

Day 1: History and Background; RACT (RACM/BACM) determination process

- **Welcome to the course. Logistics, introductions of course instructors, learning objectives**
- **Clean Air Act structure. Focus on where control technology requirements exist, especially RACT/BACT/LAER**
- Basics of NO_x formation and NO_x control
- Why Control NO_x?
- History and definitions of RACT, BACT, and LAER and when each is each required.
- RBLC - uses and caveats/dangers, how best to use it in analysis
- The role of RACT in SIP planning and the relationship between RACT and Reasonably Available Control Measure (RACM) requirements.
- RACT review process, anti-backsliding provisions, and state/local discretion.
- Source types subject to NO_x RACT and status of adoption of RACT measures for those sources in states, measures adopted, state-to-state consistency.
- Major sources of NO_x subject to RACT, major source thresholds, applicability trigger (potential to emit (PTE) versus actual emissions), once-in always-in RACT policy, PTE calculation, voluntary restrictions in lieu of add-on controls, negative declarations, delisting a facility (e.g., out of business, demolished).
- Resources available to support reviews, including the Ozone Transport Commission's RACT Tool, the RACT/BACT/LAER Clearinghouse, and other resources
- OTC tool - comparison of limits in selected categories
- Brief overview of source types subject to VOC RACT
- Monitoring - CEMS and converting wet to dry, X% oxygen to Y% oxygen

Day 2: BACT and LAER; NO_x control technology options for specific source categories

- **Welcome back, logistics reminder, review of today's topics, any questions - review homework**
- BACT and LAER
- How BACT and LAER are determined:
 - Multi step BACT process
 - Example determinations for source categories of interest to MPCA

Day 2: BACT and LAER; NOx control technology options for specific source categories

- How do MPCA states interpret BACT (e.g., cost thresholds in BACT determinations, consideration of new technologies and alternative production processes/sites/sizes).

- Review of top-down BACT determinations: cost-effectiveness, tech feasibility.
- BACT considerations for minor sources.
- Multi step LAER process.
- LAER example.
- Discussion of control technologies, including Selective Non-Catalytic Reduction (SNCR), Advanced SNCR, and Selective Catalytic Reduction (SCR);
- Qualitative discussion of older technologies*, including: low NOx burners, ultra-low NOx burners, oxygen trim monitoring, water injection, flue gas recirculation, over-fire air and under-fire air;
- Qualitative discussion of Nonselective Catalytic Reduction (NSCR), fuel injection timing retard, and other engine modifications.
- Discussion of RACT determinations for boilers, turbines for gas pipelines, hot mix asphalt plants, municipal waste incinerators, glass furnaces.
- Review of single-source RACT determination: cost-effectiveness, tech feasibility - wood-fired boiler example.

Day 3: Class Exercises for up to five source categories

- **Welcome back, logistics reminder, review of today's topics, any questions - review homework**
- RACT exercise for boilers
- RACT exercise IC Engines
- BACT exercise for turbines
- BACT exercise for engines
- LAER exercise for boilers
- Post Test/discussion of answers.
- Class Evaluation