

Potential to Emit:

What is it and why are all
Air Quality Rules based on it?

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Who will you hear from?

- Catherine Asselin, AQD Permit Engineer



- Francisco Lim, AQD Inspector



- Michelle Rogers, AQD Permit Engineer



- Jenifer Dixon, OEA Air Specialist



Webinar Set Up

- All lines will be muted
- Questions can be sent to us via the question/chat box
- We will record webinar and post online



PTE: What is it and why is it important?

- What is it?
- Calculation Methodologies
- Why are Air Quality Rules based on it?



Definition of PTE

- Citation:
 - Michigan Air Quality Control Rules, R 336.1116(n)
- Located at:
 - http://w3.lara.state.mi.us/orr/Files/AdminCode/1493_2014-153EQ_AdminCode.pdf

Definition

(n) "Potential to emit" means the maximum capacity of a stationary source to emit an air contaminant under its physical and operational design. Any physical or operational limit on the capacity of the stationary source to emit an air contaminant, including air pollution control equipment and restrictions on the hours of operation or the type or amount of material combusted, stored, or processed, shall be treated as part of its design only if the limit, or the effect it would have on emissions, is legally enforceable. Secondary emissions shall not count in determining the "potential to emit" of a stationary source. For hazardous air pollutants that have been listed pursuant to section 112(b) of the clean air act, quantifiable fugitive emissions shall be included in determining the potential to emit of any stationary source. For all other air contaminants, quantifiable fugitive emissions shall be included in determining the "potential to emit" of a stationary source only if the stationary source belongs to 1 of the following categories:

- (i) Coal cleaning plants that have thermal dryers.
- (ii) Kraft pulp mills.
- (iii) Portland cement plants.
- (iv) Primary zinc smelters.
- (v) Iron and steel mills.
- (vi) Primary aluminum ore reduction plants.
- (vii) Primary copper smelters.
- (viii) Municipal incinerators capable of charging more than 50 tons of refuse per day.
- (ix) Hydrofluoric, sulfuric, or nitric acid plants.
- (x) Petroleum refineries.
- (xi) Lime plants.
- (xii) Phosphate rock processing plants.
- (xiii) Coke oven batteries.
- (xiv) Sulfur recovery plants.
- (xv) Carbon black plants that have a furnace process.
- (xvi) Primary lead smelters.
- (xvii) Fuel conversion plants.

Definition - Truncated

- R 336.1116(n)
 - "Potential to emit" means the maximum capacity of a stationary source to emit an air contaminant under its physical and operational design.



Poll Question

What is your company categorized as?

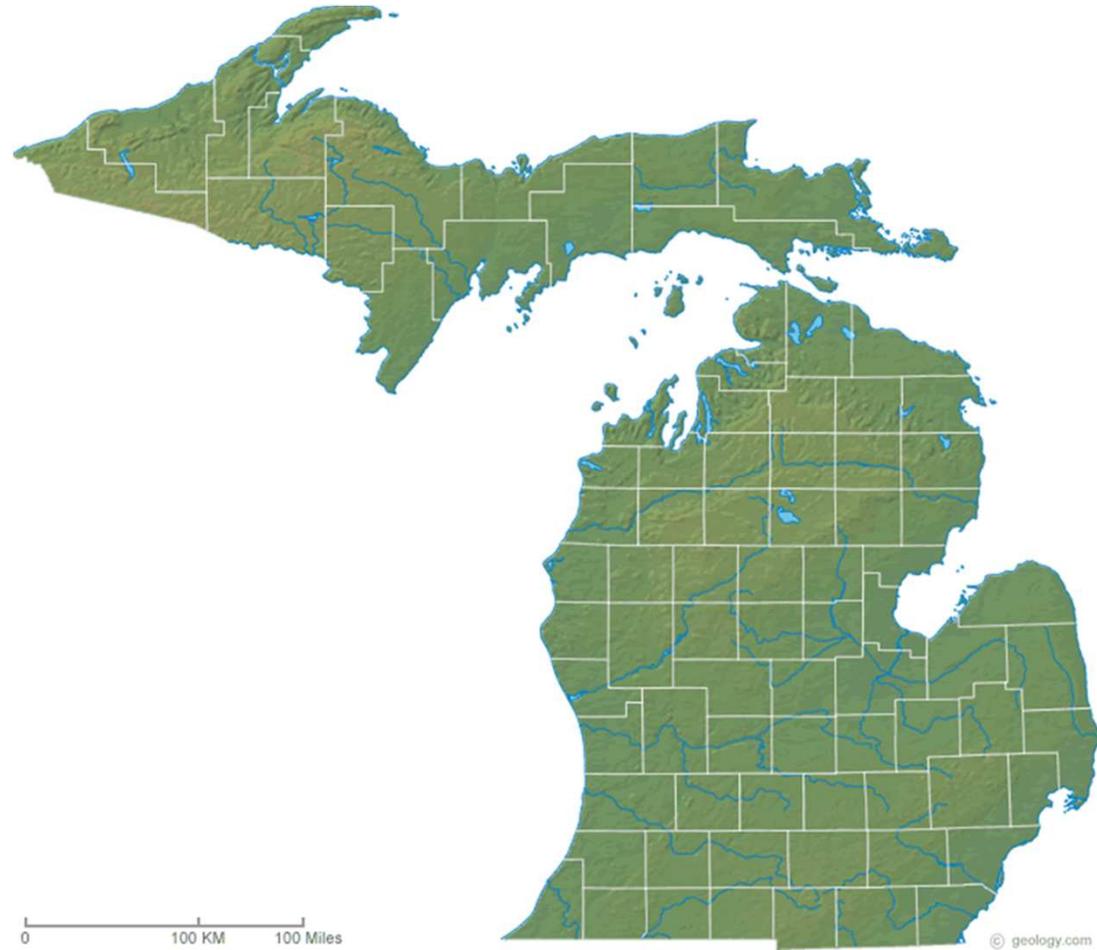
- True Minor
- Synthetic Minor – not subject to Title V or PSD
- Title V subject – not subject to PSD
- PSD
- Not sure/Not applicable

But what is it really?

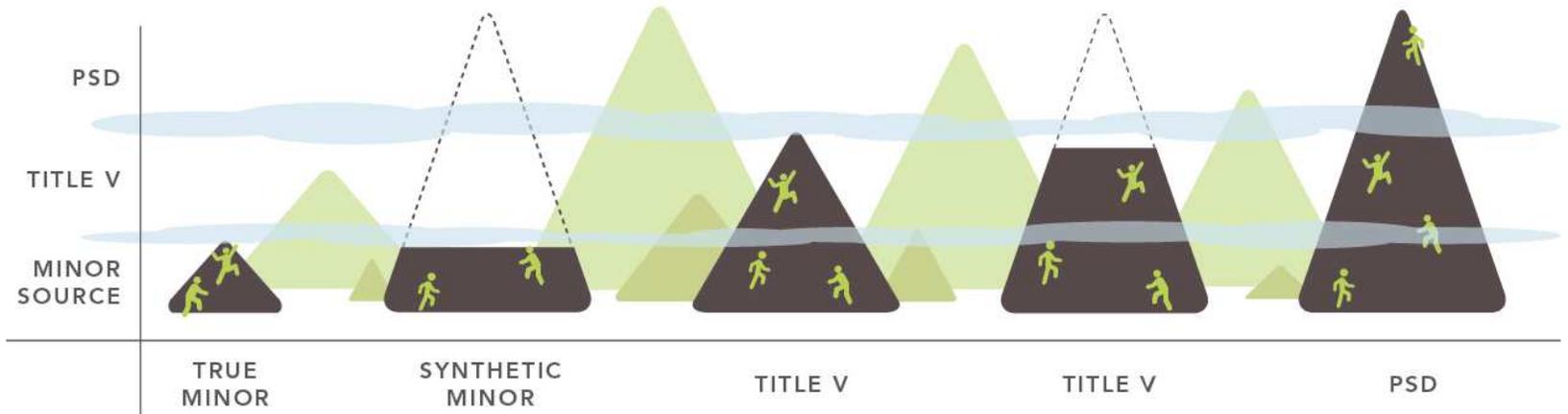
- Paraphrased:
 - The emissions associated with the maximum allowable operation of the equipment, process, or facility.



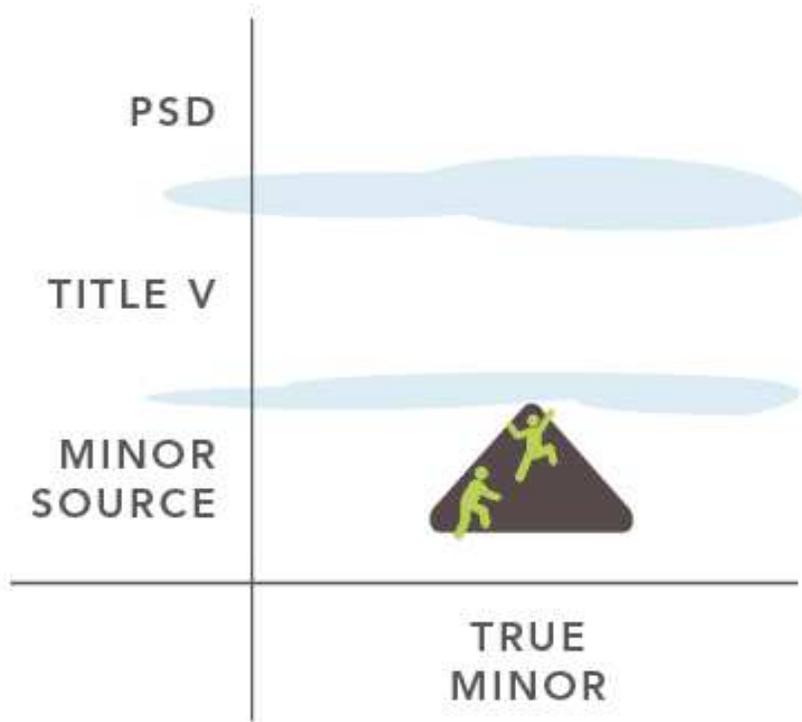
Let's take Michigan...



The Michigan Range

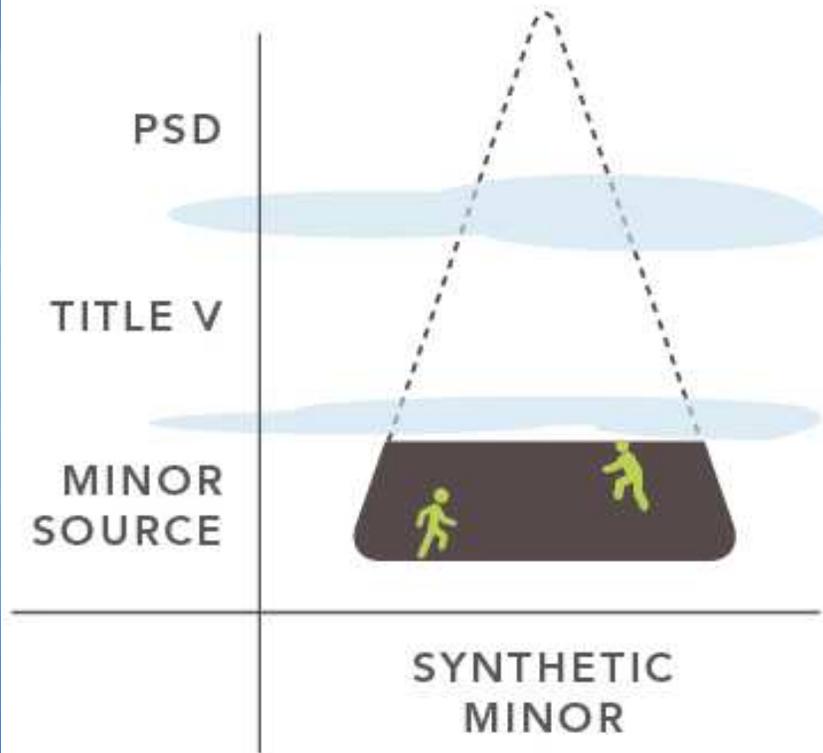


True Minor



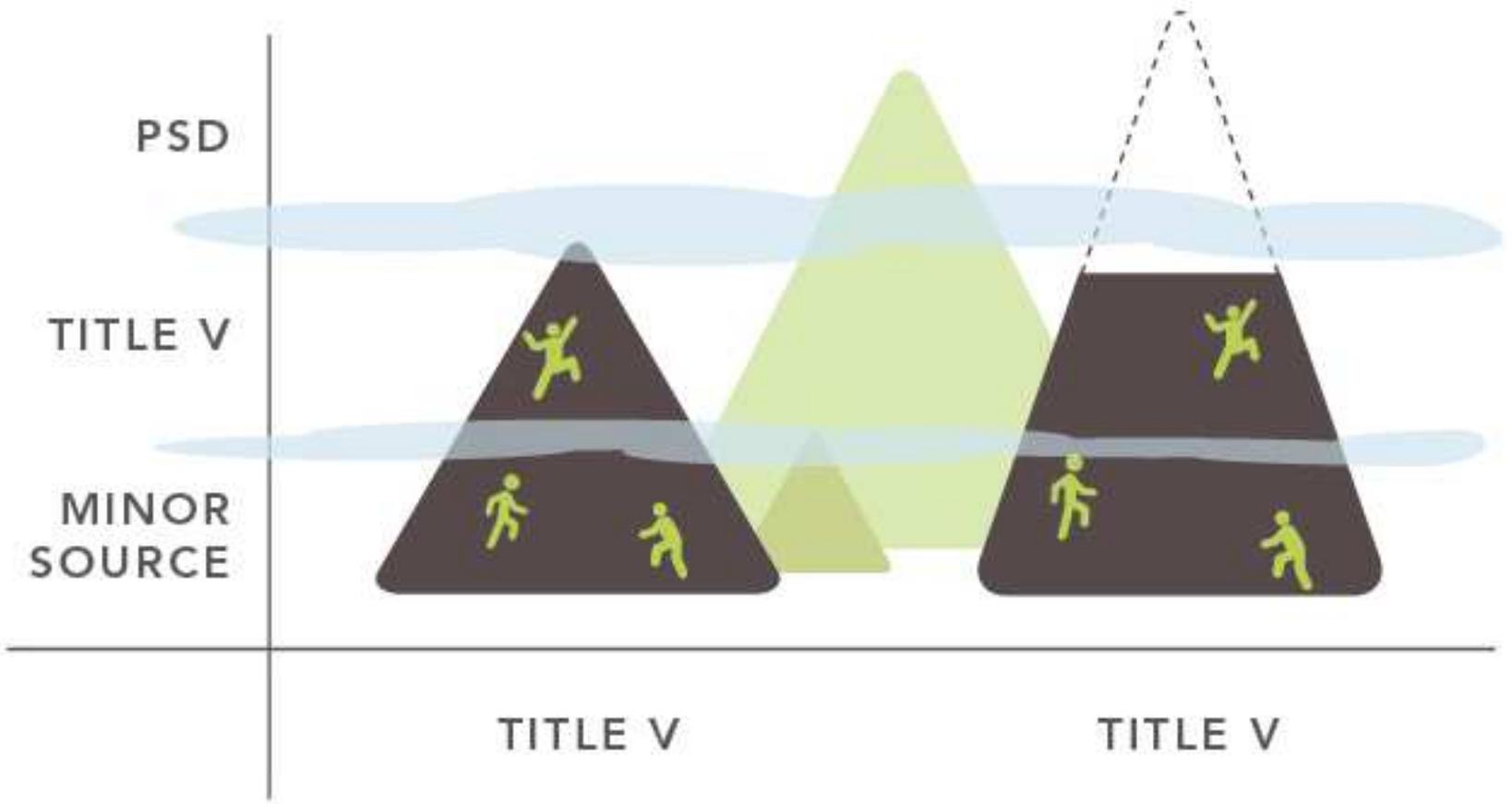
- PTE below Title V thresholds
 - <100 tons per year (tpy)
- Maximum capacity
- Many small businesses

Synthetic Minor (Title V)

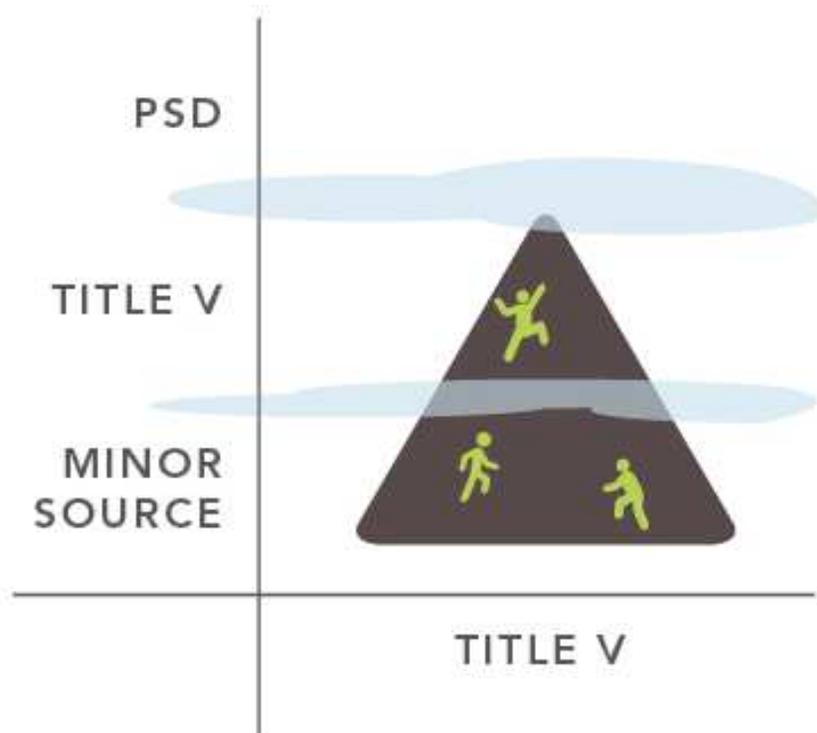


- Limited PTE below Title V thresholds
 - <100 tons per year (tpy)
- Restricted capacity
 - Maximum capacity for large emissions, but no business need

Title V subject

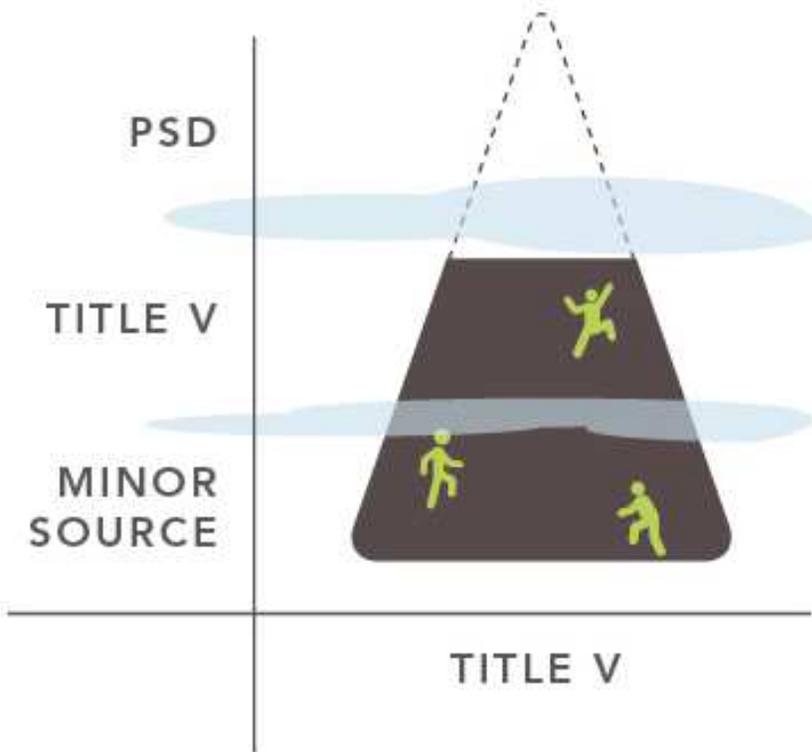


Title V subject



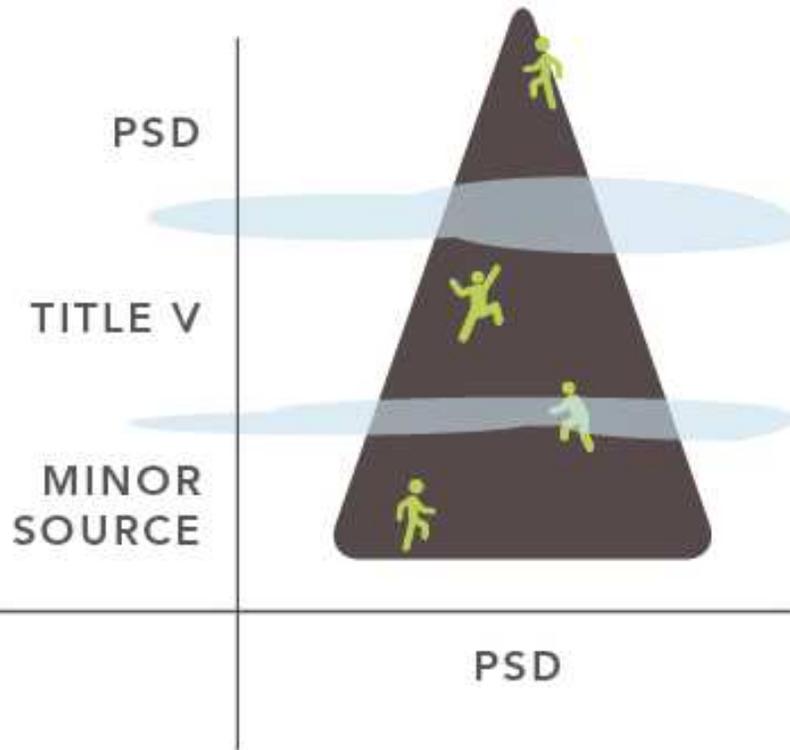
- PTE above Title V thresholds
 - 100 tpy or above
- Maximum PTE below PSD thresholds
 - <250 tons per year (tpy)*
- Maximum capacity

Title V subject



- PTE above Title V thresholds
 - 100 tpy or above
- Restricted PTE below PSD thresholds
 - <250 tons per year (tpy)*
- Restricted capacity

PSD major source



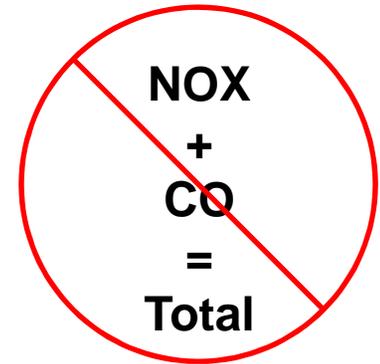
- PTE above PSD thresholds
– 250 tpy* or above
- Maximum capacity

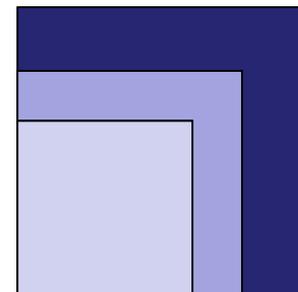
Caveats

- List of 28 sources
 - PSD threshold of 100 tpy
- Hazardous Air Pollutants (HAP)
 - EPA list of 187 HAPs
 - Individual/Aggregate: $\geq 10/25$ tpy
- Nonattainment
 - Most criteria pollutants: ≥ 100 tpy
 - May be different for certain standards
 - Contact the AQD for assistance

Key Concepts

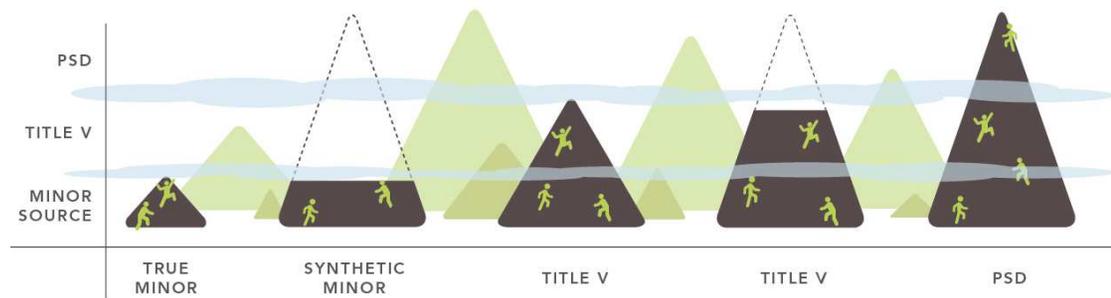
- PTE is by pollutant
 - Some exceptions:
Aggregate HAPs & GHGs
- Future permit modifications are allowed
 - Facility PTE is in flux based upon what is installed and/or permitted at any given time


$$\begin{array}{c} \text{NOX} \\ + \\ \text{CO} \\ = \\ \text{Total} \end{array}$$



Poll Question Redux

- Based on what you have learned so far, would you choose your category differently?
 - Yes
 - No
 - Not sure



Poll Question Trick

- What is your company categorized as?
 - Can't tell without calculating it!
- So, now that you know what it is, what is the next step?
 - Finding the summation of emissions for each pollutant.

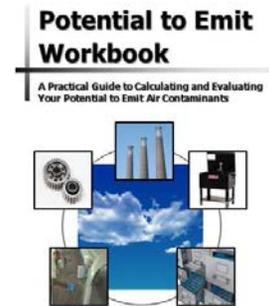
$$\text{NOx}_{\text{Equipment1}} + \text{NOx}_{\text{Equipment2}} = \text{NOx}_{\text{Total}}$$

$$\text{CO}_{\text{Equipment1}} + \text{CO}_{\text{Equipment2}} = \text{CO}_{\text{Total}}$$

Etc.

Resources

- Potential to Emit Workbook
 - Updated version coming soon
 - Published by the Office of Environmental Assistance (OEA)
- Contains
 - More in depth explanations
 - Calculation discussion
 - Categorization of the source
 - Synthetic minor restriction information



Calculation Methodology

- Legally enforceable limitations
 - Rules
 - Permit Conditions
- Performance test data
- Mass balance
- Emission factors



NOx Calculation Example

Natural gas-fired boiler

- 10 MMBtu/hr
- AP-42 Ch. 1.4, Table 1.4-1
 - NOx = 100 lb NOx / MMscf natural gas
- Assumptions:
 - 1 scf natural gas = 1,020 Btu
 - Maximum operating hr/yr = 8,760

$$(10,000,000 \text{ Btu/hr}) \times (1 \text{ scf}/1,020 \text{ Btu}) = 9,803.9 \text{ scf nat gas/hr}$$

$$(9,803.9 \text{ scf nat gas/hr}) \times (8,760 \text{ hr/yr}) = 85,882,352.9 \text{ scf nat gas/yr}$$

$$(85,882,352.9 \text{ scf nat gas/yr}) \times (100 \text{ lb NOx}/1,000,000 \text{ scf nat gas}) = 8,588.2 \text{ lb NOx/yr}$$

$$(8,588.2 \text{ lb NOx/yr}) \times (1 \text{ ton}/2,000 \text{ lbs}) = \mathbf{4.3 \text{ tons NOx/yr}}$$

Why are all Air Quality Rules based on it?

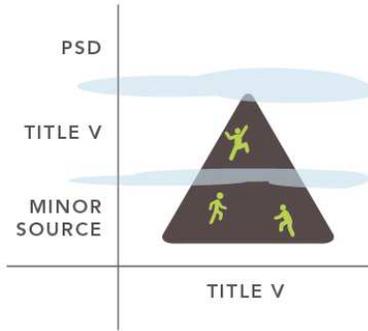
- Basics
 - Categorization/Organization
 - Consistency
 - Provides a clear line: Delineates small from large source
 - Allows for more stringent requirements for larger facilities

What are the major rules and regulations?

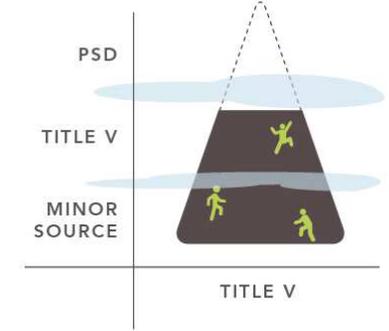
- National Emission Standards for Hazardous Air Pollutants (NESHAP)
- Title V (ROP)
- PSD and Nonattainment
- Emissions Reporting
- Permits to Install
 - Exemptions
 - Synthetic Minor permits

NESHAP

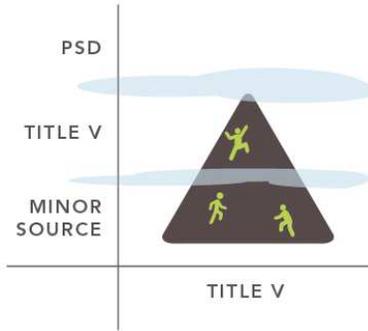
- Triggered based upon :
 - HAP PTE
 - Individual: ≥ 10 tpy
 - Aggregate: ≥ 25 tpy
 - Source type (boiler, engine, etc.)
- Major vs Area
 - Some cover major sources, area sources, or both sources
- EPA HAP list



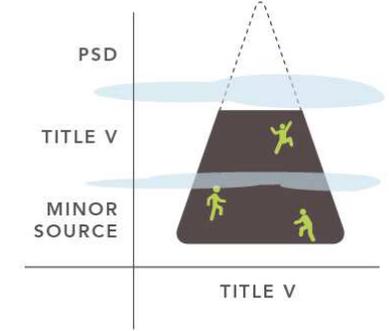
Title V



- Can be triggered multiple ways (R 336.1211)
 - Major source of HAPs
 - PTE ≥ 100 tpy of a regulated pollutant
 - PTE ≥ 100 tpy* of a nonattainment pollutant
 - Certain regulations



Title V



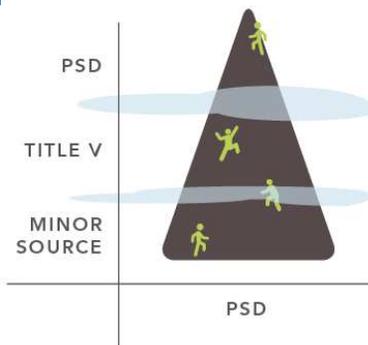
- PTE is based upon the summation of all equipment at the facility

Permitted + Exempt + Grandfathered = Facility

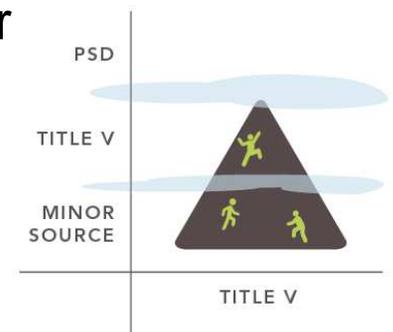
- The Title V threshold relates to PSD and nonattainment thresholds differently

PSD and Nonattainment

- PSD: Part 18 Rules
 - PTE ≥ 250 tpy of a regulated pollutant
 - PTE ≥ 100 tpy of a regulated pollutant for the list of 28 sources
- Nonattainment: Part 19 Rules
 - PTE ≥ 100 tpy for most nonattainment situations

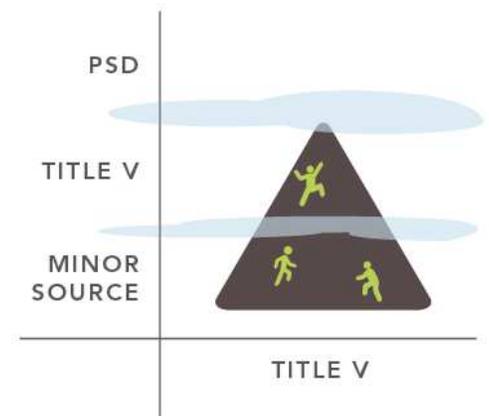
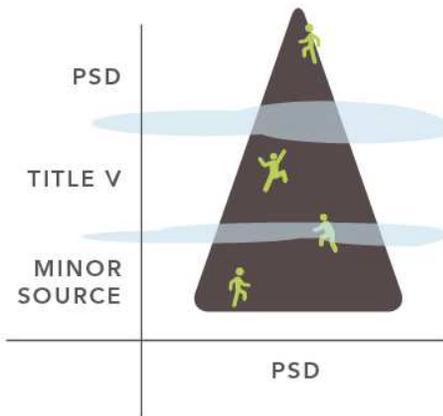


- Specific situations may have a lower threshold



PSD and Nonattainment

- PTE plays 2 roles:
 - Is the facility a major source?
 - Is the project a major project?
- PTE threshold for a major project is lowered if the facility is an existing major source.



NOx PSD Examples: 250 tpy source category

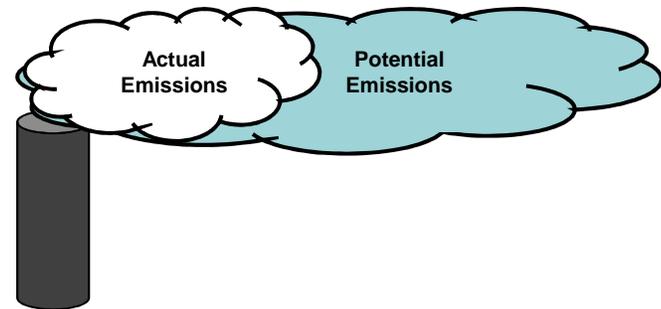
- Facility: 150 tpy
- Project: 50 tpy
 - Significance Threshold: 40 tpy
- Project: PSD subject?
 - **No**
 - The facility is not a major PSD source, so the trigger is still 250 tpy.
- Facility: 350 tpy
- Project: 50 tpy
 - Significance Threshold: 40 tpy
- Project: PSD subject?
 - **Yes**
 - The facility is an existing major PSD source, so the trigger is 40 tpy.

NOx Nonattainment Examples

- Facility: 80 tpy
- Project: 50 tpy
 - Significance Threshold: 40 tpy
- Project:
Nonattainment subject?
 - **No**
 - The facility is not a major nonattainment source, so the trigger is still 100 tpy.
- Facility: 150 tpy
- Project: 50 tpy
 - Significance Threshold: 40 tpy
- Project:
Nonattainment subject?
 - **Yes**
 - The facility is an existing major nonattainment source, so the trigger is 40 tpy.

Emissions Reporting

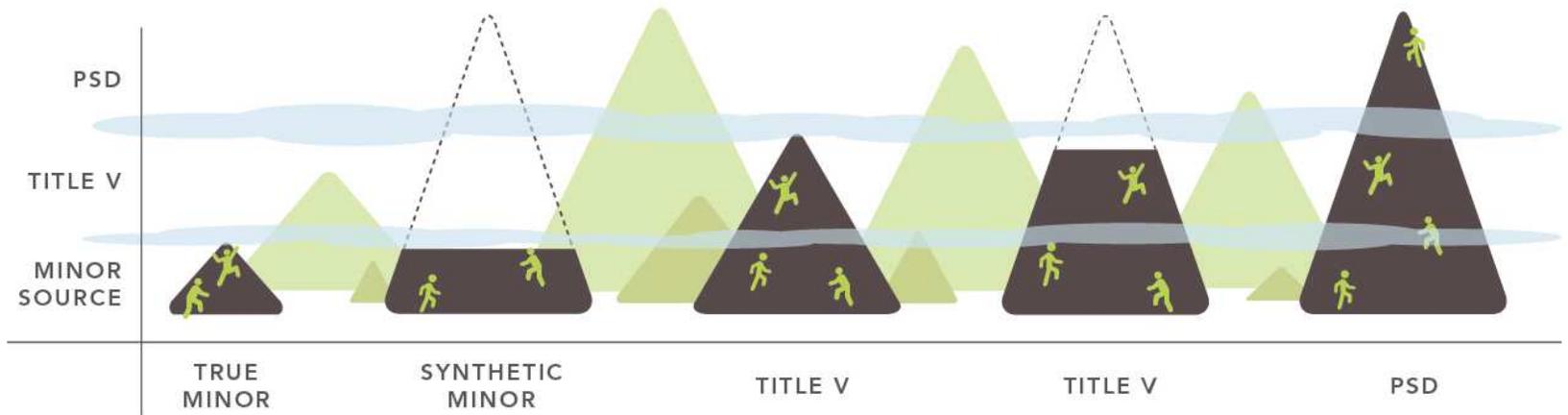
- Some facilities have to report emissions and pay fees
- PTE determines what category the facility falls under
- Actual emissions determine the fee amount



Permits to Install

Remember the Michigan Range?

- Permits to Install (PTIs) cover them all!



PTE plays a role in what projects need PTIs and what kind of review is required.

What projects need PTIs?

- Citation:

Michigan Air Quality Control Rules,
R 336.1201(1)

http://w3.lara.state.mi.us/orr/Files/AdminCode/1494_2014-154EQ_AdminCode.pdf



Permitting Rule

R 336.1201 Permits to install.

Rule 201. (1) Except as allowed in R 336.1202, R 336.1277 to R 336.1290, or R 336.2823(15) a person shall not install, construct, reconstruct, relocate, or modify any process or process equipment, including control equipment pertaining thereto, which may emit any of the following, unless a permit to install which authorizes such action is issued by the department:

(a) Any air pollutant regulated by title I of the clean air act and its associated rules, including

40 C.F.R. §51.165 and §51.166, adopted by reference in R 336.1299.

(b) Any air contaminant.

- The key above is the word “any”.
- Also, where does it mention PTE?

PTE for PTIs

- If everybody needs a PTI, then why do they need to know their PTE?
 - Michigan Air Quality Control Rules include exemptions
 - PTE determines whether or not they can be used
 - The PTE affects what kind of review is required for the PTI

Exemptions

- Rules 278-290
 - Rule 291 is in rulemaking, along with other minor changes
 - Most list specific equipment or situations which are exempt from permitting
- Rule 278: Exclusion from Exemption

Rule 278 & PTE

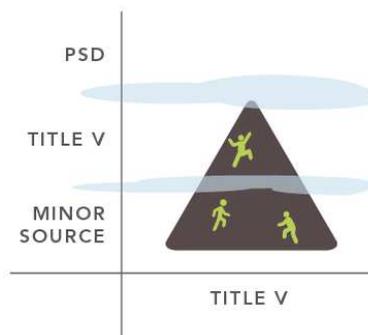
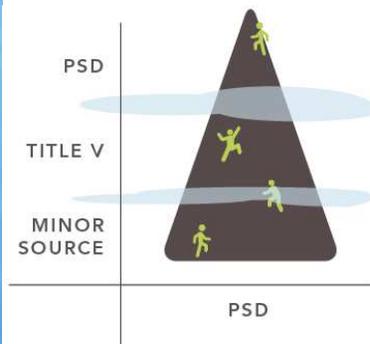
When is an exemption not an option?

- Subject to PSD or Non-Attainment New Source Review
- Actual emissions > Significance Levels
- New major source of HAPs under Part 63
- Construction or modification of major source of HAPS under Part 61

Rule 278 & PTE

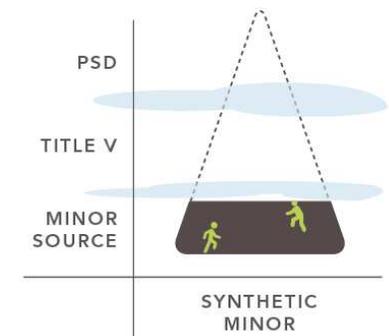
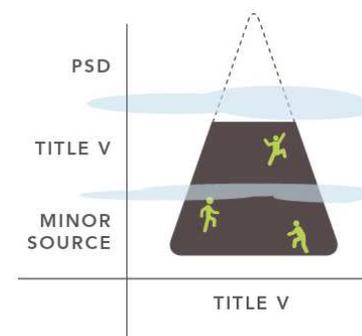
When is an exemption not an option?

- Subject to PSD or Non-Attainment New Source Review



OR

- If a restriction is needed to drop below those thresholds



Rule 278 & PTE

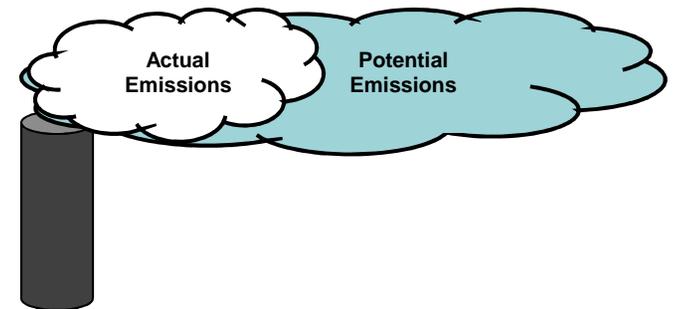
When is an exemption not an option?

- Actual emissions > Significance Levels

Rule 278 & PTE

When is an exemption not an option?

- Actual emissions $>$ Significance Levels
- Actual Emissions
 - Average over a 2-year period
 - No actual emissions upon initial startup
 - PTE surrogate
 - Safer and more defensible to get a PTI



Rule 278 & PTE

When is an exemption not an option?

- New major source of HAPs under Part 63



Rule 278 & PTE

When is an exemption not an option?

- New major source of HAPs under Part 63
- HAP PTE
 - Individual: ≥ 10 tpy
 - Aggregate: ≥ 25 tpy



Exemption Examples

- Rule 287(c) exempt paint booth PTE
 - Calculate allowable emission rates (federally enforceable limit)
 - Calculate maximum uncontrolled emission rate
- Emissions under Rule 287(c) based on a maximum of 200 gallons/month usage.



NOTE: Rule 278 trigger is HAPs (10/25 tons per year)

Exemption Examples

Worst case for HAPs: Coating A

- 10 pounds/gal coating density
- 35% by weight Toluene
- 5% by weight Xylene

$0.35 * (10 \text{ lbs toluene/gal}) * (200 \text{ gal/month}) * (12 \text{ months/year}) * (1 \text{ ton}/2000 \text{ lbs}) = 4.2 \text{ tons toluene/year}$

Rule 278 Trigger: Individual HAP, 3 booths

$4.2 \text{ tons toluene/year} * 3 \text{ booths} = 12.6 \text{ tons toluene/year}$

Exemption Examples

- Calculate maximum uncontrolled emission rate.
- Can consider operational constraints or “bottlenecks”
 - Maximum monthly skylight production is 7,500, 24/7.
 - Use one gallon for every 75 skylight frame.

$$(7500 \text{ skylights/month}) * (1 \text{ gal/75 skylight}) * 0.35 \\ * (10 \text{ lbs toluene/gal}) * (12 \text{ months/year}) * \\ (1 \text{ ton/2000 lbs}) = 2.1 \text{ tons toluene per year}$$

Exemption Examples

- To determine PTE, choose lower calculated value.
- PTE is 2.1 tons toluene.
- Five installed booths (*if installed as one project*) will trigger Rule 278.

Exemption Examples

- Rule 278 trigger for diesel generator is NO_x.
 - EF is 4.41 pounds/MM BTU heat input
 $(10 \text{ MMBTU/hr}) * (4.41 \text{ lbs/MMBTU}) * (8760 \text{ hr/yr}) *$
 $(1 \text{ ton}/2000 \text{ lbs}) = 193.2 \text{ tons Nox/year}$
- For emergency diesel generators, use 500 hours in accordance with 1995 Seitz memo
 $(10 \text{ MMBTU/hr}) * (4.41 \text{ lbs/MMBTU}) * (500 \text{ hr/yr}) *$
 $(1 \text{ ton}/2000 \text{ lbs}) = 11.0 \text{ tons Nox/year}$



Exemption Examples

- Correlate nameplate capacity (full load engine output, HP) with heat input (MM BTU/hr)

*One HP equals 2544 BTU

$(10,000,000 \text{ BTU/hr}) * (1 \text{ hp}/2544 \text{ BTU}) =$
3930 HP input

- Diesel engine efficiency is 30-50%.

*Assume average efficiency is 40%.

$0.4 * (3930 \text{ HP input}) = 1572 \text{ HP output}$

Exemption vs PTI

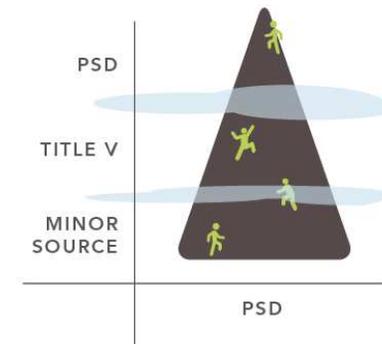
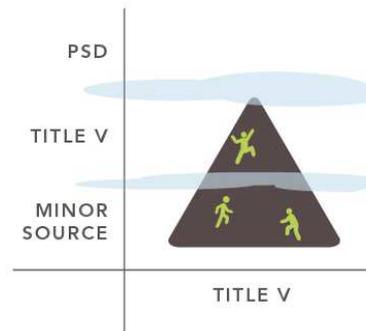
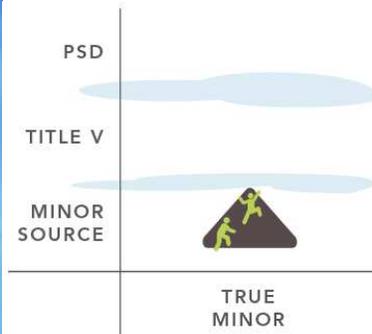
- Are they at odds with one another?



- **No!!**
 - They are merely different ways to evaluate your equipment
 - It is even possible to use exemptions for some equipment while permitting others

PTE Determines PTI Review

- What kind of facility are you?

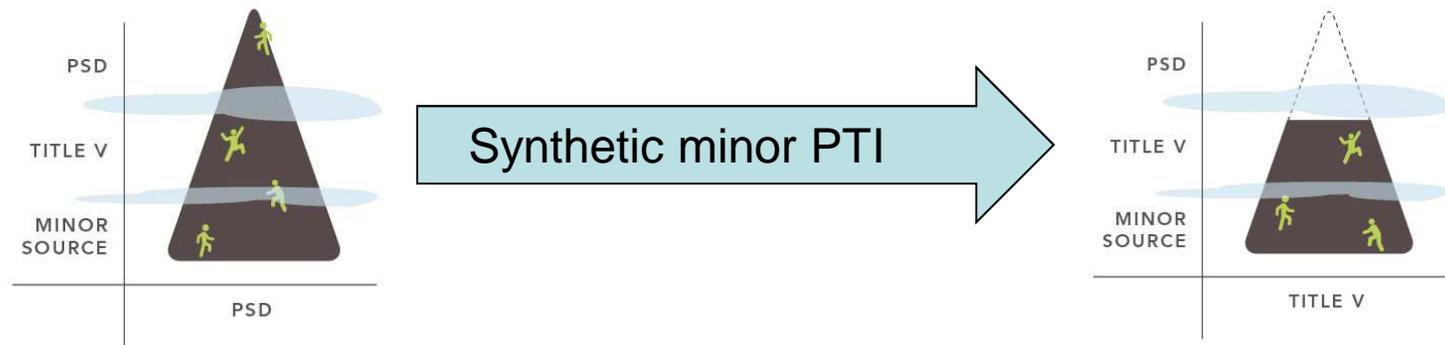


Introspective Questions

- Do you *like* your classification?
- Could your business plan accommodate a more restricted operation?
- Is it possible to maintain compliance with a more restricted operation?

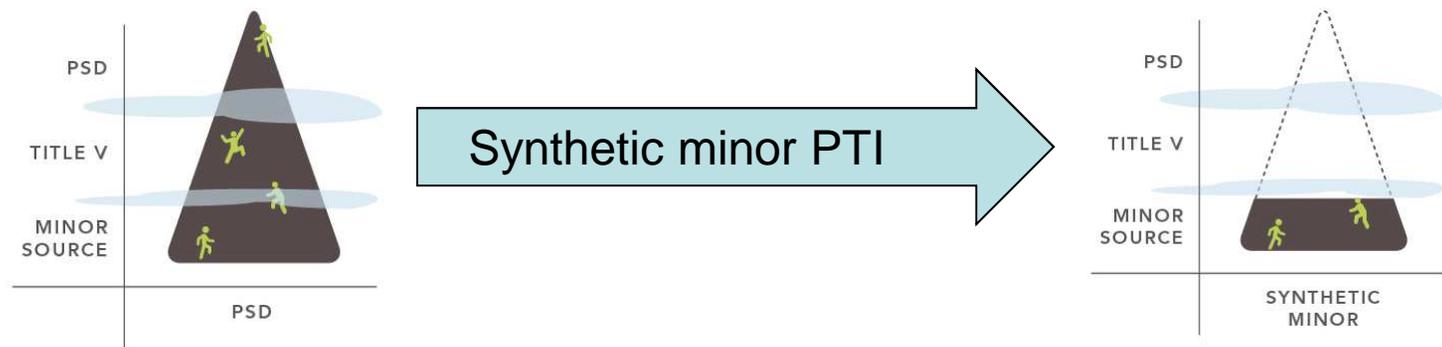
PTE Determines Review

Synthetic minor = An operation limited below maximum levels with federally enforceable limits.



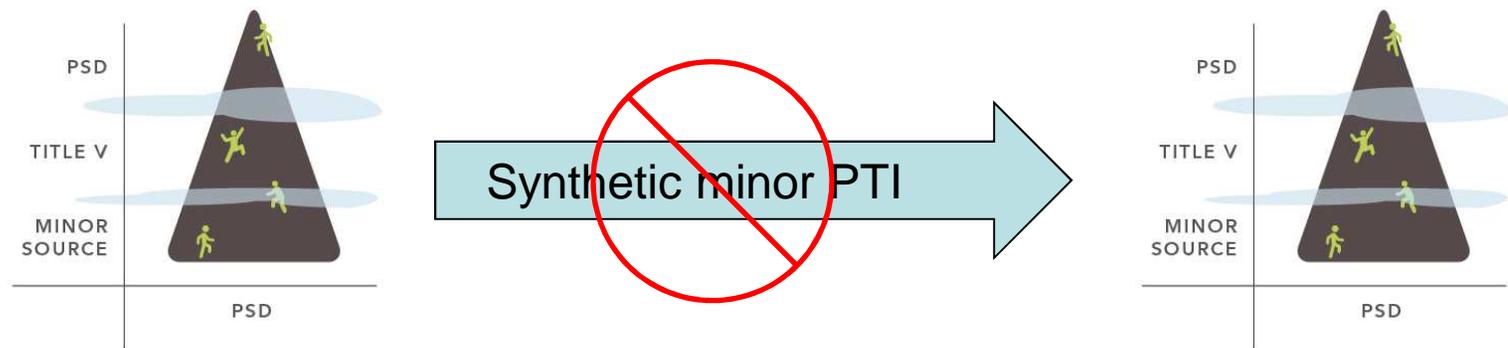
PTE Determines Review

Synthetic minor = An operation limited below maximum levels with federally enforceable limits.



PTE Determines Review

Synthetic Minor limits are not required; however, more stringent review may be necessary.



PTE Restrictions



So, let's say you have a restriction...



**DANGER:
VIOLATIONS
AHEAD**

PTE Restrictions

- A permit *can* be modified
 - Repeat the permitting process
 - New review will be performed with current standards
- So, what is the permitting process?
 - Please listen to the next webinar on **October 21, 2015**

What's Coming Up?

Introduction to Air Permit to Install

October 21, 2015 at 10:00AM

**Air Quality and the Nonmetallic Mineral
Crushing Industry**

November 18, 2015 at 10:00AM

**What is the Michigan Air Emissions
Reporting System (MAERS) and what is
the data used for??**

December 16, 2015 at 10:00AM

Please join us!

Wrap Up



- Recording
- Materials
- Evaluation

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