1-hour SO_2 Nonattainment: Scope of Work for Muscatine, IA

Muscatine County Conservation Board
Environmental Learning Center

October 3, 2013

Overview

- Welcome and Introductions
- SO_2 National Ambient Air Quality Standards
- SO_2 Nonattaiment
- Role of Affected Stakeholders
- Questions/Comments

National Ambient Air Quality Standards (NAAQS)

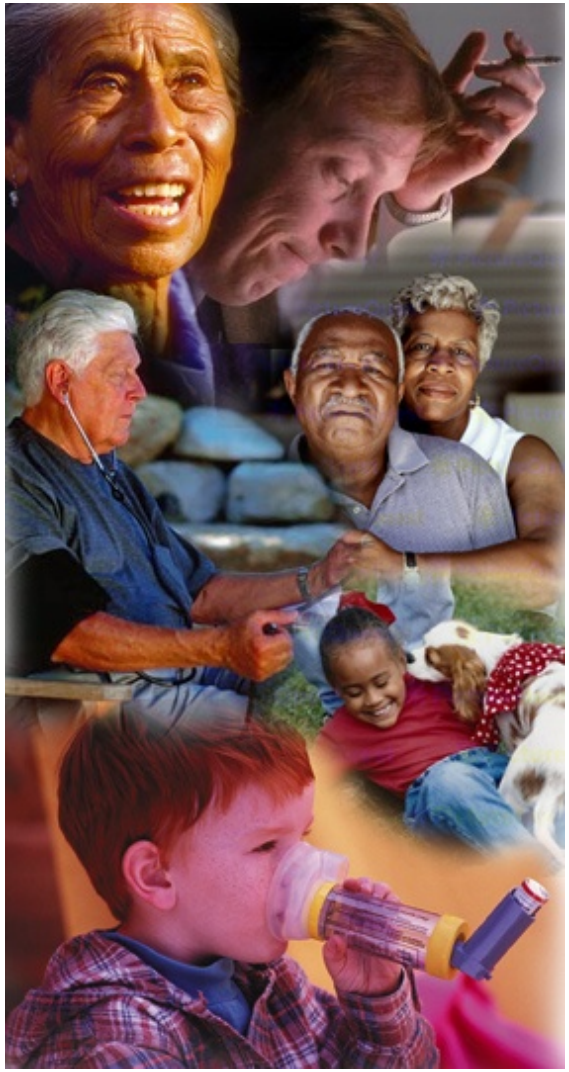
- The NAAQS are federal standards that establish maximum concentrations of air pollutants that are acceptable in the general air we breathe. These standards are set to protect public health and welfare with adequate margin of safety.
  - Primary standards
    - Protect public health
  - Secondary standards
    - Protect welfare & the environment (materials damage, soils, vegetation, ecosystem health, visibility)

- NAAQS are established for Criteria Pollutants
  - Sulfur dioxide (SO_2)
  - Nitrogen dioxide (NO_2)
  - Particulate matter (PM)

    PM broken into two size fractions, $PM_{2.5}$ & PM_{10}
  - Carbon monoxide (CO)
  - Lead (Pb)
  - Ground-level ozone (O_3)

1-hour SO_2 NAAQS

- NAAQS undergo periodic review, required by CAA
  - Every 5 years
  - Review latest pubic health information and scientific data
- New 1-hour SO_2 NAAQS finalized on June 3, 2010
  - SO_2 NAAQS established in 1971
  - Reviewed in 1996: No changes
- Level: 75 parts per billion (ppb)
- Form: 3 year average of the 99th percentile of daily maximum 1-hour average concentrations at each monitor



SO_2 and Human Health

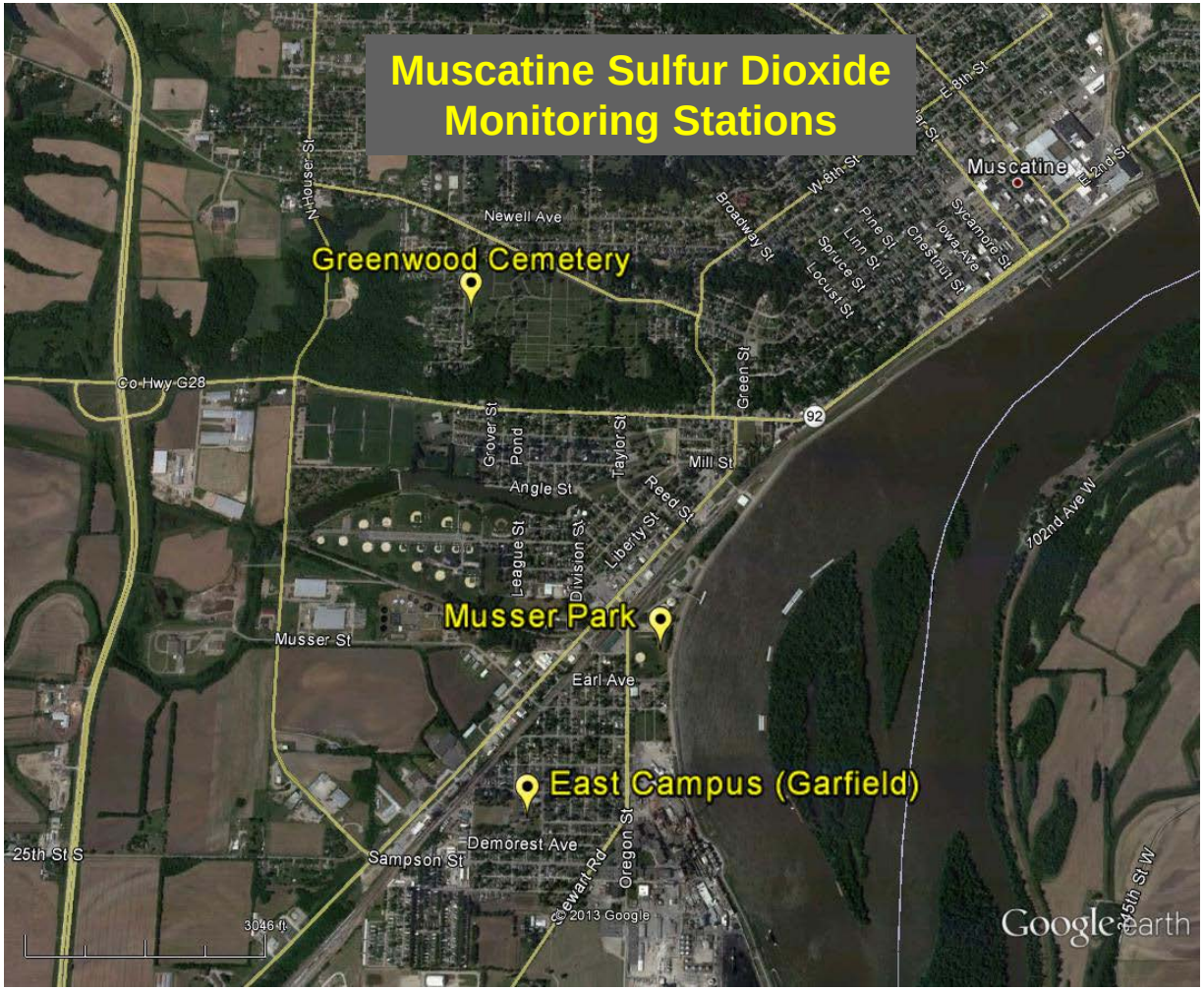
- Short-term exposures linked to adverse respiratory effects
  - Bronchoconstriction
  - Increased asthma symptoms
- Studies show connection between short-term exposures and increased visits to emergency departments and hospital admissions for respiratory illnesses
- At-risk populations include children, the elderly, and asthmatics
- Children at higher risk
  - More likely to be active
  - Breathe more air per pound
  - Bodies still developing

Characteristics of Sulfur Dioxide (SO_2)

- Burning of fuels containing sulfur for power, heat, manufacturing, and transportation
  - When a sulfur-containing fuel such as coal or fuel oil is burned, the sulfur is oxidized and released to atmosphere
- Contributes to secondary $PM_{2.5}$ (sulfates)
- Sulfates contribute to visibility loss or haze
- Leading contributor to acid precipitation

SO2 Air Monitoring Sites

- **New Monitors Operational in 2012:**
  - Greenwood Cemetery:
    - *1/1/12*
  - Muscatine High School East Campus (Garfield):
    - *8/1/12*



How Do I Check SO2 Readings in Muscatine?

Go to Current Air Quality at:
http://www.iowadnr.gov/InsideDNR/RegulatoryAir/MonitoringAmbientAir.aspx

iowa.gov | Agencies | Online Services | Search All of Iowa.gov...

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Monitoring Ambient Air

The DNR Ambient Air Monitoring group organizes and plans air monitoring activities within the State of Iowa. Federal monitoring requirements are set by EPA. DNR contracts with the State Hygienic Laboratory at the University of Iowa (SHL), along with the Polk and Linn County Local Programs, to collect air monitoring data, quality assure the results, and report the data to the public. Group members administer contracts, perform data analysis and assist in monitor siting.

Current Iowa Air Quality
Real Time Data From Continuous Monitors

- National Feeds: EPA
- Local Feeds: SHL, Polk County, Linn County

Ambient Air Quality Exceedances Report
Monitors that have exceeded EPA health levels this year

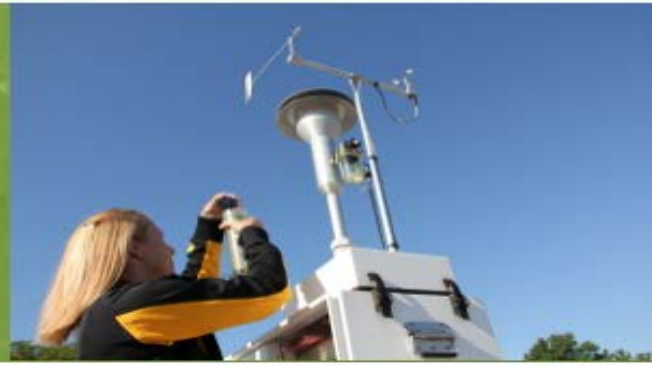
- 2013 Exceedance Report PDF

www.iowadnr.gov/Home.aspx

How Do I Check SO2 Readings in Muscatine (cont.)?

State Hygienic Laboratory
at The University of Iowa

OUTDOOR AIR QUALITY



About the SHL

Environmental

> Outdoor Air Quality
  > Air Quality Data
  > Historical Air Quality Data
  > Iowa Air Monitoring Network

> Limnology
> Private Well Water
> Analytical Services

Newborn and Maternal Screening

Disease Control

Air Quality Data

Current Air Quality Index Map

Real-time Continuous Data

Today's Predicted Air Quality Index

Hourly Air Quality Index Maps

How Do I Check SO2 Readings in Muscatine (cont.)?

OUTDOOR AIR QUALITY

- About the SHL
- Environmental
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- Newborn and Maternal Screening
- Disease Control
- Education / Training
- Lab Certification Programs
- Publications
- News

Real-time Continuous Data

Real-time Continuous Data

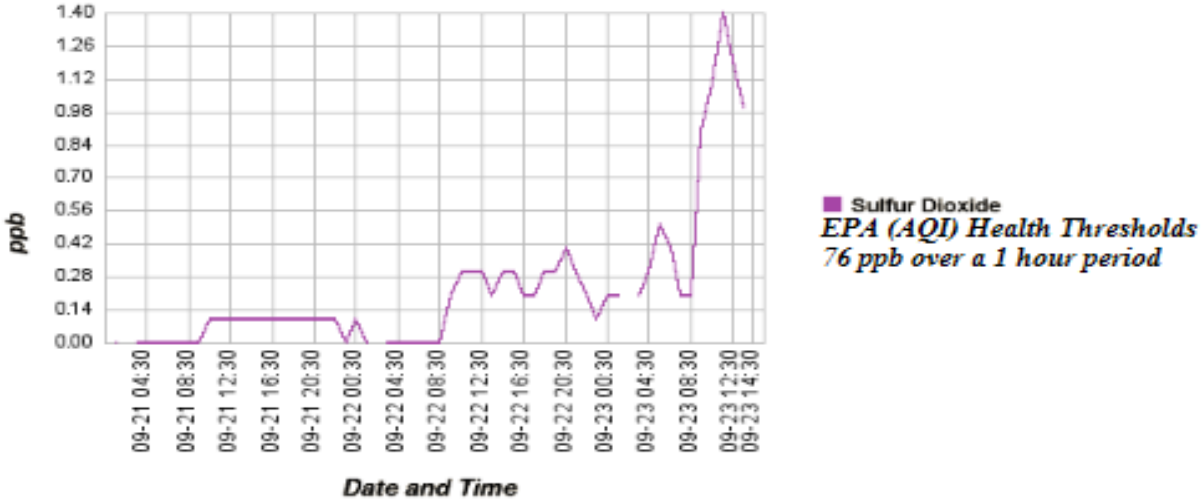
Please select a site and a date. Charts reflecting the realtime data will appear below the selected criteria.

1. Select a site: Davenport, Jefferson School

2. Select a date: 2013-09-23

3. Submit Your Query: Submit Query

All data points are reported in local time.



NAAQS Exceedances/Violations vs. Emergency Episodes

NAAQS Exceedances or Violations prompt planning actions:

- Public notification
- Forecasting persistence of high emissions
- Ongoing violations may prompt requirements for emissions control plans that may:
  1. take 1-3 years to develop, and
  2. take another 3-5 years to implement.

Emergency Episode Levels prompt immediate reductions:

- Public notification
- Forecasting persistence of high emissions
- Determination of level of episode
- Immediate implementation of appropriate abatement & curtailment strategies

AQI Comparison to Emergency Episodes

AQI	SO2 Value (ppb)*	Level of Health Concern
0-50	0-35	Good
51-100	36-75	Moderate
101-150	76-185	Unhealthy for sensitive groups
151-200	186-304	Unhealthy
201-300	305-604	Very unhealthy
301-500	605-1004	Hazardous

*SO2 values up to 304 ppb are 1-hr averages; remainder are 24-hr averages.

SO2 Value (ppb)*	Emergency Episode Level
300-599	Alert
600-799	Warning
800+	Emergency

*24-hr averages; must be expected to persist for 12 or more hrs.

Exceedance Days* for Muscatine SO2 Monitors 2011-2013

Year	Musser Park	Muscatine HS East Campus	Greenwood Cemetery
2011	37	-	-
2012	25	4	7
2013**	21	20	4

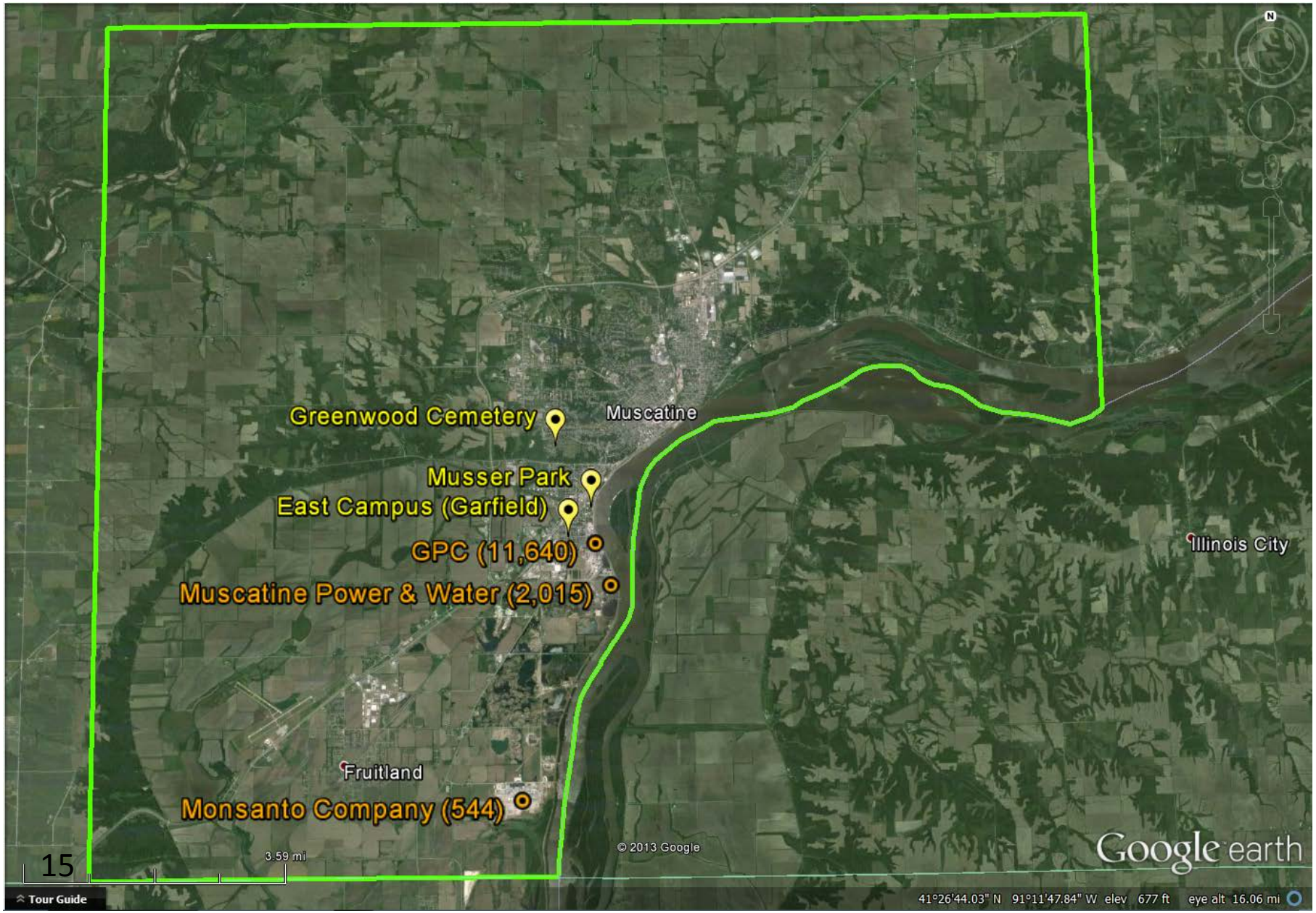
**An Exceedance Day is a day where the daily maximum 1-hour SO_2 value is at least 75.5 ppb*

*** Preliminary data reported through August 26, 2013.*

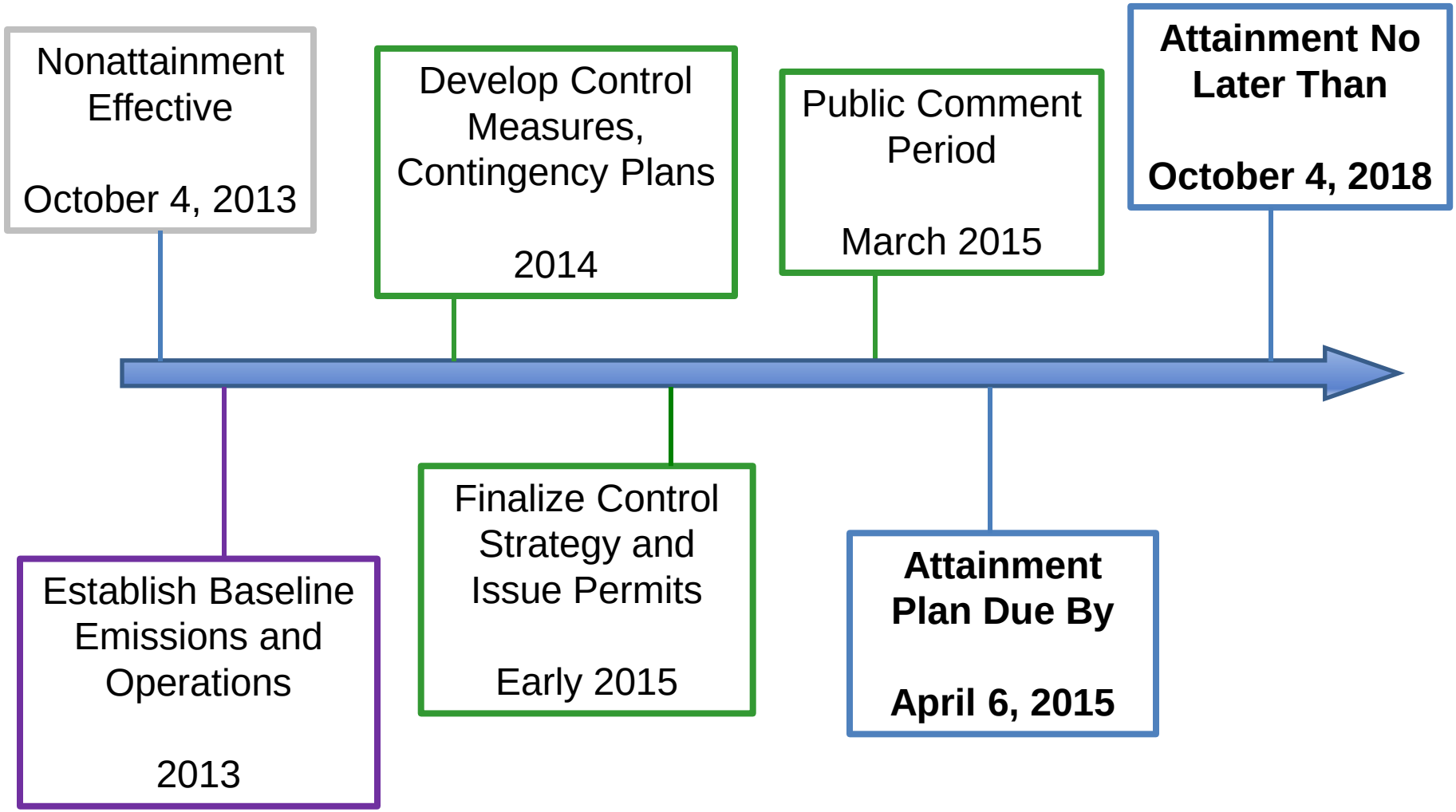
NAAQS Nonattainment Ramifications

- Ongoing violations of the NAAQS = Poor air quality
  - Increased respiratory or other health problems,
  - Increased emergency room visits and healthcare costs,
  - Lost school and work time.
- Nonattainment = Lost economic growth opportunities
  - Limitations on economic growth if the project will increase air pollution,
  - Stigma impacting new prospects.
- Attainment Plan = Plan for getting back in attainment
  - State implementation plan (SIP) including federally enforceable emissions reductions,
  - More restrictive nonattainment permitting,
  - Timelines for achieving attainment, and possible penalties.
- Failure to submit SIP may trigger loss of federal highway funds.

Nonattaiment Area (green line), Monitors (yellow), & Major Sources (orange) of SO_2 (2012 emissions in tons per year)



Progress Towards Achieving Attainment



Nonattainment SIP Elements

- State must submit plan to EPA detailing how attainment will be achieved, could include
  - Case-by-case emissions reductions strategies
  - New rules, such as stricter emissions standards

- Show that emissions reductions strategies will achieve attainment (Attainment Demonstration)

- If attainment deadline not meet, predefined control measures must go into effect without additional regulatory actions (Contingency Measures)

- Transportation Conformity does not apply to SO_2 nonattainment areas

Nonattainment NSR

- More stringent major source preconstruction permitting requirements (replaces Prevention of Significant Deterioration (PSD))
- Install most stringent emissions controls achievable
- Increases in emissions must be offset with emissions reductions elsewhere in the nonattainment area
- Source must certify compliance of all their in-state facilities
- Source must complete alternative siting analysis

Redesignation Process

- To redesignate from nonattainment to attainment:
  - Supporting (clean) data & EPA Administrator approval
    - Air quality meets the SO_2 NAAQS
  - Full approval of the nonattainment SIP
  - Air quality improvement due to permanent and enforceable emissions reductions
  - State has meet certain CAA 110 implementation requirements
  - A fully approved maintenance plan
    - 10 year time horizon (with later revisions - additional 10 years)

Role of Affected Sources

- Review, update SO_2 emissions and source characteristics
  - Perform source testing as needed
- Participate in modeling analyses
  - Provide comment on modeling protocol
  - Baseline modeling
  - Contribution evaluation
- Control strategy development
- Assist in contingency plan development
- Prepare, submit permit applications
- Participate in project update meetings as necessary

Comments, Questions, Discussion

- Nonattainment website
  http://www.iowadnr.gov/InsideDNR/RegulatoryAir/IowaNonattainmentAreas.aspx

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