

Air Permit Reviewer Reference Guide

APDG 6110

Air Pollution Control

How to Conduct a Pollution Control Evaluation

Air Permits Division
Texas Commission on Environmental Quality

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Section I - Air Pollution Control

Introduction

The Texas Commission on Environmental Quality (TCEQ or commission) manages air quality in the state of Texas by regulating the release of air contaminants under authority in the Texas Clean Air Act (TCAA), codified in Chapter 382 of the Texas Health and Safety Code (THSC). This is done by adopting rules, including those in Title 30 Texas Administrative Code (30 TAC) Chapter 116, and issuing permits. The TCEQ also implements requirements of the Federal Clean Air Act (FCAA), and Code of Federal Regulations (CFR) in rules and permits.

Applications for projects subject to air pollution control evaluations are those with new and modified facilities or sources of emissions of air contaminants. The applicant must fully document the basis for air pollution control determinations as it is the applicant's responsibility to adequately demonstrate that the permit should be issued.

This document provides permit reviewers with a process to evaluate, and determine air pollution control requirements, and provides general guidance on responsibilities, format, content, and quality assurance for case-by-case permit reviews for new and modified facilities.

In addition, the document is used to train new reviewers and refresh the knowledge of experienced staff on topics they encounter infrequently. While the focus of the document is on the technical review process and best available control technology (BACT), it is available to the regulated community and the public to provide an understanding of air pollution control requirements and processes that affect air permit applications.

Specifically, the document provides guidance for completing case-by-case air pollution control technology reviews and also discusses control technology required by regulation or rule associated with the construction or modification of facilities (or emission units). These topics include the following:

- Best Available Control Technology (minor source and major source Prevention of Significant Deterioration [PSD])
- Lowest Achievable Emission Rate (LAER) (nonattainment major source)
- Reasonably Available Control Technology (RACT) (nonattainment source)
- Maximum Achievable Control Technology (MACT) (major sources of hazardous air pollutants)
- Generally Available Control Technology (GACT) (area sources of hazardous air pollutants)

During the course of the technical review of a permit application, the permit reviewer evaluates air pollution control requirements and confirms that the applicant has proposed the appropriate air pollution controls and properly determined off-site impacts for the project facilities and associated sources. The applicant's air pollution control review, along with the permit reviewer's air pollution control evaluation and final recommendation provide a record that demonstrates that the operation of a proposed facility or related source will not cause or contribute to a condition of air pollution and will comply with all applicable federal regulations and state rules as well as with the intent of the TCAA.

While this document provides a general process and defines minimum requirements for staff's consideration of air pollution control requirements, this document is not regulatory and does not limit the permit reviewer's ability to require the applicant to provide additional information. This additional

information could be related to issues such as comments received during the public notice or meeting process, coordination with United States Environmental Protection Agency (EPA) or TCEQ staff on known areas of interest, or issues related to off-property impacts (protection of public health). In some instances, permit reviewers may deviate from this guidance on a case-by-case basis; deviation from the guidance may only occur with the approval of the permit reviewer's supervisors or of the Air Permits Division (APD) director.

Be aware that there are often differences in term usage and term definitions between the state and federal regulatory agencies. Please reference [Appendix A - Important Terminology](#) document on the APD website for more guidance related to terms and definitions.

General Requirements and Basic References

As previously stated, the TCEQ receives its authority for a control technology review through the TCAA and the FCAA. The TCAA requires air permit authorizations for facilities to consider control technology and comply with federal requirements under the FCAA. Title I of the FCAA requires:

- States to develop State Implementation Plans (SIP) to address attainment and maintenance of National Ambient Air Quality Standards (NAAQS);
- A preconstruction permitting program for both new major and minor sources (New Source Review [NSR]) and applicable modifications, to include an evaluation of control technology and off-property impacts;
- The EPA to identify stationary sources and promulgate standards of performance that reflect the degree of emission limitation achievable through the application of the best system of emission reduction. The EPA may promulgate a design, equipment, work practice, or operational standard (or combination) that reflects the best technological system of continuous emission reduction; and
- The EPA to promulgate emission standards and, where achievable, the maximum degree of reduction in emissions of hazardous air pollutants subject to the FCAA.

The EPA has approved the Texas SIP, making the TCEQ the permitting authority for regulation of air emissions generated in the state of Texas. The Texas SIP, which is federally enforceable, includes Texas' NSR permitting programs for both major and minor sources, and these programs implement both the FCAA and the TCAA. The required permits are commonly referred to as "construction," "case-by-case" or "NSR" permits and must be issued prior to construction. Owners and operators of facilities must, at a minimum, comply with TCAA requirements. Additional requirements apply if a facility is subject to the permitting programs established in the FCAA. These NSR permitting programs include PSD, Nonattainment, and, when applicable, a case-by-case MACT, including the requirements of FCAA § 112(g). This is commonly referred to as a determination of "federal applicability" or a "federal review." At a minimum, a federal review is required for a:

- New or existing major source or major modification in an area that meets NAAQS, including an assessment of BACT and human health and welfare effects related to all operations of facilities. Emissions to be evaluated include those from normal operation, production, and planned maintenance, startup, and shutdown (MSS) activities as applicable;
- New or existing major source or major modification in a nonattainment area for a NAAQS, including an assessment of LAER control technology and an assurance that the total tonnage of increased emissions of the air pollutant from the new or modified major source shall be offset by an equal or greater actual emission reduction; and

- New process or reconstruction of a process emitting a hazardous air pollutant (HAP) without an emissions standard, including an assessment of Maximum Achievable Control Technology (MACT) and human health effects (major HAP sources only).

Accessing Electronic Information in This Document

This document contains several active links to other electronic information, webpages, and citations. When viewing the document electronically, the links appear in blue underlined text. If viewing the document as a black and white printed version, the links appear simply as underlined text. To view the information, webpages, or citations in this document, open the electronic version of the document and hold down the “Ctrl” button while clicking on the appropriate link.

A limited number of the live links in this document open files that are stored on the commission’s internal servers (for example the [subject matter experts list](#)). These files will not open for external customers; however, please contact the Air Permits Division to obtain copies of these files.

Summary of Significant Changes

This subsection will provide tracking of significant changes made to the document (dates and what has changed) after release of the first version of this guidance document.

NOTE: This guidance document is a training tool that is intended to replace previous guidance by clarifying policies and providing support for the implementation of rules in 30 TAC Chapter 116. While this document replaces all previous agency air pollution control guidance documents, including the April 2001 TCEQ Evaluating Best Available Control Technology (BACT) in Air Permit Applications (Draft), the October 30, 2000 Texas Natural Resource Conservation Commission Best Available Control Technology (BACT) (Draft), and the Best Available Control Technology (BACT) Tier III Cost Analysis guidance documents (Draft), it also brings forward and updates the “Control Technology” guidance document of the Texas Air Control Board (TACB) which was finalized in Spring 1987.

Historical Guidance Information

The 1987 TACB Control Technology guidance document specifically stated that BACT will be applied as part of a case-by-case review for all new or modified facilities, and BACT determinations will be based on technical practicability and economic reasonableness. Specifically, this determination would be based on the specific characteristics of the emission stream to be controlled, the agency’s experience with the practicality and reasonableness of controls used for similar streams, and engineering judgment. This guidance document included the three-tiered BACT analysis, which has been applied by the TACB and its successor agencies, and is continued by the TCEQ by inclusion in this Reference Guide. Another important point is that the 1987 guidance document, as is also stated in this Reference Guide, is that the agency does not dictate what specific controls are required to meet the requirement for BACT. Rather, the choice of control, or a combination of controls, is determined by the owner or operator of the facilities for which construction or modification authorization is sought. BACT may be expressed in terms of an emissions limit (e.g., as a pound per hour or ton per year number), or a performance criteria (e.g., a percentage destruction efficiency or pound per million British Thermal Units [lb/MMBtu]).

This 1987 guidance document was the version used at the time the state of Texas, through the TACB, received approval from EPA to issue PSD permits as part of the Texas SIP. For discussion about how BACT in Texas was addressed in that approval, see EPA's proposed approval in *54 Federal Register* 52823, 52824-25 (December 22, 1989) and the final approval in *57 Federal Register* 28093 (June 24, 1992).

Section II – Federal Authority for Emissions Controls and Pollutants Subject to Control Analysis

Federal Applicability

EPA has developed and implemented several federal regulations to control air pollution emitted by various stationary sources. These established regulations are based on the FCAA and are implemented through the CFR. The permit reviewer determines federal applicability as the first step in any permit review.

The primary NAAQS are set to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly from the effects of "criteria air pollutants" and certain non-criteria pollutants. NAAQS secondary standards are set to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

New Source Performance Standards (NSPS) are promulgated for major and minor sources; these are found in 40 CFR Part 60. NSPS are national emission standards that are progressively tightened over time to achieve a steady rate of air quality improvement without unreasonable economic disruption. The NSPS impose uniform requirements on new and modified sources. These standards are based on the Best Demonstrated Technology (BDT). BDT refers to the best system of continuous emissions reduction that has been demonstrated to work in a given industry, considering economic costs and other factors. The format of an NSPS can vary from source to source. The standard can be a numerical emission limit, a design standard, an equipment standard, or a work practice standard.

The FCAA Amendments of 1970 required EPA to identify and list all air pollutants (not already identified as criteria pollutants) that "may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible or incapacitating reversible illness." For each pollutant identified, EPA was to then promulgate National Emissions Standards for Hazardous Air Pollutants (NESHAP); these are found in 40 CFR Parts 61 and 63. The NESHAP levels ensure the protection of the public health with an ample margin of safety to prevent any significant and adverse environmental effects, which may reasonably be anticipated, on wildlife, aquatic life, or other natural resources.

While NSPS and NESHAP provide minimum requirements that must be met by all affected sources, additional air pollution control requirements must also be considered. The most stringent requirement of all applicable requirements applies to each project, source, and pollutant. These additional requirements are as follows:

Best Available Control Technology (BACT)

Federal BACT is an emission limitation, including a visible emission standard, based on the maximum degree of reduction of each pollutant subject to regulation under the FCAA emitted from or which results from any proposed major stationary source (major source) or major modification. The federally approved permitting authority (TCEQ), on a case-by-case basis, takes into account energy, environmental and economic impacts, and other costs, and determines that the emission limitation is achievable for such source or modification through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels or treatment or innovative fuel combustion techniques for control of each such pollutant.

Ref: FCAA § 169(3) and 40 CFR § 52.21(b)(12).

The FCAA does not authorize BACT to allow emissions that will exceed the rates allowed by any applicable standard established pursuant to sections 111 (NSPS) or 112 (NESHAP) of the FCAA, or any

applicable standard under 40 CFR parts 60, 61, or 63. Emissions from any source utilizing clean fuels or any other means, to comply with BACT, shall not be allowed to increase above levels that would have been required under the FCAA as it existed prior to enactment of the Clean Air Act Amendments of 1990.

If the permitting authority (TCEQ) determines that there are technological or economic limitations related to the application of a specific measurement methodology for a particular emissions unit that would make the imposition of that emission limitation infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of BACT. The alternative prescription shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice, or operation and shall provide for compliance by means which achieve equivalent results as an emission limitation.

TCEQ has implemented this in its rules and SIP in 30 TAC § 116.160.

Ref: FCAA § 169(3) and 40 CFR § 52.21(b)(12) and (j).

Lowest Achievable Emission Rate (LAER)

LAER is an emission limitation for pollutants subject to regulation under the FCAA that are emitted from any proposed new major stationary source (major source) or major modification of an existing major stationary source in nonattainment areas (areas that are not meeting the NAAQS). LAER is:

- The most stringent emissions limitation, which is contained in the SIP, for a class or source category, unless the owner or operator of the source demonstrates that such limitations are not achievable; or
- The most stringent emissions limitation that is achieved in practice by a class or source category. This limitation, when applied to a modification, means the lowest achievable emissions rate for the new or modified facilities.

In no event shall the application of LAER authorize emissions of any pollutant in excess of the amount allowable under applicable NSPS or NESHAP.

Ref: FCAA § 171(3), 40 CFR § 51.165(a)(1)(xii), 40 CFR § 52.21(b)(53) and 30 TAC § 116.12(15)

Reasonably Available Control Technology (RACT)

The SIP includes additional control strategies for nonattainment areas and certain attainment areas. For ozone nonattainment areas, these control strategies include, but are not limited to, reductions of nitrogen oxides (NO_x), volatile organic compounds (VOC), vehicle inspection and maintenance programs, lower gasoline vapor pressures, gas pump vapor recovery.

RACT applies to existing stationary sources in nonattainment areas and certain attainment areas that were formerly designated as nonattainment areas and have been redesignated. RACT is the application or use of devices, systems, process modifications, or other apparatus or techniques that are reasonably available taking into account the following:

- The necessity of imposing such controls in order to attain and maintain a NAAQS;
- The social, environmental and economic impact of such controls; and
- Alternative means of providing for attainment and maintenance of such standard.

EPA's interpretation of the RACT requirement is that it is the lowest emissions limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.

Because RACT requirements often apply, staff should be familiar with RACT requirements. RACT is generally accomplished in Texas through rules to reduce emissions from existing sources regardless of construction authorization or date of construction for the source. TCEQ implements RACT for VOC and NO_x sources through rules in 30 TAC Chapters 115 and 117, and are part of the approved Texas SIP. Therefore, the permit reviewer should be familiar with all of the rules in Chapters 115 and 117 which constitute both RACT, and also reasonably available control measures (RACM) which are adopted as part of the Texas SIP for attainment demonstration plans for ozone nonattainment areas. For example, requests for approval of for Alternate Means of Control projects are processed by APD and therefore staff must be aware of these RACT requirements and how they apply to NSR. RACT can also be implemented through commission order as a site-specific SIP. The reviewer must ensure that RACT requirements are included in the permit conditions as applicable and the reviewer must ensure that BACT determinations are at least as stringent as RACT.

Ref: 40 CFR § 51.100(o), 40 CFR § 51.341(b), 40 CFR § 52.21(b)(54) and 30 TAC Chapters 115 and 117.

Maximum Achievable Control Technology (MACT)

The FCAA 1990 amendments established a program to regulate any stationary source or group of stationary sources located within a contiguous area and under common control that emit or has the potential to emit considering controls, ten tons per year or more of any HAP or 25 tons per year or more of any combination of HAPs (air toxics). The standards for MACT are commonly known as NESHAP for source categories (40 CFR Part 63).

MACT standards require affected sources to meet specific emissions limits that are based on emissions levels already achieved by the best controlled similar sources. On July 16, 1992, EPA published a list of industrial source categories that emit one or more HAPs at the significance levels. In addition to the 1992 list, § 112(g) of the FCAA was designed to ensure that emissions of toxic air pollutants (HAPs) do not increase if a facility is constructed or reconstructed before EPA issues a MACT or air toxics regulation for that particular category of sources or facilities. Section 112(g) reviews also apply for MACT standards which have been vacated by the courts and that have not been reestablished by EPA.

Ref: FCAA § 112(g) and 40 CFR Part 61.

Generally Available Control Technology (GACT)

To reduce emissions of HAPs and to allow more flexibility for categories and subcategories of area sources, EPA may develop alternative standards for area sources of HAPs (non-major HAP sources), known as GACT or generally available management practices.

Ref: FCAA § 112(d)(5)

Pollutants Subject to Federal Emission Control Analysis

The previous subsection ([Federal Applicability](#)) outlines the federal regulations that may apply to emission sources. This subsection addresses how each regulation applies on a pollutant by pollutant basis.

Table 1 below provides a brief summary of the pollutants subject to federal emission control review requirements. For additional details, see [Appendix B](#).

Table 1: Federal Emission Control Requirements

Analysis/Rule	Applicable Pollutants	Applicable Sources	Requirement*
BACT	Each regulated NSR pollutant (including, but not limited to, criteria pollutants and, precursors) ** However, TCEQ excludes greenhouse gases as an air contaminant and thus does not regulate them ***	Any proposed major stationary source or major modification emitting a regulated air pollutant	Ensure appropriate emission limitations considering technical practicability and economic reasonableness.
LAER	Criteria pollutants for which the area is designated nonattainment	Major source or major modification in nonattainment areas	1. Emissions limitation contained in the SIP for a class or source category or; 2. The most stringent emissions limitation which is achieved in practice by a class or source category.
RACT****	Criteria pollutants for which the area is designated nonattainment or maintenance	Existing stationary sources in nonattainment areas and certain attainment areas	RACT rules must be met if applicable.
MACT****	HAP	Major sources of a HAP	MACT rules must be met if applicable.
GACT****	HAP	Area sources that emit less than 10 tpy of any single HAP or less than 25 tpy of any combination of HAPs	GACT rules must be met if applicable.

* The most stringent requirement of all applicable requirements applies to each project, source and pollutant.

** See 40 CFR § 51.166 (b)(23)(i) and (b)(23)(ii)

*** 30 TAC § 101.1(107); See also § 116.12(17) and (18)

**** Recently promulgated rules or standards may be more stringent than BACT for a previously authorized facility.

Section III – Texas Clean Air Act (TCAA) Authority for Emissions Controls and Contaminants Subject to Control Analysis

TCAA Applicability

The policy of the state of Texas and the purpose of the TCAA is “to safeguard the state's air resources from pollution by controlling or abating air pollution and emissions of air contaminants, consistent with the protection of public health, general welfare, and physical property, including the esthetic enjoyment of air resources by the public and the maintenance of adequate visibility” Ref. THSC § 382.002(A).

The TCEQ regulates the release of air contaminants in the state of Texas through the TCAA, codified in Chapter 382 of the THSC. In regulating air quality, the TCEQ develops rules, including those in 30 TAC Chapters 116 and 106; additionally, TCEQ implements requirements of the FCAA and the federal regulations implementing the FCAA which are in Title 40 of the CFR through commission orders and rules, most of which are approved as part of the SIP.

Owners and operators of facilities must meet all applicable state rules and federal regulations to receive any state or federal air authorization. The applicant must address each of the air quality rules and regulations for applicability and explain the basis for expected compliance. If any particular rule or regulation is not applicable, the applicant must provide the basis for nonapplicability. Regardless of the type of facility for which authorization is sought, or any project that affects the construction and operation of facilities, the most stringent applicable rule should be applied during the review for air pollution control. For more information on TCAA applicability see [Appendix C](#).

The Texas SIP, which is federally enforceable, includes Texas’ NSR permitting programs for both major and minor sources, and these programs implement both the FCAA and the TCAA. EPA has approved or is routinely asked to approve most of the TCEQ’s air permitting rules. Once approved into the SIP, these become federally enforceable. Therefore, there are almost no “state only” permitting requirements.

Contaminants Subject to TCAA Control Analysis

By TCAA statute and TCEQ rule, all air contaminants released to the atmosphere trigger a pollution control evaluation. The term "air contaminant" is defined in the TCAA at § 382.003(2). The commission, through its rulemaking in 30 TAC § 101.1 defining “unauthorized emissions,” excludes several air contaminants. Therefore those contaminants are not subject to evaluation for controls. Applications for projects subject to air pollution control evaluations are those with new and modified facilities or sources of emissions of air contaminants. Under 30 TAC Chapter 116, all construction permits and amendments for facilities require the application of BACT. However, there are some exceptions to minor NSR pollution control analysis as follows:

- Renewals – During the review of an application for a permit renewal, the level of emission control cannot be relaxed and must be enforceable. If a condition of air pollution has been documented, additional control requirements may be necessary. If permits by rule (PBRs) are being incorporated into the permit (not merely referenced), then current BACT for the PBR sources must be met. This is because the permit, rather than the PBR, will become the authorization method for the facility. If an amendment is triggered, due to a change in the method of control of emissions; a change in the character of the emissions; or an increase in the emission rate of any air contaminant then all applicable amendment requirements, including BACT, must be met.

- Changes to Qualified Facilities/Senate Bill (SB) 1126 (74th Legislature, 1995). The EPA disapproved the TCEQ rules implementing SB 1126, on April 14, 2010 as revisions to the Texas NSR SIP (for more information on SB 1126 see [Appendix D](#)).

Section IV – Specific Control Evaluations

It is important to understand that individual facilities may be subject to different requirements depending on the contaminants and proposed emission rates of each facility. For example, one facility may be subject to nonattainment review for some contaminants, PSD review for other contaminants, and minor NSR for all other contaminants. In certain cases, both nonattainment and PSD reviews may be applicable.

In addition, the standards and regulations adopted by the EPA and the TCEQ are updated at different times. These varying update schedules may affect the requirements associated with other requirements in federal or state law. It is the responsibility of the applicant to demonstrate, and of the permit reviewer to independently confirm, that the most current standards and regulations are met.

BACT Review

The permit reviewer should always keep in mind that BACT for any particular industry is not static and is subject to change over time. BACT progresses as technology progresses or as process developments occur. Before accepting a BACT proposal, the permit reviewer should identify any new technical developments which may have led to new emission reduction option(s) that may not have been considered in past permit reviews for the same industry.

The permit reviewer must ensure that the administrative record provided by the applicant for the selected BACT is sound, comprehensive, and adequately supports the conclusions of the BACT review. Failure to consider all potentially applicable control alternatives constitutes an incomplete BACT analysis.

EPA Top-Down Method

EPA has developed a “top-down” process that permitting authorities can use to ensure that a BACT analysis satisfies the applicable legal criteria. While the TCEQ has followed a different approach ([Three Tier](#)), the end result from using either method should be the same. Since an applicant may choose to follow the federal top-down approach, permit reviewers should be familiar with the EPA approach. The EPA top-down BACT analysis consists of a five-step process as listed below:

- Step 1: Identify all control options
- Step 2: Eliminate technically infeasible options
- Step 3: Rank remaining control options
- Step 4: Eliminate control options based on evaluation of collateral impacts
- Step 5: Select BACT

For more detail on the EPA top-down BACT analyses see [Appendix E](#).

TCEQ Three-Tier Analysis ^[1]

The TCEQ uses a three-tiered approach to evaluate the BACT proposal in NSR air permit applications. The evaluation begins at the first tier and progresses in sequence to the second and third tiers only if necessary, as determined by the evaluation process described in the [step-by-step progression](#) later in this document.

In each tier, BACT is evaluated on a case-by-case basis for technical practicability and economic reasonableness. The three tiers are briefly described as follows:

- **Tier I.** In the first tier, an applicant's BACT proposal is compared to the emission reduction performance levels accepted as BACT in recent NSR permit reviews for the same process and/or industry, which can be identified by the principal company product or business, Standard Industrial Classification (SIC) Code and the North American Industry Classification System (NAICS) system code.

A Tier I BACT evaluation can be relatively straightforward in that the technical practicability and economic reasonableness of a particular emission reduction option may have already been demonstrated in prior reviews for the same process and/or industry. However, the BACT evaluation should also take into consideration any new technical developments, which may indicate that additional emission reductions are economically or technically reasonable.

The TCEQ has established Tier I BACT requirements for a number of industry types. This information can be accessed at the [TCEQ website](#). However, these BACT requirements are subject to change through TCEQ case-by-case evaluation procedures.

- **Tier II.** If BACT requirements have not already been established for a particular process/industry or if there are compelling technical differences between the applicant facility's process and others in the same industry, the evaluation of the BACT proposal will proceed into the second tier. A Tier II BACT evaluation involves a comparison of the applicant's BACT proposal to the emission reduction performance levels that have been accepted as BACT in recent permit reviews for similar air emission streams in a different process or industry type. This tier of BACT evaluation therefore involves the consideration of an emission reduction option(s) already in use in another industry type. As with Tier I evaluations, the economic reasonableness of a particular emission reduction option should already be established by prior permit reviews. However, in-depth technical analysis, such as emission stream comparisons, may be required to determine the technical practicability of an emission reduction option that is normally used in a different process or industry type.
- **Tier III.** A BACT evaluation should proceed to the third tier only if the first two tiers of evaluation have failed to identify an emission reduction option(s) that is technically practicable and economically reasonable. A Tier III BACT evaluation involves a detailed technical and quantitative economic analysis of all emission reduction options available for the process/industry under review. While technical practicability is established through the demonstrated success of an emission reduction option based on previous use and/or an engineering evaluation of a new technology, economic reasonableness is determined by the cost-effectiveness of controlling emissions (expressed as dollars per ton of pollutant reduced) and does not consider the effect of emission reduction costs on corporate economics. A Tier III evaluation is rarely necessary because technical practicability and economic reasonableness have usually been firmly established by industry practice as identified in the first two tiers. Due to its highly-complex and time-intensive nature, it is usually in the best interest of both the applicant and the TCEQ to avoid the third tier of BACT evaluation. Furthermore, the completion of such an evaluation is not likely to result in substantially different emission reduction options than what would otherwise be indicated by the first two tiers.

Other Considerations:

1. **Proposals beyond BACT:** An applicant may propose control(s) that are beyond accepted BACT (i.e., resulting in emission reductions that are higher than accepted BACT).
2. **Innovative Technology/Technological Advancement:** To allow for innovative technology and/or technological development, an applicant may propose control(s) that have not yet been proven. The evaluation of new technical developments may lead to the establishment of greater emission reduction performance levels to satisfy BACT requirements.
3. **Initial determination of compliance:** In either case, one or two above, the permit may contain a condition requiring an initial determination of compliance, including, but not limited to, testing to demonstrate that the control(s) perform as represented. If the control(s) do not attain the representations, the applicant may be required to seek a permit modification.

TCEQ Three-Tier Analysis BACT Determination Procedure

When applying for a new permit or a permit amendment, it is the applicant's responsibility to submit a complete BACT analysis for each pollutant from each facility subject to review. If the applicant is seeking permit authorization for planned MSS emissions, BACT must be proposed for these emission sources/activities as well. While BACT is required for permitted planned MSS operations, the level of control may be different from what is accepted as BACT for production operations and related activities at the facility.

The following step-by-step process outlines the preferred progression that should take place during an applicant's BACT analysis (see [Appendix F](#) for a three-tier BACT Analysis Checklist).

1. **Review the proposed emission reduction options.** The applicant should first identify and discuss the emission reduction option(s) chosen. Any of the following options or any combination, may be proposed to satisfy BACT requirements:
 - **Pollution Prevention.** As set forth in the TCEQ mission statement, the agency's goal is clean air with an emphasis on pollution prevention. Pollution prevention can consist of process control methods or process changes that eliminate emissions. Process controls/changes may also be proposed to simply reduce emissions or to create an emission stream that is more susceptible to control. Additionally, pollution prevention can often be easily used in conjunction with other emission reduction options as part of a BACT proposal. Pollution prevention can become an integral part of a facility's process and therefore should be considered a preferred emission reduction option, either on its own or in conjunction with another option, in an applicant's BACT proposal.
 - **Equipment Specification/Monitoring.** An applicant may specify certain equipment that inherently has lower emissions and/or propose equipment monitoring.
 - **Add-on Abatement Equipment.** Examples of add-on abatement equipment include, but are not limited to, scrubbers, oxidizers (thermal, regenerative, and catalytic), flares, baghouses, cyclones, electrostatic precipitators, vapor recovery units, and carbon adsorption systems. When comparing the technical feasibility and performance of

different types of add-on abatement equipment, there can be many issues to consider, such as emission stream characteristics, source type characteristics, and pollutants of concern. Add-on abatement equipment may also pose other concerns to consider, such as the generation of additional emissions or the transfer of air contaminants to water or some other medium.

- **Good Engineering Practice (GEP)/Best Management Practice (BMP).** GEP is effective design and efficient operation of equipment to minimize emissions. BMP is an operating practice(s) or procedure(s) that minimize(s) emissions. In some cases, GEP and BMP may be used in conjunction with other emission reduction options or may be sufficient on their own to satisfy BACT requirements.

If the applicant has not identified an emission reduction option and/or has not included a detailed description of the equipment/method used for emissions reduction, the BACT analysis is incomplete and the application is considered deficient.

2. **Review the proposed BACT performance elements.** While the applicant is free to choose among the previously stated emission reduction options to satisfy BACT requirements, the final determination of the acceptability of any BACT proposal is based on the proposal's overall ability to reduce or eliminate emissions from the facility on a consistent basis. For any proposed emission reduction option(s), the permit reviewer must evaluate the following elements of performance:

- **Capture Efficiency.** Regardless of the control device's efficiency rating, emissions cannot be reduced unless they are first captured, processed, and routed through the control device. Capture efficiency is the percentage of uncontrolled emissions captured by a control device. Specific design or performance standards for the capture system may be used to demonstrate capture efficiency (e.g. American Conference of Governmental Industrial Hygienists' (ACGIH) Industrial Ventilation: A Manual of Recommended Practice.) Testing may be required to demonstrate the actual capture efficiency.

NOTE that, capture efficiency may vary based on several parameters (air flow rates, the amount of enclosure of the source, temperature, production throughput, inlet/outlet grain-loading, varying operating conditions, etc).

- **Emission Reduction Efficiency or Resulting Emission Level.** Emission reduction efficiencies may be expressed in terms of percentage for some types of control devices. Depending on the industry and/or situation, resulting emission levels may be expressed in terms such as pound (lb) pollutant/ton product, lb VOC/gallon, lb pollutant/Million British thermal units (MMBtu), or outlet grain loading in units of grain per standard cubic foot (gr/scf) of exhaust. The permit reviewer should ensure that the proposed emission reduction efficiency or resulting emission level is consistent with what has been accepted as BACT in recent permit reviews and what would be expected from a properly designed and operating system. Testing may be required to demonstrate the actual efficiency/emission level.
- **Reliability.** The reliability of an emission reduction option must be evaluated to ensure that the represented emissions reduction will occur continuously throughout the entire range of the facility's normal operating conditions. The performance of an emission reduction option over this entire range of conditions can be dependent on key

operating parameters, such as temperature and flow rate, being maintained at certain levels. To ensure that these key parameters are maintained at levels that provide ongoing control effectiveness, the permit reviewer must evaluate operation and maintenance plans and/or parameter monitoring procedures. If there is concern that the represented performance will not be achieved over the entire operating range or if there are a large number of parameters that may affect performance, continuous emissions monitoring or periodic testing may be appropriate.

- **On-stream Time.** The goal of the proposed emission reduction option is to have it on-stream 100 percent of the time or to have a backup emission reduction option that must be reviewed and approved before the permit is issued. Backup or installed spare control devices are always encouraged, especially if the uncontrolled stream is large. Any backup or spare control devices must meet established BACT performance levels for the specific type of control device. If backup or spare control devices are not feasible, methods to minimize downtime and corrective action plans must be proposed. The applicant must also address the disposition of emissions during control system downtime, even if the proposed downtime is low.
 - The TCEQ recognizes that BACT may be different for normal production than it is for MSS. In such cases, BACT must be proposed and evaluated for operating under both normal production and planned MSS scenarios.

- **Enforceability.** To ensure enforceability, the proposed BACT performance demonstration method(s) must be evaluated. The agreed-upon performance demonstration method(s), as well as representations relied upon and assumptions made for all emission limits, should be included in a permit condition(s) to ensure that BACT performance levels will be achieved on an ongoing basis. Performance demonstration methods can include recordkeeping, testing, and/or monitoring.
 - **Recordkeeping.** In some cases, maintaining records of key operating parameters, including material throughput, may be a sufficient performance demonstration method. The recordkeeping frequency should be appropriately selected to ensure enforceability and be well-defined in a permit condition. In other cases, recordkeeping alone may not be adequate as a performance demonstration method. Testing and/or monitoring may also be required.
 - **Testing/Monitoring.** Testing or monitoring may be a direct emission measurement or a direct measurement of key operating parameters, such as temperature or pressure drop. The factors affecting the performance demonstration method chosen and the frequency of demonstration considered acceptable for a specific emission reduction proposal include, but are not limited to, the compliance margin (how close to the BACT performance level an emission unit is expected to operate); the number of parameters that affect the emission rate; the variability, toxicity, and quantity of expected emissions; and the reliability of the emission estimate.

Periodic monitoring (PM) and Compliance Assurance Monitoring (CAM) requirements may be included in the permit to demonstrate compliance (these requirements must be in the permit for all major emission sources). These monitoring requirements are a means by which the TCEQ can ensure that a control device is performing as the company represented and is achieving compliance with the applicable standards. For additional guidance see Air Permit Reviewer Reference Guides: 1) [Periodic Monitoring](#) and 2) [Compliance Assurance Monitoring](#). PM and CAM are two methods that are typically used to demonstrate compliance, but they are not the only methods available for demonstration of compliance.

If the applicant has not included a discussion of the proposed level of performance for the emission reduction option(s) chosen, as well as the necessary supporting documentation for the represented performance elements, the application is considered deficient.

3. **Complete a Tier I analysis for the BACT proposal.** After considering the five performance elements elaborated on in the previous step, the overall emission reduction performance level of a BACT proposal must be compared to the emission reduction performance levels that have been previously accepted as BACT in recent reviews for the same industry (this information can be accessed at the [TCEQ website](#)). With five performance elements, a comparison of overall performance is done in a qualitative and quantitative manner. For individual elements, there will be some situations where one or more of the proposed levels of performance vary (higher or lower) from those previously proposed and accepted as BACT. However, the overall emission reduction performance level should be evaluated based on the overall ability of the proposal to reduce or eliminate emissions from the facility.

BACT proposals are approved on a case-by-case basis. While a specific BACT proposal may be different than those accepted as BACT in recent permit reviews, the proposal must have an overall emission reduction performance that is at least equivalent to those previously accepted as BACT. To determine the acceptability of a BACT proposal, it may be necessary to review recent permit applications for similar facilities within the same industry and/or consult with APD peers and/or management. There may also be some cases when the overall emission reduction performance level of a BACT proposal is less than those accepted as BACT in recent permit reviews, but the applicant has demonstrated compelling technical differences between their process and others within the same industry. In such cases, a Tier II BACT analysis may be required.

The permit reviewer should also keep in mind that BACT for any particular industry is not static and is subject to change over time. BACT progresses as technology progresses or as process developments occur. Before accepting a BACT proposal, the permit reviewer should try to identify any technological developments which have led to new emission reduction options that may not have been considered in past permit reviews for the same industry.

If no such emission reduction options are identified and the overall emission reduction performance level of the BACT proposal is at least equivalent to what has been accepted in recent permit reviews for the same industry, the BACT proposal should be accepted as satisfying BACT requirements.

If any new or previously unconsidered emission reduction options are identified, the permit reviewer should discuss the situation with APD management before proceeding.

Generally, the emission reduction option(s) should have been successfully demonstrated in Texas and the United States. However, there may be cases when the applicant may be asked to consider options that are used outside of Texas, the United States, or that have not yet been successfully demonstrated. Determination of these cases will depend on factors such as the number of plants in Texas for the same industry, the number of plants in the United States for the same industry, the quantity of emissions, the emission reduction options considered, and the length of time since the last permit review. The emission reduction option(s) may have been successfully demonstrated for the same industry or different industries with similar emission streams (characteristics of “similar” emission streams are discussed in Step 4).

If any new or previously unconsidered emission reduction options have been identified during the permit review, the permit reviewer should instruct the applicant to perform a detailed technical and economic analysis of the identified option(s). This request is to be made only under APD management direction. The procedures used in this type of analysis are the same as those used in a [Tier III BACT analysis](#). If the analysis demonstrates that the identified emission reduction option(s) is technically practicable and economically reasonable, the applicant must propose an overall emission reduction performance level that is at least equivalent to that of the newly identified option(s).

4. **Complete a Tier II analysis, if necessary, for the BACT proposal.** If the overall emission reduction performance level of an applicant’s BACT proposal is less than those accepted as BACT in recent permit reviews, but the applicant has demonstrated compelling technical differences between their process and others within the same industry, a Tier II BACT analysis is required. A Tier II BACT analysis may also be required in cases when BACT has yet to be established for a particular industry.

Compelling technical differences are those that may prevent the overall emission reduction performance level accepted as BACT in recent permit reviews from being achieved. Additionally, compelling technical differences may also cause the emission reduction option(s) to cost much more than those used in recent permit reviews for the same industry. Technical differences may include variations in process, product, or physical configuration. The permit reviewer should request that the applicant provide a detailed description of any compelling technical differences with supporting documentation. The permit reviewer may need to consult with APD peers and/or management to determine whether the technical differences justify a lower overall emission reduction performance level.

If it is determined that there are compelling technical differences between an applicant’s process and others within the same industry, the overall emission reduction performance level of the applicant’s BACT proposal should then be compared to those accepted as BACT in recent permit reviews for other process/industry types with similar emission streams (characteristics of “similar” streams are discussed in the previous section).

Emission streams are considered “similar” if stream characteristics are similar. Stream characteristics may include air pollutant type(s), air pollutant concentrations, stream temperature, stream flow rate or moisture content. Stream characteristics do not have to be identical, only similar. Only key stream characteristics need to be similar to compare the subject plant with other plants. Stream characteristics are considered key when they directly affect the emission reduction option’s ability to achieve higher performance.

As with a Tier I BACT analysis, the permit reviewer should also try to identify any new emission reduction options that were not considered in recent permit reviews.

If no such emission reduction options are identified and the overall emission reduction performance level of the BACT proposal is at least equivalent to what has been accepted in recent permit reviews for process/industry types with similar air emission streams, the BACT proposal should be accepted as satisfying BACT requirements.

If any new or previously unconsidered emission reduction options are identified, the emission reduction option(s) will need to be evaluated in the manner discussed in the previous section. If the analysis demonstrates that the identified emission reduction option(s) is technically practicable and economically reasonable, the applicant must propose an overall emission reduction performance level that is at least equivalent to that of the newly identified option(s).

5. **Complete a Tier III analysis, if necessary, for the BACT proposal.** There may be some cases when an applicant demonstrates that there are no process/industry types with similar emission streams. Additionally, there may be some cases when an applicant’s BACT proposal cannot achieve an emission reduction performance level that is at least equivalent to those accepted as BACT in recent permit reviews for process/industry types with similar emission streams due to compelling technical differences between the applicant’s process and others. In these cases, a Tier III BACT analysis is required.

As previously discussed, a Tier III evaluation is rarely necessary because technical practicability and economic reasonableness have usually been firmly established by industry practice as identified in the first two tiers. Due to its highly-complex and time-intensive nature, it is usually in the best interest of both the applicant and the TCEQ to avoid the third tier of BACT evaluation.

The completion of a Tier III BACT analysis will result in the applicant choosing an emission reduction option(s) that is technically practicable and economically reasonable.

In order to complete a Tier III evaluation, the applicant must provide a detailed technical and economic analysis, which should accomplish the following tasks:

1. Identify all emission reduction options.
2. Eliminate technically infeasible options.
3. Rank remaining emission reduction options in terms of total emissions reduced.
4. Perform quantitative cost analysis to determine the cost-effectiveness (dollars per ton of pollutant reduced) of each emission reduction option.
5. Select BACT based on cost-effectiveness and performance.

Additional guidance for completing a Tier III evaluation is located in [Appendix G](#).

BACT and Impacts Evaluation

Once an applicant's BACT proposal has been accepted as satisfying BACT requirements, the impacts evaluation for the proposed facility begins. An off-property impacts evaluation is required for all NSR projects involving BACT. To determine ambient air impacts, the TCEQ may require air dispersion modeling. This modeling should consider all emissions from the proposed facility, including both point and fugitive sources. Depending on the projected impacts from the project, site wide emissions may need to be modeled as well. Applicants are advised not to conduct any air dispersion modeling without first meeting with the TCEQ Air Dispersion Modeling Team and the permitting staff to outline the modeling requirements for the proposed project.

The acceptability of the impacts evaluation is determined by comparing the air dispersion modeling predicted emission concentrations from the proposed facility to appropriate state and federal standards, de minimis levels, or health effects guidance levels. The specific standards or guidance levels employed in evaluating the potential emissions include the NAAQS, TCEQ standards contained in 30 TAC, and [TCEQ Effects Screening Levels](#) (ESLs).

Ambient air impacts are not considered during the initial evaluation of an applicant's BACT proposal. However, based on the results of the impacts evaluation the applicant may be required to implement a level of control greater than what was previously agreed upon in the BACT evaluation or lower the proposed emissions if a modeled emission concentration exceeds any applicable standard or ESL.

Prevention of Significant Deterioration (PSD) and BACT

PSD permitting applies to new major sources and major modifications of existing major sources in attainment areas and requires the application of BACT. For additional information on PSD see [Appendix H](#).

BACT is based on the maximum degree of emission reduction (considering energy, environmental, and economic impacts) achievable through application of production processes and available methods, systems, and techniques.

As previously discussed in this document, the TCEQ uses a [three-tier approach](#) to evaluate the BACT proposal in minor NSR air permit applications. EPA has agreed to accept the three-tier approach as equivalent to the top-down method for PSD review when the following are considered:

- Recently issued/approved permits within the state of Texas;
- Recently issued/approved permits in other states; and
- Control technologies contained within the EPA's [RBLC](#).

It is necessary for the applicant to provide detailed information concerning any comparison or reasoning as to why one technology was chosen over another. This is especially true in cases where other "more stringent" technologies have been used at other locations in the past. It is not a sufficient argument for an applicant to state that a current project represents BACT simply because the previous project, at the same facility and/or a similar facility at the site, was recently approved as BACT with the proposed controls. It is important to ensure that any control technology advancements are considered in the control technology review (the reviewer should be aware that these advancements can happen at any time).

PSD/BACT Determination Procedure

1. The BACT requirement applies to each individual new or modified affected facility and pollutant emitting activity at which a significant net emissions increase would occur. Individual BACT determinations are performed for each pollutant subject to a PSD review emitted from the same facility. Consequently, the BACT determination must separately address, for each regulated pollutant with a significant emissions increase at the source, air pollution controls for each emissions unit or pollutant emitting activity subject to review.
2. The applicant must provide information on the various control options and, when a less stringent control option is proposed, provide a detailed rationale and supporting documentation for eliminating the more stringent options. It is the responsibility of the permit reviewer to evaluate the documentation and rationale provided by the applicant.
3. The permit reviewer must also ensure that the applicant has addressed all of the most effective control options that could be applied, and
 - a. determine that the applicant has adequately demonstrated that energy, environmental, or economic impacts justify any proposal to eliminate the more effective control options;
 - b. where the TCEQ does not accept the basis for the proposed elimination of a control option, inform the applicant of the need for more information regarding the control option. However, the BACT selection essentially should default to the highest level of control for which the applicant could not adequately justify its elimination based on energy, environmental, and economic impacts; and
 - c. prepare a draft permit based on the most effective control option for which an adequate justification for rejection was not provided.
4. To complete the BACT process, the permit reviewer must establish an enforceable emission limit for each subject emission unit at the source and for each pollutant subject to review that is emitted from the source. If technological or economic limitations in the application of a measurement methodology to a particular emission unit would make an emissions limit infeasible, a design, equipment, work practice, operation standard or combination thereof, may be prescribed. Also, the technology upon which the BACT emissions limit is based should be specified in the permit. These requirements should be written in the permit so that they are specific to the individual emission unit(s) subject to PSD review.

The emissions limits must be included in the proposed permit submitted for public comment (second notice), as well as the final permit. BACT emission limits or conditions must be met on a continual basis at all levels of operation (limits written in pounds/MMbtu or percent reduction achieved), demonstrate protection of short-term ambient standards (emission limits written in pounds/hour), and be enforceable as a practical matter (contain appropriate averaging times, compliance verification procedures and recordkeeping requirements). Consequently, the permit must:

- a. require a demonstration of compliance or noncompliance (i.e., through monitoring times of operation, fuel input or other indices of operating conditions, and practices); and
- b. specify a reasonable averaging time consistent with established reference methods, contain reference methods for determining compliance and provide for adequate

reporting and recordkeeping so that the TCEQ can determine the compliance status of the source.

Once the permit is drafted and the final package is being prepared for management review and final approval, the permit reviewer must complete specific documentation and include this in the final package. The documents and other information that must be completed are addressed in the section of this document that discusses the [final package](#).

Nonattainment and Lowest Achievable Emission Rate (LAER)

New major sources and major modifications of existing major sources in a designated nonattainment area are required to go through Nonattainment NSR. Nonattainment reviews apply in areas that are not in compliance with a NAAQS. For additional information on nonattainment and LAER see [Appendix I](#).

The Permit Review

Nonattainment permits must include LAER, as opposed to BACT. LAER is usually more stringent than BACT. For new major sources and major modifications in nonattainment areas, LAER is the most stringent emission limitation derived from either of the following:

- The most stringent emission limitation contained in the implementation plan of any state for such class or category of source; or
- The most stringent emission limitation achieved in practice by such class or category of source.

The most stringent emissions limitation contained in a SIP for a class or category of source must be considered LAER, unless

- A more stringent emissions limitation has been achieved in practice; or
- The SIP limitation is demonstrated by the applicant to be unachievable.

NOTE: LAER cannot be less stringent than any applicable NSPS or part 61 or part 63 NESHAP.

There is, of course, a range of certainty in such a definition. The greatest certainty for a proposed LAER limit exists when that limit is actually being achieved by a source. However, limitations in the Texas SIP, such as in rules (e.g., Chapters 115 and 117) or in agreed orders, even if not yet applied to a source, should be carefully considered before the LAER control technology is determined. That is because those limitations were developed through a prescribed process, and were determined to be achievable. A SIP limit's credibility diminishes if:

1. No sources exist to which it applies;
2. It is generally acknowledged that sources are unable to comply with the limit and the state is in the process of changing the limit; or
3. The state has relaxed the original SIP limit. Case-by-case evaluations need to be made in these situations to determine the SIP limit's achievability.

The same logic applies to SIP limits to which sources are subject but with which they are not in compliance. Noncompliance by a source with a SIP limit, even if it is the only source subject to that specific limit, does not automatically constitute a demonstration that the limit is unachievable. The specific reasons for noncompliance must be determined and the ability of the source to comply assessed. However, such noncompliance may prove to be an indication the limit cannot be achieved, so the achievability of such a SIP limitation should be carefully studied before it is used as the basis of a LAER

determination. Some recommended sources of information for permit reviewers for determining LAER are:

- SIP limits for that particular class or category of sources;
- Preconstruction or operating permits issued in other nonattainment areas; and
- The RBLC.

Nonattainment/LAER Determination Procedure

1. The LAER review takes technical feasibility into account, but not economic reasonableness, which is considered in a BACT analysis. The [RBLC](#) contains case-specific information on the “Best Available” air pollution technologies that have been required to reduce the emission of air pollutants from stationary sources (e.g., power plants, steel mills, chemical plants, etc.). This information has been provided by state and local permitting agencies. The Clearinghouse also contains a regulation data base that summarizes EPA emission limits required in NSPS, NESHAP, and MACT standards.

Several technological considerations are involved in selecting LAER. The LAER is an emission rate specific to each emissions unit, including fugitive emission sources. The emission rate may result from a combination of emission-limiting measures such as:

- A change in the raw material processed,
- A process modification, and
- Add-on controls.

A single control measure may be appropriate for LAER or a combination of emission-limiting techniques may be considered.

The permit reviewer can also require consideration of technology transfer. There are two types of potentially transferable control technologies: (1) gas stream controls and (2) process controls and modifications. For the first type of transfer, classes or categories of sources to consider are those producing similar gas streams that could be controlled by the same or similar technology. For the second type of transfer, process similarity governs the decision.

2. Unlike BACT, the LAER requirement does not consider economic, energy, or other environmental factors. A LAER is not considered achievable if the cost of control is so great that a major new source could not be built or operated. If some other plant in the same (or comparable) industry uses that control technology, then such use constitutes evidence that the cost to the industry of that control is not prohibitive. Thus, for a new source, LAER costs are considered only to the degree that they reflect unusual circumstances, which in some manner differentiate the cost of control for that source from control costs for the rest of the industry.

Once the permit is drafted and the final package is being prepared for management review and final approval, the permit reviewer must complete specific documentation and include this in the final package. The documents and other information that must be completed are addressed in the section of this document that discusses the [final package](#).

Triggering PSD and Nonattainment for Same Pollutant

It is possible to trigger both PSD and nonattainment reviews at the same time for NO_x. This can occur because not only is NO_x regulated as an ozone precursor, but it also has its own NO₂ NAAQS.

If PSD and nonattainment are triggered, the most stringent control (LAER) must be evaluated and considered first. While the application of LAER at one source does not necessarily dictate BACT for a particular industry, over time, it typically becomes harder for the industry to claim that the LAER used for the source that triggered both PSD and nonattainment cannot be used for the same/similar industries regardless of the attainment status of their locations. This is due to the fact that the [RBLC](#) must be checked for both PSD and nonattainment review and the original LAER control used will be in the Clearinghouse.

MACT

MACT refers to the control of HAPs and is defined in 40 CFR § 63.41 as “the emission limitation which is not less stringent than the emission limitation achieved in practice by the best controlled similar source and which reflects the maximum degree of reduction in emissions that the permitting authority, taking into consideration the cost of achieving such emission reduction and any non-air quality health and environmental impacts and energy requirements, determines is achievable by the constructed or reconstructed major source.”

For major sources of HAPs, if a MACT standard has not been promulgated by EPA or has been vacated by the courts, under FCAA § 112(g), that state permitting authority must conduct a case-by-case review and determine MACT. The permit reviewer must check to see if a major source is being constructed or reconstructed under 112(g). Either of the following activities constitutes construction of a major source under 112(g):

- To fabricate, erect or install at any greenfield site a stationary source or group of stationary sources, which is located within a contiguous area and under common control and which emits or has the potential to emit ten tpy of any HAP or 25 tpy of any combination of HAPs.
- To fabricate, erect or install at any developed site a new process or production unit which, in and of itself, emits or has the potential to emit ten tpy of any HAP or 25 tons per year of any combination of HAPs.

Permit reviewers must ensure that each application requiring a case-by-case MACT determination concerning construction or reconstruction of a major source addresses the following:

- The analysis must be specific to the process or production unit with respect to the HAP emitted.
- The analysis must evaluate all control technology options with appropriate emission limitations, which have been achieved in practice by the best controlled similar source. Control technology options that may be transferable from a similar source should be included when appropriate. A source is considered similar if:
 - it has similar emission types and can be controlled with the same type of control technology; and
 - it uses similar raw materials in a similar manner such that the same work practice or pollution prevention techniques can be used to reduce emissions.

MACT Determination Procedure

Once all necessary information is received from the applicant, the following guidelines should be used by the permit reviewer to make a MACT determination:

1. Pollutant Applicability - MACT applies to the proposed source emitting HAP and considers all HAP emissions. While it is not required that each HAP emitted be considered independently, different forms of emissions should be considered separately. For example, for a proposed source that will emit both particulate and gaseous HAPs, both particulate and gaseous emissions controls should be considered as part of the MACT determination.
2. Process/Production Unit Applicability - Section 112(g) applies to any collection of structures and/or equipment that processes, assembles, applies or otherwise uses material inputs to produce an intermediate or final product. All potential process or production units and emission points, including fugitive units should be identified. Emission sources are typically classified as process vent or stack discharges, equipment leaks, evaporation and breathing losses, transfer losses, and operational losses. These emission source types should be used as a guide in identifying available control options while considering the concentration and type of constituents of an exhaust stream.
3. Identification of Available MACT -
 - a. Controls include any pollution prevention strategy that effectively limits emissions and is federally enforceable. All available control technology options, including transferable and innovative control technologies when appropriate, should be identified. Control technologies include process changes; substitution of materials or other modifications; collecting, capturing or treating pollutants; or other techniques to reduce the quantity of or eliminate emissions of HAPs. Alternative processes that inherently produce less pollution and various configurations of the same technology that achieve different control efficiencies should also be reviewed. The following information sources should be investigated to ensure that all possible control technology options have been identified:
 - 1) Relevant proposed regulation, including all supporting information.
 - 2) Background information documents for a draft or proposed regulation.
 - 3) Data and information available from the EPA Control Technology Center developed pursuant to § 112 of the FCAA.
 - 4) Data and information contained in the EPA Aerometric Informational Retrieval System (AIRS), including information in the MACT database.
 - 5) Additional information considered available by the TCEQ, which includes the following:
 - a) RBLC
 - b) Technical literature
 - c) Industrial publications
 - d) EPA, state, or local air pollution control agency surveys
 - b. All possible control technology options should be ranked in descending order based on the most stringent emission limitation achieved in practice by the best controlled similar source.

4. Evaluation of MACT - MACT cannot be less stringent than the emission limitation which is achieved in practice by the best controlled similar source, unless it has been demonstrated that the emission limitation is not feasible. Any non-air quality health and environmental impacts and energy requirements should be identified. If the control technology that achieves the maximum degree of HAP emission reduction is not feasible because of costs, non-air quality health and environmental impacts and energy requirements, permit reviewers should continue evaluating the next most efficient control technologies. The following are examples when energy, economic or environmental impacts may make a limitation not feasible:
 - a. Energy - Natural gas for operating a device is not available based on local regulations or because no gas service is available in the area.
 - b. Economic -
 - 1) The increased cost of the final product (i.e., automobile, cement, coke, etc.) would increase to a level that the project would no longer be feasible. This demonstration requires that the owner or operator of the facility submit financial information to verify this claim.
 - 2) The increased and/or incremental cost is out of proportion to the environmental benefit. 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 performed. This analysis is similar to a Tier III BACT evaluation.
 - 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 MACT emission limits should be established with a reasonable margin of safety and should be based on an appropriate averaging time. Additional requirements such as stack testing, continuous emissions monitoring, recordkeeping, and reporting requirements that make the emission limitations enforceable should also be established based on other MACTs, CAM, and Periodic Monitoring requirements, and/or recent permit requirements for similar sources.

5. Alternative Options - An applicant may recommend a specific design, equipment, work practice, operational standard, or a combination thereof as the MACT determination. Such a standard may be approved if the TCEQ specifically determines that it is not feasible to prescribe or enforce an emission limitation under the criteria set forth in § 112(h)(2) of the FCAA.
6. Selection of MACT - MACT is the most effective emission limitation, work practice and/or operation standard that has not been eliminated in Steps 4 or 5 listed above.

Once the permit is drafted and the final package is being prepared for management review and final approval, the permit reviewer must complete specific documentation and include this in the final package. The documents and other information that must be completed are addressed in the section of this document that discusses the [final package](#).

NOTE: Completing a MACT evaluation and determination satisfies federal requirements under § 112(g); however, requirements for BACT under 30 TAC Chapter 116 must also be met.

Section V – The Final Package

Pollution control determinations are one of the most critical elements in the permitting process. These determinations must be well documented in the project record. All decisions made during the review of the applicant's project proposal must be adequately explained and justified in the final package. The applicability of and basis of compliance with the following should be addressed in all agency documentation:

- BACT LAER
- RACT
- MACT (including case-by-case reviews as required by § 112(g) or (j))
- GACT

Agency Documentation

When conducting a project review, controls must be addressed in the following agency documents that are included in the final approval package submitted to the division director; these documents become part of the public record:

1. Source Analysis and Technical Review
2. Preliminary Determination Summary (PDS)**
3. Technical Briefing Sheet**
4. Response to Comment (if applicable)

** Only required for PSD, nonattainment, Plantwide Applicability Limit (PAL), and § 112(g) application reviews

The emission control discussion contained in the Source Analysis and Technical Review, PDS, Technical Briefing Sheet, and any Response to Comment documentation must contain an explanation of both how the applicant's proposed controls meet all BACT criteria and how the proposed controls were evaluated. For projects that trigger major NSR, all required documentation must include the comparison against technologies contained in the [RBLC](#) and in recently issued/approved permits within the state of Texas and in other states, as applicable.

TCEQ's BACT analysis for each PSD permit application must detail how TCEQ arrived at its BACT decision and be included in the PDS document prepared by TCEQ permit reviewers, and it should include the technical and economic analyses. The TCEQ's public participation rules require that the PDS, together with the air quality analysis and draft permit, be available for public review and comment as part of the Notice of Preliminary Decision.

The controls discussion in these documents is reviewed by APD's management and is also considered by the EPA when it conducts its reviews of Texas' proposed permits. The controls discussion also helps the TCEQ show that the agency is conducting its reviews of major NSR applications in accordance with Performance Partnership Grant (PPG) Agreements.

RACT/BACT/LAER Clearinghouse (RBLC) Entry for the Final Package

The following types of projects require entry into the [RBLC](#):

- Initial issuances of “new” PSD and/or nonattainment permits.
- Major modifications to existing PSD and/or nonattainment permits.
- Issuances of, or modifications to, § 112(g) permits.
- Projects with significant changes in BACT, even though the project may have netted out of major NSR. **IMPORTANT:** If a permit reviewer thinks a project fits into this category, the project should be discussed with the section manager before being added to the [RBLC](#).

Once the technical review is completed for a permit triggering major NSR, the permit reviewer must:

1. Fill out the RBLC Entry form (including processing time frames, as required by the RBLC)
2. Include the completed RBLC document in the final approval package to the team leader/section manager, and check the “RBLC Box” on the route slip attached to the final approval package folder;
3. E-mail the RBLC section representative/back-up the completed and approved RBLC electronic file; and
4. Complete the appropriate tracking elements to allow the project to close after the Division Director has approved the final permit package

Detailed guidance on how to complete the RBLC entry is available in the division’s [RBLC Data Entry document](#). Any questions concerning updating of the RBLC should be directed to the permit reviewer’s section RBLC representative. Section representatives can be found on the [Subject Matter Experts list](#). See the contacts listed under the Subject Matter Heading, RBLC Representative, lead or RBLC Representative, backup ^[2].

Section VI – Appendices

Appendix A - Important Terminology

While the TCAA, FCAA, and CFR may refer to identical terms, permit reviewers must understand how the terms are defined and used in the air permitting process. This understanding is particularly important for owners and operators of sites that need different permit authorizations to comply with all statutory or regulatory requirements. The following basic definitions or terms are used in this document. A **(T)** indicates the definition or term is in a Texas statute or rule; an **(F)** indicates the definition or term is in a federal statute or regulation.

Air Contaminant or Contaminant (T): particulate matter (PM), radioactive material, dust, fumes, gas, mist, smoke, vapor, or odor, including any combination of those items, produced by processes other than natural. Ref: TCAA § 382.003.

Air Pollution or Pollution (T): the presence in the atmosphere of one or more air contaminants or combination of air contaminants in such concentration and of such duration that: (A) are or may tend to be injurious to or to adversely affect human health or welfare, animal life, vegetation or property; or (B) interfere with the normal use or enjoyment of animal life, vegetation or property. Ref: TCAA § 382.003.

Area Source (F): any stationary source of hazardous air pollutants that is not a major source. FCAA § 112(a)(2).

Best Available Control Technology or BACT (F): The term “best available control technology” means an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this Act emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each such pollutant. In no event shall application of “best available control technology” result in emissions of any pollutants which will exceed the emissions allowed by any applicable standard established pursuant to section 111 or 112 of this Act. Emissions from any source utilizing clean fuels, or any other means, to comply with this paragraph shall not be allowed to increase above levels that would have been required under this paragraph, as it existed prior to enactment of the Clean Air Act Amendments of 1990. Ref: FCAA § 169(3).

Best Available Control Technology or BACT (T): An air pollution control method for a new or modified facility that through experience and research, has proven to be operational, obtainable, and capable of reducing or eliminating emissions from the facility, and is considered technically practical and economically reasonable for the facility. The emissions reduction can be achieved through technology such as the use of add-on control equipment or by enforceable changes in production processes, systems, methods, or work practice. Ref. 30 TAC§ 116.10.

Best Demonstrated Technology or BDT (F): refers to the best system of continuous emissions reduction that has been demonstrated to work in a given industry, considering economic costs and other factors, such as energy use. EPA considers BDT as synonymous with the phrase “standard of performance” meaning a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any non air quality health and environmental impact and energy requirements) the EPA Administrator determines has been adequately demonstrated. Ref. FCAA § 111(a)(1).

Building, Structure, Facility or Installation (F): This phrase is used in the definition of stationary source and EPA collectively interprets the phrase to mean all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties and are under the control of the same person (or persons under common control). Pollutant-emitting activities shall be considered as part of the same industrial grouping.

NOTE: The FCAA does not define “facility,” but the TCAA does. This discrepancy may cause a difference in interpretation of the term. Ref: 40 CFR § 51.165 (a)(1)(ii).

Construction (F): the on-site fabrication, erection, or installation of an affected source. Construction does not include the removal of all equipment comprising an affected source from an existing location and reinstallation of such equipment at a new location. The owner or operator of an existing affected source that is relocated may elect not to reinstall minor ancillary equipment including, but not limited to, piping, ductwork, and valves. However, removal and reinstallation of an affected source will be construed as reconstruction if it satisfies the criteria for reconstruction as defined in this section. The costs of replacing minor ancillary equipment must be considered in determining whether the existing affected source is reconstructed. Ref. 40 CFR § 60.2 and 40 CFR § 63.2.

Emissions Unit (F): Any part of a stationary source that emits or would have the potential to emit any regulated NSR pollutant or any pollutant listed under section 112(b) of the FCAA. Ref: 40 CFR § 51.166(b)(7)

NOTE: TCEQ equates the federal term “emission unit” with the state term “facility.” The state term is at least as stringent as the federal term. Ref.: THSC § 382.003(6).

Facility (T) - A “facility” is a discrete or identifiable structure, device, item, equipment or enclosure that constitutes or contains a stationary source, including appurtenances other than emission control equipment. A mine, quarry, well test or road is not considered to be a facility. Facility is a unique term in air permitting under Texas law. New or modified facilities must obtain permits that apply best available control technology, considering the technical practicability and economic reasonableness of reducing or eliminating the emissions resulting from the facility, and do not adversely affect public health and welfare. A “facility” is subject to Major and Minor NSR requirements, depending on the facts of the specific application.

NOTE: TCEQ equates the federal term “emission unit” with the state term “facility.” The state term is at least as stringent as the federal term. Ref.: THSC § 382.003(6).

Federal Source (T): A “facility, group of facilities, or other source” and refers to definitions in various titles of the FCAA and sections of the United States Code (e.g. shares the same two digit SIC code or other identification type).

NOTE: the terms “facility, source, and federal source” are state terms.
Ref.: [THSC § 382.003\(7\)](#).

Fugitive Emission (T): Any gaseous or particulate contaminant entering the atmosphere that could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening designed to direct or control its flow. Ref. 30 TAC § 101.1

Generally Available Control Technology or GACT (F): Alternative standard for area sources, with respect only to categories and subcategories of area sources listed pursuant to subsection (c) of the FCAA, the Administrator may, in lieu of the authorities provided in paragraph (2) and subsection (f) of the FCAA, elect to promulgate standards or requirements applicable to sources in such categories or subcategories which provide for the use of generally available control technologies or management practices by such sources to reduce emissions of hazardous air pollutants. Ref. FCAA § 112(d)(5).

Lowest Achievable Emission Rate or LAER (F), (T): The term means, for any source, the more stringent rate of emissions based on the most stringent emissions limitation contained in the SIP for such class or category of stationary source or modified emissions units, unless the owner or operator of the proposed stationary source demonstrates that the limits are not achievable; or the most stringent emissions limitation achieved in practice by such class or category of stationary sources or modified emissions units. In no event can a proposed new or modified stationary source emit any pollutant in excess of the amount allowable under an applicable new source standard of performance. Ref: FCAA § 171(3), 40 CFR § 51.165(a)(1) and § 52.21(b)(53), 30 TAC § 116.12(15).

Major Modification (F): A “major modification” is any physical change in or change in the method of operation of a major stationary source that would result in an increase of emissions of a regulated NSR pollutant equal to or above specified “significance levels.” A major modification of an existing federal permit is similar to an amendment to a minor source permit. Ref: 40 CFR § 51.165 (a)(1)(v)(a).

Major Modification (T): Any physical change in or change in the method of operation of a major stationary source that causes a significant project emissions increase and a significant net emissions increase for any federally regulated NSR pollutant. At a stationary source that is not major prior to the increase, the increase by itself must equal or exceed that specified for a major source. At an existing major stationary source, the increase must equal or exceed that specified for a major modification to be significant. The major source and significant thresholds are provided in [Table I of 30 TAC § 116.12](#) for nonattainment pollutants. The major source and significant thresholds for prevention of significant deterioration pollutants are identified in 40 Code of Federal Regulations § 51.166(b)(1) and (23), respectively. Ref: 30 TAC § 116.12(18).

Major Stationary Source (F): A “major stationary source” (commonly referred to as “major source”) is any stationary source that emits or has the potential to emit a regulated pollutant, at or above one of the significant threshold quantities (“trigger levels”) applicable to prevention of significant deterioration (PSD) and nonattainment areas; hazardous air pollutants; and Title V. The term is used to determine the applicability of major NSR. In a nonattainment area, any stationary pollutant source with potential to emit at a minimum 100 tons per year for marginal and moderate nonattainment areas, 50 tons per year for serious nonattainment areas and 25 tons per year for severe nonattainment areas is considered a major stationary source. In PSD areas the cutoff level may be either 100 (named source category) or 250 tons, depending upon the source.

NOTE: The TCAA does not define “stationary source” but includes the term in the definition of “facility.” As a discrete point, a “facility” can constitute but cannot contain a “major stationary source” as defined by federal law. A “major stationary source” can include more than one “facility” as defined under Texas law – which is consistent with EPA’s interpretation of a “major stationary source” including more than one emissions unit. A “facility” can be a major stationary source in and of itself. Ref: 40 CFR § 51.165 (a)(1)(iv)(A).

Maximum Achievable Control Technology or MACT (F): the emission limitation which is not less stringent than the emission limitation achieved in practice by the best controlled similar source and which reflects the maximum degree of reduction in emissions that the permitting authority, taking into consideration the cost of achieving such emission reduction and any non-air quality health and environmental impacts and energy requirements, determines is achievable by the constructed or reconstructed major source. Maximum Achievable Control Technology (MACT) means an emission limit or requirement that applies to a major source of hazardous air pollutants. Ref: FCAA § 112(g); 40 CFR § 63.41.

NOTE: This definition is different from the FCAA § 112(j) definition used in developing source specific standards.

Maximum Achievable Control Technology or MACT (T): the emission limitation which is not less stringent than the emission limitation achieved in practice by the best controlled similar source and which reflects the maximum degree of reduction in emissions that the permitting authority, taking into consideration the cost of achieving such emission reduction and any non-air quality health and environmental impacts, and energy requirements, determines is achievable by the constructed or reconstructed major source. The state requires owners or operators of existing facilities or federal sources to comply with applicable MACT specified in National Emission Standards for Hazardous Air Pollutants and new or modified facilities or federal sources to comply with the more stringent of BACT or MACT. In addition, new or reconstructed major sources must comply with case-by-case MACT developed if no MACT standard has been promulgated under 40 CFR Part 63. Ref: THSC § 382.0541; 30 TAC § 116.15(1) and (7); 30 TAC § 116.404.

Minor Source (F): The FCAA and CFR do not include a specific definition of the term “minor” but require the state to include a program to provide, among other things, regulation of the modification and construction of any “stationary source” within the state to assure national ambient air quality standards are achieved. Ref: FCAA § 110(a)(2)(C) and 40 CFR § 51.160(a).

Minor Source (T): Based on federal requirements, minor source under the TCAA can be interpreted to be any facility, group of facilities or source that is not considered to be a federal major source. Under the TCAA the federal “minor” NSR program applies to all federally regulated pollutants emitted below one of the significant threshold quantities (“significance levels”) applicable to PSD and nonattainment areas; hazardous air pollutants; and Title V. In addition, the term “minor source” is commonly used to include all contaminants regulated by the state.

Modification or Modification of Existing Facility (T): A modification means any physical change in or change in the method of operation of, a facility in a manner that increases the amount of any air contaminant emitted by the facility into the atmosphere or results in the emission of any air contaminant not previously emitted. See the THSC for what the term does not include. Ref: THSC § 382.003(9).

New Source Review (NSR) (F): Neither the FCAA nor CFR specifically define NSR. However, the FCAA and CFR require stationary sources of air pollution to have permits before they start construction. NSR is also referred to as construction permitting or preconstruction permitting. There are three types of NSR permitting requirements. A source may have to meet one or more of these permitting requirements. The three types of NSR requirements are: PSD permits which are required for new major sources or a major source making a major modification in an attainment area; Nonattainment NSR permits which are required for new major sources or major sources making a major modification in a nonattainment area; and minor source permits. Ref: FCAA § 110(a)(2)(C), THSC § 382.051.

Pollution (T): The presence in the atmosphere of one or more air contaminants or combination of air contaminants in such concentration and of such duration that: (A) are, or may tend to be, injurious to or adversely affect human health or welfare, animal life, vegetation or property; or (B) interfere with the normal use or enjoyment of animal life, vegetation or property. Ref: TCAA § 382.003.

Reasonably Available Control Technology or RACT (F): The lowest emissions limitation that a particular source is capable of meeting by the application of control technology that is reasonably available, considering technological and economic feasibility. Ref: 40 CFR § 51.100(o), 51.341(b), § 52.21(b)(54); (44 Federal Register (FR) 53762; September 17, 1979).

Reasonably Available Control Technology or RACT (T): RACT requirements for areas classified as moderate (or higher) nonattainment areas are included in the FCAA to assure that significant source categories at major sources of ozone precursor emissions are controlled to a reasonable extent, but not necessarily to best available control technology (BACT) levels expected of new sources or maximum achievable control technology (MACT) required for major sources of hazardous air pollutants.

NOTE: The term is not defined in the TCAA.

Reconstruction (F): Reconstruction, unless otherwise defined in a relevant standard, means the replacement of components of an affected or a previously nonaffected source to such an extent that:

- (1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new source; and
- (2) It is technologically and economically feasible for the reconstructed source to meet the relevant standard(s) established by the Administrator (or a State) pursuant to section 112 of the Act. Upon reconstruction, an affected source, or a stationary source that becomes an affected source, is subject to relevant standards for new sources, including compliance dates, irrespective of any change in emissions of hazardous air pollutants from that source. Ref. 40 CFR §63.2.

Significant emission rate or (SER) also known as Significance Level: Significant means, in reference to a net emissions increase or the potential of a source to emit any of the following pollutants, a rate of emissions that would equal or exceed any of the rates listed in [40 CFR §§ 51.166 \(b\)\(23\)\(i\) and \(b\)\(23\)\(ii\)](#).

Source (T): A “source” as a point of origin of air contaminants, whether privately or publicly owned or operated. The TCAA definition of “source” is different from the federal definition of source. In addition, the use of the term “stationary source” in the definition of “facility” is intended to mean a source that is fixed and not a source that is mobile (such as cars, trucks, off-road vehicles). Ref: THSC § 382.003(12).

Standard of performance: A standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any non air quality health and environmental impact and energy requirements) the EPA Administrator determines has been adequately demonstrated. EPA identifies that “standard of performance” is synonymous with the phrase “best demonstrated technology.” Ref. FCAA § 111(a)(1).

Stationary Source (F): A “stationary source” (commonly referred to as “source”) is any building, structure, facility or installation which emits or may emit a regulated New Source Review pollutant

NOTE: the FCAA does not define “facility” and the term does not have the same meaning as in the TCAA. Ref: 40 CFR § 51.165(a)(1)(i).

Unauthorized emissions (T): Emissions of any air contaminant except carbon dioxide, water, nitrogen, methane, ethane, noble gases, hydrogen, and oxygen that exceed any air emission limitation in a permit, rule, or order of the commission or as authorized by Texas Clean Air Act, §382.0518(g) Ref: 30 TAC § 101.1.

Appendix B - Pollutants Subject to Federal Emission Control Analysis

A major modification is any physical change in or change in the method of operation of a major stationary source that causes a significant project emissions increase and a significant net emissions increase for any federally regulated NSR pollutant. At a stationary source that is not major prior to the increase, the increase by itself must equal or exceed that specified for a major source. At an existing major stationary source, the increase must equal or exceed that specified for a major modification to be significant. The major source and significant thresholds are provided in [Table I of 30 TAC § 116.12](#) for nonattainment pollutants (note that the most recent data is also available from the Chief Engineer's Office). The major source and significant thresholds for PSD pollutants are identified in [40 CFR § 51.166\(b\)\(1\)](#) and [\(23\)](#), respectively. (Ref. 30 TAC § 116.12 (18)(A))

Best Available Control Technology (BACT)

The EPA has established criteria pollutants for which primary and secondary NAAQS apply. These pollutants must have a BACT evaluation: Carbon Monoxide, Lead, Nitrogen Dioxide, PM including PM₁₀ and PM_{2.5}, Ozone, and Sulfur Dioxide.

Areas are monitored by federal and state agencies to measure the concentrations of criteria pollutants in the ambient air. Based on those concentrations an area is classified as one of the following:

- Attainment or Unclassifiable Areas - concentrations of all criteria pollutants are below the levels established by the NAAQS; and
- Nonattainment Area - concentrations of one or more criteria pollutant is found to exceed the regulated or 'threshold' level established by the NAAQS.

Lowest Achievable Emission Rate (LAER)

When proposed net emissions increases are greater than the significant thresholds stated in [Table I](#) of 30 TAC § 116.12 or if there are proposed emissions of a nonattainment pollutant in a nonattainment area, the proposed facility shall comply with LAER for the nonattainment pollutants for which the facility is a new major source or major modification, with the following exceptions:

- Existing major sources that have a potential to emit (PTE) of less than 100 tpy of the applicable nonattainment pollutant if the project increases are offset with internal offsets at a ratio of at least 1.3 to 1. For these sources, BACT can be substituted for LAER. LAER shall otherwise be applied to each new facility and to each existing facility at which the net emissions increase will occur as a result of a physical change or change in method of operation.
- Existing major sources with a PTE of greater than or equal to 100 tpy are not required to undergo major NSR review if the project emission increases are offset at a ratio of 1.3 to 1 (internal offsets are credible emission reductions and these emissions must be permanently retired in order to satisfy this requirement).
- Existing major sources with a PTE of more than 100 tpy may elect to use internal offsets at a ratio of at least 1.3 to 1; in these cases BACT may be substituted for LAER.

Ref: 30 TAC § 116.12(15), LAER definition 30 TAC § 116.150

Reasonably Achievable Control Technology (RACT)

RACT applies to existing stationary sources in nonattainment areas and certain attainment areas and is included as a control strategy in a nonattainment SIP with the goal of attaining and maintaining NAAQS. EPA defines RACT as the lowest emission limit that a particular source is capable of meeting by the application of control technology that is reasonably available, considering technological and economic feasibility.

Ref: RACT requirements for ozone nonattainment areas are contained in 30 TAC Chapters 115 (VOC) and 117 (NO_x)

Maximum Achievable Control Technology (MACT)

HAPs identified by the EPA may trigger a MACT review. A current list of HAPs can be found on the [EPA website](#) (this list contains compounds that have been delisted, see [40 CFR Part 63, Subpart C](#) for delisted compounds). NESHAP also known as MACT standards are located in [40 CFR Part 63](#). In addition to promulgated MACT standards, FCAA § 112(g) applies to major sources of HAPs for which a MACT standard has either not been promulgated or an existing MACT standard has been vacated by the courts.

Appendix C – Additional TCAA Applicability Information

The TCAA establishes that the TCEQ shall administer the TCAA, establish the level of quality to be maintained in the state's air, and control the quality of the state's air. The TCAA mandates that the TCEQ shall seek to accomplish the purposes of the TCAA through the control of air contaminants by all practical and economically feasible methods.

The TCAA states that the TCEQ may adopt rules to enforce the TCAA. The terms and provisions of a rule adopted by the commission may differentiate among particular conditions, particular sources, and particular areas of the state. In adopting a rule, the TCAA mandates that the TCEQ shall recognize that the quantity or characteristic of air contaminants or the duration of their presence in the atmosphere may cause a need for air control in one area of the state but not in other areas. In this connection, the commission shall consider:

- The factors found by it to be proper and just, including existing physical conditions, topography, population, and prevailing wind direction and velocity; and
- The fact that a rule and the degrees of conformance with the rule that may be proper for an essentially residential area of the state may not be proper for a highly developed industrial area or a relatively unpopulated area.

Except as provided by §§ 382.0171-382.021 of the TCAA or to comply with federal law or regulations, the TCEQ, by rule, may not specify the following:

- A particular method to be used to control or abate air pollution;
- The type, design or method of installation of equipment to be used to control or abate air pollution; or
- The type, design, method of installation or type of construction of a manufacturing process or other kind of equipment.

Ref. THSC § 382.017

Appendix D – Changes to Qualified Facilities/SB 1126 History

Qualified Facilities/ SB 1126 (74th Legislature, 1995). TCEQ submitted the initial Qualified Facilities rules to EPA for SIP approval on March 13, 1996 and July 22, 1998, in 30 TAC Chapter 116 – Control of Air Pollution by Permits for New Construction or Modification. The EPA disapproved the TCEQ rules implementing SB 1126, on April 14, 2010 as revisions to the Texas NSR SIP (*see 75 Federal Register* 19468, April 14, 2010).

In the April 14, 2010 disapproval action, EPA “acknowledges and appreciates that TCEQ is developing a proposed rulemaking package to address EPA’s concerns with the current Qualified Facilities rules. We will, of course, consider any rule changes if and when they are submitted to EPA for review. However, the rules before us today are those of the current Qualified Facilities program and we have concluded that the current program is not approvable for the reasons set out in this notice” (*75 Federal Register* 19468, at 19472, April 14, 2010, Approval and Promulgation of Implementation Plans; Texas; Revisions to the New Source Review (NSR) State Implementation Plan (SIP); Modification of Existing Qualified Facilities Program and General Definitions.)

EPA disapproved the above rule citing, in general, that the rule did not meet the Federal Clean Air Act (FCAA) and EPA’s NSR regulations. EPA noted the particular concern of whether changes at Qualified Facilities circumvent Major NSR SIP requirements. The agency reiterated that this program includes a federal applicability review and that there is no federal circumvention. As set forth in TCEQ’s October 23, 2009 letter to EPA, the rule on Qualified Facilities was proposed on March 30, 2010 and the anticipated date for the Commission to consider adoption of the proposed rulemaking is August 25, 2010. The proposed rulemaking schedule coincides with the deadlines for EPA final action set forth in the Consent Decree and Settlement Agreement resolving the lawsuit brought by the Business Coalition for Clean Air (BCCA) Appeal Group, et al. Notice of the Propose Consent Decree and Settlement Agreement may be viewed at 74 Fed. Reg. 38, 015 (July 30, 2009); a Joint Motion to Enter Consent Decree and Stay was filed on October 16, 2009.

The historical use of SB 1126 applied as follows to minor NSR sources (NOTE: this method is not a federally approved authorization method):

Modifications to existing facilities under SB 1126 amended the TCAA by revising the definition of “modification of existing facility” (TCAA § 382.003) and by changing the factors that determine whether a modification occurs (TCAA § 382.0512). The legislative intent of SB 1126 was to provide certain permitted facilities in the state with the flexibility to make physical or operational changes without the requirement to obtain a permit or other approval from the TCEQ, if the facilities making the changes met the requirements of being a “qualified facility.” A qualified facility is a facility that 1) was issued a permit or a permit amendment or was exempted from pre-construction permit requirements no earlier than 120 months (ten years) before the change will occur or 2) uses air pollution control methods that are at least as effective as ten-year old BACT. If proposed changes trigger a federal major modification, the changes cannot be made without an amendment and the appropriate major NSR authorization must be obtained.

Additionally, 30 TAC § 116.10 defines modification of a qualified facility as a change at an existing facility that is a physical change in or change in the method of operation of, a facility that does not result in a net increase in allowable emission of any air contaminant and that does not result in the emission of any air contaminant not previously emitted, provided that the owner or operator of the facility:

1. has received a preconstruction permit or permit amendment or has been exempted under the TCAA, § 382.057, from preconstruction permit requirements no earlier than 120 months before the change will occur; or
2. uses, regardless of whether the facility has received a preconstruction permit or permit amendment or has been exempted under the TCAA, § 382.057, an air pollution control method that is at least as effective as the BACT that the commission required or would have required for a facility of the same class or type as a condition of issuing a permit or permit amendment 120 months (ten years) before the change will occur.

The requirements of SB 1126 for qualified facilities resulted in the establishment of ten-year old BACT for specific industry and/or control device standards by the agency. Each section/team within APD has identified ten-year-old BACT for specific industries and pollutants; these 10-year-old BACT tables are accessible at [Best Available Control Technology \(BACT\) and Air Permitting](#).

Appendix E – EPA Top-Down Method for BACT Analysis

Step 1 - Step 1 of the top-down approach requires that all available control options that are potentially applicable to the proposed source are identified. It is the applicant's responsibility to identify available control options by consulting the EPA's RACT/BACT/LAER clearinghouse, along with other reliable sources. Viable control options are those technologies that have a practical potential for application to the emissions unit and the regulated pollutant under evaluation. The full range of emissions minimization techniques should be considered as follows:

- “End-of-stack” controls
- Fuel and materials choices
- Production process design and work practices
- Innovative technologies (not required)
- Energy usage and conservation techniques

Step 2 - Step 2 of the top-down approach allows for the elimination of control options that are technically infeasible. Also, each technology should be “demonstrated” (previously installed and operated successfully on a similar facility); or if undemonstrated, then the applicant must determine whether the technology is both “available” and “applicable.” Technologies identified in Step 1 that are neither demonstrated nor found to be both available and applicable are eliminated under Step 2.

NOTE: When a major modification is proposed to an existing major source should notify their team and/or section management before proceeding with the review.

Step 3 - Step 3 of the top-down approach requires ranking of the remaining control technologies based on control effectiveness. Considerations for the effectiveness of the technologies include:

- Control effectiveness for each regulated NSR pollutant (% pollutant removed)
- Expected emission rate for each regulated NSR pollutant (tons per year)
- Expected emission reduction for each regulated NSR pollutant (tons per year)
- Output based emissions limits (pounds per kilowatt hour [kWh])

Step 4 - Step 4 of the top-down approach allows for the elimination of control options based on collateral impacts. In descending order, the applicant should evaluate and compare the collateral impacts of each control option. The permitting authority (TCEQ) has discretion on weighting each area of collateral impact. This step validates the suitability of the top control option identified or provides a clear justification as to why the top option should not be selected as BACT. Some of the collateral impacts used in this evaluation step include:

- Energy impacts (efficiency, BTU, kWh)
- Other environmental impacts
- Solid or hazardous waste
- Water discharge from control device
- Emissions of air toxics and other non-NSR regulated pollutants
- Economic impacts (e.g., total cost effectiveness, incremental cost effectiveness)

Step 5 - Step 5 of the top-down approach requires selection of BACT for the emissions unit and the regulated pollutant under evaluation. The most effective control alternative not eliminated in Step 4 is selected as BACT with a corresponding emission limit established. Selected BACT can be no less stringent than an applicable NSPS, MACT, or RACT.

Appendix F – Three-Tier BACT Checklist

A BACT analysis is required for all new and/or modified sources that are part of a new permit or amendment application. The following checklist is meant to assist the permit reviewer in determining whether an applicant's BACT analysis is complete and outlines the minimum content required for such an analysis. The following requirements must be met, as applicable. For more details regarding the BACT analysis, refer to [Section IV](#) of this document.

1. Applicant has identified one or more of the following emission reduction options to be implemented on the new/modified source:
 - Pollution Prevention;
 - Equipment Specification/Monitoring;
 - Add-on Abatement Equipment; and/or
 - Good Engineering Practice (GEP)/Best Management Practice (BMP)

 2. Applicant has demonstrated each of the following five elements of performance for the emission reduction option(s) chosen and provided documentation (technical information, calculations, previous testing results and/or manufacturer's guarantees) that the emission reduction option will achieve the proposed performance level:
 - Capture Efficiency (%)
 - Emission Reduction Efficiency (%) or Resulting Emission Level
(lb/ton, lb/MMBtu, outlet grain loading)
 - Reliability
 - On-stream Time
 - Enforceability

 - 3A. Applicant has demonstrated that the overall emission reduction performance level of the BACT proposal is at least equivalent to what has been accepted in recent permit reviews for the same industry (Tier I analysis). ***Proceed to step 3B if checked.***
- OR**
- Applicant has demonstrated, with supporting documentation, that the overall emission reduction performance level of the BACT proposal is less than those accepted as BACT in recent permit reviews due to compelling technical differences between their process and others within the same industry. ***Skip to step 4A if checked***
- 3B. Has the permit reviewer identified any new emission reduction options, as a result of recent technological developments, that have not been considered in past permit reviews?
 Yes No

If "Yes" is checked, Permit Reviewer should consult with APD Management before skipping to step 5. If "No" is checked, BACT analysis is complete.

- 4A. Applicant has demonstrated that the overall emissions reduction performance level of the BACT proposal is at least equivalent to what has been accepted in recent permit reviews for process/industry types with similar emission streams (Tier II analysis). ***Proceed to step 4B if checked.***

OR

- Applicant has demonstrated, with supporting documentation, that the overall emission reduction performance level of the BACT proposal is less than those accepted as BACT in recent permit reviews due to compelling technical differences between their process and other process/industry types with similar emission streams. ***Skip to step 5 if checked.***

OR

- Applicant has demonstrated that there are currently no process/industry types with similar emission streams. ***Skip to step 5 if checked.***

- 4B. Has the permit reviewer identified any new emission reduction options, as a result of recent technological developments, that have not been considered in past permit reviews?

Yes No

If “Yes” is checked, Permit Reviewer should consult with APD Management before proceeding to step 5. If “No” is checked, BACT analysis is complete.

5. Applicant has completed a Tier III analysis and selected BACT based on cost-effectiveness and performance. ***If checked, BACT analysis is complete.***

Appendix G – Tier III BACT Analysis

The Tier III evaluation is highly-complex and time-intensive. Since technical practicability and economic reasonableness are usually firmly established by industry practice and are clearly identified in the first two tiers of a BACT review, a Tier III review should rarely be required.

However, there may be some cases when an applicant demonstrates that there are no process/industry types with similar air emission streams. Additionally, there may be some cases when an applicant's BACT proposal cannot achieve an emission reduction performance level that is at least equivalent to those accepted as BACT in recent permit reviews for process/industry types with similar emission streams due to compelling technical differences between the applicant's process and others. In these cases, a Tier III BACT analysis is required.

The completion of a Tier III BACT analysis will result in the applicant proposing an emission reduction option(s) that is technically practicable and economically reasonable. The basic steps of each Tier III analysis will always be the same. However, the Tier III analysis is a case-by-case review that is unique to each specific project.

The information provided below outlines the *basic steps* required for Tier III review. For additional guidance regarding the Tier III review, contact a [Technical Specialist](#) ^[2] in the appropriate section within the Air Permits Division.

Steps 1-3 in the Tier III analysis consider technical practicability while Steps 4 and 5 examine economic reasonableness. In addition to technical practicability and economic reasonableness, there are also specific performance elements associated with each emission reduction option (reliability, on-stream time, enforceability) that may be considered in the final BACT selection. Also, the energy and environmental impacts associated with the implementation of an emission reduction option may be considered when proposing BACT, as appropriate.

Technical practicability and economic reasonableness are the major determinants in the selection of BACT. In order to complete a Tier III evaluation, the applicant must provide a detailed technical and economic analysis, which requires the completion of each of the following Five Steps:

Step 1: Identify all [emission reduction options](#) for each air contaminant emitted from the facility subject to review. Emission reduction options may include:

- Prevention (process controls, source reduction);
- Add-on abatement equipment; or
- New and emerging innovative technologies (including emission reduction options that are available but not yet demonstrated*).

*If the permit reviewer and applicant agree to such a proposal, the authorization will contain a condition that the control(s) must be tested at the start of operation and those control(s) must be proven to perform as represented.

Step 2: Eliminate technically infeasible options using detailed information that assesses and demonstrates the technical feasibility/infeasibility of each identified reduction option(s).

A technology that is available and applicable is generally considered technically feasible. A technology is available if it can be obtained by the applicant through commercial channels. A technology is applicable if it can reasonably be installed and operated on the source type under consideration.

For an emission reduction option to be eliminated as technically infeasible, the applicant must clearly demonstrate that, based on physical, chemical and/or engineering principles, that technical difficulties will preclude its successful use.

No option can be eliminated because of expense during Step 2 of the evaluation.

Step 3: Rank remaining emission reduction options in terms of total emissions reduced. (Using a table for this step may be useful, see [sample ranking table](#)).

Rank-order the options from highest to lowest based on the expected annual emission reduction (i.e., highest rank = option that achieves the lowest emissions or largest emission reductions).

For each emission reduction option also include the following information:

- Capture efficiency, if applicable;
- Performance level (lb/MMBtu, ppmv, gr/dscf, % control) expected from a well-designed, vendor-guaranteed system;
- Proposed allowable emission rate (tons per year); and
- Emissions reduction (tons per year) calculated as the difference between controlled emissions and uncontrolled emissions for the emission reduction option.

Ranking the remaining emission reduction options in Step 3 is the last step related to the technical feasibility of an emission reduction option. The remaining two steps in the Tier III analysis pertain to the economic reasonableness of each of the remaining emission reduction options.

Step 4: Perform quantitative cost analysis to determine the cost-effectiveness (dollars per ton of pollutant reduced) of each the remaining emission reduction option. To develop a cost analysis for each remaining emission reduction option the Tier III review must include a detailed Capital Costs estimate (including: purchased equipment costs, direct installation costs, site preparation, buildings, and indirect installation costs), and a detailed Annual Operating Costs estimate (including: direct annual costs and indirect annual costs). The US EPA Air Quality Planning & Standards [Air Pollution Control Cost Manual](#) may be consulted for additional guidance related to Capital Costs and Annual Operating Costs estimates.

NOTE: The *cost analysis* section of the Air Pollution Control Cost Manual is considered by the TCEQ to be a sound source for the quantitative cost analysis. However, the TCEQ does not use or accept equipment specifications presented in the *design development* section of the manual.

The following are examples of technical design parameters for each emission reduction option that should be provided as part of the Step 4 analysis:

- Location of the source under review within the plant;
- A preliminary process flow sheet that identifies and characterizes all process streams to be abated by an emission reduction option;
- Relative locations of the emission reduction equipment in the process;

- Preliminary sizes and material specifications for equipment items (such as process vessels, motors, pumps);
- Approximate sizes and types of construction of any buildings required to house the emission reduction option;
- Estimates of utility requirements (electricity, gas, etc...); and
- Preliminary specifications for ducting and piping.

The applicant must submit all supporting data for the estimated costs that are used to develop the BACT Tier III cost analysis in Step 4. The supporting data should contain sufficient information to corroborate the cost estimates, as well as the subsequent analysis and conclusions. The supporting data required should include, at minimum, the following:

- Preliminary sizes and specifications for equipment, buildings, utility requirements, ducting, and piping;
- Specific cost data, including vendor names and telephone numbers and quote packages;
- Economic parameter assumptions, such as expected equipment service life or energy costs; and
- Copies of calculations, printouts, and spreadsheets, including electronic copies.

Consult a [Technical Specialist](#)^[2] from the appropriate APD section for additional guidance related to Step 4 of the Tier III analysis.

Step 5: Select BACT based on cost-effectiveness and performance. Select the most stringent emission reduction option, proposed as BACT, based on the evaluation of the information developed in the previous four steps. To justify elimination of a BACT alternative, the applicant should demonstrate to the satisfaction of the TCEQ that the cost of pollutant removal (i.e., dollars per ton removed) for the control alternatives are disproportionately high when compared to the cost of control for the pollutant in recent BACT determinations (Ref EPA's Draft [1990 NSR Workshop Manual](#), Page, B.45).

Sample Ranking Table (for one source and one contaminant)

Emission Reduction Option	Capture efficiency (if applicable)	Performance Level ^a	Rank (x)	Emissions From Emissions Unit ^b		
				Allowable		Reduction ^c
				lb/hr	tpy	tpy
Uncontrolled			--			
A			1			
B			2			
C			3			

Footnotes:

- a Performance level may be expressed as % control, gr/dscf, ppmv, lb/MMBtu.
- b Emissions from the emission point or points being analyzed in the emission reduction option.
- c Reduction in emissions from uncontrolled operation.

Appendix H – Additional PSD Background and Review Requirements

In accordance with 30 TAC § 116.160, the TCEQ may not issue a permit to a new major source or major modification located in an area designated as attainment or unclassifiable if the ambient air impacts from such source or modification exceed the de minimis impact levels specified in [30 TAC § 116.12](#).

Effective July 24, 1992, the TCEQ has full approval PSD permitting in Texas. The federal PSD rules are in [40 CFR § 51.166](#) and [§ 52.21](#). Monitoring, modeling, and BACT requirements will vary with the magnitude, location, and type of emissions of a new major source or major modification. These considerations also apply to planned MSS emissions.

PSD permitting is designed to keep attainment areas in attainment so that there is no significant deterioration of air quality; additionally, one of the goals of PSD permitting is to preserve, protect, and enhance air quality in national parks. If the facility is located or proposed to be located in an attainment or unclassified area of Texas, [30 TAC §§ 116.160-116.162](#) and [30 TAC § 116.111\(a\)\(2\)\(I\)](#) must be addressed for the affected pollutants. Additional information required for review pursuant to those rules must be submitted for new sources and modifications classified as major under the PSD rules. Planned MSS emissions must also be taken into consideration in this review.

It is extremely important that communication between the applicant and APD staff be initiated well in advance of submittal of an application subject to PSD review.

A quick overview of PSD permitting requirements follows:

Best Available Control Technology (BACT) -- Emission limitation based on the maximum degree of emission reduction (considering energy, environmental and economic impacts) achievable through application of production processes and available methods, systems, and techniques*.

*The requirement to conduct a BACT analysis and determination is set forth in § 165(a)(4) of the FCAA, in federal regulations at 40 CFR § 52.21(j), in regulations setting forth the requirements for SIP approval of a state PSD program at 40 CFR § 51.166(j) and in the Texas SIP at 40 CFR § 52.2270, which includes the approval 30 TAC § 116.160.

Air Quality Analysis -- Assesses existing air quality and predicts through modeling the ambient concentrations that will result from the proposed project and future growth associated with the project. Also includes Additional Impacts and Class I Area Impacts as applicable.

Additional Impacts Analysis -- Assesses the impacts of air pollution on soils, vegetation, and visibility caused by increases in emissions from the project.

Class I Area Impacts -- Assesses Air Quality Related Values including NAAQS, Increment, and an analysis of the proposed sources' anticipated impacts on visibility in Federal Class I areas as applicable. Coordinate with the appropriate Federal Land Manager (FLM) as applicable.

Public Involvement -- Public notice is conducted via newspaper, internet, and sign posting. During the public comment period, there are opportunities for the public to submit comments and to request a public meeting or a contested case hearing.

A PSD permit must:

- Identify the emission units to be regulated by PSD;
- Establish emission standards or operating limits;
- Specify methods for determining compliance; and
- Outline procedures to maintain continued compliance.

Appendix I – Additional Nonattainment and LAER Background and Review Requirements

If the owner or operator seeking authorization of a facility that is located or is proposed to be located in a designated nonattainment area of Texas, [30 TAC §§ 116.150, 116.151](#), and [116.111\(a\)\(2\)\(H\)](#) must be addressed for the affected pollutants. Planned MSS emissions and the control of those emissions must also be taken into consideration in this review.

In a nonattainment review, permit reviewers must first determine if a source (site) is major. If the source is a minor source, but the project is a major source in and of itself, nonattainment review is triggered. If the source is an existing major source, any physical change or change in the method of operation which causes a significant project emissions increase and a significant net emissions increase the project is considered to be a major modification and nonattainment review is triggered. The [Federal New Source Review Permits \(FNSR Permits\) Applicability Determination Air Permits](#) guidance document may be referenced for additional information.

The preconstruction review requirements for new major sources or major modifications locating in designated nonattainment areas differ from PSD requirements. These differences are as follows:

- The emissions control requirement for nonattainment areas is LAER, which is defined differently than BACT emissions control requirement;
- Before operation of a nonattainment area source can be approved, the source must obtain emissions reductions (offsets) of the nonattainment pollutant from other sources that impact the same nonattainment area as the proposed source; and
- The applicant must certify that all other sources owned by the applicant in the state are complying with all applicable requirements of the Clean Air Act, including all applicable requirements in the SIP.

Section VII – Endnotes

1. As agreed in the PPG Agreements between the TACB and its successor agencies and EPA since 1991, the EPA accepts the TCEQ's three-tiered approach to BACT as equivalent to EPA's Top-Down BACT approach when the review also includes the following:
 - Recently issued/approved permits within the state of Texas;
 - Recently issued/approved permits in other states; and
 - Control technologies contained within the EPA's [RACT/BACT/LAER Clearinghouse](#) (RBLC).

This is also consistent with EPA's approval of Texas' SIP for the issuance of PSD permits on June 24, 1992. The approval states that EPA does not interpret the September 5, 1989 letter from the TACB as a specific commitment by the State to follow a "Top-Down" approach to BACT determinations.

2. External customers may contact the appropriate section assigned for reviewing applications for the facility type being permitted in the Air Permits Division to be directed to a Technical Specialist.