



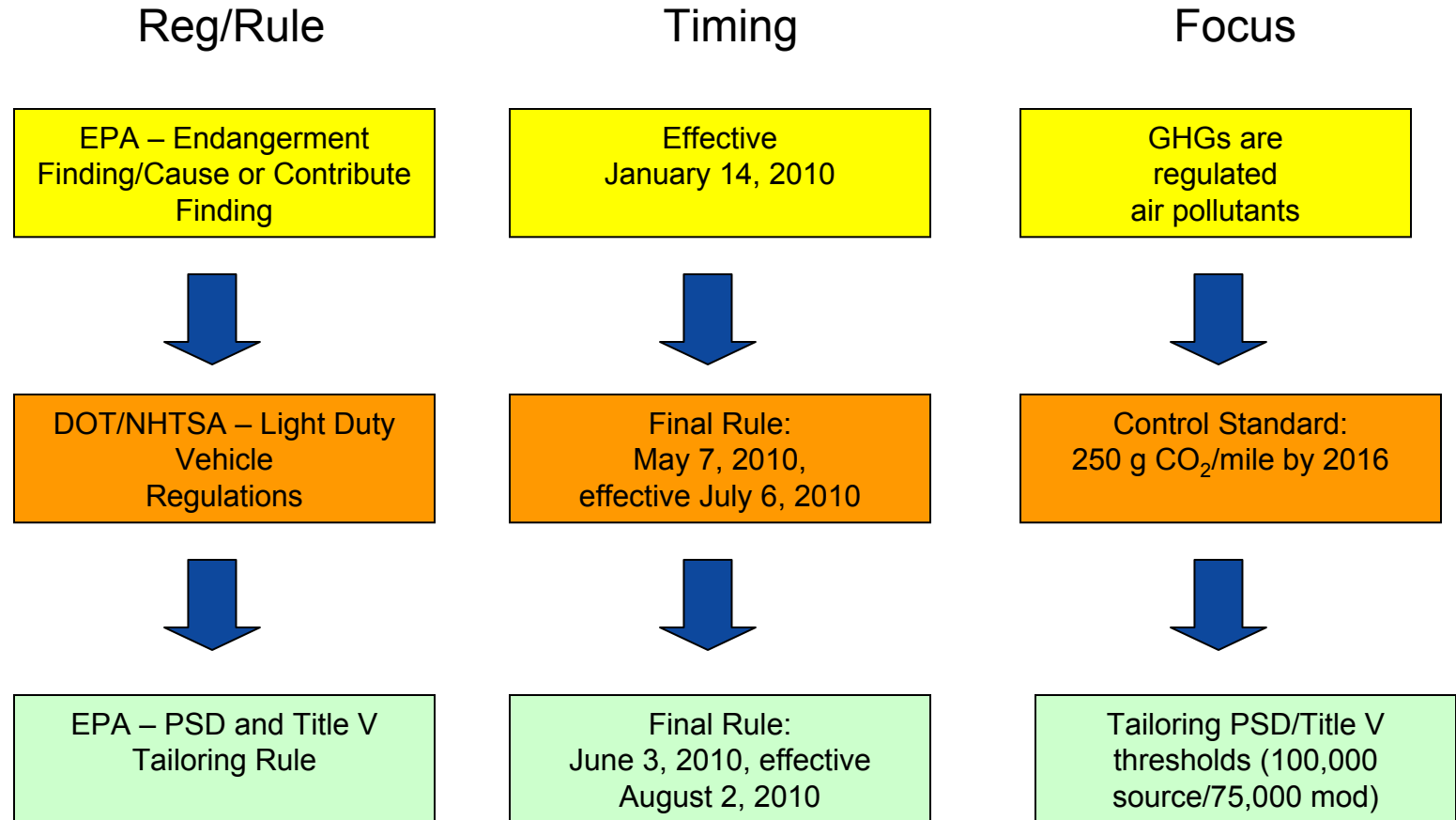
PSD and Title V GHG Tailoring Rule

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Alignment of the GHG Regulations/Rules



PSD Applicability (Overview)

- Federal pre-construction permitting program
- Applies to new “major sources” of regulated air pollutants
 - ◆ Sources that emit or have the potential to > 100/250 tpy
- Existing major source undertaking a “major modification”
 - ◆ Physical or operational change that results in a significant net emissions increase of a regulated pollutant (and not otherwise subject to an exclusion)
 - Significant emission rate (SER)
- Existing minor sources undergoing a modification that by itself is above the major source threshold

EPA's PSD and Title V GHG Tailoring Rule

- Rule finalized on June 3, 2010; Effective August 2, 2010
- Why?
 - ◆ Without “tailoring,” CAA statutory levels for major sources (e.g., 100/250 tpy for PSD) would apply as of January 2, 2011
- What GHGs?
 - ◆ Regulation of 6 GHG compounds as identified in LDVR and Endangerment & Contribution findings
 - *“the single air pollutant defined as the aggregate mix of these six well-mixed greenhouse gases”*
 - CO₂, CH₄, N₂O, HFCs, PFCs, & SF₆
 - ◆ EPA notes there is a statutory history of well mixed compounds with TRS, VOC, NO_x, etc.

PSD Tailoring Rule: Step 1

Permits issued between 1/2/11 and 6/30/11

Item	New Sources	Modified Sources
GHG PSD Applicability*	<ul style="list-style-type: none">■ Subject to PSD for traditional pollutant (“anyway PSD source”), AND■ New source PTE for GHGs \geq 75,000 tpy CO₂e	<ul style="list-style-type: none">■ Modification subject to PSD for traditional pollutant (“anyway PSD modification”), AND■ GHG emissions increase and net emissions increase \geq<ul style="list-style-type: none">□ 75,000 tpy CO₂e AND□ 0 tpy (mass basis)
Traditional Pollutants PSD Applicability	<ul style="list-style-type: none">■ Applicability process unaffected by Tailoring Rule since only “anyway PSD” sources covered	

* PSD for GHGs can be avoided by capping PTE or emissions increases to less than the applicable thresholds

PSD Tailoring Rule: Step 2

Permits issued on or after 7/1/11

Item	New Sources
GHG PSD Applicability*	<ul style="list-style-type: none"> ■ “Anyway” source from Step 1 ■ OR New source PTE for GHGs \geq <ul style="list-style-type: none"> □ 100,000 tpy CO₂e (makes GHG “regulated NSR pollutant”) AND □ 100/250 tpy (mass) (major source threshold)
Traditional Pollutants PSD Applicability	<ul style="list-style-type: none"> ■ Process for new major PSD sources unaffected by Tailoring Rule ■ For otherwise new minor PSD sources, if trigger PSD for GHG, threshold drops to PSD Significant Emission Rates for traditional pollutants

* PSD for GHGs can be avoided by capping emissions to less than the applicable thresholds

PSD Tailoring Rule: Step 2

Permits issued on or after 7/1/11

Item	Modified Sources
GHG PSD Applicability*	<ul style="list-style-type: none"> ■ “Anyway” modification from Step 1 ■ OR, Both: <ul style="list-style-type: none"> Ⓞ Existing PTE: <ul style="list-style-type: none"> □ > 100,000 tpy CO₂e AND □ > 100/250 tpy (mass basis) Ⓞ GHG emissions increase <u>and</u> net emissions increase <ul style="list-style-type: none"> □ ≥ 75,000 tpy CO₂e AND □ ≥ 0 tpy (mass basis) ■ OR, Both: <ul style="list-style-type: none"> Ⓞ Existing PSD minor source Ⓞ GHG emissions increase ≥ <ul style="list-style-type: none"> □ ≥ 100,000 tpy CO₂e AND □ ≥ 100/250 tpy (mass) <p style="color: red; font-size: small;">Note: This is consistent with EPA Nov 2010 GHG permitting guidance; but, actual rule language is open to interpretation.</p>
Traditional Pollutants PSD Applicability	<ul style="list-style-type: none"> ■ Process for existing major PSD sources unaffected by Tailoring Rule ■ For existing minor PSD sources, if modification triggers PSD for GHG, major modification threshold drops to PSD Significant Emission Rates for traditional pollutants

* PSD for GHGs can be avoided by capping emissions to less than the applicable thresholds

Step 3 and Beyond

Beginning July 1, 2013

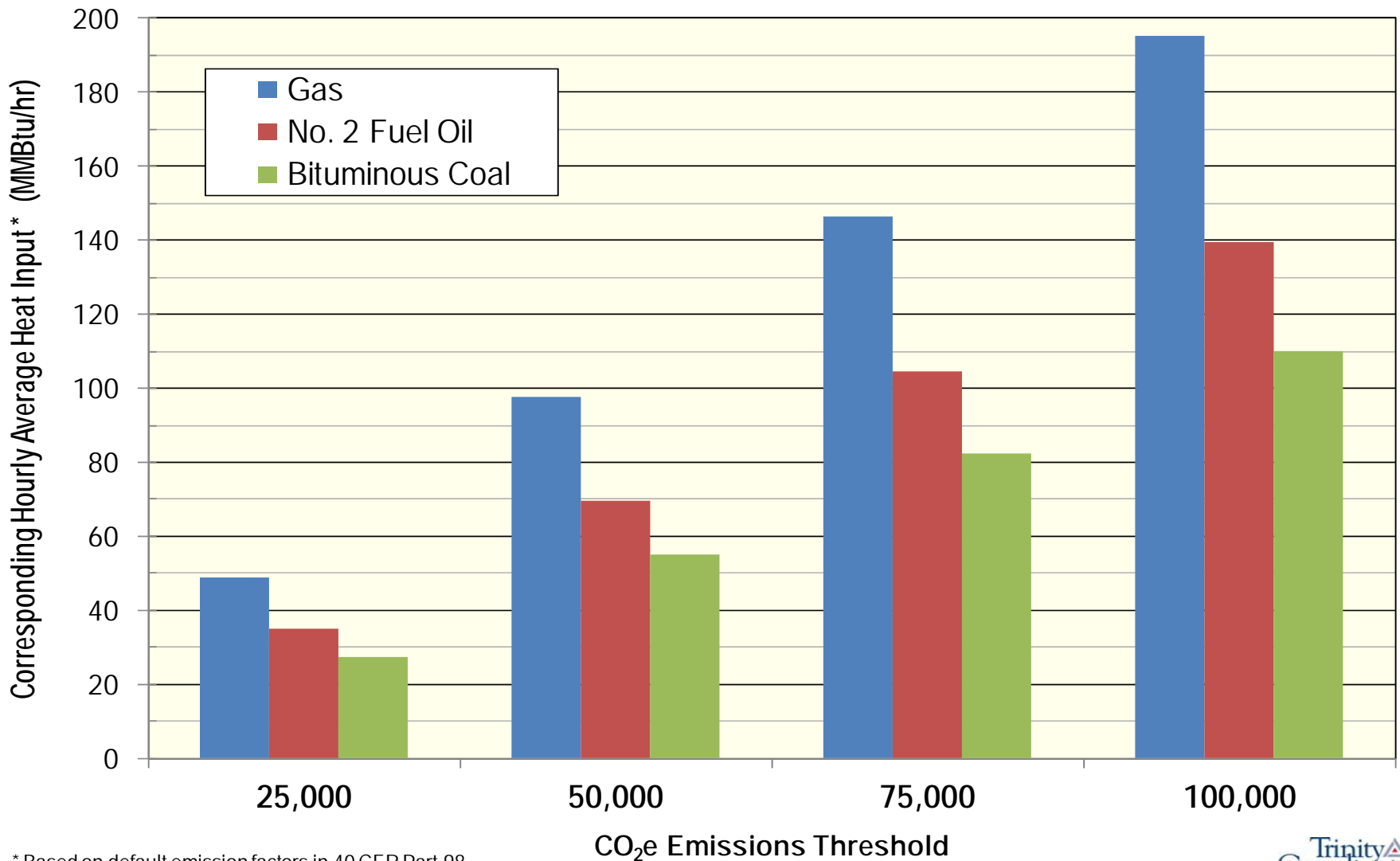
- EPA will complete another rulemaking action no later than July 1, 2012 for Step 3 phase-in
- May propose lower thresholds in this rulemaking
- May also consider permanent exclusion of certain source categories (based on Chevron “absurd results” doctrine)
 - ◆ Sources that are too small and inconsequential for GHGs
 - ◆ Sources that would be required to obtain an “empty permit”

Exclusion of Smaller Sources

- Rule provides for 6-year exclusion of smaller sources < 50,000 tpy CO₂e
- Exclusion will remain in effect until EPA takes action to address these sources in Step 4 – required by 4/30/2016
- Exclusion provides more time for permitting agencies to gear up for large number of permit actions
- Also provides time to develop and adopt streamlining measures to reduce permitting burden

Translation: Step 3 will establish major source threshold and/or significance level no more than 50,000 tpy CO₂e

What does 75,000 tpy CO₂e look like?



* Based on default emission factors in 40 CFR Part 98

Practical Impacts of Tailoring Rule for PSD (1 of 2)

- For existing major PSD sources.....
 - ◆ Most PSD triggering permit actions for non-GHGs involving combustion equipment will likely trigger PSD for GHGs (CO₂e likely to be over 75,000 tpy)
 - Address BACT for GHGs
 - ◆ Some PSD avoidance permit actions (with respect to non-GHG pollutants) could still trigger PSD for GHGs
 - ◆ Be sure construction of PSD projects permitted before January 2, 2011 starts and continues within permitted timeframes

Practical Impacts of Tailoring Rule for PSD (2 of 2)

- For existing minor PSD sources....
 - ◆ Some will become newly minted PSD major sources on July 1, 2011 due to GHG emissions, particularly those with gas and oil fired combustion units
 - PSD will be triggered more easily for non-GHG pollutants if project has emissions > PSD Significant Emission Rates (e.g., 40 tpy NO_x, SO₂, VOC; 10 tpy PM_{2.5}, etc.)
 - Possible for projects to trigger PSD for GHGs only
 - ◆ Some will be able to retain PSD minor status but only through permit action to add synthetic limit on GHG emissions (e.g., < 90,000 tpy CO₂e)
- For previous PSD synthetic minor sources....
 - ◆ Existing synthetic minor PSD limits for non-GHG pollutants (90 tpy or 225 tpy) will become moot, but still enforceable

Step 1 Title V - Tailoring Rule

Item	Requirement
Start Date	<ul style="list-style-type: none">□ January 2, 2011
Coverage	<ul style="list-style-type: none">□ Only sources required to have Title V permits for non-GHG pollutants – “anyway Title V sources”□ No sources will become major for Title V solely based on their GHG emissions during this period
Requirement	<ul style="list-style-type: none">□ “Anyway Title V sources” must address GHG requirements when apply for, renew, or revise Title V permits☂ Until PSD triggered, only requirement would be to include GHG emissions estimates in Title V applications☂ GHG MRR is not a Title V applicable requirement☂ Questions remain about how “insignificant activities” will be defined with respect to GHG emissions☂ Any future NSPS addressing CO₂e will be applicable requirements

Step 2 Title V - Tailoring Rule

Item	Requirement
Start Date	<ul style="list-style-type: none">□ July 1, 2011
Coverage	<ul style="list-style-type: none">□ “Anyway” Title V sources from Step 1, AND□ Major sources for GHG pollutants
Major Source Threshold	<ul style="list-style-type: none">□ GHG potential emissions at existing or newly constructed source (sum-of-six well-mixed GHGs) equal or exceed:<ul style="list-style-type: none">⦿ on a CO₂e basis, 100,000 tpy CO₂e
Requirement	<ul style="list-style-type: none">□ If previously a minor Title V source, apply for new Title V permit by July 1, 2012□ Address applicable GHG requirements when apply for, renew, or revise permits

Practical Impacts of Tailoring Rule for Title V

- For existing major Title V sources....
 - ◆ New administrative requirement to include GHG emissions in Title V applications
 - ◆ Implications regarding “insignificant activities” qualifiers still unknown
 - ◆ Nothing substantive to add to Title V permits until there is a PSD or PSD avoidance permit action
- For existing minor Title V sources....
 - ◆ Some will become newly minted Title V major sources on July 1, 2011 due to GHG emissions and will need to prepare Title V permit applications
 - ◆ Some will be able to retain Title V minor status but only through permit action to add synthetic limit on GHG emissions (e.g., <90,000 tpy CO₂e)



Best Available Control Technology (BACT) for GHGs

PSD Permitting Requirements for GHGs

- ✓ Best Available Control Technology Analysis
- ✗ Air Quality Analysis
 - ◆ Regulatory concepts of National Ambient Air Quality Standards (NAAQS) and PSD Increments cannot be applied to the global phenomenon of climate change
- ✗ Additional Impacts Analysis
 - ◆ Analysis of impairment to visibility, soils and vegetation likely following the same rationale for not requiring NAAQS and Increment modeling
 - ◆ No documented facility level, short-term affects of GHG emissions on visibility, soils, and vegetation
 - ◆ No EPA guidance on requirement to conduct an analysis of GHG emissions from commercial, residential, industrial and other growth associated with the source or modification

What is BACT?

- Regulatory BACT definition was not changed by the Tailoring rule:
 - ◆ *"BACT" means an emissions limitation, including a visible emission standard, based on the maximum degree of reduction for each regulated NSR pollutant that will be emitted from a proposed major stationary source or major modification that:*
 - *Is determined on a case-by-case basis after taking into account energy, environmental, and economic impacts and other costs, to be achievable by the source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of that pollutant;*
 - *Does not result in emissions of a pollutant that would exceed the emissions allowed by an applicable standard codified in 40 CFR Parts 60 and 61; . . .*

What is BACT?

- Emission limitation: BACT is an emission limit not an emission reduction rate or a specific control technology
- Each NSR regulated pollutant: BACT is analyzed for each pollutant, not a combination of pollutants
- Proposed source: BACT applies to the type of source/modification proposed by the applicant
- Achievable: Emission limitation must be achievable on a continuous basis over the lifetime of the source
- Production processes: Lower emitting production processes should be considered only if they do not redefine the source
- Available: Selected control option must be commercially demonstrated on a similar source or both “available” and “applicable”

EPA Guidance on GHG PSD Permitting

- EPA Clean Air Act Advisory Committee (CAAAC) Climate Change Work Group was formed to identify the major issues and potential barriers to implementing the PSD Program for GHGs under the Clean Air Act
- Work Group was composed of representatives from a variety of industries, state and local governments, and public health and environmental organizations
- Outcome of the Work Group process was issuance of the “Phase I” (on February 3, 2010) and “Phase II” (on October 5, 2010) reports which were considered by EPA during the development of the GHG PSD and Title V permitting guidance

EPA Guidance on GHG PSD Permitting

- After reviewing the Work Group findings, EPA issued a comprehensive guidance document entitled *PSD and Title V Permitting Guidance for Greenhouse Gases* on November 10, 2010
 - <http://www.epa.gov/nsr/ghgdocs/epa-hq-oar-2010-0841-0001.pdf>
- GHG permitting guidance document was issued for public comment on November 17, 2010 with a two week comment period ending on December 1, 2010
- Based on the comments received, EPA plans to make certain minor corrections and edits to improve the clarity of the guidance document which were expected to be issued sometime this month

EPA Guidance on GHG PSD Permitting

- GHG permitting guidance document is accompanied by seven industry-specific white papers outlining key BACT considerations for common emission units in these industries
 - Electric generating unit, large boilers, pulp and paper, cement, iron and steel, petroleum refinery, and nitric acid industries


EPA Guidance on GHG PSD Permitting

- With the exception of emissions thresholds triggering permitting, many of the longstanding processes for PSD permitting of criteria pollutants are retained in EPA's guidance (e.g., concept of major modification, contemporaneous netting, "top down" BACT analysis, etc.)
- Guidance reiterates that BACT determinations for GHGs are case-by-case and will vary from state-to-state and project-to-project
- Although detailed BACT guidance is provided for certain source types, EPA heavily caveats these examples by stating that the guidance does not prescribe BACT for any source type

EPA Guidance on GHG PSD Permitting

- Energy efficiency and carbon capture and sequestration (CCS) are endorsed as available GHG control options warranting extensive consideration in the “top down” BACT process
- Guidance provides technical resources for identifying candidate GHG control options

5-Step “Top Down” BACT Process

- Pre-Step 1: Determining the Scope of the BACT Analysis or defining the “source”
- Step 1: Identify available control options
- Step 2: Eliminate technically infeasible control options
- Step 3: Rank remaining control options by effectiveness
- Step 4: “Top-down” evaluation of control options based on the three E’s (energy, environmental, and economic impacts)
- Step 5: Select BACT 

Pre-Step 1: Defining the “Source”

- Applicant defines the goals, objectives, purpose, or basic design for the proposed source/modification
- Source definition generally provides key design elements that are not under consideration through the BACT process
- BACT can be applied to logical groupings of emission units where appropriate to evaluate synergistic reductions in emissions
- For greenfield facilities, permitting authorities are encouraged to evaluate energy efficiency measures on a facility-wide basis to reduce GHG emissions

Step 1: Identify Available Controls

- Identify all available GHG control options with the potential for practical application to the source under review
- Exclusion of control options that fundamentally redefine the source should be clearly documented in the permit record
- Sector-specific white papers and ENERGY STAR program benchmarks and guidelines are the most useful resources for identifying available GHG control options for common combustion sources
- EPA categorizes energy efficiency options into:
 1. Techniques that maximize the efficiency of the individual emission unit, and
 2. Techniques that improve the utilization of thermal energy and electricity generated onsite

Step 2: Technical Feasibility of Controls

- Available add-on control technologies for certain GHGs and certain types of emissions sources are in the early stages of development
- For these new and emerging control options, technical feasibility considerations will be a key step in the BACT process
- EPA considers CCS an available control option for “large” CO₂-emitting facilities and facilities with high-purity CO₂ streams
- For these large sources, CCS technical feasibility analyses should include an evaluation of all three phases of CCS: capture and compression, transportation, and storage

Step 3: Rank Remaining Control Options

- For non-GHG regulated pollutants, control option ranking typically considers control efficiency, expected emission rate, and emission reduction
- Input-based metrics (such as pounds per MMBtu of fuel used or pounds per ton of raw material feed) have historically been preferred for comparing BACT limits across similar units
- For ranking of energy efficiency options, EPA expressed a general preference for output-based metrics (such as pounds per MWh net electricity generation or pounds per pound steam produced)

Step 4: “Top Down” Evaluation of Controls

- Start with highest ranked control option from Step 3 and evaluate potential for adverse energy, environmental, and economic impacts
- Energy impacts only consider direct energy consumption of the control option and includes any significant or unusual energy penalties or benefits
- Environmental impacts include indirect or collateral impacts that may result from the selection of the control option to reduce GHG emissions (e.g., collateral NO_x and CO emissions from CH₄ controlled by an oxidizer)
- Recommended procedures for evaluating cost effectiveness of GHG control options follow the same guidance from the NSR Workshop manual applied to non-GHG pollutants

Step 4: “Top Down” Evaluation of Controls

- Secondary emissions from offsite power generation are not explicitly considered when identifying emissions reductions or emission limits achievable for a given GHG control option
- Reductions in electricity usage from the grid due to implementing a GHG control option should be considered in Step 4
- Cost effectiveness thresholds for GHG control options will be developed as GHG permitting progresses and results of cost analyses are documented in the RBLC
- While no formal cost effectiveness thresholds were discussed in the GHG permitting guidance, EPA acknowledged the thresholds for GHGs will be “significantly” lower than those applied to criteria pollutants

Step 5: Select BACT

- BACT is not necessarily the emission limit reflected by the highest possible degree of emission reduction but should be a limit that allows for compliance on a consistent basis
- Permitting authorities can establish GHG BACT limits with future opportunities for adjustment or optimization based on actual performance data
- Output-based BACT emissions limit (or a combination of output- and input-based limits) are generally preferred to ensure that BACT is complied with at all levels of operation
- EPA refers applicants and permitting authorities to previously issued guidance document entitled *Output-Based Regulations: A Handbook for Air Regulators*

Step 5: Select BACT

- No NAAQS for GHGs, so GHG BACT limits should be expressed on an annual average basis (i.e., 12-month calendar year or rolling average basis)
- GHG BACT limits must be enforceable as a practical matter with corresponding monitoring, recordkeeping, and reporting requirements
- Periodic stack testing, CEMs, fuel usage monitoring, and electricity/steam/heat output monitoring for combustion sources are all available compliance demonstration methods for both GHG and non-GHG BACT limits
- Energy management systems (EMS) are identified as a work practice standard requirement that could be implemented in conjunction with energy efficiency based GHG BACT limits

Closing Thoughts

- New concepts for GHG BACT analyses introduced by EPA guidance include: 1) facility-wide BACT evaluations for greenfield sources, 2) energy efficiency for emissions control, and 3) the preference for output-based limits
- Without a corresponding change to the definition of BACT, these concepts could easily be applied to non-GHG pollutants
- For GHG sources other than conventional combustion units, developing expected increases in process efficiency for available efficiency-based GHG control options may be challenging
- GHG BACT determinations by State agencies to-date do not appear to have all of the elements EPA is expecting particularly with respect to evaluating CCS and establishing appropriate limits with adequate compliance demonstration requirements

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