



**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR QUALITY DIVISION**

**OPERATIONAL MEMORANDUM  
NO. 20**

**SUBJECT:** Best Available Control Technology (BACT) Determinations

**EFFECTIVE DATE:** August 24, 2005

Preamble

The Air Quality Division (AQD) has developed and operates a minor source permitting program and a nonattainment area New Source Review (NSR) permitting program under state rules promulgated pursuant to Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451). (Note: All rules cited in this Operational Memorandum refer to rules promulgated pursuant to Act 451.) Additionally, the AQD operates a Prevention of Significant Deterioration (PSD) NSR permitting program under the terms of its delegation of authority from the U.S. Environmental Protection Agency dated September 28, 1988. This delegation, these rules, and the procedures derived from them govern the AQD's minor source and NSR permitting programs.

Within the context of its minor NSR permitting program, the AQD implements Rule 702. This rule requires volatile organic compounds (VOC) emission reductions according to the most stringent of: Best Available Control Technology (BACT), New Source Performance Standards (NSPS), permit conditions, or Reasonably Available Control Technology (RACT). In general, the BACT criterion usually ends up determining the Rule 702 requirements. The AQD also implements BACT requirements as part of its nonattainment major NSR and PSD permitting programs.

Neither state nor federal regulations establish specific control technologies or emission limits as BACT because the extensive diversity of facility types and emission reduction options makes such specifications impractical. Instead, to demonstrate that a facility will use BACT, applicants present an analysis in support of their BACT proposal. The AQD permit engineer evaluates the analysis and makes a case-by-case determination of whether the facility satisfies the BACT requirements. Engineering principles and agency experience concerning the practicality and impacts of an emission reduction option are used in this case-by-case determination.

Policy

The AQD will employ the following procedure in its determinations of BACT. This document is intended to provide guidance for preparing and evaluating BACT proposals submitted as part of a Permit to Install (PTI) application. Written primarily to provide internal guidance for permit engineers, this policy is designed to provide the AQD and applicants with the flexibility needed to determine the appropriate levels of emission reductions on a case-by-case basis while

providing a clear structure and criteria for making such determinations. The key components of BACT determinations will be AQD staff experience and expertise, relied upon within specified boundaries. This policy is intended to be adaptable to all process and facility types and to changing control requirements over time.

### Procedure

The features of a BACT determination as found in the regulatory definition, the written federal guidance, and environmental appeals decisions include:

- Identifying those air pollution control technologies or techniques with a practical potential for application to the emissions unit and the regulated pollutant under evaluation;
- Determining whether a control technology or technique is “available” and “applicable” to the equipment under consideration; and
- Evaluating a control technology’s “energy, environmental, and economic impacts and other costs.”

Consistent with its regulatory definition, BACT is an emission limitation based on the maximum degree of pollutant reduction for the emission unit(s) under review.

To properly evaluate a BACT proposal, the permit reviewer must resolve questions such as: Has the proposed control option been demonstrated to work in practice? Can the proposed control option be reasonably expected to work based on technical analysis? Is the project cost acceptable considering the emission reductions it achieves?

The AQD will evaluate BACT proposals using a four-level approach. The evaluation begins at the first level and continues sequentially to Levels 2, 3 and 4 only if necessary as determined by the evaluation process described in this document. In each level, BACT is evaluated on a case-by-case basis using engineering principles and AQD staff experience for practical potential applicability, technical feasibility, and the acceptability of energy, environmental, and economic impacts.

#### **Level 1**

The top control option for any BACT proposal is set by the Lowest Achievable Emission Rate (LAER). Any proposed BACT analysis which selects to achieve LAER will be accepted without additional review. Many applicants will not be able to meet LAER. When a proposal does not meet LAER, the BACT determination proceeds to Level 2.

#### **Level 2**

Emission limitations accepted as BACT in recent permit reviews throughout the country for the same process or industry type are acceptable unless new technical developments have been made that indicate additional emission reductions are practically achievable for that process or industry type. In this level of the BACT review, recent permit reviews against which a proposal will be compared are generally those that have been completed in the previous five-year period.

Level 2 of the BACT evaluation involves a comparison of the applicant’s BACT proposal with levels of emission reduction accepted as BACT in recent permit reviews for the same or similar source types anywhere in the nation. In some cases, evaluation of new technical developments within that industry may be necessary if the technical developments:

- Make possible greater levels of emission reduction from existing control technologies or techniques;
- Make available new forms of control technology or techniques; or
- Significantly reduce the energy, environmental, or economic impacts associated with existing control technologies or techniques.

The evaluation of such technical developments may result in a BACT emission limitation more stringent than recent BACT determinations for that source type. If no such technical developments within that industry have occurred, then additional reductions have not been shown to be practically achievable. BACT is thus determined to be consistent with emission reduction levels accepted in recent permit reviews.

If an applicant proposes emission limitations less stringent than those accepted as BACT in permit reviews for the same process and/or industry completed approximately within the past five-year period, and no new technical developments have occurred, then the BACT evaluation must continue to Level 3. Additionally, on a case-by-case basis, when few recent BACT determinations exist for a process or industry type, or when recent BACT determinations vary widely, the BACT evaluation must continue to Level 3.

### **Level 3**

A Level 3 BACT evaluation involves consideration of controls that have been accepted as BACT in recent permits for similar air emission streams from different processes or industry types. Level 3 also allows consideration, where appropriate, of older BACT determinations. Control technologies or techniques (i.e., materials, methods or equipment) that have not been demonstrated within the process or industry type under review may be evaluated for use if they are shown to be both available and applicable to the process or industry type under review. In the case of materials or methods, consideration will be made on the basis of their use in manufacturing identical or similar products from identical or similar raw materials. In the case of add-on control equipment, consideration will be made on the basis of the physical and chemical characteristics of the pollutant-bearing streams to which the controls have been applied compared with those from the process or industry type under review. In Level 3, determining whether energy, environmental, or economic impacts are appropriate is based on current and historical acceptability determinations.

After the Level 3 evaluation, if an applicant's proposed emission reduction performance level remains less stringent than those accepted as BACT in permit reviews for the same process and/or industry, then the BACT evaluation must continue to Level 4.

### **Level 4**

The Level 4 BACT evaluation involves a detailed top-down technical and quantitative analysis of all emission reduction options available for the process under review. The Level 4 evaluation considers all available emission reduction options and proceeds in a five-step process as follows:

1. Identify all emission reduction options;
2. Eliminate technically infeasible options;
3. Rank the remaining emission reduction options according to control effectiveness;
4. Evaluate the energy, environmental and economic impacts of the highest-ranked option; and
5. Select the highest-ranked remaining option as BACT.

A brief description of each of these five steps follows:

#### Step 1

The first step in the Level 4 BACT top-down analysis is to identify all “available” control options. Here the term “available” is defined to mean those air pollution control technologies or techniques with a practical potential for application to the emissions unit and the regulated pollutant under evaluation.

#### Step 2

The second step is to eliminate technically infeasible options. This step involves first determining for each technology whether it has been demonstrated; that is, installed and operated successfully elsewhere. A control technology that has been demonstrated for a given process or industry type is assumed to be technically feasible unless source-specific factors exist and are documented to justify technical infeasibility. If a technology has not been demonstrated, then it will be deemed technically feasible only if it is “available” and “applicable” to the equipment under consideration. Under the second step of the top-down analysis, the term “available” is used to refer to whether the technology is commercially available. An available technology is considered “applicable” if it can be installed and operated on the source type under consideration. Applicability is generally assumed in cases where a commercially available control option has been or is soon to be deployed on the same or a similar source type. Technologies that are not demonstrated are eliminated from further analysis under Step 2 if they are also not available or not applicable.

Notably, if a permit applicant asserts that a particular control option is technically infeasible, the applicant should provide factual support for that assertion. Such factual support may address the lack of commercial availability or difficulties associated with application of a particular control to the permit applicant’s project. A control option is not considered infeasible simply based upon the cost of applying that option to the proposed project. Rather, economic impacts are evaluated in a subsequent step of the BACT process.

#### Step 3

In Step 3 of the top-down analysis, the remaining control technologies (not eliminated in step two) are ranked and then listed in order of control effectiveness for the pollutant under review, with the most effective alternative at the top.

#### Step 4

In Step 4, the energy, environmental, and economic impacts are considered. The consideration of these collateral impacts is used to either confirm the top BACT option as appropriate or to demonstrate that it is inappropriate. Impacts, such as costs (i.e., dollars per ton of pollutant removed), borne by recently permitted similar facilities is the standard used to determine whether an impact is appropriate. Evaluations of energy or environmental impacts are generally assessments of unusual impacts at the facility under review compared to impacts at other recently permitted facilities.

#### Step 5

Finally, under Step 5 of the analysis, the most effective control alternative not eliminated in Step 4 is selected as BACT.

The five-step Level 4 evaluation is rarely necessary because BACT has usually been firmly established by industry practice as identified in Level 1, Level 2, or Level 3. Ordinarily, it is in

the best interest of both the applicant and the AQD to avoid the fourth level of evaluation because it is:

- Highly complex and quantitative;
- Difficult to agree upon because of the numerous assumptions required for completion;
- Time and resource intensive, which causes permit delays; and
- Not likely (based on past experience) to result in substantially different control options than otherwise indicated by the first three levels of review.

This memorandum is intended to provide guidance to the AQD staff and applicants to foster consistent application of Part 55. This document is not intended to limit or convey any rights or limitations to any parties or create any limitations, duties or responsibilities under law. This document and matters addressed herein are subject to revision.

Questions regarding this memorandum should be directed to the AQD Permit Section Supervisor at 517-373-7087.