Greenhouse Gas Regulation and Permitting

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Overview

- GHG Reporting
- NSPS for Power Plants and Refineries
- EPA Guidance on GHGs
- GHG Tailoring Rule
- GHG BACT
- Questions

GHG Mandatory Reporting Rule (MMR)

- The purpose of the rule is to get a better understanding of GHG emissions (on a industry-specific basis) to inform future policy decisions
- GHG MRR is not delegated to states
- Link to the rule: http://www.epa.gov/climatechange/emissions/ghgrulemaking.html

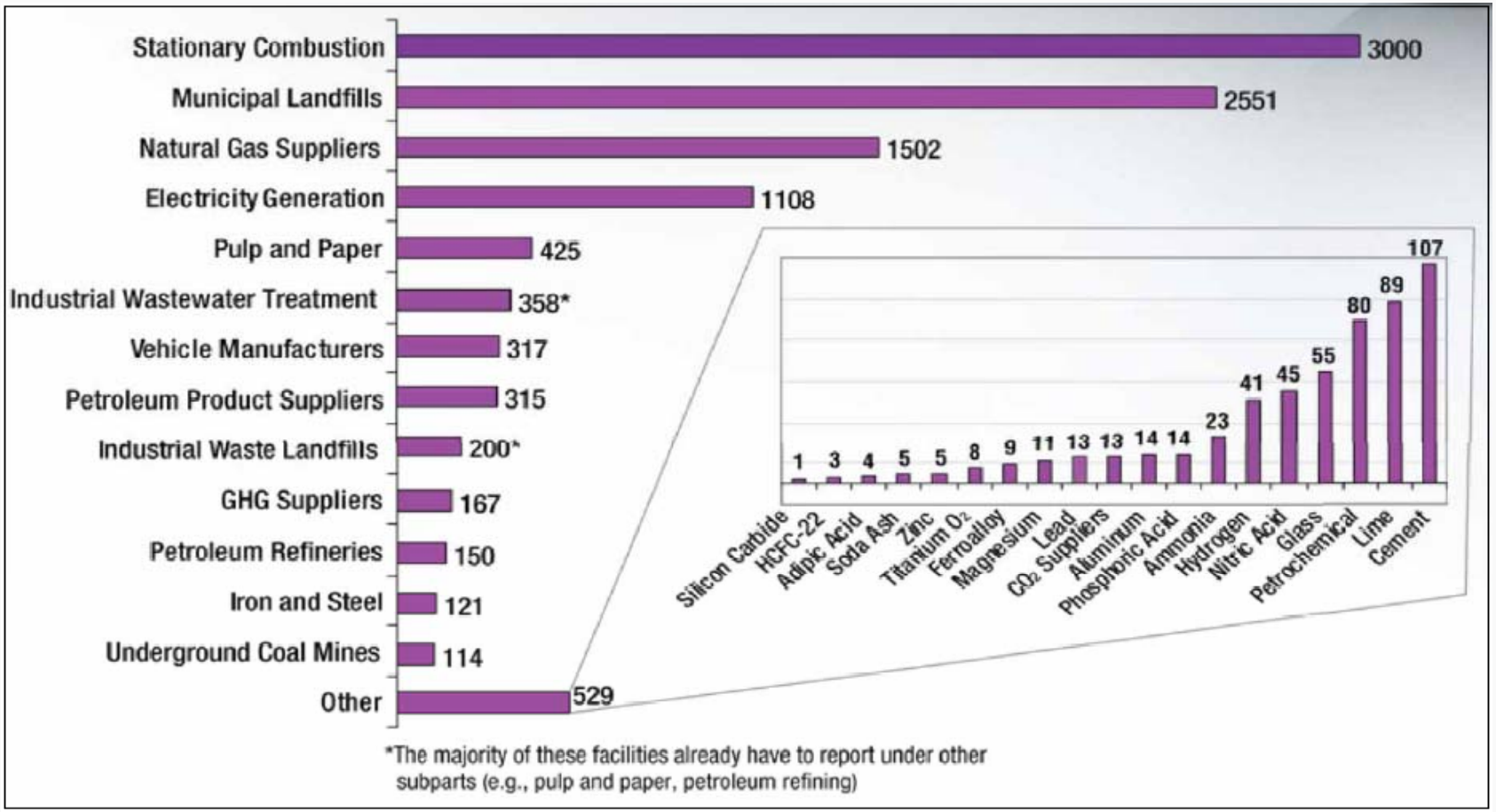
What does the GHG MRR require?

- Requires facilities to monitor, record and report their GHG emissions to EPA on a yearly basis
  - Does not require GHG emission reductions
  - GHGs covered: CO_2, CH_4, N_20, fluorinated GHGs
    - Report as tons of each gas and tons of CO_2e
  - Monitoring began at the start of 2010
  - First reports were due September 30, 2011 (initially was March 31, 2011, but was delayed)

Who is covered by the rule?

- About 10,000 facilities are expected to fall under the rule
  - 85% of all GHG emissions
- 3 groups:
  - "All-in" source categories
  - Threshold source categories
    - Facilities that emit GHGs equivalent to 25,000 metric tons CO_2e or more
    - Suppliers/distributors of more than 25,000 tons per year of GHGs
  - Sources with stationary fuel combustion sources that emit GHGs equivalent to 25,000 metric tons CO_2e or more aggregated

Breakdown of Sources



“All-in” Source Categories

* Denotes category that monitors beginning 2011 and reports beginning 2012

- Electricity Generation if report CO_2 year-round through Part 75
- Adipic Acid Production
- Aluminum Production
- Ammonia Manufacturing
- Cement Production
- HCFC-22 Production
- HFC-23 Destruction Processes that are not collocated with a HCFC-22 production facility and that destroy more than 2.14 metric tons of HFC-23 per year
- Lime Manufacturing
- Nitric Acid Production
- Petrochemical Production
- Petroleum Refineries
- Phosphoric Acid Production
- Silicon Carbide Production
- Soda Ash Production
- Titanium Dioxide Production
- Municipal Solid Waste Landfills that generate CH_4 equivalent to 25,000 metric tons CO_2e or more
- Manure Management Systems that emit 25,000 metric tons CO_2e or more
- *Underground Coal Mines that are subject to quarterly sampling by MSHA
- *Electrical transmission and distribution equipment use
- *Geologic sequestration of carbon dioxide
- *Electrical transmission and distribution equipment manufacture or refurbishment
- *Injection of carbon dioxide

NSPS for GHGs from EGUs and Refineries

- These two sectors emit nearly 40 percent of the GHG pollution in the United States
- Natural-gas, oil-, and coal-fired electric generating units (EGUs)
  - Proposal has been delayed, will develop a new schedule
- Refineries
  - Propose regulations by December 15, 2011
  - Finalize regulations by November 15, 2012

EPA Resources to Assist States and Industry

To ensure that GHG permitting runs smoothly for the larger sources that remain covered, EPA has provided the following:

- Guidance on key GHG Permitting topics (BACT, Biomass, etc.)
- White Papers on – utilities, refineries, cement, large commercial/industrial/institutional boilers, pulp and paper, iron and steel, nitric acid plants, and landfills
- Control Technology Clearinghouses – RACT/BACT/LAER, GHG Mitigation Strategies
- GHG Permitting Action Team – Primary and Secondary Contacts for each EPA Regional Office
- GHG Training for States, Industry and Other Interested Stakeholders – www.epa.gov/apti/broadcast2010.html#GHGTraining1210
- EPA's GHG permitting web site: www.epa.gov/nsr/ghgpermitting – Contains links to all the above plus Q&A's (3 posted; more likely), and EPA comment letters on proposed permits involving GHGs

EPA GHG Permitting Guidance

- Issued November 2010; technical correction posted March 2011.
- Demonstrates how to calculate CO2e-based emissions using global warming potential (GWP).
- Since there are no NAAQS or PSD increments for GHGs, GHG ambient modeling and monitoring data is not required.
- Explains that the PSD and Title V permitting requirements are generally no different for GHGs.
- Emphasizes the importance of developing a good record.
- More information available at: http://www.epa.gov/NSR/actions.html

GHG Guidance: Biomass

- **Deferral Rule** issued final on July 1, 2011
  - 3-year deferral of PSD and Title V permitting requirements for CO2 emissions from biogenic stationary sources
  - This includes CO2 emissions from the following:
    - Combustion of wood, wood waste, agricultural materials
    - Combustion of the biological portion of MSW and tire-derived fuel
    - Combustion of biogas from landfills and wastewater treatment plants
    - Fermentation at ethanol plants
- Link to the Rule: http://www.epa.gov/nsr/actions.html#jul11

GHG Guidance: Biomass (cont.)

- **Interim Biomass CO2 Guidance document**
  - Issued March 2011
  - To be used when/if Deferral Rule not yet approved into States' rules/SIP
  - Guidance to help permitting authorities analyze whether burning biofuels for energy is GHG BACT by itself for its CO2 emissions from a bioenergy facility.
  - Would still be major for GHGs and go through BACT - need a numerical CO2e limit and operational limits requiring the burning of biomass
  - Link to the guidance document: http://www.epa.gov/nsr/ghgdocs/bioenergyguidance.pdf

GHG PAL

- One can get a PAL for GHGs using actual emissions under 40 CFR 52.21(aa) but only on a mass basis not a CO2e basis. The significance level of zero on a mass basis (not 75,000 tpy).

- More information available at: http://www.epa.gov/nsr/ghgdocs/ghgissuepal.pdf

First EPA-issued GHG permit

- EPA's Region 9 issued a GHG PSD permit on October 18, 2011 to the City of Palmdale, California for the Palmdale Hybrid Power Plant.
  - A new 570 MW natural gas-fired combined-cycle power plant with an integrated 50 MW solar-thermal plant
  - Link to the permit: http://www.epa.gov/region9/air/permit/palmdale/palmdale-final-permit-10-2011.pdf

GHG Tailoring Rule

- Published Final in the Federal Register on June 3, 2010:

http://www.gpo.gov/fdsys/pkg/FR-2010-06-03/pdf/2010-11974.pdf#page=1

- The Light Duty Vehicle Rule essentially made GHGs regulated pollutants thus triggering PSD and Title V for stationary GHG-emitting sources, so Tailoring Rule tailors/raises existing PSD and Title V permitting thresholds
- GHG applicability based on both mass and CO2e emissions, resulting in a 2-part test for new sources and a 4-part test for modifications
  - Whether CO2e emissions are over “regulated NSR pollutant” thresholds
  - Whether mass emissions are over the PSD thresholds

Tailoring Rule (cont.)

- Phase-in approach (3 phases):
  - Step 1: January 2, 2011 – June 30, 2011
    - Needed to be coming in for PSD for non-GHG
    - 75,000 tpy CO2e PTE threshold
  - Step 2: July 1, 2011 – June 30, 2013
    - Continue Step I sources/modifications plus **other** large GHG emission sources/modifications
    - Can **now** be subject to PSD and Title V due to GHG emissions alone, so bring in **more** sources
    - Thresholds
      - New source: 100,000 tpy CO2e PTE and 100/250 mass
      - Modification: 100,000 tpy CO2e PTE and 75,000 tpy CO2e net increase from change

Tailoring Rule (cont.)

- Step 2 (cont.)

Title V:

- There will be some sources subject to Title V that have never been subject to permitting before.
- These newly-subject Title V sources must apply for a permit by July 1, 2012.
- Threshold: PTE of 100,000 tpy CO2e and 100 tpy mass basis

Tailoring Rule (cont.)

- Step 3:
  - To be completed by July, 2012
  - To establish thresholds from July 2013 to April 2016
  - May bring in additional sources, thresholds could stay the same or go as low as 50,000 tpy
  - Potential Streamlining Techniques
    - General permits
    - Presumptive BACT
    - Defining PTE for smaller sources

More of Step 2 (of the Tailoring Rule) (cont.)

To watch for in Step 2:

For a Step 2 GHG-only major source: If it modifies, the significance levels of non-GHG criteria pollutants do **not** apply unless the modification causes and increase of over 75,000 tpy CO2e.

GHG BACT Analysis

- Is the normal 5-step “top down” case-by-case determination
- No less stringent than NSPS (upcoming for refineries and power plants)
- Currently focus on BACT options that reduce GHGs by **improving energy efficiency**

GHG BACT Analysis (cont.)

- Numerical GHG emission limits should be set
  - (e.g., in lb/MW-hr, tpy)
- All GHG BACT decisions should be well documented in the permit record
- CO2 CEMS should be considered, but remember the other five GHGs

GHG BACT – Step 1 – Identify All Available Controls

- Consider:
    - Lower-emitting processes/designs
    - Add-on controls, CCS is being developed, so:
    - Energy efficiency measures
        - New facility: look at entire facility
        - Modification: look at the modified emissions unit
- Clean fuels which reduce GHG emissions should be considered, but not if a change in primary fuel type would fundamentally redefine the source
- Consideration of a cleaner version of the primary fuel is not considered redefining the source in most cases (e.g., cleaner coal types)
- Consider IGCC for coal-fired power plants

GHG BACT – Step 2 - Eliminate Technically Infeasible Options

- Carbon Capture and Storage: may be eliminated if any of the 3 components (capture, transport, and storage) working together are deemed technically infeasible
  - e.g., no space available for CO2 capture equipment at an existing facility; right-of-ways prevent building a pipeline or access to an existing pipeline; no access to suitable geologic reservoirs for sequestration or other storage options

GHG BACT – Step 3 – Ranking of Controls

- Ranking options include:
  - Percent pollutant removed
  - Emissions rate (input- or output-based)
  - Emissions reduction over time

- Ranking of control options should be based on total CO2e, rather than total mass or mass of the individual GHG
- For GHGs, try to rank control options based on **output**-based metrics to fully consider the thermal efficiency of the options

GHG BACT – Step 4 – Economic, Energy and Environmental Impacts

- Can look at direct impacts in $/ton of pollutant removed (in COe)
  - This will be much lower than for other pollutants due to the considerable difference in the volume of emissions
  - Existing methodology for calculating cost effectiveness is appropriate for GHGs

- Trade-offs between GHG and other pollutants
  - When conducting BACT reviews for both GHG and non-GHG pollutants at a source, permitting authorities continue to have discretion to evaluate the trade-offs associated with decreasing one pollutant versus increasing another.

GHG BACT – Step 4 – Economic, Energy and Environmental Impacts (cont.)

- Use of the Biomass Guidance document
  - It is in GHG BACT Step 4 where one can use the guidance document to help analyze whether burning biofuel is itself BACT for GHGs (for its CO2 emissions while burning biofuels for energy)

- CCS Costs:
  - CCS will often be eliminated in Step 4 of a GHG BACT analysis based on cost (assuming it is not already eliminated earlier based on technical feasibility)

GHG BACT – Step 5 – Selecting BACT

- Permitting authority is responsible to fully justify the BACT decision in the permit record
- Should include a numerical GHG BACT limit
- Should focus on longer-term averages (30-day or 365-day rolling average)
- Permits can also include conditions requiring the use of an Environmental Management System (EMS) focusing on energy efficiency as part of that BACT analysis
  - The ENERGY STAR program provides useful guidance on the elements of an energy management program

EPA Comments on GHG Permits:

- To date, EPA has provided comments on sixteen proposed GHG PSD permits.
- Link to the permit comments: http://www.epa.gov/nsr/ghgcomment.html
- Include adequate support and explanation for form of GHG BACT emissions limit
  - Numerical emissions limit, or design standard or some other type of requirement if numerical limit deemed infeasible
- Ensure practical enforceability, adequate compliance monitoring to measure emissions or efficiency over time (e.g., CO2 CEMS)
  - Consideration of non-CO2 constituents – methane and N_20 – for combustion sources
- **Bottom line: documentation of GHG control considerations and BACT limits is important for a proper permit record**

Useful links:

- **EPA GHG Permitting Web Site**: http://www.epa.gov/nsr/ghgpermitting.html
- EPA's GHG Tailoring Rule: http://www.epa.gov/nsr/actions.html#may10
- EPA's Biomass BACT guidance: http://www.epa.gov/nsr/ghgdocs/bioenergyguidance.pdf
- Biogenic CO2 Deferral Rule: http://www.epa.gov/nsr/actions.html#jul11

Questions?