

Air Permitting for Major Sources/Part 1

2011 Compliance Assistance Conference



Bob Hodanbosi
Mike Hopkins



**Environmental
Protection Agency**

Topics

- What is Major NSR?
- Attainment/Non Attainment Areas
- Important Terms
- Prevention of Significant Deterioration (PSD) Permitting
- Non Attainment New Source Review (NNSR) Permitting
- Bonus Material

What is Major NSR Permitting?

- Must get an installation permit for new or modified sources
- If the emissions are large enough (over trigger levels), then installation permit is a "Major New Source Review" permit
- Major New Source Review (NSR) includes:
 - Prevention of Significant Deterioration (PSD) in attainment areas
 - Non Attainment NSR in non attainment areas
- Major NSR rules based on Federal rules incorporated into Ohio rules

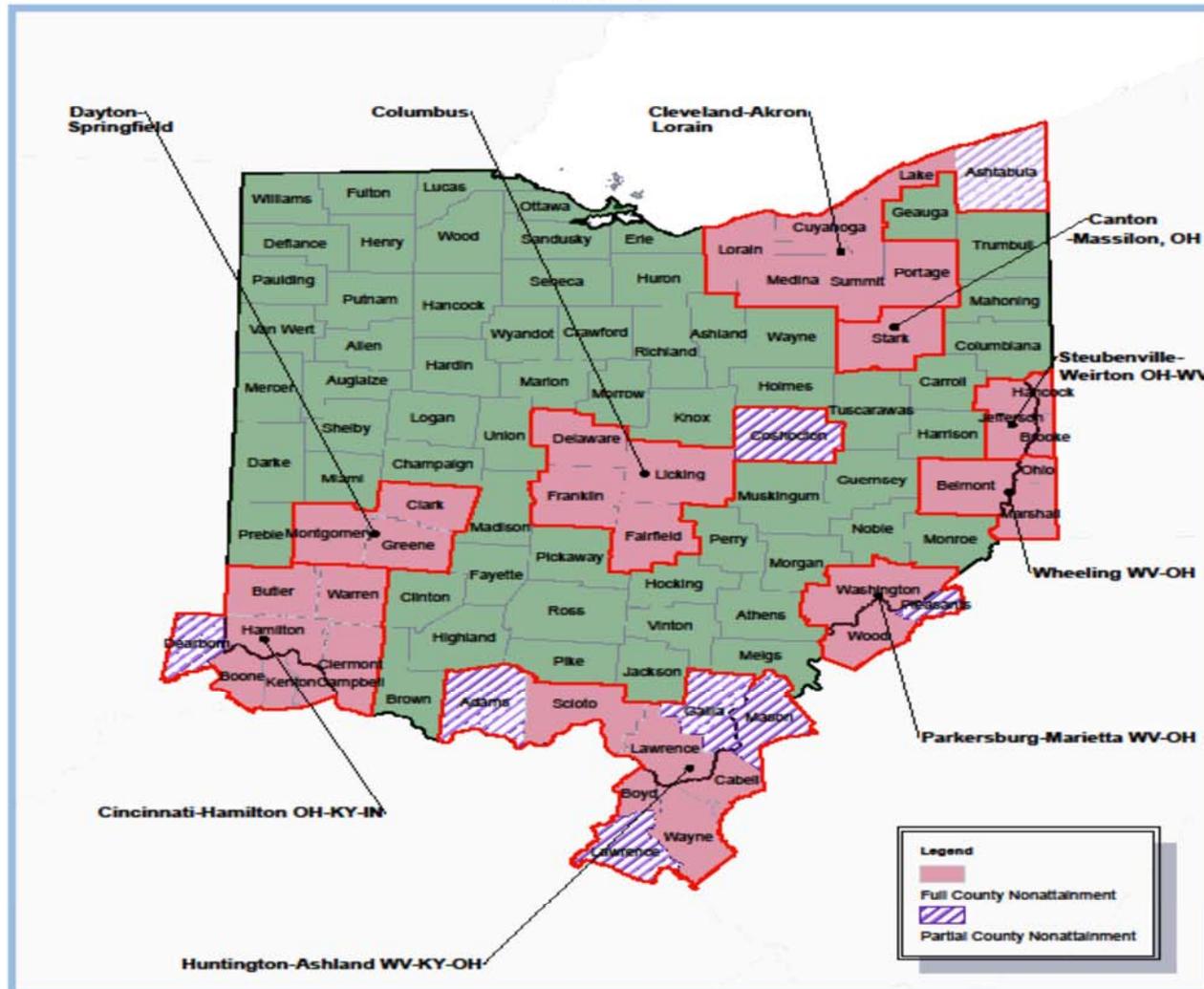
Attainment/Nonattainment

- An attainment area meets the National Ambient Air Quality Standards (NAAQS). A nonattainment area does not.
- An area can be attainment for some pollutants, and nonattainment for others.

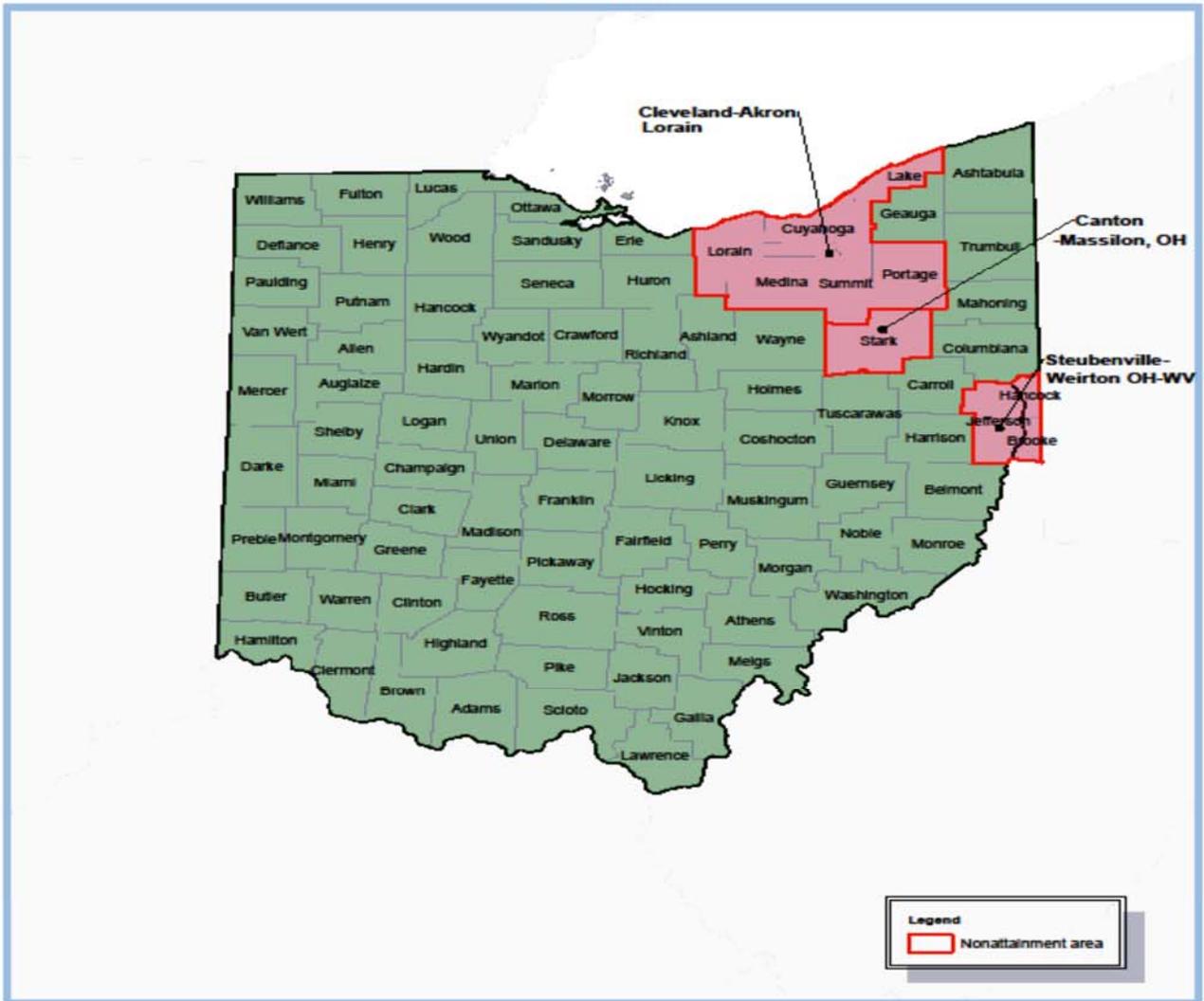
Ohio's Attainment Status

- The entire state is attainment for nitrogen dioxide, sulfur dioxide, and carbon monoxide.
- Ohio has nonattainment areas for PM2.5, lead
- Currently entire state is designated attainment for ozone and SO2 but this will change.

**Ohio 1997 Annual PM2.5 (15.0 ug/m3)
Nonattainment Areas
04/05/05**



Ohio 2006 24-Hour PM2.5 (35.0 ug/m3)
Nonattainment Areas
12/14/2009



Where does NNSR apply?

- Geographic areas where U.S. EPA has designated the area as nonattainment.
- Applies for only the nonattainment pollutant and precursor emissions.
- Some areas violate standards and are not yet designated nonattainment
- Other nonattainment areas attain standards, but redesignation process is not quick

Where does PSD apply?

- Geographic areas where U.S. EPA has designated the area as attainment or non classifiable.
- Applies for only the attainment pollutant and precursor emissions.

Prevention of Significant Deterioration



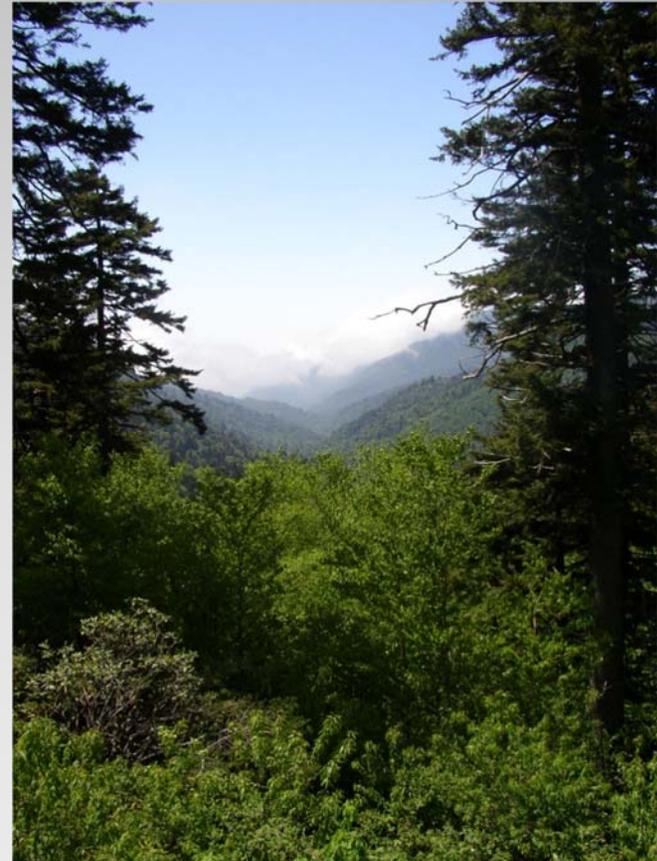
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PSD Topics

- PSD Goals
- Important Terms
- Applicability
- Requirements of PSD
- Review of PSD

PSD Permit Program Goals

- Designed to protect air quality in attainment areas
- Allow economic growth
- Protect public health and welfare
- Preserve, protect, and enhance air quality in special areas



Important Terms

Attainment Area *Regulated NSR* *Pollutants*

- What is a *regulated NSR pollutant*?
- NAAQS and constituents or precursors
- Section 111 pollutants (NSPS)
- Title VI Class I or II (ozone depleting)
- Other CAA regulated except HAPs (unless constituents or precursors)

Potential to Emit

- ***Potential to emit*** means the maximum capacity of an emissions unit or stationary source to emit an air pollutant under its physical and operational design.
- ***PTE*** can be limited through ***federally enforceable*** means, such as:
 - Control devices
 - Limits on capacity or hours
 - Limits on types or amount of material processed, combusted or stored

Stationary Source

- *Emissions Units* belonging to the same industrial grouping or support,
- Located on one or more contiguous or adjacent properties, and
- Under common control.



Major Stationary Source

- Attainment
 - 28-source category? >100 ton/yr
 - Not 28-source category? > 250 t/y



Major Stationary Source Qualifiers

- VOC for ozone
- Don't count quantifiable fugitive unless on the list
- List is not specific to NSPS
- If the change by itself is major at a non major source, then the project is a major stationary source

Major Modification

- 4 page rule definition (3745-31-01(III))
- Physical change in or change in the method of operation of a major stationary source that would result in:
 - *A significant emissions increase* of a RNSRP,
AND
 - *A significant net emissions increase* of that pollutant

Major Modification

- The change itself must be above the significance levels, **AND**
- The net change must be above the significance levels for the project to be a major modification
- **Both statements must be true to be a major modification**

Major Modification Qualifiers

- Significant VOC = significant ozone
- Calculation method for *significant emissions increase* is different for existing vs new
- Physical change or change in the method qualifiers
- *PAL* qualifier

PSD Applicability

PSD Applicability for New Facilities

- Determine if the proposed source is a *major stationary source* for any attainment area pollutants (100, 250, 100,000 ton thresholds)
- If any of the attainment pollutants trip the *major stationary source* thresholds, then the source is considered a *major stationary source* for attainment area review and PSD applies

PSD Applicability for Existing Facilities

- First, determine if the existing facility is a *major stationary source* for any attainment area pollutants (100, 250, 100,000 ton thresholds)
- Second, determine that a physical change or change in the method of operation is occurring
- Third, do the two-part emissions increase test for each pollutant

PSD Applicability for Existing Facilities

- Check each *regulated NSR pollutant* separately
- First, determine if the increase associated with the modification qualifies as a *significant emissions increase*
- Second, determine if the *net emissions increase* for that pollutant is significant

PSD Applicability Example

Existing Fac. ¹	Increase	Net Increase	Trigger	PSD?
251 t/y NO _x ²	35 t/y	45 t/y	40 t/y	No
240 t/y VOC	45 t/y	35 t/y	40 t/y	No
15 t/y PM ₁₀	5 t/y	20 t/y	15 t/y	No
50 t/y SO ₂	45 t/y	45 t/y	40 t/y	Yes

¹ Assume facility is located in an attainment area for all of the above listed pollutants.

² This emission rate makes it a "major stationary source."

Net emissions increase

- *Net emissions increase* can get complex
- Important to verify with DO/Laa
- Don't want to find out late in the permit process that your evaluation was incorrect

PSD/Fugitive Emissions

- Fugitive emissions means those emissions that cannot reasonably pass through a stack, chimney, vent or other functionally equivalent opening.
- Examples:
 - Particulate matter (PM): Coal piles, road dust, quarries
 - Volatile Organic Compounds (VOCs): Leaky valves and flanges at refineries and oil processing equipment

PSD/Fugitive (cont)

- They are included in a source's PTE to the extent that they can be quantified, if they are present at:
 - One of the 28 PSD source categories
 - A source category subject to NSPS or NESHAP as of 8/7/80
- If a source has been determined to be major for that pollutant, they are included in any subsequent analysis (e.g. air quality impact)
- Categories are general, not specific to NSPS or NESHAPS

PSD/Secondary Emissions

- Emissions which, although associated with the construction or operation of a source, are not emitted from the source itself.
- For example, particulate from the construction
- They do not count toward PTE, but must be considered in the PSD analysis if PSD is required.

PSD Requirements

PSD Requirements

- Employ BACT
- Ambient monitoring
- Emissions modeling
- Other impacts analysis

PSD Permitting - BACT

- Best Available Control Technology means an emissions limitation ... maximum degree of reduction....each regulated NSR pollutant...which the director...taking into account energy, environmental and economic impacts and other costs determines is achievable...
- Can use production processes or available methods, systems and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control

PSD Permitting - BACT

1. Top-Down Process
2. Identify all control technologies
3. Eliminate technically infeasible options
4. Rank remaining control technologies by control effectiveness
5. Evaluate most effective controls and document results
6. Select BACT

*See bonus material at the end of the presentation.

Ambient Monitoring

- Rules require pre-application monitoring if modeling shows impacts above monitoring trigger levels
- Monitoring trigger levels – 3745-31-13(H) or EG 69
- Monitoring required for one year (mostly)

Ambient Monitoring

- If you have to do pre-application monitoring, then you need to do post construction monitoring
- Can get out of pre-construction monitoring if monitors already exist (often the case)



Emissions Modeling/Other

- Rules require air quality impact analysis that demonstrate:
 - NAAQS will be met
 - Must be less than allowed increase over the baseline concentration (typically $< \frac{1}{2}$ available increment)
- Other Impacts Analysis
 - Soils, vegetation, visibility etc.
 - See bonus material at the end of the presentation

PSD Permitting Questions?

Non Attainment NSR

Nonattainment Area Regulated NSR Pollutants

- What is a regulated NSR pollutant?
- NAAQS Pollutant (SO₂, ozone, PM, PM-10, NO_x, PM_{2.5}, CO, Pb)
- Precursor pollutants
 - NO_x and VOC for ozone
 - SO₂ and NO_x for PM_{2.5}
- Different than for PSD

Basic NNSR Requirements

- LAER - Lowest Achievable Emission Rate
- Emissions Offsets
- Net air quality benefit from offsets
- Certify all major operations owned by the source in the state are in compliance with SIP (or on an enforceable schedule)

NNSR Applicability

- A new source/major modification will be subject to NA NSR in Ohio if:
 - Will emit or have the potential to emit 100 tpy, (thus a Major Source) any criteria pollutant for which the area is designated as nonattainment, OR
 - A modification (any physical or operational change) which results in a significant increase (see Significance Levels table) in emissions of a pollutant for which the source is major and the area is designated nonattainment.

NNSR Applicability Significance Levels (tons/yr) (Modifications)

	Marginal	Moderate and Basic	Serious	Severe	Extreme
Ozone (NO _x and VOCs are precursors)	40	40	25*	25*	any
CO	-	100	50	-	-
PM ₁₀	-	15	15	-	-
NO ₂	-	40	-	-	-
SO ₂	-	40	-	-	-
PM _{2.5} (Nox and SO ₂ are precursors)	-	10	40		

*when aggregated with all other net increases 25 tpy in emissions from the source over any period of 5 consecutive years

Lowest Achievable Emission Rate (LAER)

- LAER is the most stringent emission limitation based on either:
 - 1) the most stringent limitation achieved in practice by class or source category (without taking into account economic, energy, or other environmental factors),
OR
 - 2) the most stringent limitation in any SIP for that class or source category.

LAER (cont'd)

- LAER cannot be less stringent than any applicable NSPS limit.
- LAER is an emissions rate specific to each emissions unit.
- This emissions rate may result from a combination of emissions-limiting measures such as:
 - add-on controls
 - a process modification
 - a change in the raw material

Emission Offsets

- A new or modified source is required to “offset” any increased emissions (it generates) with a decrease elsewhere in the same nonattainment area.
- The offset provision shifts the burden of accommodating new growth in NA areas to new sources. Only offsets of the same pollutant are allowed within a given area.

Offsets (cont'd)

- Obtaining offsets is generally done by purchasing emission credits from another source or combination of existing sources, within the same nonattainment area, to offset the increase in emissions from the new source/modification.
- The purpose of the offsets is to allow the area to move towards attainment while still permitting some industrial growth.
- See Finding Offsets bonus material

Offsets (cont'd)

- Offset ratios are to be greater than 1:1 for moderate areas and 1.1:1 for basic areas.
- Offsets should be located in the same nonattainment area, or in adjacent nonattainment areas.
- Offsets must be in the permit or a SIP revision.
- Offsets must be practically enforceable.

What is not considered an offset?

- Emission reductions required by the State Implementation Plan (SIP) or a consent decree
- The difference between the SIP and the NSPS if it is applicable to the source

Net Air Quality Benefit

- The offsets must produce a “Net Air Quality Benefit” (for the area affected by the new/modified source)
- This is required so that after the source is built, air quality is better than before the source began operation
- Modeling demonstration required for some pollutants (SO₂, Nox)

Compliance Certification

- All major sources owned or operated by the facility in the state must be in compliance with the State Implementation Plan (SIP)
- Rules allow facility to be on an enforceable schedule or consent decree to achieve compliance

Finally

- Don't forget about "netting"
- If "internal" offsets (offsets at that plant) can be generated; "netting" will probably work
- Frequently used on expansions or replacements, but does not work for new facilities
- Questions...

Bonus Material

BACT Process

BACT Step 1: Identify All Control Techniques

- Should be comprehensive; source should not yet discount options because of infeasibility
- Source should consider add-on controls and inherently lower-emitting processes and practices
- Scope is not limited by other regulations or by national boundary

BACT Step 1: Identify All Control Techniques

- Step 1 (cont)
- Innovative technologies may be considered; technology transfer must be considered
- RBLC:
 - <http://cfpub.epa.gov/RBLC/index.cfm?action=Home.Home&lang=en>
- BAT:
 - <http://www.epa.ohio.gov/dapc/files/files.aspx> (Under Permits (Permit to Install and Permit to Operate) files)

BACT Step 2: Technical Feasibility

- If a control technology has already been installed and successfully operated on the type of source under review, it's technically feasible (unless there are obstacles at the source that justify infeasibility).
- Otherwise, source must consider whether the technology is:
 - Available (obtainable), and
 - Applicable (can be reasonably installed and operated)

BACT Step 3: Ranking Feasible Options

- Rank from most to least effective in terms of emission reduction.
- If a control technology has a range of performance, select the reduction level that has been achieved at other sources.

BACT Step 4: Evaluation

- Weighing of energy, environmental and economic factors
- Energy Impacts Analysis
- Source should determine whether the control technology's energy requirements would result in significant or unusual energy penalties or benefits
- Should only consider direct energy consumption
- May involve fuel scarcity

BACT Step 4: Evaluation

- Environmental Impacts Analysis
- Concentrates on non-air quality impacts, such as solid/hazardous waste, water effluent, visibility, or emission of unregulated pollutants.
- Significant or unusual collateral impacts may be reason for disqualifying a control technology.

BACT Step 4: Evaluation

- Economic Impacts Analysis (Cost analysis)
- Cost effectiveness: dollars per ton reduced
- A technology may be rejected if the cost is disproportionately high when compared to recent BACT determinations
- BACT analysis may involve vendor-supplied estimates, cost manuals developed by EPA, data from trade publications, etc.

BACT Step 4: Cost Effectiveness

- $(\text{Annualized Cost}) / (\text{Baseline emission rate} - \text{Control option emission rate})$
 - Capital cost estimate may include:
 - Equipment and installation costs
 - Indirect investment (e.g. engineering, construction, start-up, performance testing)
 - Contingencies
 - Working capital

BACT Step 4: Cost Effectiveness

- Annual cost estimate may include:
 - Direct costs (e.g. labor, maintenance, electricity, water)
 - Indirect costs (overhead, property tax, insurance, capital recovery)
- Capital charges (taxes and insurance, capital recovery factor, interest on working capital)

BACT Step 4: Cost Effectiveness

- Engineering Guide #46
- EPA Air Pollution Control Cost Manual
<http://www.epa.gov/ttn/catc1/products.html#cccinfo>
- Need help? Talk to NSR contact.

Bonus Material

Other PSD Impacts Analysis

Other Impacts Analysis

- PSD permit applicant must prepare an analysis on any impairment to visibility, soils and vegetation
- Applicant must prepare an analysis of the air quality impact as a result of the general commercial, residential, industrial or other grown associated with the project
- Rarely significant

PSD Soils and Vegetation Analysis

- Based on an inventory of the soils and vegetation types found in the area, including all vegetation of commercial or recreational value
- Rarely significant but can be for pollutants like hydrogen fluoride

PSD Visibility Impairment Analysis

- Affects projects that are located near or impact Class I areas
- Class I areas are places like national parks
- No Class I areas in Ohio
- Closest is Dolly Sods Wilderness area in WV
- Rarely significant but could be for large projects like power plants

"Sleeper Issue" – Alternative Sites Analysis

- An analysis by the source owner of:
 - Alternative sites
 - Sizes
 - Production processes
 - Environmental control techniques
- Analysis for such proposed source must demonstrate that benefits significantly outweigh:
 - the environmental impacts
 - social costs imposed as a result of source location, construction, or modification

Bonus Material Finding Offsets

Findings Offsets

- Contact the DO/LAA and ask them for recent shutdown sources in their area.
- Obtain copy of the emissions inventories for past years. Determine if sources have been shutdown.
- Contact local chamber of commerce to find closures
- Contact the Ohio EPA permit staff and ask about available Emission Reduction Credits in bank

Emission Banking Rules

- Ohio EPA developed rules to allow for emission banking
- Allows permanent emission reductions to be formally recognized
- Credits are posted on internet so that interested parties can see what is available in the area
- For more information contact Jennifer Avellana – 614-644-3625 or jennifer.avellana@epa.state.oh.us

Why does all this matter?

- Many more nonattainment areas for ozone, SO₂
- Want to attract new business, expansions of current business
- Ohio EPA bank designed to assist development in nonattainment areas

Ever Tightening Standards - Ozone

0.08 ppm Standard – 1997

Met everywhere – Columbus, Cleveland and Cincinnati redesignated

0.075 ppm Standard – 2008

Not being met in Cleveland, Cincinnati and Columbus (2008-2010)

0.070 ppm Standard (proposed high end of range)

Not being met in Cleveland, Dayton, Cincinnati, Columbus, Portsmouth, Toledo, Akron, Canton, Youngstown, Marietta and Lima

0.065 ppm Standard (proposed – middle of range)

No monitor meets - add Athens, Steubenville to areas not meeting

Sulfur Dioxide

- Counties measuring above 75 ppb – 1 hour avg:
 - Belmont (97 ppb)
 - Columbiana (117 ppb)
 - Jefferson (129 ppb)
 - Lake (175 ppb)
 - Meigs (85 ppb)
 - Morgan (216 ppb)
- Recommended SO₂ Nonattainment
 - Portions of Belmont, Columbiana, Jefferson, Meigs, Morgan, Washington, and Gallia County
 - All of Lake County