NACT 334

Permitting Practices and Principles

Online Housekeeping

Instructor & Student Introductions

Online Agenda

Breaks

Caveats

NACT 334 Online
Student Introductions Survey

- Air Quality Experience
- Job Responsibility with the Agency
- Permitting Experience

Course Objectives

- Overview of air pollution permitting
- Permitting agencies
- Permitting process
- Applicable regulations
- Related programs

Lessons

- Lesson 1 – Introduction - Who, What, Why & When
- Lesson 2 – Attainment of NAAQS
- Lesson 3 – Source Types
- Lesson 4 – Permitting Basics
- Lesson 5 – Potential to Emit
- Lesson 6 – Non-attainment NSR Pre-construction Permits
- Lesson 7 – PSD Pre-construction Permits
- Lesson 8 – PSD Netting
- Lesson 9 – Emission Limitations
- Lesson 10 – Averaging Time

Lessons (Cont'd)

- Lesson 11 – Best Available Control Technology (BACT)
- Lesson 12 – Offsets/Banking/Trading
- Lesson 13 – Modeling & Inventories
- Lesson 14 – Title V Operating Permits
- Lesson 15 – Monitoring, Reporting & Recordkeeping
- Lesson 16 – Compliance Assurance Monitoring (CAM)
- Lesson 17 – Permit Conditions
- Lesson 18 – NSPS & Toxics
- Lesson 19 – Compliance & Enforcement

LESSON 1

Introduction

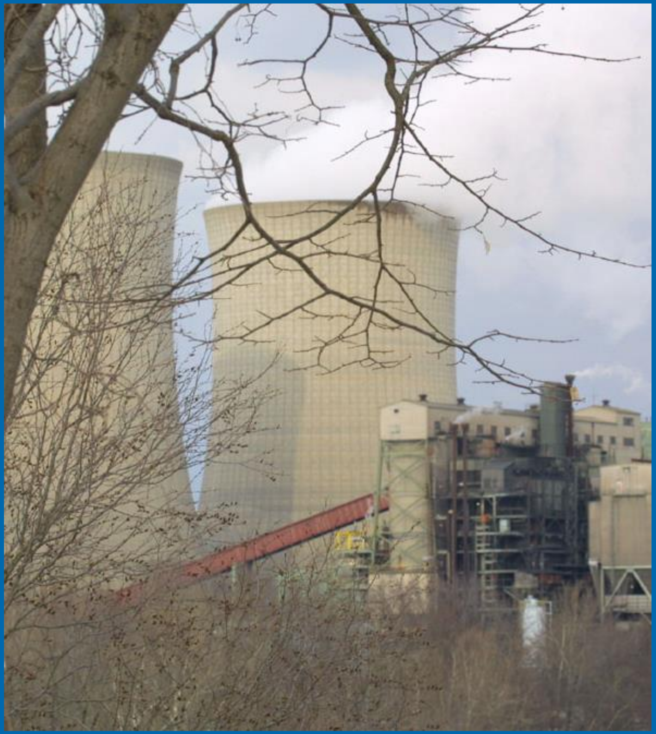
Who, What, Why and When

Lesson Objectives

- <u>Who</u> needs a permit?
- <u>What</u> requires a permit? (covered in Lesson 3)
- <u>Why</u> is a permit necessary?
- <u>When</u> is a permit required?

<u>Who</u> Needs a Permit? Pre-construction Review

- Stationary sources of air pollutants
  - Criteria pollutants
    - Pollutants for which there is a National Ambient Air Quality Standard (NAAQS)
  - Regulated pollutants
    - Criteria pollutants
    - Hazardous air pollutants



<u>Who</u> Needs a Permit?
Pre-construction Review (Cont'd)

- Permitting agencies provide specifics
  - Applicability thresholds
    - Horsepower
    - Heat input
    - Throughput
  - Exempted equipment/activities
    - Storage/Transfer of diesel fuel
    - Residential Equipment

Who Needs a Permit?

Who needs a permit?
Operating Permit

- Major Sources – Criteria pollutants
  - Applicability based on quantity of emissions
  - Definition depends upon where the source is located
  - Attainment status

<u>Who</u> needs a permit? Operating Permit (Cont’d)

- Hazardous Air Pollutants (HAPs)
  - 10 tpy of a single HAP
  - 25 tpy of combination of HAPs

Legal Basis (Federal)

- Clean Air Act (CAA)
  - NAAQS – Public health concerns
  - Title V Operating Permit
  - State Implementation Plan (SIP)

Legal Basis (State/Local)

- State and/or local environmental protection rules, regulations or legislation
  - Preconstruction Review
  - Operation of non-Title V sources

Why is a Permit Needed?

- To protect air quality
- To legally limit the amount of air pollutants released into the atmosphere
- To exercise control over air emissions by implementing statutory and regulatory requirements

Protection of Air Quality

Protection of Air Quality – Pre-construction Review

- Attainment Areas – Prevention of Significant deterioration - PSD
  - Best Available Control Technology (BACT)
  - Increment protection
  - Modeling
- Non-attainment Areas – New Source Review (NSR)
  - Lowest Achievable Emission Rate (LAER)
  - Offset requirement
  - Trading (offset) ratios
  - Modeling

When is a Permit Required?

- Construct a New Source
- Modify an Existing Source
- Operate a Source
- Renew an Existing Permit
- Change an Existing Permit
- Others?

Questions?

LESSON 2

National Ambient Air Quality Standards:

Attainment Issues

Lesson Objectives

- Understand Criteria Pollutants
  - Criteria Pollutants have NAAQS
- Define Attainment
- Define Non-attainment
- Discuss why the difference matters

NAAQS/Attainment Issues

- Many definitions, rules, applicability issues, etc. are dependent upon the concept of attainment/non-attainment
- Attainment designation is based upon an area's air quality as compared to prescribed levels of air quality
- Prescribed levels are referred to as National Ambient Air Quality Standards (NAAQS)

NAAQS

- National Ambient Air Quality Standards
  - Required by CAA § 109
- Primary Standards
  - Protect public health
  - Including at-risk population
- Secondary Standards
  - Protect public welfare

State Implementation Plans

- CAA requires SIP (§110)
  - States prepare and submit to EPA
  - Roadmap to attainment
  - Attainment dates
  - Program issues
    - Permit program
    - Regulatory requirements
    - Enforcement program

Criteria Pollutants

- Carbon Monoxide (CO)
- Lead
- Nitrogen Dioxide (NO2)
- Ozone (Secondary Pollutant)
  - Volatile Organic Compounds (VOC)
  - Nitrogen Oxides (NOx)
- Particulate Matter (PM, PM10, PM2.5)
- Sulfur Dioxide (SO2)

NAAQS

Pollutant	Averaging Time	Level	Form
Ozone	8 hr.	0.070 ppm	4th highest daily max (3 yr. ave.)
$PM_{2.5}$	Annual	12 µg/m^3	Annual mean (3 yr. ave.)
PM_{10}	24 hr.	35 µg/m^3	98th %ile (3 yr. ave.)
		150 µg/m^3	Not to be exceeded

NAAQS (Cont'd)

CO	8 hr. 1 hr.	9 ppm 35 ppm	Not to be exceeded >1x/yr.
NO_2	1 hr. Annual	100 ppb 53 ppb	98^{th} %ile 3 yr. ave. Annual Mean
SO_2	1 hr.	75 ppb	99th %ile of 1 hr. daily max (3 yr. ave.)
Lead	Rolling 3 mo. ave.	0.15 μg/m^3	Not to be exceeded

What is Attainment?

- U.S. is divided into Air Quality Control Regions (AQCRs)
- Ambient air quality is monitored
- If ambient air is “cleaner” than the standards, the AQCR is designated as <u>attainment</u>

What is Non-attainment?

- If ambient air quality is “dirtier” than the standards, the area is designated as <u>non-attainment</u>
- Degrees of non-attainment
- Designation is pollutant-specific

Insufficient Monitoring Data?

- Area is called “unclassified”
- Treated as attainment

CLASSIFICATIONS

EXAMPLE FOR THE 1-HOUR OZONE STANDARD

Classification	Level (ppm)	Attainment date
Marginal Area	.121 up to .138	3 years
Moderate Area	.138 up to .160	6 years
Serious Area	.160 up to .180	9 years
Severe Area 1	.180 up to .190	15 years
Severe Area 2	.190 up to .280	17 years
Extreme Area	.280 and above	20 years

Overview of CAA Ozone Nonattainment Area Planning & Control Mandates by Classification

EXTREME
(20 years to attain)
- TRAFFIC CONTROLS DURING CONGESTION
- CLEAN FUELS REQUIREMENT FOR BOILERS

SEVERE
(15/17 years to attain)
- PENALTY FEE PROGRAM FOR MAJOR SOURCES
- LOW VOC REFORMULATED GAS
- VMT GROWTH OFFSET

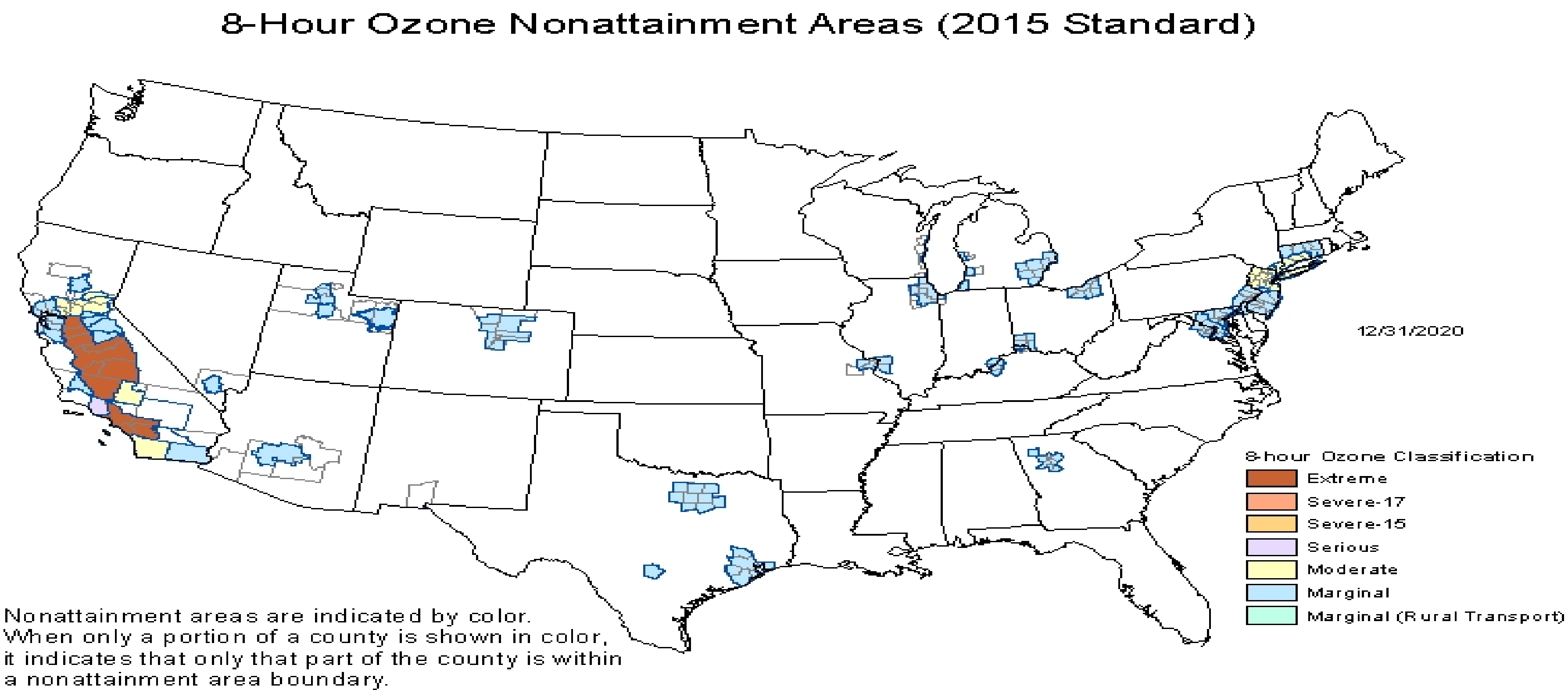
SERIOUS
(9 years to attain)
- VMT DEMONSTRATION (& TCMs IF NEEDED)
- NSR REQUIREMENTS FOR EXISTING SOURCE MODS
- ENHANCED VEHICLE I/M | CLEAN FUELS PROGRAM (IF APPLICABLE)
- MODELED DEMO OF ATTAINMENT | MILESTONE CONTINGENCY MEASURES FOR RFP
- 3% ANNUAL RFP UNTIL ATTAINMENT | ENHANCED MONITORING PLAN

MODERATE
(6 years to attain)
- ~~STAGE II GASOLINE VAPOR RECOVERY~~
- BASIC VEHICLE I/M | CONTINGENCY MEASURES FOR FAILURE TO ATTAIN
- ROP (15% RFP OVER 6 YEARS)
- VOC/NOx RACT for MAJOR/CTG SOURCES | ATTAINMENT DEMONSTRATION

MARGINAL
(3 years to attain)
- TRANSPORTATION CONFORMITY DEMONSTRATION | REFORMULATED GAS
- NEW SOURCE REVIEW PROGRAM | MAJOR SOURCE EMISSION STATEMENTS
- BASELINE EMISSION INVENTORY (EI) | PERIODIC EMISSION INVENTORY UPDATES

NSR offset ratio	Major source threshold
1.5 : 1 Extreme	10
1.3 : 1 Severe	25
1.2 : 1 Serious	50
1.15 : 1 Moderate	100
1.1 : 1 Marginal	100

8 – Hour Ozone Nonattainment Areas in the Country



Why does it matter?

- Attainment/non-attainment status impacts many issues
  - Definition of Major Source
  - Pre-construction review
  - Offset ratios

Major Source Definition

- Ozone non-attainment: NOx, VOC (CAA § 182)
  - 100 TPY – marginal and moderate
  - 50 TPY – serious
  - 25 TPY – severe
  - 10 TPY – extreme
- PM_{10} (§ 189(c))
  - 70 TPY - serious non-attainment
- CO (§ 187(c))
  - 50 TPY – serious non-attainment if stationary source contribution to CO levels is significant

Federal Offset Ratios

Area Classification		Ratio
Ozone	Marginal	1.1:1
Ozone	Moderate	1.15:1
Ozone	Serious	1.2:1
Ozone	Severe	1.3:1*
Ozone	Extreme	1.5:1*

*1.2:1 if SIP requires all existing major sources in Non-attainment Area to use BACT

CAA § 182

Federal Offset Ratios (Cont'd)

	Area Classification	Offset Ratio
CO	Moderate	1:1
CO	Serious	1:1
PM10	Moderate	1:1
PM10	Serious	1:1
NO2, SO2	All	1:1

QUESTIONS?

LESSON 3

Sources, Major Sources, and Modifications

Lesson Objectives

- Understand the different types of sources
- Understand what are the elements of a major source
- Understand what constitutes a modification
- Understand activities which are not modifications

What is a Stationary Source

Stationary source is defined in two ways:

"building, structure, or facility" = "the plant"

- Includes all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more adjacent properties, and are under the control of the same owner or operator.

Source "installation" = "the emissions unit"

- An identifiable piece of process equipment.

Major Source

- From EPA perspective only concerned with major sources*
- States may control sources smaller than major (Non-major Sources)

* Some EPA regulations apply to Non-major (Area) Sources

What is a Major Source?

- Depends on location and regulation type
- Non-attainment NSR: Potential to Emit (PTE) of 100 tpy or less
- PSD: PTE of 250 tpy unless listed

NSR "Major Source" Thresholds for NSR for Ozone, CO and PM Depend on Non-attainment Classification

Area Classification		Major Source PTE (tpy)
Ozone	Marginal	100 (precursors i.e. NOx and VOC)
Ozone	Moderate	100
Ozone	Serious	50
Ozone	Severe	25
Ozone	Extreme	10
CO	Moderate	100
CO	Serious	50
PM10	Moderate	100
PM10	Serious	70

PSD Source Categories with 100 tpy Major Source Thresholds

1. Coal cleaning plants (with thermal dryers)
2. Kraft pulp mills
3. Portland cement plants
4. Primary zinc smelters
5. Iron and steel mills
6. Primary aluminum ore reduction plants
7. Primary copper smelters
8. Municipal incinerators capable of charging more than 250 tons of refuse per day
9. Hydrofluoric acid plants
10. Sulfuric acid plants
11. Nitric acid plants
12. Petroleum refineries
13. Lime plants
14. Phosphate rock processing plants
15. Coke oven batteries
16. Sulfur recovery plants
17. Carbon black plants (furnace process)
18. Primary lead smelters
19. Fuel conversion plants
20. Sintering plants
21. Secondary metal production plants
22. Chemical process plants
23. Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels
24. Taconite ore processing plants
25. Glass fiber processing plants
26. Charcoal production plants
27. Fossil fuel-fired steam electric plants of more than 250 million British Thermal Units (BTU) per hour heat input
28. Fossil-fuel boilers (or combination thereof) totaling more than 250 million BTU/ hour heat input

Greenhouse Gases

- After July 2014, the Supreme Court decision Greenhouse Gases alone will not cause a source to be major.

Major Source (Cont'd)

- ***Major for One, Major for All***: If a source emits even one pollutant (attainment or non-attainment) in major amounts, the source will be considered major. Then all attainment pollutants, even those emitted in non-major amounts, will be reviewed for PSD applicability by using their respective ***Significant Emissions Rate (SER).***

- Emissions equal to or higher than the SER make the pollutant subject to PSD

Significant Emission Rates PSD (tpy)

Carbon monoxide	100
Nitrogen oxides	40
Sulfur dioxide	40
Particulate matter (PM/PM-10)	25/15
Ozone (VOC)	40 (of VOCs)
Lead	.6
Asbestos	.007
Fluorides	3
Sulfuric acid mist	7
Hydrogen sulfide (H2S)	10
Total Reduced sulfur compounds (including H2S)	10

Let's Look Closely at the Definition of a Stationary Source

Same Industrial Classification

- Means part of the same two digit North American Industry Classification System (NAICS) or Standard Industrial Classification (SIC)
- Support facilities are also considered regardless of SIC – EPA policy evolving

Common Control

Case-by-case determinations based on several factors:

- Common ownership
- Located on the same property
- EPA guidance and memos can be used

Determinations should be reasonable and adequately explained in the record

Adjacent or Contiguous

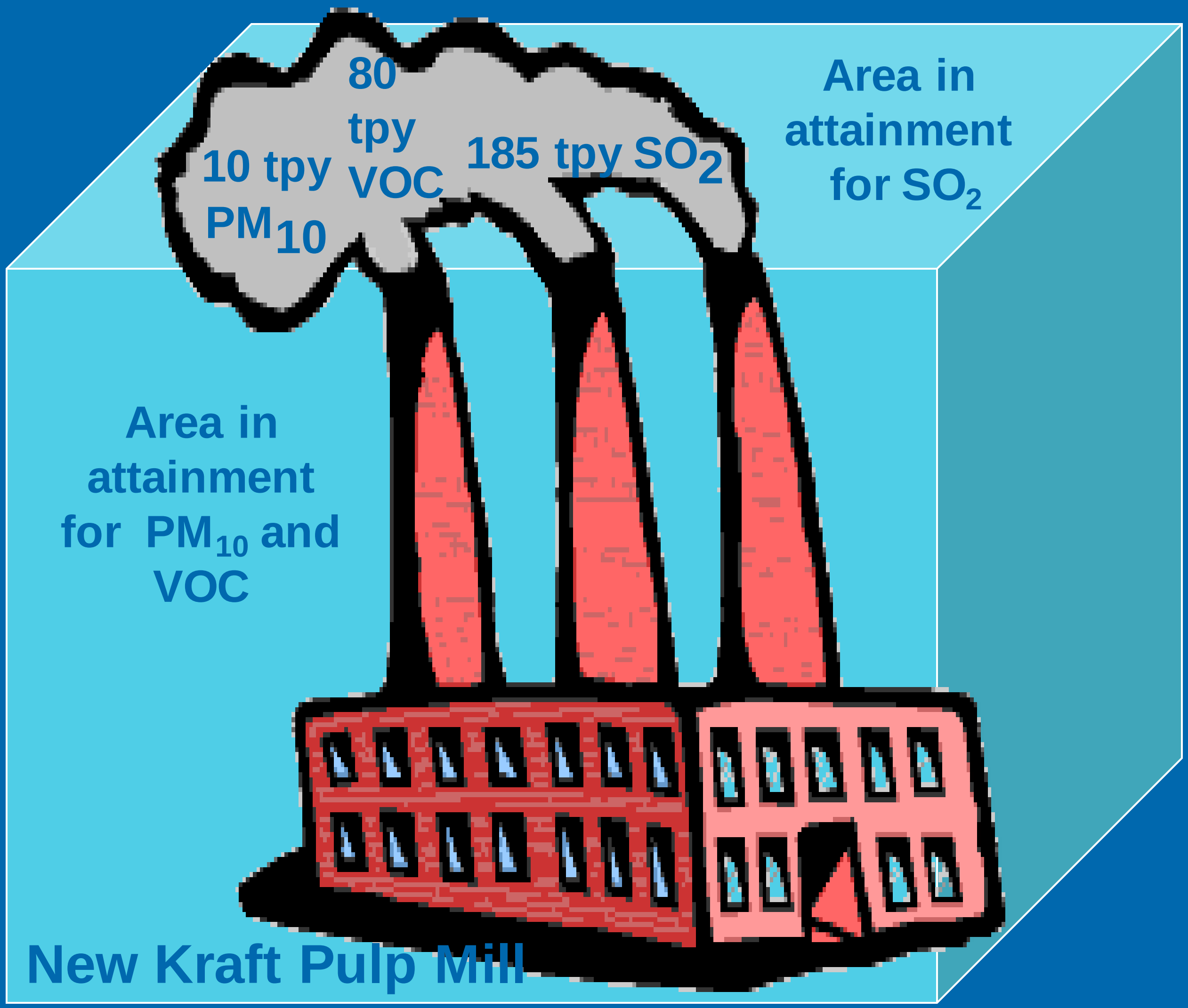
- According to Merriam Webster:
  - Contiguous means being in actual contact : touching along a boundary or at a point and
  - Adjacent means close or near : sharing a border, wall, or point
- *Changed Sept 4, 2018 - EPA no longer considers the functional interrelationships between activities to determine if they are adjacent*

Let's try an
Applicability example

Taken from an EPA power point presentation

First a simple example

Example: Which pollutants are subject to PSD, NA NSR, and minor NSR permitting?



Facts:

Kraft pulp mills produce the dark-colored wood pulp used in the manufacture of a variety of paper products

The tons per year (tpy) in the plume are the mill's potential to emit these pollutants

Example Solution

- **Mill's PTE:**
  - SO_2=185 tpy
  - VOC=80 tpy
  - PM_{10}=10 tpy
- **Area is in:**
  - Attainment for SO_2
  - Attainment for Ozone and PM_{10}

1. Evaluate for PSD
   - Determine what the applicable threshold is
     - ✓ Since kraft pulp mills are one of the 28 listed source categories, the **major source threshold is 100 tpy, not 250 tpy**
   - Determine if the source is major based on the threshold
     - ✓ In this case, the SO_2 emissions are 185 tpy, which is greater than 100 tpy. This makes the mill **a major source for PSD. Now we have to review all attainment pollutants for PSD applicability**.

Example solution (Cont'd)

- **Mill's PTE:**
  - SO2=185 tpy
  - VOC=80 tpy
  - PM_{10}=10 tpy
- **Area is in:**
  - Attainment for SO2
  - Attainment for Ozone and PM_{10}

- Review the two attainment pollutants based on their SER to see if they fall into PSD
  - ✓ The mill's VOC PTE is 80 tpy, but VOC is not on the SER list. However, it is a precursor for ozone, and ozone is on the list with a SER of 40 tpy. **VOC is subject to PSD because PTE is higher than 40 tpy.**
  - ✓ PM_{10} is on the SER list with a SER of 15tpy. The mill's PM_{10} PTE is 10tpy, which is less than the SER. **PM_{10}, not subject to PSD.**

"Significant Net Emission Increase" for NSR

Area Designation		Modification Trigger (tpy)
Ozone	Attainment	40 (NOx and VOC precursors)
Ozone	Marginal	40
Ozone	Moderate	40
Ozone	Serious	25 (count all increases in 5 years)
Ozone	Severe	25 (count all increases in 5 years)
Ozone	Extreme	0
CO	Attainment	100
CO	Moderate	100
CO	Serious	100 (if mobile sources significant)
CO	Serious	50
PM2.5	All	10
PM10	All	15
PM	All	25
NO2	All	40
SO2	All	40
Any other pollutant subject to regulation	All	any amount for those not listed in the rule*

*More pollutants are listed in the rule than are in this table.

Modified Sources

- Modification (for both PSD and NSR) as defined, means any physical change in or change in the method of operation of a major stationary source that would result in: a significant emissions increase of a regulated NSR pollutant and a significant net emissions increase of that pollutant from the major stationary source.

Is It a Modification?

- *Physical changes or changes in the Method of Operation Include:*
    - New Production Lines
    - Increased capacity of existing equipment
    - Process reconfiguration
    - Change in fuels not otherwise exempt
    - Non-routine replacement

Exemptions

- *The following are <u>not,</u> by themselves, physical changes or a changes in method of operation:*
  - Routine maintenance, repair, or replacement
  - Alternative fuel or raw material that the **source** was capable of accommodating before 1975
  - Increase in operating rate or hours of operation that does not exceed a permit limit
  - Change in ownership, with no other changes
  - Certain 1970's energy crisis driven conversions

Routine Maintenance, Repair and Replacement (RMRR)

- *You should consider:*
  - Nature and Extent of the change
  - Frequency the change is performed
  - Purpose of the change
  - Cost of the change
  - Other relevant factors

RMRR Exemption to Major Modification

Major Modification means:

(1) any physical change or change in the method of operation of a major stationary source that

(2) would result in a significant emissions increase of a regulated pollutant and a significant net emissions increase of that pollutant from the stationary source

See e.g., 40 CFR 52.21(b)(2)(i)

RMRR Exemption to Major Mod. (Cont'd)

A physical change or change in the method of operation shall not include . . . routine maintenance, repair and replacement.

See e.g., 40 C.F.R. §52.21(b)(2)(iii)

RMRR Exemption to Major Mod. (Cont'd)

- RMRR Case Law Principles:
  - Definition of "physical change" is broad; the exemption applies to a narrow range of activities
  - Applies to a narrow range of activities in keeping with EPA's limited authority to exempt activities from the CAA
  - No activity is categorically exempt
  - Applies WEPCO multi-factor test on a case-by-case basis evaluation

RMRR Exemption
Wisconsin Electric Power Company (WEPCO)

- WEPCO Multi-factor Test
  - Nature and Extent
  - Frequency
  - Purpose
  - Cost

RMRR Exemption WEPCO (Cont'd)

- Nature and Extent
  - Indications of Non-Routine Changes (from <u>Cinergy</u>)
    - Use of "several outside contractors"
    - "Several multi-volume planning studies"
    - Time to complete the project: 13 weeks; 15 weeks
    - "A majority of the parts of the unit, and in some cases every part of the unit, was modified or replaced, redesigned or upgraded"
    - "Permanent improvements"
    - Not like-kind replacements

RMRR Exemption WEPCO (Cont'd)

- Frequency
  - Indications of Non-Routine Changes
    - Occurs once or twice in the life of a unit
    - Replacement of original components that have never been replaced
    - Projects of this type occur infrequently in the industry
  - Courts tend to scrutinize this factor more than the others

RMRR Exemption WEPCO (Cont'd)

- Purpose
  - Indications of Non-Routine Changes
    - Restoring the unit to an original capacity or efficiency
    - Less outages or downtime
    - Extending the life of a unit beyond its expected retirement date
      - E.g., unit is expected to last 35 years, but project designed to add additional 30 years of service for a total of 65 years - almost 2 times the expected life

RMRR Exemption WEPCO (Cont'd)

- Cost
  - Indications of Non-Routine Changes
    - Capitalization of costs
    - Expenditures approved by high level management approval - e.g., company president
    - Comparison of project costs to average annual maintenance costs at the facility - not across the company

"Routine Maintenance, Repair and Replacement" Policy

- EPA policy is that the routine activity exception has a narrow scope and should generally be applied only to actions that are regular, customary, repetitious, and undertaken as standard practice to maintain a facility in its present condition

Debottlenecking

- Significant Net Emissions Increase must include emissions increases from <u>all</u> emissions units affected by the change, both upstream and downstream

- Removal of any limitation (physical or permitted) in a process line that enables the source to increase throughput can <u>potentially</u> increase emissions at other emissions units upstream or downstream in the process line

Example 1 - Debottlenecking

- Example from July 28, 1983 PSD Determination in Region 10
  - A digester system in a Kraft pulp mill produces black liquor which is sent through a multiple effect evaporator system where it is concentrated and is then burned in a recovery boiler
  - When the digester is expanded, in a way that additional black liquor will be produced, emissions from the recovery boiler must be counted in determining the net emissions increase
  - Since the recovery boiler itself will not be undergoing a physical change or change in the method of operation, it will not have to apply BACT

Example 2 - Debottlenecking

- **Utility Example**
  - A coal prep plant is expanded to provide more coal to a coal fired utility boiler. The boiler is not modified but operates at a higher rate because of the additional coal provided by the coal prep plant.
  - The increase in emissions from the boiler must be counted in determining the net emissions increase caused by the expansion of the coal prep plant.
  - Since the boiler itself will not be undergoing a physical change or change in the method of operation, it will not have to apply BACT, but BACT must be applied at the coal prep plant for each pollutant for which NSR is triggered.

Summary

- Concept of Source been Subject of Litigation
- Major source definition same for PSD, NSR, and Title V
- Definition depends on location and source type
- Same Source must be under Common Control, Same SIC Code, and on Adjacent Property – In flux

Summary (Cont'd)

- Modification is physical change or change in the method of operation which results in a significant change in emissions
- Significant net change varies by pollutant and location and program

Summary (Cont'd)

- Modification does not include Routine Maintenance, Repair and Replacement (RMRR); emission increases up to permit levels; and/or change of fuel (if originally designed and permitted for the fuel)

Questions?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LESSON 4

Permitting Basics

LESSON OBJECTIVES

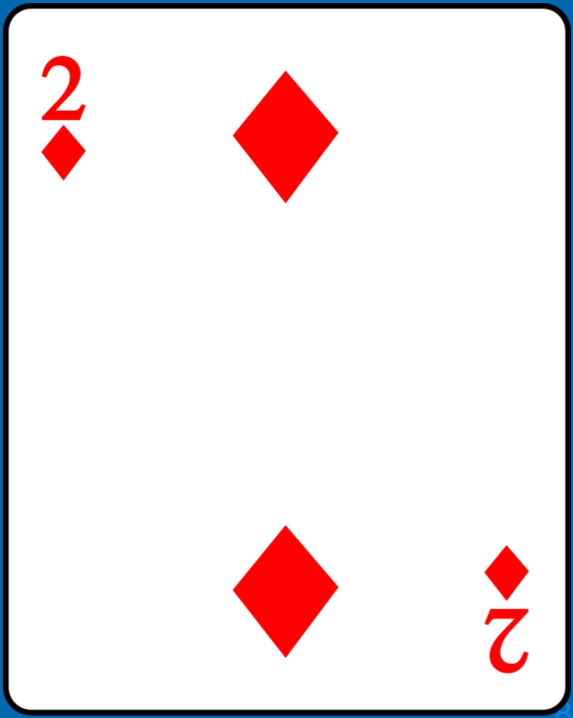
- *Understand what a permit is*
- *Discuss who issues permits*

PERMIT DEFINITIONS

- Permission given by an authorized government agency to construct, and/or to operate a source of air pollutants
- A contract between source of regulated air emissions and public (as represented by authorized agency)
- A document to translate broad regulatory requirements into specific requirements for facility

“TYPES” OF PERMITS

- Two “**types**” of permits
  - Construction (or Pre-construction)
  - Operating
- These <u>may</u> be combined
  - Depending on agency



TYPE 1:

PRE-CONSTRUCTION PERMITS

PRE-CONSTRUCTION PERMITS

- Program often referred to as “pre-construction” permitting
- Also called “New Source Review” (NSR)

PRE-CONSTRUCTION PERMITS

- Authorize the applicant to
  - Construct or build, a new source of air pollutants
  - Modify an existing source

PRE-CONSTRUCTION PERMITTING PROGRAMS

- Included in State Implementation Plan (SIP) for significant (major) sources
  - SIPs are subject to EPA approval
- For non-major sources, permitting agency rules apply
  - These may - or may not - be in the SIP
  - Referred to as “state-only” sources

PRE-CONSTRUCTION PERMITS
Major Sources

NSR
New Source Review

Agency's construction permit program

NA-NSR
Non-attainment New Source Review

Applicable in non-attainment areas

PSD
Prevention of Significant Deterioration

Applicable in attainment & unclassifiable areas

PRE-CONSTRUCTION PERMITTING
Major sources

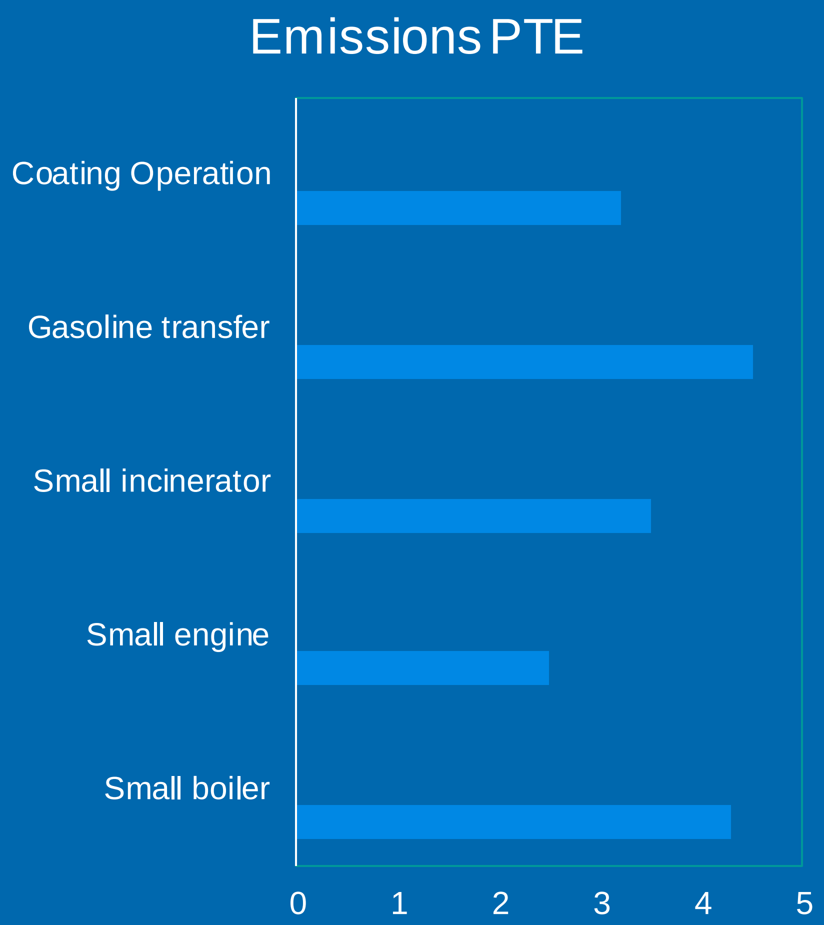
- Non-attainment
  - LAER
  - Offsets & Modeling
- Attainment/Unclassified
  - BACT
  - Air Quality Analysis
    - Increment
    - Modeling

STATE ONLY PERMITS

- Most state and local agencies have permitting rules based on state statutes
- These rules have various names such as State Air Code, etc.
- They typically cover small sources

STATE ONLY (Cont'd)

- Examples – sources below major source thresholds
  - Small boilers
  - Small engines
  - Small incinerators
  - Area sources
    - Gasoline transfer
    - Coating operations



"TRUE MINOR" PERMITS

- Permits that are required for **True Minor** sources due to the requirements of the SIP
- Examples:
  - Emission levels above a certain threshold for a criteria pollutant
  - Equipment may be subject to requirements such as NSPS

"TRUE MINOR" PERMIT DEFINED (Cont'd)

A source of regulated emissions that when operated at maximum capacity continuously for 8760 hrs. per year, emits less than the major source threshold for each regulated pollutant, *i.e.*, its PTE is less than the threshold

"TRUE MINOR" PERMITS (Cont'd)

- TRUE MINOR exercise:
  - A Waukesha lean burn internal combustion, spark ignited engine is to be installed at a natural gas gathering station. Its NOx emissions are 2.3 lbs. per hour at maximum rpm and load.
  - Calculate the yearly emissions of this engine and make a determination if it is a "True Minor"

"TRUE MINOR" PERMITS (Cont'd)

- TRUE MINOR exercise calculation
  - 8760 hrs. per year
  - 2.3 lbs. of NOx per hr.
  - 8760 x 2.3 x 1/2000 = 10.1 tpy
  - No Title V permit required
  - If SIP has a permitting threshold of 10 tpy of a criteria pollutant before permitting is required, a "True Minor" permit would be required
  - What if the source reduced it's hours of operation?

SMALL SOURCE PERMITTING

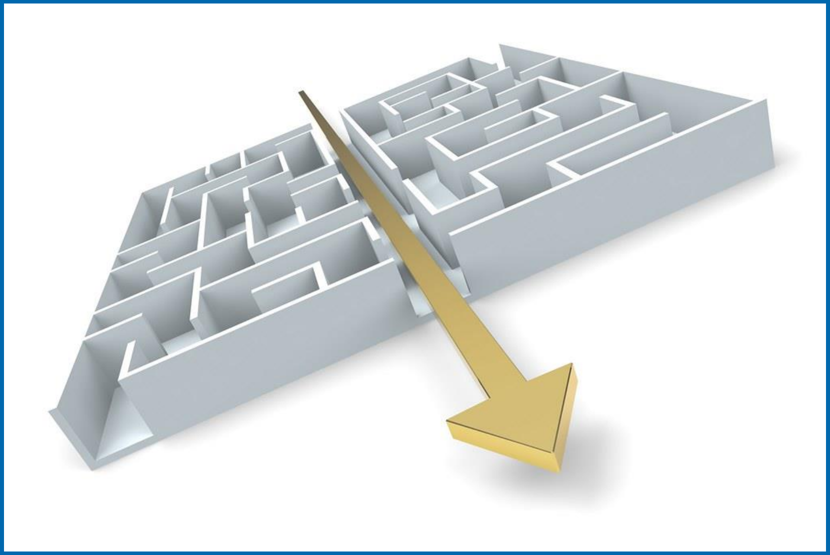
- State/local agencies may have less formal permitting procedures for smaller sources (perhaps called “area sources”)
- Some examples:
  - Dry-cleaning
  - Auto refinishing
  - Gasoline dispensing
  - Solvent cleaning/degreasing
  - Rock crushing

SMALL SOURCE PERMIT TYPES

- Permitting authority issues source-specific permits
- Permitting authority issues one permit that as long as procedures are followed, allows many individual sources to construct
  - General permits
  - Permit-by-rule
  - Registration

GENERAL PERMITS

- Application process for sources under these programs is simplified, with quicker turn-around
- In general, fees are still required



ADVANTAGES OF GENERAL PERMITS

- Extensive work done to develop “template” for source category
- Permits for source category are standardized
- Various levels of emissions may be covered by establishing categories by equipment type and emissions thresholds
- Requirements may be more extensive for source categories with greater emissions

ADVANTAGES OF GENERAL PERMITS (Cont'd)

Recordkeeping requirements are often reduced significantly

- Example for Cotton Gins
  - Compliance is determined by number of bales of cotton produced
  - Other conditions are usually included to ensure equipment is operated & maintained properly:
    - No visible emissions from process equipment and control equipment.
    - Fugitive emissions may not leave property boundaries

PRE- CONSTRUCTION PERMITS

REVIEW

OPERATING PERMITS

OPERATING PERMITS

Authorize the permit holder to <u>operate</u> a source of air emissions

OPERATING PERMITS (Cont'd)

- Federal operating permits (Title V/Part 70/71)
- Synthetic Minor permits
- FESOPs (Federally Enforceable State Operating Permits)
- State-only operating permits

State-Only Operating Permit Applicability

- Depends on
  - Program
  - Quantity and type of emissions
  - Current and historical state requirements

TITLE V PERMITS

- Often referred to as “Title V”, “Part 70”, or “Federal” Operating Permits
- Operating Permits detail the requirements that major sources, and other specified sources, must meet in order to operate in compliance with the CAA
- A detailed discussion of Title V operating permits will be presented later in the course

SYNTHETIC MINOR PERMITS

- An operator may avoid some of the requirements of the Title V program through the "synthetic minor" permit process
- An otherwise major source can limit its emissions to below major source thresholds
- These limits must be federally enforceable

SYNTHETIC MINOR PERMITS (Cont'd)

Examples of emission limitations

- Reducing the hours of operation
- Limiting throughput
- Limiting the composition of
  - Fuel
  - Coatings
- Installing control equipment

SYNTHETIC MINOR PERMITS (Cont'd)

- If a source's emissions are reduced to less than major source thresholds, and
- If those limitations are federally enforceable as reflected in a permit, then
- The source is eligible for a synthetic minor permit

FESOPs

- FESOP Federally Enforceable State Operating Permit
- A FESOP is the vehicle by which a synthetic minor source's emission limitations are rendered federally enforceable
- Purpose
  - Reduce the PTE of a source below the Title V major source threshold, or otherwise place a limit on a source which would exempt it from Title V requirements

SYNTHETIC MINOR PERMITS (Cont'd)

- How does it work?

PTE = A x EF x (1-ER/100) x (8760 hrs./yr.)/(2000 lbs./T)

- PTE = Potential to Emit
- A = Activity Rate
- EF = Emission factor for worst case operating alternatives
- ER = Overall Emissions Reduction Efficiency
  - Collection efficiency
  - Control efficiency

- Reducing anything on the right side of the equation will reduce the PTE
- In order for a limit restricting PTE to be effective, A, EF and ER must be clearly defined

SYNTHETIC MINOR PERMITS (Cont'd)

- Remember:
  - All the components in the PTE equation must not only be defined, but must be documented
  - All reductions in those components must be documented and federally enforceable
  - Must be reflected in permit conditions

SYNTHETIC MINOR PERMITS (Cont'd)

- To develop effective synthetic minor permits, the permit writer must understand the following concepts:
  - Major source
  - Potential to emit (PTE)
  - Developing enforceable permit conditions
- These concepts will all be covered in detail in this course

CAUTION

- Permit application for Synthetic Minor Permit asks for 9.9 tpy of HAP emissions
- MSDS for solvents and compounds used indicates that accuracy of proposed solvents and compounds is ± 5%
- Should this application be accepted as adequate for a synthetic minor?

STATE ONLY PERMITS

- States may or may not have a state only operating permit
- Many states view the state only construction permit as the vehicle, along with state regulations, that determine how a small source must be operated
- Must look to the individual state programs

STATE ONLY PERMITS (Cont'd)

- As in construction permits, applicability is to smaller sources, with emissions below major source thresholds
- The types of sources eligible for State Only permits varies with the permitting agency, but the typical sources are the same as those discussed in construction permits

OPERATING PERMITS

REVIEW

COMBINATION PERMITS

COMBINATION PERMITS

- Combine the construction and operating permits into a single document
- Permitting authority processes requirements at the same time
- Doesn't reduce the requirements for each type of permit
- Can reduce paperwork and duplication
  - Process and review only one permit application, rather than separate construction permit and operating permit applications

WHO ISSUES PERMITS?

Permitting Agencies

PERMITTING AUTHORIZATION

- The EPA Administrator
- Any state or local agency authorized by the Administrator
- The state/local agency must also be authorized by state law

PERMITTING AUTHORIZATION (Cont'd)

- Any State or local entity authorized "under state law" to issue permits and implement various federal, state, and/or local air quality regulations
- The agency must be authorized by EPA administrator to implement federal programs, including federal permitting programs

PERMITTING AGENCIES

- Air quality permits for stationary sources are generally issued by state or local agencies
- These agencies generally have responsibilities other than permitting

PERMITTING AGENCIES (Cont'd)

- In some states, stationary source permitting is done by the state agency
- In some states, stationary source permitting is done by local agencies
  - Counties
  - Cities
  - Special purpose Districts
- In some states, a hybrid situation exists

PERMIT CUSTOMERS

- Applicant
- Public
- Courts
- Enforcement branch of agency
- Other Sources
- EPA and other governmental agencies
- Others?

PERMIT CUSTOMERS (Cont'd)

- Class Discussion
  - For what purpose(s) did each "customer" use the permit?
  - What kinds of permit terms were important to each?
  - Are there other people who might use the permit?

PERMITTING AGENCIES
Other Roles

- In addition to permitting, state statutes authorize state and local agencies to administer certain parts of federal programs

  - State Implementation Plan (SIP) development
    - A Plan developed by the state to attain and maintain compliance with federal air quality standards

  - NSPS

  - Hazardous air pollutants: NESHAP, MACT

PERMITTING BASICS
Review

- Pre-construction permits
  - Non-attainment NSR
  - PSD
- Operating permits
  - Title V
  - State only
- Permit Issuance
  - State/local agencies (may require EPA authorization)

QUESTIONS?

LESSON 5

Potential to Emit (PTE)

POTENTIAL TO EMIT

- Why discuss Potential to Emit (PTE)?
  - Applicability is often based on PTE
    - Permit (PSD/NSR, Title V, etc.)
    - Regulatory (MACT/NESHAP standards)
  - Applicability can also be based on the date of construction, modification or reconstruction of specified source categories (e.g., NSPS)
- PTE is pollutant specific
    - The exception is total HAPs

Lesson Objectives

- Determine how PTE affects permit requirements
- Learn how to calculate PTE
- How to limit PTE

Potential to Emit (PTE)

So what is "Potential to Emit" ?

- The maximum capacity of a stationary source to emit a pollutant under its physical and operational design.
- Any physical or operational limitation on the capacity of the source to emit a pollutant, *including air pollution control equipment and restrictions on hours of operation or on the type or amount of fuel combusted, stored or processed,* shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable.

PTE (Cont'd)

- In simple terms PTE is the maximum emissions that the source can produce or is allowed to produce
- For many sources PTE can be challenging to calculate

PTE Example Calculations

- Fuel Burning sources like boilers and process heaters are frequently assumed to run at nameplate capacity for up to 8760 hours per year.
- Non-emergency generators are generally assumed to run 100% of the time or 8760 hours
- Emergency generators are limited (by EPA) to 500 hours per year.
- Batch operations like auto refinishing take into account startup clean up and actual paint time.

PTE (Cont'd)

Where does the data to calculate PTE come from?

First we calculate emissions, then ramp them up to annual rates

Ideally, source specific data

PTE (Cont'd)

- Emission Factors
  - Stack test data
  - AP-42
  - WebFIRE
- Material Balance
- EPA software
  - Tanks
  - LandGEM
  - WATER9
  - SPECIATE
- Engineering Judgment
- EPA's TTN Website is a good source
  - http://www.epa.gov/ttn

PTE (Cont'd)

Emission Factor method

$$E = A \times EF \times (1\text{-}ER/100)$$

- E = Emissions
- A = Activity Rate
- EF = Emission factor for worst case operating alternatives
- ER = Overall Emissions Reduction Efficiency
  - Collection efficiency
  - Control efficiency
- [A and EF are often stated in pounds and at hourly rates, so E must be converted to tons annually to determine the PTE]
- Activity rate is the maximum capacity of the source

PTE (Cont'd)

Material balance method

Emissions = Input – consumed – recovered – destroyed

- Input is the total amount of the pollutant that can enter the process
- Consumed is the total amount that becomes an integral part of the product or process
- Recovered for recycling or reuse
- Destroyed using a control device

PTE EXERCISE 1

- Evaluate the following:
  - A facility can use a maximum 100 lbs/hr of ink that has a VOC content of 35% by weight.
  - 20% of the ink is retained on the substrate.
  - The incinerator has a 95% control efficiency.

What are the lbs/hr of VOC emitted?

VOC Mass Emissions = (100 lbs/hr * .35) (1 - .20) (1 - .95)
= 1.4 lbs/hr

6.13 tons/year

PTE EXERCISE 2

- A 300 MMBtu/hr. boiler that can burn either natural gas or distillate oil, is limited to NOx emissions of 0.10 lbs/MMBtu by an NSPS.
- NOx EF for natural gas is 190 lb/10^6 scf
- NOx EF for distillate oil is 20 lb/10^3 gal
- Convert to MMBtu
  - Natural Gas: divide by 1,020 MMBtu/10^6 scf
  - Distillate Oil: divide by 140 MMBtu/10^3 gal
- The NSPS limit is met with low-NOx burners and FGR realizing 50% NOx reduction for fuel oil and 85% NOx reduction for natural gas
- 2011 fuel usage
  - Natural Gas - 1,200 x 10^6 scf
  - Distillate Oil – 100,000 gals

PTE EXERCISE 2 (cont'd)

- What is the PTE of the boiler for NOx?
- What are the actual annual NOx emissions from the boiler for 2011?

PTE EXERCISE 2 CALCULATIONS

- Boiler PTE for NOx:
  - EF * Max Hourly Capacity * 8760 hr/yr /2000 lbs/T
  - 0.10 lbs/MMBtu * 300 MMBtu/hr * 8760 hrs/yr / 2000 lbs/T
  - 262,800 lbs/yr of NOx ***or*** 131.4 T/yr of NOx

- Actual NOx emissions:
  - EF * annual usage * (1-control efficiency)
  - Nat Gas = 190 lb/10^6 scf * 1,200 x 10^6 scf * (1 - .85) = 34,200 lbs
  - Dist. Oil = 20 lb/1000 gal * 100,000 gal * (1 - .5) = 1,000 lbs
  - Total = 34,200 lbs + 1,000 lbs = 35,200 lbs = 17.6 T/yr

LIMITING PTE

- Why
- How
- Legal Requirements

LIMITING PTE (Cont'd)

Why place an operation or physical limitation on the capacity of a source?

- Actual emissions may be much lower than the potential to emit, or
- To clearly demonstrate that only non-regulated materials are used.
- Source can avoid some regulatory requirements
  - NSR/PSD, MACT, Title V
  - Still subject to NSPS, NESHAPS and SIP requirements not triggered by PTE or raw material usage
- Sources with similar actual emissions will be regulated similarly.
- Regulators can concentrate resources on large sources.

LIMITING PTE (Cont'd)

- Where do you find physical or operational limitations?
  - Regulations
  - Permits
  - Consent decrees
  - Other enforceable documents

LIMITING PTE (Cont'd)

- *…physical or operational limitation to be effective, it must be [federally] enforceable:*
  - Federal regulations (NSPS, NESHAPs, Acid Rain)
  - State Implementation Plan rules (SIP)
  - Legally enforceable documents (Consent decrees, binding agreements)
  - Permits
- **How do we write a permit that is federally enforceable?**

LIMITING PTE (Cont'd)

- *What does "enforceable" require?*
  - The permit limitation must be:
    - Permanent
    - Quantifiable
    - Practically Enforceable

LIMITING PTE (Cont'd)

- **Limit must be Permanent**
  - In general, limit must not expire on its own accord

LIMITING PTE (Cont'd)

- **Limit must be Quantifiable**
  - The limit can be measured or determined reliably and replicably
  - Limits must be either
    - Physical limits or operational limits
    - Blanket emission limits (i.e., less than 249 t/yr, etc.) must be accompanied by
      - Corresponding physical or operational limits or
      - Come method to demonstrate calculation methodology
- PTE = A x EF x (1-ER/100) x (8760 hrs/yr) / (2000 lbs/T)

LIMITING PTE (Cont'd)

- **Limit must be practically enforceable**
  - Limit must be clearly stated and defined
  - Specify averaging times
    - Should be monthly or less
      - Annual limits must be on a rolling basis
    - ***At a minimum, should reflect the emission limit's purpose***
- A later session will focus on averaging times

LIMITING PTE (Cont'd)

- **Practical enforceability (cont'd)**
  - Method for determining compliance
    - Initial compliance
      - Reference Test Methods usually
    - Operational compliance
      - CEMs, parametric monitoring, PEMs, periodic testing
  - Recordkeeping
  - Reporting

LIMITING PTE (Cont'd)

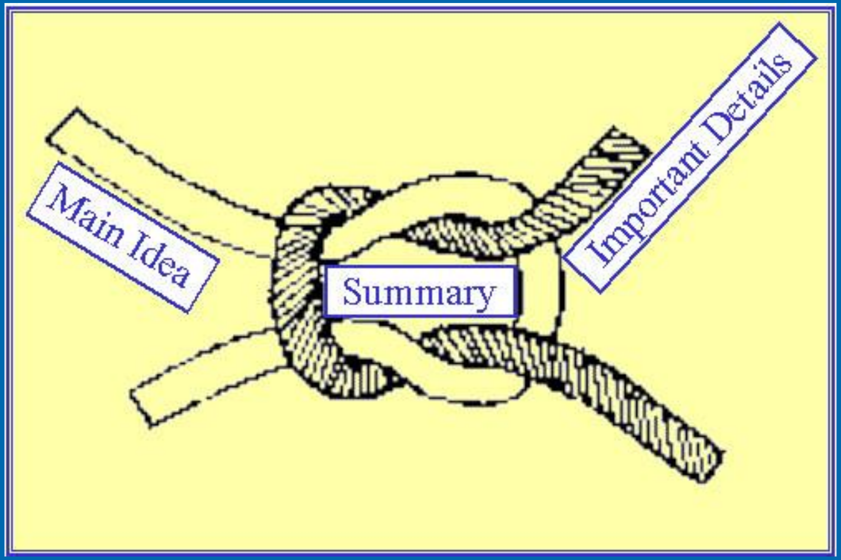
- **The limit must be properly issued**
  - Permit issued pursuant to an approved SIP, or sec. 112(l) submittal
    - Processed and issued in compliance with the approved SIP or sec. 112(l) procedure
  - Reflect an NSPS, NESHAP, SIP, Acid Rain or other federal regulation

LIMITING PTE (Cont'd)

- **Procedural requirements**
  - The procedural requirements set out in SIP or other approved permitting program must be followed
  - Example: EPA Environmental Appeals Board *In re Prairie State Generation Station*, PSD Appeal No. 05-02 (March 25, 2005)

Quick Review

- Potential to Emit (PTE)
  - Why it is important
  - How it is calculated
    - Methods
    - Reference material
  - Why limit PTE



Questions?

LESSON 6

Nonattainment (NA)

New Source Review (NSR) Permits

Lesson Objectives

- Explain legal basis for NA- NSR
- Review applicability
- Discuss state and local permits for nonattainment areas
- Define technology requirements
- Examine procedures for air quality protection

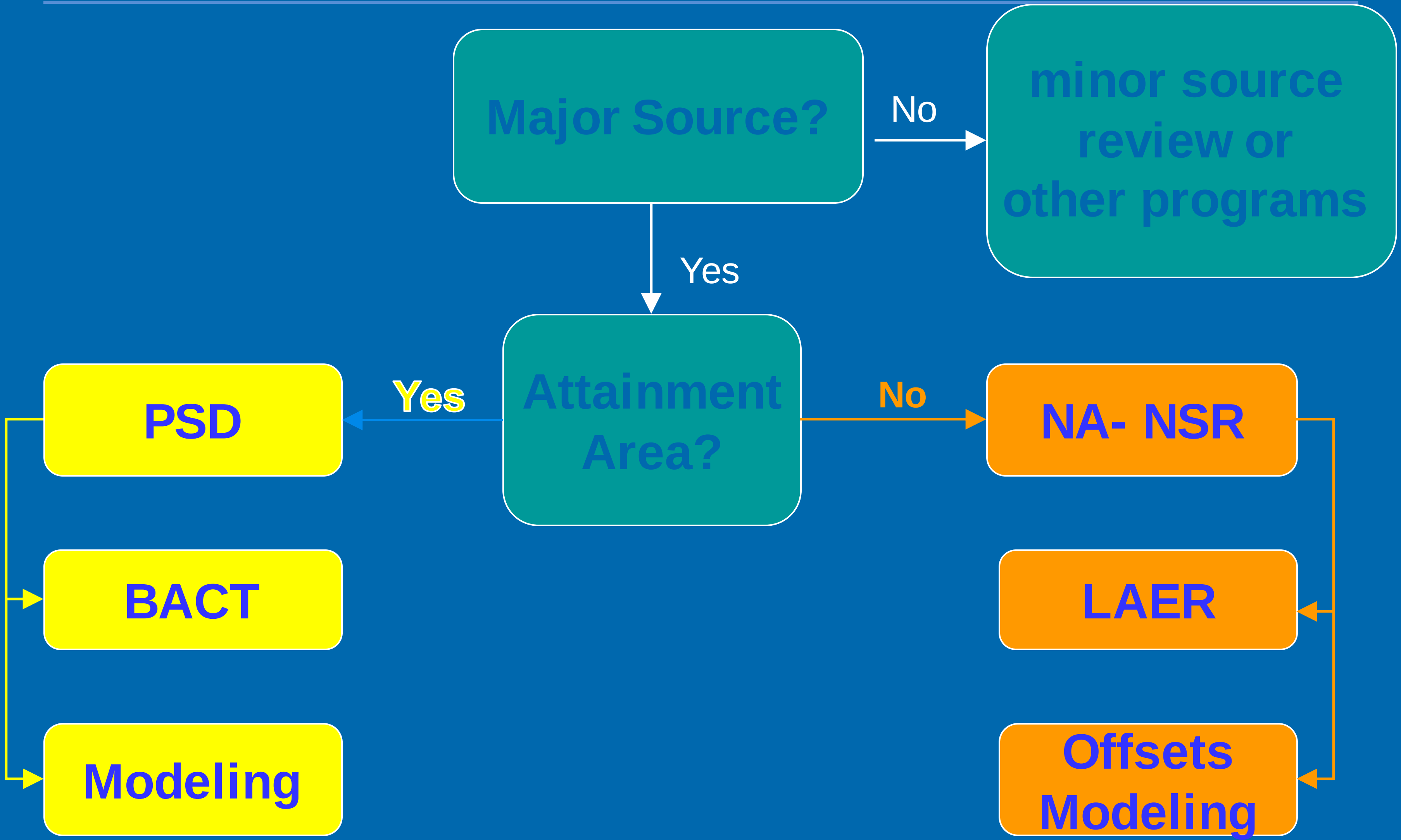
Pre-construction Permits NA-NSR

- Purpose:
  - Allow economic expansion in Nonattainment areas without air quality degradation
  - Assure emissions from new and modified major sources are reduced to the maximum extent feasible
  - Implemented through a preconstruction permit requirement

Pre-construction Permits NA-NSR (Cont'd)

- Similar to PSD in many respects, but with the following significant differences:
  - Major source thresholds
  - Pollutants evaluated
  - VOC & NOx significance levels
  - Control technology requirement is LAER rather than BACT
  - Offsets
  - Certification that other facilities under the same ownership within the state are in compliance

NSR Permitting Process



Clean Air Act – Title I

- Part A: Air Quality and Emissions Limitations
- Part B: Ozone Protection (replaced by Title VI)
- Part C: Prevention of Significant Deterioration

- Part D: Plan Requirements for Nonattainment Areas

"Major Source" Thresholds for NSR for Ozone, PM, and CO Depend on Non-Attainment Status

Area Classification		Major Source PTE (tpy)
Ozone	Marginal	100
(precursors i.e. NOx and VOC)		
Ozone	Moderate	100
Ozone	Serious	50
Ozone	Severe	25
Ozone	Extreme	10
CO	Moderate	100
CO	Serious	50
PM10	Moderate	100
PM10	Serious	70

Pre-construction Permits
NA-NSR

- Pollutants evaluated:
  - Criteria pollutant(s), precursors or constituents, for which the area is nonattainment
    - VOC and/or NOx for Ozone NA, depending on attainment plan
    - NOx and SOx are PM2.5 precursors
    - Remember, PSD evaluation includes all NSR pollutants

Pre-construction Permits NA-NSR

- Control technology requirement is LAER (Lowest Achievable Emissions Rate) rather than BACT
  - Emissions rate that does not exceed the amount allowable under applicable new source performance standards promulgated by the United States Environmental Protection Agency under 42 United States Code, §7411, and that reflects the following:
    - (A) the most stringent emission limitation that is contained in the rules and regulations of any approved state implementation plan for a specific class or category of facility, unless the owner or operator of the proposed facility demonstrates that such limitations are not achievable; or
    - (B) the most stringent emission limitation that is achieved in practice by a specific class or category of facilities, whichever is more stringent.

BACT vs. LAER

- Primary difference
  - BACT review considers economic and other factors
  - LAER does not

Pre-construction Permits NA-NSR

- Certification that other major facilities owned or operated within the state are in compliance or on a schedule of compliance (Title I certification)

Pre-construction Permits
NA-NSR

- <u>Offsets:</u>
  - Emission reductions that:
    - Offset the emissions increases resulting from the new source or modification, and
    - Provide a net air quality benefit
  - Offset ratio can be from 1:1 up to 1.5:1, depending on:
    - the criteria pollutant of concern; and
    - the nonattainment classification

Quick Review

NA-NSR Pre-construction Permits

- Nonattainment NSR
  - Major source thresholds
  - Pollutants evaluated
  - VOC & NOx significance levels
  - Control technology requirement is LAER rather than BACT
  - Offsets
  - Certification that other facilities within the state are in compliance

Questions?

LESSON 7

Prevention of Significant Deterioration (PSD)

Lesson Objectives

- What we're going to cover:
  - Purpose
  - Applicability
  - BACT
  - Increment
  - Ambient Air Impact
  - Pre- and Post-Construction Monitoring
  - Additional Impact Analysis

Regulations

- 40 CFR 52.21 - EPA PSD regulation
- 40 CFR 51.166 - A state or local approved program requirements

PSD Purpose

- Purpose:
  - Assure air quality in attainment and unclassifiable areas does not deteriorate due to construction or modification of major stationary sources
  - Assure emissions from new and modified major sources are well controlled
- Implemented through a pre-construction permit requirement (NSR for attainment and unclassifiable areas)

PSD Applicability

- Construction of a new <u>major</u> stationary source
- A Major Modification to a non-major source, if the physical change by itself constitutes a <u>major</u> stationary source
- Major Modification to a <u>major</u> stationary source resulting in a significant emissions increase and a significant net emissions increase

PSD Applicability
Major Source

- “Major stationary source” was the common term in all three scenarios

- What is a Major Source?
  - Depends on location and regulation type
  - PSD: PTE of 250 tpy unless listed source

PSD Source Categories with 100 tpy Major Source thresholds

1. Coal cleaning plants (with thermal dryers)
2. Kraft pulp mills
3. Portland cement plants
4. Primary zinc smelters
5. Iron and steel mills
6. Primary aluminum ore reduction plants
7. Primary copper smelters
8. Municipal incinerators capable of charging more than 250 tons of refuse per day
9. Hydrofluoric acid plants
10. Sulfuric acid plants
11. Nitric acid plants
12. Petroleum refineries
13. Lime plants
14. Phosphate rock processing plants
15. Coke oven batteries
16. Sulfur recovery plants
17. Carbon black plants (furnace process)
18. Primary lead smelters
19. Fuel conversion plants
20. Sintering plants
21. Secondary metal production plants
22. Chemical process plants
23. Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels
24. Taconite ore processing plants
25. Glass fiber processing plants
26. Charcoal production plants
27. Fossil fuel-fired steam electric plants of more than 250 million British thermal units (BTU) per hour heat input
28. Fossil-fuel boilers (or combination thereof) totaling more than 250 million BTU/ hour heat input

Pollutant Added to PSD

- PM 2.5
  - PM2.5 final NSR rule published May 16, 2008
  - See table on page 5 of the rule
  - Major source baseline date – October 20, 2010

Major Modification
PSD

- Subjects Source to PSD
- See Lesson 3 for discussion

Modification
PSD

- Two preliminary concepts to discuss
  - Project vs. Emissions Unit
    - Emissions from a project determine whether a significant emissions increase occurs
    - A project is made up of modifications to one or more emissions units
  - Aggregation
    - Activities at a source should be aggregated when they are substantially related.
      - EPA codified a proposed new aggregation rule
      - Note that on March 29, 2010, EPA proposed to revoke the new rule

Major Modification
PSD

- <u>Significant Emissions Increase</u>
  - New Emission Unit [52.21(b)(7)(i)]
    - Is, or will be newly constructed and
    - Has existed for less than 2 years since it first operated
  - Existing Emission Unit [52.21(b)(7)(ii)]
    - Any emission unit that isn't a new emission unit
    - A replacement unit is an existing unit

Significant Emission Rates [52.21(b)(23)]

Pollutant	SER
Carbon Monoxide	100 tpy
Nitrogen Oxide	40 tpy
Particulate Matter (PM/$PM_{2.5}$)	25/15 tpy
$PM_{2.5}$	10 tpy of direct $PM_{2.5}$ emissions; 40 tpy of sulfur dioxide emissions; 40 tpy of nitrogen oxide emissions unless demonstrated not to be a $PM_{2.5}$ precursor 52.21(b)(5)
Ozone	40 tpy VOCs or nitrogen oxides
Fluorides	3 tpy
Sulfuric acid mist	7 tpy
Total reduced sulfur (including H_2S):	10 tpy
Reduced sulfur compounds (including H_2S)	10 tpy

Significant Emission Rates [52.21(b)(23)]

Pollutant	SER
Municipal waste combustor organics (measured as total tetra-through octa-chlorinated dibenzo-p-dioxins and dibenzofurans)	3.2 x 10^{-6} megagrams per year (3.5 x 10^{-6} tons per year)
Municipal waste combustor metals (measured as particulate matter)	14 megagrams per year (15 tons per year)
Municipal waste combustor acid gases (measured as sulfur dioxide and hydrogen chloride)	36 megagrams per year (40 tons per year)
Municipal solid waste landfills emissions (measured as nonmethane organic compounds)	45 megagrams per year (50 tons per year)

Major Modification
PSD

- <u>Significant Emissions Increase – *New Units*</u>

  - Actual to Potential
    - Emissions Increase = PTE – BAE
  - Calculating Baseline Actual Emissions (BAE)
    - Equals zero for initial construction and operation purposes
    - Thereafter, and for all other purposes, equals PTE
  - Calculating PTE
    - Can be limited by enforceable restrictions

Major Modification PSD (Cont'd)

- **<u>Significant Emissions Increase – *Existing Units*</u>**
  - Actual to Projected Actual
    - Emissions Increase = PAE – BAE

      BAE = Baseline Actual Emissions

      PAE = Projected Actual Emissions

Major Modification PSD (Cont'd)

- <u>Significant Emissions Increase – *Existing Units*</u>

- Calculating Baseline Actual Emissions (BAE)
  - Highest of two years in past five
  - With approval non electric utility may use 10 years

- Calculating Projected Actual Emissions (PAE)
  - Consider all relevant information, including but not limited to, historical operational data, the company's own representations, the company's expected business activity and the company's highest projections of business activity, the company's filings with the State or Federal regulatory authorities.

Pre-construction Permits
PSD

- Major Modification (cont):
  - Significant Emissions Increase (cont)
    - Actual to Potential
      - Emissions Increase = PTE – BAE
    - Hybrid
      - Calculate Actual to Projected Actual or Actual to Potential, depending on whether an emissions unit is new or existing
      - Sum the ***increases*** only

Modification
PSD

EXERCISE

Major Modification

Let’s do some calculations

PSD Source Categories with 100 tpy Major Source thresholds

1. Coal cleaning plants (with thermal dryers)
2. Kraft pulp mills
3. Portland cement plants
4. Primary zinc smelters
5. Iron and steel mills
6. Primary aluminum ore reduction plants
7. Primary copper smelters
8. Municipal incinerators capable of charging more than 250 tons of refuse per day
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27. Fossil fuel-fired steam electric plants of more than 250 million British thermal units (BTU) per hour heat input
28. Fossil-fuel boilers (or combination thereof) totaling more than 250 million BTU/ hour heat input

Significant Emission Rates (tpy) PSD

Carbon monoxide	100
Nitrogen oxides	40
Sulfur dioxide	40
Particulate matter (PM/PM10/PM2.5)	25/15 /10
Ozone (VOC)	40 (of VOCs)
?Lead	.6
xAsbestos	.007
xBeryllium	.0004
xMercury	.1
xVinyl chloride	1
xFluorides	3
xSulfuric acid mist	7
xHydrogen sulfide (H2S)	10
xTotal Reduced sulfur compounds (including H2S)	10

EXERCISE

- Scenario 1:
  - New Chemical Process Plant
  - Non-fugitive NOx emissions – 75 T/yr PTE
  - Non-fugitive VOC emissions – 30 T/yr PTE
  - Fugitive VOC emissions – 75 T/yr PTE
- PSD review required?

- Scenario 2:
  - New Source which is not a listed source
  - Non-fugitive NOx emissions – 75 T/yr PTE
  - Non-fugitive VOC emissions – 210 T/yr PTE
  - Fugitive VOC emissions – 75 T/yr PTE
- PSD review required?

EXERCISE

- Scenario 3:
  - Adding a new < 250 MMBtu/hr boiler at a hospital
  - Hospital existing maximum PTE: 240 T/yr NOx
    (assume any existing boilers total < 250 MMbtu/hr)
  - Boiler PTE: 200 T/yr NOx
- PSD review required?
- Scenario 4:
  - Same scenario except the boiler > 250 MMBtu/hr
- Scenario 5:
  - Same as 3, except Boiler PTE is 270 T/yr
- Scenario 6:
  - Same scenario as 3, except the source is a refinery rather than a hospital

Example

- Lets look at a couple of baseline examples

Baseline Actual Emissions

EUSGU (for each emissions unit)

Actual TPY		
900	2002	
870	2003	
970	2004	
850	2005	
900	2006	Date actual construction begins

870 + 970 = 1840/2 = 920

Baseline Actual Emissions

Non- EUSGU (for each emissions unit)

Actual TPY		
840	1997	
910	1998	
870	1999	
970	2000	
850	2001	
830	2002	
170	2003	0.85 emission reduction limit commences
130	2004	
120	2005	
150	2006	Date actual construction begins

870 + 970 = 1840/2 = 920 * (1 - 0.85) = 138

170 + 130 = 300/2 = 150

Projected Actual Emissions
(for each emissions unit)

Actual TPY		
960	2009	Unit resumes normal operation
960	2010	
960	2011	
1020	2012	
950	2013	Year 5 (no increase in design cap. or PTE)
1020	2014	
1300	2015	
1300	2016	
1300	2017	
1100	2018	Year 10 (inc. design cap. or PTE)

Baseline Average Emissions
Same Pollutant

EU1-NOx		EU2-NOx	
840	1997	100	1997
910	1998	120	1998
870	1999	110	1999
970	2000	140	2000
850	2001	100	2001
900	2002	150	2002
960	2003	120	2003
910	2004	90	2004
970	2005	110	2005
930	2006	100	2006

What is the NOx BAE for the project?

Baseline Average Emissions
Same Pollutant

EU1-NOx		EU2-NOx	2year average
840	1997	100	
910	1998	120	985
870	1999	110	1005
970	2000	140	1045
850	2001	100	1030
900	2002	150	1000
960	2003	120	1065
910	2004	90	1040
970	2005	110	1040
930	2006	100	1055

Looks like 2002 and 2003

Baseline Average Emissions
Different Pollutants

EU1-NOx		EU1-VOC	
840	1997	100	1997
910	1998	120	1998
870	1999	110	1999
970	2000	140	2000
850	2001	100	2001
900	2002	150	2002
960	2003	120	2003
910	2004	90	2004
970	2005	110	2005
930	2006	100	2006

What are the NOx & VOC BAE for the project?

Major Modification PSD (Cont'd)

- <u>Significant Emissions Increase</u>

  - If the emissions increase for the <u>project</u> is below the significance rate for each pollutant, PSD does not apply

  - If the emissions increase for the <u>project</u> exceeds the significance rate for a pollutant, the next step is to determine whether there is a significant <u>net</u> emissions increase

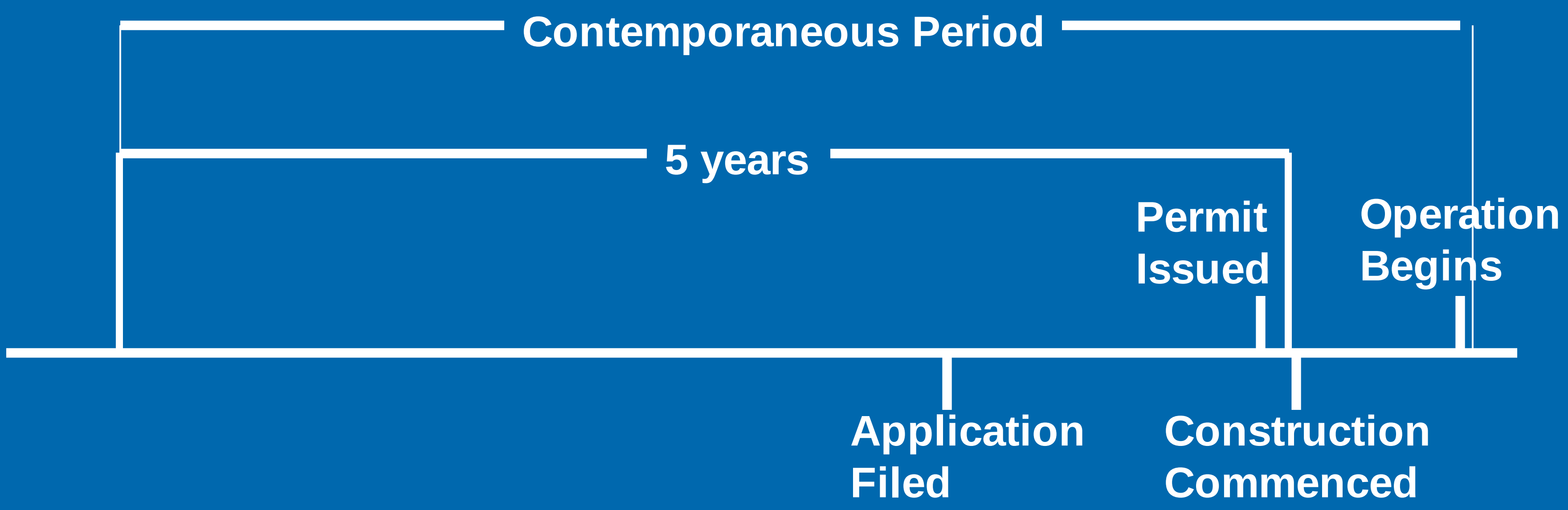
Major Modification PSD (Cont'd)

- Significant Emissions Increase (cont)
  - Provisions relating to recordkeeping and reporting requirements when electing to use "projected actual emissions" are found at 52.21(r)(6)
    - Recordkeeping and reporting required if there is a "reasonable possibility" that significance level will be exceeded

Major Modification PSD (Cont'd)

- Netting (Significant Net Emission Increase)
  - Only applies to significant emissions increase
    - Considers "contemporaneous" emission increases and decreases
    - 5 years prior to commencing construction, through
    - Date the subject increase occurs

Contemporaneous Emissions Increases and Decreases



Major Modification PSD (Cont'd)

- Netting (Significant Net Emission Increase)
  - Emission increases and decreases must be "otherwise creditable"
    - Not relied upon previously in issuing a PSD permit (i.e., not used in air quality analysis)
    - There are special provisions relating to NOx, PM or SOx reductions prior to minor source baseline
    - Other restrictions to consider, including decreases must approximate the same qualitative significance for public health and welfare as the increase from the change

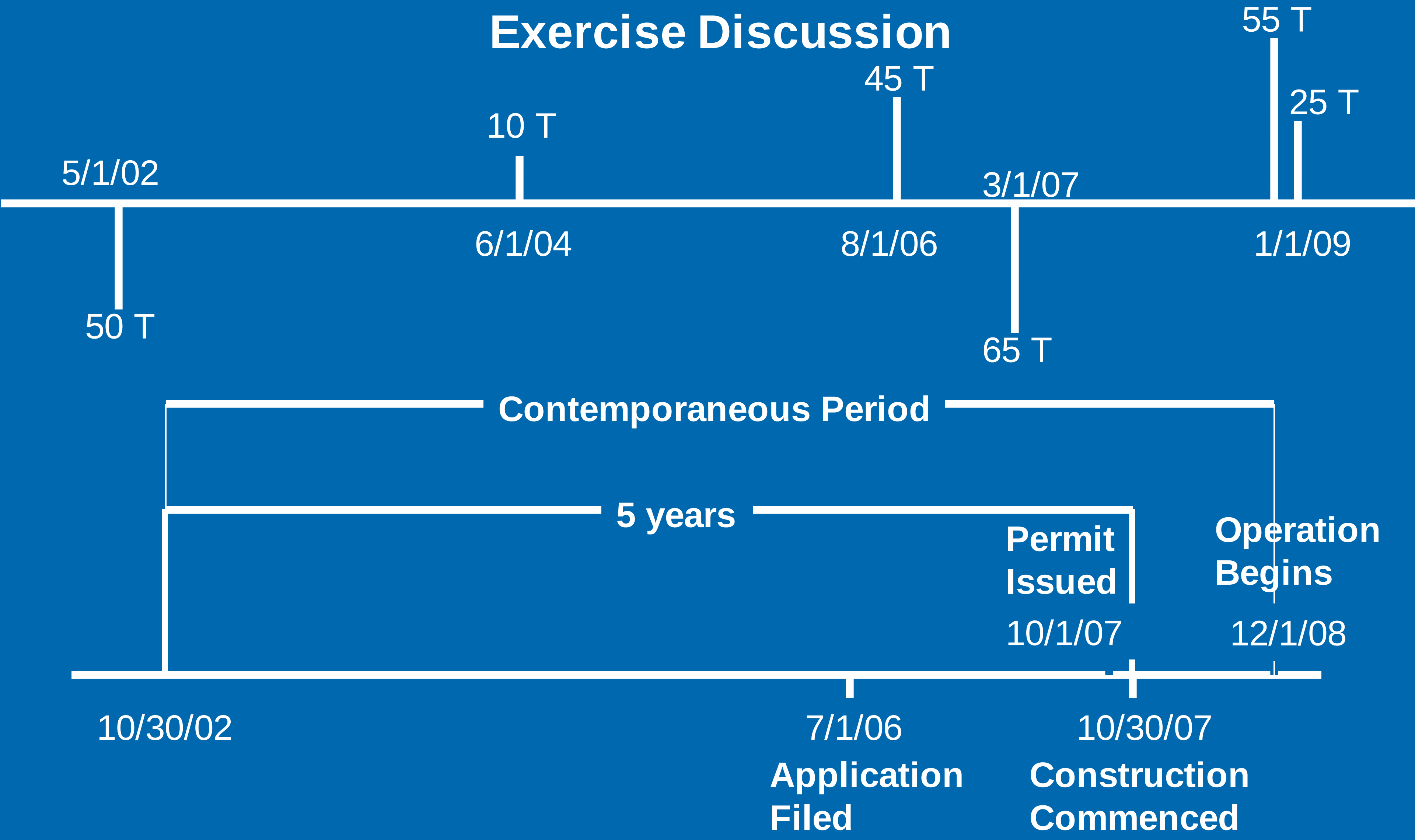
Exercise
Netting

- For each of the following, determine whether there is
  - A significant emissions increase, and
  - A significant net emissions increase.
  - (For each example, assume the emissions increases and reductions are all NOx)

Exercise
Netting (Cont'd)

- Example 1:
  - 7/1/06: Complete permit application submitted
  - 10/1/07: Permit issued (Estimated)
  - 10/30/07: Construction commenced (Estimated)
  - 12/1/08: New unit commences operation (Estimated)
  - PTE related to new construction is 28 T/yr
  - 5/1/02: 50 T/yr decrease
  - 6/1/04: 10 T/yr increase
  - 8/1/06: 45 T/yr increase
  - 3/1/07: 65 T/yr decrease
  - 1/1/09: 25 T/yr increase
- Example 2: Same as Example 1 except new construction PTE is 55 T/yr
- Example 3: Same as Example 2 except pre 8/1/06 were used to net out 8/1/06 increase

Exercise Discussion



Netting
PSD

- We will have an in depth discussion and exercise addressing netting later in the course

PSD

- <u>Quick Review – Applicability</u>
  - New Major Source
    - 100/250 TPY
    - Source categories
  - Modification to a non-major source, if modification by itself would be major
  - Modification to a major source if results in:
    - A significant emissions increase,
        - Project vs. Emissions unit
        - Aggregation
        - New EU vs. Existing EU
      - AND
    - A significant <u>net</u> emissions increase
        - Contemporaneous period
        - Creditable emissions

Best Available Control Technology (BACT) PSD

- Emission limitation required of a source subject to PSD
- New major stationary source
  - BACT for each regulated NSR pollutant with PTE > significant levels
- Major modification
  - BACT for each regulated NSR pollutant emitted resulting in a significant net emissions increase

  - This requirement applies to each emission unit at which a net emissions increase would occur *as a result of a physical change or change in method of operation of the unit*

BACT
PSD (Cont'd)

- Top Down evaluation (EPA guidance) or equivalent (see Puzzle Book)
- Determine all emission reduction technologies in use by similar processes (world wide) (BACT/LAER Clearinghouse)
- Defined at 52.21(b)(12)
  - consideration given to the energy, environmental, and economic impacts and other costs
  - See "Guidance for Determining BACT Under PSD"

BACT
PSD (Cont'd)

- Cannot be less stringent than NSPS or NESHAP
- *BACT is not set until final permit issued*
- BACT at Phased Construction Projects requires special considerations 52.21(j)(4)
- **We will have an in depth exercise addressing BACT later in the course**

Ambient Impact Analysis PSD

- Owner/Operator required to demonstrate allowable increases will not cause or contribute to:
  - An increment exceedance
  - A NAAQS violation
- Modeling exercises

Increment
PSD

- Increment is the extent by which the ambient concentration of a pollutant is allowed to exceed a specified baseline
- Limits increases in ambient concentrations of PM 2.5, PM10, SOx and NOx from new or modified emission sources
- Increment consumption includes emissions from major, minor, area and secondary sources.
- 3 area classifications [52.21(e) & (g)]
  - Class I – primarily nat'l parks, preserves, etc. and international parks
  - Class II – most other areas
  - Class III – must be specifically designated

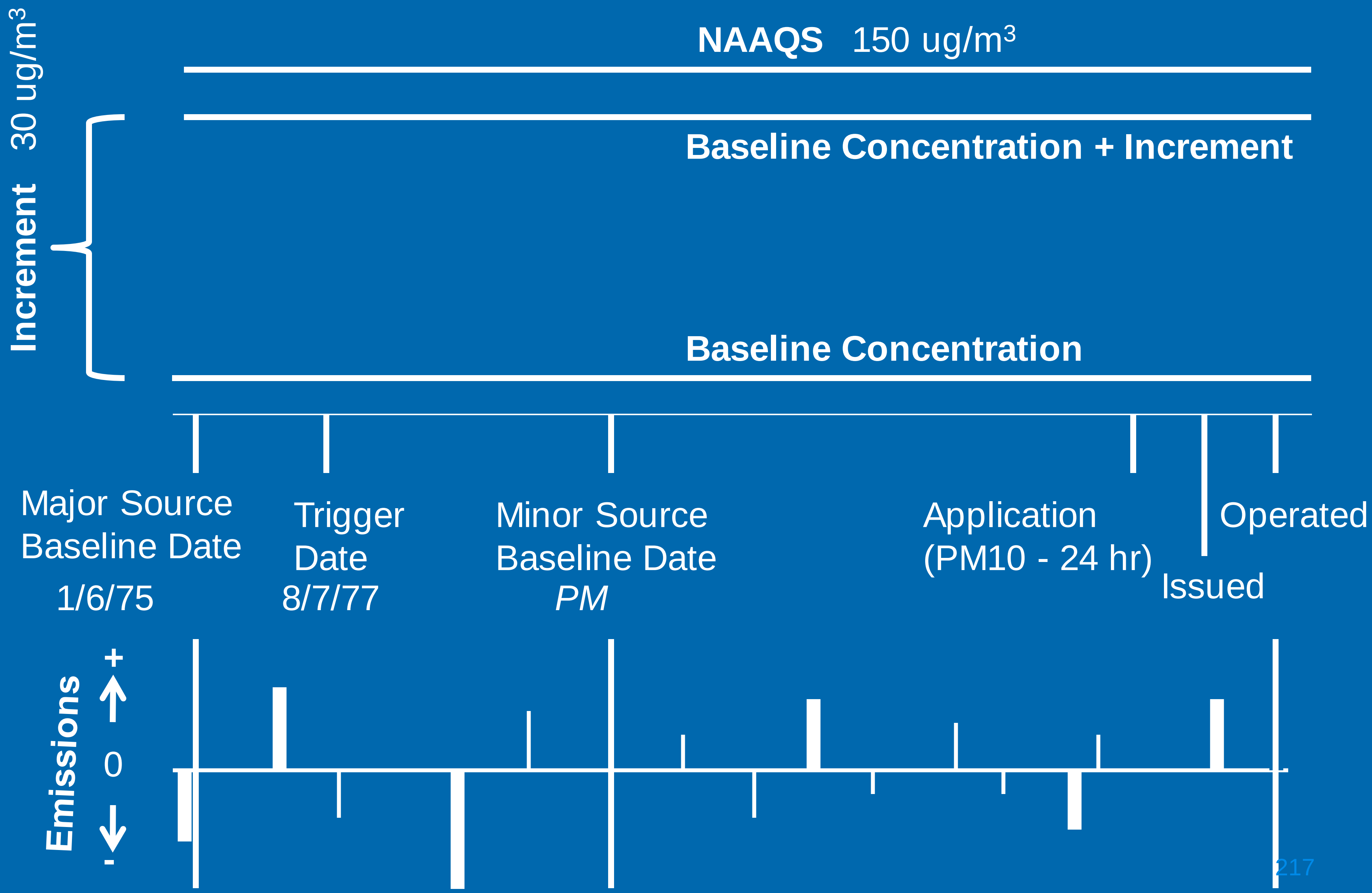
Increment Terms
PSD

- Baseline area [52.21(b)(15)] [40CFR Part 81]
  - Area for which the minor source baseline date is established
- Baseline concentration [52.21(b)(13)]
  - Concentration against which the increment change is evaluated
- Minor Source Baseline Date [52.21(b)(14)(ii)]
  - Defines the date for calculating the baseline concentration
  - Date after which all increases and decreases affect increment
  - Date of which first PSD application is submitted
- Major Source Baseline Date [52.21(b)(14)(i)]
  - Date after which Major Source increases and decreases affect increment

Increment Terms PSD (Cont'd)

- Trigger Date – Date, set by regulation, before which, the Minor Source Baseline Date cannot be triggered
- Baseline concentration and minor source baseline date established by area classifications
  - In any case, emissions impact shall not cause or contribute to a NAAQS exceedance [52.21(d)]

Increment


NAAQS 150 ug/m3
Baseline Concentration + Increment
Baseline Concentration
Increment 30 ug/m3
Major Source
Baseline Date
1/6/75
Trigger
Date
8/7/77
Minor Source
Baseline Date
PM
Application
(PM10 - 24 hr)
Issued
Operated
Emissions
+
0
-

Pre-construction Permits
PSD

- <u>Increment</u>
  - Increment Analysis is a modeling exercise
  - Generally, if project emissions are below the Significant Impact Limits (SIL), increment evaluation not required
  - If project emissions impact is above the SIL, evaluate all associated emissions, including secondary emission, for increment consumption

Secondary Emissions

- Emissions which would occur as a result of the construction or operation of a major stationary source or major modification, but do not come from the major stationary source or major modification itself. Secondary emissions include emissions from any offsite support facility which would not be constructed or increase its emissions except as a result of the construction or operation of the major stationary source or major modification.

EXERCISE

- Scenario 1:
  - SO2 24 hour standard – 366 ug/m^3 (0.14 ppm)
  - SO2 increment – 91 ug/m^3
  - SO2 Baseline Concentration – 200 ug/m^3
  - SO2 increment consumed – 61 ug/m^3
  - Construction emissions impact – 10 ug/m^3
- Scenario 2:
  - Same a 1 except
    - SO2 increment consumed is 81 ug/m^3
    - construction emissions impact is 15 ug/m^3?
- Scenario 3:
  - Same as 1 except Baseline concentration was 300 ug/m3

NAAQS analysis
PSD

- If project increase is below the SIL, no further review necessary
- If project increase is above the SIL, then evaluate all emissions for NAAQS impact
- Impact on Nonattainment Area
  - If project increase is above the SIL, must reduce impacts of its emissions by obtaining emission reductions to compensate for its adverse impact.

Pre-construction Monitoring PSD

- Minimum of 1 year preconstruction ambient monitoring data
- May use approved state monitors

- Pollutants to monitor
  - New construction – pollutants PTE > significance amount
  - Modifications – pollutants resulting in significant net emissions increase
  - Non-criteria pollutants – as determined necessary

- <u>Post-construction Monitoring</u>
  - As determined necessary

Permit Conditions PSD

- <u>Obligation of source to provide information</u>
  - Mandatory
    - information necessary to evaluate proposed source, construction schedule, emissions, controls and emissions impacts
  - Upon request
    - air quality impact evaluation of proposal, including met and topo data
    - Air quality impacts, and nature and extent of commercial, residential, industrial and other growth since 8/7/77, in the area the source would affect

Other analysis
PSD

- <u>Additional Impact Analysis</u>

  - Impairment to visibility, soils & vegetation
    - As a result of the source or modification
    - Must include general commercial, residential, industrial and other associated growth
    - No analysis required of impact on vegetation with no significant commercial or recreational value

  - Air quality impact analysis as a result of general commercial, residential, industrial and other associated growth

  - Visibility monitoring in any Federal Class I area near the source or modification may be required

Sources impacting Federal Class I areas PSD

- Federal Land Managers (FLMs) must be notified if emissions impact a Class I area
- FLM may conduct or request a visibility analysis
- Permit can be denied based upon FLM analysis, even if increment requirements satisfied
- FLM role
    - Can be a point of contention
- Other special provisions relating to Class I areas
- Regional Haze requirements
    - Improve worst days
    - No degradation on best days

PSD

- Plantwide Applicability Limits (PALs) [52.21(aa)]
- 52.21(v) addresses procedures if a source proposes innovative control technologies

PSD

- Permit issuance procedures
  - Public notice with opportunity for public hearing
  - Check state regulations for individual notice requirements
  - Taking, and responding to, comments
    - Source
    - Public
    - Sister state, local and tribal air agencies
    - Other federal, tribal, state and local units of government
    - EPA
    - FLMs

PSD - Review

- PSD Permits
  - Attainment or Unclassifiable areas
- Applicability
  - Major source
  - Modification at non-major source
    (if the modification itself exceed the major source level)
  - Major modification at major source
    - Significant emissions increase
    - Netting
    - Routine Maintenance
- BACT
- NAAQS & Increment analysis
- Air Quality and Adverse Impact Analysis
- Preconstruction Monitoring
- FLM involvement
  - Also, Regional Haze requirements
- PALs

QUESTIONS?

LESSON 8

PSD Netting

Major Modification

<u>NSR Applicability to a Proposed Modification</u>

To determine whether or not a proposed modification at an existing major stationary source is a Major Modification, we use a two-step test:

1. <u>Step one</u> is to determine if there is a “significant emission increase” of a regulated NSR pollutant from the proposed modification “project”
2. <u>Step two</u> is to determine whether or not the “project” results in a “significant <u>net</u> emissions increase” of that pollutant

PSD & NNSR
Project Emissions Accounting

EPA Revises the NSR Applicability for Modifications

On 10/22/2020 EPA finalized a rule to clarify the process for evaluating whether NSR applies to a proposed modification at a major stationary source.

- The final rule clarifies that both emission increases and decreases from a major modification are to be considered during "Step One" of the two-step NSR applicability test.
- This process is called "Project Emissions Accounting" and applies to projects that include a combination of new and existing units

Project Emissions Accounting (Cont'd)

EPA Revises the NSR Applicability for Modifications

- This final rule applies to EPA and permitting authorities that have been delegated federal authority from EPA to issue NSR permits on behalf of EPA
- State and Local Agencies that implement NSR program through an EPA-approved SIP, are not required to modify their program to account for this final rule and may continue to implement their current program without change.

Netting

- Netting is a process of looking back over a specified period and summing all the applicable increases and decreases in emissions of a pollutant and comparing that to the major modification threshold
- Netting concept applies only to existing major sources
- Minor sources not eligible to “net” emissions changes

Determination of Significant Emissions Increase - Netting

- Determine if a "net emissions increase" will result
- Considers previous and prospective emissions changes
- If so, PSD applies to each pollutant's emissions for which the net increase is "significant

Netting

- Required only if proposed project - by itself, or with "related projects" – has significant emissions, or a significant emissions increase

- Process also used in NA- NSR
  - Affects amount of offsets required

Netting (Cont'd)

- Net Emissions Change
- **EQUALS**
- Emissions <u>increases</u> associated with the proposed modification
- **MINUS**
- Source-wide creditable contemporaneous emissions <u>decreases</u>
- **PLUS**
- Source-wide creditable contemporaneous emissions <u>increases</u>

Creditable Contemporaneous Emissions

- Emission increases and decreases are credible if:
  - They have occurred within 5 years of modification
  - Have not been relied upon for permits

Netting (Cont'd)

- Netting analysis uses projected new emissions rather than potential
- *Projected actual emissions* means the maximum annual rate, in tons per year, at which an existing emissions unit is projected to emit a regulated NSR pollutant in any one of the 5 years (12-month period) following the date the unit resumes regular operation after the project, or in any one of the 10 years following that date, if the project involves increasing the emissions unit's design capacity or its potential to emit that regulated NSR pollutant and full utilization of the unit would result in a significant emissions increase or a significant net emissions increase at the major stationary source.

PSD NETTING EXERCISES (*Optional*)

- Use handouts
- Perform the netting calculations for each of the three exercises
- A class discussion will follow

PRACTICAL EXERCISES – NETTING

- **EXERCISE 1**
- An existing minor source (subject to the 100 ton per year threshold for the list of 28) proposes a modification. The modification involves the shutdown and removal of an old emissions unit (providing an actual contemporaneous reduction in NOx emissions of 75 tpy) and the construction of two new units with a total projected actual NOx emissions of 110 tpy.
- **Does PSD apply to the new units?**
- **Why or Why not?**

PRACTICAL EXERCISES – NETTING

- **EXERCISE 2**
- An existing major source is located in an area which is attainment for all criteria pollutants. The source had less-than-significant increases of NOx (30 tpy) and SO2 (15 tpy) two years ago, and a 50 tpy decrease of SO2 three years ago. The source now proposes to add a new process unit with an associated projected increase in emissions of NOx (35 tpy) and SO2 (80 tpy). The 80 tpy increase in SO2 is significant before netting. The 35 tpy increase in NOx is not significant.
- **Would either the NOx or SO2 emission increase trigger PSD after netting?**
- **Why or why not?**

PRACTICAL EXERCISES – NETTING

- **EXERCISE 3**
- A plant which manufactures automobile and truck tires – an existing major source – proposes to increase its production of both types of tires. For its automobile tire line, the source applies for – and is granted – a minor modification permit for a new extruder that will increase projected VOC emissions by 39 tons per year. A few months later, the source applies for another minor modification permit to construct a new tread end cementer on the same line. This will increase projected actual VOC emissions by 12 tons per year.
- **Should the extruder modification have been subject to PSD?**
- **Why or why not?**
- **Should the tread-end cementer modification cause the plant to be subject to PSD?**
- **Why or why not?**

QUESTIONS?

LESSON 9

Emission Limitations

Lesson Objectives

- Understand types and pros/cons of emission limitations
- Understand basics of converting technical/legal emission limit language of regulations into understandable language in permit

Emission Limits

- Performance-based
  - Most common
  - Requires meeting an emission standard
- Technology-based
  - Requires using a specified technology
- Other
  - Work Practices

Performance-based Limits

- Numerical limit is directly stated
- Averaging times specified
- Flexibility in how to meet limit
- May be based on statute or rule

Establishing a Performance-based limit

- Can be established using dispersion modeling level set safely below an emissions rate at which adverse impact will occur
- May reflect Best Available Control Technology (BACT) or Lowest Achievable Emission Rate (LAER) determinations

Performance-based Limits Issues

Pro

- Flexibility
- Expectations clear
- Encourages advanced technology

Con

- Compliance may be difficult or expensive to determine
- Selection of averaging times is crucial

Technology-based Limits

- Require specified technology
  - Actual control device specified
  - Fuel throughput/composition
  - Raw materials throughput/composition
  - Must at a minimum reflect applicable
    - BACT/LAER determinations
    - NSPS/NESHAP
    - MACT

Technology-based Limits Issues

Pro

- Compliance may be easy to determine
- Precedents exist
- Expectations clear

Con

- Minimizes flexibility
- May inhibit technical innovation

Emission Limits – Other

- Neither technology nor performance-based
- Parametric/surrogate measures
- Design parameters that limit uncontrolled emissions
- Caps on production or operating hours
- Applicability limits

Should emission limits be included in permit?

- Required for “Title V Operating Permits”
- Other permits?

How should emission limits be included in permit?

- Copy verbatim?
- By reference?*
- Redundant requirements?
- Paraphrase?*
    - *Use with caution!

Documentation

- The basis for the emission limitation must be specified
- Determine applicable requirements
- Explain determination in support document

Emission limitations vs. Permit conditions

- Line may be blurry
- Some permit conditions are surrogate for emission limitations
- Emission limitations a subset of permit conditions

Discussion Question

- Why is it important to specify the effective date of any regulations on which emission limits in a permit are based?

QUESTIONS?

LESSON 10

Averaging Time

Lesson Objectives

- Understand the reason for averaging times
- Review the connection between emission limits and averaging times
- Examine the effects of shorter vs. longer averaging times

Averaging Time - Purpose

- Establishes compliance parameter for emission limit
- Allows emission limitation to match effect needed to be protected against

Averaging Times (Cont'd)

- Instantaneous
- Short-term (24 hours or less)
- Long-term (more than 24 hours, i.e. monthly, annually, or May 1 through September 30)

Averaging Times (Cont'd)

- Must be specified for performance-based limits
- May appear:
  - In or near same condition as the limit
  - In general section of permit on monitoring or testing
  - In test method

Averaging Time – Stringency

- Affects stringency of limit
- For a given level of emissions, a longer averaging time is less stringent than a shorter averaging time
- Too long an averaging time would not protect against adverse effects of short term exposure

Short Averaging Times

- If not explicitly stated, source will argue for longest reasonable time
- If explicitly stated, but very short term, source may resist
- Agency needs to impose averaging times commensurate with effect

Averaging Times
Technology-based Emission Limits

- Irrelevant for some limits
  - Work practices
  - Solvent content, etc.
- Others do need averaging time
  - Specific control equipment

Sample Permit Condition Rolling 12-month Average

To comply with this Permit and to avoid applicability of 15A NCAC 2D .0530, "Prevention of Significant Deterioration", as requested by the permittee, volatile organic compound (VOC) emissions from the modified nylon 6,6 manufacturing process (ID No. SRC-BCI) must be less than 40 tons in any consecutive twelve (12) month period. [15A NCAC 2D .0530]

Class Discussion

Results for three 2-hour tests conducted over 3 consecutive days are 3.1, 2.6, and 4.9 lbs/hour. The average is 3.5 lbs/hour. Assuming the results are representative, what limits do the data support?

$$(3.1 + 2.6 + 4.9) / 3 = 3.5$$

Response to Class Discussion

- Assuming the results are representative, the data support:
  - A limit near 3.5 lbs/hour with a 72 hour averaging time
  - A limit somewhere around 5 lbs/hour with a 2-hour averaging time or 6-hour averaging time
- The data does not support an averaging time of less than 2 hours

Class Exercise

An applicant requests that an emissions unit be limited to 6000 hours per year of operation to keep emissions below the major source threshold of 100 tons per year. Operation for 6000 hours at the estimated emissions rate and maximum capacity would result in emissions of 99 tons per year.

Can this be done? If so, how? If so, what conditions should be imposed?

Class Exercise (Cont'd)

- Yes, it can be done
- However must ensure accuracy of ±1%
- May be less costly for source to reduce it's request to 95 tpy
- Agree on an emission factor
- Permit condition limiting Hours
- Select appropriate averaging time

Class Exercise (Cont'd)

- An agreed upon factor (such as 0.1 lb emissions per unit produced) is consistent and can represent average emissions. It provides the most certainty to the source, which only has to stay below 6000 hours per year to comply with that limit

Class Discussion

- What are the three classifications used to describe averaging times?

Averaging Times

- Instantaneous
- Short-term (24 hours or less)
- Long-term (more than 24 hours, i.e. monthly, annually, or May 1 through September 30)

Group Exercise
Averaging Time (1 of 2)

- 5 new 4000 HP EGU peaking engines at an existing major source in an attainment area:
  - NSPS PM limit – 0.40 g/HP-hr
  - PTE of each engine is 15 T/yr PM_{10}
  - 24 hr PM_{10} SIL is 5 ug/m^3
  - 24 hr PM_{10} impact on PM_{10} NA area is 7 ug/m^3

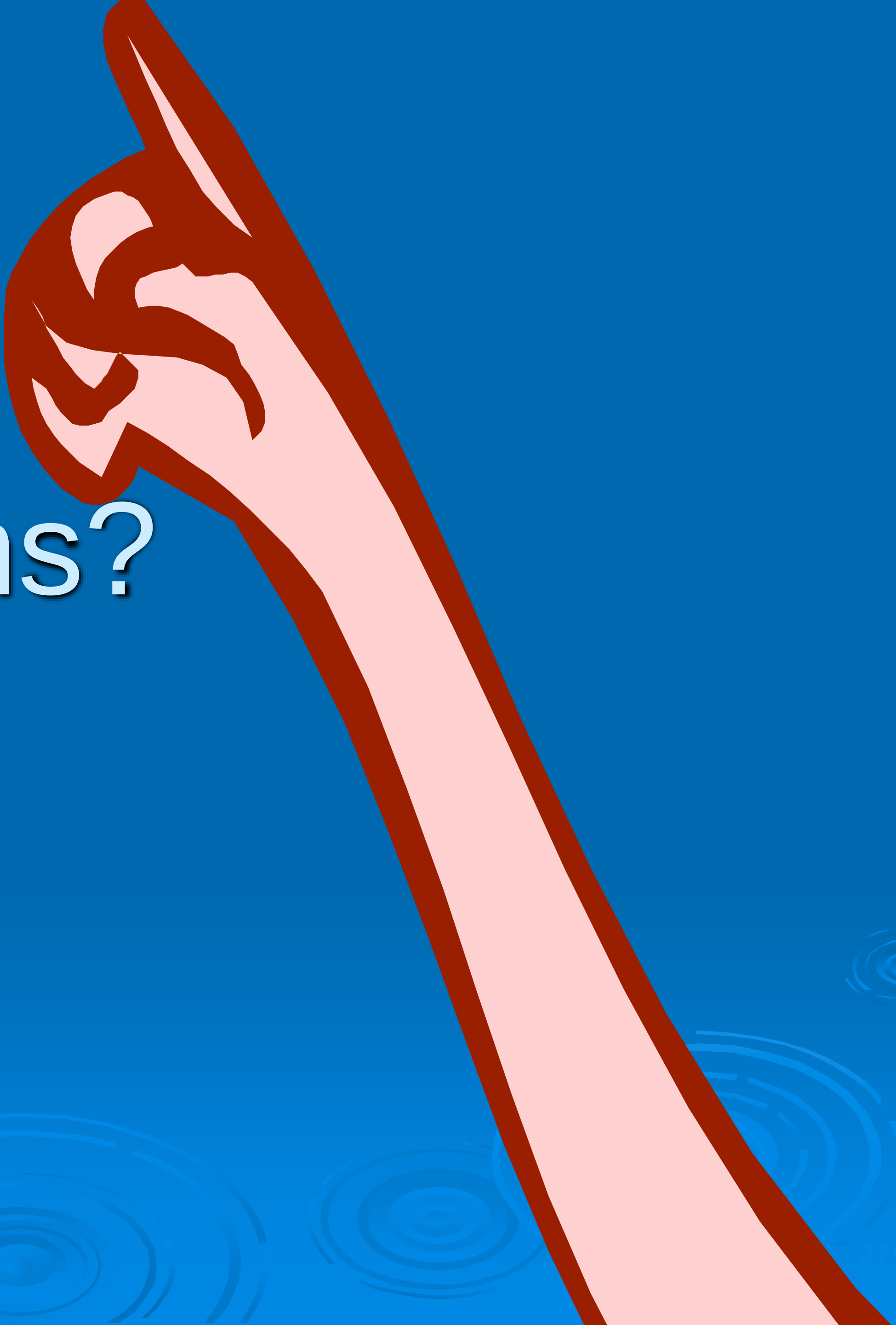
Group Exercise
Averaging Time (2 of 2)

- What is the averaging time for the NSPS PM limit?
- Write an "hours of operation" limit that makes the project a PM_{10} synthetic minor (<15 T/yr).
- What is the maximum averaging time a PM_{10} limit could be given to assure PM_{10} emissions do not cause or contribute to a PM_{10} NAAQS violation?

Discussion of Exercise

- Points to discuss
  - "Speed limits" vs. average limits
  - Referencing test methods
  - Using CEMS for compliance monitoring
  - Block average vs. rolling average (or sums)
  - Operational flexibility vs. regulatory conditions

Questions?



LESSON 11

Best Available Control Technology (BACT)

Best Available Control Technology (BACT)

Best Available Control Technology (BACT) means an emission limitation (including opacity limits) based on the maximum degree of reduction which is achievable for each pollutant, taking into account energy, environmental, and economic impacts, and other costs.

PSD Top Down BACT

- Step 1 – Identify all control technologies
- Step 2 – Eliminate technically infeasible options
- Step 3 – Rank remaining control technologies by control effectiveness
- Step 4 – Evaluate cost effectiveness of controls and document results
- Step 5 – Select BACT

BACT Limitations

- BACT Determination is site specific
- BACT does not redefine project
  - BACT does not mandate changes in process or fuel (i.e. a coal fired power plant does not have to be gas fired)
- BACT for GHG for "Anyway PSD Sources" will be addressed separately

BACT TYPES

- ***Inherently Lower-Emitting Processes/Practices***, including the use of materials and production processes and work practices that prevent emissions and result in lower "production-specific" emissions; and
- ***Add-on Controls***, such as scrubbers, fabric filters, thermal oxidizers and other devices that control and reduce emissions after they are produced.
- ***Combinations of Inherently Lower Emitting Processes and Add-on Controls***. For example, the application of combustion and post-combustion controls to reduce NOx emissions at a gas-fired Combined Cycle Gas Turbine

BACT Sources

- Data sources for Determining Feasible control technology include:
  - EPA's BACT/LAER Clearinghouse and Control Technology Center;
  - Best Available Control Technology Guideline - South Coast Air Quality Management District;
  - Control technology vendors;
  - Federal/State/Local new source review permits and associated inspection/performance test reports;
  - Environmental consultants;
  - Technical journals, reports and newsletters air pollution control seminars

BACT/LAER Clearinghouse

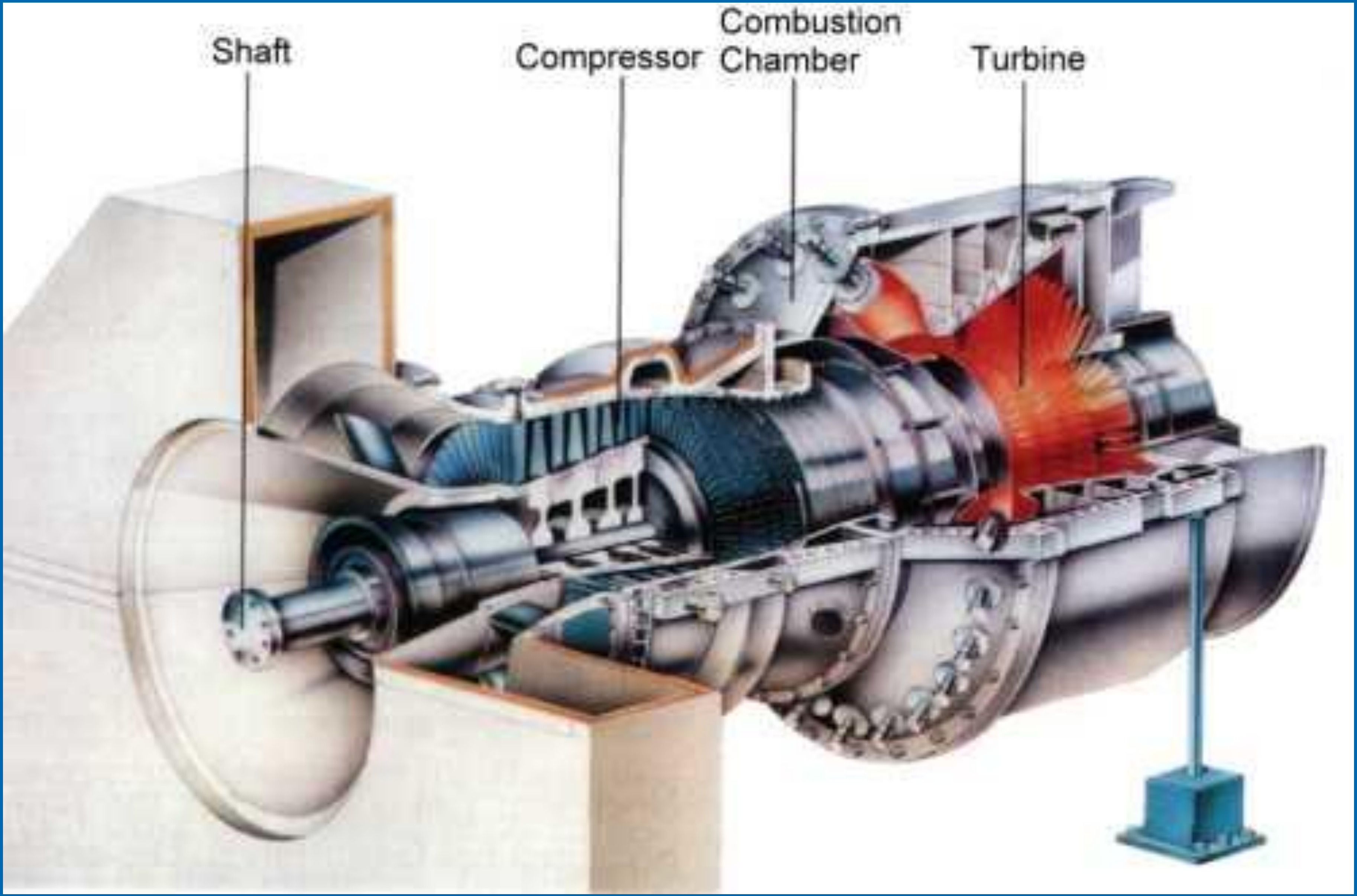
- Data on:
  - Source Type (i.e. boiler, turbine etc)
  - Type of Permit (NSR or PSD)
  - Allowed Emission Rate in various units
  - Basis for emission rate

BACT/LAER Clearinghouse (Cont'd)

- Control Levels will vary by Locality
- Control Levels will vary by process and manufacturer
- https://cfpub.epa.gov/RBLC/
- Other agencies have clearinghouse documents
- CARB, SCAQMD, BAAQMD, SJVAPCD

BACT Determination

- Example:
  - Simple cycle gas turbine for peaking power Added to existing major source
  - Existing plant has potential to emit (PTE) more than 250 tpy of NOx
  - New peaking gas turbine has PTE > 40 tpy, but < 100 tpy CO
  - New turbine is subject to PSD BACT for NOx


Shaft
Compressor
Combustion Chamber
Turbine

BACT Determination For Simple Cycle Gas Turbine

- Step 1 Identify All control technologies
  - Water or Steam Injection
  - Combustion control i.e. low NOx Combustor
  - Combination of above
  - Add on controls like Selective Catalytic Reduction (SCR)
- Step 2 Eliminate Infeasible technologies
  - Steam Injection not feasible

BACT Determination For Simple Cycle Gas Turbine (Cont'd)

- Step 3 - Rank Remaining Controls
  - SCR add on controls most effective
  - Combustion Controls are higher emitting than SCR
  - Water Injection least effective on controlling emissions

BACT Determination For Simple Cycle Gas Turbine (Cont'd)

- According to BACT/LAER Clearinghouse;
  - 7 Installations build simple cycle gas turbines between 2001 and 2014
  - BACT determinations ranged from 9ppm (3 cases) to 42 ppm (1 case)
  - 42 ppm was special case where limited water was available
  - Range in BACT results shows that BACT is case by case

BACT Determination For Simple Cycle Gas Turbine (Cont'd)

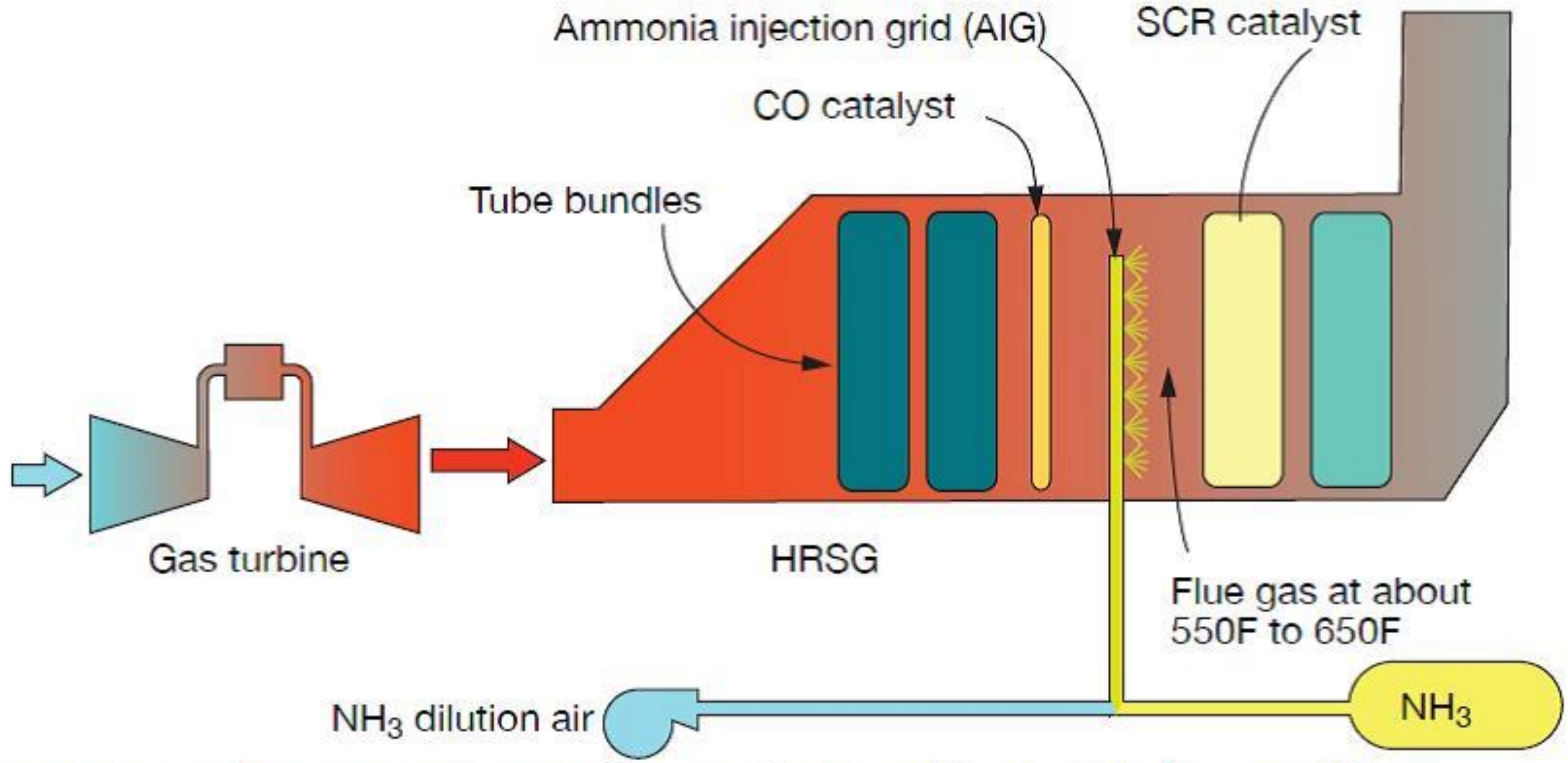
- Best Available Control Technology Guidelines - South Coast Air Quality Management District
- Gas Turbines, Simple Cycle
- Gas Turbine, A/N 406065, El Colton, LLC 2/17/04
- Gas Turbine, A/N 383044, Indigo 9/18/01
- Gas Turbine, A/N 374502, LADWP Valley 9/18/01

BACT Determination For Simple Cycle Gas Turbine (Cont'd)

- Step 4 - Evaluate Cost/Rank Controls
- Cost of SCR for Peaking Turbine ~$18 K/t of NOx
- Cost of Combustion modification ~ $1K/t of NOx
- Cost of water injection ~ $1.5K/t of NOx
- Step 5 – Select BACT
  - Water injection and combustion control

Another Example

- Combined Cycle Power Plant with heat recovery steam generator



1. SCR catalyst arrangement for a typical combined cycle has no diffuser vanes, perforated plates, or tempering air downstream of the gas turbine. A uniform NH_3/NO_x profile at the catalyst inlet is critical to achieving desired SCR performance in terms of NO_x reduction and ammonia slip

BACT Options

- Step 1 - Options Similar to Simple Cycle Gas Turbine
  - Add on control i.e. SCR and NSCR
  - Water injection
  - Steam Injection
  - Dry NOx Control
- Step 2 - Eliminate Infeasible Options
  - All options are technically feasible

BACT Determination

- Step 3 – Rank Controls
  - Combined (dry + Add on) highest control
  - Add on controls
  - Dry NOx Control
  - Steam injection next
  - Water Injection the Next
- Step 4 – Evaluate Cost/Rank Controls
  - Add on $30,000 per ton of NOx
  - Others less than $4,000 per ton of NOx

BACT Determination (Cont'd)

- Step 5 – Select BACT ????
- Review of BACT Documents
- According to BACT/LAER Clearinghouse
  - 36 sources since 2000
  - Since 2010 all less than 5 ppm with add on control (SCR)
  - 2000-2010 most = dry control from 15-25 ppm

BACT Determination (Cont'd)

- Differences based on:
  - technology demonstration – use of technology leads to more use
  - <u>Definitions of cost effectiveness vary from state to state</u>

Examples of Cost Effectiveness

- What is your agency's threshold?
- Examples

Summary of BACT Cost Effectiveness Thresholds ($/ton)					
	SCAQMD	BAAQMD	SJVAPCD	YSAQMD	SDAPCD
NOx	19,100	17,500	24,500	24,500	18,000
CO	400		300	300	
VOC	20,000	17,500	17,500	3,900	
SOx	10,100	18,300	18,300	3,900	
PM10	4,500	5,300	11,400	5,700	

Summary Top Down BACT Review

- Step 1 – Identify all control technologies
- Step 2 – Eliminate technically infeasible options
- Step 3 – Rank remaining control technologies by control effectiveness
- Step 4 – Evaluate most effective controls and document results
- Step 5 – Select BACT

QUESTIONS?

LESSON 12

Emission Offsets Banking and Trading

Lesson Objectives

- Explain the emission offset requirements
- Define the offset ratios
- Discuss criteria for emission offsets
- Examine emissions trading vs emissions banking

Emission Offsets
Pre-Construction Permits NA-NSR

- Offsets:
  - Emission reductions that:
    - Offset the emissions increases resulting from the new source or modification, and
    - Provide a net air quality benefit
  - Offset ratio can be from 1:1 up to 1.5:1, depending on:
    - the criteria pollutant of concern; and
    - the nonattainment classification

Federal Offset ratios

Area Classification		Ratio
Ozone	Marginal	1.1:1
Ozone	Moderate	1.15:1
Ozone	Serious	1.2:1
Ozone	Severe	1.3:1*
Ozone	Extreme	1.5:1*

*1.2:1 if SIP requires all existing major sources in Non-attainment Area to use BACT

CAA § 182

Federal Offset Ratios

	Area Classification	Offset Ratio
CO	Moderate	1:1
CO	Serious	1:1
PM10	Moderate	1:1
PM10	Serious	1:1
NO2, SO2	All	1:1

Offsets Exercise

- Maximum emission rate of new source is 100 pounds per hour
- LAER reduces emissions 80%
- Offset required is 1.2:1

- What is the <u>uncontrolled</u> PTE of the source in tons per year?
- What are the offsets required in pounds per hour?
- From what geographical area are the offsets required?
- How is the source going to obtain the offsets?

Offsets Exercise (Cont'd)

- Offsets:
  - Calculating offsets is more involved than the example
    - The example looked only at offsetting direct emissions from the project
    - In practice, offsets must assure "reasonable further progress"
      - Reasonable further progress is a planning term

Emission Offsets

- How are offsets obtained?
  - Enforceable emission reductions in the non-attainment area
  - Banking
  - Other?

Emission Allowances & Emission Offsets

Emissions trading

versus

Emissions banking

Emissions Trading

- <u>Emissions Trading (Market Based program):</u>
  - Also called a “cap and trade” program
  - Emissions are limited on a geographic basis
  - Emissions are tracked through allowances
  - Sources must hold enough allowances to cover actual emissions (usually on an annual basis)
  - Sources can buy or sell allowances
    - Sources that can economically reduce emissions can sell excess allowances to sources that cannot economically reduce emissions
  - Title IV Acid rain SOx trading program is an example of an emissions trading program
  - Requires comprehensive and transparent method of tracking emissions

Emissions Banking

- Emissions Banking:
  - Primarily a nonattainment area program
  - Allows sources who have gone out of business or reduced nonattainment pollutants to below regulatory requirements to “bank” those emissions
  - New or modified sources may purchase banked emissions when needed for offsets
  - Requires comprehensive and transparent method of tracking emissions

Emissions Banking (Cont'd)

<u>Emissions Banking</u>:

- For purposes of banking, trading, or immediate use, emissions reductions must be:
  1. Real
  2. Surplus
  3. Permanent
  4. Quantifiable
  5. Enforceable

Emissions Banking (Cont'd)

Emissions Banking:

- A state or local agency operating a registration program must ensure that the banked emissions meet these five criteria

Emissions Banking (Cont'd)

Emissions Banking:

- Offsets must generally be of same pollutant
  - Some consideration of inter-pollutant offsetting between ozone precursors (VOC/NOx)
- The use of emission reduction credits to offset other criteria pollutants may be restricted geographically

Questions?

LESSON 13

Role of Modeling & Inventories in Permitting

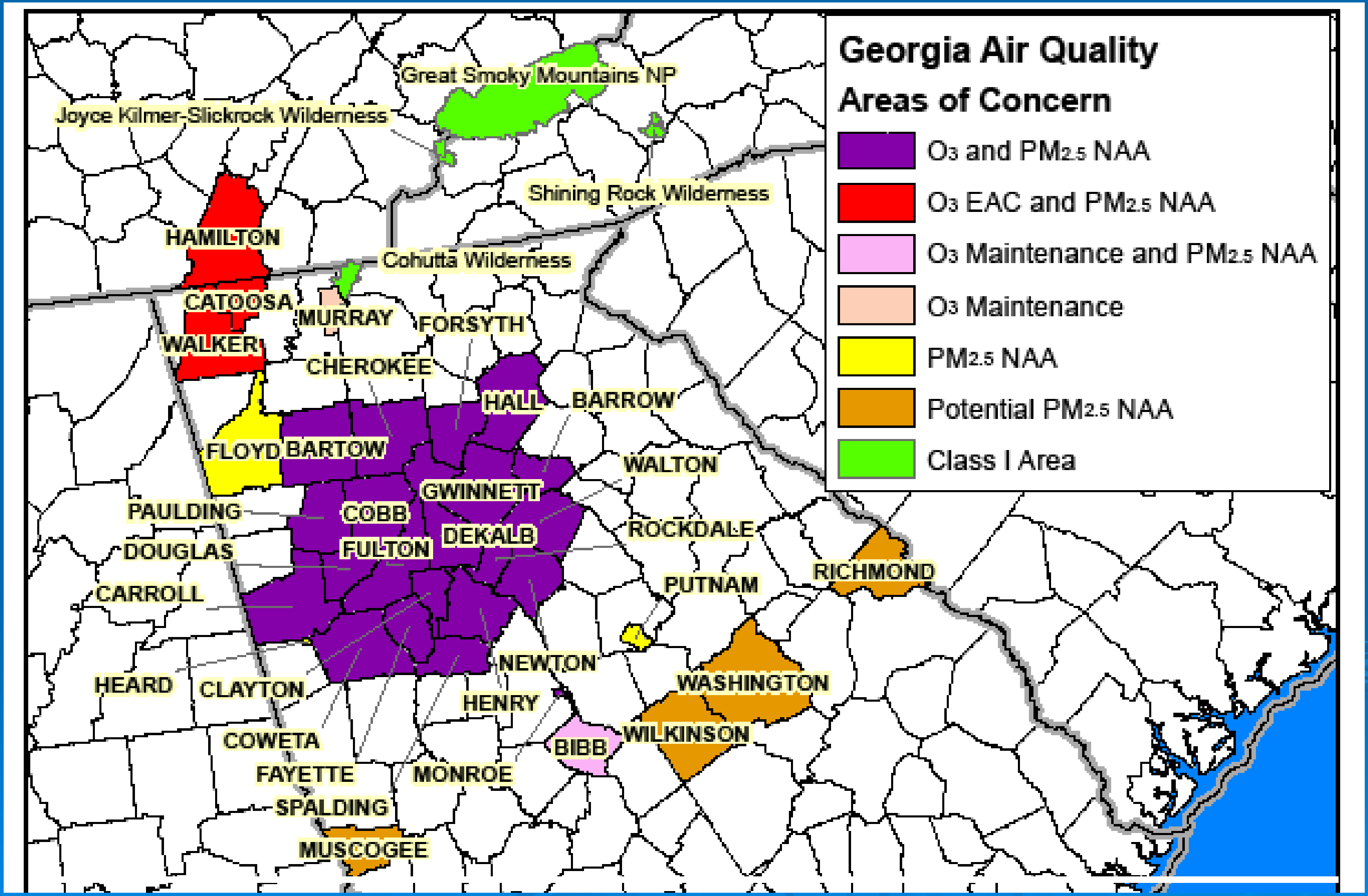
AIR SHED MODELING EXAMPLE

- Air Quality Modeling to Support the Georgia SIPs for O_3
- Courtesy of Georgia Department of Natural Resources
- Special thanks to Jim Boylan of the Protection Branch

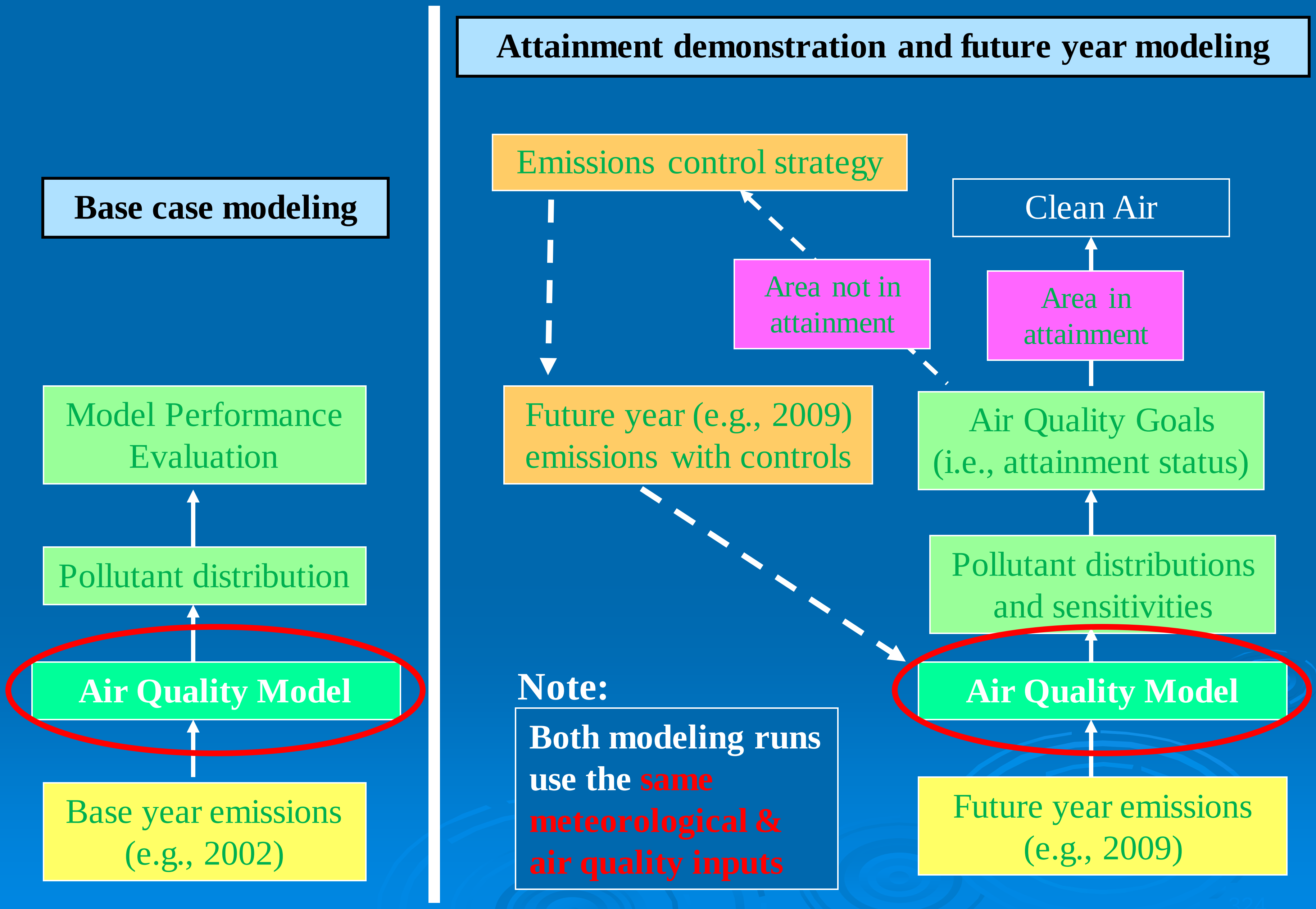
Lesson Objectives

- Learn how permits fit within the SIP planning process
- Provide an overview of Modeling & Inventories
  - Uses and Reasons
  - Benefits
  - Limitations
  - Factors Affecting Models
  - Types of Models

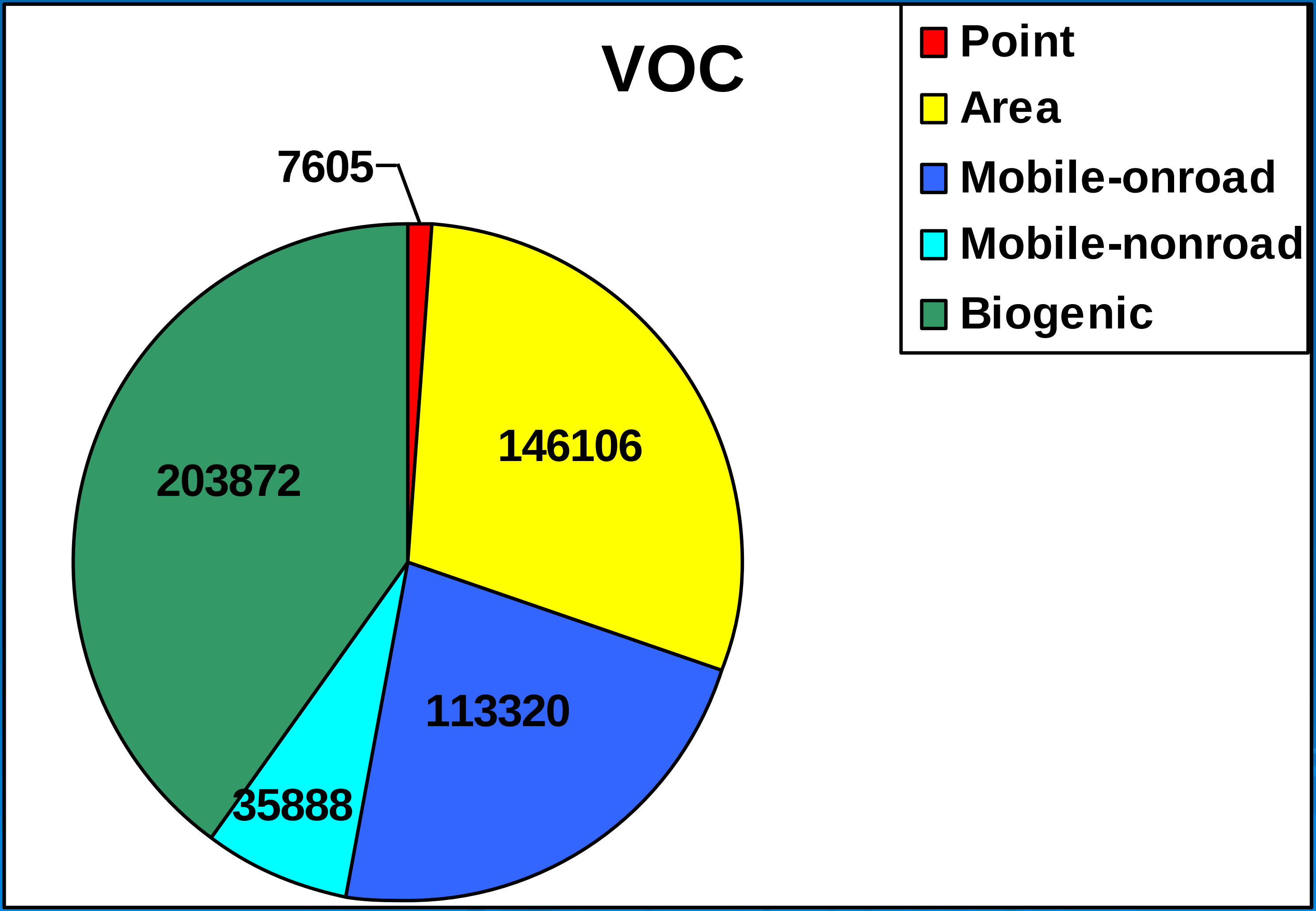
Non-Attainment in Georgia



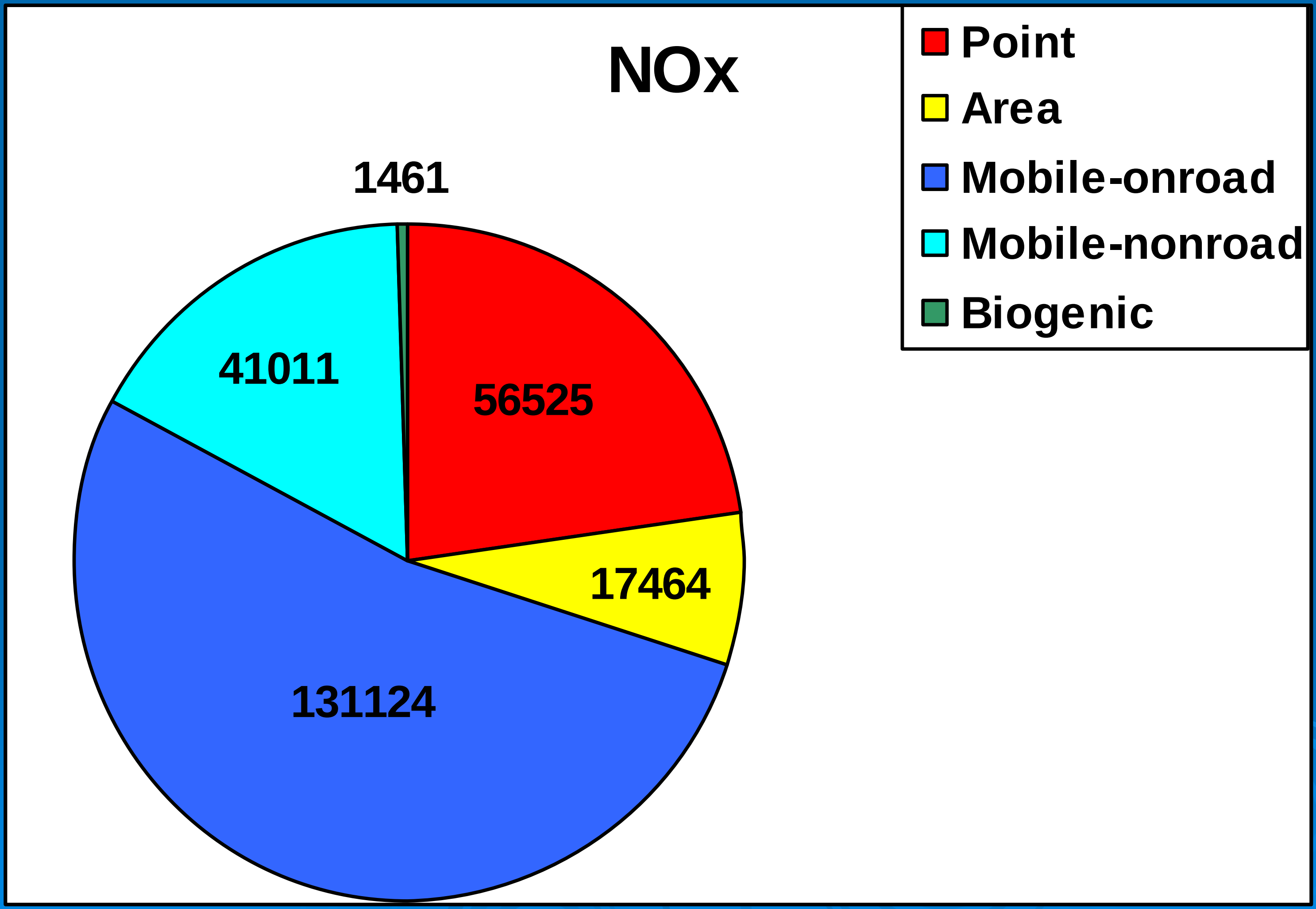
Demonstrating Attainment using AQ models



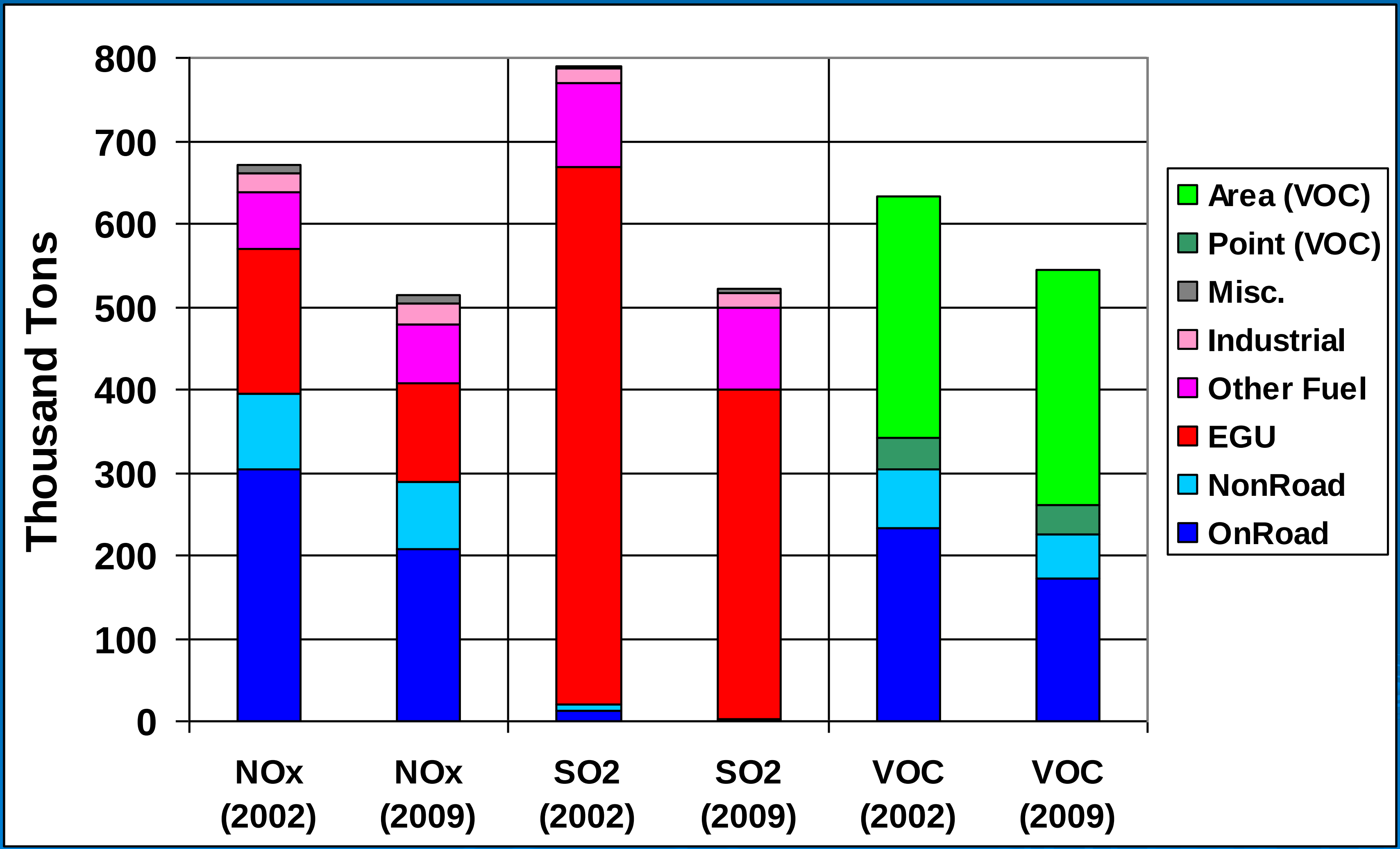
2002 Atlanta VOCs (tons)



2002 Atlanta NOx (tons)



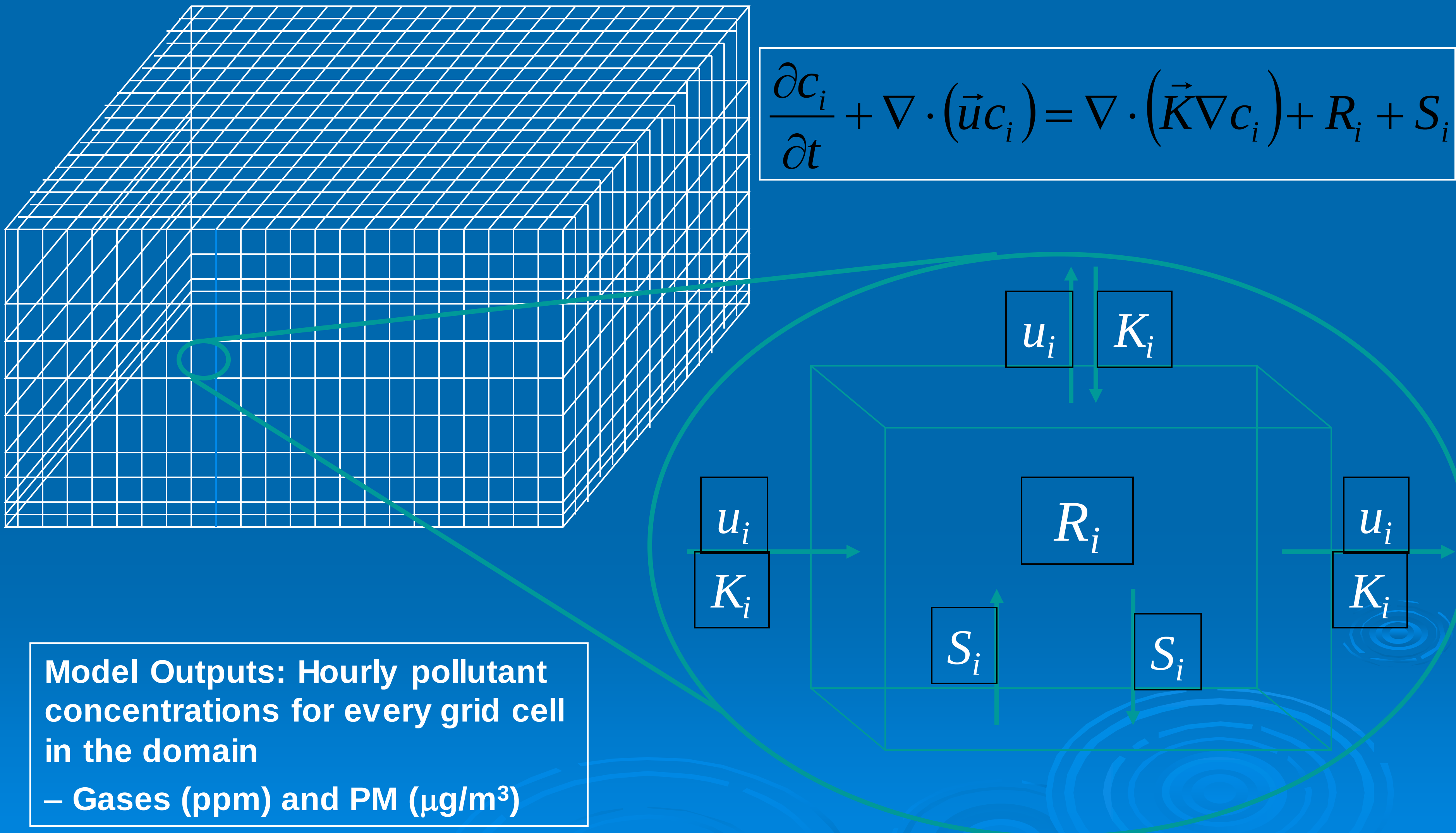
Future Emissions in Georgia



Reductions in NO_x and SO_2 $\Rightarrow$ reductions in ozone and sulfate $PM_{2.5}$

CMAQ is a Grid-Based Model

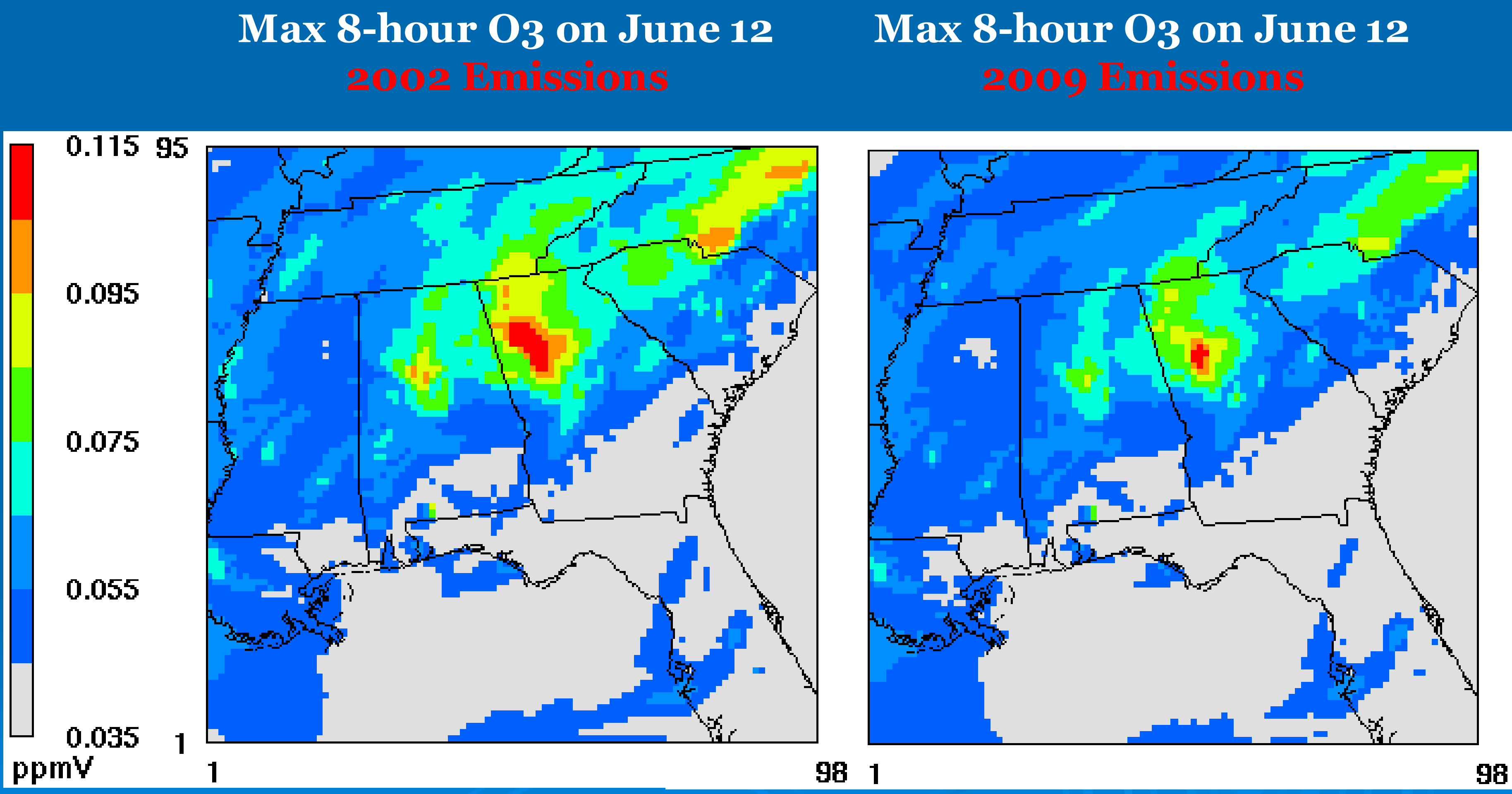
$$\frac{\partial c_i}{\partial t} + \nabla \cdot \left(\vec{u} c_i\right) = \nabla \cdot \left(\vec{K} \nabla c_i\right) + R_i + S_i$$



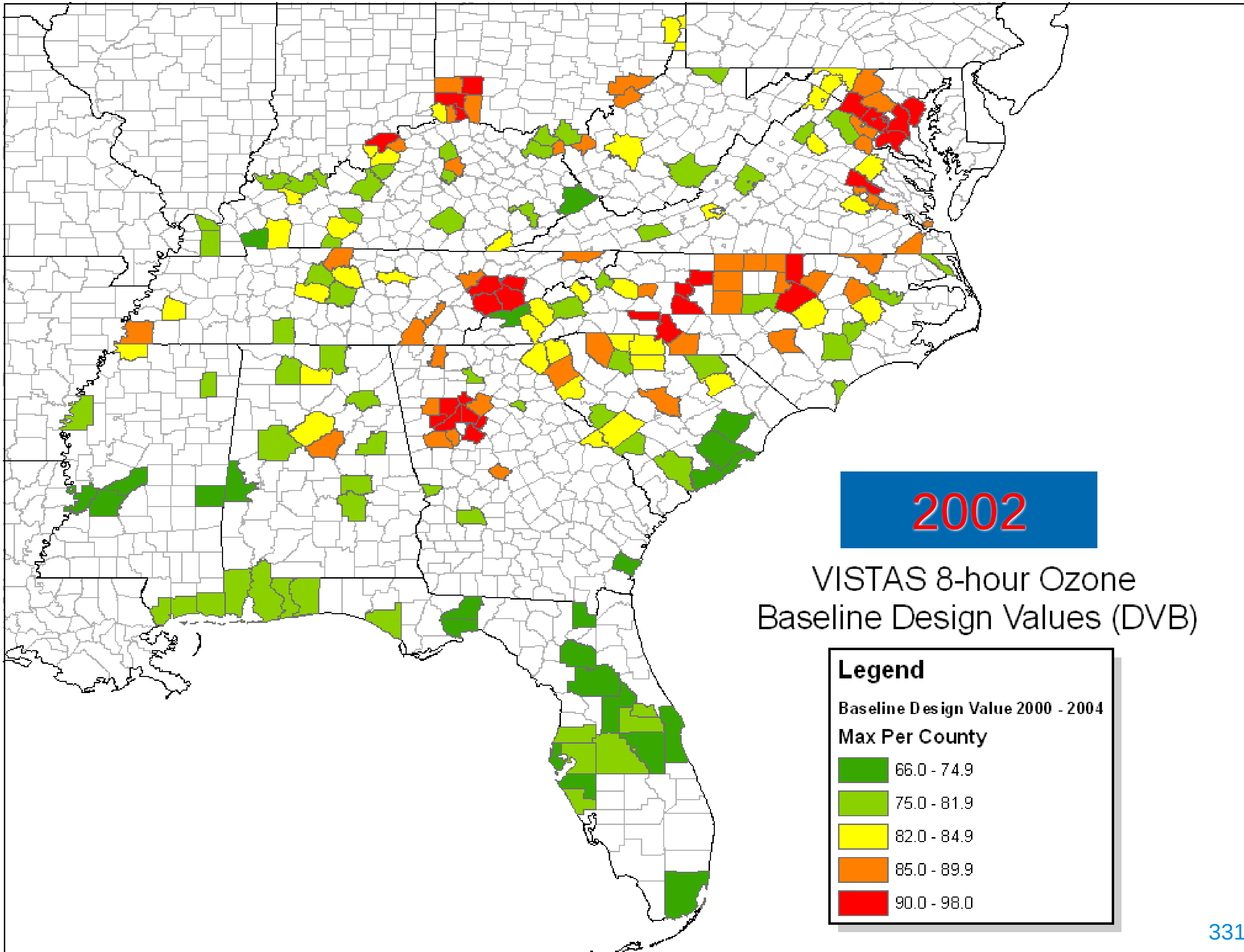
Model Outputs: Hourly pollutant concentrations for every grid cell in the domain

– Gases (ppm) and PM (μg/m³)

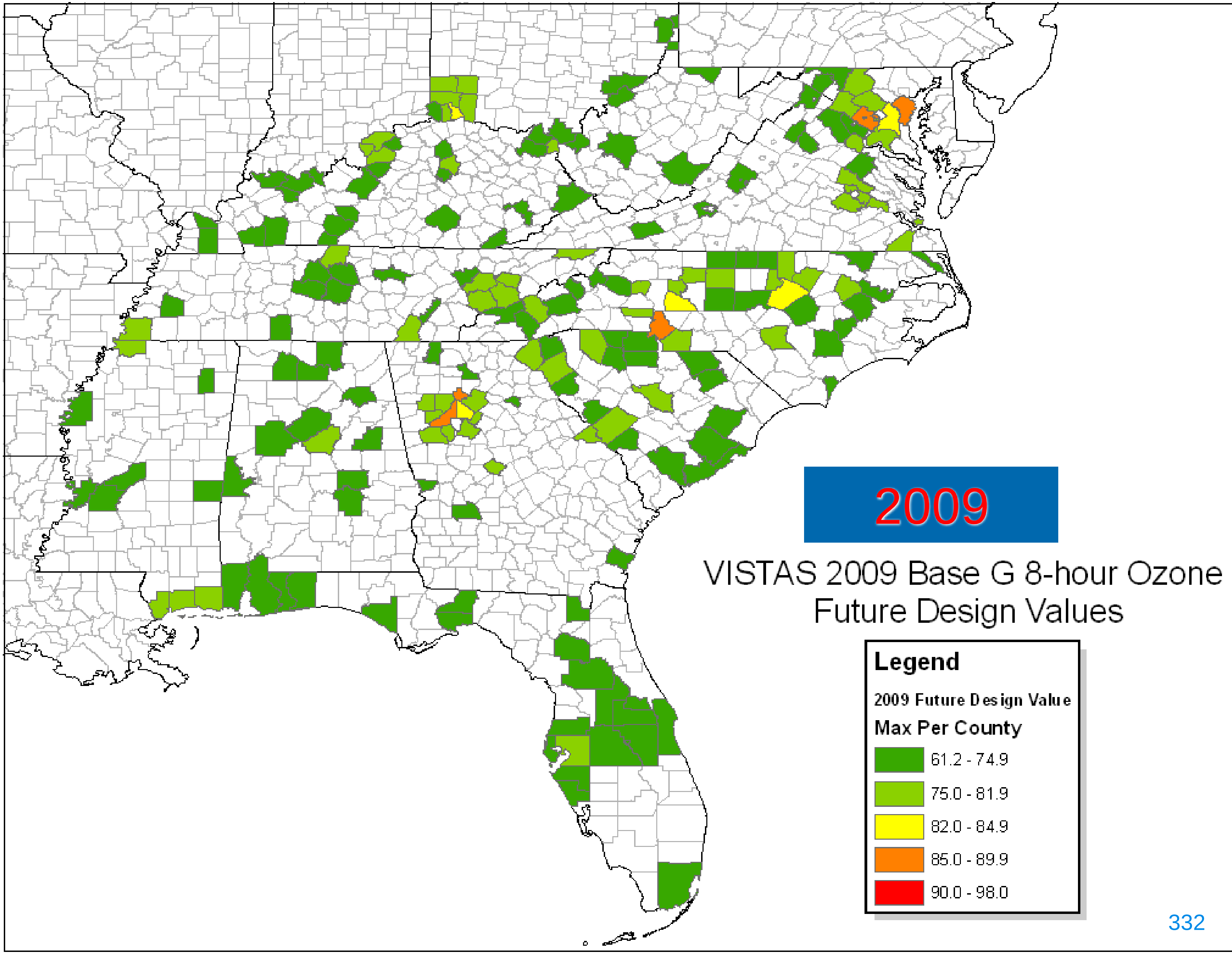
Air Quality Modeling (CMAQ)



Projected Ozone Attainment Status for 2009

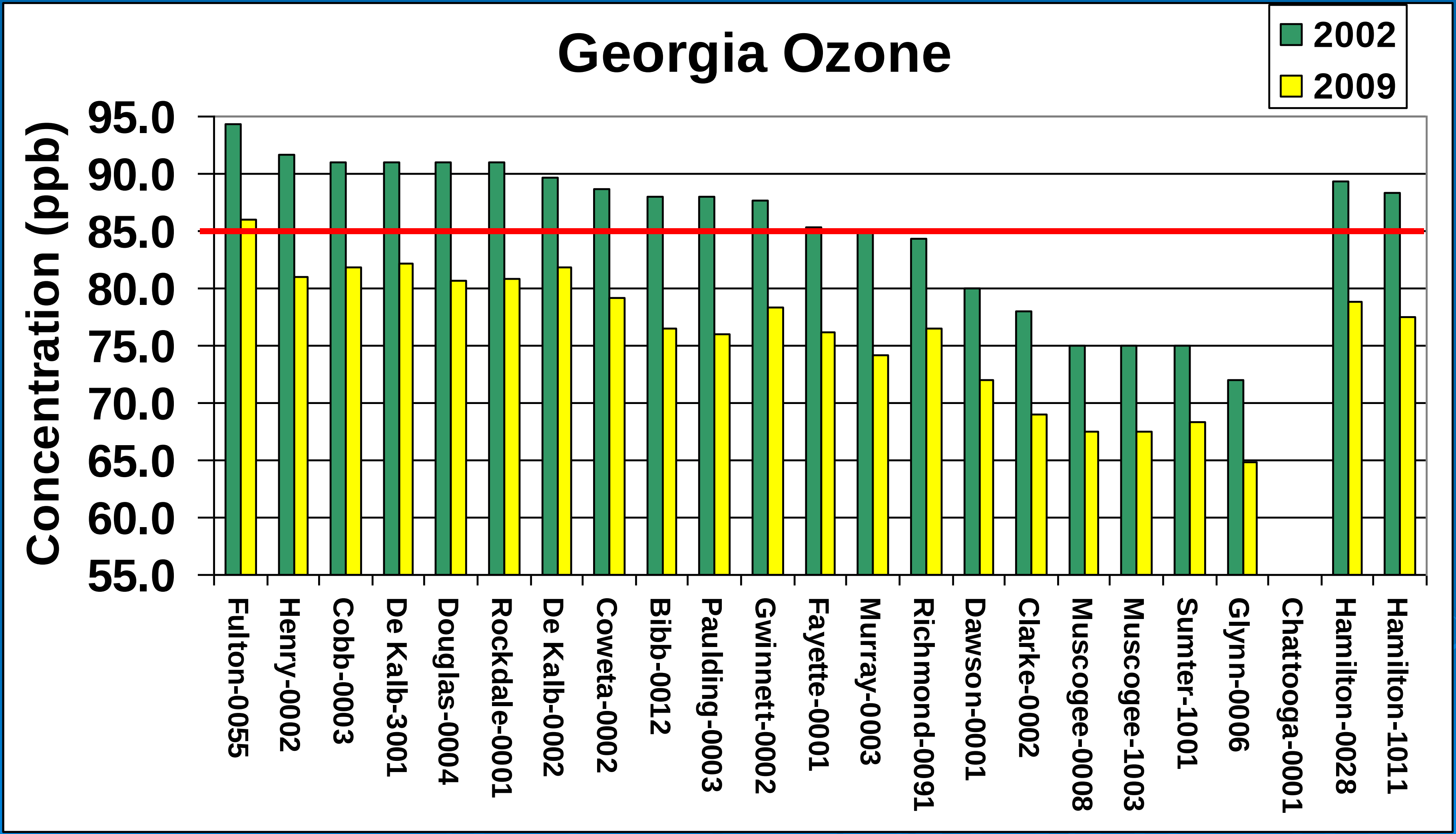


2002
VISTAS 8-hour Ozone
Baseline Design Values (DVB)
Legend
Baseline Design Value 2000 - 2004
Max Per County
66.0 - 74.9
75.0 - 81.9
82.0 - 84.9
85.0 - 89.9
90.0 - 98.0


2009
VISTAS 2009 Base G 8-hour Ozone Future Design Values
Legend
2009 Future Design Value
Max Per County
61.2 - 74.9
75.0 - 81.9
82.0 - 84.9
85.0 - 89.9
90.0 - 98.0

Future Ozone Concentrations

(BaseG2 emissions)



Discussion

- How were permit terms and conditions helpful to development of the State's SIP?

QUESTIONS

Lesson Objectives

- Provide an overview of Modeling & Inventories
  - Uses and Reasons
  - Benefits
  - Limitations
  - Factors Affecting Models
  - Types of Models

Overview

- Models use mathematical and numerical techniques to :
  - Simulate physical and chemical processes that affect air pollutants
  - Predict concentrations of pollutants of interest
- Based on input related to
  - Meteorological data
  - Source information
  - Type of pollutant

Uses and Reasons

- Used by agencies tasked with controlling air quality
- Identify source contributions to air pollution problems
- Verify that emissions from a new or modified source will not cause or contribute to a violation of air quality standards or PSD increment and/or adversely affect human health and the environment
- Assist in the design of control strategies
- Determine emission limits from stacks that are greater than GEP

Benefits

- Predict future concentrations from multiple sources
- Capture peak concentrations (design values)
- Determine contribution from proposed or existing sources
- Only modeling can determine the emission limit for a proposed source
- Faster turn-around than monitoring
- Monitoring tools may be unavailable
  - methodology
  - instruments

Most Common Types of Models

- **Screening**
- **Dispersion**
  - Near Field - Gaussian, steady state
  - High resolution
  - Single or multiple sources
- **Photochemical**
  - Long Range Grid Models
  - Primarily for O_3 Secondary $PM_{2.5}$
- **Puff**
  - Long-Range Transport
  - Time dependent
  - E.g. used to predict the impact from a new source on a Class I area that is > 50 km away

Screening Models

- Usually applied to determine the need for more refined models

- Common Screening models
  - AERSCREEN – for flat and complex terrain
  - CTS SCREEN – a more refined complex terrain
  - VISCREEN – for visibility source impacts

AERSCREEN

- Inputs
  - Emission rate
  - Source type (i.e., point, area, volume)
  - H_s, D_s, V_s, & T_s
  - Distance out to which receptors are placed
  - Urban or Rural
  - Building dimensions – if downwash is being considered
- Limitations
  - Can model a single source only
  - Does not predict best case estimates of concentration. It uses conservative assumptions so it overpredicts

SCREEN Model Attributes

- Easy to use
- Conservative downwind concentration
- Minimal input requirements
- Can simulate point, area, and volume type sources
- AERSCREEN can simulate both inversion break-up as well as coastal fumigation.

SCREEN Model Limitations

- Cannot handle multiple sources
- Only predicts hourly concentrations – 3hr., 24hr. & annual are scaled based on research studies
- Does not use actual meteorology representative of the site
- Impacts are generally overestimated

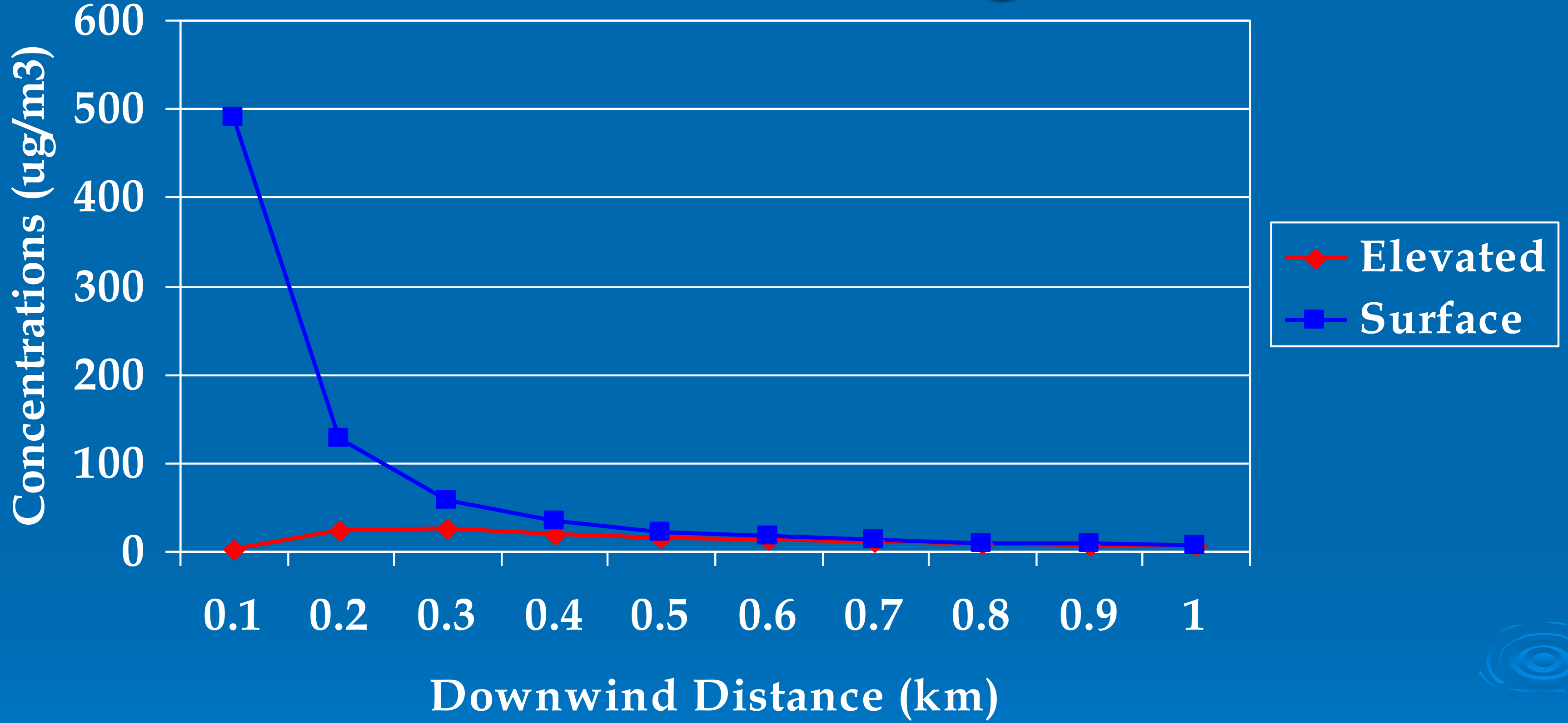
Dispersion Models

- Typically used in the permitting process
  - Predicts ground-level concentrations at specified receptor locations no > than 50 km from the source
- Commonly used for “inert” pollutants, although AERSCREEN can consider NO_x chemistry

Modeling Assumptions

1. Concentrations at the receptor are directly proportional to emissions
2. Dispersion models are steady-state
3. Dispersion models assume Gaussian and bi-Gaussian distributions of concentration.
4. Grid model resolution is only as fine as the size of the grid cell, which is on the order of Kms.
5. The greater the down wind distance the greater the dispersion, but not necessarily the lower the concentration

Sensitivity of GLC to Release Height



$$H_e = H_s + \Delta h$$

Effective Stack Height = Physical Stack Height + Plume Rise

Atmospheric Influences

- Dilution
- Dispersion
- Transport
- Chemistry
- Removal
  - Settling
  - Deposition
  - Transformation

Dispersion - A Function of

- STACK CHACTERISTICS
  - Stack height & diameter
  - Exit gas temperature and velocity
  - Emission rate
- METEROLOGY
  - Atmospheric turbulence
  - Stability & Mixing height
  - Wind direction & speed
  - Distance down wind to point on ground

The Results

- Ground level concentrations at all selected receptors
  - Results can be the incremental impact from one or more sources. E.g. when estimating impact on PSD increment.
  - By modeling all appropriate sources and adding background to account for distance sources, total concentrations can be estimated

AERMOD

- U.S. EPA and American Meteorological Society (AMS) initiated a formal working group – AMS/EPA Regulatory Improvement Committee (AERIC)
- AERMOD has replaced ISCST3 and Complex I as the approved Regulatory Guideline Model for both flat and complex terrain
  - (*Guideline on Air Quality Models*, 40 CFR 51 Appendix W)

AERMOD

- AERMOD stands for American Meteorological Society/ Environmental Protection Agency Regulatory Model
- Formally Proposed as replacement for ISCST3 in 2000
- Adopted as Preferred Model November 9, 2005

AERMOD GOALS

- Replace ISCST3 by:
  - Updating ISCST3's algorithms based on the significant degree of research performed in the 1980's
  - Improve handling of source and atmospheric processes
  - Produce a concentration that applies in both flat and complex terrain.

AERMOD GOALS (Cont’d)

- Replace ISC3 by:
  - Capturing our present understanding of atmospheric processes
  - Providing reasonable concentration estimates under a wide variety of conditions
  - Accommodating modifications easily as technology advances

AERMOD

- 3 COMPONENTS
  - **AERMET** – THE METEOROLOGICAL PREPROCESOR
  - **AERMAP** – THE TERRAIN DATA PREPROCESSOR
  - **AERMOD** – THE DISPERSION MODEL
- 2 SUPPORT TOOLS
  - **AERSURFACE** – PROCESSES SURFACE CHARACTERISTICS DATA for input to AERMET
  - **AERMINUTE –** Processes 1 min. data for input to AERMET
  - **AERSCREEN** – PROVIDES A SCREENING TOOL

AERMOD (Cont'd)

- Requires extensive data input
  - Meteorological
  - Terrain
- Steady state plume model, with concentration assumed to be
  - Bi-Gaussian in the Vertically
  - Gaussian in the Horizontal
- Applicable to
  - Rural & urban areas
  - Flat & complex terrain
  - Point, area, line & volume sources

AERMOD (Cont'd)

- Removes need to distinguish between simple, intermediate, and complex terrain
- **Important because?**
- Includes two preprocessors and the dispersion model
  - AERMET is the preprocessor which provides meteorological info to AERMOD
  - AERMAP is the preprocessor which provides terrain and spatial info to AERMOD
- Calculates concentrations, deposition and depletion

AERMOD (Cont'd)

- Requires local information
  - Wind speed, direction
  - Surface Characteristics – Land use, impervious surface and tree Canopy
  - Mixing height
  - Topographical data
  - Population – urban mode
- Requires detailed source information
  - Emissions
  - Stack parameters
  - Operation conditions
  - Building dimensions – downwash
- Tends to overestimate impacts for some situations but in general its predictions are unbiased

Photochemical Models

- Used Primarily for O_3 attainment demonstrations, and the long-range transported $PM_{2.5}$ aerosols component of the total $PM_{2.5}$ concentration
- Simulates impacts from all sources, anthropogenic and biogenic
- Predict deposition of pollutants over wide areas
  - Generally not useful for NSR/PSD permit modeling – lack of needed spatial resolution
- Requires considerable computational resources

Common Photochemical Models

- Community Multi-scale Air Quality (CMAQ)
- Comprehensive Air Quality Model with extensions(CAMx)
- Regional Modeling System for Aerosols and Deposition (REMSAD)
- Urban Airshed Model Variable Grid (UAM V)

Mobile Source Models

- Mobile sources contribute significantly to:
  - Criteria pollutant concentrations
  - Air toxics effects
  - Greenhouse gases emissions
- EPA uses mobile models to estimate emissions from on-road vehicles, nonroad sources, and fuels, not ambient concentrations
- Results of the mobile models are used for input to air quality simulation models

Mobile Source Models (Cont'd)

- These models calculate amount of
  - Carbon Monoxide
  - Hydrocarbons
  - Nitrogen Oxides
  - Particulate Matter
  - Sulfur Dioxide
  - Air Toxics

Mobile Source Models (Cont'd)

- MOBILE – predicts on-road source emissions
- NONROAD – predicts emissions from nonroad vehicles, equipment and engines
- NMIN (National Mobile Inventory Model) uses outputs from MOBILE and NONROAD to develop current and future mobile source emission inventories

Mobile Source Models (Cont'd)

- Predict and assess, in conjunction with an air dispersion model, the effectiveness of mobile source and fuel control strategies
  - Sulfur reduction in diesel fuels for PM 2.5
  - Catalytic converter effectiveness
  - Particulate traps for reduction of PM 2.5
  - Future attainment strategies

A WORD ABOUT MONITORING

- Useful tool
- **Advantages:**
  - Accurate data
  - Needed to develop background levels
- **Disadvantages:**
  - Limited locations
  - Ability to capture maximum concentrations are highly uncertain
  - Time consuming & Expensive

EMISSIONS AS RELATED TO INVENTORIES

- Emissions: Gases and particles which are put into the air or emitted by various sources

EMISSION DATA REQUIREMENTS

- EPA’s Emissions Measurement Center develops standards and evaluates testing methods
- Example: Emission factors
- This results in consistent emissions data for various uses

EMISSION INVENTORIES

- Quantity of pollutants are measured over time using standardized methods
- Once measurements are made the data is stored for various uses
- Rule development
- Modeling use

CHIEF

- Clearinghouse for Inventories and Emission Factors
- Centralized resource for emissions data

Questions?

LESSON 14

Title V

Operating Permits

Lesson Objectives

- What is Title V
- The purpose of Title V
- Title V Applicability
- What is included in a Title V permit
- What is an “applicable requirement”
- What is the “application shield”
- Title V permit amendments/modifications

What Is Title V

- 6 Titles in the 1990 Clean Air Act Amendments
  1. Programs and Activities
  2. Emission Standards for Moving Sources
  3. General Provisions
  4. Acid Deposition
  5. Permits
  6. Stratospheric Ozone Protection

How Title V Permits Differ from Pre-Construction Permits

- Pre-Construction Permits are required for most new facilities or new/modified units at existing facilities
- Title V is an “Operating Permit” program
- Title V does <u>not</u> generally create any new federal requirements for a source
- Title V permits contain most Pre-Construction Permit conditions

Title V Permits – AKA Part 70

- Statutory basis for federal operating permit program
  - CAA Title V
- Regulations implementing program
  - 40 CFR Parts 70 & 71
  - Part 70: State-issued permits
    - Therefore often referred to as Part 70 Operating permits
  - Part 71: EPA-issued permits

Part 70 Programs

- Most states (and some tribes) have a Title V operating permit program approved by EPA
- The programs may be carried out by
  - The state/tribal agency
  - A local agency
- These state/tribal/local programs must meet the requirements of 40 CFR Part 70

Part 71 Programs

- EPA will administer an operating permits program (full or partial program)
  - If a Part 70 program has not been granted full approval
    - In a state
    - In Indian country
  - As needed, for a specific permit/source

Title V Permits

PURPOSE & BENEFITS

Purpose of Title V

- A comprehensive permit system that identifies, aggregates, and implements Clean Air Act requirements for sources of air pollution
- Enable the source, states/locals/tribes, EPA, and the public to better understand the requirements to which the source is subject to
- Combines existing applicable requirements into one permit

Benefits of Title V

- Provide an opportunity for citizens to be involved in the permit review process
- Aid in determining whether the source is meeting those requirements
- Increase source accountability resulting in better compliance

Benefits of Title V (Cont'd)

- Provide the basis for better emission inventories
- Provide a vehicle for the states to administer parts of the Federal Air Toxics program
- Play a significant role in ensuring compliance with the acid rain regulations based on Title IV of the Clean Air Act

Benefits of Title V (Cont'd)

- Fee-for-service program
  - Ensure that States have resources necessary to develop and administer the program effectively
  - Create an incentive for sources to reduce emissions

Title V Public Participation Opportunities

- Comment on and request a public hearing on draft permits
- Appeal Part 70 permits in state court
- Petition the EPA to object to a permit
- Appeal EPA-issued permits to the Environmental Appeals Board and federal courts
- Track compliance by reviewing reports/certifications submitted by sources
- Bring citizen suit in civil court for permit noncompliance

Title V Permits

APPLICABILITY

Applicability

- Title V Operating Permits are required for: (40 CFR 70.3)
  - Major Sources
  - Affected Sources (under CAA Title IV)
  - Sources subject to section 111 (NSPS) or 112 (NESHAP) of the CAA
  - Sources required to have a permit under Part C (attainment areas) or Part D (nonattainment areas) of CAA Title I

Applicability (Cont'd)

- Regulated pollutant thresholds:
  - Criteria pollutants: $\geq$ 100 tpy PTE
  - HAPs: $\geq$ 10tpy (1 HAP) or $\geq$ 25 tpy of HAPs
- Solid Waste incinerators required to obtain a permit under CAA section 129(e)
- Non-major sources when required by the applicable standard

Pollutant Added to PSD

- PM 2.5
  - PM2.5 final NSR rule published May 16, 2008
  - Major source baseline date – October 20, 2010

Greenhouse Gas "Anyway Sources"

- In 2014, the Supreme Court found EPA could no longer regulate sources under the PSD and Title V permit programs based solely on their emissions of GHGs.
- However, if a source triggers the PSD program for other pollutants, it can be required to comply with BACT for GHGs. *Utility Air Regulatory Group v. EPA*, 134 S. Ct. 2427 (2014).
- These are often referred to as "anyway sources".

Applicability (Cont'd)

Exempt source categories

- 40 CFR 60 subpart AAA, NSPS for New Residential Wood Heaters
- 40 CFR 61.145, Asbestos Reno/Demo NESHAP
- Subsequently added exemptions:
  - Non-major sources not otherwise required to obtain a Part 70 permit (state discretion)

Major Source

- A more thorough discussion about the definition of "major source" is presented in Lesson 3

Fugitive Emissions

- To be included in PTE calculation when base program (*i.e.*, MACT, certain PSD & NSR) so require inclusion
- Definition of fugitive seems straightforward
- Interpretation and application of definition may be challenging

Synthetic Minor

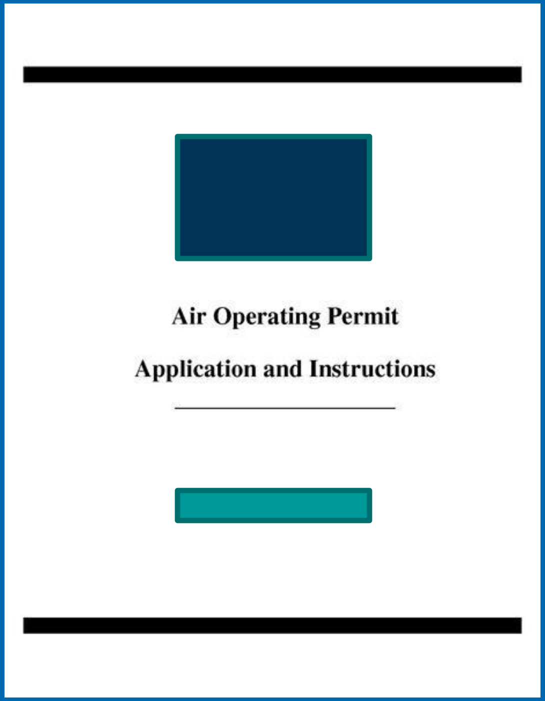
- Source can avoid Title V requirements under certain conditions
- Maintain an emission level below applicability thresholds

Synthetic Minor (Cont'd)

- Emission levels must be
  - Reflected in a formal permit issued by the agency
  - Enforceable (federally and practically enforceable)
  - Federally Enforceable State Operating Permit (FESOP) and Minor NSR Permit

Title V Permits

PERMIT APPLICATION


Air Operating Permit

Application and Instructions

Permit Application

40 CFR 70.5 specifies the minimum requirements for Part 70 applications

- Timely submittal
- Completeness determination
- Application "Shield"
  - Protects source from action while application is being processed, if application is timely and complete

Permit Application (Cont’d)

- Identifying Information (address, contact information, information about emitting equipment)
- Emissions Reports (Potential, Actual)
- Listing of Significant & Insignificant Activities
- Compliance Plan
- Compliance Schedule
- Compliance Certification

Class Discussion

- Is this application complete?
  - Certification has been reworded
  - NSPS emission unit does not include compliance demonstration method
  - Fails to include compliance status of the source with respect to all applicable requirements
  - Certification signed by plant manager (definition of responsible official next page)

Responsible Official

- For a corporation
  - Official in charge of a principal business function, *e.g.*, president, vice president, secretary, or treasurer
  - Delegation may be allowed if the chosen person oversees
    - More than 250 employees; or
    - Gross sales or expenditures > $\$25x10^6$

  and if the permitting agency agrees

Responsible Official (Cont'd)

- For a government agency
  - A principal executive officer, or
  - A ranking elected official
  - For a federal agency, the chief executive officer over a region
- For a partnership or sole proprietorship
  - One of the general partners, or the owner

Title V Permits

PERMIT CONTENT

Permit Content Requirements

- Emission limitations and standards
  - All applicable requirements
  - Origin & authority for each term or condition
- Permit duration (usually 5 years)
- Monitoring, and related recordkeeping and reporting
  - Submittal of required monitoring reports every 6 months
  - Include identification of deviations
  - Certified by responsible official
  - Compliance Assurance Monitoring (CAM) and addressed in a separate lesson

40 CFR 70.6

Permit Content (Cont'd)

- Prohibition of exceedances of Title IV limits
- Severability clause
- Permittee must comply with provisions of permit
- Need to halt or reduce activity not a defense
- Permit may be reopened…for cause
- Permit does not convey property rights
- Permittee must provide requested information

Permit Content (Cont'd)

- Requirement to pay Title V fees
- Emissions trading language
- Alternative operating scenarios
- All documents be signed by a responsible official
- Periodic compliance certifications (at least annually)
- Various general provisions
- Anything else the permitting authority might require

Permit Content: Additional Discussion

- Credible Evidence rule
  - Any credible evidence can be used to show compliance or noncompliance with applicable requirements
  - Disallows using only reference test method results to determine compliance or non-compliance
- State rule amendments or modifications not yet approved into the SIP
  - The applicable requirement is the SIP rule
  - The amended or modified state rule is the applicable requirement once the SIP has been revised

Permit Content (Cont'd)

- Compliance requirements
  - Monitoring, Reporting & Recordkeeping (MRR)
  - Right of Entry
  - Right to Records
  - Right to monitor and/or sample
  - Compliance Schedule
  - Compliance Assurance Monitoring (CAM)

Class Discussion

What is an applicable requirement?

Class Discussion (Cont'd)

Why is the concept of "applicable requirements" important to the Title V Operating permit program?

Class Discussion (Cont'd)

- Which of the following are applicable requirements?
  - A BACT requirement?
  - A LAER requirement?
  - Terms and conditions of a minor NSR permit?
  - A BARCT requirement?
  - A requirement that office air conditioning units be maintained by a licensed technician?
  - A state rule?
  - A requirement that an affected source operate it CEMs according to the requirements of 40 CFR Part 72?
  - A requirement that all asbestos abatement projects meet the requirements of 40 CFR Part 61?
  - A severability clause required by Title V of the CAA?
  - An NSPS or NESHAP requirement?
  - A consent decree order entered into between the state and the source?

Class Discussion (Cont'd)

- You are drafting a Title V permit for XYZ Corporation. XYZ Corporation timely submitted the application and your agency determined the application was administratively complete.
- During your review of the application in preparing to draft the permit, you find that the application states that XYZ Corporation has a boiler that is subject to the Subpart Dc NSPS. However, you find no reference to emission limits or monitoring, record keeping and reporting requirements for the boiler.
- What can you legally do?

Permit Shield

- Permit may include a "permit shield"
  - A provision stating that compliance with the conditions of the permit shall be deemed compliance with any applicable requirements as of the date of permit issuance, with certain caveats
  - Not mandatory – an option left to permitting authority
  - If permit does not expressly state that a permit shield exists, it is presumed not to exist

Title V Permits

PERMIT ISSUANCE

Permit Issuance

- Before a permitting authority can issue a permit, it must have:
  - Received a complete application
  - Complied with public participation requirements
  - Notified, and responded to, affected states
  - Included in the permit a requirement that source comply with all applicable requirements and Part 70 requirements
  - Prepared a statement of the legal and factual basis for issuing the permit (Statement of Basis or SOB); and
  - Provided a copy of the permit application, permit, & SOB to EPA and received no objection to its issuance from EPA

40 CFR 70.7

Permit Issuance (Cont'd)

- Public Participation requirements
  - Notice (Contents specified at 70.7(h)(2))
    - Newspaper of general circulation where source is located or in state publication designed to give general public notice, or posted on a public website identified by the permitting agency
    - To persons on the Title V mailing list
    - To affected states
    - Other means necessary to notify affected public
    - Other state requirements

Permit Issuance (Cont'd)

- Public Participation requirements (cont'd):
  - Must provide at least 30 days to submit comments
  - Must provide at least 30 days notice prior to public hearing
  - Must keep record of commenters, and issues raised
  - Response to comments

Response to Comments

- The permitting authority must respond in writing to all significant comments raised during the public participation process, including any such written comments submitted during the public comment period and any such comments raised during any public hearing on the permit.

Permit Issuance (Cont'd)

- Statement of Basis (SOB)
  - Sets forth the legal and factual basis for the draft permit conditions
  - Include references to applicable statutory or regulatory provisions
  - Send to EPA and anyone requesting it
  - **Follow your agency policy in regard to Statement of Basis**

40 CFR 70.7(a)(5)

Permit Issuance (Cont'd)

- More on Statement of Basis
- Should discuss decision-making that went into the development of the permit
  - Rationale for selected monitoring methods
  - Basis for applying permit shield
  - Compliance history of the source

Permit Issuance (Cont'd)

- EPA review of permit (40 CFR 70.8)
  - EPA must be provided a copy of the
    - Permit application
    - Proposed permit
    - Statement of Basis
    - **See your agency procedure for specific requirements**

Permit Issuance (Cont'd)

- EPA objection
  - If EPA objects to the permit within 45 days of receiving all required information, permit cannot be issued
  - Permitting authority has 90 days to revise and submit proposed permit, or EPA will issue or deny a permit under Part 71

Petitions Requesting EPA Object

- If EPA's Administrator does not object, any person may petition the Administrator within 60 days after the expiration of the Administrator's 45-day review period to make such objection.
- The petitioner shall provide a copy of the petition to the permitting authority and the applicant.
- A petition shall be based only on objections to the permit that were raised with reasonable specificity during the public comment period, unless the petitioner demonstrates that it was impracticable to raise such objections within such period, or unless the grounds for such objection arose after such period.

Petitions Requesting EPA Object

- If the Administrator objects to the permit as a result of a petition, the permitting authority shall not issue the permit until EPA's objection has been resolved,
  - Except that a petition for review does not stay the effectiveness of a permit or its requirements if the permit was issued after the end of the 45-day review period and prior to an EPA objection.
- If the permitting authority issued a permit prior to receipt of an EPA objection, the Administrator will modify, terminate, or revoke such permit, except in unusual circumstances. The permitting authority may thereafter issue only a revised permit that satisfies EPA's objection.

Title V Permits

PERMIT

MODIFICATION

Permit Modification

- Three types
  - Administrative amendments (AAs)
  - Minor Modifications (MMs)
  - Significant Modifications (SMs)

Permit Modification (Cont'd)

- Administrative amendments
  - Typos
  - Change in name or phone number
  - Require more frequent monitoring
  - Change of ownership if no other changes
  - Other changes approved by EPA as AA
    - Case-by-case determination
  - No Public notice or EPA review

Permit Modification (Cont'd)

- Minor Modifications
  - Would not violate any applicable requirement
  - No significant changes to MRR conditions
  - No impact on MACT, NSPS, AAQS, or PSD increments requirements
  - No change to permit term for which source has assumed responsibility to avoid other requirements
  - Not a modification as Per Title I
  - Not deemed significant by Permitting Agency

Permit Modification (Cont'd)

- Significant Modification
  - Anything that cannot be classified as an Administrative Amendment or a Minor Modification is a Significant Modification

Reopening for Cause

- Originated by Permitting Agency or EPA
  - Additional applicable requirements
  - Material mistakes
  - To assure compliance
- Affect only flawed parts of permit
- Procedurally similar to initial issuance
- As expeditiously as possible

40 CFR 70.7

Title V Permits

PERMIT RENEWAL

Permit Renewal

- Generally required every 5 years
- Permittee must submit application for renewal at least six months prior to expiration
- Renewal process is nearly as extensive as initial issuance

QUICK REVIEW
TITLE V OPERATING PERMITS

- Purpose
- Applicability
- Permit Application
  - Application Shield
- Permit Content
  - Applicable Requirements
  - Permit Shield

QUICK REVIEW (Cont'd)
TITLE V OPERATING PERMITS

- Permit Issuance
  - EPA Review
  - Public participation
  - Statement of Basis
- Permit revision
- Permit Renewal
- CAM*
- Compliance/Enforcement issues*

* These two topics are covered in other lessons

QUESTIONS?

LESSON 15

Monitoring, Reporting and Recordkeeping

Lesson Objectives

- Understand reasons for monitoring, reporting and recordkeeping
- Determine what types of monitoring, recordkeeping, and reporting are required
- Identify who is responsible for monitoring, recordkeeping, and reporting

Monitoring, Reporting and Recordkeeping

- Required for Title V sources
  - 40 CFR 70.6 (a) (3)
- Advisable for all sources

Why Required?

- To ensure continuous compliance with regulations and permit conditions
- To ensure proper operation of equipment
  - Prime equipment
  - Control equipment

Monitoring Requirements

- Based on underlying regulation
- Permit should identify techniques to measure emissions from unit
  - By source operator
  - By inspector
- Permit should specify that penalties would apply for failure to monitor

Emissions Monitoring

- Performance testing
  - Stack tests
  - Extraction tests
  - Fuel analysis
- Continuous Emission Monitoring
- Opacity monitoring

Parametric Monitoring

- Track some surrogate for emissions
  - Combustion temperatures
  - Boiler exhaust O_2 content
  - Gas inlet and outlet temperatures
- Opacity monitoring
- Throughput

Calculations

- Fuel usage
- Mass balance
  - Coatings utilized
  - Raw material

Monitoring to Ensure Effective Operation of Control Equipment

- Bag leak detector on baghouse
- Pressure drop for baghouse
- Breakthrough detector on carbon bed
- Water flow to dust suppression system
- Electrical parameters (ESP)

If No Monitoring Requirements Prescribed in Regulation

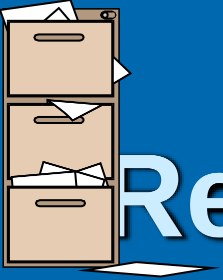
- Prescribe monitoring based on:
  - Previous permit
  - Similar facilities
  - EPA guidance
  - Manufacturer's recommendation
  - Proposal presented by applicant

Reporting Requirements

- Permit should identify specific information that permittee is required to submit
- Permit should define schedule for submittals
- Permit should specify that penalties would apply for failure to submit reports as prescribed

What Shall Be Reported?

- Reports of any required monitoring at least every 6 months
- All instances of deviations from permit requirements must be clearly identified
- All reports required by Title V must be certified by a responsible official



Record Keeping Requirements

- Identify data and records to be maintained (electronic or paper)
- Indicate how records are to be accessible to agency
- Indicate how long records are to be maintained
- Permit should specify that penalties would apply for failure to maintain records

What records must be kept?

- Title V requires records of required monitoring (advisable for all permits)
  - Date, place & time of sampling or measurements
  - Date of analyses
  - Who performed the analyses
  - Identification of analytical methods
  - Analytical results
  - Source operating conditions during sampling or measurements

How long must records be kept?

- Title V requires:
  - Records of all required monitoring data and support information shall be maintained for a period of at least 5 years from the date of the monitoring sample, measurement, report, or application.

Class Discussion

- Are there circumstances where no monitoring, recordkeeping or reporting are required?

QUESTIONS?

LESSON 16

Compliance Assurance Monitoring (CAM)

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Lesson Objectives

- Explain legal basis for CAM
- Review CAM applicability
- Define CAM requirements
- Discuss source, agency and EPA roles
- Discuss Quality Improvement Plans

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CAM Background

- CAA Origins: Titles V & VII
- Promulgated 10/22/97; codified in 40 CFR Part 64
- Regulation implementing the Title V monitoring principle:
  - ***"…monitoring sufficient to assure compliance"***

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CAM Background (Cont'd)

- Targets facilities with add-on control devices
- "assure that control measures...are properly operated and maintained so that they do not deteriorate to the point where the owner/operator fails to remain in compliance..."
- "long-term, significant loss of control efficiency that can occur without complete failure of a control device"

Some New Concepts

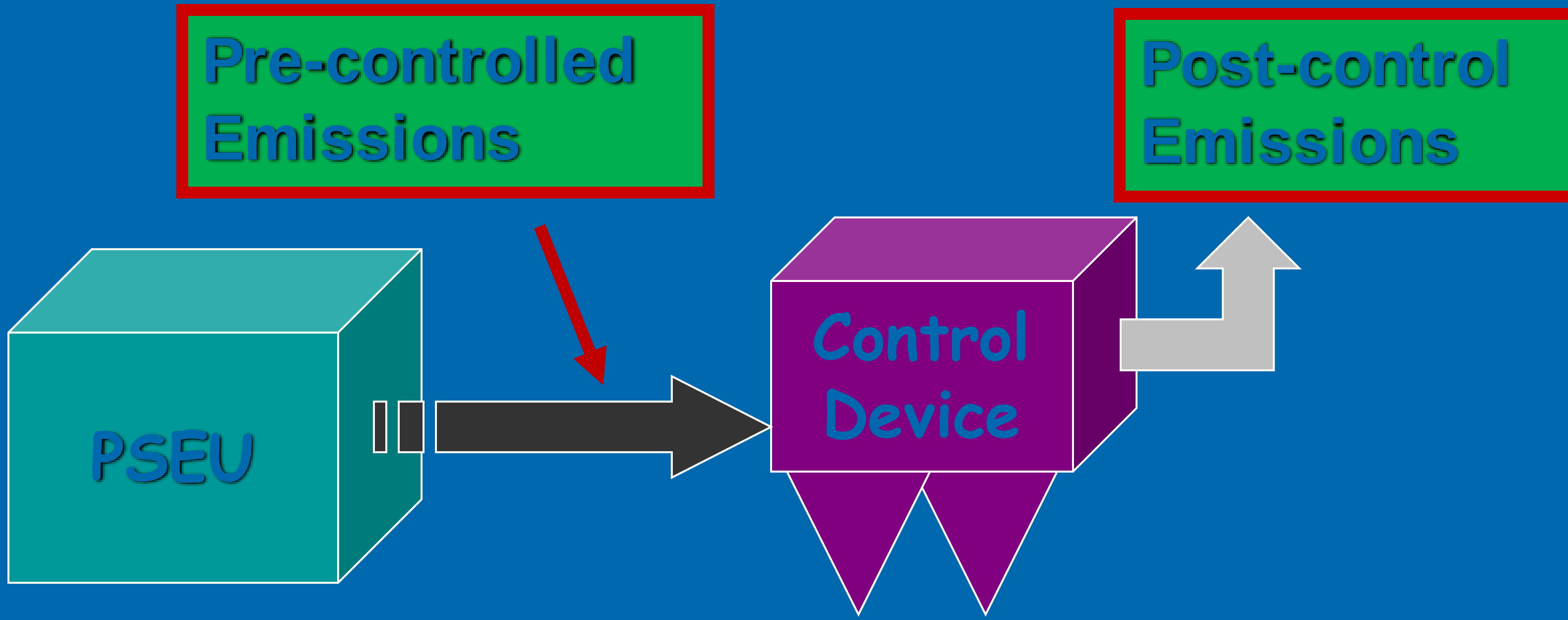
- Pollutant Specific Emissions Unit (PSEU)
- Pre-control Potential to Emit
- Exceedance
- Excursion

Exceedance vs. Excursion

- Exceedance
  - A condition whereby emissions (or opacity) are greater than the applicable emission limitation or standard (or less than the applicable standard in the case of a percent reduction requirement)
- Excursion
  - A departure from an indicator range established for monitoring

Pre-Control Emissions

Annual emissions = Control Device X Emission Rate



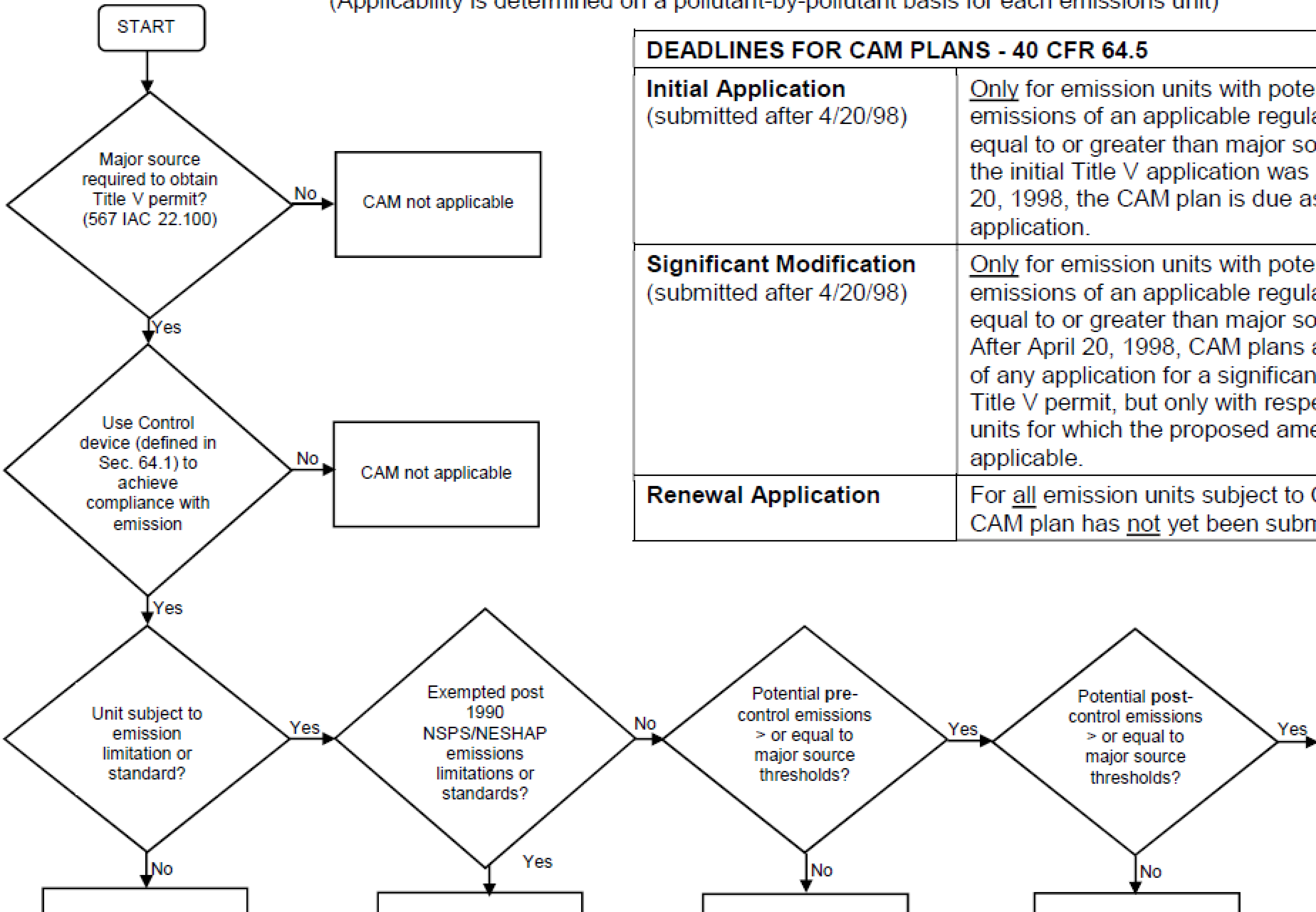
CAM Applicability (§64.2)

- an emission unit (except some backup utility power emission units) AND
- with a control device AND
- with pre-control emissions greater than major source thresholds AND
- with an emission limit (see exceptions) AND
- at a major source subject to title V permitting

CAM Applicability Flowchart

(Applicability is determined on a pollutant-by-pollutant basis for each emissions unit)

DEADLINES FOR CAM PLANS - 40 CFR 64.5	
Initial Application (submitted after 4/20/98)	Only for emission units with pote emissions of an applicable regula equal to or greater than major so the initial Title V application was 20, 1998, the CAM plan is due as application.
Significant Modification (submitted after 4/20/98)	Only for emission units with pote emissions of an applicable regula equal to or greater than major so After April 20, 1998, CAM plans a of any application for a significan Title V permit, but only with respe units for which the proposed ame applicable.
Renewal Application	For all emission units subject to C CAM plan has not yet been subm

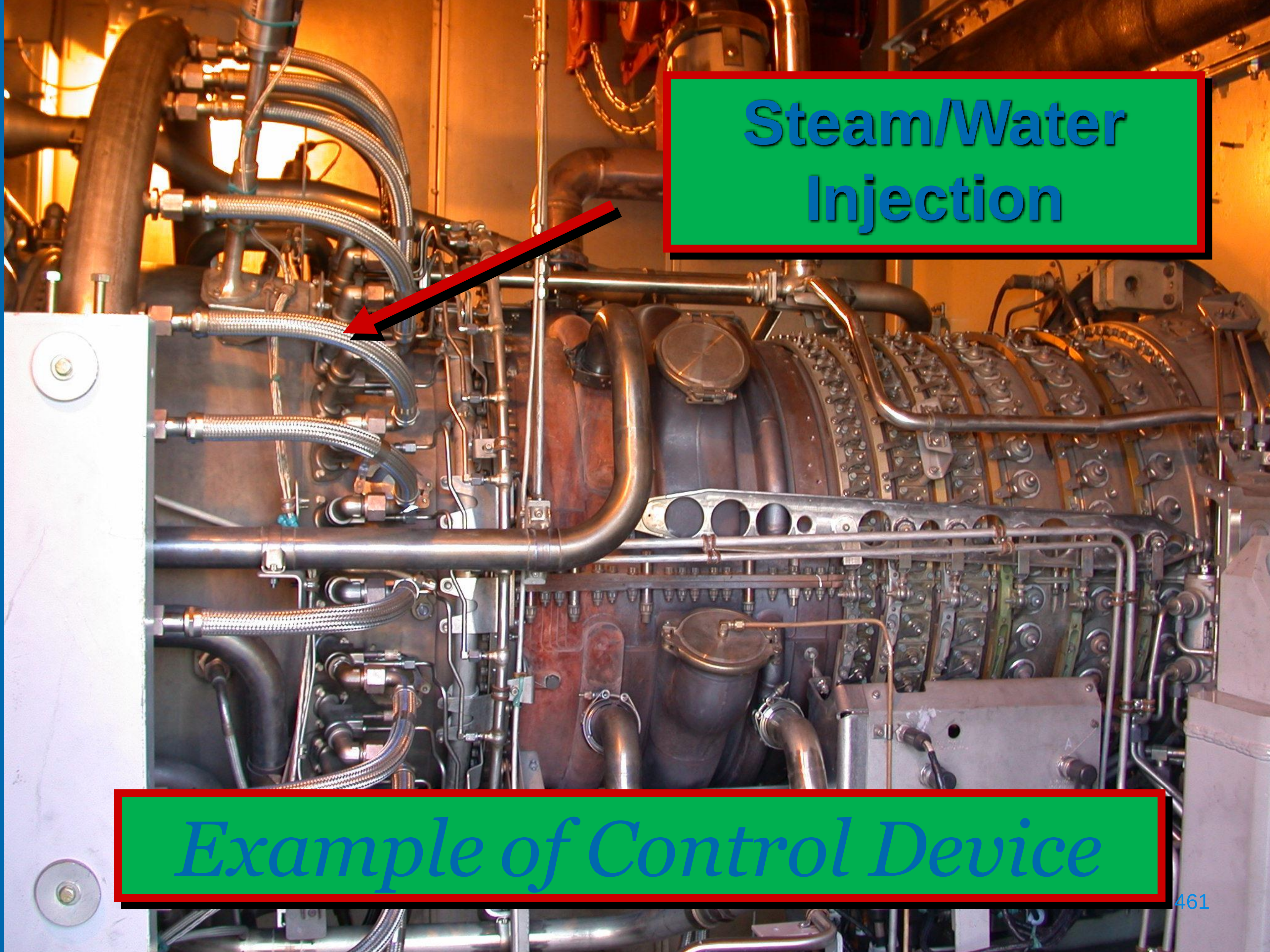


Fugitives Counted as in Title V Applicability

- Not counted in pre-control PTE unless source belongs to one of 28 listed source categories in definition of "major source" in Part 70 (§70.2)
- Fugitives are included when calculating HAP PTE
- If counted in title V applicability determination, counted towards PSEU PTE.

Definition of Control Device

- Equipment used to destroy or remove pollutants
  - end of pipe controls: scrubber, ESP, baghouse, catalyst, incinerator
  - in-process controls where treatment can be adjusted to control emissions: steam/water injection on turbines, FGR for boiler



Example of Control Device

Control Devices (Cont'd)

- Control Devices Do <u>NOT</u> Include:
  - Combustion or other process design features, e.g. low NOx burner (LNB)
  - Passive control measures, e.g. seals, lids, low-polluting fuel

CAM Exemptions

- CAM NOT triggered by:
  - Post-1990 NSPS and NESHAP emission limits
  - CFC rules
  - Acid Rain requirements
  - Emissions trading programs
  - Emission caps
  - Title V permit requires continuous compliance determination method

Exempt *Limit*, not PSEU

- Exemption does not apply to other limits on same PSEU
- No additional monitoring for exempt limit
- But monitoring for exempt limit may satisfy CAM for non-exempt limit
- Example: Using installed “CEMS” to satisfy monitoring requirement
- Note: ***Must*** be stated in CAM plan!

Continuous Compliance Determination Methods

- CEMS is subset - could also include PEM*
- PSEU with CEMS not automatically exempt
  - only if Title V permit specifies as compliance determination method
  - if not exempt, CEMS is CAM monitoring
- CEMS not required if not already present

* Predictive Emissions Monitoring

Exemption for Backup Utility Power EUs

- Municipally owned AND
- Exempt from Part 75 monitoring requirements AND
- Peaking unit throughout Title V permit term AND
- Actual emissions over last three years are <50% of major source threshold

Source's Role

- Develop and propose monitoring in permit application (CAM Plan)
- Monitoring in CAM Plan must "provide a reasonable assurance of compliance" to provide a basis for certifying compliance with applicable requirements for PSEUs with add-on control devices

CAM Monitoring Design Criteria (§64.3)

- Select representative control device operational parameters
- Establish indicator ranges for reasonable assurance of compliance -a single maximum or minimum value or multiple values
- Ranges based on source testing ((§64.4(c)(1)))

CAM Monitoring Design Criteria (§64.3) (Cont'd)

- Specify how data to be obtained, e.g. location of pressure drop gauge
- Verification procedures for new or modified equipment
- Quality assurance and control practices to ensure validity of data
- Frequency of monitoring

Frequency of Monitoring (§64.3)

- Sources should account for typical variability of the PSEU (including the control device and associated capture system)
- "Such intervals shall be commensurate with the time period over which a change in control device performance that would require actions by owner or operator to return operations within normal ranges or designated conditions is likely to be observed."

Frequency of Monitoring (§64.3) (Cont'd)

- "Large" PSEUs
  - for each parameter, collect four or more data values equally spaced over each hour
- "Other" PSEUs
  - some data collection at least once per 24-hour period

Evaluation Factors for CAM
Account for site-specific factors

- Applicability of existing monitoring equipment and procedures
- Ability of the monitoring to account for process and control device operational variability
- Reliability and latitude built into control technology
- Level of actual emissions relative to emission limits

What does a source do with monitoring results?

- Report deviations, excursions, and exceedances in semi-annual monitoring reports
  - date and duration
  - nature of corrective action
- Certify compliance status for each applicable requirement
  - can cross-reference to semi-annual monitoring reports and other reports (e.g. to identify excursions)

Agency Role
Evaluate source's CAM plan

- If submitted plan is **INADEQUATE**
  - Confer with source regarding needed changes
  - Disapprove submitted plan
    - Formal notice of disapproval
    - Request revised plan by date certain
    - Draft or Final permit must include periodic monitoring
    - Compliance schedule in permit

Agency Role
Evaluate source's CAM plan (Cont'd)

- If submitted plan is **ADEQUATE**
  - Approve Plan
    - Agency may condition approval on source gathering more data on indicators
  - Include provisions of CAM in permit and in Statement of Basis
  - If testing or equipment installation required, permit must include enforceable schedule with milestones

Agency Role
Issue final permit that includes

- Indicators to be monitored
- Means or device(s) used to measure indicators (e.g. temperature measurement device, VE, CEMS)
- Performance requirements
- Definitions of exceedance or excursion
- Obligation to conduct monitoring, reporting and recordkeeping, Implement QIP if required

Agency Role
Compliance Certification Condition

- Part 70 (§70.6(c)(5)(iii)) revised when Part 64 promulgated
- Certification conditions must "…identify as possible exceptions to compliance any periods during which compliance is required and in which an excursion or exceedance as defined under part 64 of this chapter occurred."

EPA Role

- Same as with periodic monitoring or other title V monitoring
- Review permits to determine if monitoring is sufficient to assure compliance

Quality Improvement Plan (§64.8)

- Agency or EPA can require
- Permit may specify appropriate threshold, such as an accumulation of exceedances or excursions exceeding 5% of PSEUs operating time
- Implementation of QIP does not shield source from noncompliance with emission limit

Quality Improvement Plan (§64.8) (Cont'd)

- Written QIP available for inspection
- Evaluate performance problems, and then
- Modify QIP to include
  - improved preventive maintenance practice
  - process operation changes
  - improvements to control methods
  - more frequent or improved monitoring

PM Control - Facility X

- Baghouse
- PM emission limit: 0.1 gr/dscf, 3-hr average
- See Table – Next slide

Facility X

Indicator	Measurement Approach	Indicator Range	QIP Threshold
VE	Daily VE Survey	Presence of VE	5 excursions in 6 months
Pressure Drop	Differential Pressure Gauge	Pressure drop >5 in. H_2O	None selected

VOC Control - Facility Y

- Thermal Oxidizer (incinerator)
- VOC emission limit: 95% control
- See Table – Next slide

Facility Y

Indicator	Measurement Approach	Indicator Range	QIP Threshold
Chamber Temperature	Thermocouple	≥1500 degrees F	7 excursions in 6 months
Work Practice	Burner Inspection and Maintenance	Failure to do annual maintenance or daily flame observation	None selected

Enforcement Authority §64.7(d)

- "Upon detecting an excursion or exceedance, the owner or operator shall restore operation of the pollutant-specific emissions unit (including the control device and associated capture system) to its normal or usual manner of operation as expeditiously as practicable in accordance with good air pollution control practices for minimizing emissions."

Relationship of CAM to Other Title V Monitoring

- PSEUs not subject to CAM are subject to periodic monitoring
- Periodic monitoring similar but less detailed approach than CAM
- Periodic monitoring could be used to develop data to support proposed CAM plan

Review of Key Concepts

- CAM can only apply if PSEU has control device
- New concepts in CAM
  - pre-control PTE
  - PSEU
  - excursion and exceedance
- Data collection to ensure control device operating properly
  - sources that don't address problems subject to enforcement

QUESTIONS?

LESSON 17

Permit Conditions

Lesson Objectives

- Understand the need for permit conditions
- Examine the various types of permit conditions
- Learn how to prepare effective permit conditions

Permit Conditions

- Crucial component of permit
- Define terms of permit “contract”
- Tell permittee:
  - What is allowed
  - What is prohibited
  - What is required
  - When it is required

Permit Conditions (Cont'd)

- Necessary to:
  - Ensure compliance of all emission units
  - Provide operating requirements, information and limits to
    - site personnel
    - agency inspectors

Basis for Permit Conditions

- Applicable regulations
- Compliance demonstration
- Threshold management
- Record keeping & reporting
- Others?

Basis for Permit Conditions (Cont'd)

- Basis for each condition should be stated in:
  - Permit
  - Review document
  - Engineering analysis
  - Statement of basis

Permit Conditions (Cont'd)

- Must be enforceable
  - For Title V permits, conditions must be "federally enforceable"
  - All conditions must be practically enforceable

Permit Conditions
Enforceable / Credible Evidence

- Practical Enforceability
  - No calendar year limits
  - Long-term limits based on 12 month rolling sum
  - <u>Operation</u> of required control equipment
- Credible evidence
  - Permit conditions cannot limit information
  - Nothing in permit precludes use of <u>any</u> credible evidence

How many conditions?

- No single “right” answer
- No more than are necessary
- Need to examine need for each condition
- Better to divide complex conditions
- Omit conditions that are redundant, unauthorized, or unnecessary

Categories of Permit Conditions

- Standard conditions
- Emission limits
- Compliance demonstration
- Other conditions

Standard Conditions (Boilerplate)

- Conditions in every permit
- Language reviewed many times
- Generally not revised by permit writers
- May differ by type of permit
- May differ by type of emission unit

Standard Conditions (Cont'd) (Boilerplate)

- What boilerplate does your agency use?

Standard Conditions - Examples

- Effective and expiration dates
- Operator Training
- Excess emission reporting
- Transfer of permit
- Severability
- Right of entry

Emission limitations

- Related requirements must also be specified as conditions
  - Averaging time
  - Testing requirements

Compliance Demonstration

- What must the permittee do to demonstrate continuing compliance?
  - Inspect
  - Maintain
  - Test
  - Monitor
  - Keep records
  - Report

Compliance Demonstration (Cont’d)

- Periodic Visible Emission Evaluations (VEE)
- Certified VEE observer on staff
- Stack tests
- Operation and Maintenance (O & M) logs

Miscellaneous Statements

- Generally advisory conditions
- Examples
  - Steps to revise emission limits
  - Notice to permittee that regulation revisions may result in reopening of permit
  - Definitions and abbreviations

Problem Conditions

- Redundant
- Conflicting
- Vague or ambiguous
- Unenforceable

QUESTIONS?

LESSON 18

Permitting Aspects: New Source Performance Standards (NSPS) & Hazardous Air Pollutants (HAPs)

Lesson Objectives

- Review basics of New Source Performance Standards and MACT programs
- Review basics of toxics issues associated with permitting

Why Discuss Emission Standards in Permitting Course

- NSPS, NESHAP, and MACT standards form a baseline for many emission limits
- Also gives minimum recordkeeping and reporting requirements
- Being subject to a standard can bring in permit requirements

Acronyms

- New Source Performance Standards (NSPS)
- National Emission Standards for Hazardous Air Pollutants (NESHAP)
- Maximum Available Control Technology (MACT)

New Source Performance Standards

- CAA Section 111 and 129
- Requires EPA to establish federal emission standards
- Intended to promote use of best technologies
- Since 12/71 – ~105 NSPS adopted
- Codified in 40 CFR 60

NSPS (Cont'd)

- Part 60 also contains "guidelines" for some existing sources – mainly waste incineration

NSPS Format

- Applicability
  - Typically apply to larger equipment
- Emission Standards
  - May be less stringent than your agency's
  - May not include standards for all pollutants
- Testing and monitoring provisions
- Special provisions or requirements may be different than your agency's
- Some NSPS standards are "ancient"

National Emission Standards for Hazardous Air Pollutants

- Originally required by 1970 Clean Air Act Amendments
  - Section 112
- Hazardous Air Pollutant:
  - "…reasonably anticipated to increase mortality or cause a serious illness."

NESHAPS (Cont'd)

- 1973
  - Asbestos
  - Beryllium
  - Mercury
- 1984
  - Vinyl chloride
  - Benzene
  - Radionuclides
  - Arsenic
  - Coke oven emissions

METHODOLOGY WAS SLOW AND CONTROVERSIAL

- Toxic list contains “approximately” 186 to 190 compounds
- A better way to address toxic air emissions needed to be developed
- EPA decided to move to a “control based method”
- Hence the MACT program was developed
- EPA did not have the “statutory ability” to implement the MACT program under the 1970 CAA
- CAA was “opened” by Congress to make additional authority to implement this program.

Maximum Achievable Control Technology

- 1990 Clean Air Act Amendments
- Emission limits based on the best demonstrated technology or practices in similar sources

MACT For <u>New</u> Sources

- The emission limit which:
  - is not less stringent than that achieved in practice by the best similar source
  - reflects the maximum degree of reduction, taking into consideration
    - the cost of achieving such emission reduction
    - any non-air quality health and environmental impacts and energy requirements

MACT for Existing Sources

- The emission limitation reflecting the maximum degree of reduction in emissions considering
  - the cost of achieving such emission reduction,
  - any non-air quality health and environmental impacts, and
  - energy requirements.
- The limit must be
  - achievable by sources in the category of stationary sources, and
  - not be less stringent than the MACT floor.

MACT Floor

- For new sources
  - The emission limitation achieved in practice by the best controlled similar source.
- For existing sources
  - For source categories with > 30 sources: MACT is the average achieved by the best 12% of the sources, excluding those recently equipped with MACT.
  - For source categories with < 30 sources: MACT is the average achieved by the best performing five sources.

Example MACT Standards

- Ferroalloy Production
- Flexible Polyurethane Foam
- Oil & Natural Gas Production
- Portland Cement
- Cellulose Production
- Large Appliance Coating
- Lead Acid Battery Mfg
- Petroleum Refineries

Example MACT Standards (Cont'd)

- Primary Aluminum Production
- Pulp and Paper Production
- Wool Fiberglass Manufacturing
- Sewage Sludge Incinerators
- Tire Manufacturing
- Metal Coil Coating
- Natural Gas Transmission
- RICE

A WORD ABOUT "RESIDUAL MACT"

- A "control based" technology has it's advantages but it also has some inherent disadvantages
- Advantage: A relatively fast way to reduce the amount of toxic emissions being emitted by regulated sources
- Disadvantage: A threat to human health and the environment may still remain

"HYPOTHETICAL EXAMPLE"

- Example I: A source that emitted 100 tpy of a regulated HAP implements the MACT for its source category resulting in a 90% reduction of the HAP and reducing its HAP emissions to 10 tpy
- Example II: A facility in the same source category has pre MACT emissions of 1000 tpy of the same HAP, therefore reducing its emission levels to 100 tpy

“RESIDUAL MACT” (Cont’d)

- At a level of 100 tpy a real threat to human health and the environment may remain
- Hence “Residual MACT”
- Refinery – fence line monitoring
- Stay tuned for others

Reclassification of Major Sources as Area Sources

- May 1995 EPA Memo (John Seitz), “PTE for MACT Standards – Guidance on Timing Issues”, AKA Once In Always In (OIAI)
- Major sources of HAPs on first significant compliance date of a major source NESHAP, must “permanently” comply with the standard, and thus be also subject to Title V.

Reclassification of Major Sources as Area Sources (Cont'd)

- On January 25, 2018, EPA issued a guidance memo "Reclassification of Major Sources as Area Sources Under Sect. 112 of the CAA" and withdrew OIAI since EPA has determined that it is "contrary to the clear language of the CAA"
- On October 1, 2020, EPA took final action amending NESHAP General Provisions to allow sources that reduce PTE below 10 & 25 tpy of HAPs to reclassify as Area Sources

Questions

LESSON 19

Compliance & Enforcement Considerations

Lesson Objectives

- Answer question “What is compliance?”
- Explain how to define compliance in permit
- Examine what is required to demonstrate compliance
- Examine the importance of enforcement
- What should the permittee do?
- What can the agency do?

Basis for Compliance

- Basic purpose of a permit term or condition is to tell permit holder
  - What is allowed
  - What is prohibited
  - What is required
  - When it is required
  - How to comply

Compliance vs. Enforcement

- Compliance: The full implementation of requirements
- Enforcement: The set of actions taken by the government to achieve compliance
  - Inspections
  - Negotiations
  - Legal action
- NACT 335
  - Principles of Compliance and Enforcement

What Constitutes Compliance?

Examples:

- Emission limits being met
- Work practices being observed
- Maintenance being performed
- Hours of operation within limits
- Fuel meeting specifications

Compliance Defined in Permit

- Describe what constitutes compliance and how compliance will be determined
- State who is responsible for demonstrating compliance (or noncompliance)
- What does the permittee need to do to demonstrate to the agency that all the terms of the permit are being fulfilled
- What actions does the permittee need to take if noncompliance is documented or observed

Compliance Defined in Permit (Cont'd)

- Specify those actions in permit conditions
- Define time limits by which compliance must be attained
- Describe evidence required to prove a violation

Compliance Provisions

- Permittee shall not knowingly falsify or render inaccurate any monitoring device or method required by the permit
- The information obtained from the required monitoring can be used directly for enforcement.
- Any credible evidence

Compliance Demonstration

- Surrogate measurements may be useful in demonstrating compliance
  - Temperature
  - Pressure drop
- If relationship can be established, these may be easier, less costly
- Must be reflected in permit

Compliance Demonstration (Cont'd)

- Permittee activities
  - Source tests
  - Continuous emission monitors (CEMs)
  - Logs
    - Fuel/raw material usage
    - Parametric data (temp., pressure drop, VE)
    - Maintenance/repair
- Agency activities
  - Inspections

Compliance Demonstration (Cont'd)

- Compliance demonstration hierarchy
  1. Reference method stack tests
  2. Calibrated (with reference method) CEMS
  3. Calibrated tests on similar units
  4. Non-reference method tests on unit
  5. Non-reference method tests on similar units
  6. Literature data for similar units
  7. AP-42 factors
- Follow Agency Guidelines

Noncompliance

- Noncompliance with any permit condition constitutes a violation of the Clean Air Act and/or State rules and is grounds for
  - Enforcement action
  - Permit termination, revocation and reissuance, or modification
  - Denial of a permit renewal application

Class Discussion - Compliance

- What is meant by the term "compliance"?
- Why must the term "compliance" be defined in a permit for each emission unit and for each emission limitation?
- Is the definition for the term "compliance" negotiable?

Enforcement

- After the permit is issued
- Different than compliance schedule

Importance of Enforcement

- Permitting process meaningless if not appropriately enforced
- Levels “playing field”
- Provides disincentive
- Affords credibility to agency

Enforcement (Cont'd)

- Agency must communicate
- Complex permits may warrant:
  - In house meeting with appropriate enforcement personnel before draft permit is issued
  - A meeting with permittee upon completion of the draft permit
  - A walk-through existing facility with permit writer, enforcement personnel, and facility representatives

Enforcement (Cont'd)

- Permittee responsibilities:
  - Understand the permit
  - If questions, ask the agency
  - Request a meeting if necessary
- If permittee doesn't understand the permit, compliance will be difficult and enforcement action is likely

Enforcement (Cont'd)

- Agency responsibilities
  - Diligence
  - Periodic inspections
  - Thorough review of records
  - Formal enforcement action if warranted
    - Depends on agency's enforcement policy
    - Warning
    - Notice of Violation (NOV)

Commencement of Construction

- Important in two different contexts in Pre-Construction PSD Permit
  - Before a Pre-Construction Permit is Issued
  - After a Pre-Construction Perm it is issued

Commencement of Construction Building a New Plant

- Application Preparation
- Agency Review
- Final Permit Issuance
- Land Will Be Laying Idle
- Plant Construction Period

Activities Allowed Before Permit Is Issued

12/18/1978 EPA Memo from Ed Reich interprets 40 CFR 52.21(i) as follows:

- Planning / Preparation
- Ordering of Equipment
- Clearing the Site
- Grading Activities
- On-Site Storage of Equipment and Material

Activities Not Allowed Before Permit Is Issued

- Pouring Foundation
- Installing Building Support
- Paving
- Laying Underground Pipework and Utilities
- Avoiding “Equity In the Ground” argument

Activities Required After Permit Is Issued

- Source is required to "Commence Construction" within 18 months after Permit is issued (40 CFR 52.21(r)(2))
- Avoiding "Yesterday's BACT"

Commencement of Construction?

What Qualifies as Commencement of Construction after permit is issued?

- Placement, assembly, installation of materials, equipment or facilities as part of ultimate structure of source
- Activities must take place at proposed site and be site-specific

Commencement of Construction Extensions

- Extension beyond 18 months is allowed "upon a satisfactory showing that an extension is justified"
- Jan. 31, 2014 EPA may no longer require a new application, if applicant shows extensive analysis is not needed, on a case-by-case basis
- 2014 EPA Policy in SIP or Agency Policy for state/local/tribal agency issued permit

Penalties

- Should result in behavior change
- Not just cost of doing business
- Should recognize certain factors

Penalty Factors

- Agency should formalize penalty factors
- Economic factors
  - Cost avoided
  - Cost postponed
- Deviation from standard
- Potential for harm
- Length of violation

QUESTIONS?

SUMMARY

Permits

- Permits
  - Permission to Pollute
  - Preconstruction
  - Operating permit
- Who needs permit varies
- Sources can reduce emissions to avoid stringent permit requirements

Federal Permits

- PSD
  - Only major sources
    - Major source is >250 tpy or 100 tpy on list
    - Major modification means a physical change with emissions greater than SER (note source is major if the modification is major on own)
  - Applies in attainment or unclassified areas
  - Requires BACT
    - BACT considers cost
    - Uses Top down approach that identifies all possible options

Federal Permits (Cont'd)

- PSD (Cont'd)
  - PSD applies to criteria pollutants
  - PSD does not require offsets or banking

NSR

- Applies in non-attainment area
- Applies only to Criteria Pollutants
- Requires LAER
  - No consideration of cost
- Offsets Required
  - Are greater than 1 to 1
- Offsets come from shutdowns or over control
- Offsets may be obtained from banks

Title V

- Operating Permit Program
- Covers major sources – generally great than 100 tpy
- Consolidates all other permit conditions
- May add recordkeeping provisions
- If control equipment may have CAM plan (CAM plan will include CEM)
- CAM plans use reference methods

Title V (Cont'd)

- All permits reviewed by EPA

Tools

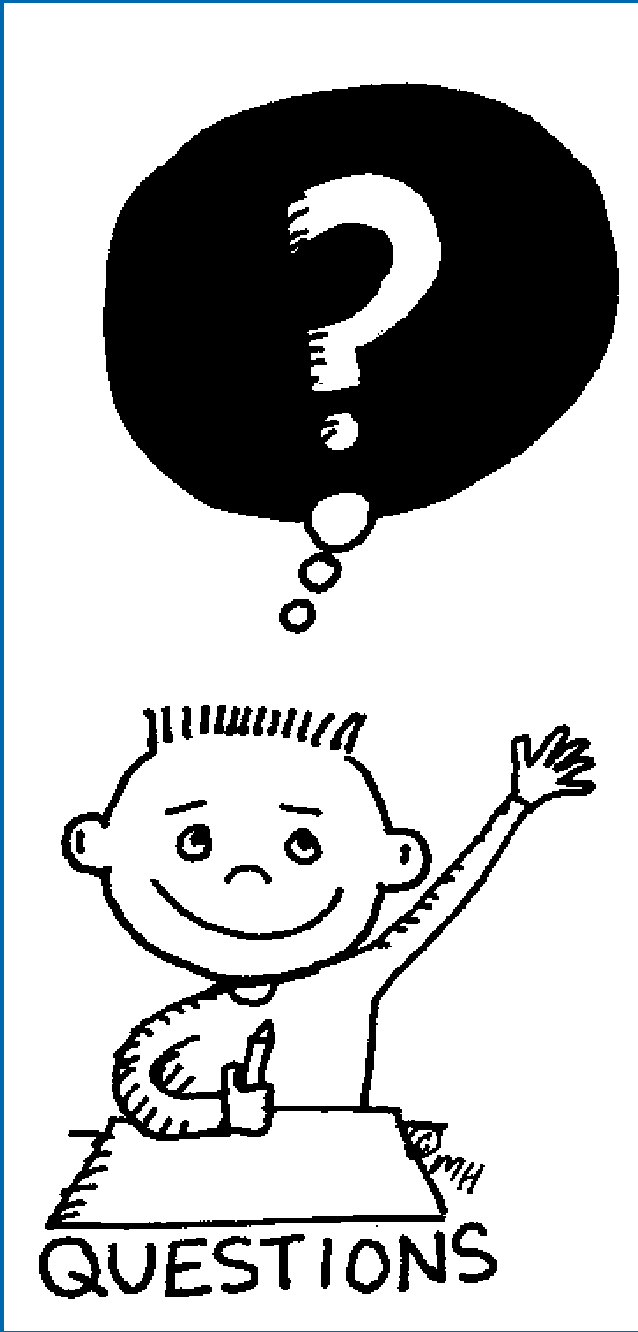
- Inventory
  - Used in PSD in increment analysis
  - Mobile sources very large part of inventory
- Dispersion Models
  - Only EPA approved models
  - Estimate air quality impact of sources
  - Can estimate point of maximum concentration more easily than monitoring
  - Uses local met data for input
  - Stack height influences results

EPA Emission Standards

- Provide basis for permit conditions
- NSPS
  - Emission or performance standards
  - Best demonstrated technology considering cost
  - Local standards can be more stringent
- NESHAP
  - In 1970 act
  - Health based approach
  - Not successful

EPA Emission Standards (Cont'd)

- MACT
  - Technology based does consider cost
  - New – based on best demonstrated
  - Existing average of top sources but above MACT floor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QUESTIONS