GHG Permitting Experience With EPA Region 6

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Today's Agenda

1. GHG Regulation Background
2. GHG Permitting Statistics
3. GHG Permit Application Elements
4. Top-Down BACT Review
5. GHG Permit Issues
6. Questions for TCEQ

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GHG Regulation History in Texas

- **06/03/2010**: PSD Tailoring Rule
- **12/30/2010**: Federal Implementation Plan (FIP) authorizing EPA to issue PSD permits in Texas for GHG-emitting sources
- **01/02/2011**: Effective date of GHG Permits
- **06/14/2013**: HB 788 pass in Texas Legislature gives TCEQ authority to issue GHG permits
- **03/26/2014**: Adoption of rules by TCEQ
- **06/23/2014:** SCOTUS issues opinion on UARG v. EPA
- **11/10/2014:** EPA approval of updated Texas SIP/Withdrawal of FIP

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PSD Tailoring Rule After UARG

For New Sources, PSD applies to GHGs, if:

- The source is otherwise subject to PSD for another regulated NSR pollutant "Anyway Source", and
- The source has a GHG PTE equal to or greater than 75,000 TPY CO_2e

For Modified Sources, PSD applies to GHGs, if:

- Modification is otherwise subject to PSD (for another regulated NSR pollutant), and has a GHG mass emissions increase (>0) and net emissions increase equal to or greater than 75,000 TPY CO_2e

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GHG Emission Levels from Combustion Sources

- Natural Gas-Fired Combustion Source
- 146.5 MMBtu/hr = 75,000 tons CO_2e

- Diesel-Fired Combustion Source
- 106.3 MMBtu/hr = 75,000 tons CO_2e

- Subbituminous Coal-Fired Combustion Source
- 80.1 MMBtu/hr = 75,000 tons CO_2e

- Petroleum Coke-Fired Combustion Source
- 75.8 MMBtu/hr = 75,000 tons CO_2e

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EPA Region 6 GHG Permitting Statistics

- 89 GHG Applications submitted in Texas since 03/15/2011
- 63 GHG permits issued by EPA Region 6

  Remaining 26 application either withdrawn due to “GHG only” PSD status, project changes, or transferred to TCEQ
- Average Processing Time for Issued Permits: 480 days
- Shortest Processing Time: 240 days (first one issued)
- Longest Processing Time: 778 days (final permit issued 02/19/2015)

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TCEQ GHG Permitting Statistics

- 32 GHG Applications submitted in Texas since 01/27/2014
- 2 GHG permits issued by TCEQ
- Average Processing Time for Issued Permits: 213 days
- Shortest Processing Time: 77 days (originally submitted to EPA 09/04/2012, EPA Draft Permit issued 02/21/2014, transferred to TCEQ 12/12/2014)
- Longest Processing Time: 348 days (second permit issued 04/01/2015)

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GHG Permit Application Elements

- General Information from PSD Application:
  - PI-1 Form
  - Plot Plan
  - Area Map
  - Process Flow Diagram
- Project Scope
- GHG Emission Calculations
- GHG Netting Analysis: CO_2e
- Top-Down BACT Analysis

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Project Scope

- EPA guidance: Top-Down BACT does not necessarily include inherently lower polluting processes that would fundamentally redefine the nature of the source proposed by the permit applicant
- EPA looks at the administrative record to see how the applicant defined its goal, objectives, purpose or basic design for the proposed facility in its application
- Use the Project Scope to explain:
  - Type of equipment selected
  - Type of fuel selected
  - Operating conditions that are essential to the project that may affect GHG emissions

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GHG Netting

- CO_2e only
- Project Increases
- Contemporaneous Emission Changes
  - Beginning 5 years prior to Start of Construction for Electric Utilities
  - 10 years prior to Start of Construction for other industries
  - Ends at Start of Operation
- Demand Growth Exclusion
- Sometimes difficult to estimate GHG emissions for years prior to Mandatory GHG Reporting

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Top-Down BACT Analysis

Step 1: Identify All Available Control Technologies

- Inherently Lower-Emitting Processes/Practices/Designs
- Add-On Controls: Carbon Capture and Storage (CCS)
- Use of Lower-Emitting fuels

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Top-Down BACT Analysis

Step 2: Eliminate Technically Infeasible Options

- EPA Region 6 position is that Carbon Capture is technically feasible
- Address CCS in Step 4

  Note that EPA included CCS (for enhanced oil recovery) as part of BACT for a natural gas processing plant in the Permian Basin

Step 3: Rank Control Technologies

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Top-Down BACT Analysis

Step 4: Evaluate Most Effective Controls

- Provide cost estimate for CCS
- National Energy Technology Laboratory: Cost and Performance Baseline for Fossil Energy Plants – good CCS cost information
- Distance to nearest CO_2 pipeline
- Distance to nearest CO_2 reservoir or enhanced oil recovery well
- EPA wants more detailed CCS cost information as time goes on

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Top-Down BACT Analysis

Step 4 (continued):

- EPA looks at cost of CO_2 avoided ($/ton) and installation cost of CCS compared to project cost
- Example for Cement Kiln:
  - $158.4/ton CO_2 avoided
  - CCS Cost/Project Cost: >500%
- CCS costs lower than $80/ton CO_2 will get a close look by EPA

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Top-Down BACT Analysis

Step 5: Select BACT

- Examples of Output Based Limits:
  - Power Plant: lb CO_2e/MWh
  - Boilers/Process Heaters: thermal efficiency
  - Cement Kilns: ton CO_2e/ton clinker
- Examples of Other BACT Limits:
  - Flares: good combustion practices
  - Natural Gas Piping Fugitives: LDAR or AVO periodic monitoring
  - Process Heaters: stack temperature limit
  - Lime Kiln: specific output based limits based on product and fuel type used

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Current Cement BACT

Cement BACT Based on Existing Permits

- Output Based Limits:
  - New Cement Kiln: 0.91 - 0.93 ton CO_2e/ton clinker
  - Existing Cement Kiln: 0.95 ton CO_2e/ton clinker
  - Max firing rate MMBtu/ton of clinker
- Examples of Other BACT Limits:
  - Variety of energy efficiency processes, practices, and design elements
  - Alternative fuels as practicable
  - Natural Gas Piping Fugitives: LDAR or AVO periodic monitoring

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Top-Down BACT Analysis – Lower GHG Emitting Fuels

- On one hand, EPA guidance says that Top-Down BACT does not necessarily include inherently lower polluting processes that would fundamentally redefine the nature of the source proposed by the permit applicant.
- On the other hand, EPA guidance says when a permit applicant has incorporated a particular fuel into one aspect of the project design (such as startup or auxiliary applications), this suggests that a fuel is "available". Greater utilization of a fuel that the applicant is already proposing to use in some aspect of the project design should be listed as an option in Step 1 of the BACT unless it can be demonstrated that such an option would disrupt the applicant's basic business purpose for the proposed project.
- Difficulty: Costs and availability of fuels changes over time.
- In one application, a "worldwide" alternative fuel usage "goal" listed in a sustainability report on the applicant's website was included by EPA as a permit condition in a draft GHG permit.

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GHG Permit: Emission Limits

- EPA includes emission limits for CO_2, CH_4, N_2O, SF_6 and CO_2e for each separate emission unit
- GHG Permits issued by states: often only see CO_2e emission limits
- Sometimes the Global Warming Potential factors change, affecting CO_2e emission calculations

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GHG Permit Issues: Monitoring

- EPA originally pushed for CO_2 CEMS
- Now allows CO_2 reporting methods from Mandatory GHG Reporting Rules and Acid Rain Rules

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GHG Permit Issues: Performance Test

- EPA has included initial and annual performance tests in GHG permits
- However, there are no short-term limits to compare performance tests results to
- EPA says the purpose is to generate data points

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Questions for TCEQ

- How will minor modifications/revisions to GHG PSD permit be authorized? Certification form?
  - *Process for voluntary amendments to be rolled our summer of 2015*
- Separate GHG application?
  - *Required for permits already in process, optional for new applications*
- Specific GHG application forms?
  - *Yes, in process*

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Questions for TCEQ

- Separate public notices?
  - *Yes, initially but coordinated PN possible, combined in future*
- Detailed CCS cost analysis for every application?
- Top-Down BACT analysis or Three Tier Approach?

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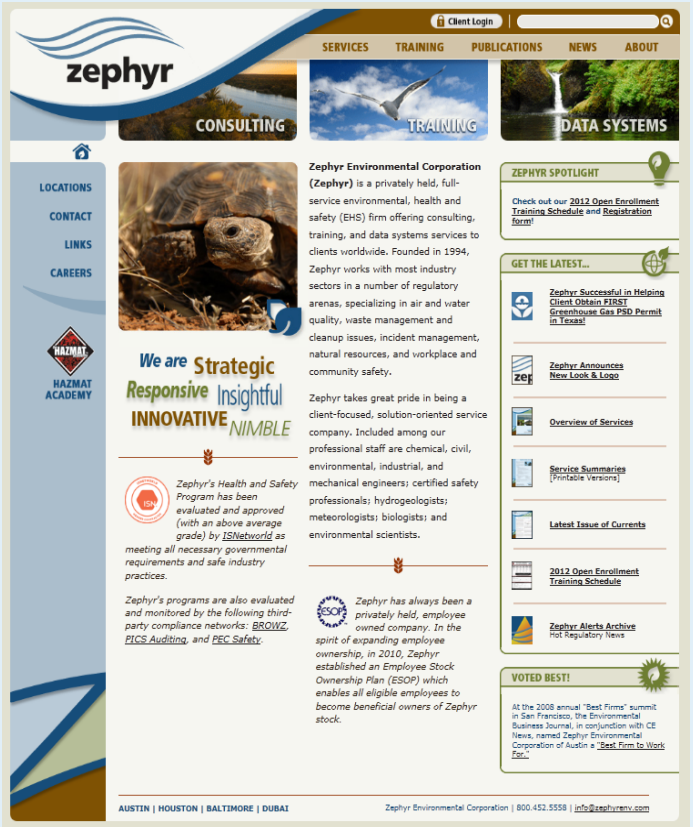
Thank you!



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