Impact of New Regulatory and Technological Developments on Obtaining Air Pollution Construction Permits for New Combustion Turbines and Strategies for Dealing with These Developments

Paper #723

By:

Dr. Howard Ellis, QEP
Michael Hirtler, CCM
Dr. Allen Dittenhoefer

Enviroplan Consulting
Fairfield, New Jersey 07004

ENVIROPLAN CONSULTING

Introduction

- National need for new sources of power
- New combustion turbine (CTs) power generation capacity is satisfying much of this need

Introduction (continued)

- Air permit application process may be organized into the following eight steps:

1. Calculate the Potential to Emit (PTE) of each regulated air pollutant
2. Make applicability determination
3. Conduct air pollution control technology evaluation
4. If required, develop acceptable air quality modeling protocol and conduct modeling within 50 km of proposed plant

Introduction (continued)

5. If required, develop acceptable protocol and conduct modeling of air quality and visibility impacts in PSD Class I areas

6. If subject to nonattainment area permitting requirements, determine the emission offsets required

7. If applicable, determine the NOx offsets required to satisfy the state NOx SIP Call requirements and determine the SO2 Allowances required under 40 CFR Part 75

8. Complete the applicable permit applications

Introduction (continued)

Several recent technological and regulatory developments will impact this approach for obtaining the air pollution permits for new CTs

Purpose of this paper:

1. Describe these developments and their impact

2. Examine strategies for dealing with these developments

Development 1: Growing Technological Feasibility of Using SCR Control Technology for Simple Cycle CTs

- At least 15 simple cycle CTs using SCR control technology are on order for delivery by next year
- Only a few of these CTs are 80 MW or more
- Maximum exhaust temperatures are about 1,050° F

Strategies for Dealing with Development 1

- Identify SCR manufacturers and users with simple cycle CTs
- Conduct survey to determine costs, successes, pitfalls, and special circumstances for identified simple cycle CT projects
- Combine survey information with BACT/LAER Clearinghouse and state permit data base information to support/refute technical and economic feasibility of using SCR for the proposed source

Development 2: U. S. EPA Policy That the Collateral Environmental Impacts of Ammonia Use with an SCR may Justify not Requiring SCRs on Combined Cycle CTs with Dry Low NOx Burners (DLNBs)

- August 4, 2000 Draft Guidance indicating that in some situations the adverse environmental impacts of ammonia slip, handling and catalyst waste may not outweigh the environmental benefits of requiring SCRs on combined cycle CTs with dry low NOx burners

- Typical NOx emissions from combined cycle CT with DLNB: 9 ppm

- Typical NOx emissions from combined cycle CT with DLNB and SCR: 2.5-4.5 ppm

Strategies for Dealing with Development 2

- Discuss dangers of transport, storage and handling of ammonia in quantities required
- Quantify ammonia slip emissions (typically 5 to 10 ppm)
- Quantify catalyst waste generated
- Compare these environmental and safety impacts to the additional NOx reductions from using an SCR

Development 3: New Emission Factors for Hazardous Air Pollutants Covered Under the Clean Air Act Section 112(b) from CTs

- HAP emission rates determine whether MACT applies
- Final emission factors for 13 HAPs from gas and oil fired CTs were issued in April 2000 in AP-42 Supplement F
- Replaced draft emission factors from July 1998 in AP-42 Supplement D

Strategies for Dealing with Development 3

- If CT is major source of HAPs (≥ 10 TPY any one HAP or ≥ 25 TPY all HAPs), decide whether to limit operating hours per year to not be major and avoid MACT

- Require CT supplier to run emission tests on model being supplied to determine actual HAP emission rates

Development 4: Revisions to the Guideline on Air Quality Models with AERMOD Becoming the Principal Recommended Model for Determining Impacts within 50 Kilometers Strategies for Dealing with Development 3

- Becomes preferred model one year after EPA issues revised Guideline
- Includes improved procedures for addressing terrain impacts
- Includes the improved features for addressing building and stack effect downwash now in the ISC Prime Model

Strategies for Dealing with Development 4:

- AERMOD predicts more accurate and lower concentrations than current Guideline models in complex terrain

- Once the revised Guideline is issued, all new permit applications should use AERMOD in determining PSD increment consumption and NAAQS attainment

Development 5: New Requirements and Analytical Tools for Conducting PSD Class I Impact Evaluations

- In December 2000, the U.S. Forest Service, National Park Service and U.S. Fish and Wildlife Service issued the FLAG Report

- The FLAG Report is the basic guidance Federal Land Managers will use to provide state permitting authorities and permit applicants a consistent and predictable process for assessing the impacts of new and existing sources on Air Quality Related Values (AQVRs)

- CALPUFF is the recommended model for determining PSD Class I increment consumption, visibility impacts and impacts on other AQRVs at distances of 200 kilometers or more

Strategies for Dealing with Development 5

- Determine the potential impact of the proposed CTs in the Class I area at the start of the permitting process
- Confer with the Federal Land Manager (FLM) of the PSD Class I areas within 200 kilometers to agree on the approach to the analysis
- Screening analysis of the proposed CTs with CALPUFF using agreed conservative input parameters

Strategies for Dealing with Development 5 (continued)

- If significant impacts on the AQRVs in the Class I areas are predicted, negotiate with the FLM to use less conservative input parameters and repeat the screening analysis
- If significant impacts still result, conduct a cumulative impact analysis using other PSD increment consuming sources with a screening analysis
- If PSD Class I increments, visibility or other AQRVs based on cumulative impacts are exceeded, consider a refined modeling analysis with CALPUFF

Development 6: MACT Standards for New Combustion Turbines

- The MACT emission standard for CTs is expected to be promulgated by EPA in 2001
- A CT commencing construction before the MACT is promulgated shall have three years to comply with it following date of promulgation
- A CT commencing construction after the MACT is promulgated shall comply with it immediately
- Until the MACT is promulgated, states must specify case specific MACTs

Strategies for Dealing with Development 6

- Try to be exempt from the MACT requirements using the strategies discussed in response to Development 3

Conclusions

- Energy demand across the country will continue to require new power plants and CT projects will continue to fulfill much of that need
- Several regulatory and technological developments are affecting the ability to obtain air pollution construction permits for new CTs
- These developments are increasing the already complex, time-consuming, and costly air permitting process
- These new developments are requiring new permitting strategies to obtain air pollution construction permits in a timely and cost effective manner
- This paper has discussed these developments and suggested strategies for dealing with them to minimize the cost and time to complete the permit application process