



# ***Update on the Federal Air Quality Standards and Texas State Implementation Plan***

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2012 Environmental Trade Fair



# Today's Topics

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- National Ambient Air Quality Standards (NAAQS)
- Status of Texas Air Quality Planning Activities



# National Ambient Air Quality Standards



# National Ambient Air Quality Standards (NAAQS)

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- Required by the Federal Clean Air Act (FCAA)
- Set by the Environmental Protection Agency (EPA)
- Health-based standards
- Set for six criteria air pollutants:
  - Ground-Level Ozone
  - Particulate Matter (PM)
  - Nitrogen Dioxide (NO<sub>2</sub>)
  - Sulfur Dioxide (SO<sub>2</sub>)
  - Carbon Monoxide (CO)
  - Lead



# National Ambient Air Quality Standards

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- The EPA is required to review these standards every five years. For more information on the review process go to the [EPA's NAAQS review Web page](http://epa.gov/ttn/naaqs/review.html).  
(<http://epa.gov/ttn/naaqs/review.html>)
- States with counties failing to meet the NAAQS (nonattainment) are required to develop and submit State Implementation Plan (SIP) revisions to the EPA.



# Current NAAQS

Pollutant	Level	Averaging Time
CO	9 ppm	8-Hour
	35 ppm	1-Hour
Lead	0.15 µg/m <sup>3</sup>	Rolling 3-Month Average
NO <sub>2</sub>	0.053 ppm	Annual (Arithmetic Mean)
	0.100 ppm	1-Hour
PM <sub>10</sub>	150 µg/m <sup>3</sup>	24-Hour
PM <sub>2.5</sub>	15.0 µg/m <sup>3</sup>	Annual (Arithmetic Mean)
	35 µg/m <sup>3</sup>	24-Hour
Ozone 2008	0.075 ppm	8-Hour
Ozone 1997	0.08 ppm*	8-Hour
SO <sub>2</sub>	75 ppb	1-Hour

Note: Secondary NAAQS are the same as the primary NAAQS for all pollutants EXCEPT SO<sub>2</sub>, which has a secondary NAAQS for 0.5 ppm over three hours. More information can be found at [EPA's NAAQS webpage \(http://epa.gov/air/criteria.html\)](http://epa.gov/air/criteria.html).

\* In 1997, EPA revoked the one-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding").



# NAAQS Review Schedule

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Criteria Pollutant	Proposed Rule	Final Rule
Nitrogen Oxides (NO <sub>x</sub> ) and Sulfur Oxides (SO <sub>x</sub> ) Secondary Standard*	July 12, 2011	March 20, 2012
PM	June 2012	June 2013
Ozone	October 2013	July 2014
Lead	January 2014	November 2014
NO <sub>2</sub>	June 2015	March 2016
SO <sub>2</sub>	December 2015	September 2016
CO	May 2016	February 2017

\*Dates are from previous revisions; the next revision schedule is yet to be determined.



# Calculating Eight-Hour Ozone Design Values

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- Find the fourth highest eight-hour daily peak at each monitor.
- Average those fourth highest values from the most recent three years. Remember to do this for each monitor. This is the design value for each monitor.
- The design value for a county or Metropolitan Statistical Area (MSA) is the maximum design value from all of the monitors located within that county or MSA.
- A design value is valid if each year in the calculation has at least 75% valid data or if a design value with incomplete data is above the NAAQS.



# Calculating 2008 Eight-Hour Ozone Design Values: An Example

1. Monitor A has three years of complete data.

	2009	2010	2011
Maximum Peak Eight-Hour Ozone	124	112	104
2 <sup>nd</sup> Highest Peak Eight-Hour Ozone	105	100	101
3 <sup>rd</sup> Highest Peak Eight Hour Ozone	98	92	96
4 <sup>th</sup> Highest Peak Eight-Hour Ozone	95	88	86

Note: All units in parts per billion (ppb)

2. Take the 4th highest peak-hour ozone from each year and find the average.

$$\frac{95 + 88 + 86}{3} = 89.667$$

3. Now truncate the average so there are no decimal places and you have the design value.

$$89.667 = 89$$



# Ozone Design Value Rounding Conventions

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- Note that the 1997 eight-hour ozone standard is reported to two decimal places.
  - 0.084 ppm → 0.08 ppm → **ATTAINMENT**
  - 0.085 ppm → 0.09 ppm → **NONATTAINMENT**
  - Note that the standard is in parts per million (ppm); if using parts per billion (ppb), **84 ppb would be attainment** and **85 ppb would be nonattainment**.
- The 2008 ozone standard is reported to three decimal places so rounding is no longer necessary. Anything past three decimal places is still truncated.



# Ozone Design Value Rounding Conventions

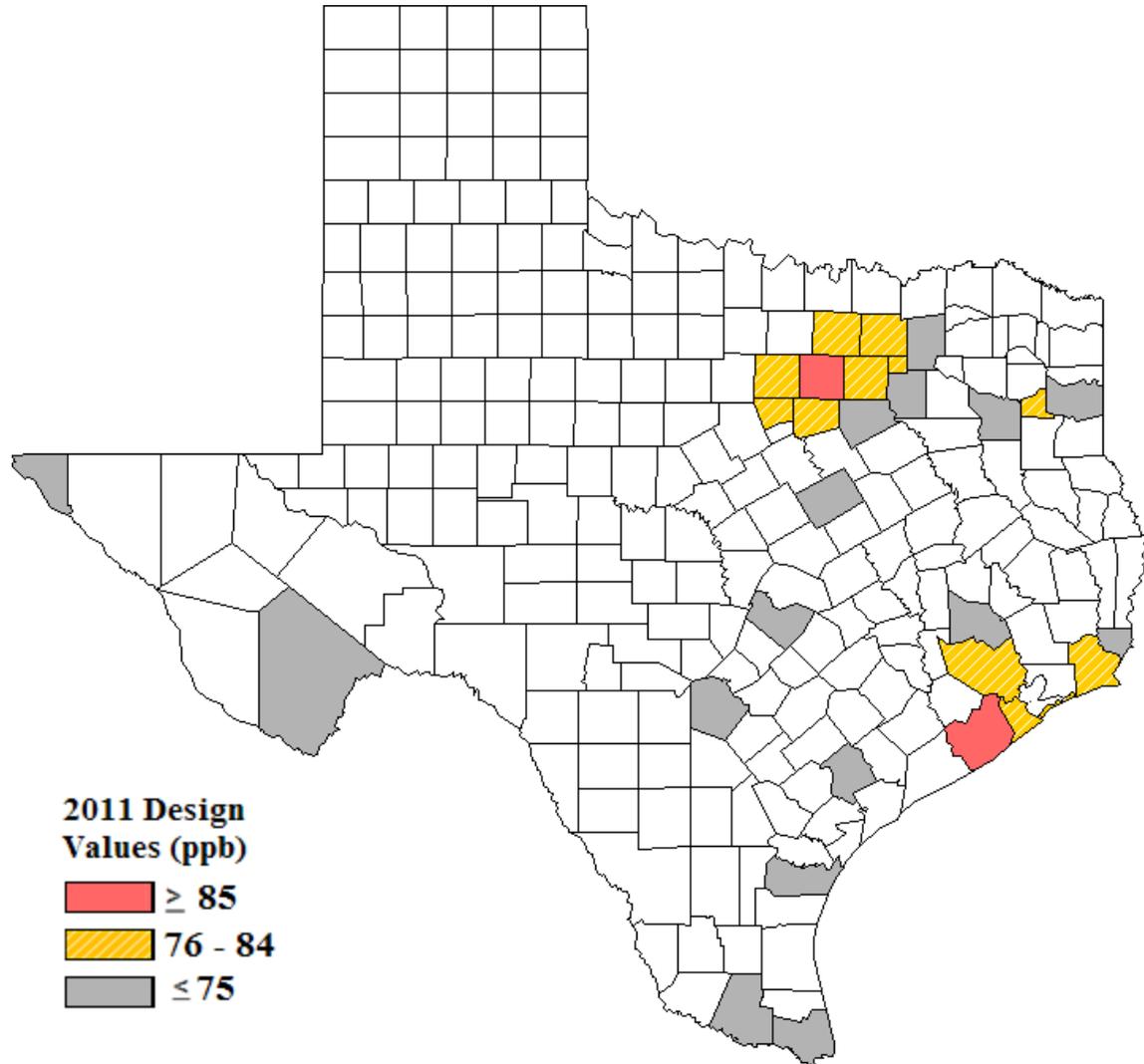
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- Example – For the 2008 ozone standard of 0.075 ppm:
  - 0.075 ppm → **ATTAINMENT**
  - 0.076 ppm → **NONATTAINMENT**
  - If using ppb, **75 ppb would be attainment**, and **76 ppb would be nonattainment**.



# 2011\* Ozone Design Values

Region	County	2011* 8hr Ozone DV (ppb)
DFW	Tarrant	90
HGB	Brazoria	89
HGB	Harris	84
DFW	Denton	83
DFW	Dallas	82
DFW	Collin	81
BPA	Jefferson	79
DFW	Johnson	79
HGB	Galveston	78
DFW	Parker	78
DFW	Rockwall	77
NETX	Gregg	77
DFW	Hood	76
SAN	Bexar	75
BPA	Orange	75
NETX	Smith	75
ARR	Travis	75
DFW	Ellis	74
HGB	Montgomery	74
CC	Nueces	72
WACO	McLennan	72
NETX	Harrison	72
ELP	El Paso	71
VIC	Victoria	70
BIG BEND	Brewster	69**
DFW	Hunt	69
DFW	Kaufman	68
LRGV	Cameron	64
MEM	Hidalgo	62



\* 2011 data is as of March 20, 2012; it is not certified and is subject to change.

\*\*Brewster County monitor is maintained by the US National Park Service; the design value is reported in EPA AQS.



# 2011 \* SO<sub>2</sub> Design Value

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- Calculating SO<sub>2</sub> Design Value
  - Three-year average of the 99<sup>th</sup> percentile one-hour SO<sub>2</sub> concentration
  - Requires at least 75% valid data; however, if incomplete data give a design value higher than the NAAQS, that design value is used
- SO<sub>2</sub> Design Values in Texas - all regulatory monitors currently meet the one-hour SO<sub>2</sub> NAAQS

\*2011 design values are as of March 20, 2012; they are not certified and are subject to change.



# 2011 \* PM<sub>2.5</sub> Design Values

- Calculating PM<sub>2.5</sub> Design Values
  - Annual: Three-year average of the weighted annual mean PM<sub>2.5</sub>
    - The weighted annual mean is the mean of the four quarters.
    - Each quarter requires at least 75% valid data.
  - 24-Hour: Three-year average of the 98<sup>th</sup> percentile 24-hour PM<sub>2.5</sub> concentration with at least 75% valid data per quarter
- PM<sub>2.5</sub> Design Values in Texas
  - Annual: All areas are below the annual PM<sub>2.5</sub> NAAQS of 15.0 micrograms per cubic meter (µg/m<sup>3</sup>).
  - 24-Hour: All areas are below the 24-hour PM<sub>2.5</sub> NAAQS of 35 µg/m<sup>3</sup>.

\*2011 design values are as of March 20, 2012; they are not certified and are subject to change. Design Values may include exceptional event data.



# 2011 \* PM<sub>10</sub> Design Values

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- 24-Hour: An exceedance-based standard that cannot be exceeded more than once per year on average over a three-year period
- PM<sub>10</sub> monitors do not sample every day
- Number of expected exceedances used
- PM<sub>10</sub> Design Values in Texas
  - 24-Hour:
    - El Paso County 2011\* design value is 6.1 expected exceedances.
    - All other counties in Texas meet the PM<sub>10</sub> 24-Hour NAAQS.

\*2011 design values as of March 20, 2012; they are not certified and are subject to change. Design Values may include exceptional event data.



# 2011 \* NO<sub>2</sub> Design Values

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- Calculating NO<sub>2</sub> Design Values
  - Annual: Annual average of the one-hour NO<sub>2</sub> concentrations
  - One-Hour: Three-year average of the 98<sup>th</sup> percentile one-hour NO<sub>2</sub> concentration
  
- NO<sub>2</sub> Design Values in Texas
  - Annual: All areas are below annual NO<sub>2</sub> NAAQS of 0.053 ppm.
  - One-Hour: All areas are below one-hour NO<sub>2</sub> NAAQS of 0.100 ppm.

\*2011 design values are as of March 20, 2012; they are not certified and are subject to change.



# 2011\* Lead Design Values

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- Calculating Lead Design Values
  - 2008 lead NAAQS (three-month average): Maximum rolling three-month average over a three-year period
- Lead Design Values in Texas
  - 1978 NAAQS: All areas are below Lead NAAQS of 1.5  $\mu\text{g}/\text{m}^3$ .
  - 2008 NAAQS:
    - Collin County 2011\* design value equals 0.71  $\mu\text{g}/\text{m}^3$ .
    - All other areas are below the Lead NAAQS of 0.15  $\mu\text{g}/\text{m}^3$ .

\*2011 design values are as of March 20, 2012; they are not certified and are subject to change.



# 2011 \* CO Design Values

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- Calculating CO Design Values
  - One-Hour: Highest annual second maximum one-hour CO concentration
  - Eight-Hour: Highest annual second maximum non-overlapping eight-hour CO concentration
- On January 28, 2011, the EPA proposed to retain the existing CO NAAQS
- Carbon Monoxide Design Values in Texas
  - One-Hour: All areas are below the one-hour CO NAAQS of 35 ppm.
  - Eight-Hour: All areas are below the eight-hour CO NAAQS of 9 ppm.

\*2011 design values are as of March 20, 2012; they are not certified and are subject to change.



# Texas State Implementation Plan



# When is a SIP Revision Needed?

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- EPA revises or adds a NAAQS
- EPA or the state revises or adds rules
- An area attains the NAAQS
- An area does not attain the standard during the specified timeframe
- An area is reclassified



# Consequences of an Inadequate SIP

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## Federal Implementation Plan

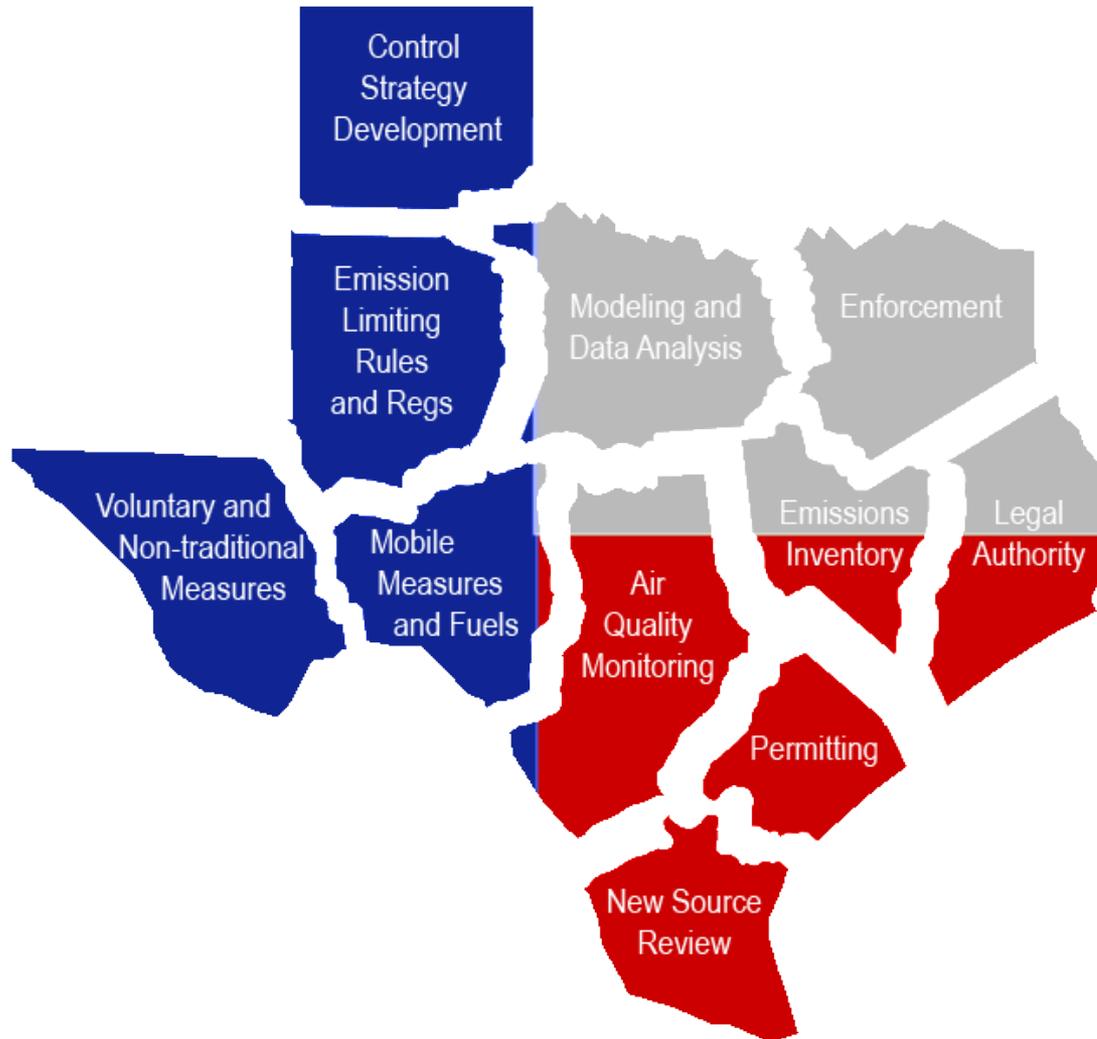
 Federal highway funding cut-off



Federal air permits are more difficult to obtain



# Components of a SIP Revision





# Components of a SIP Revision

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- **Monitoring Data**
  - Used to determine whether an area meets the NAAQS
  - Used to analyze trends
- **Emissions Inventory**
  - Used to quantify all sources of emissions
  - Used to determine potential control strategies
- **Photochemical Modeling**
  - Used to estimate the reductions needed to attain the NAAQS
  - Used to validate effectiveness of control strategies
- **Control Measures**
  - Implemented through rule revision, memorandums of agreement, ordinances, or voluntary actions





# Emissions Inventory Source Examples

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- **Point**
  - Refineries, electric generating facilities
- **Area**
  - Temporary generators, painting, gas stations, etc.
- **On-road mobile**
  - Cars, trucks
- **Non-road mobile**
  - Construction equipment, trains, planes
- **Biogenic**
  - Based on estimates of vegetation type/quantity

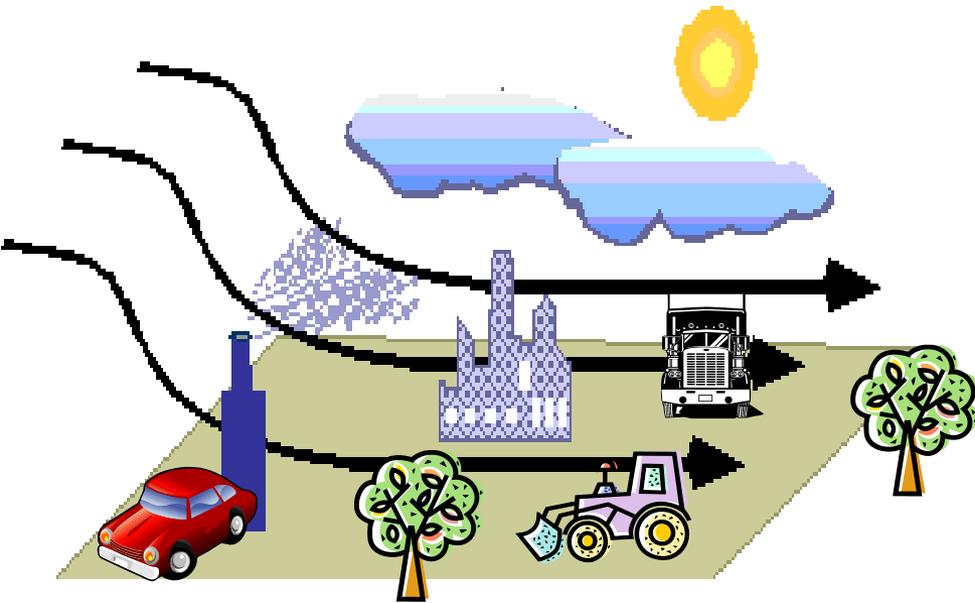


# Photochemical Modeling

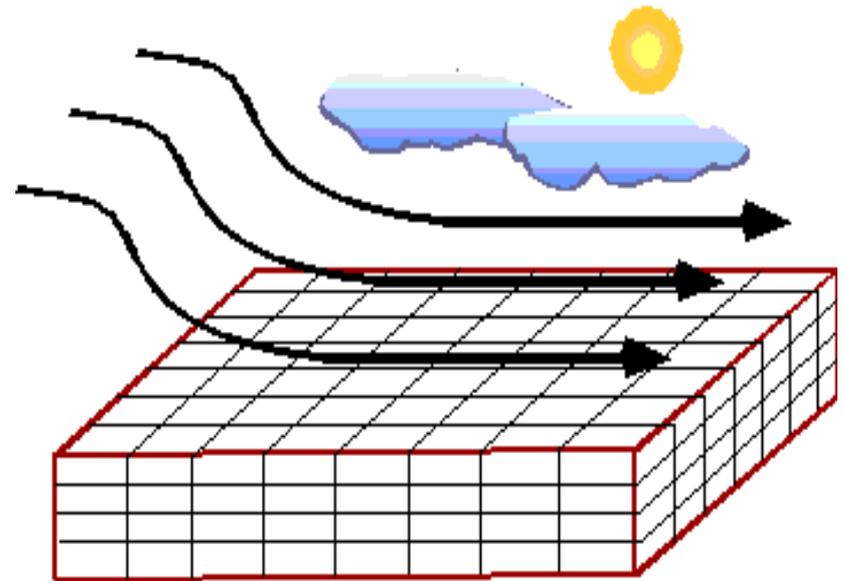
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- Computer simulation of atmospheric chemistry and meteorological conditions.
- Prediction tool to help determine the most effective way to reduce ozone pollution.

# Photochemical Modeling



Real World Situation



Computer Grid Simulation



# Control Measures

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- Technical work helps determine what types of measures
- Development includes stakeholder process
- Commission adopts rules
- Local governments adopt ordinances



# SIP Revision Process

*Typically a 3 - 4 year process*

1 Pollution-exceeding episode is selected

2 Base case and future emissions inventories are prepared

3 Photochemical grid modeling is performed to determine the amount of emission reductions required

4 Control measures are evaluated to determine how to accomplish the needed reductions

5 Draft SIP revision and rules are prepared

6 Commission approves the proposed SIP revision and rules package





# SIP Revision Process

*Typically a 3 - 4 year process*

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Formal public review and comment period with a public hearing

8

Response to comments are prepared and options are reviewed based on comments

9

Proposed control measures are re-quantified and re-modeled

10

Final revisions are made to SIP and rulemaking packages

11

Commission adopts final rules and SIP revision packages

12

The state submits the complete rule and SIP revision packages to the EPA



# Status of Texas Air Quality Planning Efforts





# Status of Texas Air Quality Planning Efforts

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- Criteria Pollutants
  - Ozone
  - Lead
  - SO<sub>2</sub>
  - NO<sub>2</sub>
  - PM
  - CO
  
- Other Statewide Air Issues
  - Cross-State Air Pollution Rule (aka Transport)
  - Regional Haze

# Texas Air Quality Planning Areas



## Legend

- |   |  |   |
|---|--|---|
|  Dallas-Fort Worth          |  San Antonio    |  Victoria                |
|  Houston-Galveston-Brazoria |  Austin         |  Big Bend                |
|  Beaumont-Port Arthur       |  El Paso        |  Lower Rio Grande Valley |
|  Northeast Texas            |  Corpus Christi |  Waco                    |

This map was generated by the Chief Engineer's Office Air Quality Division of the Texas Department of Environmental Quality and is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries. For information concerning this map, contact the Air Quality Division at (512) 226-1459.

# Ozone





# 1997 Eight-Hour Ozone Standard

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- Standard is 0.08 ppm
  - Design value must be greater than or equal to 85 ppb
- Houston-Galveston-Brazoria (HGB)
  - Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties
- Dallas-Fort Worth (DFW)
  - Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant Counties



# 2008 Eight-Hour Ozone Standard

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- Standard is 0.075 ppm
  - Design value must be greater than 75 ppb
- HGB Area
  - TCEQ recommends same eight counties
  - EPA proposes adding Matagorda County
- DFW Area
  - TCEQ recommends same nine counties
  - EPA proposes adding Hood and Wise Counties



# 2008 Eight-Hour Ozone Standard

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- EPA to finalize designations by May 31, 2012
- First portion of implementation rules published 2/14/12
- Final guidance released - "Ozone Advance"



# HGB Area

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- Severe ozone nonattainment area for the 1997 standard
- Attainment deadline no later than June 2019
- 3/10/10 – Attainment Demonstration and Reasonable Further Progress revisions adopted



# HGB Area

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- 12/7/11 - Reasonably Available Control Technology analysis to include Control Techniques Guidelines adopted
- October 2012 – proposed SIP revision planned to update Motor Vehicle Emission Budgets
  - Applies to attainment demonstration and RFP budgets
  - Necessary for transportation conformity purposes



# DFW Area

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- Reclassified to serious nonattainment effective January 19, 2011
- Attainment deadline no later than June 2013
- Attainment Demonstration and RFP SIP revisions adopted December 2011



# Beaumont-Port Arthur (BPA) Area

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- Attainment (maintenance) for 1997 standard
- Re-designation request and maintenance plan approved November 2010
- June 2012 – proposed SIP revision planned to update Motor Vehicle Emission Budgets
  - Applies to 2021 maintenance budgets
- Proposed as attainment/unclassifiable under the 2008 standard



# El Paso Area

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- Attainment (maintenance) for 1997 standard
- Maintenance SIP approved in 2009
- Proposed as attainment/unclassifiable under 2008 standard



# Victoria Area

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- Attainment for the 1997 standard
- Proposed as attainment/unclassifiable under 2008 standard
- Maintenance SIP revision was submitted to EPA March 2007
- Contingency plan SIP revision was adopted in July 2010



# Additional Areas

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- Austin, Corpus Christi, Northeast Texas, and San Antonio all proposed as attainment-unclassifiable under 2008 standard
- Previously developed voluntary emission reduction programs (ozone flex, early action compacts) to maintain attainment status
- Ozone Advance could be pursued

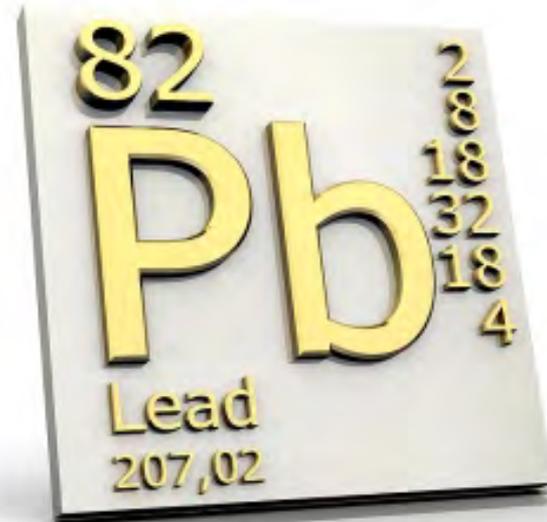


# Additional Areas

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- Lower Rio Grande Valley
- Brewster County (Big Bend)
- McLennan County (Waco)
  
- All proposed as attainment/unclassifiable under 2008 standard

# Lead



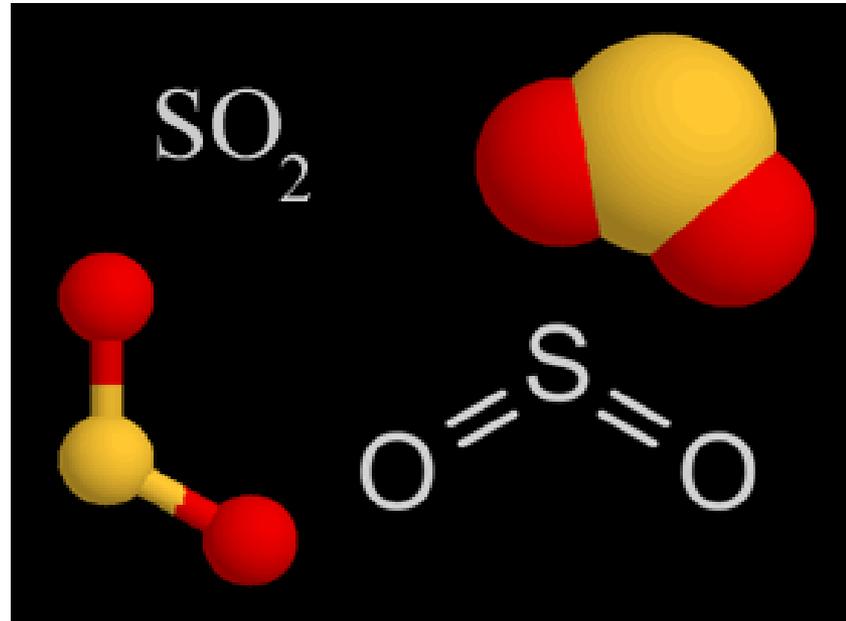


# Lead

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- Portion of Collin County nonattainment for the 2008 lead NAAQS
- Attainment demonstration due by June 30, 2012
- SIP revision proposed by TCEQ in June 2011; scheduled for adoption May 30, 2012
- Interstate transport SIP revision for lead adopted by TCEQ August 2011

# Sulfur Dioxide





# 2010 SO<sub>2</sub> NAAQS

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- Final designations expected summer 2012
  - Jefferson Co. recommended for nonattainment based on 2008-2010 data
  - 2009-2011 data shows attainment for Jefferson Co.
  - New data and revised recommendation sent to EPA
  - Data for other areas to be submitted when certified
- Infrastructure and transport SIP revisions due June 2013
- Attainment demonstration due February 2014



# 2010 SO<sub>2</sub> NAAQS

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- Initially monitoring/modeling “hybrid” approach introduced to assess compliance or demonstrate attainment
- EPA recent letter indicates:
  - Stakeholder groups to be established to determine implementation requirements
  - Areas with monitored violations to be nonattainment
  - All other areas to be unclassifiable



# SO<sub>2</sub> Litigation and Current Status

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- Litigation ongoing (D.C. Circuit Court of Appeals)
  - Court decision possible in mid/late 2012
- The 2010 SO<sub>2</sub> NAAQS remains effective (pending litigation outcome)
- Proposed guidance published October 2011
- Additional SO<sub>2</sub> monitors required by Jan 2013



# Particulate Matter



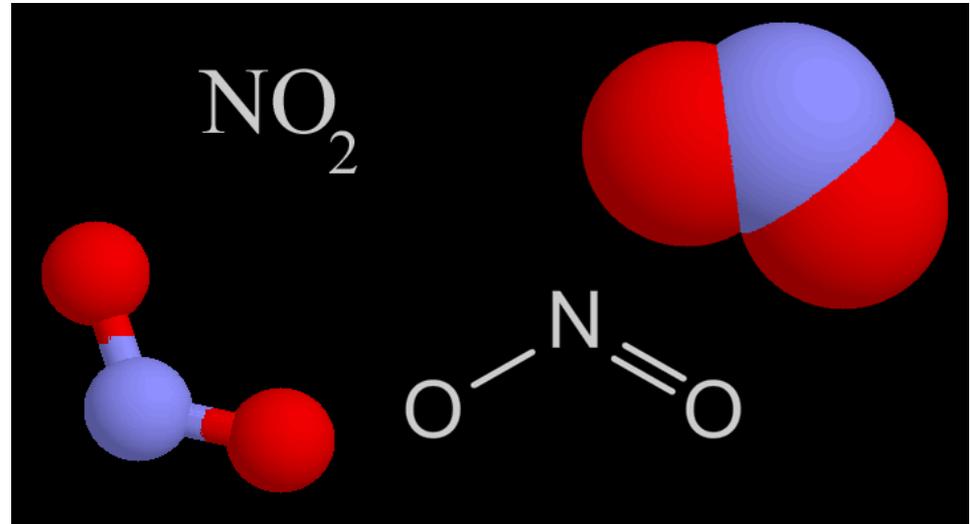


# PM<sub>10</sub> and PM<sub>2.5</sub>

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- City of El Paso is moderate nonattainment area for 24-hour PM<sub>10</sub> standard
- SIP revision adopted January 25, 2012
  - Incorporates revised Memorandum of Agreement and Chapter 111 rule change for PM<sub>10</sub>
- All areas in Texas classified as attainment/unclassifiable for PM<sub>2.5</sub>

# Nitrogen Dioxide





# 2010 NO<sub>2</sub> NAAQS

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- Final rule published February 2010
- New monitoring network requirements
- Two near-road monitors required in DFW and HGB areas (1 in each) by January 1, 2013
- Two near-road monitors required in Austin and San Antonio areas (1 in each) by January 1, 2014

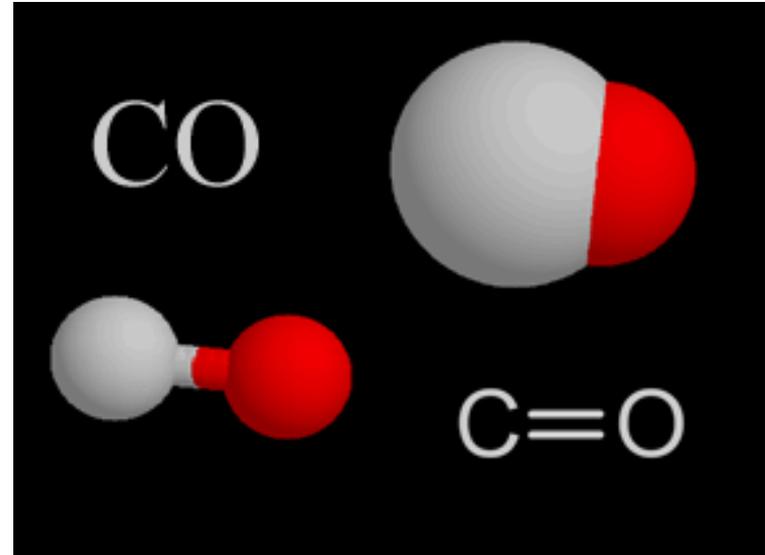


# 2010 NO<sub>2</sub> NAAQS

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- Initial designations published February 2012
- All areas of the U. S. unclassifiable/attainment
- EPA to re-designate areas once three years of data collected from new monitors (likely 2016-2017 time frame)
- Infrastructure and Transport SIP proposal anticipated for June 2012; adoption in November 2012

# Carbon Monoxide





# CO NAAQS

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- Final rule to retain the CO NAAQS published August 15, 2011
- Requires one CO monitor to be collocated with one required near-road NO<sub>2</sub> monitor in Core Based Statistical Areas with populations of 1 million or more persons\*
- All areas in Texas attainment for CO



# Cross State Air Pollution Rule (CSAPR)



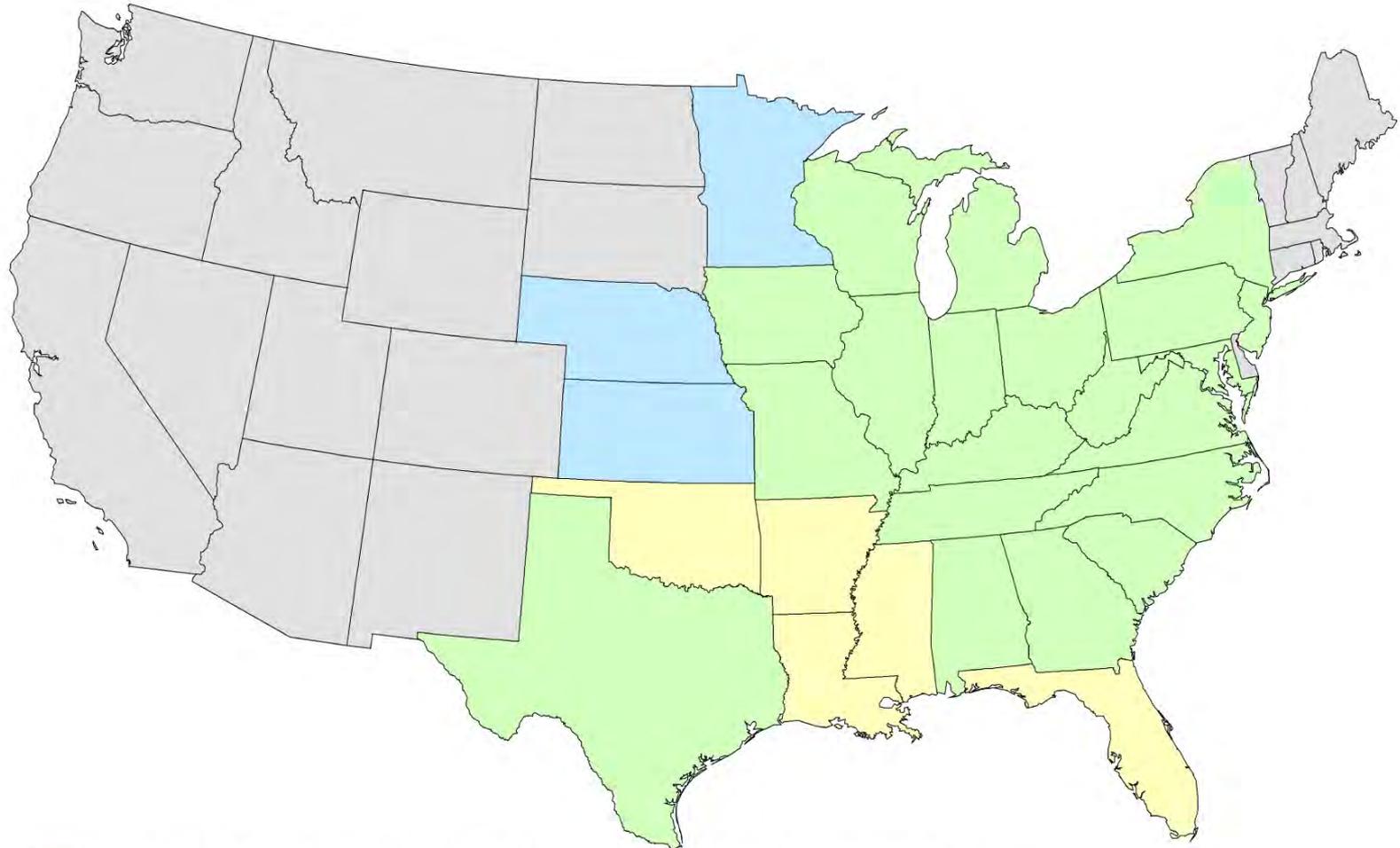
# CSAPR

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- Replaces the Clean Air Interstate Rule (CAIR)
- Addresses 1997 ozone and PM<sub>2.5</sub> and 2006 PM<sub>2.5</sub> NAAQS
- Requires 28 states to reduce power plant emissions that cross state lines
- Relies on cap and trade programs, with state-level budget caps (and unit-specific allowances)



# CSAPR States



-  States controlled for both fine particles (annual SO<sub>2</sub> and NO<sub>x</sub>) and ozone (ozone season NO<sub>x</sub>) (20 States)
-  States controlled for fine particles only (annual SO<sub>2</sub> and NO<sub>x</sub>) (3 States)
-  States controlled for ozone only (ozone season NO<sub>x</sub>) (5 States)
-  States not covered by the Cross-State Air Pollution Rule



# EPA's Cross-State Air Pollution Rule

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- Based on July 2011 rule:
  - Compliance date for PM<sub>2.5</sub> program 1/1/12
  - Compliance date for ozone program 5/1/12
  - Texas included in both PM<sub>2.5</sub> and ozone programs



# CSAPR Litigation

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- December 2011 – U.S. Court of Appeals for the D.C. Circuit
  - Stayed the rule pending judicial review
  - Ordered CAIR to remain in place
- Oral arguments April 13, 2012
- EPA has continued with revisions to CSAPR regardless of stay ruling



# CSAPR Revisions

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- February 2012 CSAPR rulemakings
- Final rule:
  - Revised state budgets and individual unit allocations for some states; and
- Direct final rule/corresponding proposal:
  - Made further revisions to state budgets and individual unit allocations for some states
  - Adverse comments received
  - Direct final to be withdrawn



# Regional Haze



# Regional Haze

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- Rule requires states to improve visibility in 156 national parks and wilderness areas
  - In Texas, this includes Big Bend National Park and Guadalupe Mountains National Park
- TCEQ's Regional Haze SIP Revision submitted to EPA in March 2009
- EPA proposed limited disapproval for Texas (and other states) December 2011 due to reliance on CAIR



# Regional Haze

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- Unclear how CSAPR will impact Regional Haze
- Next Regional Haze SIP Revision is due to EPA in 2014



# Contact Information

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- To join the SIP/Air Quality update e-mail list go to: [www.tceq.texas.gov/airquality/sip/sipcontact.html](http://www.tceq.texas.gov/airquality/sip/sipcontact.html)



**Questions?**