NACT 334 - INTRODUCTION

Lesson Objectives

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

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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

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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

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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

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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

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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

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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

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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.

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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

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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

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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

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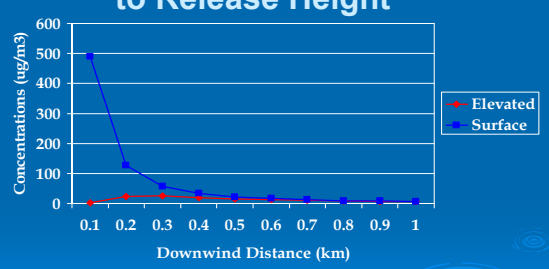
Sensitivity of GLC to Release Height



$$H_e = H_s + \Delta h$$

Effective Stack Height = Physical Stack Height + Plume Rise

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Atmospheric Influences

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

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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

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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

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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)

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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

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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.

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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

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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

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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

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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

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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

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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

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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)

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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

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Mobile Source Models (Cont'd)

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

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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

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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

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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

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EMISSIONS AS RELATED TO INVENTORIES

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

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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

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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

365

CHIEF

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

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Questions?

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LESSON 14

Title V Operating Permits

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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

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What Is Title V

- 6 Titles in the 1990 Clean Air Act Amendments
  I. Programs and Activities
  II. Emission Standards for Moving Sources
  III. General Provisions
  IV. Acid Deposition
  V. Permits
  VI. Stratospheric Ozone Protection

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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 not generally create any new federal requirements for a source
- Title V permits contain most Pre-Construction Permit conditions

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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

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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

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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

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Title V Permits

PURPOSE & BENFITS

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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

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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

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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

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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

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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

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Title V Permits

APPLICABILITY

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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

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Applicability (Cont'd)

- Regulated pollutant thresholds:
  - Criteria pollutants: ≥ 100 tpy PTE
  - HAPs: ≥ 10tpy (1 HAP) or ≥ 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

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Pollutant Added to PSD

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

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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".

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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)

EXEMPT

386

Major Source

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

387

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

388

Synthetic Minor

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

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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

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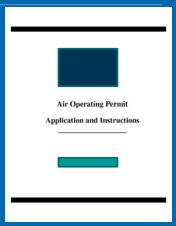
Title V Permits

PERMIT APPLICATION



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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

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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

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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)

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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

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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

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Title V Permits

PERMIT CONTENT

397

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

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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

399

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

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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

401

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)

402

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Class Discussion

What is an applicable requirement?

403

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Class Discussion (Cont'd)

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

404

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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?

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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?

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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

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Title V Permits

PERMIT ISSUANCE

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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 70.7 409

409

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

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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

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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.

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412

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) 413

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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

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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**

415

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

416

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.

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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.

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Title V Permits

PERMIT MODIFICATION

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Permit Modification

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

420

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

421

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

422

Permit Modification (Cont'd)

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

423

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 70.7 424

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Title V Permits

PERMIT RENEWAL

425

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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

426

QUICK REVIEW TITLE V OPERATING PERMITS

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

KEEP CALM AND LET'S RECAP

427

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

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QUESTIONS?

429

LESSON 15

Monitoring, Reporting and Recordkeeping

430

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

431

Monitoring, Reporting and Recordkeeping

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

432

Why Required?

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

433

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

434

Emissions Monitoring

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

435

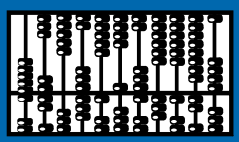
Parametric Monitoring

- Track some surrogate for emissions
  - Combustion temperatures
  - Boiler exhaust O2 content
  - Gas inlet and outlet temperatures
- Opacity monitoring
- Throughput

436

Calculations

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



437

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)

438

If No Monitoring Requirements Prescribed in Regulation

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

439

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

440

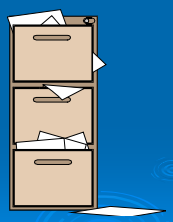
What Shall Be Reported?

- 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

441

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



442

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

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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.

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Class Discussion

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

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QUESTIONS?

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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"

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Some New Concepts

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

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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

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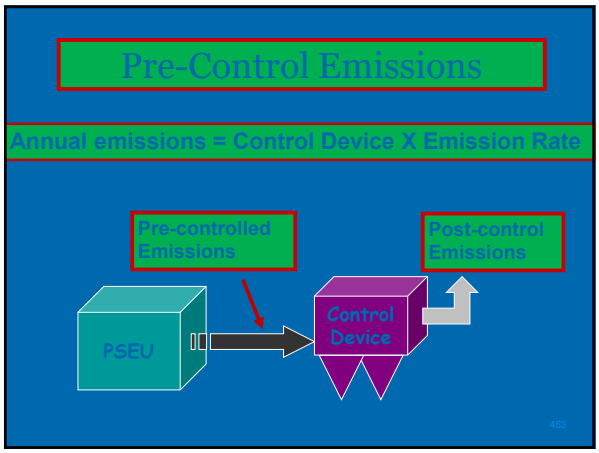
NACT 334 - INTRODUCTION



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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

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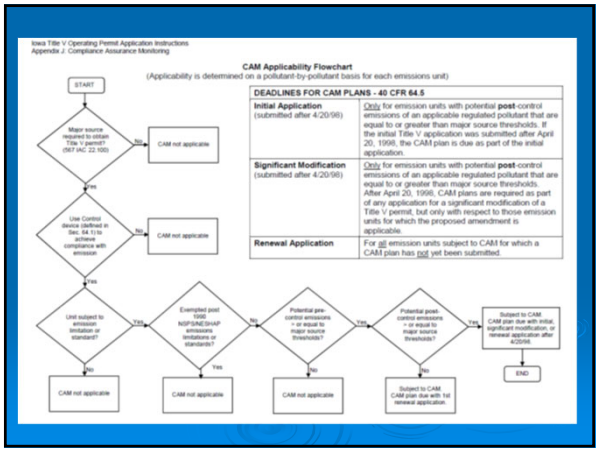

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Fugitives Counted as in Title V Applicability

- 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.

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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

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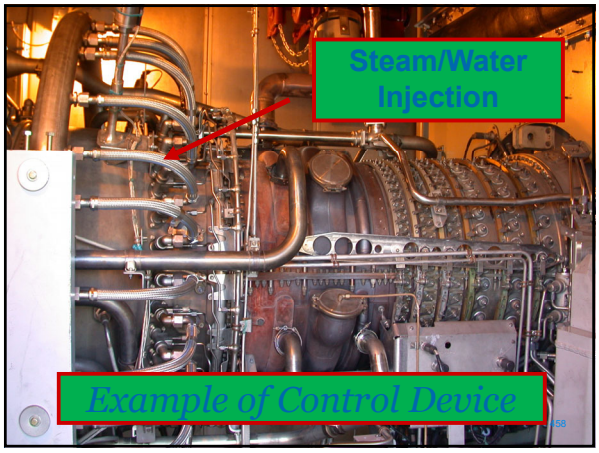

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Control Devices (Cont'd)

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

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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

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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!

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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

* Periodic Emission Monitoring

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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

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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

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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)))

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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

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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."

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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

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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

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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)

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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

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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

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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

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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."

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EPA Role

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

475

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

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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

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PM Control - Facility X

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

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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

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VOC Control - Facility Y

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

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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

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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."

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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

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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

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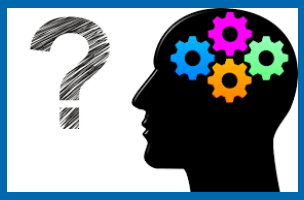
QUESTIONS?



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