Strategic Considerations for Effectively Managing the Greenhouse Gas Permitting Process

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overview

• why GHG has become a key pollutant for construction permitting
• PSD vs. synthetic minor limits – the strategic tradeoffs
• tips to plan for and streamline PSD permitting
• PSD vs. MRR calculations
background on limits for GHGs

• tailoring rule customized how GHGs become subject to the NSR/PSD programs
  – aimed at the largest sources
  – frequently the limiting pollutant in triggering major source/major modification

• results in the need for additional strategy consideration with respect to permitting
  – PSD vs. synthetic minor limitations
GHG PSD in MN

- 137 GHG PSD permits issued in United States through mid-2013
- Four GHG PSD permits issued in MN
  - US Steel – Keewatin Taconite: 12/6/11
  - Essar Steel: 4/6/12
  - Southern Minnesota Beet Sugar: 5/22/13
  - Flint Hills Resources: 9/11/13
- No GHG PSD applications currently being processed at MPCA
cheap natural gas energy results in GHGs being triggered first

- a new 150 MMBtu/hr NG boiler
  - GHGs
    - subject to regulation threshold: 75k tpy CO2e
    - PTE: 77k tpy CO2e
  - NOx with ULNB at 0.04 lb/MMBtu
    - major modification threshold: 40 tpy
    - PTE: 26 tpy
- projects nearing the threshold should consider the advantages and disadvantages
The advantages of undergoing PSD review include:

- **Operational flexibility**
  - Economic considerations without a synthetic minor limit
- **Possibility for future expansion**
  - Permitting implications for relaxation under §52.21(r)(4)
- **Preservation of netting credits**
  - Synthetic minor limit project inclusion for future permitting
advantages of accepting limits to avoid PSD review

• ease of permit issuance; schedule certainty
  – frequently less complicated
  – less probability of EPA commenting, requiring additional detail on BACT

• certainty in compliance limits and demonstration
  – additional analyses and review in MN (ESA, CRA)
  – precludes need to define “best available”
permitting alternatives case study

- Dakota Prairie Refining, LLC (DPR) near Dickinson, ND
- Dakota Oil Processing, LLC (DOP) near Trenton, ND
case study – facility descriptions

- DPR and DOP share fundamentally similar designs
  - throughput: 20 kbdp
  - products: diesel for local market
  - GHG PTE: ~130k tpy vs 100k tpy threshold
case study – DOP permitting approach

- accept synthetic minor limit on CO$_2$e to avoid PSD
  - 98k tpy limit
  - compliance demonstrated through monthly emission calculations
- additional controls/restrictions for compliance
  - CO$_2$ from H$_2$ production will be captured for enhanced oil recovery or other sequestration
  - or effectively restrict capacity factor to ~75%
case study – DOP summary

• advantages
  – schedule assurance
    • similar in nature to many other minor permits issued by NDDH
    • 3.5 month turnaround
  – criteria pollutants can be minor up to < 100 tpy

• disadvantages
  – limitations on future expansion
  – potential need for rate reductions
  – capital expense for CO₂ capture; req’ts for disposition
case study – DPR permitting approach

- conduct PSD analysis for GHG at full PTE
  - BACT analysis: efficiency measures
    - heaters and boilers
    - hydrogen unit
    - fugitive leaks
    - flare
    - emergency generators
- Accept limits on criteria pollutants against SERs
  - BACT / air quality impacts analysis not required
case study – DPR summary

• advantage: economic certainty
  – flexibility to operate at maximum capacity
  – ability to accommodate future growth

• disadvantages
  – reduced comparison threshold to trigger major source determination for other pollutants
  – schedule uncertainty, but took only 4 months
  – capital expenditure for ultra low-NO\textsubscript{X} burner technology
permitting and calculation conflicts between PSD and Part 98 GHG Reporting Rule

- PSD and Minn Rules reference Part 98 methods
- Part 98 does not include every emissions unit and may not consider startups, shutdowns, malfunctions
- proposed changes to GWP in Part 98: use of MRR GWPs may result in the need to reevaluate past permitting exercises with changes to the rule
- unit conversions: do not overlook conversion from metric to standard units
Considerations for streamlining PSD

- many large projects won’t have a choice to go synthetic minor; GHG emissions will be too large
- if undertaking a PSD analysis for GHGs, how can you reduce adverse project schedule risk as well as the potential for unduly restrictive permit conditions?
  - refining BACT applicability and analysis
  - being prepared for other required supplemental analyses
BACT applicability scope

• what is subject to BACT? 52.21(j)
  – new major source: all new GHG EUs
  – major modification an existing major source: each proposed EU at which
    • net emissions increase occurs
    • as a result of physical change or change in method of operation of unit
  • limit to zero increase or do not change the EU
top-down BACT steps

1. identify all available control options
2. eliminate technically infeasible options
3. rank remaining control technologies
4. evaluate most effective controls and document results
5. select BACT

Key issues: where does CCS fall out; where does project/source redefinition become problematic
the changing form of GHG BACT

• MPCA GHG BACT determinations to date
  – focus on combustion sources
  – most emission limits on 12-mth rolling sums
  – no add-on controls
  – fuel choice and energy efficient design
  – no $/ton level established
possible next stages - design standards to ensure efficiency

• output performance standards: 1) for EGUs (lb/MWh), 2) for boilers (tons/MMlb steam), 3) for process heaters (thermal efficiency %)
• air pre-heat or other heat recovery
• oxygen monitoring and/or air trim control systems
• maximum stack temperature
• periodic maintenance and tuning
• for new process units, overall energy or process efficiency or process heat integration
• reducing conductive heat loss through insulation
• reducing steam condensate handling losses
CCS Considerations

CCS rejected based on high cost of capture/purification/compression, high cost of even a relatively short pipeline, pipeline right of way issues, and being dependent on a single third party outlet for the CO2. Additional sequestration demonstration sites in western Illinois (MGSC); closest site to Twin Cities.
advancing CO2 capture technologies (Air Quality IX Conference)

• 0.5 to 3 MW demonstration projects scheduled for 2014 to 2017
• attempting to reduce CO2 capture costs from $60/ton to < $30/ton; current DOE target is $40/ton
  – NeuStream advanced absorber design
  – ADA solid amine sorbent system
  – TDA activated carbon sorbent system
  – ION Chemicals 2\textsuperscript{nd} generation liquid CO2 sorbent
• chemical looping – potentially lowest cost $15/ton
other non-CAA analyses required under PSD

- MPCA working under EPA’s rule, so “agency action” – 52.21(u)
- October 15, 2012 EPA memo to regions
  1. Endangered Species Act – Biological Evaluation
  2. National Historic Preservation Act – Cultural Resources Assessment
  3. Coastal Zone Management Act
  4. Magnuson-Stevens Fishery Conservation and Management Act
- must consider all pollutant emissions, not just PSD
Endangered Species Act Section 7 Consultation

- USEPA Region 5 and USFWS Region 3 (Twin Cities Ecological Services Field Office) or Nat’l Marine Fisheries Service
- biological evaluation: identify federally-listed species
  - qualitative (including SILs/NAAQS)
  - screening ecological risk (chemical deposition)
- species effects analyses: ground disturbance and construction, noise, lighting and visible impacts, intrusion into air space, water intake and discharge, deposition effects on soil and vegetation
Cultural Resource Assessment Section 106 Consultation

• MN State Historic Preservation Office (SHPO)
• identify area of potential effect - recorded historic and archaeological sites (i.e., MNDOT for bridges)
• adverse effects: demolition or damage; alterations inconsistent with DOI’s standards for treatment of historic properties; relocation of property, change in property’s use; introducing audible, atmospheric, or visual elements
• informed by ESA Section 7 work
conclusions

• GHG is becoming the first pollutant of concern in PSD applicability for “clean energy” projects
• strategically manage benefits/risks of GHG PSD
• if PSD, plan ahead on resources and allow for schedule in addressing the analyses and documentation
  — keeping up on moving BACT target
  — environmental review for ESA and CRA
questions?

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