

# Introduction to the Clean Air Act

## Environmental Law Institute Summer School Program

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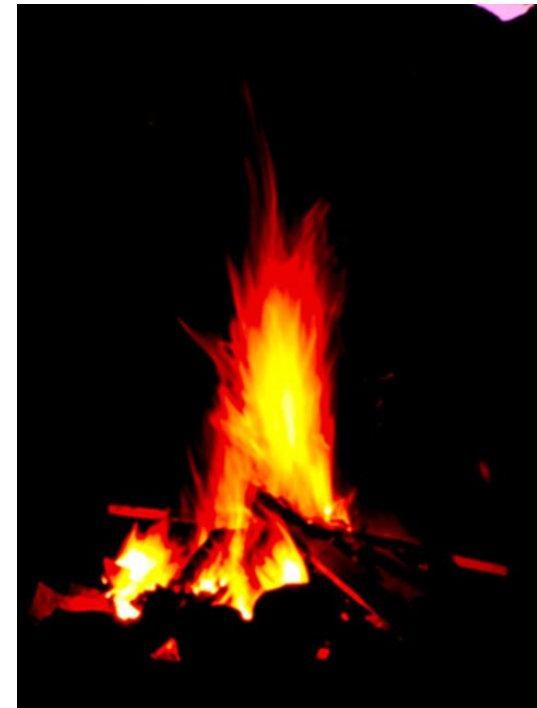
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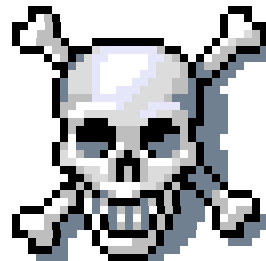
# Introduction to Air Pollution: Health Effects

- Particulate Matter (PM)
  - Sources
  - Health Effects
  - Environmental Effects



# Introduction to Air Pollution: Health Effects

- Carbon Monoxide (CO)
  - Sources
  - Health Effects
  - Environmental Effects



# Introduction to Air Pollution: Health Effects

- Nitrogen Oxides ( $\text{NO}_x$ ) / Ozone
  - Sources
  - Health Effects
  - Environmental Effects



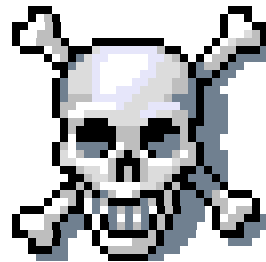
# Introduction to Air Pollution: Health Effects

- Sulfur Dioxide ( $\text{SO}_2$ )
  - Sources
  - Health Effects
  - Environmental Effects



# Introduction to Air Pollution: Health Effects

- Lead
  - Sources
  - Health Effects
  - Environmental Effects



# National Ambient Air Quality Standards (NAAQS)

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- 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.
- Consideration of uncertain science is required, but costs of control may not be considered.
- CAA § 109

# National Ambient Air Quality Standards (NAAQS)

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- Expressed in  $\mu\text{g}/\text{m}^3$
- Primary vs. Secondary NAAQS
- To have been met nationwide by 1975
- Attainment/Maintenance vs. Nonattainment
- To be reviewed every five years



# Achieving NAAQS through Air Quality Planning

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- 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)

# Achieving NAAQS through Air Quality Planning

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- 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)

# Achieving NAAQS through Air Quality Planning: Section 110

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

# Nonattainment: Ozone

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- 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 I&M; NSR offset ratio
- Serious nonattainment (§ 182(c)): Enhanced I&M; clean-fuel vehicle program; vapor recovery; transportation controls; reformulated gasoline
- Severe/Extreme (§ 182(d-e)): Enhanced offsets; reduced vehicle miles traveled; new technologies

# Prevention of Significant Deterioration (PSD)

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- 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 sources

# 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 (to be discussed later) to 2:1
  - EPA refusal to approve construction permits

# Review of Air Quality Planning

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- 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

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|            |  |
|------------|--|
| Title I    | Air Quality Planning; Air Toxics;<br>New Source Performance<br>Standards; Enforcement;<br>Nonattainment; PSD |
| 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   |



# Stationary Source Case Study— Coal-fired Power Plant



# Programmatic Overview

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- New Source Performance Standards
- New Source Review (PSD/NAA NSR)
- Hazardous Air Pollutants
- Title V Permitting
- Acid Rain Program

## New Source Performance Standards (“NSPS”)

- New, reconstructed, or modified stationary sources must install “best adequately demonstrated technology” (BADT) (CAA § 111)
- The best time for installation of controls is at a new or modified unit
- Control technology is defined on a **categorical** basis
- The categorical requirements for new pulverized coal-fired power plants are set forth in 40 C.F.R. Part 60, Subpart Da:
  - SO<sub>2</sub>: 90% removal efficiency and 1.2 #/MMBtu (flue gas desulfurization, or “scrubber”)
  - NO<sub>x</sub>: 0.70 #/MMBtu (low-NO<sub>x</sub> burners/combustion management)
  - PM: 0.051 #/MMBtu (electrostatic precipitator)

# New Source Review—PSD

- New or modified sources must obtain a **preconstruction** permit
- Best Available Control Technology (“BACT”), selected on a top-down case-by-case basis, must be installed
  - SO<sub>2</sub>: 0.09 #/MMBtu
  - NO<sub>x</sub>: 0.067 #/MMBtu
  - PM: 0.012 #/MMBtu
- Ambient air quality impact analysis (Class I, Class II, visibility)
- Netting

Expert Tip:

1990 PSD Draft Workshop Manual

## New Source Review—NAA NSR

- New or modified sources must obtain a **preconstruction** permit
- Lowest Achievable Control Technology (“LAER”), selected on a top-down case-by-case basis, must be installed:
  - SO<sub>2</sub>: 0.09 #/MMBtu or lower
  - NO<sub>x</sub>: 0.067 #/MMBtu or lower
  - PM: 0.012 #/MMBtu or lower
- Ambient air quality impact analysis (Class I, Class II, visibility)
- Offsets

Expert Tip:

RACT/BACT/LAER Clearinghouse

<http://cfpub.epa.gov/RBLC>

# New Source Permitting: When Is a New Source “New?”

- NSPS

- Reconstruction (50%) *or*
- Physical change, plus
- Increase in hourly emission rate

- NSR

- Physical change (RMRR exemption)
- Significant net emissions increase

- Leading cases

- Ohio Edison; Duke Energy; Alabama Power; SIGECO; Cinergy Corp.

- Reform efforts underway (NSR I, II, III, and IV)

Expert Tip:

Hopelessly confused

# MACT Program

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- Section 112 added in 1990 Amendments
- Separate from air quality planning
- New and existing major sources for hazardous air pollutants (10/25 tpy) must install Maximum Achievable Control Technology (“MACT”)
- Control technology is defined on a **categorical** basis

# Title V Permitting

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- A comprehensive operating permitting program for significant stationary sources
- Old program included multiple (possibly inconsistent) permits
- Goals
  - Easier enforcement
  - Consistency with other media programs
  - “One-stop” source of requirements



# Title V Permitting

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- Covered sources
  - Acid Rain Program sources
  - Major stationary sources
  - Major sources of HAPs
  - Sources subject to state HAP regulation
  - NSPS sources
  - PSD sources

# Acid Rain Program

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- Innovative Market-Based Regulatory Program
  - Caps nationwide emissions of SO<sub>2</sub> and NO<sub>x</sub> at ten million and two million tons, respectively, below 1980 levels.
  - Sources are distributed a limited number of “allowances” that authorize the emission of one ton of SO<sub>2</sub>
  - NO<sub>x</sub> is controlled through required technology

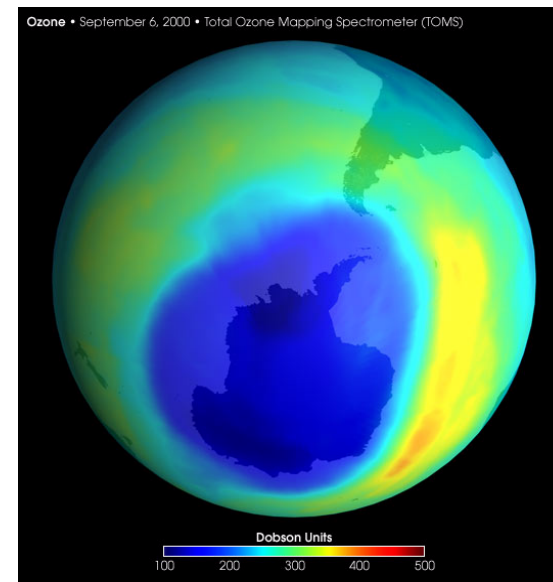
# Acid Rain Program

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- Fossil-fuel fired utility units are the primary affected sources.
- Affected sources must hold one allowance for each ton of SO<sub>2</sub> emitted.
  - If the source emits fewer tons than allowances it holds, it may sell the excess.
  - If a source emits more tons than allowances it holds, it must purchase additional allowances.
- Significantly altered by the Clean Air Interstate Rule to reduce nationwide caps in 23 states and the District by 2015 to 2.5 million tpy SO<sub>2</sub> and 1.3 million tpy NO<sub>x</sub>.

# Stratospheric Ozone

- Interactions between chlorofluorocarbons, stratospheric ozone, and high-energy solar radiation result in elimination of ozone.
- This process is assisted by slow chemical reactions in the extreme polar cold.
- Class I production phase-out (2002); Class II (2030)
- Use and disposal restrictions



# Climate Change

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- Kyoto Protocol; European Trading System
- Regional Greenhouse Gas Initiative; AB32; New Jersey Global Warming Response Act; S.2191 (Lieberman-Warner)
- *Massachusetts v. EPA* Supreme Court decision has impacted CO<sub>2</sub> issue for mobile sources; EPA response

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