



PSD and Title V GHG Tailoring Rule

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William Bruscano
Senior Consultant
225.292.2661

bbruscin@trinityconsultants.com



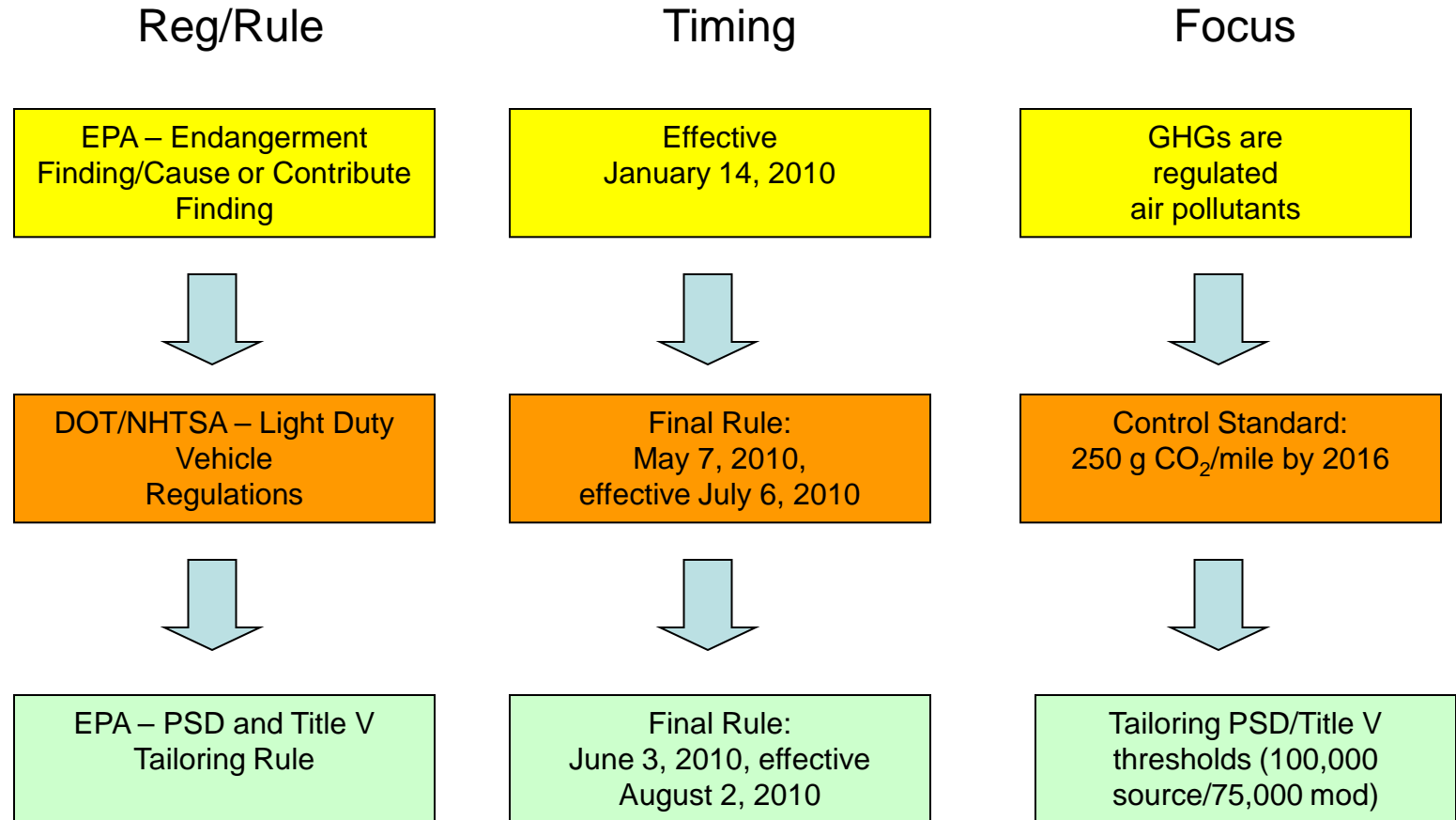


Discussion Topics

- Alignment of the GHG Regulations/Rules
- PSD Applicability (Overview)
- EPA's PSD and Title V GHG Tailoring Rule
- BACT for GHGs
- Questions



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.



Step 1 PSD - Tailoring Rule

Item	Requirement & Criteria
Start Date	<ul style="list-style-type: none">• January 2, 2011
Coverage	<ul style="list-style-type: none">• New construction or modification subject to PSD for GHGs ONLY if undergoing PSD anyway for non GHG pollutants (“anyway PSD sources”) AND exceed major modification threshold for GHGs• No additional PSD permitting <u>solely</u> for GHG emissions
Major Modification Threshold	<ul style="list-style-type: none">• GHG emissions (or net emissions increase) due to construction (or modification) calculated as the sum of the six well-mixed GHGs equal or exceed:<ul style="list-style-type: none"><input type="checkbox"/> on a mass basis, 0 tpy, AND<input type="checkbox"/> on a CO₂e basis, 75,000 tpy CO₂e
Requirement	<ul style="list-style-type: none">• PSD Permit, GHG emission calculations, and BACT for GHGs



Step 2 PSD - Tailoring Rule

Item	Requirement
Start Date	<ul style="list-style-type: none">• July 1, 2011
Coverage	<ul style="list-style-type: none">• “Anyway PSD Sources” from Step 1, AND• Major sources for GHG pollutants• PSD permitting solely for GHG emissions is possible
Major Source Threshold	<ul style="list-style-type: none">• GHG potential emissions (sum-of-six well-mixed GHGs) equal or exceed:<ul style="list-style-type: none"><input type="checkbox"/> on a CO₂e basis, 100,000 tpy CO₂e
Major Modification Threshold	<ul style="list-style-type: none">• GHG net emissions increase resulting from the project (sum-of-six well-mixed GHGs) equal or exceed:<ul style="list-style-type: none"><input type="checkbox"/> on a mass basis, 0 tpy, AND<input type="checkbox"/> on a CO₂e, 75,000 tpy CO₂e
Requirement	<ul style="list-style-type: none">• PSD Permit, GHG emission calculations and BACT for GHGs



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
 - ▲ Sources that are too small and inconsequential for GHGs
 - ▲ Sources that would be required to obtain an “empty permit”

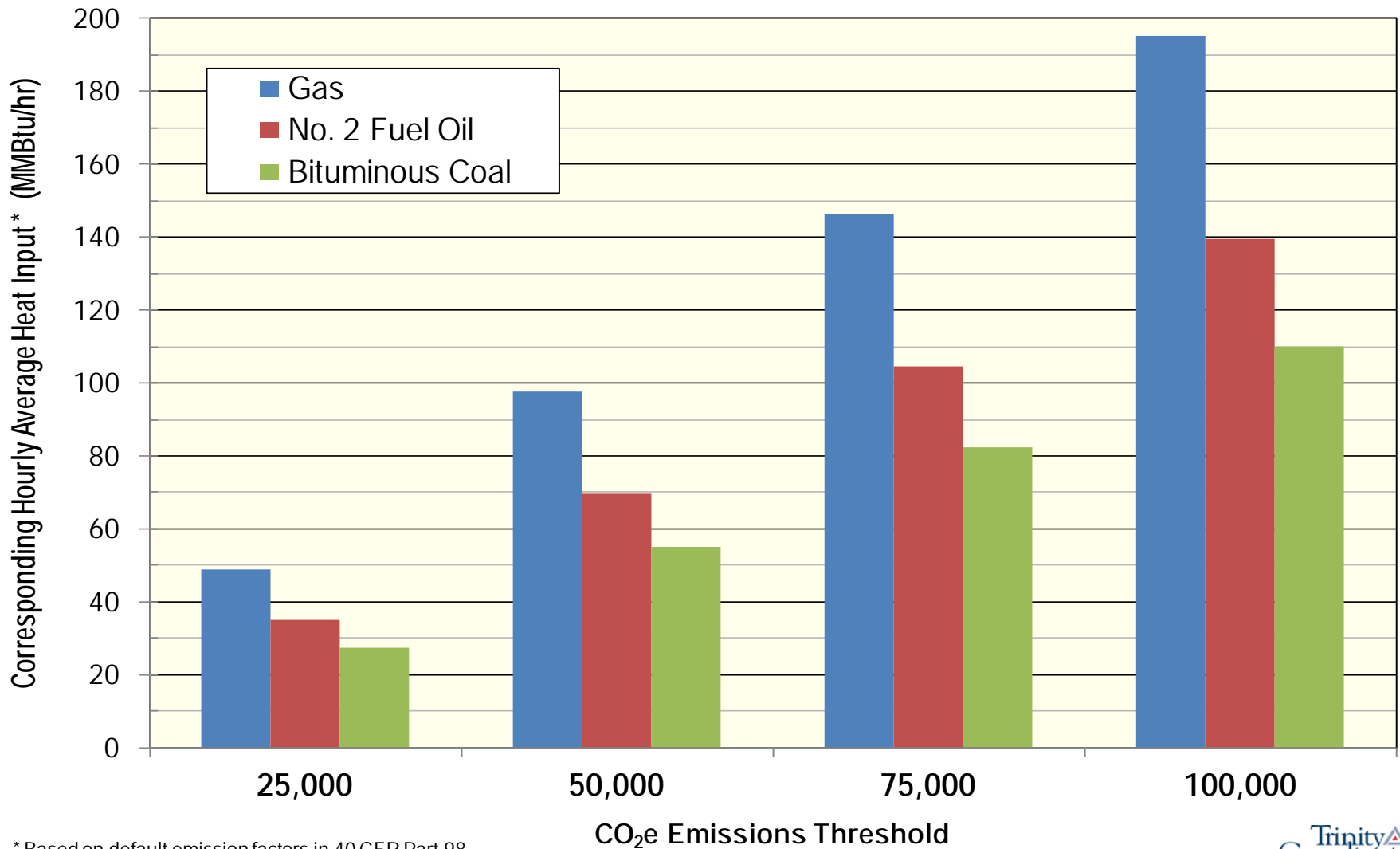


Exclusion of Smaller Sources

- 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



What does 75,000 tpy CO₂e look like?



* Based on default emission factors in 40 CFR Part 98



PSD Applicability Example 1 (1 of 2)

- Existing PSD major source
- Replacing existing 200 MMBtu/hr coal boiler with two 120 MMBtu/hr gas-fired package boilers with fuel oil backup
- Synthetic limits being proposed on new package boilers to avoid PSD for non-GHG pollutants
- What are the GHG permitting ramifications?



PSD Applicability Example 1 (2 of 2)

- Key Question: Can PSD avoidance permit be issued prior to July 1, 2011 for non-GHG?
 - ▲ If yes, project will **not** need to go through PSD for GHGs as only “anyway PSD sources” are subject to PSD permitting in Step 1
 - ▲ If no, then need to evaluate the following:
 - Calculate GHG emissions increases (and decreases over 5 year contemporaneous period)
 - Can you “net” out? (i.e., net < 75,000 tpy CO₂e)
 - If no, then project would trigger PSD for GHGs



PSD Applicability Example 2 (1 of 4)

- Existing minor PSD source, not on List of 28
- Facility plans to install new surface coating operation and drying oven
 - ▲ PTE of new equipment < 250 tpy of non-GHG pollutants
- After completion of project, PTE of facility will exceed 250 tpy of non-GHG pollutants
- Could this permit action be affected by Tailoring Rule?



PSD Applicability Example 2 (2 of 4)

- Minor sources do not trigger PSD unless:
 - ▲ Project is major “in and of” itself (> 250 tpy), OR
 - ▲ Project involves relaxation of previously established PSD synthetic minor limit
- PSD for non-GHG pollutants not triggered
- Under Step 1, GHGs are not subject to regulation unless project triggers PSD for non-GHG pollutants, thus
- Project not impacted by Tailoring Rule, unless...



PSD Applicability Example 2 (3 of 4)

- If permit revision not issued by July 1, 2011...
 - ▲ Need to re-evaluate whether site was an existing major PSD source with respect to GHGs (i.e., was PTE > 100,000 tpy CO₂e)
 - ▲ If existing PTE of CO₂e < 100,000 tpy
 - PSD not triggered since project is still a minor modification to an existing minor PSD source
 - ▲ If existing PTE of CO₂e ≥ 100,000 tpy
 - Project will trigger PSD for non-GHG pollutants if any net emissions increase > PSD Significant Emission Rates
 - Project will trigger PSD for GHG if net emissions increase of GHG pollutants > 0 tpy and CO₂e > 75,000 tpy



PSD Applicability Example 2 (4 of 4)

- What if agency is able to issue the amended permit before July 1, 2011, but construction has not yet begun by then?
 - ▲ EPA's Step 2 Transitional Guidance – “No Mercy”
 - “Sources that are not subject to PSD permitting requirements until Step 2 need not obtain a PSD permit addressing GHGs in order to **continue any actual construction** that begins before July 1, 2011...”
 - “Step 2 sources that **begin actual construction** in Step 2 may do so only after obtaining a PSD permit”



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
 - 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)



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<ul style="list-style-type: none">➤ 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 effects 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 BACT for GHGs

- Case-by-case determination
- Performed by applicant; approved by agency
- EPA recommends 5-Step top-down BACT evaluation process
- Emission limits achievable considering...
 - ▲ Economic impacts
 - ▲ Environmental and energy impacts
- EPA guidance materials
 - ▲ *PSD and Title V Permitting Guidance for GHGs*
 - ▲ White Papers on GHG Control Measures
 - ▲ On-Demand Video Training Materials, including sample BACT assessments
 - ▲ Enhanced RBLC



How is BACT Selected?

- 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



Step 1: Identify Available Controls

- Begin by considering fundamental business purpose of project (“Pre-Step 1”)
 - ▲ Define in permit application
- Identify all control technologies available to the source, including:
 - ▲ Inherently lower-emitting processes and designs
 - ▲ Add-on technologies
 - ▲ Control methods applied at similar emissions sources
 - ▲ Feasible combinations of these technologies
- Not required to include options that “fundamentally redefine the nature of the source”



Step 1: Identify Available Controls

- Considers facility-level impacts
 - ▲ No off-site impacts considered, technology must represent emissions reduction at facility
- No clear guidance regarding which technologies redefine nature of source
- Fuel type as BACT? EPA guidance considers:
 - ▲ Cleaner versions of primary fuel
 - ▲ Increased usage of secondary fuel
 - ▲ Alternative fuel for which source is not already configured
- EPA guidance leaves door open for stricter interpretations by permitting authority
- Use relevant white papers as starting point



Step 1: Identify Available Controls

- EPA BACT guidance stresses importance of energy efficiency
 - ▲ Primary Step 1 option(s) for combustion sources
- Construction of new sources
 - ▲ GHG BACT evaluated on facility-wide basis, including energy efficiency
 - ▲ Evaluate emissions from non-emitting, energy consuming equipment
- Modification to existing sources
 - ▲ BACT applies to new or modified emission unit, not necessarily to energy consuming equipment
 - ▲ EPA guidance still encourages permitting agencies to consider energy efficiency



Step 1: Identify Available Controls

- **Carbon Capture and Storage (CCS)**
- One of the primary distinctions between traditional BACT and GHG BACT
- Per EPA, consider CCS in Step 1 for large CO₂ emitters, sources emitting high-purity CO₂ streams
 - ▲ Hydrogen production
 - ▲ Ammonia production
 - ▲ Natural gas processing
 - ▲ Ethanol production
 - ▲ Ethylene oxide production
 - ▲ Cement production
 - ▲ Iron and steel manufacturing



Step 2: Eliminate Technically Infeasible Controls

- Is technology available?
 - ▲ Reached licensing and commercial development stage
 - ▲ Compliance with BACT limit demonstrated at similar facility
- Is technology applicable based on physical, chemical, and engineering principles?
- Per EPA, absence of a commercial guarantee for GHG emissions not sufficient to eliminate option from consideration



Step 2: Eliminate Technically Infeasible Controls

- **CCS Considerations**
- Must consider technical feasibility of each step:
 - ▲ Capture, transport and storage
- If any step infeasible, CCS considered technically infeasible
 - ▲ Space
 - ▲ Right-of-ways
 - ▲ Access to storage reservoir
- May suffice to demonstrate difference between CCS considerations at applicant's facility and demonstrated CCS
- Many state agencies prefer to monetize everything (eliminate from Step 4 instead)



Step 3: Rank Remaining Control Options

- Ranked by effectiveness of control
- Traditionally presented as:
 - ▲ Percent pollutant removal
 - ▲ Controlled emission rate
 - ▲ Reduction in emissions over time
- For GHG, EPA advocating efficiency-based control effectiveness
 - ▲ Consider thermal efficiency by using emissions per unit of output (rather than per unit of fuel input)
- Must rank logical combinations of the technologies



Step 4: "Top Down" Evaluation of Controls

- Ranked by effectiveness of control
- Top-down – Start with most effective control option
- Consider economic, environmental, and energy-related impacts
 - ▲ BACT typically focuses on economic considerations
 - ▲ But EPA guidance suggests other collateral impacts increasingly important for GHG BACT



Step 4: "Top Down" Evaluation of Controls

- Economic considerations
 - ▲ Evaluated on a per ton CO₂ equivalent basis instead of per ton individual GHG
 - ▲ EPA guidance considers average cost effectiveness and incremental cost of adding compatible control technology
- No cost effectiveness threshold (\$/ton CO₂e) in EPA guidance
 - ▲ Work Group's Interim Phase I Report identifies cost effectiveness range from \$3-\$150/ton CO₂e
- Additional local economic factors (new for GHGs):
 - ▲ High control cost relative to project cost
 - ▲ Potential movement to overseas production
 - ▲ Local job losses



Step 4: "Top Down" Evaluation of Controls

- Additional considerations
 - ▲ Direct energy costs (e.g. combustion sources)
 - ▲ Indirect energy usage (e.g. purchased electricity)
 - ▲ For CCS, consider parasitic load
 - ▲ On-site and off-site environmental implications (e.g., air, water, waste)



Step 5: Select BACT

- Select BACT based on most efficient control option or combination of options not eliminated by Step 4
- Permitted BACT standards vary
 - ▲ Emission limits (output basis, accounting for energy efficiency)
 - ▲ Averaging time periods
 - ▲ Equipment specifications
 - ▲ Work practices
 - ▲ Associated monitoring, recordkeeping, and reporting
- EPA advocates BACT limits with longer averaging periods to address GHG emissions and load variations inherent in combustion equipment



Step 5: Select BACT

- May include work practices such as an Environmental Management System (EMS) focused on energy efficiency
 - ▲ ENERGY STAR provides guidance
 - ▲ BACT limit may include implementation of energy saving measures identified by EMS
- EPA's Sample GHG BACT assessments
 - ▲ Municipal solid waste landfill
 - ▲ Natural gas-fired boiler
 - ▲ Hydrogen plant at petroleum refinery
 - ▲ Coal-fired electricity generating facility
 - ▲ Kiln at a cement plant
 - ▲ Natural gas compressor station
 - ▲ Gas-fired combined cycle power plant



Questions?



Bill Bruscano

Phone: (225) 292-2661

Email: bbruscin@trinityconsultants.com