>86.2</b>
<b>Natural (Western)</b>	<b>4.2</b>	<b>14.</b>	<b>7.1</b>	<b>17.</b>	<b>7.53</b>	<b>21.</b>
<b>Uniform rate of progress for 2018</b>					<b>20.01</b>	<b>74.0</b>
<b>Reasonable progress goal for 2018</b>	<b>9.22</b>	<b>25.1</b>			<b>21.33</b>	<b>84.4</b>

The visibility at the Wichita Mountains already has improved sufficiently to meet the reasonable progress goal for 2018 during 2009-2013 for the worst quintile of days. Visibility has improved nearly enough to meet the reasonable progress goal for 2018 during 2009-2013 for the best quintile of days. DEQ attributes this dramatic improvement not to emission reductions alone, but rather to a combination of emission reductions, reductions associated with the economic downturn, and changes in weather and climate. Major emitting facilities in Oklahoma had not installed BART controls before these improvements in visibility occurred; therefore, DEQ anticipates some further improvement in visibility after their installation.



## 7 Assessment of Effectiveness of Existing Implementation Plan

Based on the analyses throughout this progress report, DEQ concludes that the current version of Oklahoma's regional haze SIP is successfully improving visibility so as to meet the reasonable progress goals at the Wichita Mountains for 2018. For the 2009-2013 period, the 2018 reasonable progress goal on the worst quintile days for the Wichita Mountains has been exceeded (21.25 deciview with a goal of 21.33 deciview), and the improvement on the best quintile days is 96% of the way to the 2018 reasonable progress goal (9.22 deciview). The Uniform Rate of Progress for the worst quintile days in 2018 is 20.01 deciview, and the 2009-2013 period shows to be over 67% of the way to meeting that level. This assessment does not reflect the benefit of BART installations at the six required sources, and therefore DEQ expects even greater visibility improvement to report in the next assessment.

DEQ identifies no emissions from Oklahoma preventing or inhibiting reasonable progress at mandatory federal Class I areas in other states, nor has any other state contacted DEQ to assert this. Although it is rare that emissions from Oklahoma impact the Caney Creek and Upper Buffalo Wilderness Areas in Arkansas due to the location of large pollutant emitting sources in Oklahoma combined with the prevailing wind direction and topographical setup along the Oklahoma/Arkansas border, DEQ will continue to surveil these and other necessary Class I areas in other states. DEQ intends to continue to enforce its rules and abide by the provisions of its SIP, including any revisions submitted to EPA for review and approval.

## 8 Consultation and Comment

### 8.1 Central States Air Resources Agencies

In conformance with 40 C.F.R. §51.308(i)(4), DEQ consults with federal land managers during development and review of this progress report (40 C.F.R. §51.308(i)(4) (2015)). In development of this progress report, the Central States Air Resource Agencies (CenSARA) coordinated communications between states and the federal land managers in the following ways:

- During a conference call on 16 December 2011, a federal land manager representative discussed the expectations for this progress report.
- On 27 February 2012, CenSARA members held a conference call for an initial planning session.

### 8.2 Federal Land Manager Review

Additionally Oklahoma individually consulted the federal Secretary of Interior and Secretary of Agriculture as statutory federal land managers during the report development process. DEQ also sent drafts of the progress report to the federal land managers on 11 April 2016. DEQ notified the federal land managers of the public review comment period on 2 August 2016 and of the opportunity to request a public hearing tentatively scheduled for 6 September 2016. DEQ considered or incorporated the comments of the federal land managers alongside other comments on this progress report (see Appendix II).

DEQ will continue to coordinate and consult with the federal land managers on future revisions to the SIP for regional haze, including progress reports, as well as during the implementation of programs with the potential to contribute to visibility impairment at the Wichita Mountains or at any other mandatory Class I area.

### 8.3 Public Comment

In conformance with 40 C.F.R. §51.308(g), this submittal process also complies with 40 C.F.R. §§51.102-51.103, which require DEQ to offer the public the opportunity to request a hearing or to comment on any proposed implementation plan revision before submission to EPA (40 C.F.R. §§51.102-51.103 (2015)). DEQ provided public notice of the opportunity to comment on the implementation plan revision on 2 August 2016. DEQ provided notice of public hearing on 2 August 2016. DEQ held public hearings regarding the implementation plan revision on <dates>. Appendix II to this report summarizes and addresses any public comments. <Provide a description of the process of Oklahoma to compile and address public comments regarding the implementation plan revision>.

## 9 Future Implementation Plan Revisions

The regional haze regulation in 40 C.F.R. §51.308(f) requires a comprehensive revision of the Oklahoma regional haze SIP before 31 July 2018 (40 C.F.R. §51.308(f) (2015)). DEQ has begun its technical analysis for the development of that SIP revision. DEQ alongside CenSARA continues to participate with EPA in the process of developing guidance for the future of the regional haze program. EPA may issue such guidance or amend its regulations to describe its expectations for contents of the SIP revisions more fully or to extend submission deadlines from 2018 to 2021. DEQ will continue to coordinate with EPA and the Texas Commission on Environmental Quality on pollution reductions in Texas necessary to achieve clean air for Oklahoma's Class I area. In conformance with applicable statutory and regulatory law, DEQ also intends to coordinate with other upwind and downwind states in the development of any future revisions of its regional haze SIP for visibility at the Wichita Mountains and at any other Class I areas.

## Appendix I Legal Authority

27A O.S. § 2-5-105 designates DEQ as the administrative agency for the Oklahoma Clean Air Act (27A O.S. §2-5-105 (2011)). The AQD of DEQ has the authority to carry out all duties, requirements, and responsibilities necessary and proper for the implementation of the Oklahoma Clean Air Act and the fulfillment of the requirements of the federal Clean Air Act. 27A O.S. § 1-3-101(B)(8) (2011); 27A O.S. § 2-3-101(E)(1) (2011); 27A O.S. § 2-5-105 (2011). Section I.D. and Appendix 1-1 of Oklahoma's original Regional Haze SIP revision contains a more complete description of AQD's legal authority.

Upon recommendation of the Air Quality Advisory Council, the Environmental Quality Board has the authority under 27A O.S. § 2-5-106 to adopt air quality regulations applicable in the state of Oklahoma. 27A O.S. § 2-5-106 (2011). DEQ has the authority under Oklahoma law to:

- Enforce those regulations and issue and enforce orders to comply with the same, 27A O.S. §§ 2-5-105(4),2-5-110 (2011);
- Maintain and update an inventory of air emissions from stationary sources, 27A O.S. § 2-5-105(19) (2011);
- Establish a permitting program, issue permits, and issue and enforce orders to comply with the same, 27A O.S. § 2-5-105(2) (2011); and
- Carry out all other duties, requirements, and responsibilities necessary and proper for the implementation of the Oklahoma Clean Air Act and the fulfillment of the requirements of the federal Clean Air Act, 27A O.S. § 2-5-105(20) (2011).

Specifically, the Environmental Quality Board and Department of Environmental Quality have the existing authority to:

- Adopt emissions standards and regulations to implement the Oklahoma Clean Air Act and to fulfill requirements of the federal Clean Air Act,27A O.S. §§ 2-2-104, 2-5-105, 2-5-106, 2-5-107,2-5-114 (2011);
- Enforce the relevant laws, regulations, standards, orders and compliance schedules authorized by the Oklahoma Clean Air Act, 27A O.S. §§ 2-5-105(4), 2-5-110 (2011), and seek injunctive relief when necessary, 27A O.S. §§ 2-5-105(14), 2-5-117(A) (2011);
- Abate pollutant emissions on evidence that the source is presenting an immediate, imminent and substantial endangerment to human health, 27A O.S. § 2-5-105(15) (2011);
- Prevent construction, modification, or operation of a source in violation of the requirement to have a permit or of any substantive provision or condition of any permit issued pursuant to the Oklahoma Clean Air Act, 27A O.S. § 2-5-117(A)(2) (2011);
- Obtain information necessary to determine compliance, 27A O.S. §§ 2-5-105(17), (18) (2011);
- Require recordkeeping, to make inspections, and to conduct tests, 27A O.S. § 2-5-105(17) (2011);

- Require that owners or operators install, maintain, and use monitors and to require their emissions reports, 27A O.S. § 2-5-112(B)(5) (2011); and
- Make emissions data available to the public, 51 O.S. §§ 24A.1-24A.27, except §§ 24A.10a, 24A.11, 24A.12, 24A.15, 24A.16, 24A.16a, 24A.19, 24A.22, 24A.23, and 24A.24 (2011).

## Appendix II      Comments and Responses

### Comments from Federal Land Managers

**Ozark-St. Francis and Ouachita National Forests** – Letter received on May 31, 2016, from Reggie Blackwell, Forest Supervisor, and Norman Wagoner, Forest Supervisor.

1. **COMMENT:** Please update the status of impending projects for BART installations.

**RESPONSE:** This has been updated for AEP/PSO Northeastern (Section 2.4.6), OG&E Seminole (Section 2.4.1), and AEP/PSO Comanche (Section 2.4.2).

2. **COMMENT:** Define what a Tier II permit is.

**RESPONSE:** A citation has been provided to the regulation that outlines who must apply for a Tier II permit.

3. **COMMENT:** Please provide a citation for the revised DEQ rules in Section 3.6.

**RESPONSE:** The citation has been inserted.

4. **COMMENT:** Please provide the delta for emissions between 2011 and 2002. Also include the 2018 projected emission inventory.

**RESPONSE:** A table of the 2018 projected emission inventory has been added. The requested delta was inserted into Table 5-2.

**National Park Service and U.S. Fish and Wildlife Service** – E-mail received June 9, 2016, from Pat Brewer, Regulatory and Policy Specialist.

1. **COMMENT:** Please update the status of impending projects for BART installations.

**RESPONSE:** See above response.

2. **COMMENT:** Please report the 2015 continuous emissions monitoring data for the electric generating units. Also, please include emissions from oil and gas extraction separately and discuss the trend.

**RESPONSE:** When this report was generated, 2015 data was not yet available and was therefore not included. Also, the continuous emissions monitoring data from 2015 will not reflect reductions in emissions due to the required BART installations for regional haze, because they were not initiated until 2016. An analysis of electric generating units' emissions and the effect on visibility is better suited for the next regional haze implementation plan. DEQ does not believe separate oil and gas

extraction data is necessary for this report, but will take this suggestion into consideration for the next assessment.

3. **COMMENT:** Include a chart of pollutant contributions to the 20% worst visibility days. Also note that visibility conditions are not yet below the Uniform Rate of Progress.

**RESPONSE:** Calculating and charting individual pollutant contributions to the worst visibility days is a time and effort intensive project which DEQ believes would be better suited for the next regional haze implementation plan. The Uniform Rate of Progress goals and current conditions are included in Table 6-8 and Section 7 has been expanded to address that conditions are not yet below the Uniform Rate of Progress.

4. **COMMENT:** Please discuss emission contributions in Oklahoma to visibility impairment at Class I areas in other states.

**RESPONSE:** A discussion has been added to Section 7.

#### **Public Comments**

<Reserved>