Case History of LCRA Ferguson Plant GHG Permitting

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Presented to:

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1. GHG Regulation Background
2. GHG Permit Application Elements
3. EPA Application Review
4. Additional Reviews: Three Elements
5. Permit Condition Issues
6. Title V Implications
7. Conclusions & Recommendations
GHG Regulation History

- **12/15/2009**: EPA Endangerment Finding for GHG Emissions
- **04/02/2010**: EPA published interpretation that a pollutant becomes “subject to regulation” and thus covered under PSD and Title V rules on the date a rule adopted by EPA under the CAA becomes applicable to the regulated activity
- **05/07/2010**: Light-Duty Vehicle Rule (LDVR) final rule establishing national GHG emission standards for vehicles
- **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 LDVR and GHG Permits
# PSD Tailoring Rule: New Sources

## Table II-A. Summary of PSD Applicability Criteria for New Sources of GHGs

<table>
<thead>
<tr>
<th>Permits issued from January 2, 2011, to June 30, 2011 (Step 1 of the Tailoring Rule)</th>
<th>Permits issued on or after July 1, 2011 (Step 2 of the Tailoring Rule)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PSD applies to GHGs, if:</strong>&lt;br&gt;• The source is otherwise subject to PSD (for another regulated NSR pollutant), <strong>and</strong>&lt;br&gt;• The source has a GHG PTE equal to or greater than:&lt;br&gt;  ○ 75,000 TPY CO₂e</td>
<td><strong>PSD applies to GHGs, if:</strong>&lt;br&gt;• The source is otherwise subject to PSD (for another regulated NSR pollutant), <strong>and</strong>&lt;br&gt;• The source has a GHG PTE equal to or greater than:&lt;br&gt;  ○ 75,000 TPY CO₂e <strong>OR</strong>&lt;br&gt;• Source has a GHG PTE equal to or greater than:&lt;br&gt;  ○ 100,000 TPY CO₂e, <strong>and</strong>&lt;br&gt;  ○ 100/250 TPY mass basis</td>
</tr>
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### PSD Tailoring Rule: Modified Sources

**Table II-B. Summary PSD Applicability Criteria for Modified Sources of GHGs**

<table>
<thead>
<tr>
<th>Permits issued from January 2, 2011, to June 30, 2011 (Step 1 of the Tailoring Rule)</th>
<th>Permits issued on or after July 1, 2011 (Step 2 of the Tailoring Rule)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PSD applies to GHGs, if:</strong></td>
<td><strong>PSD applies to GHGs, if:</strong></td>
</tr>
<tr>
<td>- Modification is otherwise subject to PSD (for another regulated NSR pollutant), and has a GHG emissions increase and net emissions increase:</td>
<td>- Modification is otherwise subject to PSD (for another regulated NSR pollutant), and has a GHG emissions increase and net emissions increase:</td>
</tr>
<tr>
<td>- Equal to or greater than 75,000 TPY CO₂e, and</td>
<td>- Equal to or greater than 75,000 TPY CO₂e, and</td>
</tr>
<tr>
<td>- Greater than -0- TPY mass basis,</td>
<td>- Greater than -0- TPY mass basis,</td>
</tr>
<tr>
<td><strong>OR BOTH:</strong></td>
<td><strong>OR BOTH:</strong></td>
</tr>
<tr>
<td>- The existing source has a PTE equal to or greater than:</td>
<td>- The source is an existing minor source for PSD, and</td>
</tr>
<tr>
<td>- 100,000 TPY CO₂e and</td>
<td>- Modification alone has actual or potential GHG emissions equal to or greater than:</td>
</tr>
<tr>
<td>- 100/250 TPY mass basis</td>
<td>- 100,000 TPY CO₂e, and</td>
</tr>
<tr>
<td>- Modification has a GHG emissions increase and net emissions increase:</td>
<td>- 100/250 TPY mass basis</td>
</tr>
<tr>
<td>- Equal to or greater than 75,000 TPY CO₂e, and</td>
<td>- Greater than -0- TPY mass basis</td>
</tr>
<tr>
<td>- Greater than -0- TPY mass basis</td>
<td></td>
</tr>
</tbody>
</table>
LCRA Ferguson Power Plant Timeline

• TCEQ Permit
  – Submitted: Oct. 29, 2010
  – Issued: Sept. 01, 2011

• GHG Permit
  – Submitted: Mar. 15, 2011
  – Issued: Nov. 10, 2011
GHG Permit Application

• Project Scope
• General Information from PSD Application:
  – PI-1 Form
  – Plot Plan
  – Area Map
  – Process Flow Diagram
• GHG Emission Calculations
• GHG Netting Analysis: Mass GHG and CO$_2$e
• Top Down BACT Analysis
• 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 first 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.
GHG Emission Calculations

- Combustion emissions from turbines
  - $\text{CO}_2$: Equation G-4 using Fc Factor and Heat Input (Acid Rain Rules)
  - $\text{CH}_4$ & $\text{N}_2\text{O}$: Table C-2 GHG Reporting Rules
- Combustion emissions from emergency engines
  - $\text{CO}_2$: Table C-1 GHG Reporting Rules
  - $\text{CH}_4$ & $\text{N}_2\text{O}$: Table C-2 GHG Reporting Rules
- Natural Gas Fugitives
  - $\text{CO}_2$ and $\text{CH}_4$: GHG Reporting Rules, Subpart W
- $\text{SF}_6$ Fugitives
  - Mass Balance: GHG Reporting Rules, Subpart DD
- Global Warming Potential to Calculate $\text{CO}_2e$: Table A-1 GHG Reporting Rules
GHG Emission Netting

- Used TCEQ Netting Tables
- Both Mass GHG and CO$_2$e
- Project Increases
- Contemporaneous Emission Changes
  - Beginning 5 years prior to Start of Construction
Step 1: Identify All Available Control Technologies

- Inherently Lower-Emitting Processes/Practices/Designs
- Add-On Controls: Carbon Capture and Storage (CCS)
Step 2: Eliminate Technically Infeasible Options

- Carbon Capture not commercially available for gas turbine exhaust
- Closest Potential CO$_2$ Geologic Storage Site 210 miles away
- EPA asked for estimated costs for CCS
Step 3: Rank Control Technologies
Step 4: Evaluate Most Effective Controls
Step 5: Select BACT

- Listed Energy Efficient Designs associated with gas turbine, HRSG, steam turbine, plant-wide equipment
- Proposed output based limit: 7,720 Btu/kWh (net basis) annual average
EPA Application Review: BACT Limit

• EPA asked for detailed BACT-based emission limit comparison
  – Compare proposed output based emission limit to issued permits and pending applications
  – Few GHG BACT entries in RBLC
  – Different bases for BACT limits:
    • Annual average heat rate vs. short-term
    • Gross electrical output vs. net electrical output
    • Higher heating value fuel heat input vs. lower heating value fuel heat input
    • Some did not account for degradation over time and low-load operation
• Federal government cannot be involved in an action that:
  – impacts threatened and endangered species,
  – impacts cultural resources, or
  – results in adverse impacts to underprivileged populations
• Federal law requires that a federal agency’s actions be in compliance with the Endangered Species Act (ESA) and Section 106 of the National Historic Preservation Act (NHPA)
Three Elements

• Environmental justice analysis (independently performed by EPA)
• Cultural resources review: to comply with Section 106 of NHPA
• Biological assessment: to comply with the ESA
  – EPA must ensure that existence of listed threatened or endangered species habitats is not jeopardized
Cultural Resources Review

- Prepared by applicant
- Scope:
  - Minimum area may be construction area and equipment laydown/staging areas
  - Maximum area may be action area defined in biological assessment
- Considers effects on properties eligible for inclusion in National Register of Historic Places
- Applicant may consider receiving signed concurrence from State historic commission before EPA submittal
Biological Assessment: Defining the Scope

- EPA is not asking for assessment of GHG emission effects on threatened and endangered species.
- EPA is asking for assessment based on all other project pollutants in areas beyond the applicant’s property.
- Action area development for Ferguson Project:
  - Defined the action area as area predicted by dispersion modeling to exceed the SIL (screening limit) for pollutants with secondary NAAQS standards.
  - 1-hour NO₂ secondary NAAQS standard has been proposed; could increase action area significantly.
• Conclusion: No Affect on Threatened & Endangered Species
  – No habitat within construction area or action area
  – No suitable habitat within receiving waters (Lake LBJ)
  – No known occurrences of threatened or endangered species in the receiving water
  – No evidence that any listed species of potential occurrence in the Action Area is specifically susceptible to emissions from a natural gas-fired power plant.
• EPA Required CO$_2$ CEMS
• The Permit requires performance test even though there are no short-term GHG emission limits
• The GHG PSD permit required to be incorporated into Title V Permit.

• TCEQ says they will not issue or revise Title V permits to incorporate GHG permits.

• EPA recommends including the GHG permit with the Title V application to TCEQ
  – If TCEQ does not include GHG in draft permit, EPA will file objection letter
  – Part 71 permitting action
Conclusions & Recommendations

- Provide a detailed BACT-limit comparison in initial permit application
  - Obtain pending applications from EPA
  - Note different BACT limit bases
- Meet with EPA and determine the level of detail and documentation required for the biological assessment and cultural resources review
- Budget and schedule for biological assessment
  - Bigger hurdle than the GHG application
• Carefully review monitoring and testing permit conditions

• Scheduling: allow time to obtain Title V revision before operation
Thank you!

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