Webinar for Combined Heat and Power Partnership

Greenhouse Gas Permitting for CHP Systems

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Items to be Covered

- Explanation of GHG Tailoring Rule and other relevant GHG rules
- Application of GHG Permitting Guidance to CHP systems
- Information on other GHG permitting resources
- Current status of GHG permitting

GHG "Tailoring Rule"

- Covers applicability of PSD and Title V to GHG emissions
- Issued June 3, 2010
- Establishes Initial Phase-In:
  - Step 1 between January 2, 2011 and June 30, 2011
  - Step 2 on or after July 1, 2011
- Does not change the basic applicability processes
- Incorporates a "subject to regulation" threshold question to determine if GHGs are a "regulated NSR pollutant" based on CO_2 equivalent (CO_2e) emissions.
- PSD applicability determined in two-step process:
  - Whether CO_2e emissions are at/over "subject to regulation" thresholds
  - Whether mass emissions are at/over the PSD thresholds

CO_2 Equivalency

- CO_2e aggregate emissions of GHGs based on global warming potential (GWP)
- CO_2e = Sum of [(mass of the GHG) x (its GWP)]
- Current GWPs:
  - CO_2: 1
  - CH_4: 21
  - N_2O: 310
  - SF_6 : 23,900
  - HFCs: 140 to over 11,700
  - PFCs: 5,210 to 9,200

(Ratios in Table A-1 of GHG MRR – subpart A of 40 CFR Part 98.)

PSD for New Sources of GHGs

January 2, 2011 to June 30, 2011

- New source is otherwise subject to PSD for another regulated NSR pollutant, and
- GHG PTE is:
  - Equal to or greater than 75,000 TPY CO_2e

Note: All thresholds are expressed in short tons (2,000 lbs)

PSD for New Sources (cont'd)

On or after July 1, 2011:

- Source is otherwise subject to PSD for another pollutant and GHG PTE is:
  - Equal to or greater than 75,000 TPY CO_2e

OR

- Source has GHG PTE equal to or greater than:
  - 100,000 TPY CO_2e and
  - 100/250 TPY mass basis

PSD for Modified Sources of GHG

January 2, 2011 to June 30, 2011

- Modification is otherwise subject to PSD for another regulated NSR pollutant, and
- GHG emissions increase and net emissions increase are:
  - Equal to or greater than 75,000 TPY CO_2e, and
  - Greater than -0- TPY mass basis

PSD for Modified Sources of GHG (cont.)

On or after July 1, 2011

- Modification is subject to PSD under Step 1 of the Tailoring Rule

OR BOTH

- Source PTE for GHGs is equal to or greater than:
  - 100,000 TPY CO_2e and
  - 100/250 TPY mass basis
- Modification GHG emissions increase and net emissions increase:
  - Equal to or greater than 75,000 TPY CO_2e, and
  - Greater than -0- TPY mass basis

OR

- Modification alone has GHG emissions equal to or greater than
  - 100,000 TPY CO_2e, and
  - 100/250 TPY mass basis

GHG Permitting Guidance

Issued Nov. 2010; technical correction in March 2011.

PSD Permitting

- Long-standing and familiar processes apply to GHGs
  - BACT determinations continue to use 5-step, top down process, and BACT decisions are State- and project-specific
  - GHG BACT is not prescribed for any source type
- BACT analysis focus is on options that will achieve emission reductions within the fence line of the facility.
  - For Cogens, this can mean increasing operational efficiency through techniques such as boiler blowdown heat recovery and condensate recovery.
  - Impacts/benefits beyond the fence line can be considered later in Step 4 of BACT process (i.e., collateral impacts analysis).

GHG Permitting Guidance (Cont'd)

- In most cases, energy efficiency improvements will satisfy the BACT requirement for GHGs.
  - BACT for a new source may consider source-wide emissions reductions resulting from energy efficiency at the source, including non-emitting units (e.g., electric fans, pumps) that draw energy from emitting units.
  - BACT for a modified existing source can consider energy efficiency reductions that are part of the changed emissions unit.
  - Use industry-established benchmarking tools to assist in comparing control options.
- Carbon Capture and Storage (CCS) is composed of 3 main components: CO_2 capture and/or compression, transport, and storage.
  - CCS may be eliminated if any of the 3 components working together are deemed technically infeasible for the source.

GHG Permitting Guidance (Cont'd)

- CCS should be considered an available control option for certain types of sources, but costs will likely eliminate CCS for now.
  - There are cases now where the economics of CCS may be favorable – e.g., enhanced oil recovery.
- A BACT analysis for GHG emissions does not need to consider a fuel switch that would fundamentally redefine the source.
  - Specific types of fuels or facility design neither required nor precluded.
- Ranking of control options should be based on total CO_2e, rather than total mass or mass for the individual GHGs to best reflect global warming impact.

GHG Permitting Guidance (Cont'd)

- Output-based BACT limits are encouraged, and should focus on longer-term averages (*e.g.*, 30- or 365-day rolling average) rather than short-term.
- Emphasizes proper documentation of BACT decisions to bolster the permit record.
- Since no NAAQS or PSD increments for GHG, ambient modeling (i.e., additional impacts analysis or Class I area) is not required for GHG emissions.
- Not necessary for applicants to gather monitoring data to assess ambient air quality for GHGs, since GHGs do not affect "ambient air quality" as pollutants do.

GHG Permitting Guidance (Cont'd)

EPA's "Top Down" BACT Analysis

1. Identify all available control options
2. Eliminate technically infeasible options
3. Rank options by their effectiveness
4. **EVALUATE ECONOMIC, ENERGY AND ENVIRONMENTAL IMPACTS**
5. Select BACT and create permit limits

GHG Permitting Guidance (Cont'd)

Step 4: Economic, Energy and Environmental Impacts

How to examine cost effectiveness:

- Dollars per ton of emissions eliminated (in CO_2e)
- Average cost effectiveness and incremental cost effectiveness
- Steady state case
  - Operating cost plus annualizing initial investment
  - Annual emissions reduction at full capacity
- Can also use lifetime analysis for project
  - This makes sense when costs and emissions reductions are not steady (*e.g.*, landfills)

GHG Permitting Guidance (Cont'd)

- Cost effectiveness criteria
  - As with other pollutants, acceptable cost levels for GHG will evolve through permitting experience
  - Given the large amount of GHG emissions when compared to other pollutants, we expect the cost per ton criteria will be lower than for other pollutants
- Other economic considerations that are relevant
  - Cost of control relative to cost of project
  - Impact on product cost and local job losses

GHG Permitting Guidance (Cont'd)

- Energy impacts: Both the energy use and its economic implication are addressed.
  - Direct energy impacts (*e.g.*, cost of fuel) as well as indirect energy impacts (*e.g.*, fuel scarcity).
  - Purchased electricity and other offsite benefits and impacts can be considered.

- Other environmental impacts:
  - Solid and hazardous waste generation, wastewater discharges, visibility impacts, demand on local water resources or emissions of unregulated pollutants.
  - Both onsite and offsite impacts considered.

GHG Permitting Guidance (Cont'd)

- GHG Issues
  - Impacts of CCS on energy use and related emissions
  - Weighing of possible trade-offs of criteria pollutants and GHGs
- Permitting authority has discretion in determining the weight given to the particular impacts under consideration.
- Consideration and rationale must be documented.

GHG Permitting Guidance (Cont'd)

Title V Permitting

- Reiterates Tailoring Rule
  - Under step 1 no sources subject to Title V based solely on GHG emissions
  - Step 2 includes "anyway" sources and those with at least 100,000 TPY CO_2e and 100 TPY mass
  - Existing sources address GHGs upon renewal or modification
- For now, only Federally applicable requirement is a GHG BACT determination contained in a PSD permit.

CO_2 from Biomass Combustion

- In Jan 2011, EPA announced a rulemaking to defer completely the application of preconstruction permit requirements to biomass-fired CO_2 *and other biogenic* CO_2 emissions for a period of three years.
- Final Rule signed 7/1/11
- During deferral, EPA will examine the scientific and technical issues associated with biogenic CO_2 emissions and develop an accounting methodology, including a review by an independent panel.
- Results of study will be used to develop a rule to treat biogenic CO_2 emissions in PSD and Title V permitting.

Interim Guidance for Bioenergy Prod.

- In March 2011, EPA issued **interim guidance** to help permitting authorities establish a basis for concluding that BACT for GHG at some sources is the combustion of biomass fuels alone
  - May be used in permit actions where deferral is not available
  - May be revisited after biomass study is complete
- Provides a rationale to support elimination of GHG control options during Step 4 of the BACT analysis
  - Applies only to control options being considered for GHG from biomass fuel combustion
  - Concept of considering offsite impacts can apply to CHP systems
- Guidance available at: http://www.epa.gov/nsr/ghgdocs/bioenergyguidance.pdf

Resources to Assist in GHG Permitting

- Permitting Action Team
  - HQ and Regional Office staff communicating biweekly to resolve GHG permitting issues, and disseminate decisions and direction on GHG permitting policy and rules.
- Website for GHG permitting resources: **www.epa.gov/nsr/ghgpermitting**
  - Contains links to GHG Online Training, Technical White Papers, Clearinghouses, Permitting Action Team, etc.
  - Updated to include new Implementation Q&A's
  - Includes EPA comment letters on proposed permits involving GHG

Legal Challenges

- 80 Lawsuits, 35 petitioners (industry, environmental, states/locals) on:
  - Endangerment Finding
  - LDVR
  - Johnson Memo and Tailoring Rule
- DC Court refused to stay the rules in Dec. 2010; thus beginning GHG permit requirements in 2011.
- Briefing in the cases will be completed by the end of 2011, and the Court will hear oral arguments on all three proceedings on the same day before the same panel.
- EPA also sued on Biomass Deferral rule and reconsideration.

GHG Permitting Authority

- In 2010, EPA took a series of actions to ensure that PSD permitting would continue without disruption after the date when GHG emissions regulations where going to take effect - January 2, 2011.
- First, EPA issued a “SIP Call,” requiring 13 states to revise their PSD programs to cover GHG emissions.
- Second, EPA issued FIPs to cover those programs that did not address how the program will apply to pollutants newly subject to regulation or that did not submit revised SIPs by their selected deadline.
- In 2011, several of the “FIP’d” programs revised their SIPs to include GHG and received EPA approval.

GHG Permitting Status

As of September 2011,

- 7 PSD permits have been issued with GHG limits
  - One permit relied upon Step 4 BACT Guidance for Bioenergy Production.
- Roughly 100 PSD permit applications are pending that may include a GHG component.
  - 48 include BACT analyses
  - Permit volume lower than projected under Tailoring Rule
- As with other pollutants, sources that have obtained a PSD permit for GHGs will need to apply for a title V operating permit within 12 months of obtaining the PSD permit.

Upcoming GHG Rules/Actions

- Tailoring Rule Step 3
  - To establish thresholds from July 2013 to April 2016
  - Rule must be completed by July 2012
  - Levels could stay the same or go as low as 50K, depending on an assessment of the manageability of GHG permitting

Upcoming GHG Rules/Actions (cont.)

- Tailoring Rule's Possible Streamlining Techniques
  - General permits
  - Presumptive BACT
  - Defining PTE for smaller sources
  - Electronic permitting
- Title V Program Revisions to adopt Tailoring Rule
- 5 Year Study / Step 4
- EGU and Refinery NSPS will set floor for BACT

Next 2 Years in GHG Permitting

- September 2011 – Proposed EGU NSPS for GHG
- December 2011 – Proposed Refinery NSPS/NESHAP
- January 2012 – Proposed Tailoring Step 3 Rule
- Spring 2012
  - Biomass scientific study released
  - Final EGU NSPS for GHG
- July 2012 – Final Tailoring Step 3 Rule (one year for states to adopt)
- Late 2012
  - If necessary, proposed rule addressing biomass study
  - Final Refinery NSPS for GHG
- July 2013 – Tailoring Rule Step 3 goes into effect

Questions?