Michigan Department of Environmental Quality - Air Quality Division

GUIDELINES FOR CONDUCTING A RULE 224 T-BACT ANALYSIS

General Requirements

A. Best Available Control Technology for Toxics (T-BACT) means the maximum degree of emission reduction which the Department determines is reasonably achievable for each process that emits toxic air contaminants (TACs), taking into account energy, environmental, and economic impacts, and other costs.

B. The analysis must be specific to the process and the TACs subject to a T-BACT review.

C. The evaluation must identify the entire range of demonstrated options. Control alternatives that may be transferable or innovative must at least be considered.

D. The level of detail in the control options analysis should vary with the relative magnitude of the emissions reduction achievable. The T-BACT analysis is the responsibility of the permit applicant as part of a complete permit application.

E. Emission limits should be expressed in pounds/hour, based on maximum process capacity, and also in terms of process variables such as material processed, fuel consumed, or pollutant concentrations. Acceptable units include lbs/MMBtu, lbs/gal of solids applied, and g/dscm.

F. Emission limits and work practice standards resulting from the T-BACT analysis must be enforceable as a practical matter. Permit conditions will specify appropriate stack testing, continuous emission monitoring, continuous process monitors, recordkeeping, etc.

For technical questions pertaining to this document, contact the AQD Permit Section at 517-373-7074.

Procedure

1. Pollutant Applicability

   Determine which TACs are to be evaluated in the T-BACT analysis. Rule 224(2) lists exemptions from the T-BACT requirement. For example, carcinogens with an Initial Risk Screening Level (IRSL) greater than 0.1 microgram per cubic meter and non-carcinogens with an Initial Threshold Screening Level (ITSL) greater than 200 micrograms per cubic meter are exempt from T-BACT if their maximum allowable emission rates are less than 0.1 lb/hr and 1.0 lb/hr, respectively.

2. Identify Process Emissions

   Determine all potential process emissions including fugitive emissions. (i.e., each stack or vent, relief valves, pumps, storage piles or tanks, conveyors, valves)

3. Identify Available Control Options

   a) Determine the “base case.” The base case is the control option that, in the absence of T-BACT decision-making, would normally have been applied. Examples are New Source Performance Standards, National Emission Standards for Hazardous Air Pollutants, emission limits in state or local air pollution regulations, or the level of control that is generally used in practice.

b) Identify alternative control options that afford greater control than the base case and are available at the time of the submittal of a complete permit application. Include:

   i) Transferable and innovative control technologies,

   ii) Processes or alternate modes of operation that inherently produce less pollution, and

   iii) Various configurations of the same technology that achieve different control efficiencies (i.e., one-field and five-field electrostatic precipitators, 95% and 99% efficient scrubbers).

c) The following sources of information should be investigated to ensure that all alternative control options are identified.

   i) Technical Literature

   ii) Industrial Publications

   iii) RACT/BACT/LAER Clearinghouse (RBLC)

   iv) EPA/State/Local air pollution control agency surveys

4. Impact Analysis

Determine if the control option that provides the greatest emission reduction is not reasonable because of energy, economic or environmental impacts, or other costs. Consideration of these collateral impacts is used to demonstrate whether or not the control option is appropriate. If this control option is found to be unreasonable, repeat the evaluation for the less effective alternatives. The following are examples when energy, economic, or environmental impacts may make an alternative not reasonable.

a) Energy – Natural gas for operating an afterburner is not available based on local regulations or use of liquid propane gas as an alternative may be eliminated as inappropriate based on its relative cost. Most energy-based demonstrations work themselves out under the economic evaluation.

b) Economic -

   i) The increased cost of the process or project would be unreasonable.

   ii) The increased cost is out of proportion to the environmental benefit. For example, the increased cost of going from 93% to 94% control increases the capital cost from $2,000,000 to $4,000,000 and the operating costs from $500,000/year to $1,000,000/year, while only reducing the emissions of acetone by 20 tons per year.

c) Environmental – Certain control options may result in detrimental environmental impacts (i.e., generation of solid or liquid waste, impacts to surface or ground water).

The capital cost, the amortized capital cost, and the annual operating costs of the emission control system should be submitted for each different economic control cost evaluation preformed. A 7% interest rate should be used unless interest rates change significantly, and the life of the control equipment is assumed to be at least 10 years unless a demonstration to the contrary is provided. Provide all supporting assumptions, calculations and other documentation. The standard method used to determine the aforementioned costs is contained within the USEPA OAQPS Control Cost Manual which is available on the following website: www.epa.gov/ttn/catc/products.html#cccinfo.

5. Select T-BACT

T-BACT is the most effective control alternative that is not eliminated in Step 4.