

Clean Air & Climate Change

Environmental Law Institute Summer School
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Environmental / U.S.



Introduction to Air Pollution—Criteria Pollutants

Particulate matter (PM/PM₁₀/PM_{2.5})



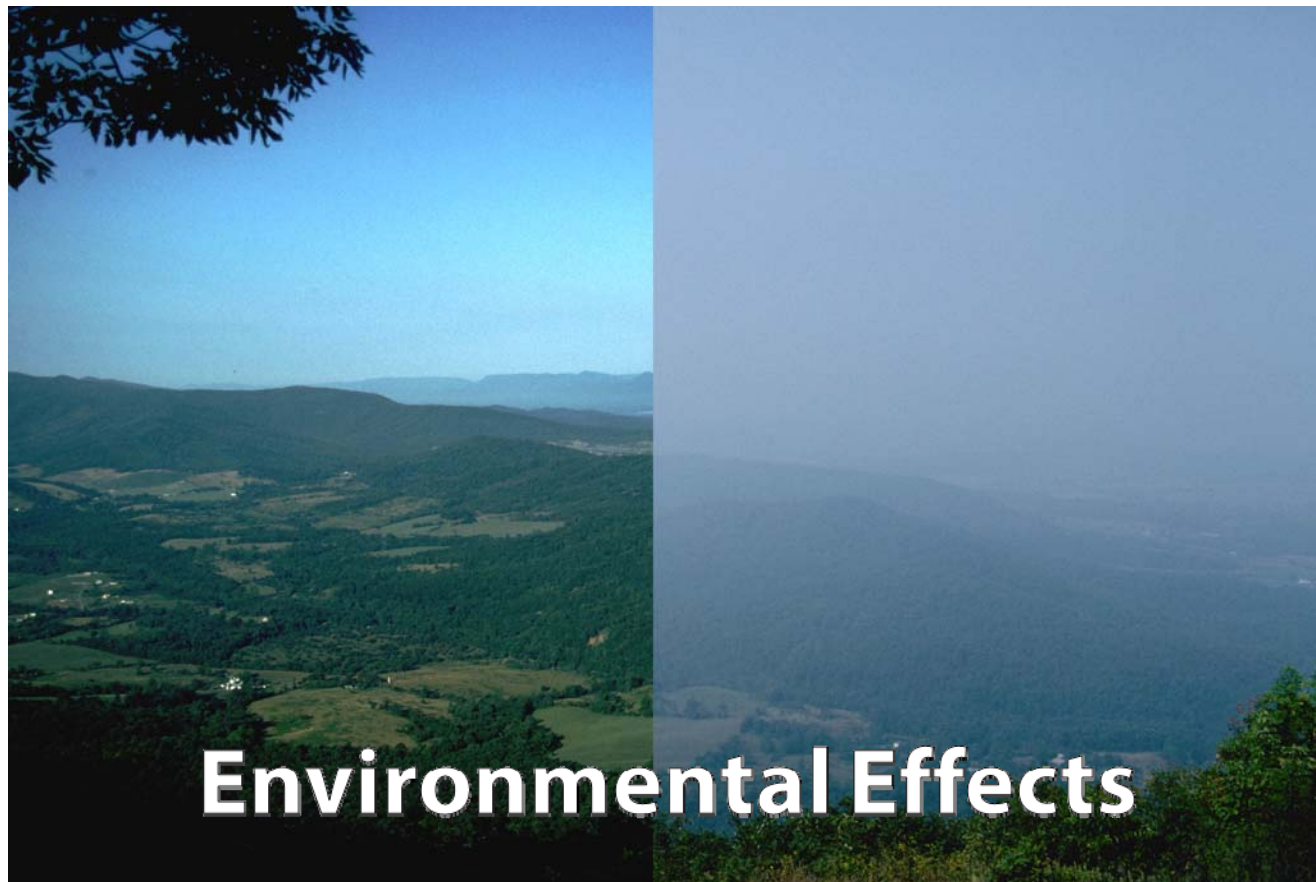
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Health Effects

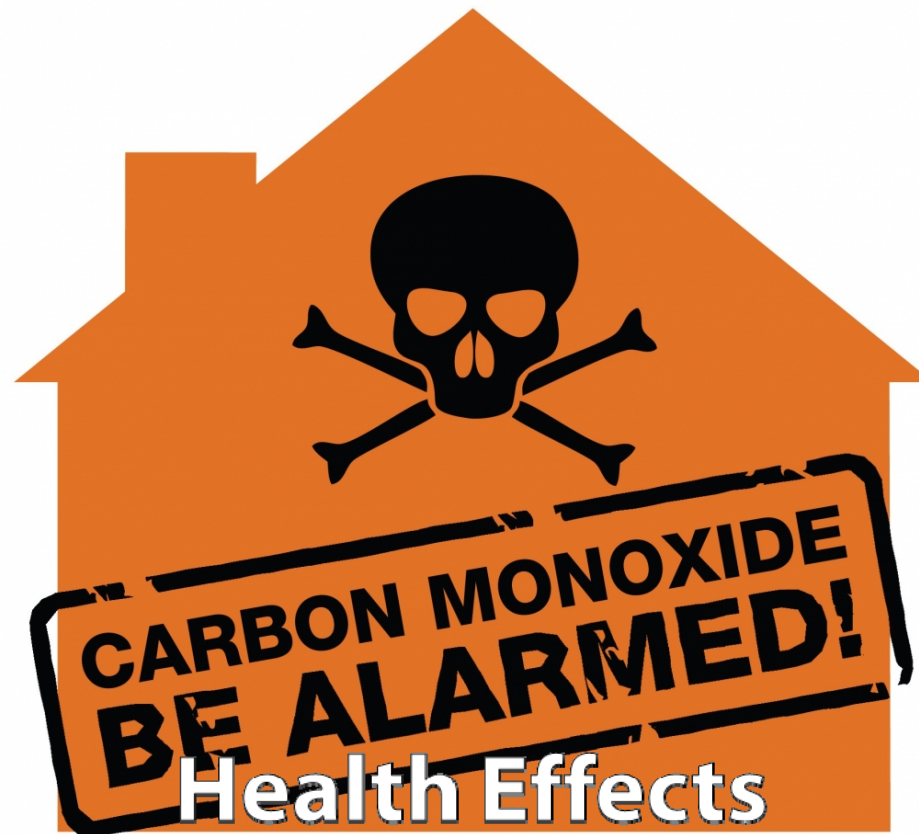
Introduction to Air Pollution—Criteria Pollutants

Carbon monoxide (CO)



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Carbon monoxide (CO)



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Nitrogen dioxide (NO₂) and Ozone (O₃)



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Environmental Effects

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Nitrogen dioxide (NO₂) and Ozone (O₃)



Introduction to Air Pollution—Criteria Pollutants

Sulfur dioxide (SO₂)



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Sulfur dioxide (SO₂)



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Sulfur dioxide (SO₂)



Health Effects

Introduction to Air Pollution—Criteria Pollutants

Lead



Introduction to Air Pollution—Criteria Pollutants

Lead



Health Effects

National Ambient Air Quality Standards (NAAQS)

- National numerical air quality standard for each “criteria pollutant” (designated in CAA § 107) adequate to protect public health and allowing an adequate margin of safety
- Standards are expressed as maximum acceptable mass (micrograms per cubic meter) for a period of time (e.g., 1 hour; 24 hours) or a concentration based limit (parts per million)
- Can consider uncertain science and provide for margin of safety
- Costs of control may not be considered

National Ambient Air Quality Standards (NAAQS)

- Attainment/Nonattainment
- To have been met nationwide by 1975
- To be reviewed every five years, but often takes longer
- Primary and Secondary NAAQS
 - Primary standards provide public health protection, including protecting the health of “sensitive” populations such as asthmatics, children, and the elderly
 - Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, and vegetation

National Ambient Air Quality Standards (NAAQS)

Pollutant [final rule cite]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide [76 FR 54294, Aug 31, 2011]		primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead [73 FR 66964, Nov 12, 2008]		primary and secondary	Rolling 3 month average	0.15 µg/m ³ (1)	Not to be exceeded
Nitrogen Dioxide [75 FR 6474, Feb 9, 2010] [61 FR 52852, Oct 8, 1996]		primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		primary and secondary	Annual	53 ppb (2)	Annual Mean
Ozone [73 FR 16436, Mar 27, 2008]		primary and secondary	8-hour	0.075 ppm (3)	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution Dec 14, 2012	PM _{2.5}	primary	Annual	12 µg/m ³	annual mean, averaged over 3 years
		secondary	Annual	15 µg/m ³	annual mean, averaged over 3 years
		primary and secondary	24-hour	35 µg/m ³	98th percentile, averaged over 3 years
	PM ₁₀	primary and secondary	24-hour	150 µg/m ³	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide [75 FR 35520, Jun 22, 2010] [38 FR 25678, Sept 14, 1973]		primary	1-hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

as of October 2011

Achieving NAAQS through Air Quality Planning

- The basic geographical unit of air pollution control is the Air Quality Control Region (AQCR) (CAA § 107)
- Each state is to develop a State Implementation Plan (SIP) designed so that each AQCR attains and maintains the federally-set NAAQS (CAA § 110)
- Based on cooperative federalism principles

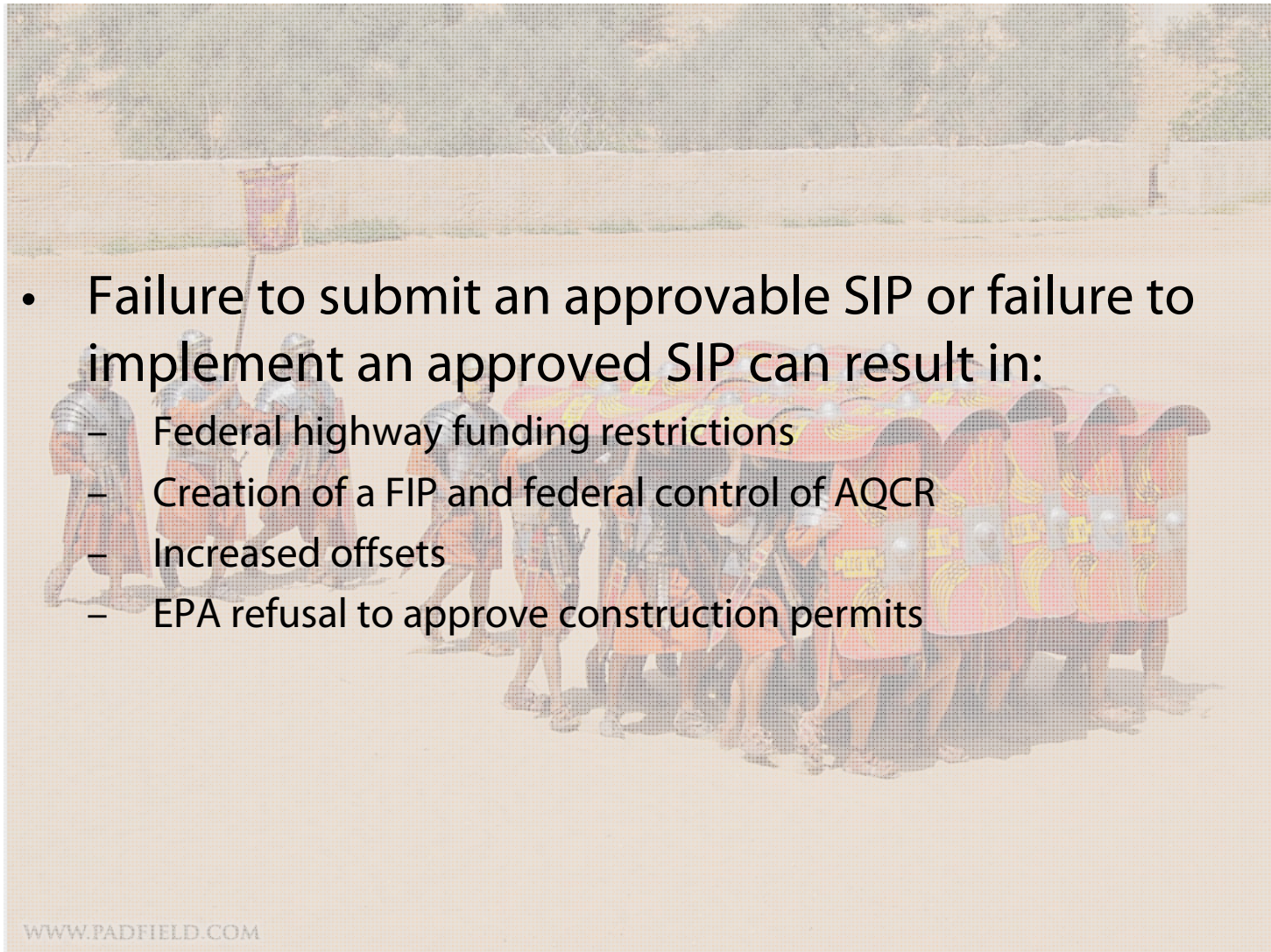
Achieving NAAQS through Air Quality Planning

- The states submit their SIPs to EPA for approval
- If the SIP meets the Section 110 requirements, EPA approves it
- If the SIP fails to meet the Section 110 requirements, EPA may approve it in part, or reject it and create a Federal Implementation Plan (FIP)
- EPA has one year to approve of a SIP, but that deadline may slip

Achieving NAAQS through Air Quality Planning: Section 110

- Enforceable emission limitations or other control measures, and schedules for compliance
- Source emission monitoring and reporting
- Enforcement provisions
- Collect air quality data
- Prohibits sources from contributing to nonattainment or interfering with maintenance of NAAQS
- Periodically revise SIP

NAAQS: You and what army?



- Failure to submit an approvable SIP or failure to implement an approved SIP can result in:
 - Federal highway funding restrictions
 - Creation of a FIP and federal control of AQCR
 - Increased offsets
 - EPA refusal to approve construction permits

Prevention of Significant Deterioration (PSD)

- Applies to attainment areas
- AQCR designated as Class I, Class II, or Class III
- Designed to maintain attainment status by setting an “increment” above the current ambient concentrations of criteria pollutants that can be “consumed” by new emissions
- Requires preconstruction review of new/modified major sources
- Requires use of the Best Available Control Technology (“BACT”) for all pollutants emitted in a “significant” amount
- Requires air quality modeling and monitoring

Best Available Control Technology (BACT)

- Step 1 – Identify all control technologies
 - Don't have to consider options that “redefine” the source
- Step 2 – Eliminate technically infeasible options
 - Carbon, capture, and sequestration
- Step 3 – Rank remaining control technologies
- Step 4 – Evaluate most effective controls
 - Case-by-case consideration of energy, environmental, and economic impacts
- Step 5 – Select BACT

Nonattainment Example: Ozone

- Marginal nonattainment (§ 182(a)): Emission inventory; RACT; new source review; reformulated gasoline opt-in
- Moderate nonattainment (§ 182(b)): 15% reduction in emissions; Stage II vapor recovery; basic inspection & maintenance; NSR offset ratio
- Serious nonattainment (§ 182(c)): Enhanced monitoring; enhanced inspection & maintenance; clean-fuel vehicle program; vapor recovery; transportation controls; reformulated gasoline
- Severe/Extreme (§ 182(d-e)): Enhanced offsets; reduced vehicle miles traveled

Review of Air Quality Planning

- Section 108: List criteria pollutants
- Section 109: Set NAAQS for criteria pollutants
- Section 107: Designate AQCRs
- Section 110: Creation and adoption of SIPs
- Sections 160-169: Attainment area requirements
- Sections 171-193: Nonattainment area requirements

The Big Picture

Title I	Air Quality Planning; PSD; Nonattainment; New Source Performance Standards; Air Toxics; Enforcement
Title II	Mobile Sources
Title III	General Provisions
Title IV	Noise Pollution
Title IV-A	Acid Rain Program
Title V	Operating Permits
Title VI	Stratospheric Ozone Protection

The Big Picture

- Title I Air Quality Planning; PSD; Nonattainment; New Source Performance Standards; Air Toxics; Enforcement
- New Source Performance Standards
 - Implement nationwide technology-based standards that establish the minimum floor of emission limitations applicable to certain categories of sources
 - Largely eclipsed by the PSD/NNSR program
 - Important in the context of GHG regulation
 - Air Toxics
 - Establishes technology-based MACT standards
 - Followed by residual risk standards

The Big Picture

Title II Mobile Sources

- Authorizes EPA to set emissions standards for certain types of mobile sources
 - Cars, trucks, buses, motorcycles, airplanes, ships, and other non-road mobile sources
 - EPA can recall vehicles that do not comply with emissions standards
- Mandates regulation of fuels and fuel additives
 - Includes reformulated gasoline program and renewable fuels mandate
- Greenhouse gas (“GHG”) standards for MY 2012 and beyond vehicles
 - Essentially fuel efficiency standards

The Big Picture

Title III General Provisions

- Includes definitions and enforcement provisions

Title IV Noise Pollution

Title IV-A Acid Rain Program

- Creates cap-and-trade system for regulation of SO₂ and NO_x from power plants

Title V Operating Permits

- Intended to bring together all applicable federally required air pollution control requirements into a single permit

Title VI Stratospheric Ozone Protection

- Regulates CFCs, HCFCs, and other ozone-depleting substances

Recent Cases/Rulemaking (non-GHG related)

- *Mississippi v. EPA* – D.C. Circuit upheld EPA's revised ozone NAAQS standard promulgated in 2008
- *White Stallion Energy Center v. EPA* – D.C. Circuit upheld EPA's mercury and air toxics standards for power plants
 - EPA estimated the rule will cost the power industry \$9.6 billion annually
- *EPA v. EME Homer City Generation, LP* - Supreme Court upheld EPA's Cross State Air Pollution Rule
 - Overturned D.C. Circuit opinion invalidating the rule

Fact Pattern

Freedom Industries was founded in 1992. The company has a facility near Charleston, West Virginia, which distributes chemicals used in coal production. The site includes fourteen storage tanks, which contain the chemicals, with a total capacity of 4 million gallons. It is located in an area zoned for industrial use. Freedom has an industrial stormwater general permit, which covers runoff that occurs as a result of precipitation, from the West Virginia Department of Environmental Protection (DEP). The company does not have any other environmental permits. The site on which Freedom operates has not been inspected by DEP or the U.S. Environmental Protection Agency (EPA) since 1991, when a different company owned the site. On December 31, 2013, Freedom merged with three other companies.

On January 9, 2014, approximately 10,000 gallons of crude 4-methylcyclohexanemethanol (MCHM) and polyglycol ethers leaked from a hole in one of Freedom's storage tanks. The capacity of the tank was about 48,000 gallons. MCHM is a chemical foaming agent used in coal processing. It is an organic compound and is classified as an alcohol. MCHM removes impurities in coal that contribute to pollution when the coal is combusted. It has a sweet smell similar to the smell of licorice. Exposure to MCHM can cause headaches, itching, rashes, reddened or burning skin or eyes, nausea, vomiting, and diarrhea. Polyglycol ethers are solvents based on alkyl ethers of ethylene glycol. Most are nontoxic.

Area residents were exposed to chemical vapors that occurred as a result of the spill. Many of them began to feel ill and called DEP to report that they had noticed a sweet smell in the air, which they believed was making them sick. By January 10, nearly 700 people in the Charleston area had called the local poison control center to report symptoms, including nausea and rashes. By January 12, about 169 people had been treated at area hospitals for chemical exposure.

Fact Pattern Issues

- Preconstruction Permit?
 - Is it a major source?
 - State could require preconstruction permit even if not a “major source” under the CAA
- Operating Permit?
 - Is it a major source?
 - Subject to any NSPS or MACT standards?
 - State could also require operating permit even if not a “major source” under the CAA

Section 112(r)

- Established under the 1990 amendments to the Clean Air Act
- Came about as the result of a deadly release of toxic chemicals from a Union Carbide facility in Bhopal, India, and a release of toxic chemicals the following year from another Union Carbide facility in Institute, West Virginia
- Requires facilities that use or store threshold quantities of extremely toxic or flammable substances to develop Risk Management Plans (“RMPs”)
 - The more impactful a catastrophic failure would be, the more stringent the requirements
- Focuses on accident prevention and mitigation

Section 112(r)

- “General Duty” clause applies to all stationary sources using extremely toxic or flammable substances in plant operations, even if the facility is not subject to EPA’s Risk Management Plan rule (i.e., it does not use or store the substances above threshold quantities)
- Requires facilities to identify hazards which may result from accidental releases using appropriate hazard assessment techniques, to design and maintain a safe facility taking such steps as are necessary to prevent releases, and to minimize the consequences of accidental releases which do occur

State Law

- West Virginia cited Freedom Industries for violating a state regulation that says, “No person shall cause, suffer, allow, or permit the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public.”

Regulation of Greenhouse Gases



Current Status

- Light and heavy duty vehicle rules
- Prevention of Significant Deterioration requirements under new source review program (pending Supreme Court decision in *Utility Air Regulatory Group v. EPA*)
- Proposed rule for new power plants
- Proposed rule for existing power plants
- Methane controls for landfills, agriculture, coal mines, and oil and gas sector

Massachusetts v. EPA, 549 U.S. 497 (2007)

- Background
 - 1998 Cannon memorandum: “CO₂ emissions are within the scope of EPA’s authority to regulate”
 - 1999 Int’l Center for Tech. Assessment CO₂ petition
 - 2003 EPA denial of ICTA petition (and reversing the 1998 Cannon memorandum)
 - 2007 Supreme Court opinion remanding EPA’s denial decision
- Essential elements of the decision
 - GHGs are an “air pollutant” under Section 302(g)
 - EPA lacks the discretion to decide whether to exercise its judgment under Section 202(a)(1) to determine whether GHGs “cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare.”
 - Ordered EPA to express its judgment on the endangerment question

Endangerment Finding (2009)

- Summarizes scientific evidence to date in support of anthropogenic climate change
 - Anthropogenic GHG emissions are causing climate change
 - Climate change is projected to continue during this century
- Describes human health and welfare effects of climate change
 - Temperature
 - Air quality (particularly ground-level ozone concentrations)
 - Climate-sensitive diseases and aeroallergens
 - Environmental justice
 - Extreme events
 - Sea level rise
 - Water use

Light-duty Vehicle GHG Emission Standards (2010)

- Establishes carbon dioxide emission standards for light duty trucks and cars, commencing MY2012 (October 1, 2011)
- Result of a deal struck between the automobile industry and the White House coordinating CAFE, EPA, and state GHG standards into a single, federal GHG standard for light duty trucks and cars
- Essentially a fuel efficiency standard, which will increase from 30.1 to 35.5 MPG in 2012-2016
- Expected to reduce CO₂ emissions by 950 million metric tons over the lifetime of the MY2012-2016 vehicles and save 1.8 billion barrels of oil
- GHG emissions standards for MYs 2017-2025 finalized in October 2012
 - Incentivizes production of electric and fuel cell vehicles
 - Requirement of 54.5 mpg by 2025

Timing Rule (2010)

- Finds that GHGs are not currently “subject to regulation”
- GHGs “subject to regulation” as of January 2, 2011
- Therefore, as of January 2, 2011, pending PSD permits for new or modified sources will be subject to GHG BACT
- States must implement a PSD program for GHGs by January 2, 2011
- PSD is triggered based on GHG emissions alone (that is, GHG emissions can cause a source to be a major source)

Tailoring Rule (2010)

- The Problem
 - The Tailpipe Rule impact on PSD and Title V permitting (100/250 tpy thresholds)
 - Would increase Title V sources from 15,000 to six million
 - Would increase PSD permits from 300 per year to 40,000 per year
- The Solution
 - “Absurd results,” “administrative necessity,” and “one-step-at-a-time”
 - Lower regulatory threshold levels in phases:
 - Phase I (January 2011-June 2011): 75,000 tpy CO₂e and otherwise subject to PSD
 - Phase II (July 2011-June 30, 2013): Phase I sources plus 100,000 tpy CO₂e new sources or 75,000 tpy CO₂ net emission increase sources
 - Phase III (July 1, 2012): Consider permanent exclusion of small sources
 - Phase IV (April 30, 2016): Final implementation rule

Coalition for Responsible Regulation, Inc. v. EPA (D.C. Cir. 2012)

- Involved challenges to the Endangerment Finding, Tailpipe Rule, Timing Rule, and Tailoring Rule
- D.C Circuit upholds all of the rules
- Rehearing denied by D.C. Circuit on December 20, 2012
 - Two dissents
- Cert granted in *Utility Air Regulatory Group v. EPA*: whether PSD requirements are triggered for all major new or modified sources that emit GHGs at or above statutory threshold levels
- Argued February 24, 2014
- At stake: Best Available Control Technology for NSR permits
 - Generally only energy efficiency measures for CO₂ (CCS may be rejected based on cost considerations – 2014 Environmental Appeals Board decision in *In re: ExxonMobil Chemical Company*)
 - May require other control measures for other GHGs (e.g., methane)

Climate Action Plan (2013)

- New Source Performance Standard for Electricity Generating Units (Section 111(b))
- Existing Source Performance Standard for Electricity Generating Units (Section 111(d))
- Sector-Based Methane Reductions
 - Landfills
 - Coal Mines
 - Agriculture
 - Oil and Gas

Power Plant NSPS

- (Re)proposed January 8, 2014; to be finalized by January 8, 2015 (by statute)
- Section 111(b): EPA may set national performance standards for source categories that “cause[], or contribute[] significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare”
- Section 111(a)(1): Performance standard is set based on “best system of emission reduction . . . adequately demonstrated,” taking into account costs (BSER)
- Separate standards for coal and natural gas plants
 - Coal: BSER = partial carbon capture and sequestration
 - Natural gas: BSER = performance of modern (i.e., most efficient) natural gas units

Power Plant ESPS

- Proposed June 2, 2014; to be finalized by June 1, 2015 (by Presidential directive)
- Section 111(d): EPA may set performance standards for existing sources from source categories regulated under section 111(b) and provide for state formulation of plans to achieve those standards
- Four “building blocks” of BSER → state goals for power plant CO₂ emission reductions
 - 1) Heat rate improvements at existing plants
 - 2) Switching to under-utilized natural gas plants
 - 3) Low- or zero-carbon generation (renewables and nuclear)
 - 4) Demand-side energy efficiency measures
- State compliance through individual or multi-state plans

Reduction of Methane Emissions

- EPA white papers regarding methane emissions from oil and gas sector and potential control technologies
 - Compressors for pipeline transport of natural gas
 - Completions and ongoing production of hydraulically fractured oil wells
 - Leaks from natural gas production, processing, transmission, and storage
 - Liquids unloading at gas wells
 - Natural-gas driven pneumatic devices
- Evaluation of what, if any, regulations to issue (performance standards under section 111 or control techniques guidelines under section 182)



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