2017

State of the Air

Office of Air Quality

Arkansas Department of Environmental Quality

CONTENTS

Tables

Figures

Purpose and Acknowledgements

Purpose

The 2017 State of the Air Report is intended to provide a concise presentation of data about the state of air quality in Arkansas and the programs implemented by the Arkansas Department of Environmental Quality (ADEQ) Office of Air Quality. This report highlights key milestones by the Office of Air Quality during federal fiscal year 2017 and documents trends in air quality throughout the State. We welcome your questions and comments on the information contained in this report to the contacts below.

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Acknowledgments

The 2017 State of the Air Report was edited by Tricia Treece. We gratefully acknowledge the contributions of the staff and management of the Office of Air Quality in the production of this report:

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All images were obtained from Wikimedia Commons, created by ADEQ staff, or are otherwise credited.

Introduction

The Office of Air Quality endeavors to protect air quality to enhance the lives and health of all Arkansans and visitors to the State, while fostering responsible economic expansion opportunities

Who we are:

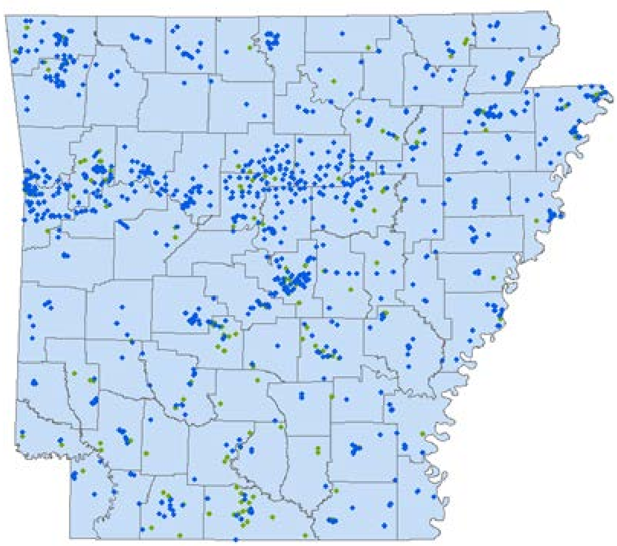
- A team of scientists, engineers, attorneys, and administrative professionals
- 75 Positions located in North Little Rock and throughout the State in 9 Regional Field Offices

What we do:

- Develop and implement programs designed to ensure compliance with federal and State law
- Develop language and documentation for State rules governing air quality
- Regulate emissions through a permitting program that sets emission limits protective of public health
- Monitor ambient air quality in Arkansas through deployment and maintenance of a statewide monitoring network
- Investigate complaints and violations of State and federal air quality laws

The Permits Branch is responsible for issuing air permits to approximately 1300 facilities in Arkansas (Figure 1). The Permits Branch implements a single-permit system for new and modified facilities that encompasses both State and federal regulatory requirements for stationary sources. Permits include information on which pollutants are being released, how much may be emitted, and what steps the source's owner or operator is taking to reduce pollution. All permits include a mechanism to demonstrate compliance with the permit conditions. The permitting process ensures that stationary sources will be constructed or modified to operate without resulting in a violation of the Arkansas environmental statutes and regulations and without interfering with the attainment and maintenance of the national ambient air quality standards (NAAQS).

Figure 1 Permitted Facilities



Types of Air Permits

There are two types of air permits: Minor Source and Major Source/Title V. Title V sources are sources of air pollutants that have actual or potential emissions at or above the major source threshold for any air pollutant. Minor sources are those required to obtain a permit under APC&EC regulations, but do not meet any major source thresholds. ADEQ also offers general standardized permits for specific types of facilities.

THE PERMITS TEAM

- ONE SENIOR OPERATIONS MANAGER
- ONE SENIOR ASSURANCE ENGINEER
- THREE ENGINEER SUPERVISORS
- FOURTEEN ENGINEERS
- ONE ADMINISTRATIVE ANALYST
- ONE ADMINISTRATIVE SPECIALIST

MAJOR SOURCE THRESHOLDS

- 100 TONS PER YEAR OF ANY POLLUTANT
- 10 TONS PER YEAR FOR A SINGLE HAZARDOUS AIR POLLUTANT OR 25 TONS PER YEAR FOR ANY COMBINATION OF HAZARDOUS AIR POLLUTANTS
- LOWER THRESHOLDS MAY APPLY IN NONATTAINMENT AREAS

GENERAL PERMITS

- AIR CURTAIN INCINERATORS
- ANIMAL/HUMAN REMAINS INCINETRATORS
- COTTON GINS
- GASOLINE BULK PLANTS
- HOT MIX ASPHALT FACILITIES
- NATURAL GAS COMPRESSION STATIONS

Minor Source Permits

The Permits Branch received 379 minor source permit applications and issued 368 minor source permits during federal fiscal year 2017 (October 1, 2016–September 30, 2017). Figure 2 (bottom left) shows the breakdown by permit activity type of minor source permit applications received and issued.

The Permits Branch has worked to improve permit turnaround time. Figure 3 (bottom right) shows trends in the permit issuance time frame for new minor source permits, minor source permit modifications, and minor source general permit renewals. The Permits Branch achieved a fifty-six percent reduction in new minor source permit issuance time frame and a forty-five percent reduction in minor source permit modification permit issuance time frame in the past five years.

**For FY 2017, permit issuance time frames do not reflect the 19 permit applications still in review.*

Image Credit: Dwight Burdette

Figure 2 Number of Minor Source Permitting Activities

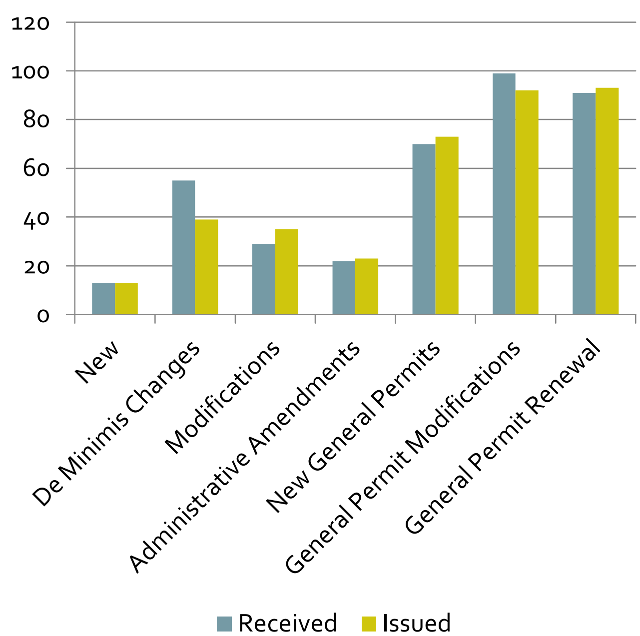
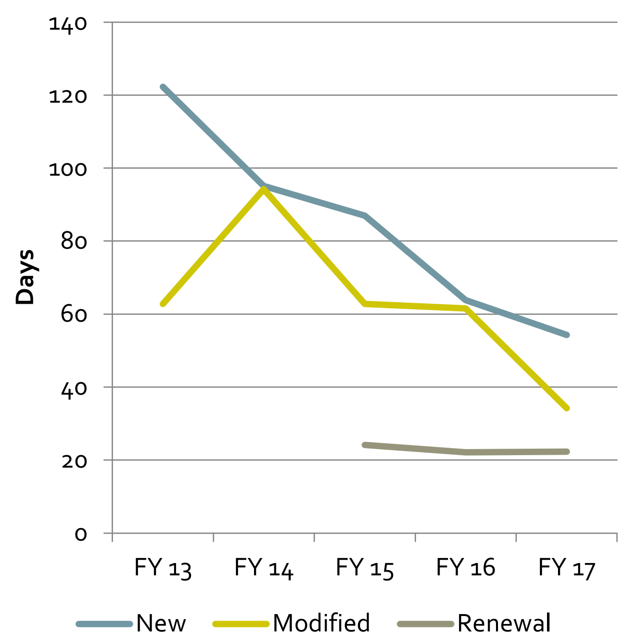


Figure 3 Trends in Minor Source Permit Issuance Time Frame



Title V Permits

The Permits Branch received 152 Title V permit applications and issued 108 Title V permits during federal fiscal year 2017 (October 1, 2016–September 30, 2017). Figure 4 (bottom left) shows the breakdown of Title V applications received and issued by permit activity type.

The Permits Branch has worked to improve permit turnaround time. Figure 5 (bottom right) shows trends in turnaround time for new Title V permits, Title V permit modifications, and Title V permit renewals. The Permits Branch achieved an eighty-eight percent reduction in new Title V permit turnaround time, a forty-six percent reduction in Title V permit modification turnaround time, and a fifty-nine percent reduction in Title V renewal turnaround time in the past five years.

**For FY 2017, turnaround times do not reflect the thirty permit applications still on hold or still in review.*

Image Credit: Arnold Paul

Image Credit: Leonard G.

Figure 4 Number of Title V Permitting Activities

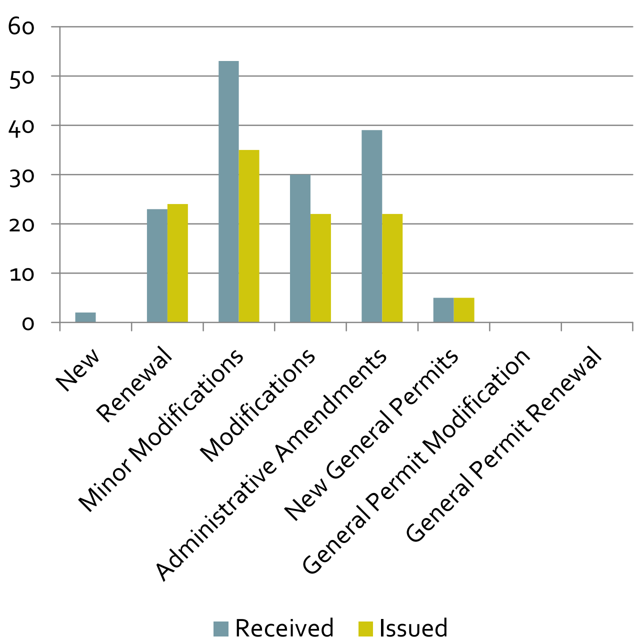
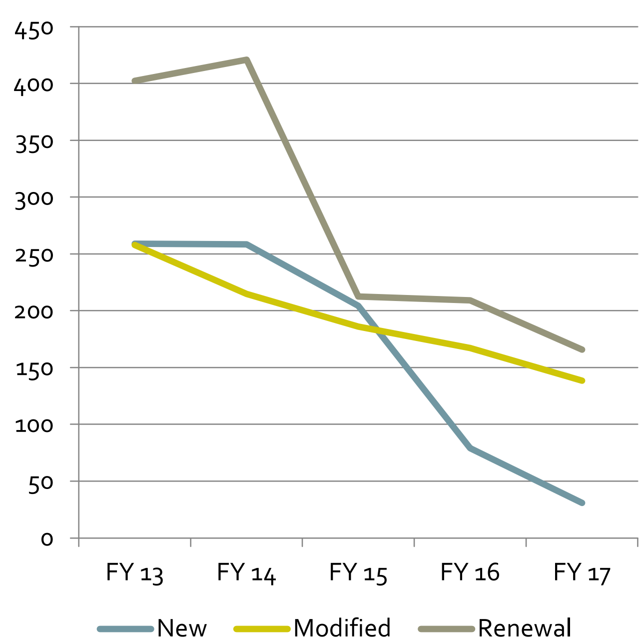


Figure 5 Trends in Title V Permit Issuance Time Frame



Title V National Rankings

Arkansas is among the timeliest in the United States in issuance of Title V significant modification and renewal permits.

Title V Significant Modifications

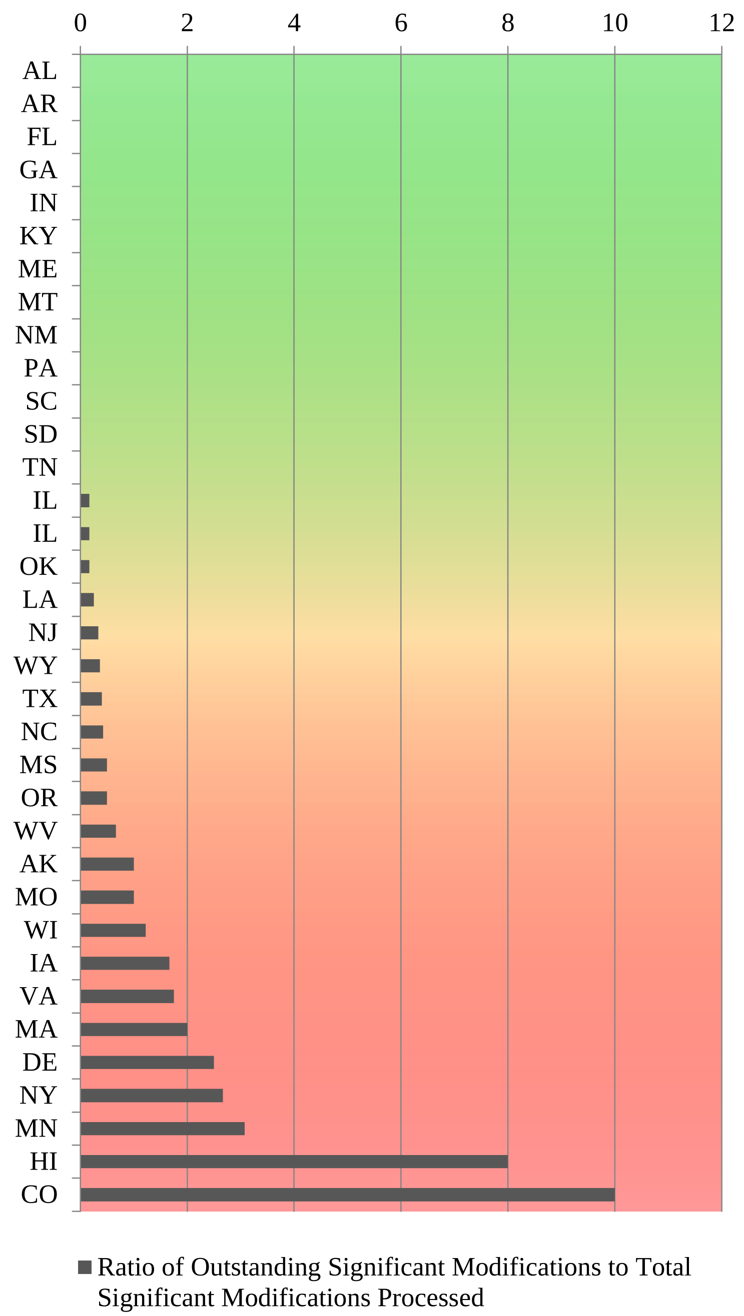
The Clean Air Act considers Title V significant modifications to be timely if they are issued within eighteen months of application submittal.

According to the latest data from EPA's National Title V Operating Permit System database (January–June 2017), Arkansas is one of thirteen states that completed all Title V significant modification permitting actions within eighteen months of application submittal.

Twenty-two states failed to issue all Title V significant modifications within the eighteen month window considered timely under the Clean Air Act.

Significant modifications that are not issued within eighteen months are referred to as outstanding significant modifications.

Figure 6 Comparison of State Air Permitting Authority Timeliness for Issuance of Title V Significant Modifications

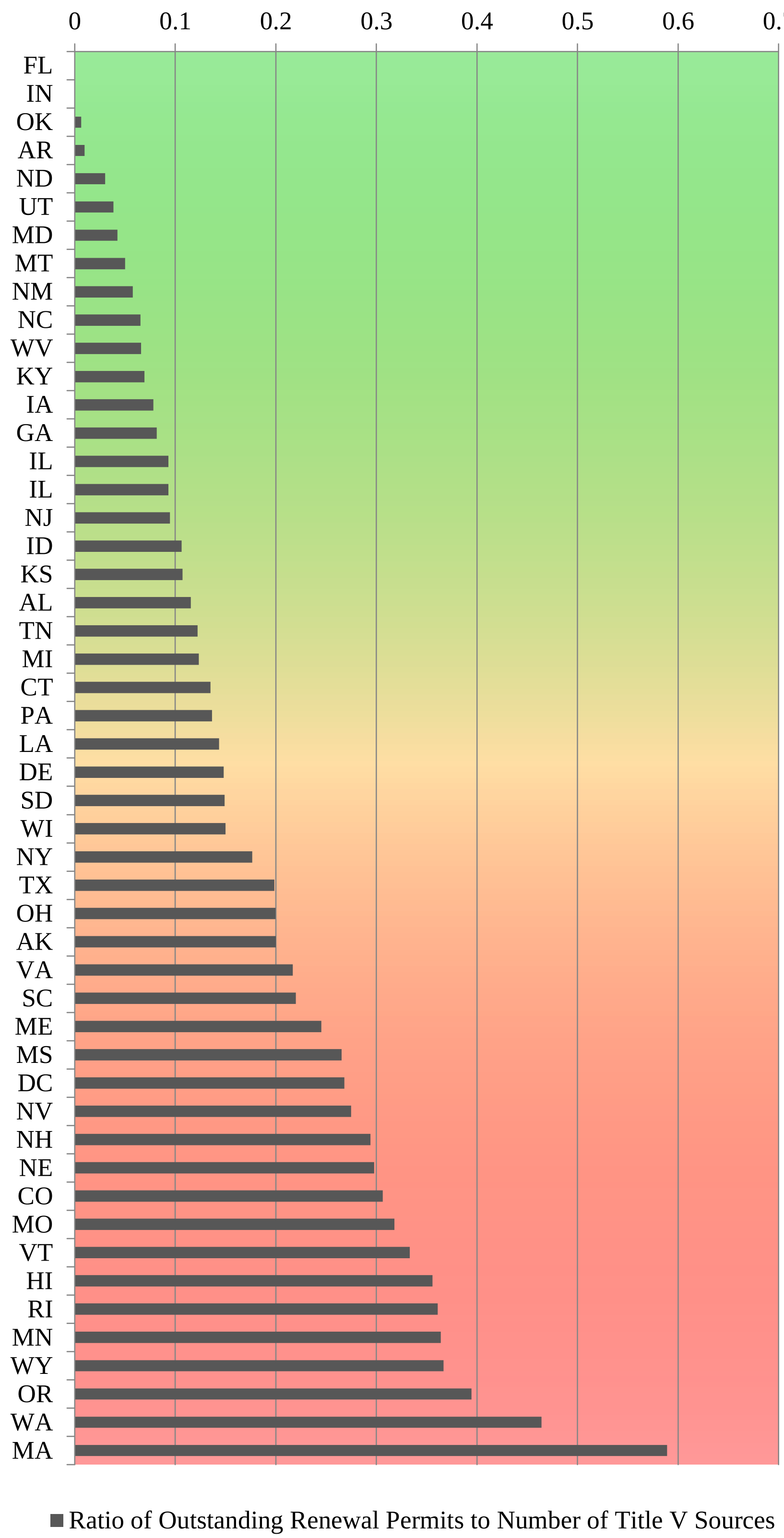


Title V Renewals

The Clean Air Act considers renewal of Title V permits to be on time if they occur prior to the expiration of the existing permit. According to the latest data from EPA's National Title V Operating Permit System database (January–June 2017), Arkansas ranks fourth among states for timeliness in issuance of Title V renewals. Title V permits that are not completed on time are referred to as outstanding renewal permits. An outstanding permit renewal can result from either failure of a Title V source to submit a renewal application, late submission of the renewal application by the Title V source, or from failure of the permitting authority to complete a final action on a timely renewal application before the Title V permit expires.

Appendix D contains additional information about trends in permitting metrics. Further efficiency improvement efforts by the Permits Branch are described in Appendix E.

Figure 7 Comparison of State Air Permitting Authority Timeliness for Issuance of Title V Renewals



Air Compliance, Asbestos, and Enforcement

The Compliance and Enforcement Branches work together to ensure that permitted facilities are operated in accordance with State and federal air pollution regulations. In addition, the Enforcement Branch also includes a section responsible for implementing State and federal asbestos regulations and grants.

Compliance Branch

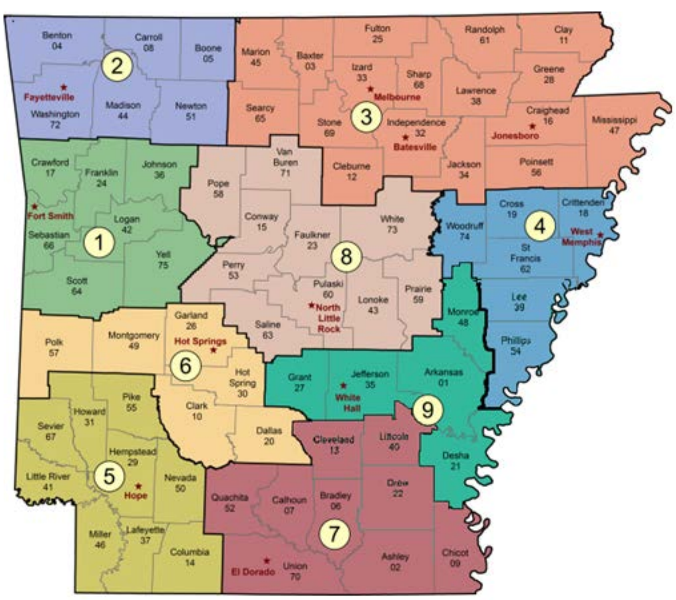
The primary responsibility of the Office of Air Quality Compliance Branch is to investigate whether permitted facilities are operated in accordance with State and federal air pollution regulations, as specified in each facility's permit. This is accomplished through unannounced compliance inspections, stack testing, and monitoring of reporting requirements. Compliance Branch inspectors also investigate citizen complaints regarding air pollution, respond to emergency situations, and perform pre-assessments of vegetative burn sites, as needed.

Arkansas has seventy-five counties, which are divided into nine inspection districts. Figure 8 is a map of Office of Air Quality Compliance Branch inspector districts. The air compliance inspectors range in experience from new hires to over thirty years' experience with the State. All inspectors are required to have a Bachelor's degree in a related field and attend numerous annual training activities covering many topics.

THE COMPLIANCE TEAM

- ONE BRANCH MANAGER
- FOUR INSPECTOR SUPERVISORS
- NINETEEN INSPECTORS
- TWO ADMINISTRATIVE ANALYSTS

Figure 8 Air Compliance Inspector Districts Map



Air Inspections

Compliance Branch air inspectors performed 702 inspections of permitted facilities during federal fiscal year 2017 (October 1, 2016–September 30, 2017). Figure 10 (bottom right) shows the breakdown of inspections by district. Only ten percent of inspections resulted in inspectors noting areas of concern with respect to compliance with permit requirements. Figure 9 (bottom left) shows the relative number of inspections performed for sources subject to Title V of the Clean Air Act and other typically smaller sources, referred to as minor sources.

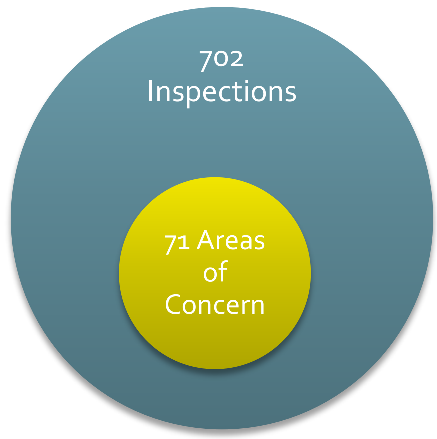


Figure 9 Title V and Minor Source Inspections

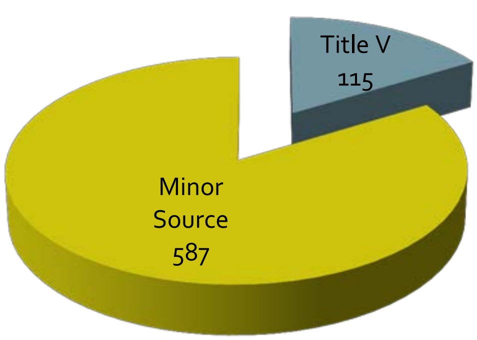
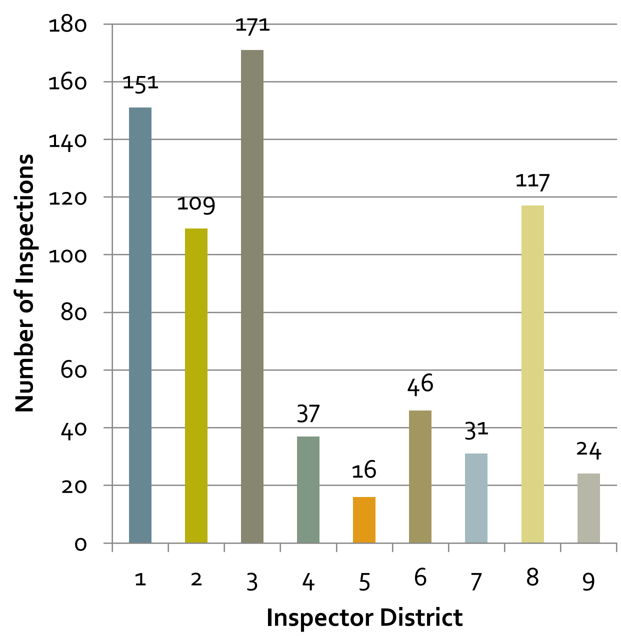


Figure 10 Air Compliance Inspections Per District



Air Quality Complaints

Compliance inspectors investigated 473 air quality complaints during federal fiscal year 2017 (October 1, 2016–September 30, 2017). ADEQ provides citizens with multiple ways to file complaints, including through the ADEQ website and via mobile applications. Figure 11 (bottom left) shows the breakdown of air quality complaint investigations by district. Approximately thirty-seven percent of complaints were about open burning. Figure 12 (bottom right) shows the relative number of investigations for various types of air quality complaints.

ADEQ's Mobile App - Pollution Complaints
Get our app and start sending complaints from your phone.

Download on the App Store

ANDROID APP ON Google play

Figure 11 Complaint Investigations Per District

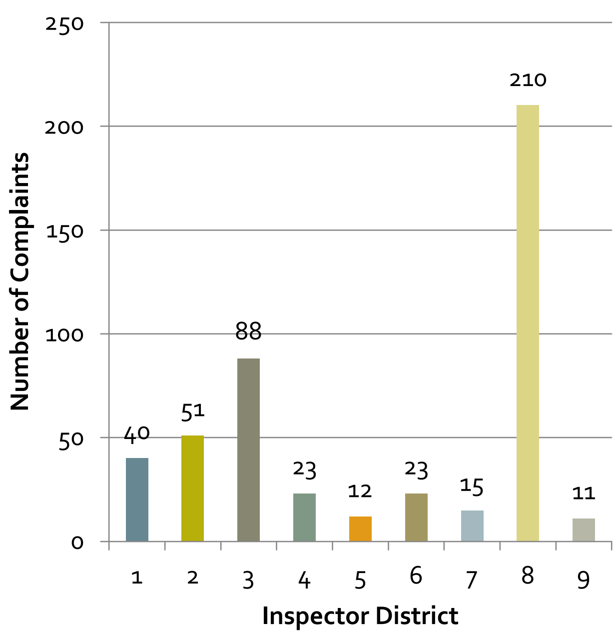
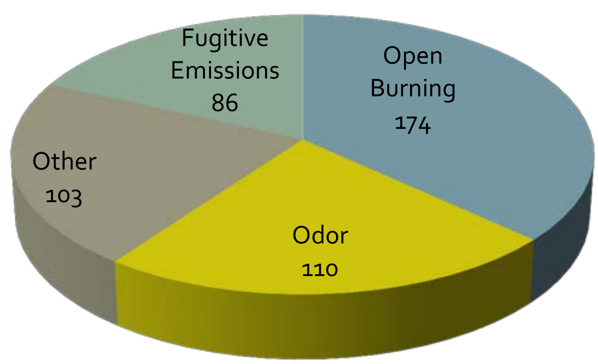


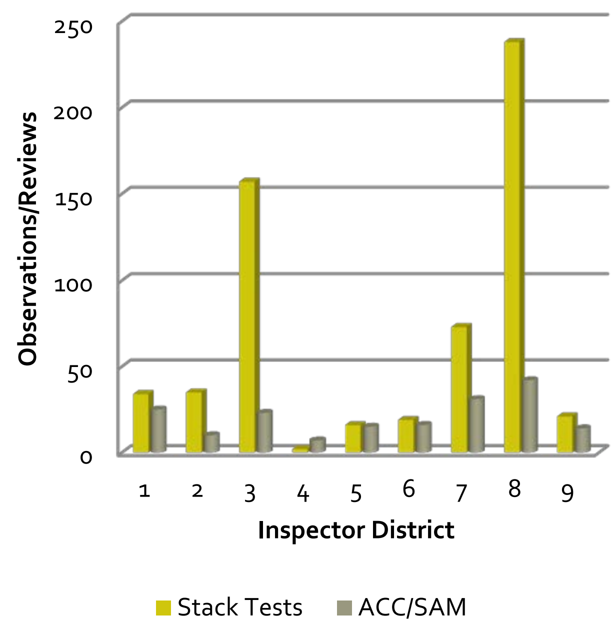
Figure 12 Investigations by Complaint Type



Stack Testing Observations and Compliance Certification and Monitoring Report Reviews

Compliance inspectors observed 595 stack tests during federal fiscal year 2017 (October 1, 2016–September 30, 2017). Compliance inspectors observe stack tests to ensure that they are performed in accordance with ADEQ-approved methods. Compliance inspectors also reviewed 183 Title V permit certifications of compliance (ACC) and Title V semi-annual monitoring (SAM) reports. SAM reports provide data for all monitoring requirements in effect.

Figure 13 Stack Test Observations and ACC/SAM Reviews by District



Asbestos Program

The Asbestos Program ensures that the public adheres to State asbestos rules as set forth in Arkansas Pollution Control and Ecology Commission (APC&EC) Regulation No. 21. This is done through complaint investigations, monitoring of demolition and renovation projects, licensing and certifying of asbestos professionals, and conducting outreach demonstrations—which are used to educate interested parties. The Asbestos Program also funds a grant that assists small cities and counties to clean up and stabilize structurally impaired asbestos-containing structures.

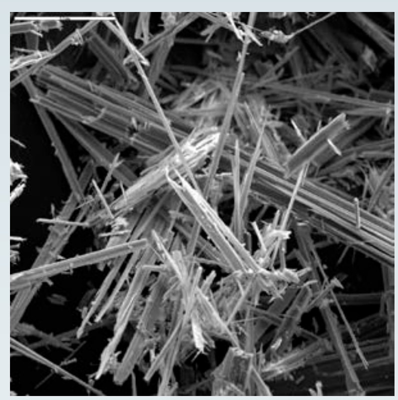
THE ASBESTOS TEAM

- ONE BRANCH MANAGER (ALSO MANAGES ENFORCEMENT)
- ONE ENVIRONMENTAL PROGRAM COORDINATOR
- THREE INSPECTORS
- ONE ADMINISTRATIVE ANALYST
- ONE ADMINISTRATIVE SPECIALIST

WHAT IS ASBESTOS?

Asbestos is a naturally occurring mineral substance, which over thousands of years has proven to be very useful and durable. Because of its resistance to heat, asbestos has been used in several commercial applications such as cigarette filters, car brakes, various building materials (insulation, roofing, piping, etc), fire-proof clothing, and stage curtains. While it seemed to be an all-purpose material, asbestos also proved to be detrimental to human health causing diseases such as lung cancer, asbestosis, and mesothelioma. In 1971, the EPA deemed asbestos to be a hazardous air pollutant. In 1993, the APC&EC developed Regulation No. 21, which sets forth regulations pertaining to the handling of asbestos.

Although asbestos is no longer mined in the United States, it still has a variety of uses that are now regulated to ensure public safety. Through education the public is learning to leave undamaged asbestos containing material alone. It poses little harm when the fibers are not disturbed and broken into inhalable pieces that can ultimately attach to the pulmonary system and cause incurable illness.



Asbestos Complaints

Asbestos inspectors investigated fifty-one complaints during federal fiscal year 2017 (October 1, 2016–September 30, 2017). Asbestos inspectors found violations during thirty-five percent of asbestos complaint investigations. ADEQ inspectors also inspected 310 out of 699 asbestos activities reported to ADEQ via Notice of Intent (NOI). See Figures 14 and 15.

Figure 14 NOI Submissions by Type

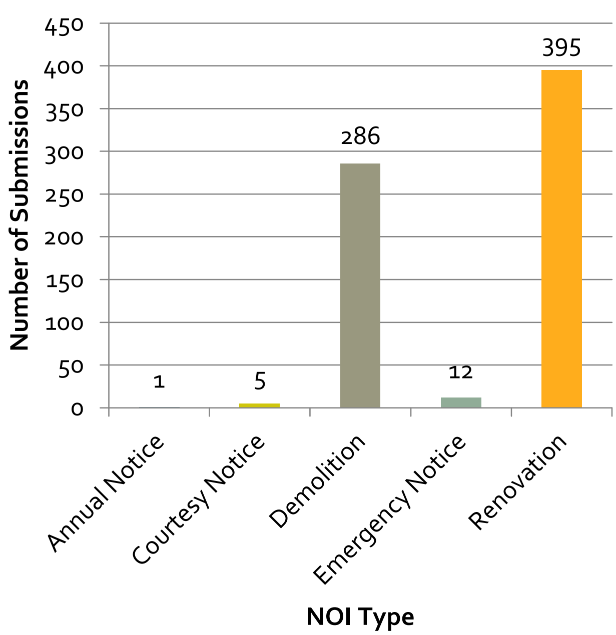
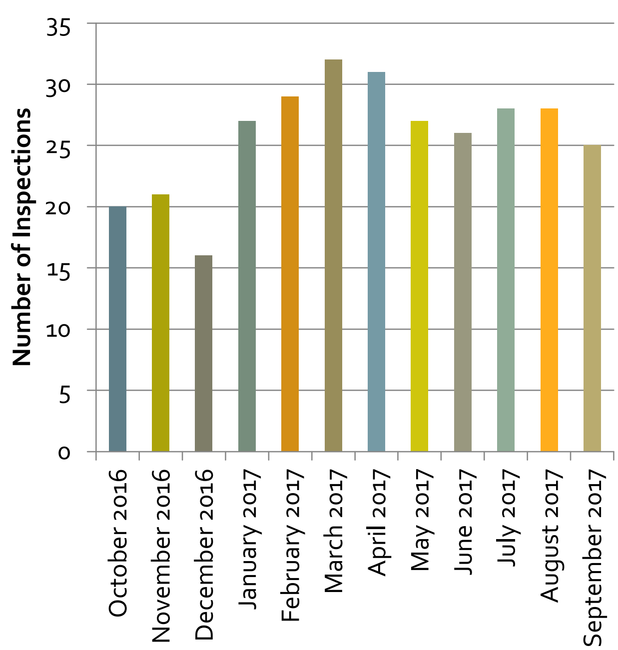


Figure 15 NOI Inspections per Month



Arkansas Asbestos Abatement Grant Program

The Arkansas Asbestos Abatement Grant Program (AAGP) is a competitive grants program that assists cities and counties with populations of fifty thousand or less with abatement, stabilization, and remediation in asbestos containing structures. The program is self-funded through fees collected from asbestos contractor and consultant licensing, NOI submissions and revisions, and certifications. ADEQ distributes a total of $150,000 each fiscal year to recipients chosen based upon eligibility and project proposal approval. Table 1 details the projects that received AAGP grants during Federal fiscal year 2017 ((October 1, 2016–September 30, 2017).

Table 1 Federal Fiscal Year 2017 AAGP Grant Recipients

Recipient	Use	Amount
CITY OF ARKADELPHIA	Abatement of asbestos containing material in former Clark County Hospital	$92,503
CITY OF AUGUSTA	Abatement of asbestos containing material in an elementary school building that closed in 2002 and was later vandalized, with a section of the building set on fire.	$43,997
HOWARD COUNTY	Removal of asbestos containing material from a former county hospital that had its roof damaged following the hospital's closure in 2009 exposing asbestos containing material	$13,500
TOTAL		$150,000

Enforcement

The Enforcement Section is responsible for initiating consistent, appropriate, and timely enforcement of the State and federal air pollution laws and regulations administered by the Department. This section provides support and assistance on Office of Air Quality enforcement issues designated for formal and informal enforcement action. These enforcement actions are in response to referrals from the Asbestos Section and the Compliance and Permit Branches.

The Enforcement Section coordinates administrative enforcement actions and provides technical assistance and training to the regulated community and the general public on enforcement-related issues. The enforcement process helps facilities achieve successful compliance with State and federal standards and ensure compliance with air pollution laws and regulations. Figure 16 depicts the types of enforcement actions taken during federal fiscal year 2017 (October 1, 2016–September 30, 2017).

The Enforcement Section has engaged in a lean effort to streamline the enforcement process and improve communication. An overview of this lean process is included in Appendix E.

ENFORCEMENT TEAM

- ONE BRANCH MANAGER (ALSO MANAGES ASBESTOS)
- ONE ENFORCEMENT SUPERVISOR
- THREE ENFORCEMENT ANALYSTS
- ONE ADMINISTRATIVE ANALYST
- ONE ADMINISTRATIVE SPECIALIST

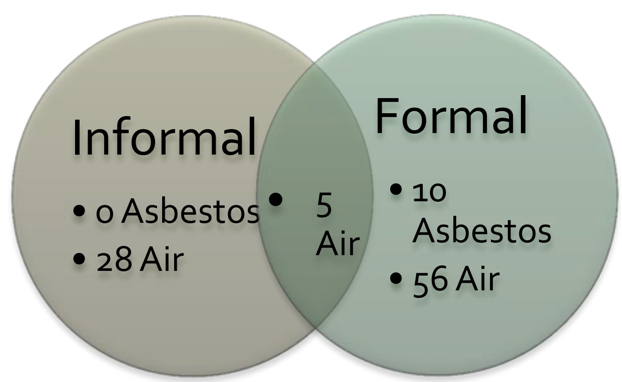
Informal Enforcement Actions

- Action taken using a letter detailing violations found of an air permit and/or applicable regulations that do not at that time warrant a formal enforcement action
- Requires corrective actions for violations

Formal Enforcement Actions

- Action taken using Consent Administrative Orders and/or Notices of Violation
- Incorporate assessment of a civil penalty, corrective actions for violations, and other terms
- Legally binding

Figure 16 Fiscal Year 2017 Asbestos and Air Compliance Enforcement Actions



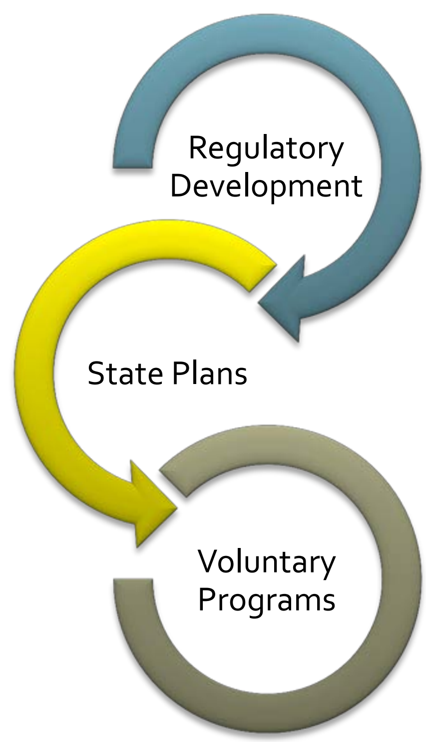
The Policy and Planning Branch is responsible for regulatory review, making revisions to State air quality regulations, and is service-oriented specializing in technical, educational, and graphical assistance for the Office of Air Quality. The Policy and Planning Branch is composed of the State Implementation Plan (SIP)/Planning Section and the Technical Section. This State of the Air Report was produced by the Policy and Planning Branch with collaboration from the other Office of Air Quality branches.

THE POLICY AND PLANNING TEAM

- ONE BRANCH MANAGER AND POLICY ADVISOR
- TWO SUPERVISORS
- TWO EPIDEMIOLOGISTS
- TWO AIR COMPLIANCE MONITORS
- TWO ENVIRONMENTAL PROGRAM COORDINATORS
- TWO ADMINISTRATIVE SPECIALISTS

SIP/Planning

The SIP/Planning Section is responsible for developing plans to comply with federal Clean Air Act requirements. These plans demonstrate how federal Clean Air Act requirements will be implemented through State statute and APC&EC regulations. In addition to developing federal Clean Air Act SIPs and state plans, the SIP/Planning Section prepares regulatory revisions and associated documentation for initiation and adoption by APC&EC. The SIP/Planning Section also works on the development and implementation of voluntary emission reduction programs. The ultimate goal of the SIP/Planning Section is to develop plans that are protective of air quality for the citizens of Arkansas while fostering responsible economic expansion opportunities.



2017 SIP, State Plan, and Regulatory Achievements

The Clean Air Act requires each state to submit to EPA a SIP that provides for the implementation, maintenance, and enforcement of a revised primary or secondary NAAQS. States are also required to develop SIPs to protect visibility, prevent significant deterioration of air quality (PSD), and re-attain the NAAQS in areas designated as non-attainment.

During 2017, ADEQ proposed three SIPs—including a multi-pollutant infrastructure SIP package and two visibility SIPs—and finalized two of the SIPs. In 2017, EPA took action to propose approval of certain elements of two SIP submissions and to fully approve a third SIP submission.

Proposed SIPs

- 2006–2012 Infrastructure and Transport; Revisions to Definition of VOC; Title V and PSD Updates
- Regional Haze : Electric Generating Unit (EGU) nitrogen oxides (NOx)Requirements
- Regional Haze :EGU sulfur dioxide (SO_2) Requirements

Final SIP Submissions

- 2006–2012 Infrastructure and Transport; Revisions to Definition of volatile organic compound (VOC); Title V and PSD Updates
- Regional Haze : EGU NOx Requirements

EPA Proposed Approvals

- 2006–2012 Infrastructure and Transport SIPs; Revisions to the Definition of VOC
- Threshold Revision SIP
- Regional Haze SIP: EGU NOx Requirements

2017 Voluntary Program Achievements

During 2017, the SIP/Planning section worked on initiatives to voluntarily reduce emissions of air pollutants, including Ozone Advance in Crittenden County, Nominations of Alternative Fuels Corridors, and plan development for programs under the Volkswagen Environmental Mitigation Trust. The SIP/Planning section also assisted with implementation of the Reduce Emissions from Diesels (Go RED!) funding assistance program.

Image obtained from: Georgia Diesel Emissions Reduction Program

The Go RED! program is a competitive funding assistance program that awards funding for projects that reduce emissions from diesel engines in Arkansas. Such projects include installation of exhaust controls, engine upgrades, idle reduction technologies, engine replacements, and vehicle/equipment replacements. Public, private, and nonprofit entities in Arkansas are eligible to receive funding assistance.

Year-to-year funding availability is dependent on Congressional appropriation and an optional match from the State of Arkansas.

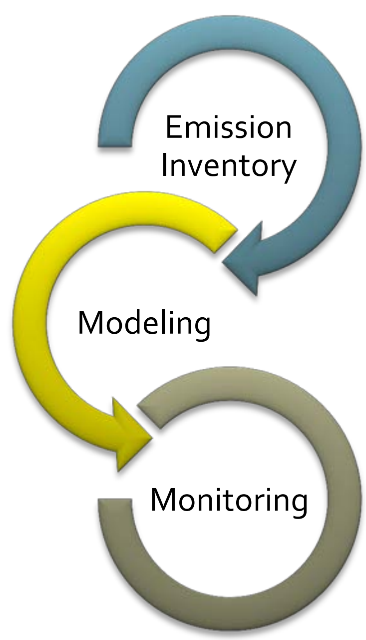
Table 2 Federal Fiscal Year 2017 Go RED! Funding Assistance Recipients

Recipient	Use	Amount
CLINTON SCHOOL DISTRICT	Replaced Two School Buses	$45,000
DOVER SCHOOL DISTRICT	Replaced Two School Buses	$45,664
COUNTY LINE SCHOOL DISTRICT	Replaced One School Bus	$19,745
DANVILLE SCHOOL DISTRICT	Replaced One School Bus	$25,000
YELLVILLE-SUMMIT SCHOOL DISTRICT	Replaced Two School Buses	$49,097
JASPER SCHOOL DISTRICT	Replaced Three School Buses	$50,000
VIOLA SCHOOL DISTRICT	Replaced One School Bus	$20,000
RIVERSIDE SCHOOL DISTRICT	Replaced One School Bus	$22,410
SOUTHERN REFRIGERATED TRANSPORTATION	Installed 20 Truck Stop Electrification units	$50,000
TOTAL		$326,917

Technical

The Technical Section performs air quality analysis including emission inventory development, atmospheric dispersion modeling, assessment of photochemical modeling, risk assessments, and air quality monitoring. These analyses support air quality designations, state plan and SIP development, State monitoring plans, and other Policy and Planning objectives.

For example, the Technical Section produced a report combining emissions inventory data and monitoring data to produce a report on the PM2.5 monitoring network. (See Appendix B.)



Emission Inventory

The Technical Section Emission Inventory Team collects and verifies submissions of industry emissions data from large stationary (point) sources: Type A and Type B.

After the Emission Inventory Team compiles and quality assures emission inventory data, this data is submitted to the Environmental Protection Agency (EPA). Every three years, EPA releases a national emission inventory, including point sources, nonpoint (area sources), biogenic sources, mobile sources, and event sources.

Type A Point Source

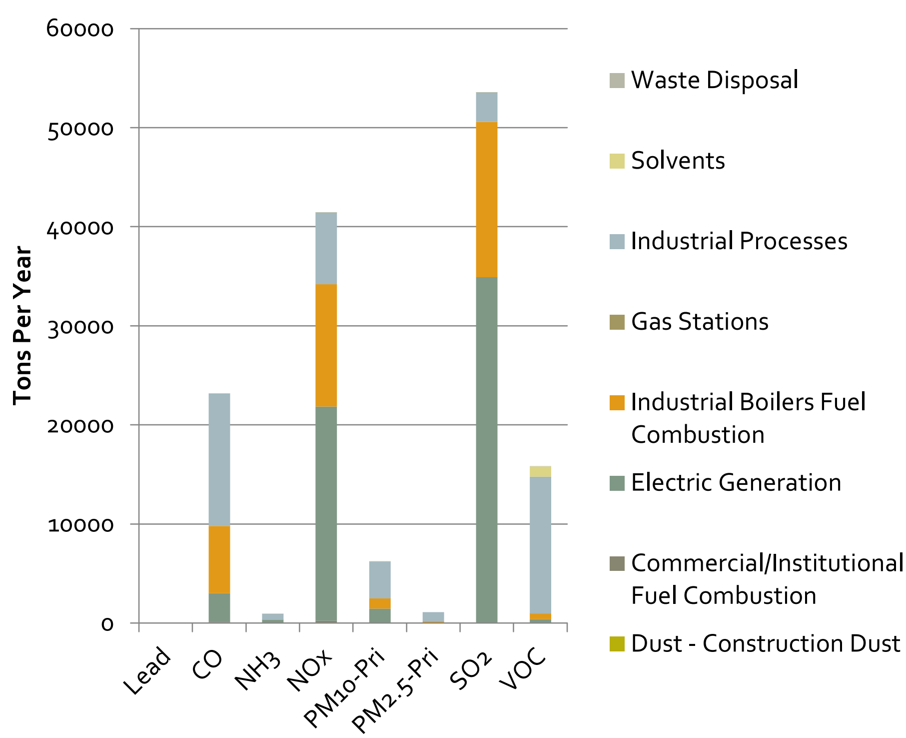
- Permitted to emit ≥ 2500 tons per year of sulfur oxides (SOx), NOx, or carbon monoxide (CO); or
- Permitted to emit ≥ 250 tons of VOCs, coarse particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), or ammonia (NH_3).
- Report emissions every year

Type B Point Source

- Permitted to emit ≥ 1000 tons per year of CO;
- Permitted to emit ≥ 100 tons per year of SOx, NOx, VOC, PM_{10}, $PM_{2.5}$, or NH_3; or
- Have actual lead emissions ≥ 0.5 tons per year
- Report emissions every three years

Figure 17 provides a breakdown of emissions from Type A facilities during 2016. ADEQ will begin the process of collecting 2017 emissions data from both Type A and Type B facilities in 2018. Appendix C provides more information about historical emissions trends, including estimates from point, nonpoint (area) sources, biogenic sources, mobile sources, and event sources.

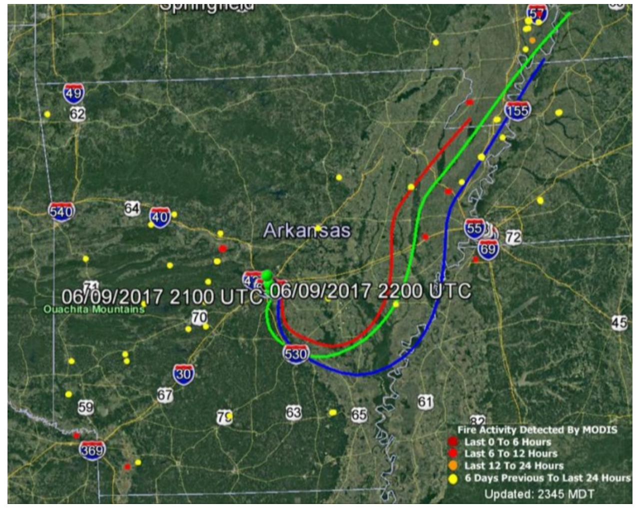
Figure 17 2016 Type A Source Emissions by Major Sector



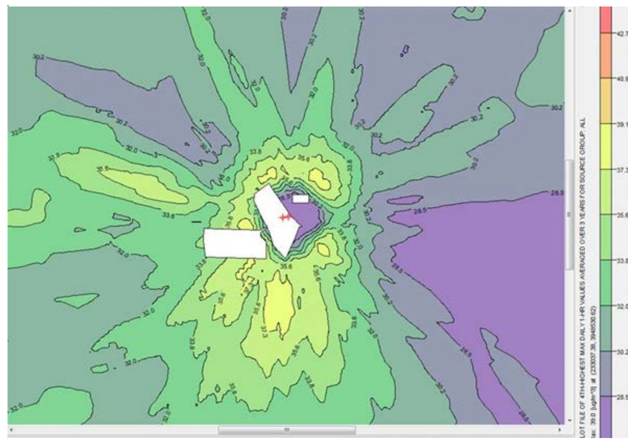
Modeling

For several reasons (e.g., planning, NAAQS attainment demonstrations, PSD permitting, transportation assessments, etc.), ADEQ uses ambient air quality modeling simulation software to evaluate and predict air quality.

As an example, on June 3, 2010 the EPA established a one-hour SO_2 NAAQS of seventy-five parts per billion and, in three rounds of assessments, required states to evaluate ambient air quality by source-specific modeling for industrial sources that emitted over 2,000 tons per year of SO_2 using 2011 emissions data. In Arkansas, five sources emitted over this threshold and were evaluated by ADEQ using the AERMOD atmospheric dispersion model. On January 9, 2018, the EPA published the last of the three rounds of assessments and made initial designations for Arkansas counties, none of which were designated as not complying with the 2010 SO_2 NAAQS.



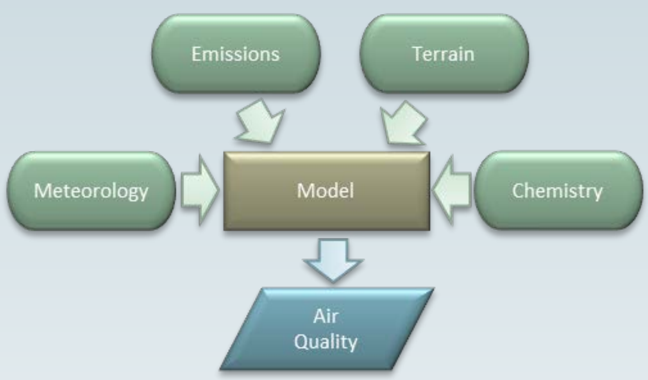
NOAA Hysplit Model Wind Trajectories



AERMOD Dispersion Model Output

HOW DOES AIR QUALITY MODELING WORK?

With today's computers, ambient air quality can be efficiently and accurately simulated and evaluated by air quality modeling software. There are a variety of models that can be used to assess transport and concentrations of a single pollutant or of multiple pollutants from a single source, multiple sources, or groups of sources across large geographic areas. These models require the input of the source's equipment characteristics, as well as meteorological, terrain, existing atmospheric chemistry, and emissions data. The models then use mathematical algorithms to calculate and graphically display pollutant concentrations.



Ambient Air Quality Monitoring

ADEQ has monitored air quality in the State of Arkansas for over thirty-five years. The Department's air monitoring network is composed of various types of intermittent and continuous monitors that are strategically located throughout the state. Using the high-quality information provided by the monitoring network, ADEQ can confirm that air quality programs in the state are adequately protecting public health and that environmental goals are being achieved.

Arkansas's ambient air quality monitoring network is used to determine attainment with NAAQS for six criteria pollutants: ozone, particulate matter (PM2.5 and PM10), CO, SO_2, nitrogen dioxide (NO_2), and lead. Attainment is determined based on a comparison of time-weighted averages (design values) to the level of the NAAQS. Appendix A contains information about the NAAQS and the nature and health impacts of these criteria pollutants.

Particulate Matter Samples

Table 3 Pollutants Monitored by Arkansas Ambient Air Monitoring Network

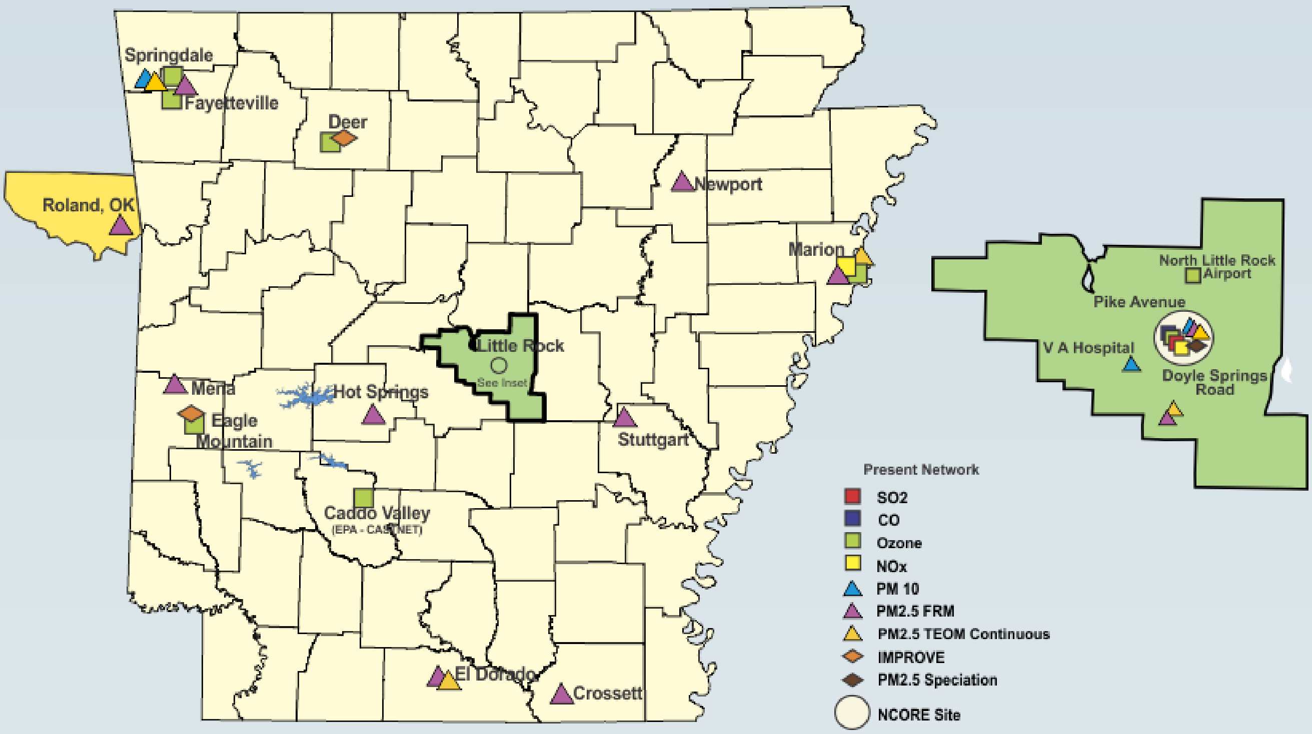
Pollutant	Number of Monitors	Locations
Ozone	8	Clark County Crittenden County Newton County Polk County Pulaski County Washington County
Coarse Particulate Matter (PM_{10})	3	Pulaski County Washington County
Fine Particulate Matter ($PM_{2.5}$)	14	Arkansas County Ashley County Crittenden County Garland County Jackson County Polk County Pulaski County Union County Washington County Sequoyah County (Oklahoma)
Carbon Monoxide	1	Pulaski County
Nitrogen Dioxide	2	Crittenden County Pulaski County
Sulfur Dioxide	1	Pulaski County
Lead	1	Pulaski County

Determining Locations for Ambient Air Monitors

Ambient air monitoring networks are established according to federal requirements based on total population in a metropolitan statistical area. Within a metropolitan statistical area, several factors are used to determine the location of the monitoring sites:

1. Where the highest concentration is expected to occur in the area covered by the monitor (usually determined through modeling);
2. What the expected representative concentrations are in areas of high population density;
3. What impacts on ambient pollution levels significant sources or source categories may have; and
4. What the background concentration levels are.

Locations of the various monitor types in Arkansas are indicated in the map below.



Periodic Review of Monitoring Network

ADEQ reviews the Arkansas Ambient Air Monitoring Network each year to detail the exact expected operation schedule for each monitor for the coming calendar year. The most recent annual network review was submitted to EPA on July 6, 2017 and approved on October 3, 2017. The network is evaluated every five years to determine whether the current number and location of monitors meets ADEQ's environmental monitoring objectives and satisfies federal monitoring requirements for each pollutant. The most recent Five-Year Network Assessment was submitted to EPA on October 12, 2015. EPA acknowledged on July 22, 2016 that the monitoring plan detailed in the Five-Year Network Assessment was adequate to meet federal requirements.

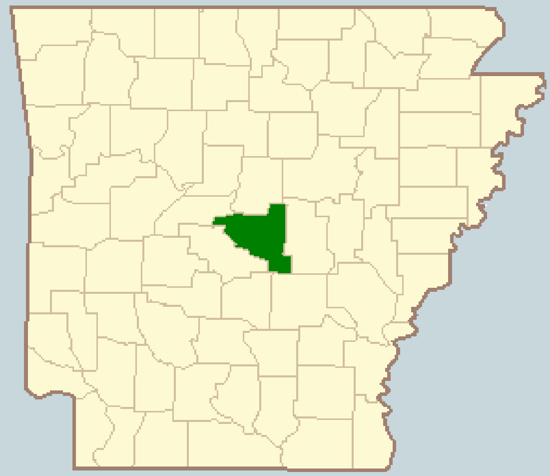
Ambient Air Monitoring Network

Pollutant: **Carbon Monoxide**

Method: Instrumental/Non-Dispersive Infrared Photometry

Data Interval: Hourly

Units: Parts per million (ppm)



Arkansas is in attainment with the primary one-hour and primary eight-hour NAAQS for CO. This attainment status is based on results from the Arkansas CO ambient air monitoring network. No more than one observed ("Obs") average value can exceed the level of the standard for each CO NAAQS. Table 4 provides a summary of CO monitor activity for 2016. CO design values from the Arkansas monitoring network have shown a decreasing trend over the past decade. Figures 18 and 19 on the following page illustrate these trends relative to the corresponding NAAQS.

Primary NAAQS:

One-Hour: Thirty-five parts per million (35 ppm), not to be exceeded more than once per year

Eight-Hour: Nine parts per million (9 ppm), not to be exceeded more than once per year

Secondary NAAQS:

None

Table 4 2016 Arkansas CO Monitor Values Summary Data

County	Site Address	# Obs	Eight-Hour Averages (ppm)			One Hour Averages (ppm)		
			1st Max	2nd Max	Obs > 9	1st Max	2nd Max	Obs> 35
Pulaski	Pike Ave At River Road, North Little Rock	8738	0.9	0.8	0	1.2	1.1	0

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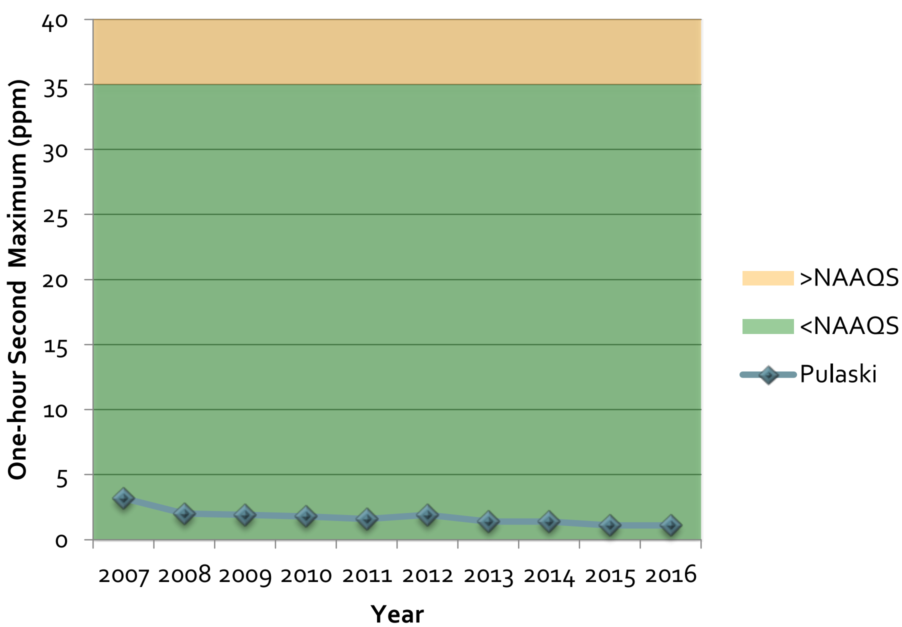
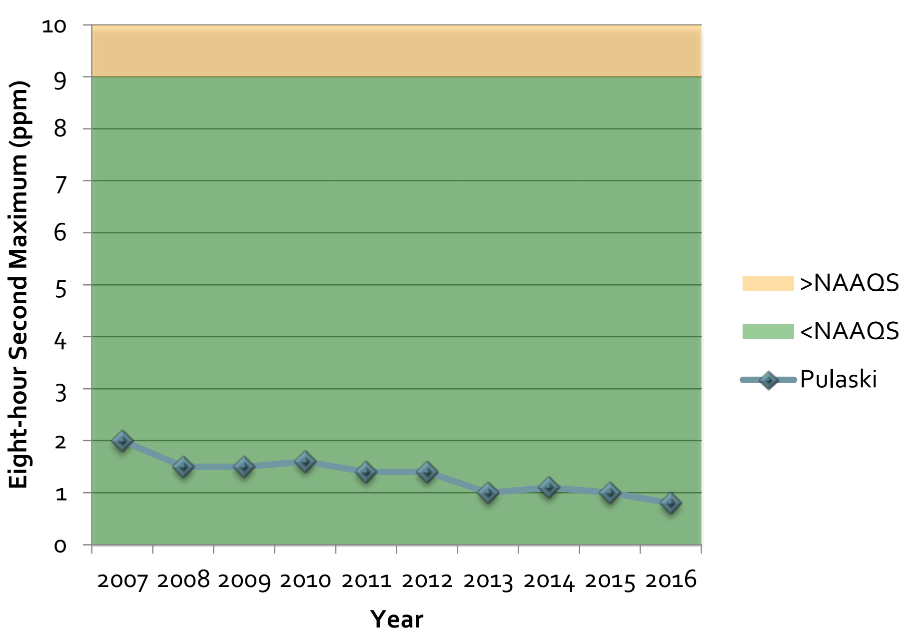
The values contained in the figures below are displayed to the right of the figure along with the slope and R^2 value for the line of best fit. A positive slope indicates an increase, while a negative slope indicates a decrease in values. The R^2 value indicates how well the values correspond to the line of best fit. The closer the R^2 value is to one, the better the line fits the data and the more confidence in the slope's indication of a positive or negative trend.

Figure 18 Second Highest Annual One-Hour CO Concentration by Year



	Pulaski
2007	3.2
2008	2
2009	1.9
2010	1.8
2011	1.6
2012	1.9
2013	1.4
2014	1.4
2015	1.1
2016	1.1
Slope	-0.1733
R^2	0.7457

Figure 19 Second Highest Annual Eight-Hour CO Concentration by Year



	Pulaski
2007	2
2008	1.5
2009	1.5
2010	1.6
2011	1.4
2012	1.4
2013	1
2014	1.1
2015	1
2016	0.8
Slope	-0.1733
R^2	0.7457

Ambient Air Monitoring Network

Pollutant: **Lead**

Method: High volume sampler; Inductively coupled plasma-mass spectroscopy

Data Interval: Twenty-four hour

Units: Micrograms per cubic meter (µg/m^3)

Arkansas is in attainment with the lead NAAQS. Arkansas began monitoring for lead in Pulaski County in 2010. The first full year of data was 2011. Arkansas ceased monitoring for lead on December 31, 2016 consistent with EPA's 2016 revisions to ambient monitoring quality assurance and other requirements rules. Table 5 provides a summary of lead monitor activity for 2016. Figure 20 illustrates trends in the maximum three-month rolling average (design value) for lead compared to the lead NAAQS.

Primary NAAQS:

Three-Month: Fifteen hundredths of a microgram per cubic meter (0.15 µg/m^3) not to be exceeded

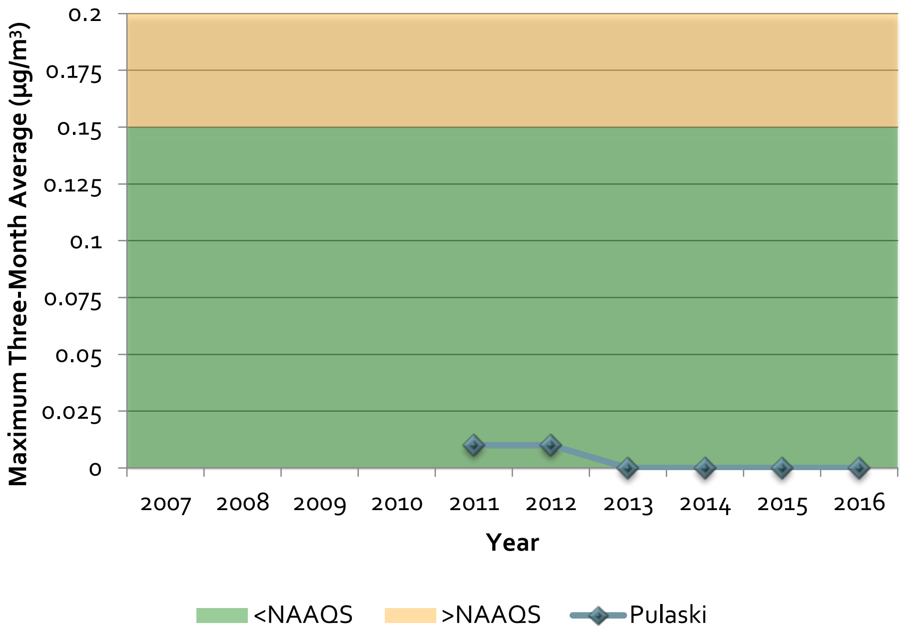
Secondary NAAQS:

Same as Primary

Table 5 2016 Arkansas Lead Monitor Values Summary Data

County	Site Address	# Obs	Max Three-Month Average (µg/m^3)
Pulaski	Pike Ave At River Road, North Little Rock	61	0
Pulaski	Pike Ave At River Road, North Little Rock	29	0

Figure 20 Maximum Three-Month Rolling Average Lead Concentration by Year



	Pulaski
2011	0.01
2012	0.01
2013	0
2014	0
2015	0
2016	0
Slope	-0.0023
R2	0.6857

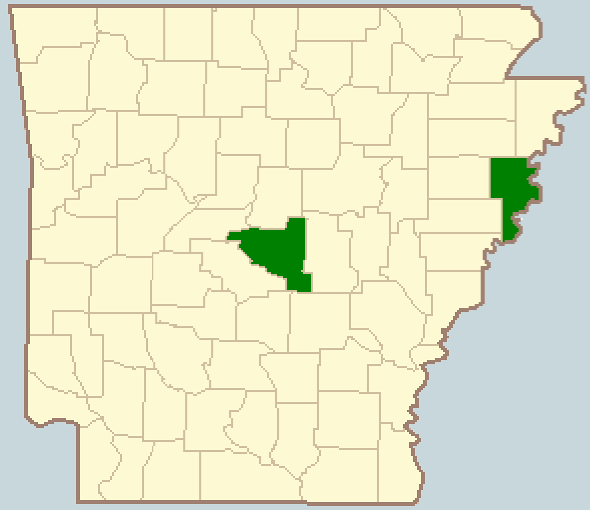
Ambient Air Monitoring Network

Pollutant: **Nitrogen Dioxide**

Method: Instrumental/Gas-Phase Chemiluminescence

Data Interval: Hourly

Units: Parts per billion (ppb)



Arkansas is in attainment with all NO_2 NAAQS. This attainment status is based on results from the Arkansas NO_2 ambient air monitoring network. Table 6 provides a summary of NO_2 monitor activity for 2016. Figures 21 and 22 illustrate trends over the past ten years in nitrogen dioxide design values relative to the corresponding NAAQS.

Primary NAAQS:

One-Hour: One hundred parts per billion (100 ppb), ninety-eight percentile of one-hour daily maximum concentrations averaged over three years

Annual: Fifty-three parts per billion (53 ppb), annual mean

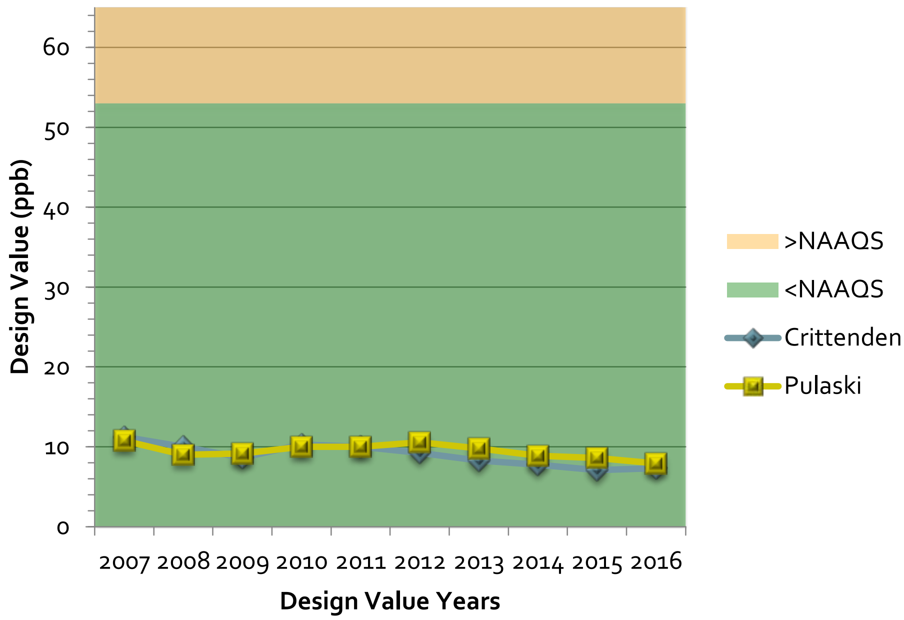
Secondary NAAQS:

Same as annual primary

Table 6 2016 Arkansas NO_2 Monitor Values Summary Data

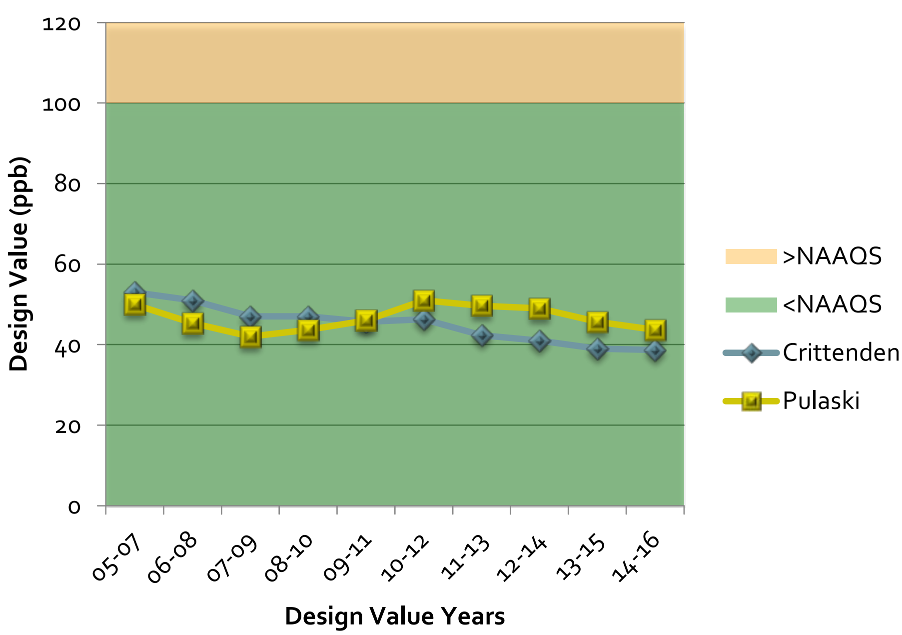
County	Address	# Obs	98th Percentile One-Hour Average (ppb)	Annual Mean (ppb)
Crittenden	Lh Polk And Colonial Drive, Marion	8685	38	7.33
Pulaski	Pike Ave At River Road, North Little Rock	8741	41	7.9

Figure 21 Annual Nitrogen Dioxide Design Values by Year



	Crittenden	Pulaski
2007	11	11
2008	10	9
2009	9	9
2010	10	10
2011	10	10
2012	9	11
2013	8	10
2014	8	9
2015	7	9
2016	7	8
Slope	-0.4053	-0.1813
R^2	0.7789	0.3633

Figure 22 One-Hour Nitrogen Dioxide Design Values by Year



	Crittenden	Pulaski
05-07	53	50
06-08	51	45
07-09	47	42
08-10	47	44
09-11	46	46
10-12	46	51
11-13	42	50
12-14	41	49
13-15	39	46
14-16	39	44
Slope	-1.5535	0.0202
R^2	0.9511	0.0004

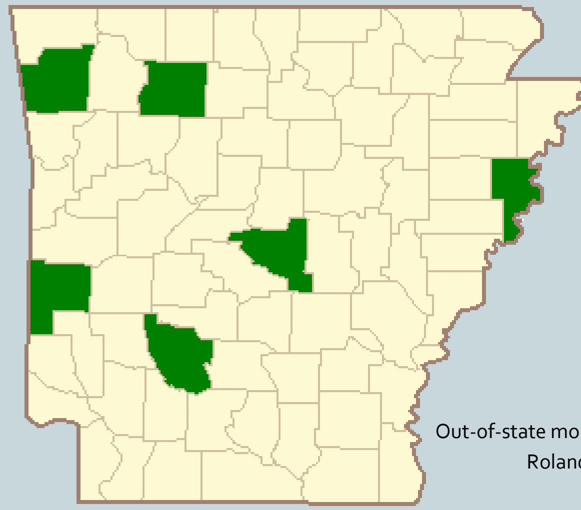
Ambient Air Monitoring Network

Pollutant: **Ozone**

Method: Ultra-Violet Photometry

Data Interval: Hourly

Units: Parts per million (ppm)



Arkansas is in attainment with the ozone NAAQS. This attainment status is based on results from the Arkansas ozone ambient air monitoring network. Table 7 provides a summary of ozone monitor activity for 2016. Figure 23 illustrate trends over the past ten years in ozone design values relative to the NAAQS in effect for that year.

Primary NAAQS:

Eight-Hour: Seventy parts per billion (70 ppb or 0.070 ppm), annual fourth-highest daily maximum eight-hour concentration averaged over three years

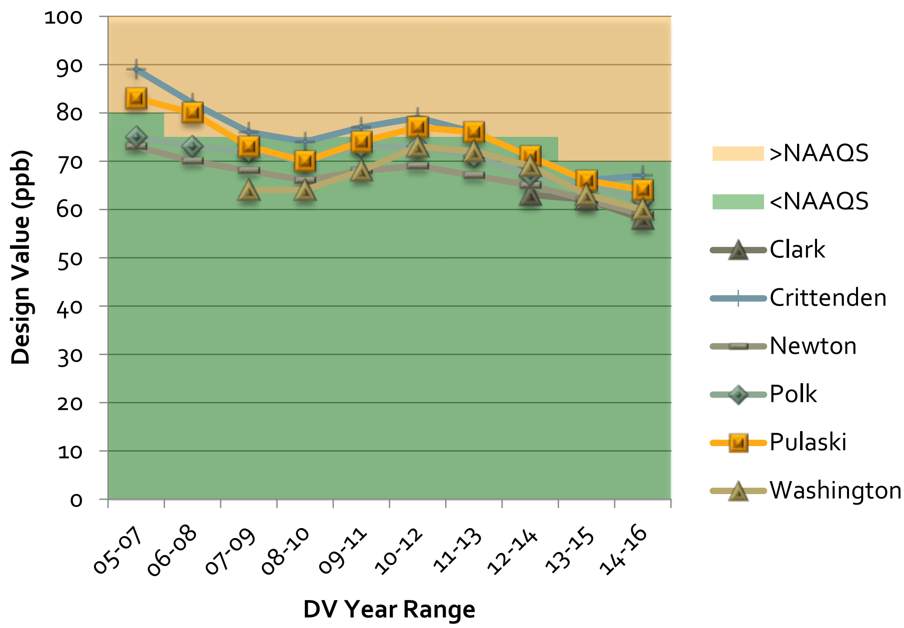
Secondary NAAQS:

Same as Primary

Table 7 2016 Arkansas Ozone Monitor Values Summary Data

County	Site Address	Valid Days	Daily Maximum Eight-Hour Average (ppm)				
			1st Max	2nd Max	3rd Max	4th Max	Obs > 0.075
Clark	Lower Lake Recreation Area, Caddo Valley	264	0.056	0.056	0.055	0.055	0
Crittenden	Lh Polk And Colonial Drive, Marion	273	0.089	0.079	0.071	0.07	3
Newton	Hwy 16	274	0.067	0.063	0.059	0.056	0
Polk	463 Polk 631, Mena	274	0.066	0.063	0.062	0.06	0
Pulaski	Pike Ave At River Road, North Little Rock	275	0.068	0.065	0.065	0.065	0
Pulaski	Remount Road, North Little Rock	275	0.07	0.068	0.065	0.063	0
Washington	600 South Old Missouri Road, Springdale	275	0.06	0.057	0.057	0.056	0
Washington	429 Ernest Lancaster Dr., Fayetteville	274	0.063	0.059	0.058	0.058	0

Figure 23 Eight-Hour Ozone Design Values by Year



County	05-07	06-08	07-09	08-10	09-11	10-12	11-13	12-14	13-15	14-16	Slope	R^2
Clark								0	0	0	-2.5	0.8929
Crittenden	89	82	76	74	77	79	76	71	66	67	-1.9818	0.764
Newton	73	70	68	66	68	69	67	65	62	59	-1.16976	0.7833
Polk	75	73	72	70	73	73	71	67	65	62	-1.1818	0.7439
Pulaski	83	80	73	70	74	77	76	71	66	64	-1.5636	0.6375
Washington			64	64	68	73	72	69	63	60	-0.369	0.0387

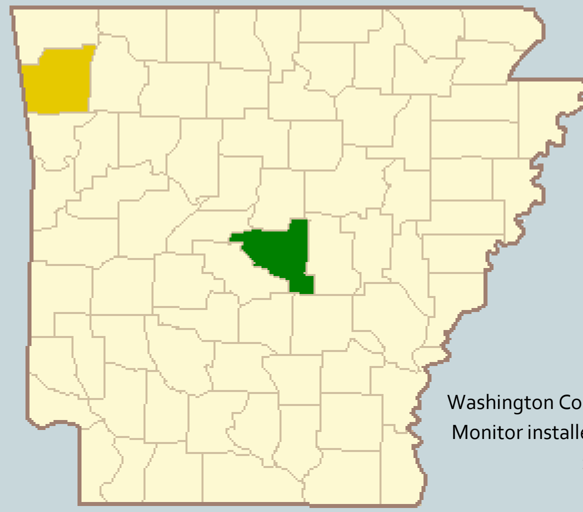
Ambient Air Monitoring Network

Pollutant: **PM_{10}**

Method: Gravimetric

Data Interval: Twenty-Four Hour

Units: Micrograms per cubic meter (µg/m³)



Arkansas is in attainment with the PM_{10} NAAQS. This attainment status is based on results from the Arkansas PM_{10} ambient air monitoring network. Table 8 provides a summary of PM_{10} monitor activity for 2016. Figure 24 illustrates trends over the past ten years in maximum PM_{10} twenty-four hour concentrations relative to the PM_{10} NAAQS.

Primary NAAQS:

Twenty-Four-Hour: 150 micrograms per cubic meter (150 µg/m3), not to be exceeded more than once per year on average over three years

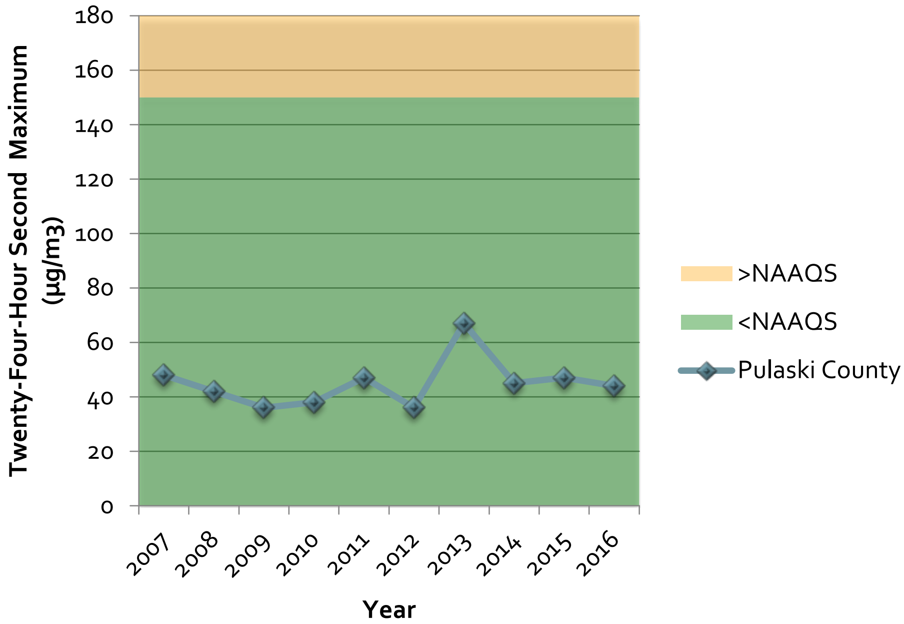
Secondary NAAQS:

Same as Primary

Table 8 2016 Arkansas PM_{10} Monitor Values Summary Data

County	Site Address	Valid Days	1st Max (µg.m³)	2nd Max (µg.m³)
Pulaski	Pike Ave At River Road, North Little Rock	61	50	44
Pulaski	Pike Ave At River Road, North Little Rock	29	51	30
Pulaski	4300 Block Of West 7th St, Little Rock	61	53	34

Figure 24 Twenty-Four Hour Maximum PM10 Concentrations by Year



	Pulaski
2007	48
2008	42
2009	36
2010	38
2011	47
2012	36
2013	67
2014	45
2015	47
2016	44
Slope	0.7273
R^2	0.0604

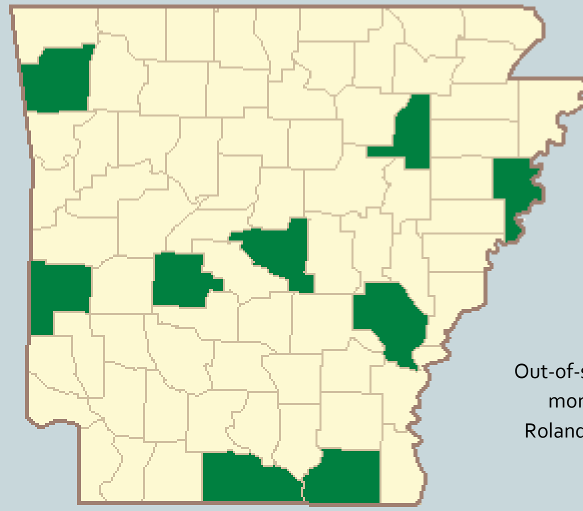
Ambient Air Monitoring Network

Pollutant: $PM_{2.5}$

Method: Gravimetric

Data Interval: Twenty-Four Hour

Units: Micrograms per cubic meter ($\mu g/m^3$)



Out-of-state monitor: Roland, OK

Arkansas is in attainment with all $PM_{2.5}$ NAAQS. This attainment status is based on results from the Arkansas PM_{10} ambient air monitoring network. Table 9 provides a summary of $PM_{2.5}$ monitor activity for 2016. Figures 25 and 26 illustrate trends over the past ten years in $PM_{2.5}$ design values relative to the corresponding, concurrent primary NAAQS.

Primary NAAQS:

Annual: Twelve micrograms per cubic meter (12 $\mu g/m^3$), annual mean averaged over three years

Twenty-Four-Hour: 150 micrograms per cubic meter (150 µg/m3), 98th percentile averaged over three years

Secondary NAAQS:

Annual: : Fifteen micrograms per cubic meter (15 $\mu g/m^3$), annual mean averaged over three years

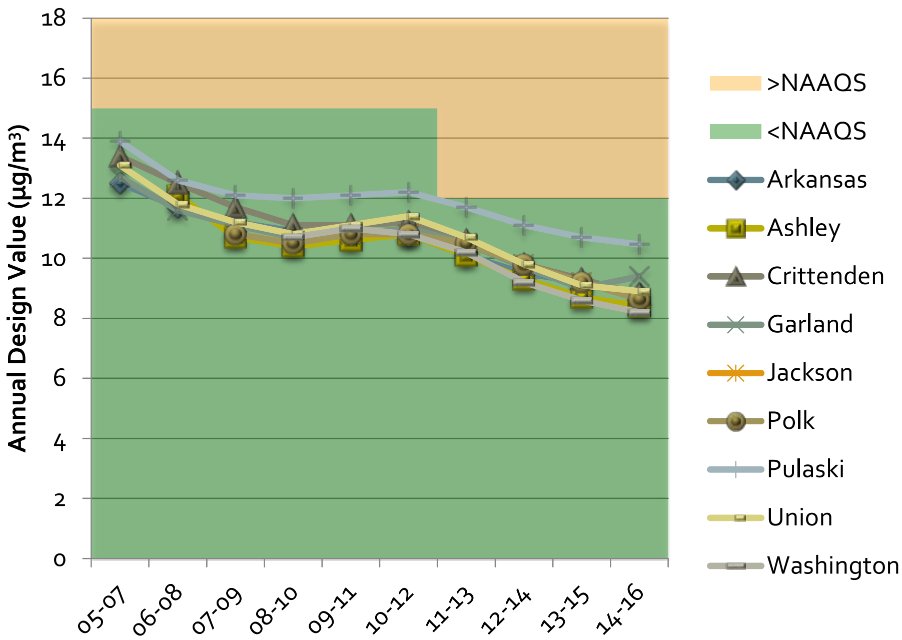
Twenty-Four-Hour: Same as Primary

Table 9 2016 Arkansas PM_{10} Monitor Values Summary Data

County	Site Address	# Obs	Twenty-Four-Hour 98th Percentile ($\mu g.m^3$)	Annual Mean ($\mu g.m^3$)
Arkansas	1703 N Beurkle - Hwy 63, Stuttgart	119	18	8.4
Ashley	1015 Unity Road, Crossett	118	18	8.3

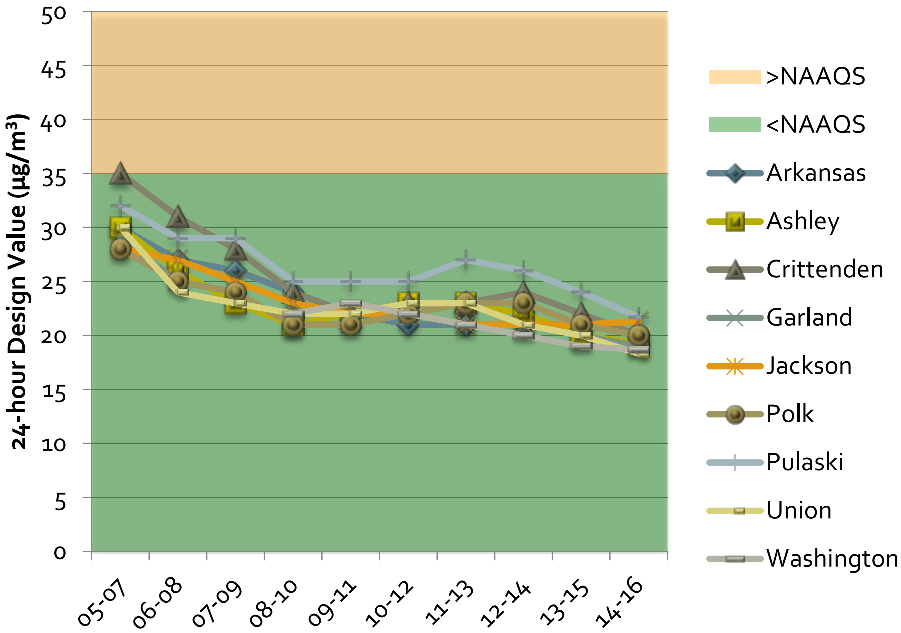
Crittenden	Lh Polk And Colonial Drive, Marion	119	17	8.4
Garland	300 Werner St., Hot Springs	119	16	8.6
Garland	300 Werner St., Hot Springs	30	20	9.9
Jackson	7648 Victory Blvd, Newport	115	23	8.3
Polk	Hornbeck Road, Mena	120	20	8.3
Pulaski	Pike Ave At River Road, North Little Rock	366	19	9.4
Pulaski	Pike Ave At River Road, North Little Rock	30	19	10.7
Pulaski	Doyle Springs Road, Little Rock	122	21	9.8
Union	Union Memorial Hospital, El Dorado	122	16	9
Washington	600 South Old Missouri Road, Springdale	119	18	8.1

Figure 25 Annual PM2.5 Design Values by Year



County	05-07	06-08	07-09	08-10	09-11	10-12	11-13	12-14	13-15	14-16	Slope	R^2
Arkansas	12.5	11.7	11.2	10.9	10.7	10.8	10.1	9.5	9.2	8.8	-0.3733	0.9627
Ashley		12.1	10.7	10.4	10.6	10.8	10.1	9.3	8.7	8.4	-0.3917	0.8622
Crittenden	13.4	12.5	11.7	11.1	11.1	11.2	10.6	9.8	9.3	8.8	-0.4527	0.9465
Garland	12.7	11.6	11.1	10.7	10.8	11	10.5	9.7	9	9.4	-0.3352	0.8689
Jackson			10.8	10.5	10.8	10.8	10.5	9.8	9.2	8.6	-0.2972	0.7675
Polk			10.8	10.5	10.8	10.8	10.5	9.8	9.2	8.6	-0.2972	0.7675
Pulaski	13.9	12.6	12.1	12	12.1	12.2	11.7	11.1	10.7	10.5	-0.303	0.8567
Union	13.1	11.8	11.2	10.8	11.1	11.4	10.7	9.8	9.1	8.9	-0.3861	0.8534
Washington				10.7	11	10.8	10.2	9.2	8.6	8.2	-0.4964	0.8882

Figure 26 Twenty-Four Hour PM2.5 Design Values by Year



County	05-07	06-08	07-09	08-10	09-11	10-12	11-13	12-14	13-15	14-16	Slope	R^2
Arkansas	30	27	26	24	22	21	21	21	21	20	-1.0121	0.8443
Ashley	30	26	23	21	22	23	23	22	20	19.3	-0.8261	0.6498
Crittenden	35	31	28	24	22	23	23	24	22	20	-1.3333	0.7422
Garland	29	25	24	21	21	22	21	21	20	19	-0.8424	0.7497
Jackson	28	27	25	23	22	22	21	21	21	21.3	-0.7776	0.8082
Polk	28	25	24	21	21	22	23	23	21	20	-0.5939	0.564
Pulaski	32	29	29	25	25	25	27	26	24	21.7	-0.8285	0.7157
Union	30	24	23	22	22	23	23	21	20	18.3	-0.8442	0.686
Washington				22	23	22	21	20	19	18.7	-0.7107	0.8813

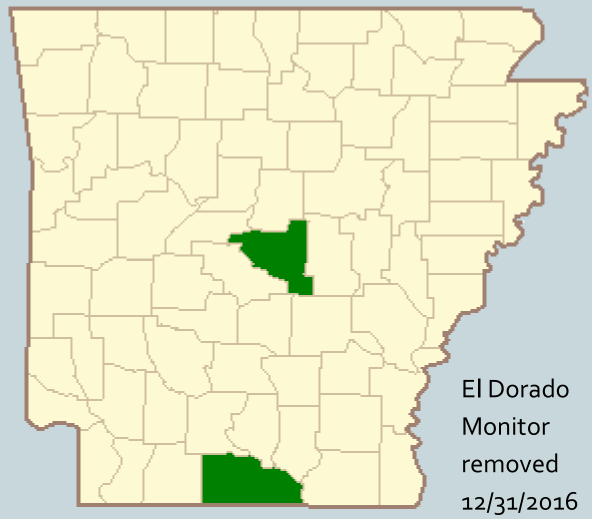
Ambient Air Monitoring Network

Pollutant: **Sulfur Dioxide**

Method: Instrumental Ultra-Violet Fluorescence

Data Interval: Hourly

Units: Parts per billion (ppb)



All areas of Arkansas are designated attainment, attainment/unclassifiable, or unclassifiable with all SO_2 NAAQS. There are no SO_2 nonattainment areas in Arkansas. Attainment status is based on results from the Arkansas SO_2 ambient air monitoring network described below and the SO2 designations modeling described on page 20. Table 10 provides a summary of SO_2 monitor activity for 2016. Figure 27 illustrates the trend over the past ten years in SO_2 design values relative to the primary NAAQS.

Primary NAAQS:

One Hour: Seventy-five parts per billion (75 ppb), ninety-ninth percentile of one-hour daily maximum concentrations averaged over three years

Secondary NAAQS:

Three Hour: One-half part per million (0.5 ppm or 500 ppb), not to be exceeded more than once per year

Table 10 2016 Arkansas SO_2 Monitor Values Summary Data

County	Site Address	One-Hour		Twenty-Four Hour		
		# obs	99th Percentile (ppb)	# obs	1st Max (ppb)	2nd Max (ppb)
Pulaski	Pike Ave At River Road, North Little Rock	8737	7	366	2	1.9
Union	Union Memorial Hospital, El Dorado	8748	26	366	13.1	4.9

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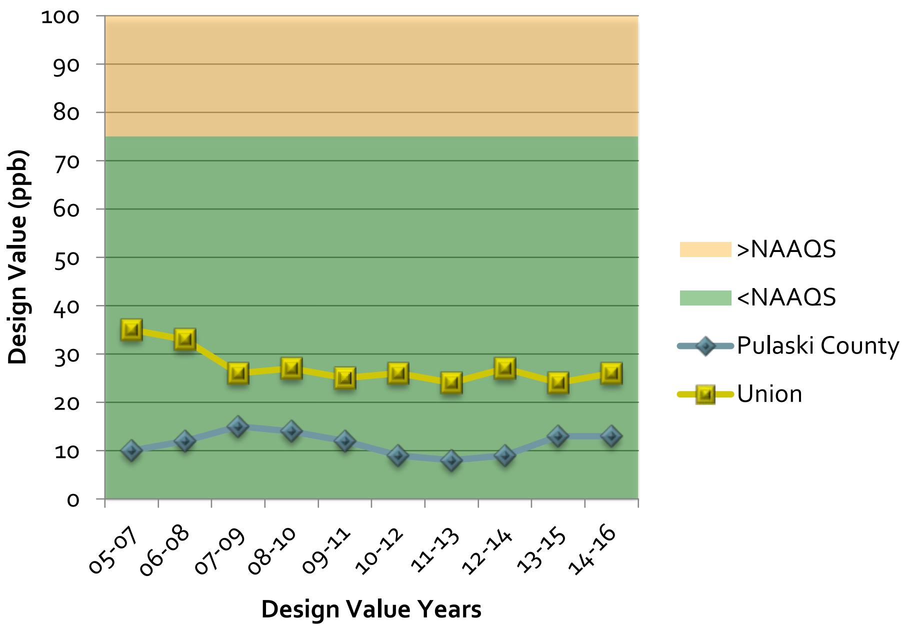
Figure 27 One-Hour SO_2 Design Values by Year



	Pulaski	Union
05-07	10	35
06-08	12	33
07-09	15	26
08-10	14	27
09-11	12	25
10-12	9	26
11-13	8	24
12-14	9	27
13-15	13	24
14-16	13	26
Slope	-0.103	-0.8909
R^2	0.0173	0.5277

Appendix A: National Ambient Air Quality Standards

Introduction

Setting the Standards

The Clean Air Act requires that United States Environmental Protection Agency (EPA) set national ambient air quality standards (NAAQS) for pollutants that are common to outdoor air and are considered harmful to public health and the environment. These pollutants, which are referred to as "criteria pollutants," include ozone, particulate matter, carbon monoxide (CO), lead, sulfur dioxide (SO_2), and nitrogen dioxide (NO_2).

The EPA Administrator, in consultation with the Clean Air Scientific Advisory Committee, sets primary and secondary NAAQS for each criteria pollutant. The primary NAAQS is set at a level that reduces the risk of harm so as to protect public health, including sensitive populations, with an adequate margin of safety. The secondary NAAQS is set at a level that is protective of the public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

Periodic Review

The NAAQS are reviewed every five years to determine whether recent scientific data continue to indicate that the level, form, and averaging time of the current NAAQS are protective of public health. If the data show that the current level of the NAAQS is not protective of public health with an adequate margin of safety, the EPA must revise the standard.

CRITERIA POLLUTANTS

- CARBON MONOXIDE (CO)
- LEAD
- NITROGEN DIOXIDE (NOx)
- OZONE
- FINE PARTICULATES ($PM_{2.5}$)
- COARSE PARTICULATES (PM10)
- SULFUR DIOXIDE (SO_2)

FEDERAL STATUTORY REQUIREMENTS

- CLEAN AIR ACT § 108 AIR QUALITY CRITERIA AND CONTROL TECHNIQUES
- CLEAN AIR ACT § 109 NATIONAL PRIMARY AND SECONDARY AMBIENT AIR QUALITY STANDARDS
- CLEAN AIR ACT §110 STATE IMPLEMENTATON PLANS FOR NATIONAL PRIMARY AND SECONDARY AMBIENT AIR QUALITY STANDARDS
- CLEAN AIR ACT §111 STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES
- CLEAN AIR ACT §§ 160-169B PREVENTION OF SIGNIFICANT DETERIORATION
- CLEAN AIR ACT §§ 171-193 PLAN REQUIREMENTS FOR NONATTAINMENT AREAS

Implementation

States must develop implementation plans to ensure that all areas of the state attain and maintain any new or revised NAAQS. Areas in which the NAAQS for a particular criteria pollutant is not being met are designated as nonattainment and require additional planning efforts to improve air quality. Nonattainment designation recommendations are made by the Governor and promulgated by EPA. EPA classifies nonattainment areas as marginal, moderate, serious, severe, or extreme, based on the severity of the air pollution and the availability and feasibility of pollution control measures. For each nonattainment area, the affected states must develop plans to reduce pollutant levels in the air to achieve attainment with the NAAQS as expeditiously as possible.

Table A- 1 List of Current National Ambient Air Quality Standards

Pollutant	Primary/ Secondary	Averaging Time	Level	Form
CARBON MONOXIDE (CO)	Primary	8-hour	9 parts per million	Not to be exceeded more than once per year
		1-hour	35 parts per million	
LEAD (PB)	Primary and Secondary	Rolling 3-month average	0.15 micrograms per cubic meter	Not to be exceeded
NITROGEN DIOXIDE (NO2)	Primary	1-hour	100 parts per billion	98th percentile, averaged over 3 years
	Primary and Secondary	Annual	53 parts per billion	Annual mean
OZONE (O3)	Primary and Secondary	8-hour	70 parts per billion	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
FINE PARTICULATE MATTER (PM2.5)	Primary	Annual	12 micrograms per cubic meter	Annual mean, averaged over 3 years
	Secondary	Annual	15 micrograms per cubic meter	
	Primary and Secondary	24-hour	350 micrograms per cubic meter	98th percentile, averaged over 3 years
COARSE PARTICUALTE MATTER (PM10)	Primary and Secondary	24-hour	150 micrograms per cubic meter	Not to be exceeded more than once per year on average over 3 years
SULFUR DIOXIDE	Primary	1-hour	75 parts per billion	99th percentile of 1-hour daily maximum concentration, averaged over 3 years
	Secondary	3-hour	0.5 parts per million	Not to be exceeded more than once per year

Carbon Monoxide

Carbon monoxide is a colorless, odorless gas emitted from combustion processes. Carbon monoxide is primarily a byproduct of incomplete combustion of fuels such as gasoline, natural gas, oil, coal, and wood. Carbon monoxide emissions in Arkansas come primarily from fires, mobile sources, and biogenics.[1] Smaller contributions come from industrial processes, fuel combustion, solvents, and other miscellaneous sources.

Carbon monoxide can cause harmful health effects by reducing oxygen delivery to the body's organs (like the heart and brain) and other tissues. At extremely high levels, Carbon monoxide can cause death. Exposure to carbon monoxide can reduce the oxygen-carrying capacity of the blood. People with several types of heart disease already have a reduced capacity for pumping oxygenated blood to the heart, which can cause them to experience myocardial ischemia (reduced oxygen to the heart), often accompanied by chest pain (angina), when exercising or under increased stress. For these people, short-term carbon monoxide exposure further affects their body's already compromised ability to respond to the increased oxygen demands of exercise or exertion. The primary national ambient air quality standard is set to reduce the acute risks of exposure to carbon monoxide

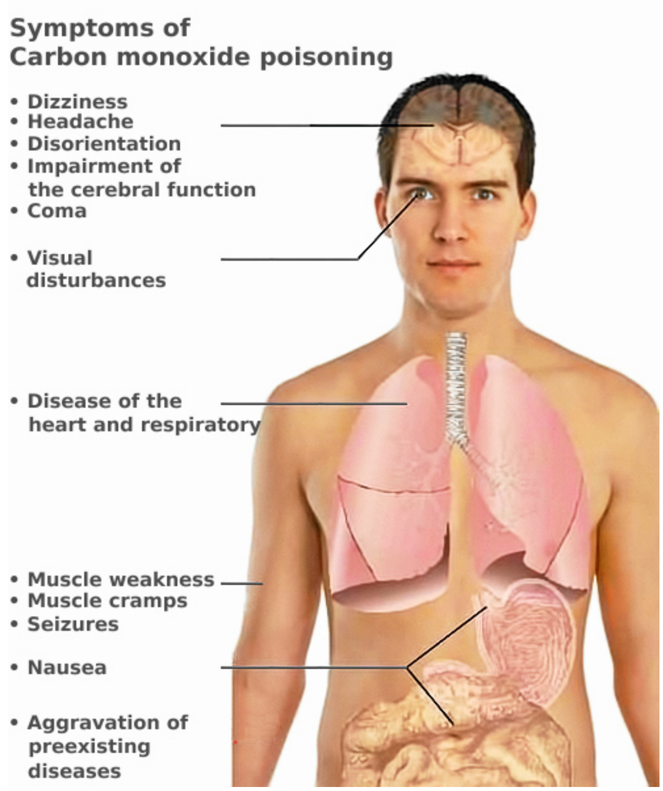


Image Credit: By Intermedichbo derivative work: MagentaGreen [Public domain], via Wikimedia Commons

MAJOR SOURCES

- VEHICLES
- FIRE
- POWER PLANTS
- INDUSTRY
- FOSSIL FUEL COMBUSTION

[1] Source: 2014 National Emissions Inventory version 1

Lead

Lead is a naturally occurring element that can be found in the air, water, and soil. Although small levels of lead are naturally occurring in soil, lead is also emitted into the air during ore and metals processing and combustion of fuels containing lead. In Arkansas, sixty-six percent of lead emissions come from aircraft running on leaded fuel. The remaining thirty-four percent of lead emissions primarily come from the industrial and electricity sectors. Lead emitted into the air can settle onto surfaces like soil, dust and water where it can remain for long periods because it does not decay or decompose.

Exposures to lead over a long period of time can cause deleterious effects on the central nervous system. Lead exposure is particularly harmful to children because exposure may lead to neurodevelopmental impairment resulting in lowered intelligence quotients (IQ) and behavioral problems. According to the Centers for Disease Control, harmful effects may also result from short-term exposures to very high levels of lead. The national ambient air quality standard is set at this level to reduce the risk of long-term health effects due to exposure to lead.

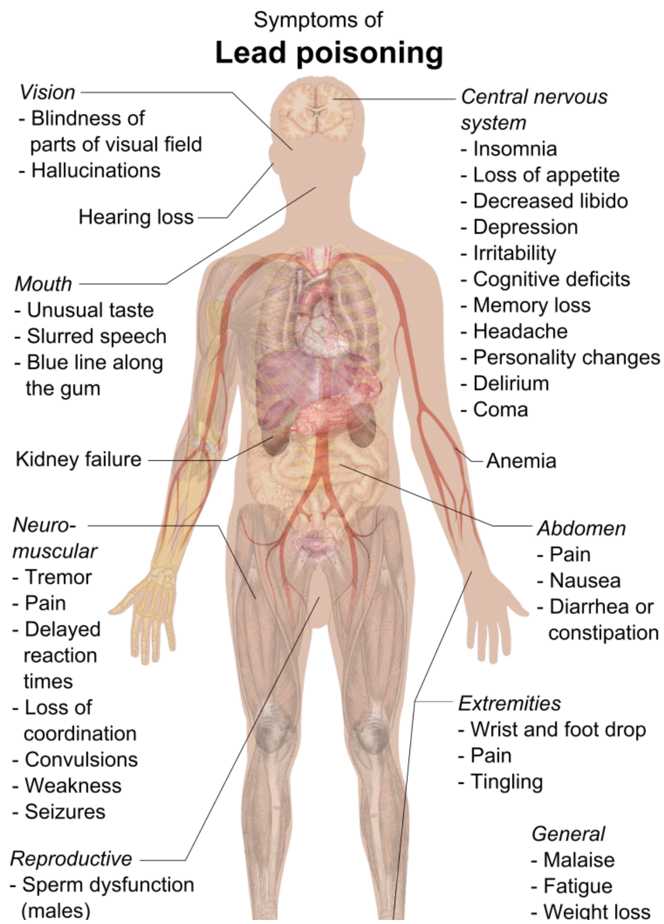


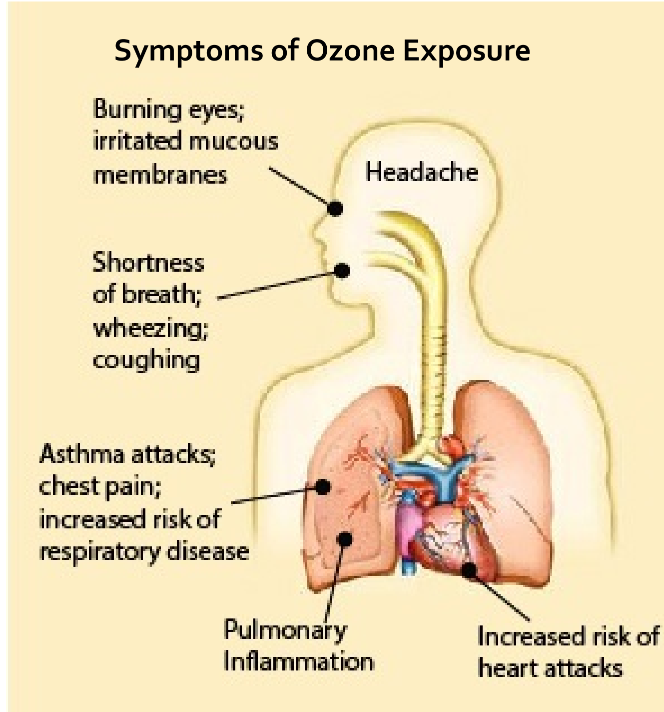
Image Credit: By Mikael Häggström (Own work) [CCo], via Wikimedia Commons

MAJOR SOURCES
AIRPORTS
VEHICLES BURNING LEADED FUELS
INDUSTRY

Ozone

Ozone is a reactive molecule composed of three atoms of oxygen. In the upper atmosphere, ozone is beneficial and protects the earth from harmful ultraviolet rays. At ground level, ozone is unhealthy to breathe and can trigger various respiratory and cardiovascular health problems. Ozone is ubiquitous in the natural environment. Ozone is formed by photochemical reactions involving nitrogen oxides (NOx), volatile organic compounds (VOCs), and sunlight. VOCs can be emitted from both biogenic and anthropogenic sources. In Arkansas, approximately eighty-one percent of VOC emissions come from biogenic sources, particularly trees, and only ten percent of emissions come from sources regulated by State and federal air quality programs. NOx is formed primarily by combustion of fossil fuels. The formation of ozone is highly weather dependent, and ozone can be transported long distances by wind.

In setting the level of the ozone standard, EPA considers various clinical and epidemiological studies to evaluate what level, averaging time, and form of the standard would be protective of human health and public welfare. The primary national ambient air quality standard is set to reduce the risk of acute and chronic health effects due to exposure to ozone.



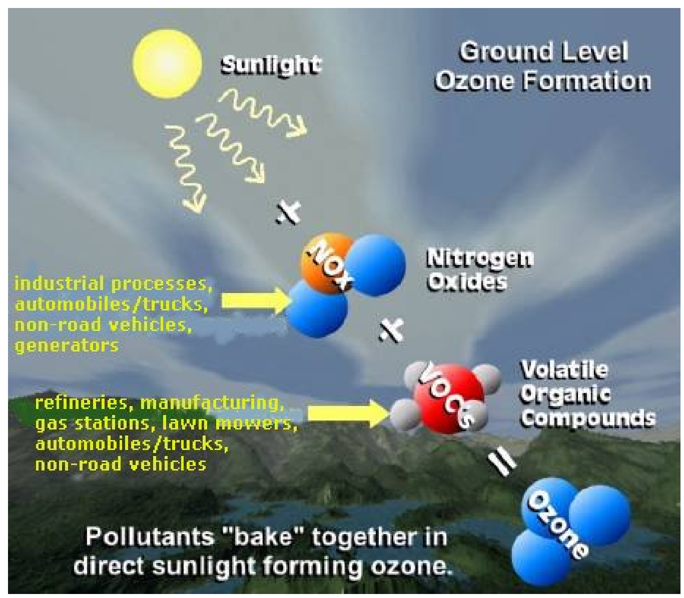


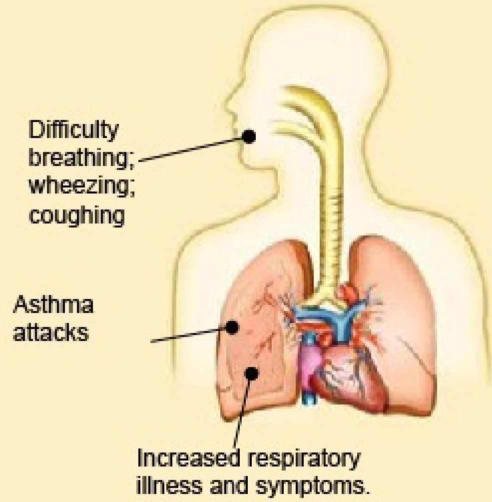
Image Credit: Harris County, Texas

Nitrogen Dioxide

Nitrogen dioxide is one of a group of highly reactive gases known as "oxides of nitrogen," "nitrogen oxides," or NOx. Other nitrogen oxides include nitrous acid and nitric acid. EPA's national ambient air quality standard uses nitrogen dioxide as the indicator for the larger group of NOx. NOx forms quickly from emissions from cars, trucks, buses, power plants, and off-road equipment. NOx may be transported for long distances and may react with other pollutants or water vapor to form secondary pollutants. NOx emissions in Arkansas result primarily from mobile sources and fuel combustion. Smaller sources include biogenics, industrial processes, fires, solvents and other miscellaneous sources.

Exposure to NOx occurs through inhalation. Scientific studies link short-term NOx exposures, ranging from thirty minutes to twenty-four hours, with adverse respiratory effects including airway inflammation in healthy people and increased respiratory symptoms in people with asthma. Also, studies show a connection between breathing elevated short-term NOx concentrations and increased visits to emergency departments and hospital admissions for respiratory issues. This is especially true for people with asthma. The primary national ambient air quality standards set to reduce the risk of acute and chronic health effects due to exposure to NOx.

Symptoms of NOx Exposure



MAJOR SOURCES

- VEHICLES
- INDUSTRY
- POWER PLANTS

Sulfur Dioxide

Sulfur dioxide (SO_2) is one of a group of highly reactive gases known as "oxides of sulfur." The largest sources of sulfur dioxide emissions are from fossil fuel combustion at power plants and other industrial facilities. Smaller sources of SO_2 emissions include industrial processes, such as extracting metal from ore, and the burning of high sulfur-containing fuels by locomotives, large ships, and nonroad equipment. While SO_2 tends not to be transported long distances in its original form, it does react with other pollutants and water vapor to form fine particulates and acidic aerosols that may be transported long distances. It also contributes to acid rain. Sulfur dioxide emissions in Arkansas result primarily from fuel combustion, with much smaller contributions from fires, industrial processes, mobile sources, solvents and other miscellaneous sources.

Current scientific evidence links short-term exposures to SO_2, ranging from five minutes to 24 hours, with an array of adverse respiratory effects, including bronchoconstriction and increased asthma symptoms. These effects are particularly important for asthmatics at elevated ventilation rates (e.g., while exercising or playing). The primary national ambient air quality standard is set to reduce the risk of acute and chronic health effects due to exposure to SO_2

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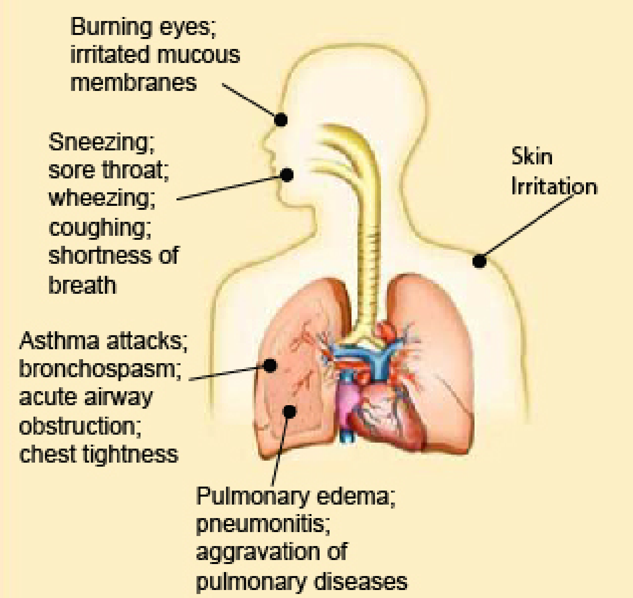
Symptoms of SO_2 Exposure



MAJOR SOURCES
▲ INDUSTRY
▲ POWER PLANTS

ARKANSAS DEPARTMENT OF ENVIRONMENTAL QUALITY

Particulate Matter

There are two size fractions of particulate matter for which EPA sets national ambient air quality standards: particles less than 10 microns in diameter (PM_{10} or "coarse particulate matter") and particles less than 2.5 microns in diameter ($PM_{2.5}$ or "fine particulate matter").

PM_{10} and $PM_{2.5}$ fractions of particulate matter have different physical characteristics and are emitted by different sources. PM_{10} particles originate from a variety of mobile and stationary sources, and their chemical composition varies widely. Actions that generate PM_{10} particles include grinding or crushing operations, mineral processing, agricultural operations, fuel combustion, and fires. $PM_{2.5}$ is emitted directly from diesel engines, smelters, and other combustion sources. $PM_{2.5}$ can also form in the atmosphere because of complex reactions of precursor compounds, such as SO_2 and NOx. $PM_{2.5}$ may be composed of sulfate, nitrate, ammonium, and/or hydrogen ions. It may also contain elemental carbon, metal compounds, organic compounds, and particle-bound water.

PM_{10} particles often settle out in areas relatively near their sources; however, smaller $PM_{2.5}$ particles may stay suspended in the atmosphere for long periods of time and may be transported hundreds of miles. The vast majority of PM_{10} emissions in Arkansas can be attributed to dust, agricultural activities, and fires. Much smaller contributions come from industrial processes, mobile sources, fuel

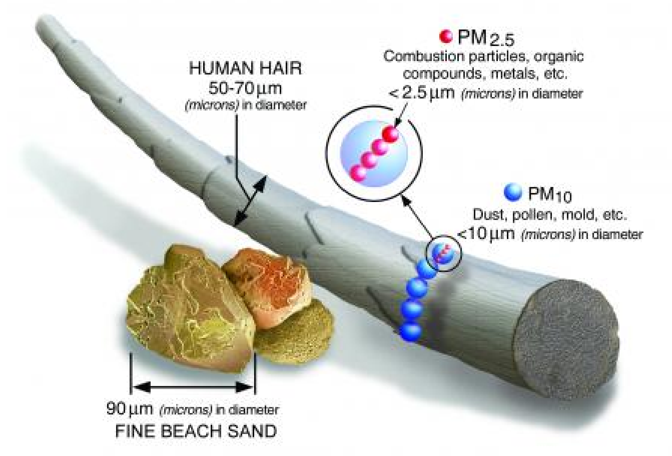


Image Credit: United States Environmental Protection Agency

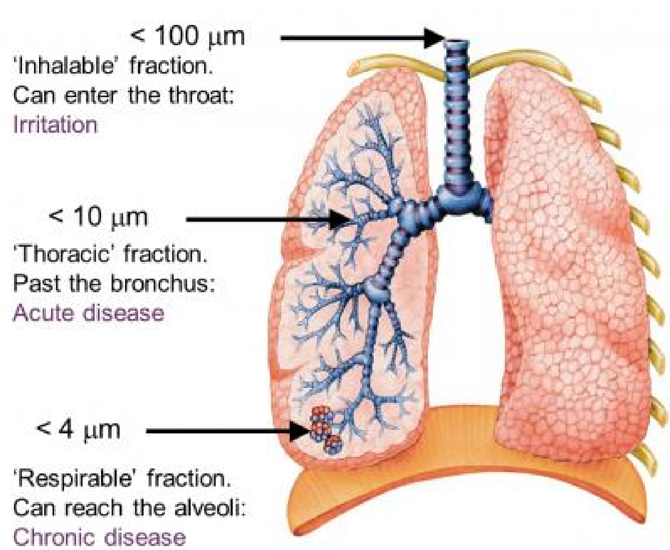
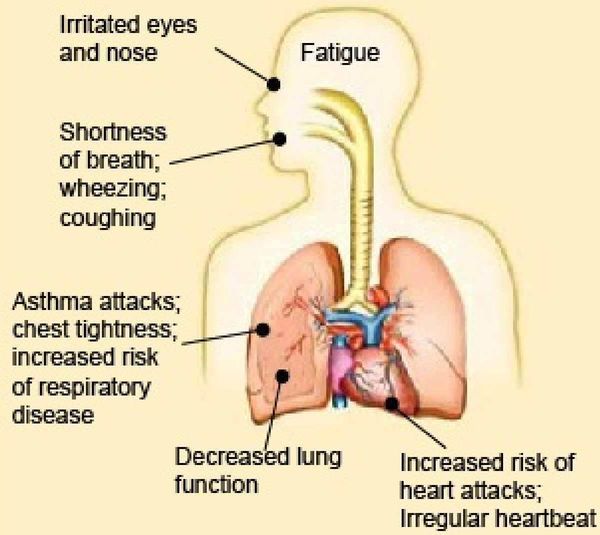


Image Credit: United States Geological Survey combustion, solvents, and other miscellaneous sources. The majority of $PM_{2.5}$ emissions in Arkansas can be attributed to fires, agricultural activities, and dust. Much smaller contributions are made by mobile sources, industrial processes, miscellaneous sources, fuel combustion, and solvents. It is difficult to tie secondary $PM_{2.5}$ in the atmosphere to specific sources.

PM_{10} particles are small enough to enter the respiratory tract once inhaled. Inhalation of PM_{10} can increase the frequency and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Certain populations may be more sensitive to the effects of particulate pollution than others. These include children, the elderly, exercising adults, and those with pre-existing lung disease.

$PM_{2.5}$ particles are microscopic solids and liquid droplets that are small enough to penetrate deep into the lungs when inhaled. Numerous scientific studies have linked $PM_{2.5}$ exposure to a number of adverse health effects. These effects include the following: premature death in people with heart or lung disease; nonfatal heart attacks; irregular heartbeat; aggravated asthma; decreased lung function; and increased respiratory symptoms, such as irritation of airways, coughing, and difficulty breathing. The primary national ambient air quality standard is set to reduce the risk of acute and chronic health effects due to exposure to particulate matter.

Symptoms of PM Exposure



MAJOR SOURCES

- FIRE
- VEHICLES
- INDUSTRY
- POWER PLANTS
- AGRICULTURE
- DUST

Appendix B: Report on the $PM_{2.5}$ Monitor Network

This report was originally prepared in January 2018 to provide an overview of the Arkansas $PM_{2.5}$ monitoring network with a special emphasis on monitoring in northeast Arkansas.

PM2.5 Monitor Requirements and Guidelines

40 CFR § 58.11 sets forth the ambient air monitoring network requirements. Specifically, this section requires state and local governments to adhere to the network design requirements in 40 CFR Part 58, Appendix D when building and maintaining an ambient air monitoring network.

Appendix D provides information on goals, types of sites, siting criteria, and other requirements. Appendix D identifies the three following general objectives: (1) provide air pollution data to the general public; (2) support compliance with ambient air quality standards and emissions strategy development; and (3) support air pollution research studies. In furthering these broad goals, Appendix D identifies the following six general types of sites:

(a) sites located to determine the highest concentrations expected to occur in the area covered by the network

(b) sites located to measure typical concentrations in areas of high population density

(c) sites located to determine the impact of significant sources or source categories on air quality

(d) sites located to determine general background concentration levels

(e) sites located to determine the extent of regional pollutant transport among populated areas; and in support of secondary standards

(f) sites located to measure air pollution impacts on visibility, vegetation damage, or other welfare-based impacts

Section 4.7 Fine Particulate Matter ($PM_{2.5}$) Design Criteria specifically sets forth the requirement for $PM_{2.5}$. States are required to operate the minimum number of required $PM_{2.5}$ state and local agency monitoring stations (SLAMS) listed in Table D-5, which is recreated here as Table D-1:

Table D-1 40 CFR Part 58 Appendix D $PM_{2.5}$ Minimum Monitoring Requirements

Metropolitan Statistical Area (MSA) population	Most Recent 3-year design value >85% of any $PM_{2.5}$ NAAQS	Most Recent 3-year design value >85% of any $PM_{2.5}$ NAAQS
>1,000,000	3	2
500,000—1,000,000	2	1
50,000-499,999	1	0

For example, if the population of an MSA is between 50,000 and 500,000 and the most recent 3 year design value is less than 85% of any $PM_{2.5}$ NAAQS, then Appendix D does not require a $PM_{2.5}$ monitor. A state must operate $PM_{2.5}$ monitors equal to at least one-half (round up) the minimum required sites list in Table-5. In addition, each state is required to install and operate at least one $PM_{2.5}$ site to monitor for regional background and at least one $PM_{2.5}$ site to monitor regional transport.

In addition, each state is required to operate at least one NCore site, which is a site that must measure the following: $PM_{2.5}$ particle mass using continuous and integrated/filter-based samplers, speciated $PM_{2.5}$, $PM_{10-2.5}$ particle mass, O_3, SO_2, CO, NO/NO_Y, wind speed, wind direction, relative humidity, and ambient temperature.

A comprehensive list of the current PM2.5 network is as follows:

Table D-2 Table of Current PM2.5 Monitors

Location	Purpose	Scale
STUTTGART	Population Exposure	Neighborhood
CROSSETT	Population Exposure	Neighborhood
MARION	Regional Transport	Neighborhood
HOT SPRINGS	Population Exposure	Neighborhood
NEWPORT	Population Exposure	Neighborhood
MENA	Regional Background	Neighborhood
NORTH LITTLE ROCK	Population Exposure	Neighborhood
EL DORADO	Population Exposure	Neighborhood
SPRINGDALE	Population Exposure	Neighborhood

$PM_{2.5}$ Network Background

ADEQ initially envisioned the $PM_{2.5}$ monitoring network in a 1999 plan: $PM_{2.5}$ Ambient Air Monitoring Network, 1999-2000 ("1999-2000 Plan"). The 1999-2000 Plan described the existing PM_{10} network, which had been in existence since 1988, and planned the state's future $PM_{2.5}$ network as well as the withdrawal of a number of unnecessary PM_{10} monitoring sites.

The $PM_{2.5}$ monitoring network as envisioned in the 1999 plan was funded by the EPA's Section 103 grant. The Section 103 grant is issued for research purposes. At that time, little was known about concentrations of $PM_{2.5}$ that might be present around the country. However, concentrations of PM_{10}, a coarser fraction of particulate matter, had been monitored and reported for a number of years. The initial deployment of a $PM_{2.5}$ monitoring network was largely based on locations where PM_{10} was already being monitored. Urban and industrialized areas were identified as prime candidate sites and other monitors were sited based on various factors including concentration trends of PM_{10}.

Once a monitor has been in operation for at least three years and data completeness objectives have been met, a design value can be calculated and compared against the National Ambient Air Quality Standards (NAAQS) for that pollutant. If, over the duration of the monitoring activity at a site, the design value is consistently lower than 85% of the NAAQS and the Metropolitan Statistical Area is below 500,000, there is no regulatory requirement to continue monitoring at that site.

In the 1999-2000 Plan, ADEQ deliberately sited a number of monitors around the state. As ADEQ obtained sufficient data to calculate design values for the various monitors, ADEQ discontinued certain monitoring locations because the concentrations consistently fell below 85% of the NAAQS as well as below the MSA threshold specific 40 C.F.R. 58 Appendix D. In addition, ADEQ relocated certain monitors to different areas of the State to obtain new data regarding concentrations in those areas. Over time, ADEQ has consolidated its $PM_{2.5}$ monitoring network in a manner so as to efficiently provide data regarding areas that are required by regulations to be monitored or areas in a part of the state without other representative monitors. To date, no $PM_{2.5}$ monitors in Arkansas have exceeded the NAAQS. The following is a comprehensive list of all past or present $PM_{2.5}$ monitors as well as a graphic illustrating the network:

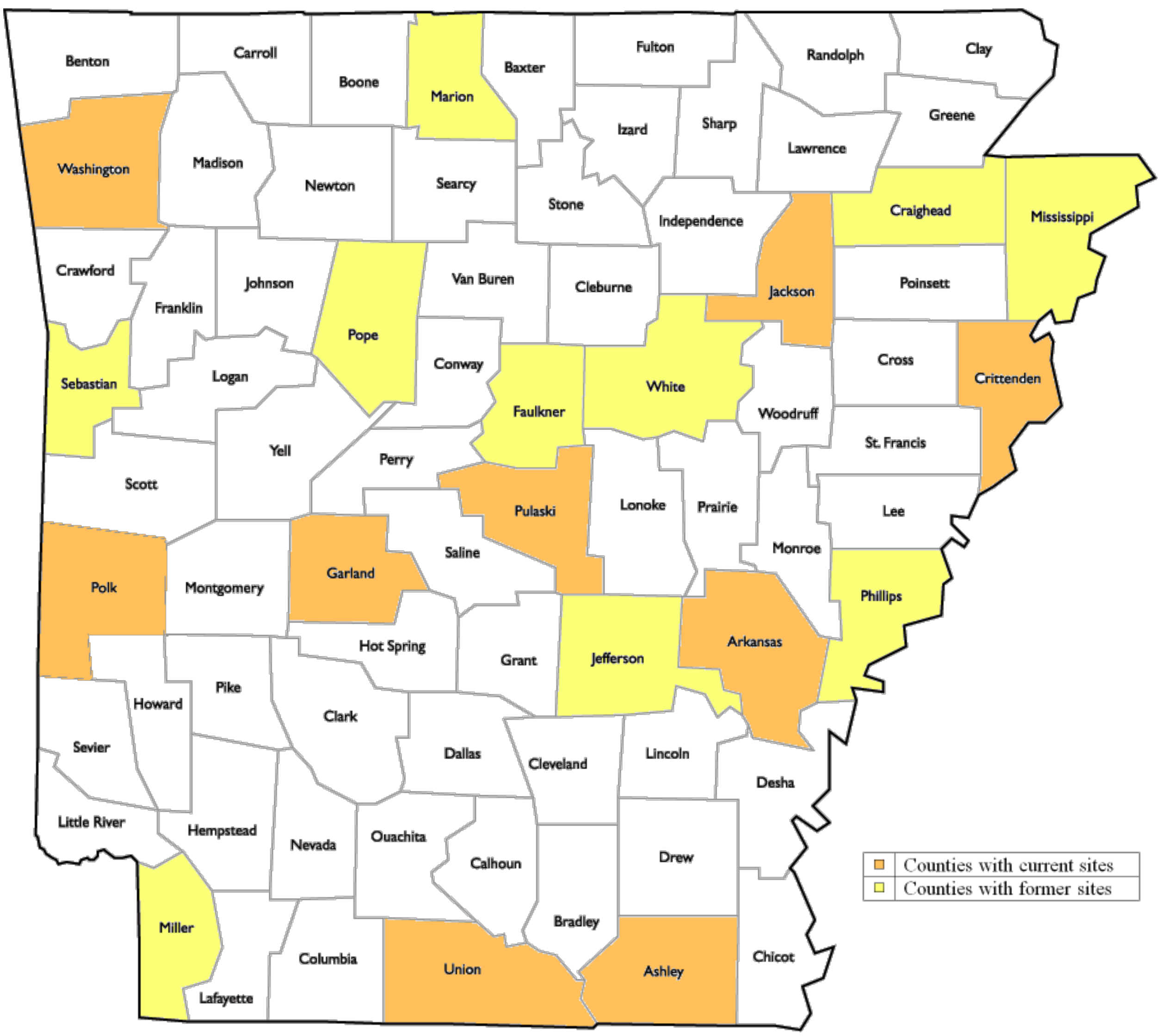
Table D-3 Table of Current and Past PM2.5 Monitors[2]

Location	Purpose	Scale
STUTTGART	**Population Exposure**	**Neighborhood**
CROSSETT	**Population Exposure**	**Neighborhood**
CRAIGHEAD	Special Purpose Monitor	Neighborhood
MARION	**Regional Transport**	**Neighborhood**
CONWAY	State Discretionary	Neighborhod
HOT SPRINGS	**Population Exposure**	**Neighborhood**
NEWPORT	**Population Exposure**	**Neighborhood**
PINE BLUFF	Supplemental	Neighborhood
TEXARKANA	Supplemental	Neighborhood
BLYTHEVILLE	Supplemental	Neighborhood
HELENA	SLAMS NonCore	Neighborhood

[2] The current monitors are bolded.

MENA	**Regional Background**	**Neighborhood**
RUSSELVILLE	Slams NonCore	Neighborhood
NORTH LITTLE ROCK	**Population Exposure**	**Neighborhood**
FORTH SMITH	Transport	Neighborhood
EL DORADO	**Population Exposure**	**Neighborhood**
SPRINGDALE	**Population Exposure**	**Neighborhood**
SEARCY	**State Discretionary**	**Neighborhood**

Figure D-1 Past and Current $PM_{2.5}$ Monitors



$PM_{2.5}$ Trends in Northeast Arkansas

Northeast Arkansas is predominantly rural with the exception of Crittenden County, which is adjacent to Memphis, and Jonesboro. Currently, ADEQ operates a monitor in Newport about 49 miles west of Jonesboro. From 1999 to 2003, ADEQ closely monitored the trends of $PM_{2.5}$ in Jonesboro, Marion, and Helena. Readings from all three monitors closely tracked one another with the Marion and Jonesboro readings having a particularly strong correlation. Although the Jonesboro monitor was discontinued in 2003, ADEQ continues to operate the monitor in Marion, which ADEQ believes would continue to accurately reflect the conditions in northeast Arkansas broadly.

While Jonesboro is a significant population center in northeast Arkansas, the population is below 500,000 and the most recent available data indicated the concentrations there consistently fell below 85% of the NAAQS from 1999 through 2003. ADEQ determined that this site was no longer required as part of the network. EPA approved ADEQ's determination to remove this monitor and ADEQ discontinued the monitor in 2003.

Figure D-2 Quarterly Average $PM_{2.5}$ concentrations near Jonesboro

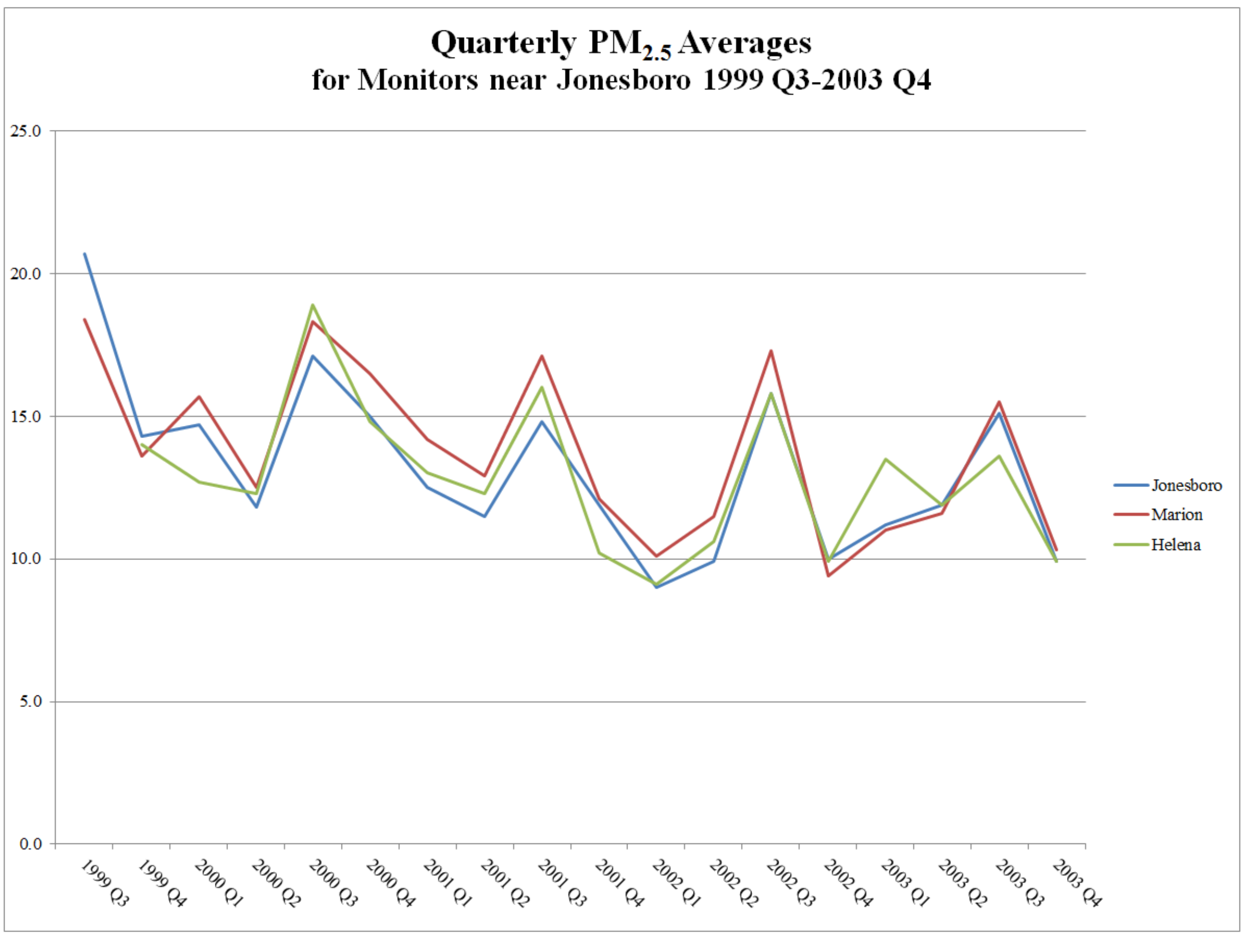


Table D-4 Quarterly PM2.5 Averages for Monitors in Northeast Arkansas (1999–2003)

Quarter	Jonesboro	Marion	Helena-West Helena
1999 Q3	20.7	18.4	N/A
1999 Q4	14.3	13.6	14
2000 Q1	14.7	15.7	12.7
2000 Q2	11.7	12.5	12.3
2000 Q3	17.1	18.3	18.9
2000 Q4	15	16.5	14.8
2001 Q1	12.5	14.2	13
2001 Q2	11.5	12.9	12.3
2001 Q3	14.8	17.1	16
2001 Q4	11.9	12.1	10.2
2002 Q1	9	10.1	9.1
2002 Q2	9.9	11.5	10.6
2002 Q3	15.8	17.3	15.8
2002 W4	10	9.4	9.9
2003 Q1	11.2	11.0	13.5
2003 Q2	11.9	15.5	13.6
2003 Q3	15.1	15.5	13.6
2003 Q4	9.9	10.3	9.9

In addition, recent trends indicated a decline in concentrations across the state including in Jackson County, which is the county in which the Newport monitor is located. Charts showing the annual and twenty-four hour design values as compared to the NAAQS are shown below.

Figure D-3 $PM_{2.5}$ Annual Design Values at Arkansas Monitors

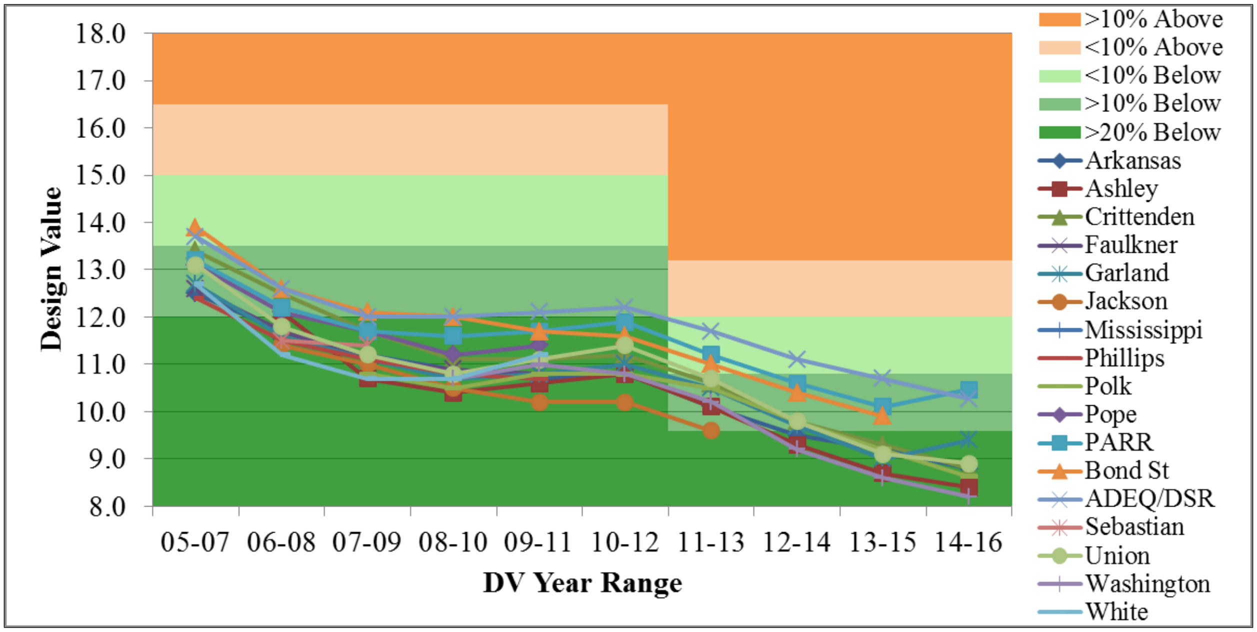
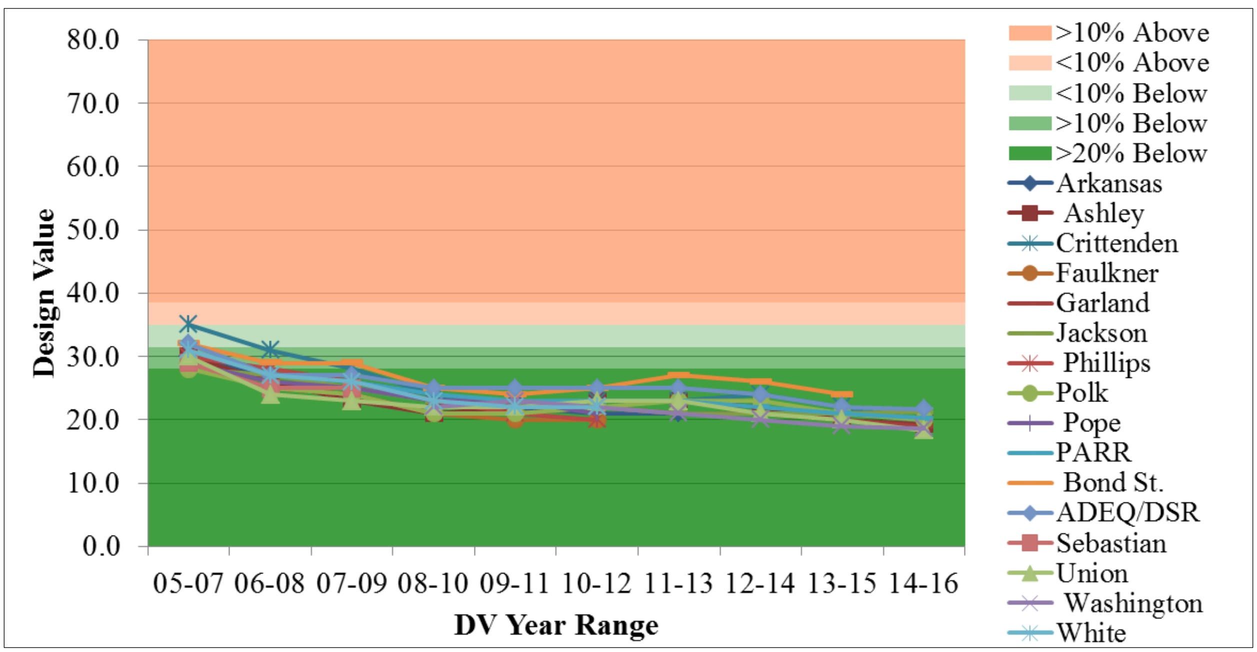


Figure D-4 $PM_{2.5}$ 24-hour Design Values at Arkansas Monitors



Appendix C: Anthropogenic Emission Inventory Trends

National Emissions Inventory

Every three years, the United States Environmental Protection Agency (EPA), in collaboration with the states, collects data on criteria pollutant emissions. EPA publishes the data in the National Emissions Inventory (NEI) and provides information about the estimated emissions of criteria pollutants and their precursors from various source categories. The Arkansas Department of Environmental Quality (ADEQ) provides EPA with emissions estimates reported by larger stationary sources for inclusion in the NEI. EPA estimates emissions from smaller stationary sources, nonpoint sources, biogenic sources, mobile sources, and event sources.

The nonpoint source category includes small stationary sources too small to be reported as point, as well as biogenic sources—vegetation and other natural sources of emissions. The mobile source category is split into two subcategories: onroad vehicles and nonroad vehicles. Wildfires and prescribed burns fall into the event category.

This analysis examines trends for the three most recent NEI years: 2008, 2011, and 2014.

EMISSION SOURCE CATEGORY	EXAMPLES
POINT	Larger stationary sources
NONPOINT	Residential heating, solvents, agriculture, road dust
BIOGENIC	Crops, lawns, trees, soils
ONROAD	Passenger vehicles, trucks, buses
NONROAD	Aircraft, locomotives, marine vessels
EVENT	Wildfire, prescribed burns

ANTHROPOGENIC VS NATURAL EMISSIONS

- Criteria pollutants and their precursors are emitted by both natural and anthropogenic sources.
- All point sources, nonroad sources, and onroad sources are considered anthropogenic sources of emissions.
- Most nonpoint sources, with the exception of biogenic sources, are considered anthropogenic sources of emissions.
- All biogenic emissions are natural.
- In general, event sources—such as volcanic emissions, dust storms, and wildfires—are natural emissions. There is some disagreement among environmental professionals as to whether prescribed fires should be considered anthropogenic. For this trends analysis, all event sources are considered natural.

REGULATED SOURCES OF EMISSIONS

ADEQ air quality programs primarily regulate point sources; however, some nonpoint sources also fall within ADEQ's regulatory authority. Mobile sources are regulated by EPA.

Trends in Anthropogenic Nitrogen Oxides Emissions

Nitrogen oxides (NOx) are precursors for multiple criteria pollutants including ozone and fine particulate matter ($PM_{2.5}$). Approximately eighty-eight percent of total NOx emissions in Arkansas come from anthropogenic sources.[3] The primary anthropogenic contributors to NOx emissions in Arkansas are mobile sources, particularly onroad vehicles, and point sources.

Overall, NOx emissions from anthropogenic sources decreased by eight percent between 2008 and 2014.[4] Onroad NOx emissions decreased by approximately seventeen percent, non-road NOx emissions decreased by twenty-four percent, and point source NOx emissions decreased by two percent between 2008 and 2014. Nonpoint source NOx emissions increased by approximately eighteen percent between 2008 and 2014.

Figure B-1 2014 Relative Contribution of Anthropogenic NOx Emissions in Arkansas by Data Category

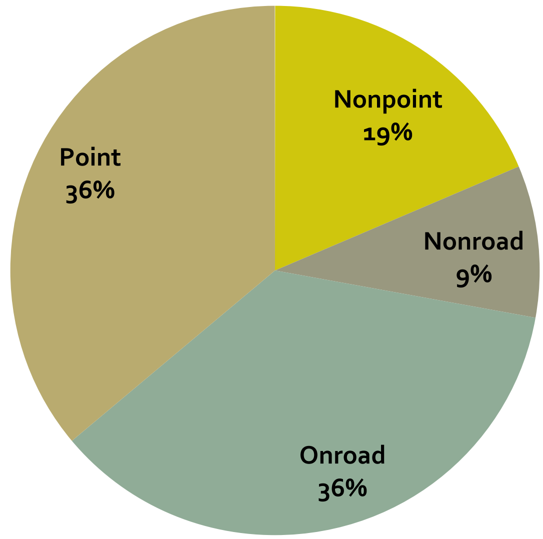
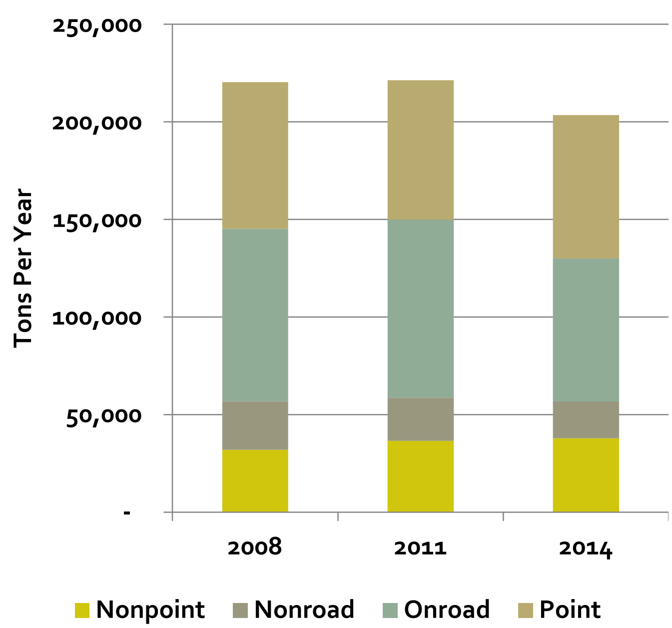


Figure B-2 Trends in Arkansas Anthropogenic NOx Emissions by Category



[3] Source: 2014 National Emissions Inventory version 1

[4] Source: 2008 National Emissions Inventory version 3, 2011 National Emissions Inventory version 2, 2014 National Emissions Inventory version 1

Trends in Anthropogenic Volatile Organic Compound Emissions

Volatile organic compounds (VOCs) are precursors for ozone. Only ten percent of total VOC emissions in Arkansas come from anthropogenic sources.[5] Emissions from nonpoint sources comprise the largest portion (fifty-three percent) of the Arkansas anthropogenic VOC emission inventory.

Overall, VOC emissions from anthropogenic sources in Arkansas decreased by approximately twelve percent between 2008 and 2014.[6] Emissions from nonpoint sources increased by six percent between 2008 and 2014. Emissions from nonroad, onroad, and point sources decreased during the same time period. The largest reduction (thirty-five percent) in emissions was achieved by the on-road source category.

Figure B-3 2014 Relative Contribution of Anthropogenic VOC Emissions in Arkansas by Data Category

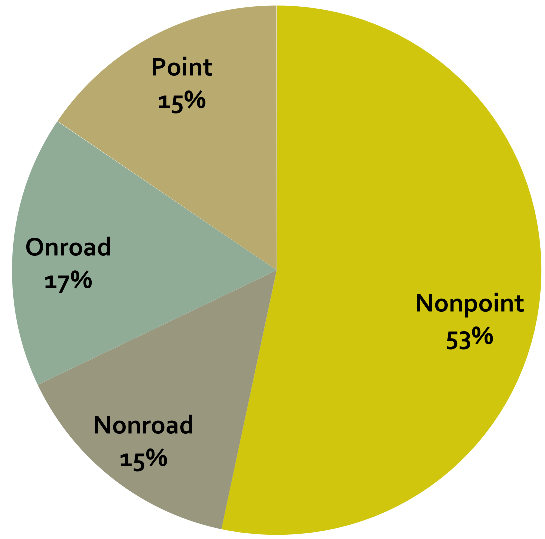
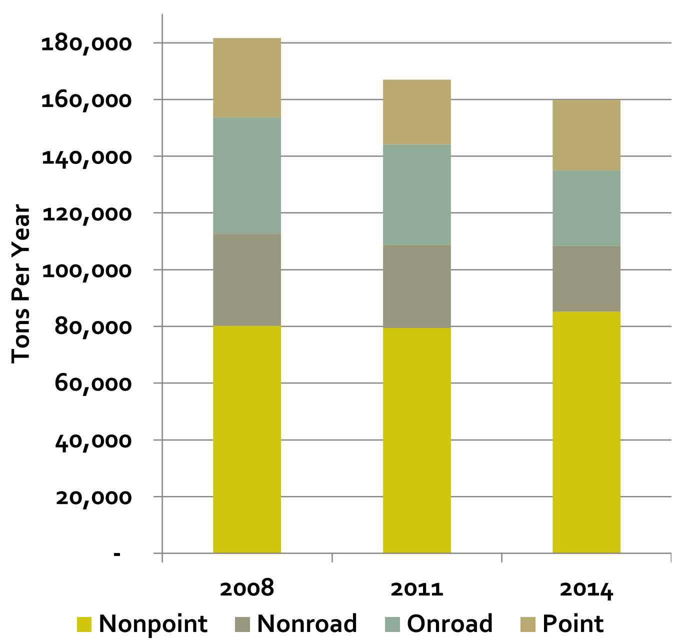


Figure B-4 Trends in Arkansas Anthropogenic VOC Emissions by Category



5 Source: 2014 National Emissions Inventory version 1

6 Source: 2008 National Emissions Inventory version 3, 2011 National Emissions Inventory version 2, 2014 National Emissions Inventory version 1

Trends in Anthropogenic Carbon Monoxide Emissions

Carbon monoxide (CO) is both a criteria pollutant and a precursor for ozone. Approximately forty-three percent of total Arkansas CO emissions come from anthropogenic sources.[7] Emissions from onroad sources comprise the largest portion (forty-eight percent) of the Arkansas anthropogenic CO emissions inventory.

Overall, CO emissions from anthropogenic sources decreased by thirty-five percent between 2008 and 2014.[8] Onroad and nonroad CO emissions dropped sharply by approximately forty-five percent and thirty percent, respectively. Nonpoint CO emissions decreased by approximately thirteen percent between 2008 and 2014 and point CO emissions decreased by approximately eight percent.

Figure B-5 2014 Relative Contribution of Anthropogenic CO Emissions in Arkansas by Data Category

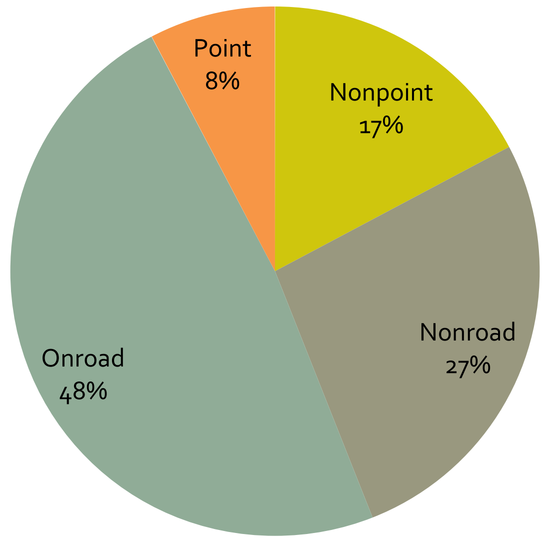
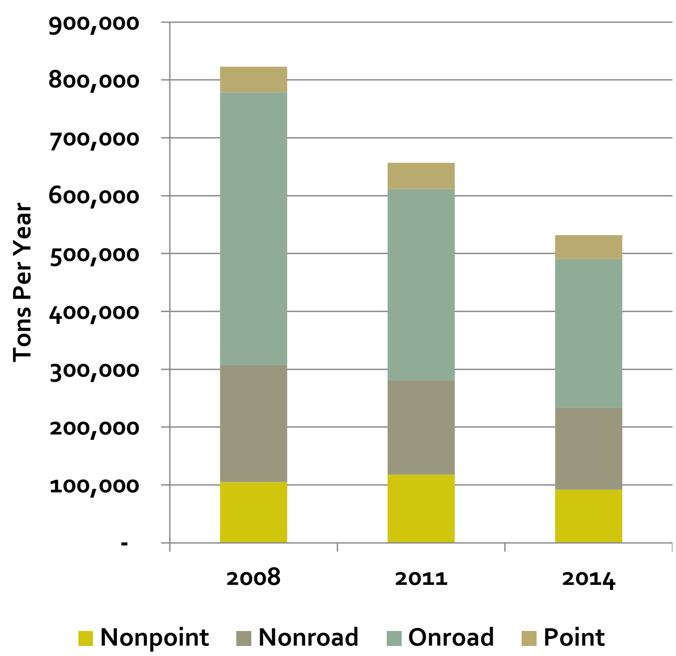


Figure B-6 Trends in Arkansas Anthropogenic CO Emissions by Category



7 Source: 2014 National Emissions Inventory version 1

8 Source: 2008 National Emissions Inventory version 3, 2011 National Emissions Inventory version 2, 2014 National Emissions Inventory version 1

Trends in Anthropogenic Sulfur Dioxide Emissions

Sulfur dioxide (SO_2) is both a criteria pollutant and a precursor for fine particulate matter ($PM_{2.5}$). Virtually all SO_2 emissions come from anthropogenic sources.[9] Emissions from point sources comprise the largest portion (ninety-nine percent) of the Arkansas anthropogenic SO_2 emissions inventory.

Overall, SO_2 emissions from anthropogenic sources decreased by approximately three percent between 2008 and 2014. SO_2 emissions from point sources decreased by approximately two percent.[10] SO_2 emissions from onroad sources decreased by fifty-six percent. SO_2 emissions from nonroad sources decreased by ninety-one percent. SO_2 emissions from nonpoint sources increased from 2008 to 2011, but decreased by thirty-nine percent between 2008 and 2014.

Figure B-7 2014 Relative Contribution of Anthropogenic SO_2 Emissions in Arkansas by Data Category

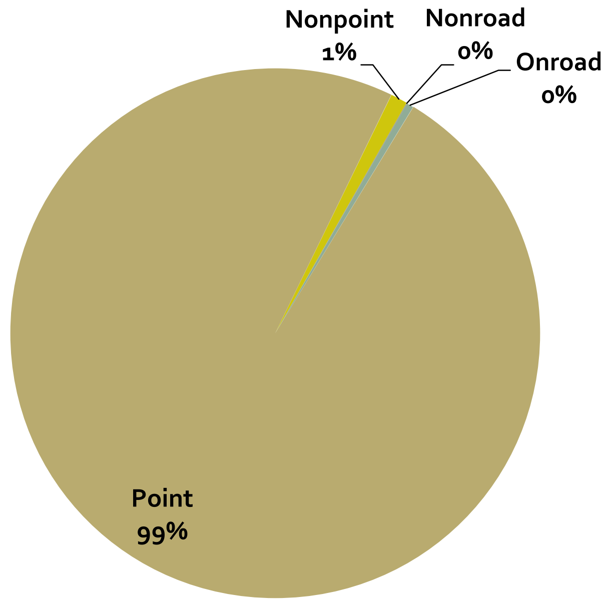
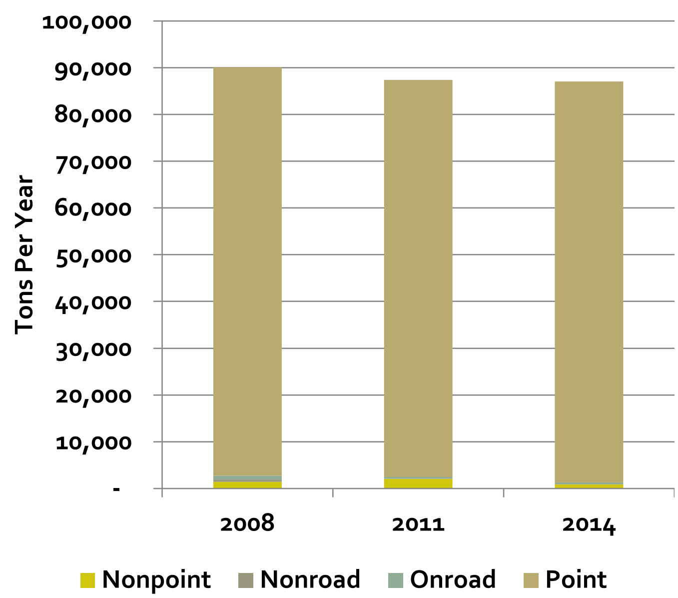


Figure B-8 Trends in Arkansas Anthropogenic SO_2 Emissions by Category



[9] Source: 2014 National Emissions Inventory version 1
[10] Source: 2008 National Emissions Inventory version 3, 2011 National Emissions Inventory version 2, 2014 National Emissions Inventory version 1

Trends in Anthropogenic Coarse Particulate Matter Emissions

Coarse particulate matter (PM_{10}) is a criteria pollutant. Approximately ninety-one percent of Arkansas PM_{10} emissions come from anthropogenic sources.[11] Emissions from nonpoint sources comprise the largest portion (ninety-seven percent) of the Arkansas anthropogenic PM_{10} emissions inventory.

Overall, PM_{10} emissions from anthropogenic sources in Arkansas increased by approximately forty-one precent between the 2008 and 2014.[12] Emissions from point and nonroad source categories decreased. Nonpoint source emissions increased by forty-three percent and onroad emissions increased by twenty-six percent.

Figure B-9 2014 Relative Contribution of Anthropogenic PM_{10} Emissions in Arkansas by Data Category

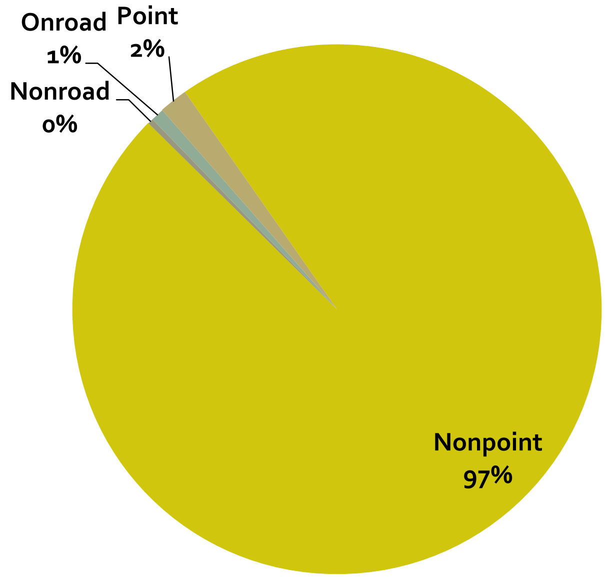
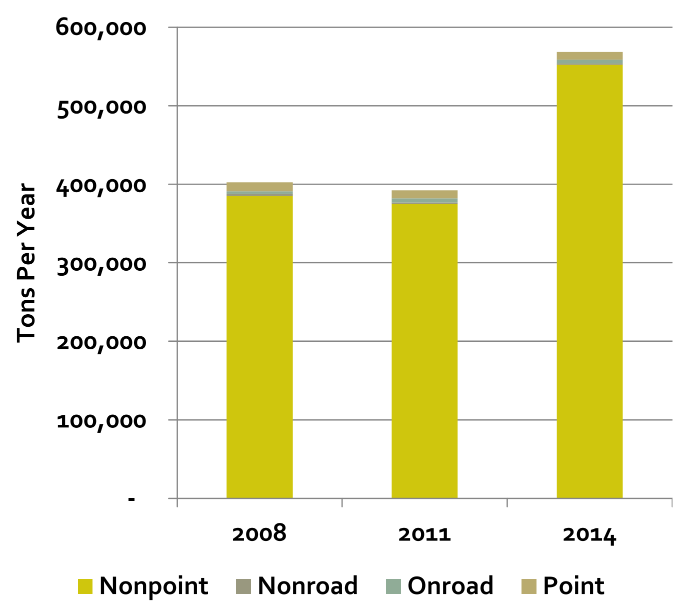


Figure B-10 Trends in Arkansas Anthropogenic PM_{10} Emissions by Category



[11] Source: 2014 National Emissions Inventory version 1
[12] Source: 2008 National Emissions Inventory version 3, 2011 National Emissions Inventory version 2, 2014 National Emissions Inventory version 1

Trends in Anthropogenic Primary Fine Particulate Matter Emissions

Primary fine particulate matter ($PM_{2.5}$) is the condensable and filterable fraction that is directly emitted from sources. Primary $PM_{2.5}$ does not include $PM_{2.5}$ formed downwind by reactions between precursor pollutants, such as nitrogen oxides (NOx), sulfur dioxide (SO_2), and ammonia (NH_3). Approximately sixty-nine percent of primary $PM_{2.5}$ emissions in Arkansas come from anthropogenic sources.[13] Emissions from nonpoint sources comprise the largest portion of the Arkansas anthropogenic primary $PM_{2.5}$ emissions inventory.

Overall, primary $PM_{2.5}$ emissions increased between 2008 and 2014; however, this was driven by an increase in emission estimates from the nonpoint source category and in particular from two sectors not regulated by ADEQ or EPA: agriculture—crop and livestock dust—and unpaved road dust.[14] Emissions from point, onroad, and nonroad source categories decreased.

Figure B-11 2014 Relative Contribution of Anthropogenic Primary $PM_{2.5}$ Emissions in Arkansas by Data Category

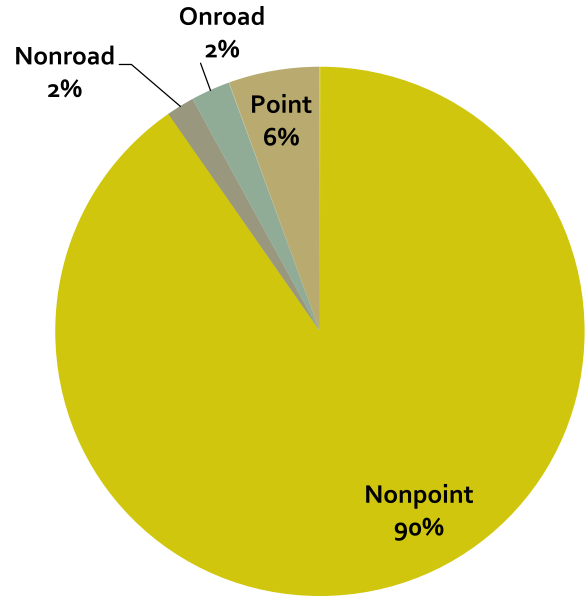
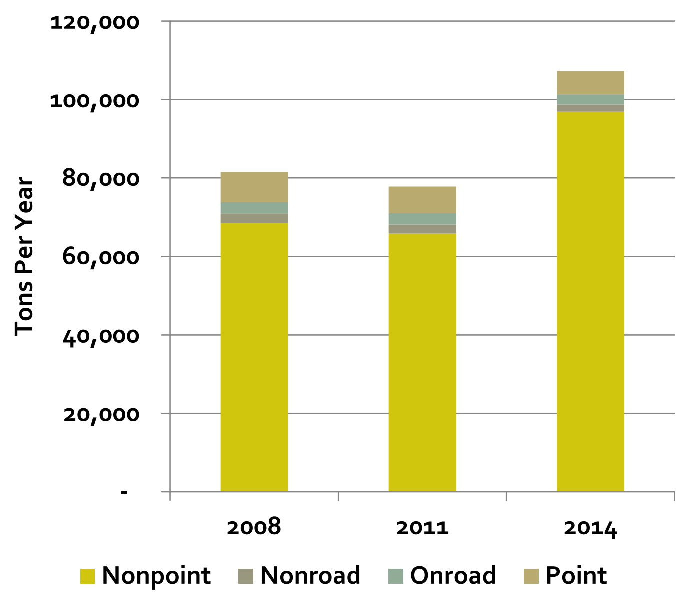


Figure B-12 Trends in Arkansas Anthropogenic Primary $PM_{2.5}$ Emissions by Category



[13] Source: 2014 National Emissions Inventory version 1

[14] Source: 2008 National Emissions Inventory version 3, 2011 National Emissions Inventory version 2, 2014 National Emissions Inventory version 1

Trends in Anthropogenic Ammonia Emissions

Ammonia (NH_3) is a precursor for fine particulate matter ($PM_{2.5}$). Approximately eighty-nine percent of NH_3 emissions in Arkansas come from anthropogenic sources.[15] Emissions from nonpoint sources comprise the largest portion (ninety-six percent) of the Arkansas anthropogenic NH_3 emissions inventory from source categories regulated by state and federal air quality programs.[16]

Overall, NH_3 emissions from anthropogenic sources decreased by approximately thirty-nine percent between 2008 and 2014. The overall decrease in NH_3 emissions was driven by a forty-percent decrease in nonpoint source NH_3 emissions between 2008 and 2014. Onroad sources of NH_3 emissions also decreased between 2008 and 2014. Nonroad and point source emissions increased between 2008 and 2014.

Figure B-13 2014 Relative Contribution of Anthropogenic NH_3 Emissions in Arkansas by Data Category

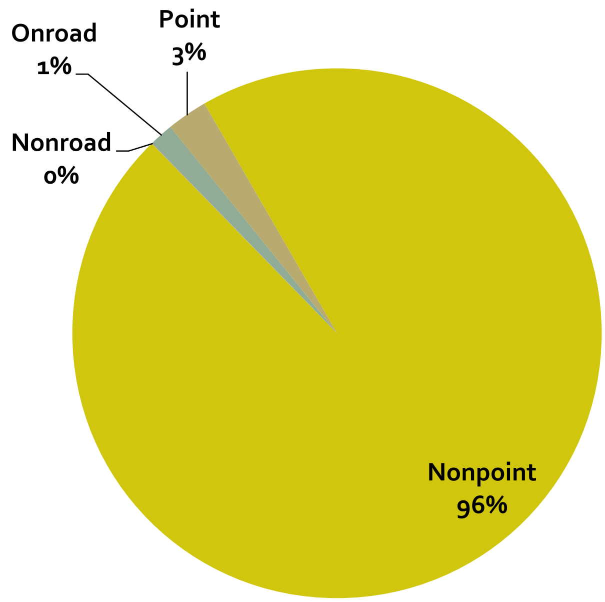
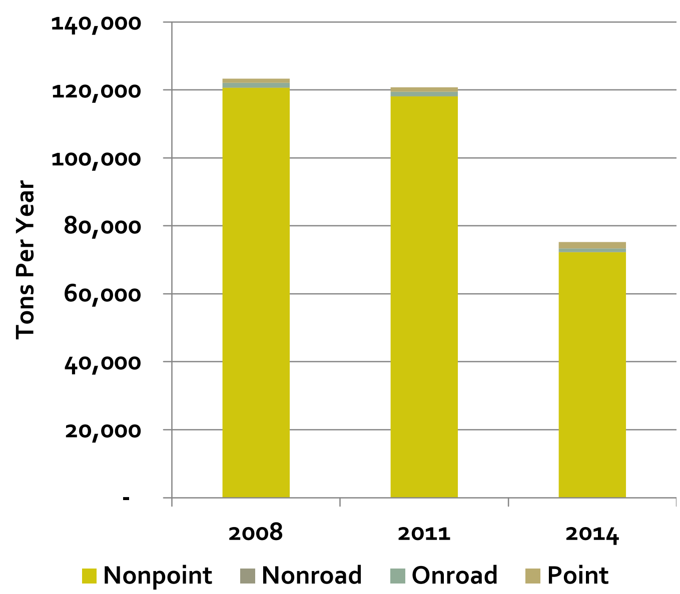


Figure B-14 Trends in Arkansas Anthropogenic NH_3 Emissions by Category



[15] 2014 National Emissions Inventory version 1
[16] Id.

Appendix D: Permitting Metrics Progress Report

This report was originally prepared in August 2017 to provide an overview of progress toward reducing turnaround times in permitting since 2014.

Executive Summary

The Permits Branch of the Office of Air Quality at the Arkansas Department of Environmental Quality (ADEQ) is responsible for issuing air permits to approximately 1300 facilities in Arkansas. The Permits Branch implements a single-permit system for new and modified facilities in the State of Arkansas that encompasses both State and federal regulatory requirements for stationary sources. Permits include information on which pollutants are being released, how much may be released, and what kinds of steps the source's owner or operator is taking to reduce pollution. All permits include a mechanism to demonstrate compliance with the permit conditions. The permitting process ensures that stationary sources will be constructed or modified to operate without resulting in a violation of Arkansas Pollution Control and Ecology Commission (APC&EC) regulations and without interfering with the attainment and maintenance of the national ambient air quality standards.

Under the leadership of Thomas Rheaume, Senior Operations Manager of the Office of Air Quality, the Permits Branch has worked to streamline the permitting process and lower the cost of the permitting process for the regulated community. Projects have included expanding the availability of standardized, easy to apply for permits; changing APC&EC regulations to exclude some smaller sources and allow quicker initial approval for a wider range of permits; and automating many of the procedures in issuing permits. As a result of these efforts, permit processing timeframes have been reduced.

In the past few years, the Permits Branch has continued improvement and streamlining efforts by instituting further procedural and technical systems. In particular, efficiencies in both time and cost have been realized from the institution of an online permit submission system known as e-Portal. This system reduces costs associated with paper and postage, as well as the time involved in the permit application process, for both Permits Branch staff and for permit applicants. E-Portal also tracks the status of each application and notifies Permits Branch staff when supporting materials are submitted and when the application is ready for each next step in the review process.

This report demonstrates the improvements achieved in permitting efficiency as a result of implementation of the Permits Branch's streamlining efforts. Dramatic reductions in turnaround times are observed for the following permitting action types: new minor source permits, minor source modifications, new Title V permits, and Title V permit renewals. According to the latest national data on Title V permit issuance, Arkansas is among only thirteen states that processed all Title V significant modifications on time and is ranked third among state air permitting authorities for timeliness in issuance of Title V renewals. These improvements have occurred while Permits Branch staff levels have remained fairly constant.

Permits Branch Turnaround Time

There are two major types of air permits: Minor Source and Title V. The Permits Branch also issues motor vehicle racing facility permits. In addition to permits, the Permits Branch processes registrations for stationary sources not otherwise required to obtain a permit and that have emissions of one or more pollutants exceeding the registration emission thresholds.

Minor Source permits are issued to smaller sources that are not subject to Title V. The Title V State Operating Permit Program issues permits to major sources of federally-regulated air pollutants. Due to the complexity of regulatory requirements for major sources, Title V permitting actions typically require more time to process than do Minor Source permitting actions. The Permits Branch also develops General Permits—standardized permits for specific types of facilities—that, depending on the specific stationary source type, may fall under either the Minor Source program or the Title V program.

The following sections describe various permitting actions performed by the Permits Branch and provide trends in turnaround time for those permitting actions. Trends are examined for each six month period starting in 2014 and continuing through latest available data (January–June 2017). Staffing levels in the Permits Branch over each six month period averaged between twenty-five and twenty-six full time employees. Because staffing levels for the Permits Branch were fairly consistent, changes in turnaround times observed can largely be attributed to changes in procedural and technical systems.

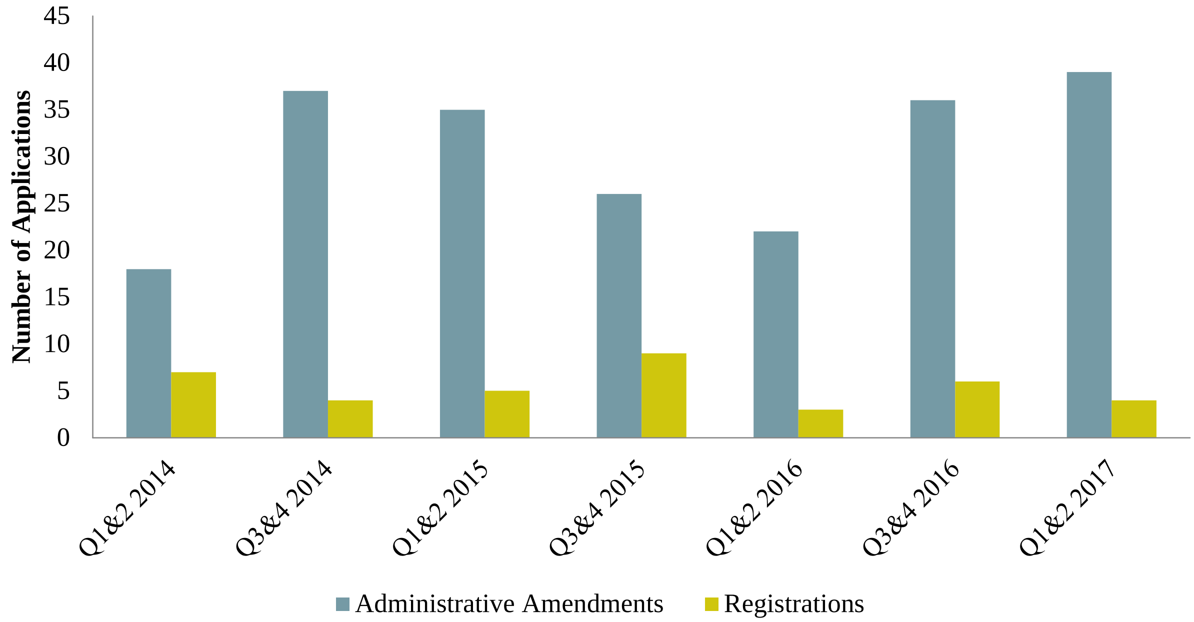
Administrative Amendments and Registrations

An administrative amendment is a permit revision that corrects a typographical error; identifies a minor administrative change at a permitted source, requires more frequent monitoring or reporting by a permittee, incorporates a change in a permit involving the retiring of equipment or emissions units, or the decrease of permitted emission; or incorporates a change to a facility’s insignificant activities list. Changes addressed in a request for administrative amendment may be implemented immediately upon approval of the amendment request; however, the permit may not be updated to include the administrative amendment until a later date.

Registration enables ADEQ to track stationary sources required to obtain a permit under the emission thresholds contained in APC&EC regulations prior to December 5, 2008 that are no longer required to obtain a permit under the revised thresholds adopted on December 5, 2008. Stationary sources may be constructed, operated, or modified immediately upon submittal of the registration.

Because administrative amendments and actions for registration sources can be implemented prior to final action by ADEQ, turnaround time was not calculated for these types of permitting actions. Between 2014 and the first half of 2017 (Q1&2 2017), the Permits Branch has received on average 30 administrative amendment requests and 5 registrations each year. The number of each permitting action type varies from year to year, but no clear trend is apparent. Figure 1 illustrates the number of administrative amendment requests and registrations received during each six month period since 2014.

Figure C-1 Administrative Amendment Requests and Registrations: 2014–2017



Minor Source Review Permitting Actions

ADEQ's Minor Source Program is for stationary sources of air pollutants that do not require Title V permits. States have considerable flexibility in designing their minor source programs so long as the program ensures that State and federal requirements are met and that construction or modification of sources does not interfere with attainment and maintenance of the national ambient air quality standards.

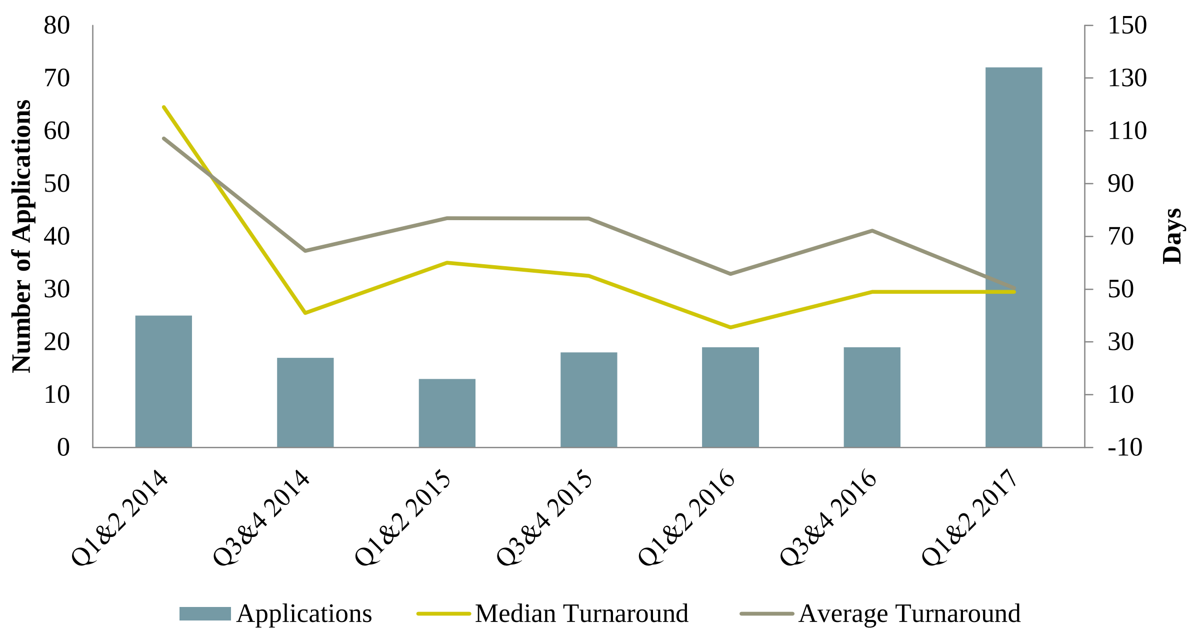
For this report, motor vehicle racing facility permitting actions have been grouped with minor sources. With the exception of the general permit for air curtain incinerators, all Arkansas-issued general permits fall within the Minor Source Program. This report quantifies the number of applications received for new minor sources, modification of minor sources, de minimis actions, and renewals of minor source general permits.

NEW MINOR SOURCE PERMITTING ACTIONS

The number of applications received for new minor source permits during each six month period between 2014 and the first half of 2017 has ranged between thirteen and seventy-two. The first half of 2017 showed a dramatic increase in new source permit applications from typically observed numbers for previous six-month periods.

For each six-month period, median and average permit turnaround times were calculated. The median turnaround time provides the middle point of the turnaround time data set and is less impacted by extremes in the data set distribution than the average. Turnaround time for new minor source permit actions was calculated as the period of time between the later of the application date or administrative completeness date and the issuance of the final permit. The public is provided a thirty-day comment period on all new minor source permits and the Permits Branch must respond to any comments received. The public comment period is included in the calculated turnaround time. Withdrawn, cancelled, or superseded permit applications were not factored into turnaround time summary statistics. Figure 2 illustrates trends in new minor source permitting turnaround times compared to the number of applications received.

Figure C-2 New Minor Source Permit Applications and Turnaround Time



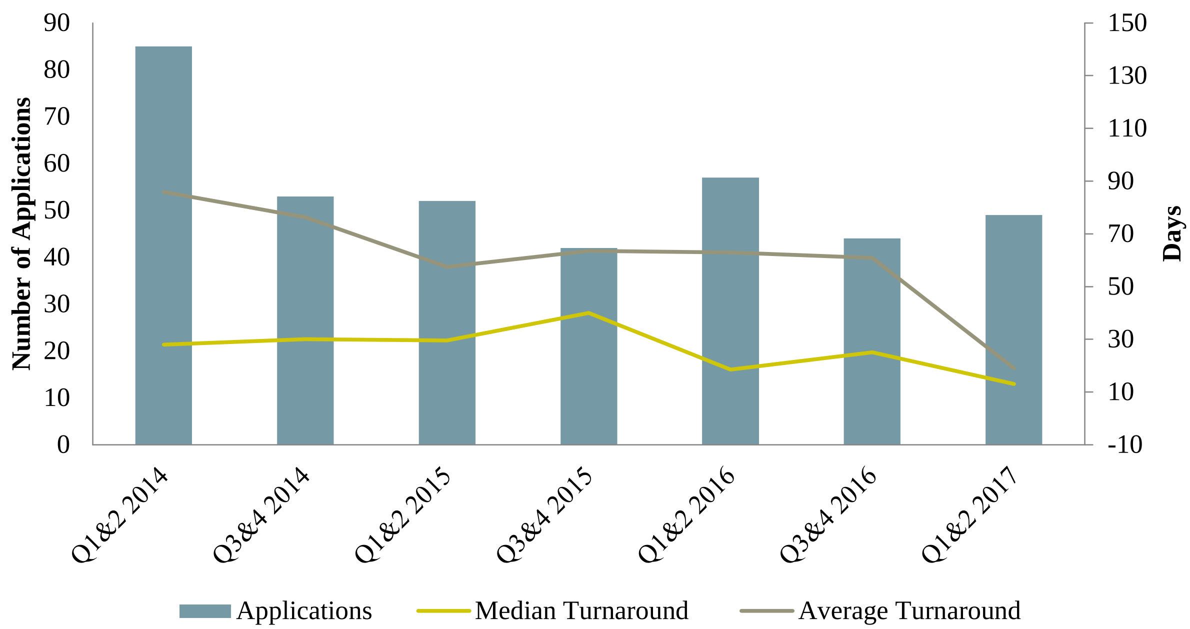
Both average and median turnaround time for new minor source permits have decreased markedly since the first half of 2014. Median turnaround time was typically lower than average turnaround time. Additionally, the average and median converge during the first half of 2017 indicating higher consistency in the distribution of the new minor source permit turnaround time data set. Despite the increase in volume of new minor source permit applications during the first half of 2017, the Permits Branch was able to efficiently issue these permits with similar or lower turnaround times than in previous six-month periods.

MINOR SOURCE MODIFICATION ACTIONS

The number of applications received for minor source modification permits during each six month period between 2014 and the first half of 2017 has ranged between forty-two and eighty-five. The Permits Branch received much higher than average minor source permit modification applications during the first half of 2014 than observed for other six-month periods.

For each six-month period median and average permit turnaround times were calculated. Turnaround time for minor source permit modification actions was calculated as the period of time between the later of the application date or administrative completeness date and the issuance of the final permit. The public is provided a thirty-day comment period on all minor source modification permits and the Permits Branch must respond to any comments received. The public comment period is included in the calculated turnaround time. Withdrawn, cancelled, or superseded permit applications were not factored into turnaround time summary statistics. Figure 3 illustrates trends in minor source modification permitting turnaround times compared to the number of applications received.

Figure C-3 Minor Source Permit Modification Applications and Turnaround Time



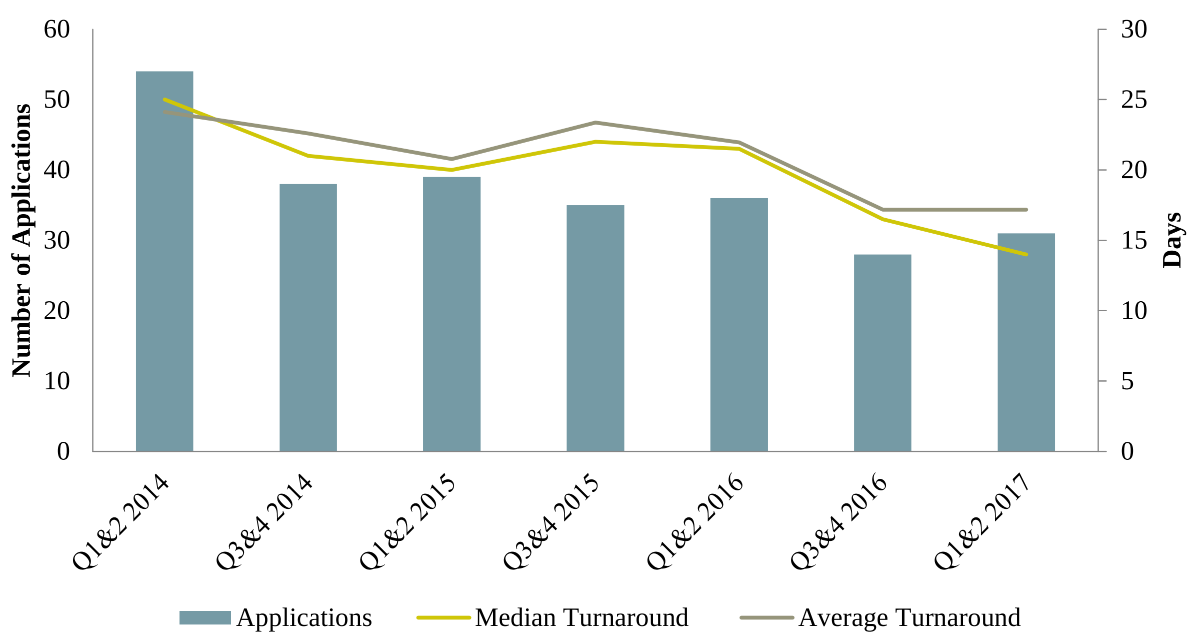
The average turnaround time for minor source permit modifications has dramatically decreased since the first half of 2014.The average turnaround time during the first half of 2014 was eighty-six days; whereas the average turnaround time during the first half of 2017 was nineteen days. The median turnaround time for the first half of 2017 was also half the turnaround time of the first half of 2014. Median turnaround time was typically much lower than average turnaround time. Additionally, the average and median converge during the latter half of 2016 and the first half of 2017 indicating higher consistency in the minor source modification permits turnaround time data set.

DE MINIMIS ACTIONS

The number of applications received for de minimis actions during each six month period between 2014 and the first half of 2017 has ranged between twenty-eight and fifty-four. The Permits Branch received much higher than average de minimis applications during the first half of 2014 than observed for other six-month periods.

For each six-month period, median and average de minimis action turnaround times were calculated. Turnaround time for de minimis actions was calculated as the period of time between the later of the application date or administrative completeness date and the issuance of the de minimis letter indicating whether the de minimis request was approved or denied. Final permit turnaround time was not used because stationary sources may implement the de minimis change immediately upon approval and are not required to wait until the change is incorporated into a permit revision. There is no public comment period for de minimis actions. Withdrawn, cancelled, or superseded permit applications were not factored into turnaround time summary statistics. Figure 4 illustrates trends in de minimis action turnaround times compared to the number of applications received.

Figure C-4 De Minimis Applications and Turnaround Time



Both the median and average turnaround time for issuance of de minimis letters has decreased since 2014. The median and average turnaround time trends have closely traced each other indicating consistency in the distribution of turnaround times for de minimis letters. Median turnaround time was typically less than the average turnaround time.

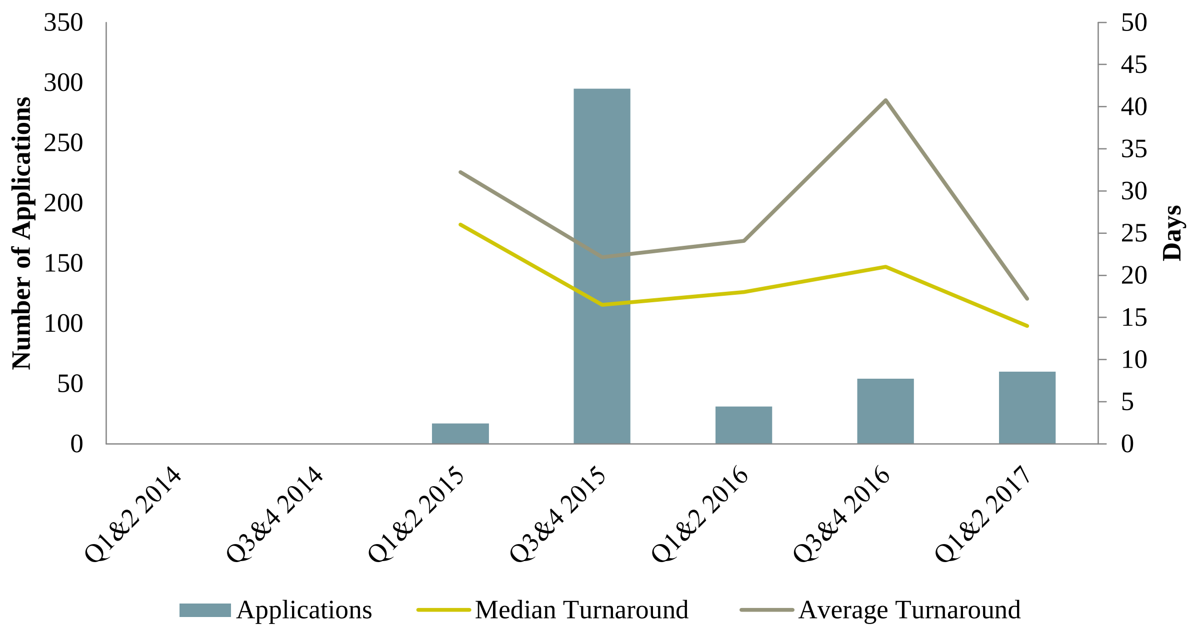
MINOR SOURCE GENERAL PERMIT RENEWALS

Although many minor source permitting actions do not require renewal, stationary sources with general permits are required to renew their permit every five years. The public is afforded a thirty-day comment period on new general permits and the first issuance of a general permit to a source; however, no public comment period is given for general permit renewals.

The number of applications received for minor source general permit renewals during each six month period between 2014 and the first half of 2017 has ranged between zero and two hundred ninety-five. The Permits Branch received a much greater number of renewals during the second half of 2015 than observed for other six-month periods.

For each six-month period median and average renewal turnaround times were calculated. Turnaround time for minor source permit renewal actions was calculated as the period of time between the later of the application date or administrative completeness date and the issuance of the final permit. Withdrawn, cancelled, or superseded permit applications were not factored into turnaround time summary statistics. Figure 5 illustrates trends in minor source permit renewal turnaround times compared to the number of applications received.

Figure C-5 Minor Source General Permit Renewal Applications and Turnaround Time



Minor source general permit renewal median and average turnaround times did not show a consistent trend during the time periods examined. Median turnaround time was lower than average turnaround time for each six-month period. The average turnaround time diverged greatly from the median turnaround time in the second half of 2016 indicating that some renewal actions took much longer than the typical renewal action during that period. The average and median turnaround times appeared to converge during the first half of 2017 indicating greater consistency in renewal issuance.

Title V Permitting Actions

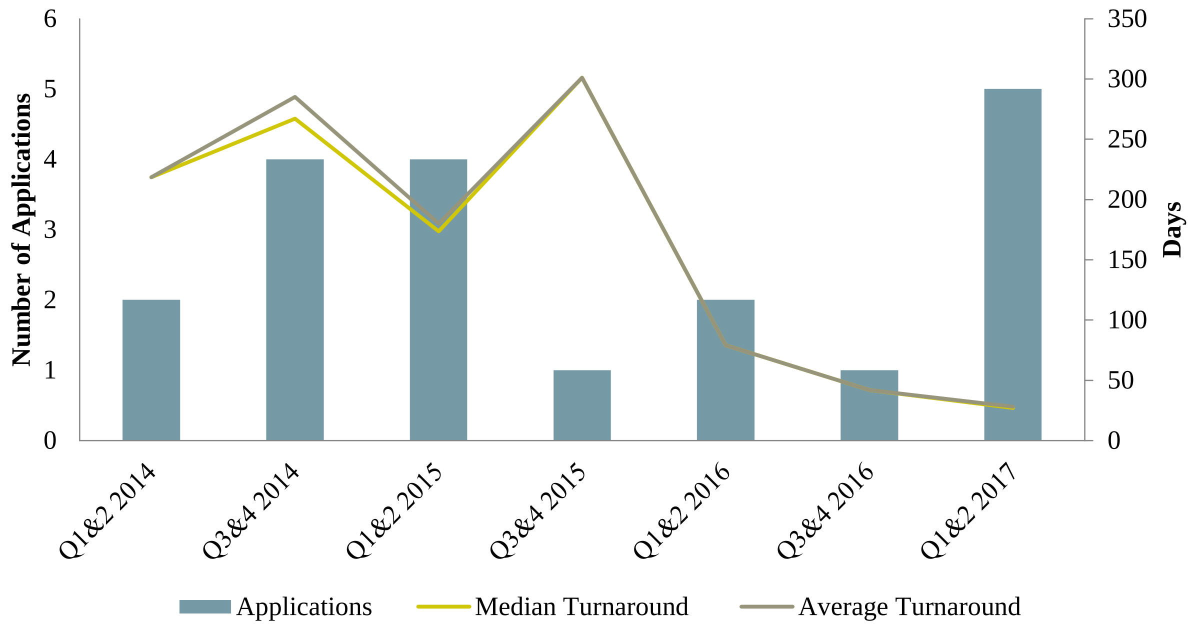
The Title V State Operating Permit Program meets Environmental Protection Agency (EPA) operating permit requirements for major sources under 40 Code of Federal Regulations Part 70. Requirements for review and approval of Title V permitting actions are typically more extensive than for minor source permitting actions. All Arkansas Title V permitting actions require public notice for at least thirty days. The public comment period factored into the turnaround time of each of the Title V permitting actions is discussed below.

NEW TITLE V PERMITTING ACTIONS

The number of applications received for new Title V permits during each six month period between 2014 and the first half of 2017 has ranged between one and five. Title V permit application volume was higher in the latter half of 2014 and the first half of both 2015 and 2017.

For each six-month period, median and average permit turnaround times were calculated. The median turnaround time provides the middle point of the turnaround time data set and is less impacted by extremes in the data set distribution than the average. Turnaround time for new Title V permit actions was calculated as the period of time between the later of the application date or administrative completeness date and the issuance of the final permit. The public is provided at least thirty days to comment on all new Title V permits, and the Permits Branch must respond to any comments received. The public comment period is included in the calculated turnaround time. Withdrawn, cancelled, or superseded permit applications were not factored into turnaround time summary statistics. Figure 6 illustrates trends in new Title V permitting turnaround times compared to the number of applications received.

Figure C-6 New Title V Permit Applications and Turnaround Time



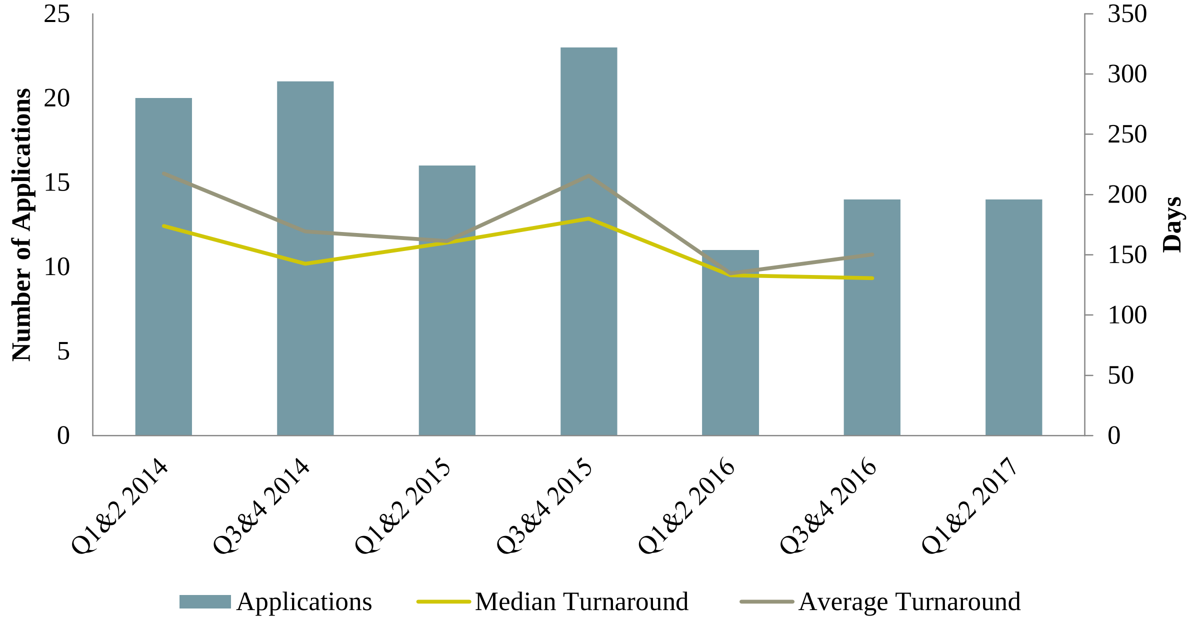
The median and average turnaround times have tracked closely in all periods examined. Both the median and average turnaround times have dropped dramatically since the first half of 2014. The average turnaround time for new Title V permits in the first half of 2014 was two hundred eighteen days; whereas, the average turnaround time for new Title V permits in the first half of 2017 was twenty-eight days. This dramatic decrease in turnaround time speaks to the effectiveness of the Permits Branch's efforts to streamline the Title V permitting process.

TITLE V MODIFICATION ACTIONS

The number of applications received for Title V modification permits during each six month period between 2014 and the first half of 2017 has ranged between eleven and twenty-three. Title V permit modification volume was higher in 2014 and 2015 than in 2016 and 2017.

For each six-month period median and average permit turnaround times were calculated. Turnaround time for Title V permit modification actions was calculated as the period of time between the later of the application date or administrative completeness date and the issuance of the final permit. The public is provided a thirty-day comment period on all Title V modification permits and the Permits Branch must respond to any comments received. The public comment period is included in the calculated turnaround time. Withdrawn, cancelled, or superseded permit applications were not factored into turnaround time summary statistics. Figure 7 illustrates trends in Title V modification permitting turnaround times compared to the number of applications received.

Figure C-7 Title V Modification Permit Applications and Turnaround Time



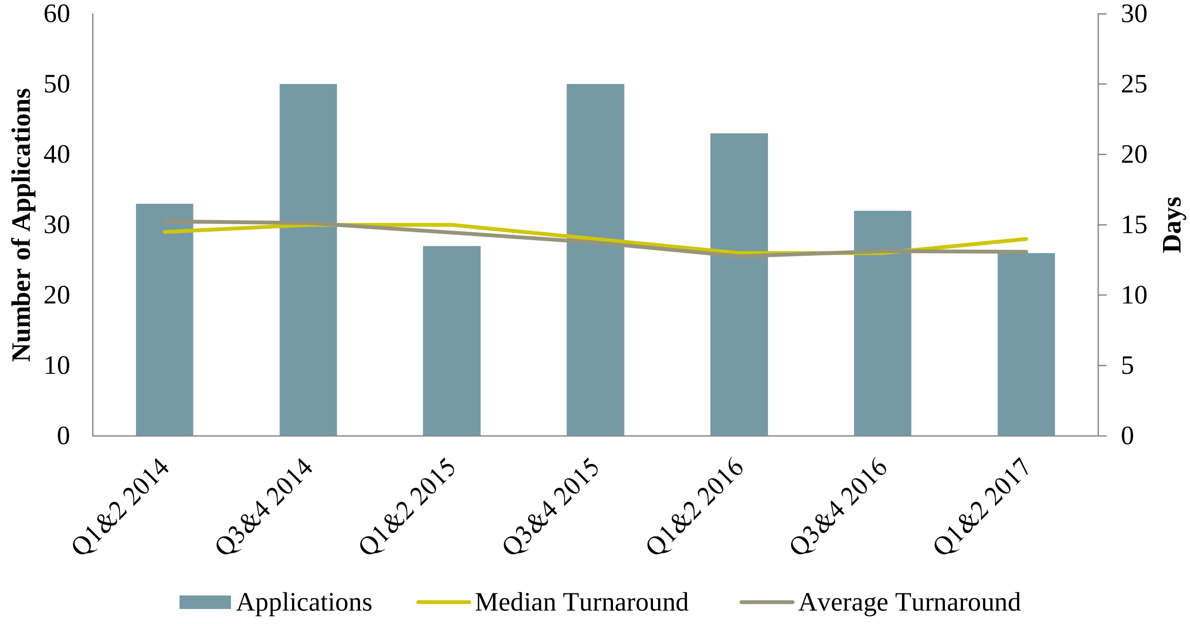
For the most part, median and average turnaround times for Title V modifications tracked with the number of applications received. Median turnaround times for Title V modifications were lower than the average turnaround times indicating that some Title V modification permits took demonstrably longer than the typical Title V modification permit action. No Title V permit modification actions applied for during the first half of 2017 were completed by June 30, 2017.

TITLE V MINOR MODIFICATION ACTIONS

The number of applications received for Title V minor modification actions during each six month period between 2014 and the first half of 2017 has ranged between twenty-six and fifty.

For each six-month period, median and average minor modification action turnaround times were calculated. Turnaround time for Title V minor modification actions was calculated as the period of time between the later of the application date or administrative completeness date and the issuance of the minor modification letter indicating whether the minor modification request was approved or denied. Final permit turnaround time was not used because stationary sources may implement the minor modification change immediately upon approval and are not required to wait until the change is incorporated into a permit revision. Public notice for Title V minor modifications is not required under the Clean Air Act, but it is required under current APC&EC regulations. However, the public notice is required for the permit revision and not the minor modification letter; therefore, the public comment period is not factored into turnaround time. Withdrawn, cancelled, or superseded permit applications were not factored into turnaround time summary statistics. Figure 9 illustrates trends in Title V minor modification action turnaround times compared to the number of applications received.

Figure C-8 Title V Minor Modification Permit Applications and Turnaround Time



Median and average turnaround times for minor modification letters were fairly consistent across all periods examined. Median and average turnaround times for minor modification letters tracked fairly closely during all six month periods; however, the median turnaround time for issuance of minor modification letters is slightly higher than average turnaround during several six-month periods because the average is lowered by several applications for which the minor modification letter was issued the same day as the application was determined to be administratively complete.

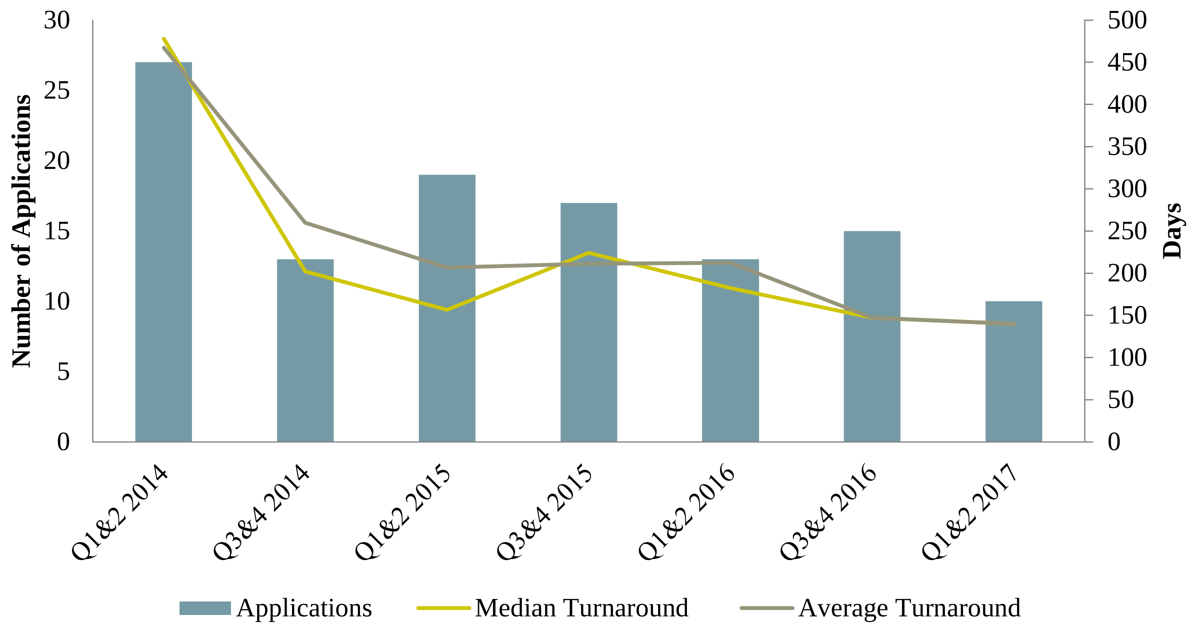
TITLE V RENEWALS

All Title V permits are issued with a fixed term that may not exceed five years; therefore, to continue operating beyond the term of the permit, Title V sources must apply for renewal of their permits. Application for renewal of a Title V permit is considered timely if the application is received by ADEQ no later than six months prior to expiration of the current Title V permit's term. ADEQ has eighteen months to take final action on a renewal application. The existing permit remains in effect until the Department takes final action on the renewal application.

The number of applications received for Title V permit renewals during each six month period between 2014 and the first half of 2017 has ranged between ten and twenty-seven.

For each six-month period median and average renewal turnaround times were calculated. Turnaround time for Title V permit renewal actions was calculated as the period of time between the later of the application date or administrative completeness date and the issuance of the final permit. Withdrawn, cancelled, or superseded permit applications were not factored into turnaround time summary statistics. Figure 9 illustrates trends in Title V permit renewal turnaround times compared to the number of applications received.

Figure C-9 Title V Permit Renewal Applications and Turnaround Time



Median and average turnaround times for Title V renewals have decreased markedly since the first half of 2014. There was a steep drop in turnaround time in the latter half of 2014 which has largely been sustained. The average turnaround time for Title V renewals in the first half of 2014 was four hundred sixty-seven days; whereas, the average turnaround time for the first half of 2017 was one hundred forty. Median and average turnaround times track fairly closely throughout most of the six-month periods examined and are identical during the latter half of 2016 and first half of 2017. This indicates consistency in distribution of Title V permit renewal turnaround time data points.

Title V Significant Modification and Renewal National Rankings

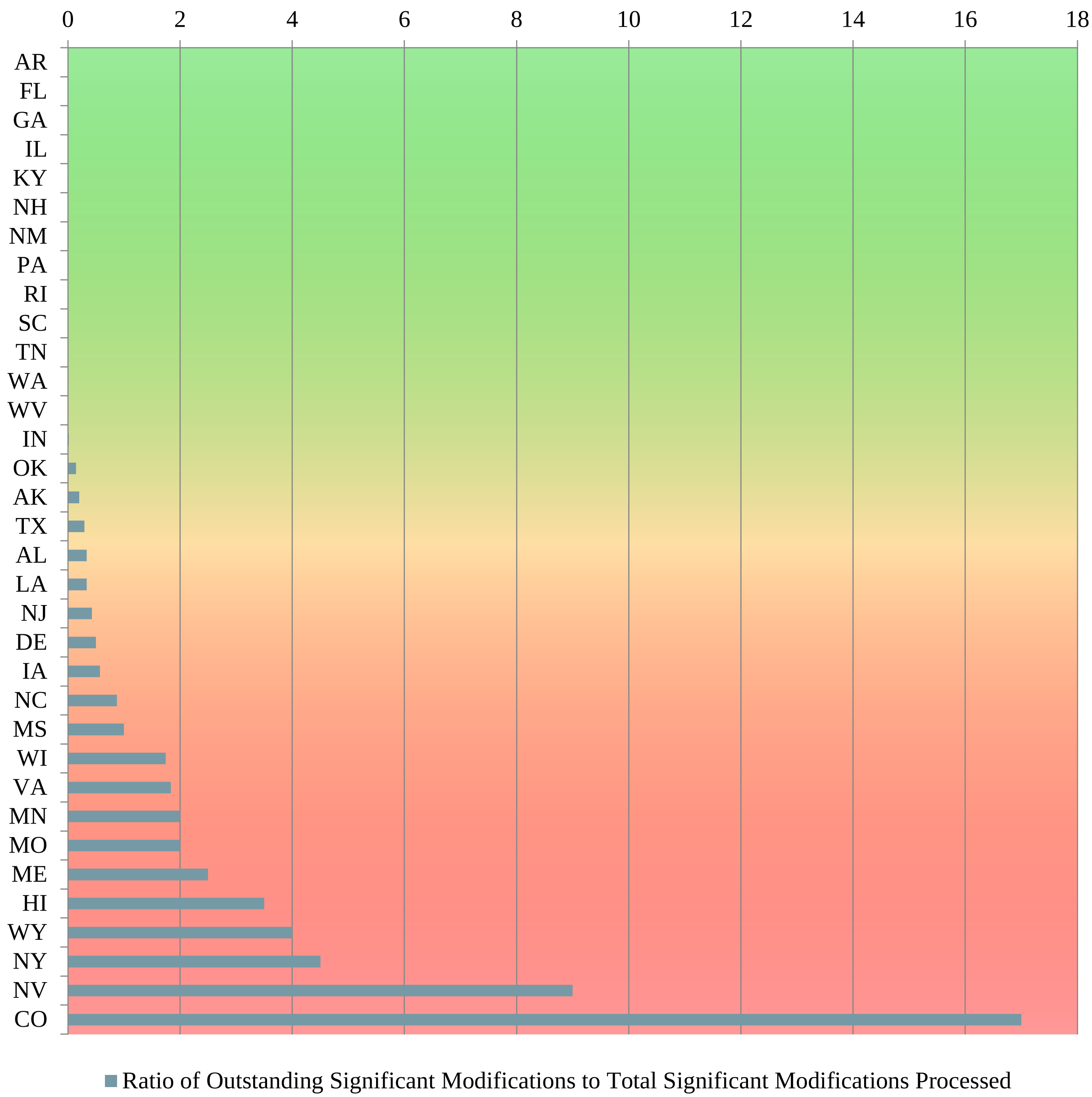
The EPA collects information on Title V permitting actions from state and local permitting authorities on a semi-annual basis. The data on the number and timeliness of Title V permitting actions for all permitting authorities are available in EPA's National Title V Operating Permit System (TOPS) database. This database is useful in comparing the efficiency of the ADEQ Office of Air Quality Permits Branch with other air permitting authorities in other states.

According to the latest reporting period TOPS data (July–December 2016), thirteen states, including Arkansas, completed all Title V significant modification permitting actions within eighteen months of receiving the application.[17] Twenty-one states failed to issue all Title V significant modifications within

[17] Only state-level air permitting authorities that processed at least one Title V significant modification during the July–December 2016 period were compared in this report. Some states rely upon local permitting authorities for issuance of Title V permit; therefore, Title V permitting actions from these smaller permitting authorities are not captured in this report.

the eighteen month window considered timely under the Clean Air Act. Significant modifications that are not issued within eighteen months are referred to as outstanding significant modifications. Figure 10 compares state air permitting authority rankings for timeliness of issuance of Title V significant modifications.

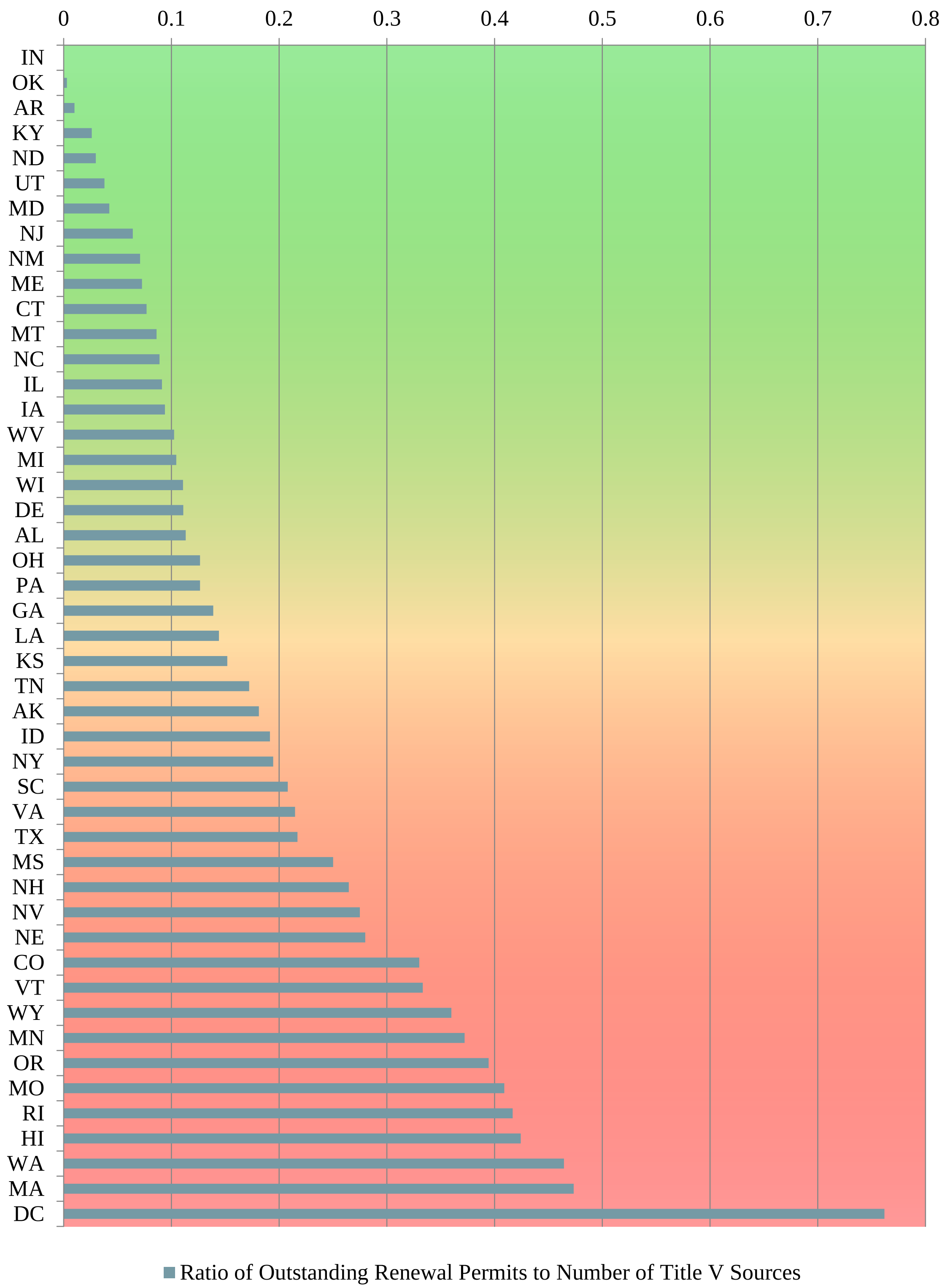
Figure C-10 Comparison of State Air Permitting Authority Timeliness for Issuance of Title V Significant Modifications



According to the latest reporting period TOPS data (July–December 2016), only one state, Indiana, did not have any Title V permits expire due to failure to complete the renewal process on time (prior to expiration of the existing permit).[18] Such Title V permits that are not completed on time are referred to in the TOPS database as outstanding renewal permits. Timely submission of a Title V renewal application is six months prior to expiration of the permit. An outstanding renewal permit can result from either failure of a Title V source to submit a renewal application, late submission of the renewal application by the Title V source resulting in less than six months to complete the renewal, or from failure of the permitting authority to complete a final action on a timely renewal application within the six month period before the Title V permit expires. Arkansas ranked third among states for timeliness in issuance of Title V renewals. Figure 11 compares state air permitting authority rankings for timeliness of issuance of Title V renewals.

[18] Data on outstanding permit renewals was missing for Florida.

Figure C-11 Comparison of State Air Permitting Authority Timeliness for Issuance of Title V Renewals



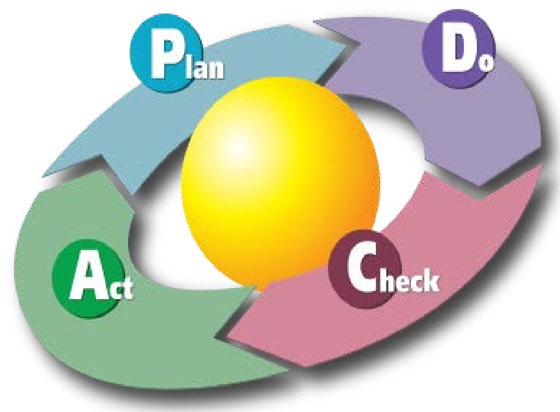
Conclusion

In the past three years, the Permits Branch has achieved dramatic reductions in turnaround times in permitting and ranks among the best in the nation in timeliness of Title V permitting actions. Turnaround times for action on new minor source permits, minor source modifications, new Title V permits, and Title V permit renewals have dropped precipitously since 2014. According to the latest national data on Title V permit issuance, Arkansas is among only thirteen states that processed all Title V significant modifications on time and is ranked third among state air permitting authorities for timeliness in issuance of Title V renewals. These improvements in turnaround time and decreases in outstanding permit actions speak to the efficiency gains that the Permits Branch has worked diligently to achieve.

Appendix E: Office of Air Quality 2017 Lean Events

What is a Lean Event?

The Arkansas Department of Environmental Quality (ADEQ) is working to achieve continuous improvement in our work to serve the citizens of Arkansas. As part of our continuous improvement efforts, ADEQ is implementing Lean Six Sigma concepts throughout the agency. Lean Six Sigma is a management practice first introduced in Japan by the Toyota Motor Co. that has since been adopted across a broad spectrum of organizations, including state and federal agencies. By implementing certain lean management principles, ADEQ is working to increase the quality of our work and reduce costs.



A lean event (also known as a "Kaizen event") is the beginning of a continuous cycle of planning, implementing, evaluating, and revising product work flows to reduce waste and rework while maintaining or improving product quality. During a lean event, a team creates a plan to improve the work flow for product development. This plan involves identifying the value of the product, evaluating the value of each step in producing the product, challenge the wasted steps, creating a work flow through value added steps, and establishing metrics to evaluate process changes.

The overall goal for ADEQ's lean efforts is to achieve continuous improvement in achieving our mission to protect, enhance, and restore the natural environment for the well-being of all Arkansans by understanding those we serve and creating better, more efficient processes.

Permits Lean Event

In December 2017, the ADEQ Office of Air Quality (OAQ) staff held a lean event to evaluate the process for issuing new permits, significant modifications, and Title V renewals to identify potential changes to the process that could improve permitting times. The team for this event was composed of staff from the Permits Branch, the Compliance Branch, and the Enforcement Branch. The lean event was facilitated by Tim Cain and Lori Goode. Amanda Leamons served as team leader.

Opportunities for Improvement in Permitting Metrics

- Average lead time for permit issuance forty-five days beyond targeted timeframe of 180 days
- Forty-three percent of applications submitted are administratively incomplete
- Online applications through e-Portal make up only 8.3% of total applications received

As part of this lean event, the team recognized past efforts to achieve improvements in permitting times and a reduction in backlogged permits and areas where further improvement was necessary to reach ADEQ strategic goals. Appendix D to the State of the Air Report details improvements achieved by these past efforts. The team sought to achieve further achievements in reducing permit turnaround times by developing strategies to reduce the number of administratively incomplete applications received and to increase the number of applications submitted through ADEQ's online e-Portal system.

1. Identifying the Value

The permitting process impacts a variety of stakeholders (customers) including citizens, permittees (regulated facilities), permit writers, compliance inspectors and enforcement analysts. For permittees, efficiency and speedier permit issuance is highly valued. Permittees must wait until their permit is finalized to construct or make significant modifications. Delays in permit issuance may result in lost opportunity cost. For ADEQ staff, streamlining of the permitting process is anticipated to result in a reduction in wasted effort and rework.

One source of delay in permit issuance is the submission of administratively incomplete applications by permittees. ADEQ sent a survey about application submissions to permittees and the Arkansas Environmental Federation—an environmentally-regulated community advocacy group. The purpose of the survey was to identify why some submissions did not include all necessary components. Responses to this survey were used in identifying refinements that could be made to the permitting process to reduce the likelihood of submission of an administratively incomplete permit application.

2. Mapping the Value Stream

In a 2015 streamlining effort, the OAQ Permits Branch evaluated the purpose of each step in the permit process to determine whether the step was required and/or beneficial. Duplicative or unnecessary steps were eliminated. As a result, all steps remaining in the process at the time of the lean event were considered value added.

3. Creating Flow

Because no steps could be eliminated from the permitting process, the permits lean event team looked for elements of each step that could be fine-tuned to improve process flow. The team specifically evaluated how fees are collected and documents submitted, expedited processing procedures, the number of public notices published versus required, and the responsibilities of the permit writers versus the applicants in the permit process. The team developed a list of twenty-five action items to refine the permitting process.

4. Establishing Pull

The permits lean event team established three quantitative goals and three qualitative goals by which to measure changes as a result of implementing the twenty-five action items identified during the lean event. These action items focus on improving the e-Portal application process and providing outreach to permittees on the application submission process. E-Portal upgrades are in the works to make it more convenient to use for agency and external users. The Permits Branch is also planning on surveying permittees on their use of e-Portal to identify how the program could be better and reasons why a permittee may not be using e-Portal. The Permits Branch is developing a webinar and other training for permit applications to improve understanding of required application submission components. The Permits Branch and Compliance Branch staff members are working to implement an inspector review process for draft permits to identify potential enforceability issues with permit conditions. The team is working to fully implement the lean event action items by January 31, 2019.

Quantitative Goals

- By January 31, 2019, the percent of administratively incomplete applications received will be reduced from forty-three percent to thirty-four percent.
- By January 31, 2019, the overal average lead time for new, renewal, and significant modification permits will be reduced from 225 days to 180 days.
- By January 31, 2021, the percent of online new, renewal, and significant modification permit applications received will be increased from 8.3% to fifty percent.
  - Milestone#1: By January 31, 2019, the percent of online new, renewal, and significant modification permit applications received will be increased from 8.3% to fifteen percent.
  - Milestone#2: By January 31, 2020, the percent of online new, renewal, and significant modification permit applications received will be increased from 8.3% to thirty percent.

Qualitative Goals

- Improve the e-Portal experience and promote the use of online application submission
- Investigate technology improvements to the ADEQ permitting process
- Consider legal and/or regulatory changes and application form improvements to improve the applicants permitting experience and reduce overal permitting times.

5. Seeking Perfection

Implementation of the permits lean event action items will be evaluated quarterly. The team will identify solutions to challenges that arise during roll-out and implementation of the new lean permits process. The team will also evaluate changes in the permitting metrics identified in the lean event to determine whether changes to the permitting process are yielding the anticipated results.

Enforcement Lean Event

In April 2017, staff from the ADEQ Offices of Air Quality, Land, Water, Law and Policy, and Operations met to initiate a lean process event related to routing and approval of formal enforcement documents. The effort was undertaken to explore more efficient and cost-effective procedures in order to deliver a quality product—consent administrative order (CAO) or notice of violation (NOV)—in a timely manner. By engaging in this effort, the team brainstormed methods to improve routing time, bring more consistency to the enforcement process, and improve efficiency throughout the process.

Opportunities for Improvement in Enforcement Process

- 149 day average lead time for enforcement action from assignment to proposal
- Lack of established timeframes for steps in the enforcement process
- Redundant or unnecessary review steps

The enforcement lean event team targeted the process for routing and approval of formal enforcement documents starting with the assignment of an enforcement case to an enforcement analyst and ending with proposal of the enforcement action. Team members discussed specific areas in which delays had been noted and suggested ways to streamline the process. Inconsistencies were identified and possible solutions were discussed. Staff members from each media (Air, Water, and Land) worked on the enforcement process in their respective media.

1. Identifying the Value

The enforcement process impacts a wide variety of stakeholders (customers) including citizens, regulated facilities, permit writers, compliance inspectors and enforcement analysts. For entities against whom enforcement actions are taken, efficiency in the enforcement process reduces uncertainty that may impact future actions by the entities. Improved efficiency internally at ADEQ and streamlining of the enforcement process is anticipated to result in a reduction in wasted effort and rework. Improvements will lead to more efficient use

of staff resources and is expected to lead to cost savings for the agency.

2. Mapping the Value Stream

During the lean event, the team visually mapped out the steps in the enforcement process and identified which steps were necessary or added value and which steps were unnecessary or redundant. The team developed a series of recommendations to streamline the process by eliminating redundant steps while ensuring that no necessary steps were left out. The team also evaluated whether, by changing the order of certain steps, a more efficient work flow could be realized. Additionally, suggestions were made regarding ways to improve consistency within the process.

The lean event resulted in multiple recommendations for eliminating unnecessary steps in the process that cause delays. The team determined that requiring peer review for every enforcement document prior to routing was unnecessary for experienced enforcement analysts and added time to the process. Therefore, the team recommended elimination of peer review, except for documents generated by new hires or unusual cases. In addition, the team realized that the review step for permit writers was unnecessary because enforcement analysts already consult with permit writers as necessary during the drafting of enforcement documents. Therefore, the team suggested eliminating the permit writer review step from the process. Furthermore, the team suggested that a meeting with the director for every low penalty enforcement action was not necessary. Instead, the team recommended that the Director would review documentation for all enforcement orders but formal meetings only need be held for enforcement actions with potential penalties over $10,000.

In addition, the team recommended changes to the flow of the process to reduce redundancy in the review process.

3. Creating Flow

The team provided a number of suggestions to improve work flow. Duplicative steps in the enforcement process were identified and the specific role of each reviewer was examined. Staff suggested that each reviewer should limit review to material specific to his/her discipline in order to cut down on review time. Additionally, staff suggested that peer review by enforcement analysts should only be used as a training tool rather than a requirement for each enforcement action. Furthermore, certain review steps were reordered to reduce the number of re-reviews by the same reviewer. In addition, the team established target times for completing certain steps in the process. Other suggestions included creating a check list to ensure that all necessary documentation is included in each routing packet and standardizing documentation.

4. Establishing Pull

Many of the suggestions generated by the enforcement lean event team were approved by the Director. The team began implementing approved process changes in July 2017 with staff training in the new process to be completed by October 1, 2017. The team established a goal of achieving a general goal of an eighty percent reduction in the time to produce a proposed enforcement action by April 30, 2018. For certain media, this reduction is applied to the work time spent by ADEQ staff on the enforcement action and does not include defined notification and response times for the subject of the action. Because the OAQ provides a thirty-day notice to parties referred to enforcement, the OAQ is targeting a forty–fifty percent reduction in total time from assignment to proposal. The team also established milestones for implementation steps to achieve the goal.

Goal

- Achieve an eighty percent reduction in time to review and approve enforcement actions on average across all medias by April 30, 2018

Milestones

- Fully train all current enforcement staff by October 1, 2017, and train new enforcement staff within five months of hire
- Submit draft data collection plan for all enforcement team members to use to Information Technology Services by June 1, 2017

5. Seeking Perfection

Implementation of the enforcement lean event process changes will be evaluated quarterly. The team will meet to identify solutions to challenges that arise during roll-out and implementation of the new lean enforcement process. The team will also evaluate changes in the enforcement action routing and approval time metrics identified in the lean event to determine whether changes to the enforcement process are yielding the anticipated results. As of December 2017, the OAQ enforcement team has realized a twenty-six percent drop in enforcement routing and approval times.[19]

[19] The average case time from assignment to proposal was evaluated for the six month period prior to implementation of the lean enforcement process (January 1, 2017–June 30, 2017) and a six month period beginning with implementation of the lean enforcement process (July 1, 2017-December 31, 2017). The average case time for the period preceding implementation of the lean enforcement process was 140 days; whereas, the average case time for the first six month period of implementation of the lean enforcement process was 103 days.