

**LESSON 5**

**Potential to Emit  
(PTE)**

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**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

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**Lesson Objectives**

➤ Determine how PTE affects permit requirements

➤ Learn how to calculate PTE

➤ How to limit PTE

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# NACT 334 - INTRODUCTION

## 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.

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## 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

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## 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.

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# NACT 334 - INTRODUCTION

## 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

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## 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>

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## PTE (Cont'd)

### Emission Factor method

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

- 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

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# NACT 334 - INTRODUCTION

## 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

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## 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?

$$\begin{aligned} \text{VOC Mass Emissions} &= (100 \text{ lbs/hr} * .35) (1 - .20) (1 - .95) \\ &= 1.4 \text{ lbs/hr} \\ &= 6.13 \text{ tons/year} \end{aligned}$$

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## 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<sup>6</sup> scf
- NOx EF for distillate oil is 20 lb/10<sup>3</sup> gal
- Convert to MMBtu
  - Natural Gas: divide by 1.020 MMBtu/10<sup>6</sup> scf
  - Distillate Oil: divide by 140 MMBtu/10<sup>3</sup> 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<sup>6</sup> scf
  - Distillate Oil – 100,000 gals

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# NACT 334 - INTRODUCTION

## 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?

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## PTE EXERCISE 2 CALCULATIONS

- Boiler PTE for NOx:
  - $EF * \text{Max Hourly Capacity} * 8760 \text{ hr/yr} / 2000 \text{ lbs/T}$
  - $0.10 \text{ lbs/MMBtu} * 300 \text{ MMBtu/hr} * 8760 \text{ hrs/yr} / 2000 \text{ lbs/T}$
  - $262,800 \text{ lbs/yr of NOx}$  or  $131.4 \text{ T/yr of NOx}$
- Actual NOx emissions:
  - $EF * \text{annual usage} * (1 - \text{control efficiency})$
  - $\text{Nat Gas} = 190 \text{ lb}/10^6 \text{ scf} * 1,200 * 10^6 \text{ scf} * (1 - .85) = 34,200 \text{ lbs}$
  - $\text{Dist. Oil} = 20 \text{ lb}/1000 \text{ gal} * 100,000 \text{ gal} * (1 - .5) = 1,000 \text{ lbs}$
  - $\text{Total} = 34,200 \text{ lbs} + 1,000 \text{ lbs} = 35,200 \text{ lbs} = 17.6 \text{ T/yr}$

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## LIMITING PTE

- Why
- How
- Legal Requirements



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# NACT 334 - INTRODUCTION

## 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.

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## LIMITING PTE (Cont'd)

➤ Where do you find physical or operational limitations?

- Regulations
- Permits
- Consent decrees
- Other enforceable documents

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## 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?

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# NACT 334 - INTRODUCTION

## LIMITING PTE (Cont'd)

➤ What does "enforceable" require?

- The permit limitation must be:
  - Permanent
  - Quantifiable
  - Practically Enforceable

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## LIMITING PTE (Cont'd)

➤ Limit must be Permanent

- In general, limit must not expire on its own accord

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## 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

➤  $PTE = A \times EF \times (1-ER/100) \times (8760 \text{ hrs/yr}) / (2000 \text{ lbs/T})$

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# NACT 334 - INTRODUCTION

**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

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**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

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**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

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# NACT 334 - INTRODUCTION

## 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)

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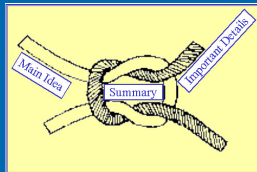
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## Quick Review

### ➤ Potential to Emit (PTE)

- Why it is important
- How it is calculated
  - Methods
  - Reference material
- Why limit PTE



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## Questions?



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**LESSON 6**

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**Nonattainment (NA)  
New Source Review  
(NSR) Permits**

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- Lesson Objectives**
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- 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

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- Pre-construction Permits  
NA-NSR**
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- 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

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# NACT 334 - INTRODUCTION

## 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

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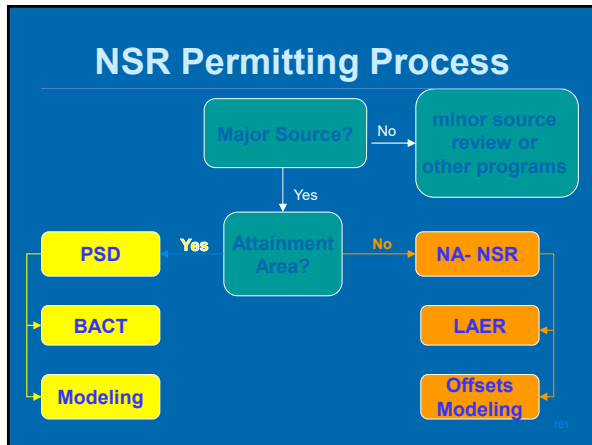
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## Clean Air Act – Title I

- 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

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# NACT 334 - INTRODUCTION

## “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

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## 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

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## 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.

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# NACT 334 - INTRODUCTION

## BACT vs. LAER

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

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## Pre-construction Permits NA-NSR

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

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## Pre-construction Permits NA-NSR

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- 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

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# NACT 334 - INTRODUCTION

**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

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**Questions?**



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**LESSON 7**

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**Prevention of Significant Deterioration (PSD)**

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# NACT 334 - INTRODUCTION

## Lesson Objectives

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

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## Regulations

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

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## 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)

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# NACT 334 - INTRODUCTION

## PSD Applicability

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

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## 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

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## PSD Source Categories with 100 tpy Major Source thresholds

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

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# NACT 334 - INTRODUCTION

## 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

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## Major Modification PSD

- Subjects Source to PSD
- See Lesson 3 for discussion

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## 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

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# NACT 334 - INTRODUCTION

## Major Modification PSD

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- Significant Emissions Increase
  - **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

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

Pollutant	SER
Carbon Monoxide	100 tpy
Nitrogen Oxide	40 tpy
Particulate Matter (PM/PM <sub>2.5</sub> )	25/15 tpy
PM <sub>2.5</sub>	10 tpy of direct PM <sub>2.5</sub> emissions; 40 tpy of sulfur dioxide emissions; 40 tpy of nitrogen oxide emissions unless demonstrated not to be a PM <sub>2.5</sub> 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 <sub>2</sub> S):	10 tpy
Reduced sulfur compounds (including H <sub>2</sub> S)	10 tpy

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## 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 <sup>-6</sup> megagrams per year (3.5 x 10 <sup>-6</sup> 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)

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# NACT 334 - INTRODUCTION

## Major Modification PSD

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➤ Significant Emissions Increase – *New Units*

- 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

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## Major Modification PSD (Cont'd)

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➤ Significant Emissions Increase – *Existing Units*

- Actual to Projected Actual
  - Emissions Increase = PAE – BAE
  - BAE = Baseline Actual Emissions
  - PAE = Projected Actual Emissions

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## Major Modification PSD (Cont'd)

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- Significant Emissions Increase – *Existing Units*
- 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.

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# NACT 334 - INTRODUCTION

## 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

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## Modification PSD

# EXERCISE

Major Modification  
Let's do some calculations

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## PSD Source Categories with 100 tpy Major Source thresholds

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

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# NACT 334 - INTRODUCTION

## 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

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## 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?

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## 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

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# NACT 334 - INTRODUCTION

## Example

➤ Lets look at a couple of baseline examples

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## Baseline Actual Emissions EUSGU (for each emissions unit)

Actual TPY	Year
900	2002
870	2003
970	2004
850	2005
900	2006

Date actual construction begins

$$870 + 970 = 1840/2 = 920$$

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## Baseline Actual Emissions Non- EUSGU (for each emissions unit)

Actual TPY	Year
840	1997
910	1998
870	1999
970	2000
850	2001
830	2002
170	2003
130	2004
120	2005
150	2006

0.85 emission reduction limit commences

Date actual construction begins

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

$$170 + 130 = 300/2 = 150$$

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# NACT 334 - INTRODUCTION

### Projected Actual Emissions (for each emissions unit)

Actual TPY	Year	Notes
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)

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### 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?

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### Baseline Average Emissions Same Pollutant

EU1-NOx		EU2-NOx		Year 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		1005
910	2004	90		1040
970	2005	110		1040
930	2006	100		1055

Looks like 2002 and 2003

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# NACT 334 - INTRODUCTION

### 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?

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### Major Modification PSD (Cont'd)

> Significant Emissions Increase

- If the emissions increase for the project is below the significance rate for each pollutant, PSD does not apply
- If the emissions increase for the project exceeds the significance rate for a pollutant, the next step is to determine whether there is a significant net emissions increase

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### 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

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# NACT 334 - INTRODUCTION

## 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

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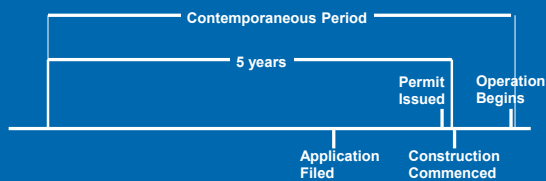
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## Contemporaneous Emissions Increases and Decreases



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## 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 NO<sub>x</sub>, PM or SO<sub>x</sub> 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

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# NACT 334 - INTRODUCTION

## Exercise Netting

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➤ 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)

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## Exercise Netting (Cont'd)

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➤ 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

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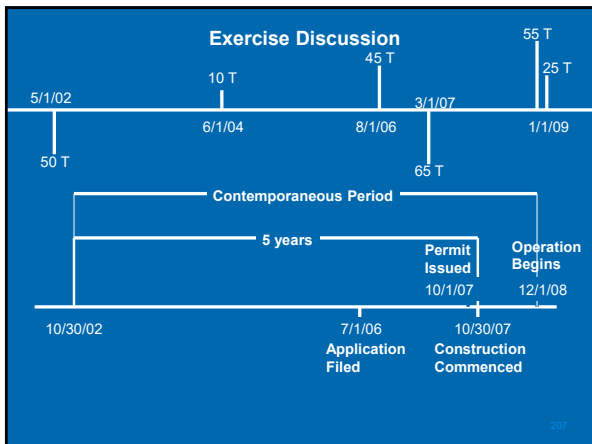
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# NACT 334 - INTRODUCTION

## Netting PSD

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

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## PSD

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➤ Quick Review – Applicability

- 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 net emissions increase
    - Contemporaneous period
    - Creditable emissions

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## Best Available Control Technology (BACT) PSD

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➤ 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

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# NACT 334 - INTRODUCTION

## 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"

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## 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**

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## 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

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# NACT 334 - INTRODUCTION

## 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

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## 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

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## 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)]

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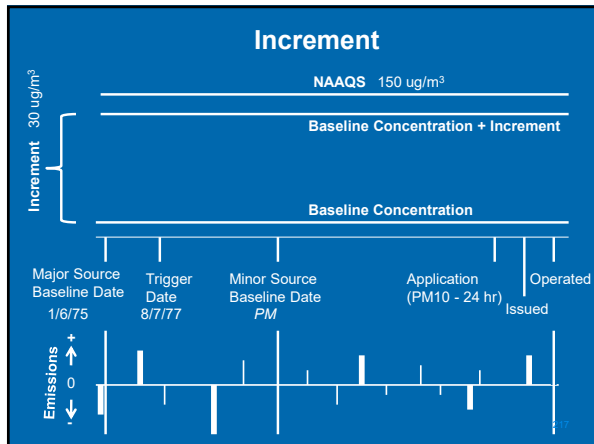
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# NACT 334 - INTRODUCTION



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## Pre-construction Permits PSD

➤ Increment

- 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

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## 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.

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# NACT 334 - INTRODUCTION

## EXERCISE

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

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## 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.

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## 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
- Post-construction Monitoring
  - As determined necessary

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# NACT 334 - INTRODUCTION

## Permit Conditions PSD

- Obligation of source to provide information
  - 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

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## Other analysis PSD

- Additional Impact Analysis
  - 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

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## 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

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# NACT 334 - INTRODUCTION

**PSD**

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

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**PSD**

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- 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

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**PSD - Review**

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- 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

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# NACT 334 - INTRODUCTION



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