United States
Environmental Protection
Agency

Air Pollution Training Institute
MD 20
Environmental Research Center
Research Triangle Park, NC 27711

EPA-450/
January 1986

Air

APTI
Course SI:454
Effective Permit Writing

Student Guidebook

DRAFT

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Office of Air, Noise, and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, NC 27711

NOTICE

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AVAILABILITY

This document is issued by the Manpower and Technical Information Branch, Control Programs Development Division, Office of Air Quality Planning and Standards, EPA. It was developed for use in training courses presented by the EPA Air Pollution Training Institute and others receiving contractual or grant support from the Institute. Other organizations are welcome to use the document.

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Others may obtain copies, for a fee, from the National Technical Information Service (NTIS), 5825 Port Royal Road, Springfield, Virginia 22161.

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COURSE INTRODUCTION

Description

This course is designed for permit engineers and administrators responsible for issuing and reviewing construction and/or operating permits for stationary sources of air pollution. Permit auditors who review and analyze permit review, preparation, execution, and revision will also find it useful. The following major topics are covered:

- Basic overview of permit review goals
- Regulatory requirements
- Major elements of permit review
- Legal, technical, and administrative considerations
- Key elements of good permit construction
- Permit followup and renewal.

Course Goal and Objectives

Course Goal

To familiarize you with the basic requirements and components of permit review, permit preparation, and permit evaluation.

Course Objectives

At the end of the course, you should be capable of the following -

1. Stating the goals of the permit review process
2. Recognizing the basic Federal regulatory requirements that may be applicable to the permit review process
3. Briefly describing the basic steps necessary in reviewing and issuing federally enforceable permits under Part C (PSD) and Part D (Nonattainment Areas) of the Clean Air Act

4. Naming the major elements of permit review

5. Naming the major legal considerations for writing a successful permit

6. Discussing the procedures for reviewing technical and engineering specifications involved in permit review

7. Recognizing the major elements of successful permit construction

8. Listing the key components to be addressed in writing a good permit

9. Discussing the major factors involved in permit followup and/or renewal

10. Discriminating between good permit conditions and those with major flaws.

Requirements for Successful Completion of this Course

To receive 4.0 Continuing Education Units (CEU's) and a certificate of course completion, you must:

1. Take a mail-in final examination

2. Achieve a final examination grade of at least 70 percent (out of 100 percent).

Reading:

This text is the only required reading material. Other supplementary reading material is not required.

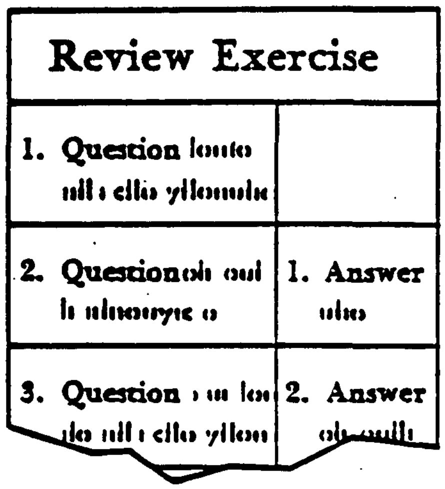
Prerequisite Courses:

SI:453 Overview of PSD Regulations

Using the Guidebook

This book directs your progress through the course. Seven lessons review and summarize the key elements in permit review and preparation. Review exercises are presented at the end of each lesson with the exception of lesson Nos. 2 and 3 which are required reading assignments only. The final examination for this course will not include a test for these lessons.

The content of lesson Nos. 2 and 3, however, is extremely important to a total understanding of the permit review process and should be read very carefully. To complete an exercise, place a piece of paper across the page covering the questions below the one you are answering. After answering the question, slide the paper down to uncover the next question. The answer for the first question will be given on the right side of the page separated by a line from the second question, as shown here. All answers to review questions will appear below and to the right of their respective questions and will be numbered to match the question. Please do not write in this book. Always complete the review exercise in the lessons. If you are unsure about a question or answer, review the material preceding the question. After completing the review exercises, proceed to the next section.



Instructions for Completing the Final Examination

To complete the final examination, use the answer sheet provided. Circle the letter corresponding to the correct answer for each question in the examination. Do not write or mark your answers on the examination sheet.

After completing the final examination, return it and the answer sheet to the Air Pollution Training Institute. The final examination grade and course grade will be mailed to you.

Air Pollution Training Institute
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LESSON 1

REGULATORY REQUIREMENTS AND PERMIT REVIEW

Goal: To familiarize you with the major elements of the Federal air pollution control program for stationary sources and how these elements are interrelated.

Objectives: At the end of this lesson, you should be capable of the following:

1. Understanding the program requirements for New Source Performance Standards (NSPS), Prevention of Significant Deterioration (PSD), Nonattainment Review, and how they relate to the overall New Source Review (NSR) program

2. Recalling the primary goals of the programs listed in objective No. 1

3. Discussing the major differences between the programs listed in objective No. 1.

The Clean Air Act (Act) and its amendments strive to achieve and maintain clean air by a variety of means. The dominant concept is the establishment of National Ambient Air Quality Standards (NAAQS) for pollutants believed to have an adverse effect on public health and welfare. These criteria pollutants are listed in Table 1. States are divided into Air Quality Control Regions (AQCR's), which are designated as "attainment," "nonattainment," or "unclassified" for each criteria pollutant according to whether the ambient air quality is better or worse than the NAAQS for that pollutant. Each State is required to adopt a State Implementation Plan (SIP) that is designed to attain and maintain the NAAQS throughout the State.

Generally, owners of proposed major new sources and existing major sources planning modifications must obtain air pollution permits prior to commencing construction of the new or modified source. To obtain these permits, sources must undergo a general preconstruction review. The type of review required is determined by the pollutants the source will emit and the existing ambient pollutant concentrations at the location where the source

TABLE 1-1. CRITERIA POLLUTANTS

°	Sulfur dioxide	SO_2
°	Carbon monoxide	CO
°	Total suspended particulate	TSP
°	Nitrogen dioxide	NO_2
°	Photochemical oxidants	O_x
°	Lead	Pb

will be constructed. Sources located in nonattainment areas and emitting a pollutant or pollutants for which the area is nonattainment must undergo nonattainment review. Sources located in attainment areas must generally undergo PSD review. Because an area may simultaneously be attainment for one pollutant and nonattainment for another, a source may have to undergo both types of review.

The evaluation of an application for a "permit to construct" by the air quality regulatory agency with legal jurisdiction to issue the permit is commonly referred to as NSR. The rather complicated permitting process can take from 6 months to several years to complete. An NSR application is required for all proposed major new or modified sources, as well as for selected minor new or modified sources.

The sources for which NSR is applicable generally are required to conduct the following studies:

- Engineering. To estimate expected emission rates and available control technologies.
- Ambient Impact. To determine the expected impact of the emissions from the source, either new or modified.
- Monitoring/Testing. To establish actual air pollutant concentrations and to evaluate impacts on soils, vegetation, or visibility, as required.

Although the specific NSR requirements may vary from State to State, all NSR programs must as a minimum comply with the basic requirements set forth in 40 CFR 51.18.

1.1 SIP REQUIREMENTS

Federal regulation (40 CFR 51) requires that States have the authority to "prevent construction, modification, or operation of any stationary source at any location where emissions from such source will prevent the attainment or maintenance of a national standard." The implementation plans submitted by the States (SIP's) and approved by EPA include procedures for reviewing air pollution sources prior to construction and disapproving those construction projects that would interfere with the attainment and maintenance of the NAAQS's.

Typically, the most effective means of conducting NSR is through the framework of a permitting program. The State issues a permit for the construction of a facility following a prescribed examination of the plans for that facility to ensure that the facility will comply with all applicable regulatory requirements. In many States the NSR process may be followed by the issuance of an operating permit after construction has been completed and initial compliance has been demonstrated. The source must continuously comply with the permit conditions or face enforcement action and/or revocation or suspension of the permit.

The primary benefits of a permit system are that it:

1. Insures proper design of air pollution control equipment
2. Provides an opportunity to examine potential impacts of proposed new sources and major modifications of existing sources
3. Provides a mechanism for generating source and emission inventory data
4. Supports uniform enforcement operations.

All new sources in a State are subject to the requirements of the applicable SIP. The SIP normally specifies limitations on allowable emissions and procedural requirements for preconstruction review. In addition, NSPS may apply to specific pollutants emitted by the permitted source, and the emission of specified hazardous pollutants may also be subject to special regulation under the National Emission Standards for Hazardous Air Pollutants (NESHAPS).

1.2 NSPS REQUIREMENTS

Section 111 of the Act, "Standards of Performance of New Stationary Sources," requires EPA to establish Federal emission standards for stationary source categories that cause or contribute significantly to air pollution. Both the regulated pollutants emitted by these source categories and their associated emission limits vary for each NSPS promulgated and include particulate matter, SO_2, CO, nitrogen oxides, volatile organic compounds (VOC), acid mist, total reduced sulfur (TRS), and fluorides. The regulated sources and pollutants at issue are numerous and are listed in 40 CFR 60. The Act, however, precisely states that the States should have the primary authority for implementing the NSPS program.

If a NSPS does apply to a particular new or modified source, the owner must give advance notification to EPA or the State before beginning construction with further notification due before actual startup of the facility. The owner or operator must also submit operating data after startup to demonstrate that the source is complying with the applicable limit. A new or modified source will be subject to NSPS if standards have been proposed for that particular source category before the facility has commenced construction.

In the language of Section 111, the standards of performance for each affected facility "shall reflect the degree of emission limitation and the percentage reduction achievable through application of the best technological systems of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated." The "percentage reduction" requirement is limited to fossil-fuel-fired sources of air pollution.

The emission control technology on which NSPS are based is best demonstrated technology (BDT). Numerical emission limits that reflect the performance of BDT are established for each affected facility. Typically, the numerical limit is accompanied by other provisions requiring proper operation and maintenance of the control system. Design, equipment, work practice, or operational standards are authorized by Section 111 where it is not feasible to prescribe or enforce a numerical emission limit.

1.3 NESHAPS AND TOXIC AIR POLLUTANTS REQUIREMENTS

Section 112 of the Act, "National Emission Standards for Hazardous Air Pollutants," requires EPA to establish Federal emission standards for non-criteria air pollutants that the Administrator judges "to cause or contribute to air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness." These standards apply to new, modified, and existing sources and are set at levels to protect public health with an ample margin of safety.

Within 1 year of listing a particular pollutant under Section 112, EPA must propose a standard for that pollutant under NESHAPS. The intent of the NESHAPS program is to establish a uniform national standard for specific sources that emit the listed hazardous pollutant.

In addition to the NESHAPS program, many State air pollution control agencies are in the process of formulating toxic air pollutant control programs. Many States have to one degree or another attempted to use their permitting program as a method of implementing their air toxic control program.

The current State air toxics control programs generally fall into four categories--ambient guidelines, ambient standards, risk assessment, and control technology requirements.

- Ambient Guidelines. Some States rely on ambient guidelines for determining "acceptable ambient levels" of toxic air pollutants. Acceptable levels are based primarily on Threshold Limit Values (TLV's) developed by the American Conference of Governmental and Industrial Hygienists (ACGIH) and the Occupational Safety and Health Administration (OSHA).

- Ambient Standards. Some States base their program primarily on TLV's adjusted for area receptors. In these programs modeling is the primary tool for demonstrating compliance. A few States have issued such ambient standards requiring a source to demonstrate compliance for various averaging periods.

- Risk Assessment. Some States have elected to use a risk assessment approach particularly for evaluating sources of suspected carcinogens. Levels of acceptable risk are established with modeling techniques used to project lifetime exposures.

- Control Technology Requirements. Some States also use control technology requirements in conjunction with one of the preceding programs. State requirements, especially with regard to suspected carcinogen emissions, can be particularly exacting.

If a State develops its own regulations to deal with hazardous air pollutants, the regulations must be consistent with the Federal regulations outlined in 40 CFR Parts 60 and 61. All emission limits or standards applicable to NESHAP sources must be at least as stringent as the Federal NESHAPS. State agencies must not grant immunities that are not granted by Federal regulations. Test methods, monitoring requirements, and reporting requirements must be approved by EPA and be comparable to EPA methods. As with the NSPS programs, the Act indicates that the States should have the primary authority for implementing NESHAPS programs.

1.4 PSD PROGRAM REQUIREMENTS (PART C)

The purpose of PSD is to prevent significant deterioration of air quality already cleaner than the NAAQS. PSD applies to major new stationary sources of air pollution and to major modifications of existing sources. Because the purpose of PSD is to prevent significant deterioration of air quality in areas where the air is cleaner than the applicable national standards, PSD regulations apply only in areas that are either cleaner than the national standards, or are unclassified with respect to the areas attainment status.

New sources among the list of 28 source types specified in the PSD regulations (Table 2) are required to obtain a PSD permit if controlled emissions of any pollutant regulated under the Act have the potential to exceed 100 tons per year. New sources in categories not found on the list of 28 are required to obtain a PSD permit if controlled emissions of any pollutant regulated under the Act have the potential to exceed 250 tons per year. Both criteria and noncriteria pollutants are subject to PSD review if emitted by a major new source or increased by a major modification in significant amounts.

In determining PSD permit requirements needed for major modifications of existing sources, new capitol equipment or emission units with different

TABLE 1-2. MAJOR STATIONARY SOURCES (THRESHOLD - 100 TONS PER YEAR)

1. Fossil-fuel-fired steam electric plants of more than 250,000,000 Btu per hour heat input
2. Coal cleaning plants (with thermal dryers)
3. Kraft pulp mills
4. Portland cement plants
5. Primary zinc smelters
6. Iron and steel mills
7. Primary aluminum ore reduction plants
8. Primary copper smelters
9. Municipal incinerators capable of charging more than 250 tons of refuse per day
10. Hydrofluoric acid plants
11. Sulfuric acid plants
12. Nitric acid plants
13. Petroleum refineries
14. Lime plants
15. Phosphate rock processing plants
16. Coke oven batteries
17. Sulfur recovery plants
18. Carbon black plants (furnace process)
19. Primary lead smelters
20. Fuel conversion plants
21. Sintering plants
22. Secondary metal production facilities
23. Chemical process plants
24. Fossil-fuel boilers of more than 250,000,000 Btu per hour heat input
25. Petroleum storage and transfer facilities with a capacity exceeding 300,000 barrels
26. Taconite ore processing facilities
27. Glass fiber processing plants
28. Charcoal production facilities

Standard Industrial Codes (SIC's) at the same facility must each be treated as new sources. A PSD permit is required for modifications to major existing facilities if the "net" emissions increase due to the modification will exceed any value on the *de minimis* emissions list (Table 3). The net change in emissions accounts for both increases and decreases associated with the modification over a specified period of time prior to the intended date for beginning construction. A modification to an existing minor source would not require a PSD permit unless the proposed modification would be major by itself (i.e., exceed 100 or 250 tons per year as a function of the source category).

TABLE 1-3. DE MINIMIS EMISSION RATES

Pollutant	Emission rate, tons per year
CO	100
Nitrogen oxides (NO_x)	40
SO_2	40
Particulate matter	25
Ozone	40 tons per year of volatile organic compounds
Pb	0.6
Asbestos	0.007
Beryllium	0.0004
Mercury	0.1
Vinyl chloride	1
Fluorides	3
Sulfuric acid mist	7
Hydrogen sulfide (H_2S)	10
TRS (including H_2S)	10
Reduced sulfur compounds (including H_2S)	10

The following are the major components of the PSD program:

1. Area Classification System. All areas in the Nation are designated as Class II except selected National parks, wilderness areas, etc., that are classified as Class I areas.

2. Air Quality Increments. Numerical limitations restricting increases in the ambient concentration above existing baseline concentrations.

3. Best Available Control Technology (BACT). The best available emission control technology is decided on a case-by-case basis, after all costs and impacts have been taken into account to

determine what is achievable at the proposed installation. The BACT can never be less strict than NSPS and it applies to all pollutants regulated under the Act.

4. Preconstruction Review and Approval. This review includes the submission of detailed data along with modeling and engineering analyses, public hearings, and monitoring data.

1.5 NONATTAINMENT AREA REQUIREMENTS (PART D)

The EPA's preconstruction review regulations (40 CFR 51) require States to prevent construction or modification of any source that would interfere with attainment and maintenance of ambient standards. Because a literal interpretation of the Act would essentially prohibit all new growth in and around nonattainment areas, EPA developed regulations to allow new growth in such areas only if stringent conditions were met. These conditions ensure that new source emissions will be reduced to the greatest degree possible, that more than equivalent emission reductions (i.e., offsets) will be obtained from existing sources, and that the actions will have a net air quality benefit.

Thus, the Nonattainment Area requirements (Part D) provide that in any area where any ambient air quality standard is being violated, no major new source can be constructed unless a permit has been issued that imposes stringent controls and requires sufficient offsets to assure progress toward compliance. Sources subject to the nonattainment requirements may include any new source (or modification) with potential emissions of any criteria pollutant in quantities equal to or greater than 100 tons per year .

In principle, new sources can be allowed only within a framework that assures a net reduction in total emissions. The SIP revision process gives a State considerable leeway as to how it chooses to direct its control efforts toward attaining NAAQS in a nonattainment area. Nevertheless nonattainment permit requirements have certain things in common. These include:

1. Offsets. Enforceable reductions in existing sources of pollution that exceed expected emissions from the new source.

2. Lowest Achievable Emission Rate (LAER). LAER is required for new or modified major sources located in nonattainment areas. LAER is based on the most stringent emission rate contained in any SIP or achieved in practice by the same or similar sources.

3. Other Sources in Compliance. All other commonly owned or operated sources within the affected State must be in compliance or on approved compliance schedules.

Some confusion and overlap can exist in the application of the PSD or the nonattainment regulations to a new or modified source. The basic rule of distinction is that a major new source is subject to PSD requirements if the source impacts a clean area and subject to nonattainment requirements if it impacts an area that is currently exceeding the NAAQS. A new source, however, may be subject to both PSD and nonattainment reviews if 1) cross-boundary effects would cause emissions from a source in a PSD area to have an impact on a nonattainment area or vice versa, or 2) the source's location is classified as PSD with regard to certain pollutants, but classified as nonattainment with regard to others.

REVIEW EXERCISE

1. Each State is required to adopt a State Implementation Plan designed to attain and maintain ____________ throughout the State.

   a. NESHAPS
   b. Pollution offsets
   c. NAAQS
   d. Compliance

---

2. All proposed new sources that, after installation of air pollution control equipment, have the potential to emit 100 tons per year or more of any regulated pollutant are required to file ________________ application.

   a. A New Source Review
   b. An NSPS
   c. A source test
   d. A *de minimis*

1. c. NAAQS

---

3. PSD and Nonattainment Permit reviews cannot be required of the same source?

   True or False

2. a. A New Source Review

---

4. Of the Clean Air Act regulatory programs, which clearly requires a verifiable improvement in ambient air quality rather than maintenance of existing levels? a. NSPS b. NESHAPS c. PSD d. Nonattainment	3. False
5. Operating permits are ____________________. a. Required by the Clean Air Act b. Found in all States c. Required at the discretion of the States d. Only applicable to new sources	4. d. Non-attainment
6. NSR always requires _______ analyses of ________ pollutants regulated under the Clean Air Act. a. Modeling, criteria b. Offset, noncriteria c. Separate, each d. None of the above	5. c. Required at the discretion of the States
7. True or False? Section 111 of the Clean Air Act (Standards of Performance of New Stationary Sources) authorizes design, equipment, work practice, or operational standards where prescription or enforcement of emission limits is not feasible.	6. c. Separate, each
8. If the _________ emissions increase due to a modification at a major source is significant, PSD review is required. a. Criteria pollutant b. Actual c. Potential d. Net	7. True
	8. d. Net

LESSON 2

PSD REQUIREMENTS

Goal: To familiarize you with the PSD program requirements.

Objectives: At the end of the lesson, you should be capable of the following:

1. Understanding the source applicability requirements
2. Understanding the pollutant applicability requirements
3. Reviewing a BACT proposal and analysis
4. Describing the ambient air quality analysis process
5. Understanding the source impact analysis
6. Conducting a determination of a completed PSD permit application.

2.1 INTRODUCTION

Prior to the Clean Air Act Amendments of 1977, the question arose as to whether a State could allow the air quality within its borders to deteriorate to the NAAQS level in areas that were cleaner than the NAAQS for a given pollutant. Several environmental groups brought suit on this issue and the court held that Congress intended to prevent significant deterioration of air quality that was better than the applicable NAAQS. As a result of the court's decision, the EPA promulgated the first set of PSD regulations on December 5, 1974.

On August 7, 1977, Congress substantially amended the Clean Air Act and outlined a rather detailed PSD program. On June 19, 1978, EPA revised the PSD regulations to comply with the 1977 Amendments. The June 19, 1978, regulations were challenged in a lengthy and comprehensive judicial review process. As a result of the judicial process, EPA proposed a revised set of PSD regulations, which were finally promulgated on August 7, 1980. These regulations and subsequent minor modifications and interpretations of these regulations are the subject of Lesson 2.

2.2 SOURCE APPLICABILITY DETERMINATION[1,2]

The basic goal of the PSD program is to ensure that air quality in clean air areas (i.e., those areas with air quality better than the applicable NAAQS) does not significantly deteriorate while maintaining a margin for future industrial growth and expansion. Thus, the PSD regulations focus on those new and modified sources that create large increases in emissions and could significantly affect the air quality levels in the area surrounding the source.

A source is defined as all emission units in the same industrial grouping located on contiguous or adjacent properties under common ownership or control. An emission unit is any part of a stationary source that emits or has the potential to emit any pollutant subject to regulation under the Clean Air Act. The major groups of two-digit codes contained in the Standard Industrial Classification (SIC) manual define industrial groupings.

Once a source is defined, one must determine if the stationary source is a major or minor source. This determination is based on the source's potential to emit pollutants regulated by the Clean Air Act. Potential to emit is defined as "the capability at maximum design capacity to emit a pollutant after air pollution control equipment has been applied, considering all Federally enforceable permit restrictions that limit the design capacity utilization, the hours of operation, or the type or amount of material processed or stored." In the absence of Federally enforceable limits, the potential to emit is based on full capacity and year round operation. The emissions after control are considered only to the extent that the emission levels are the result of Federally enforceable emission limitations. Enforceability is determined by two conditions: 1) the applicable restriction must be required by a Federal or State permit granted under the applicable SIP or be embodied in the SIP itself, and 2) the source and/or enforcement authority must be able to demonstrate compliance by using approved methods. For estimation of emissions from a source, the emissions from the individual units should be estimated and the individual values summed for the source in question.

Fugitive emissions, where quantifiable, are included in the potential emissions accounting procedure to determine if a source is major. Fugitive emissions are defined as emissions that cannot reasonably be expected to pass through a stack, vent, or functionally equivalent opening, such as a chimney, roof vent, or roof monitor. Because fugitive emissions vary widely from source to source, they must be quantified through a source-specific analysis.

Although fugitive emissions are to be included in the determination of potential emissions, secondary emissions, or those emissions associated with the source but not emitted by the source itself, are not included in the in the calculation of potential emissions. Secondary emissions, however, must be considered in other aspects of the PSD analysis when a PSD review is required.

The primary step in assessing the applicability of both new and proposed modifications focuses on whether the source is a major or minor source. A source is major if 1) it is one of the 28 named source categories (Table 2-1) listed in Section 169 of the Act and emits or has the potential to emit 100 tons/yr or more of any pollutant regulated by the Act, or 2) it is an unlisted stationary source that emits or has the potential to emit 250 tons/yr or more of any pollutant regulated by the Act.

The first applicability test involves the application of the 100 or 250 tons/yr emission threshold against the total potential emission estimates for each pollutant emitted by the source. If any regulated pollutant equals or exceeds the applicable 100 or 250 tons/yr criterion, the source is designated as a major stationary source.

A modification is generally a physical change in a stationary source or a change in its method of operation that increases the source's actual emissions of any pollutant regulated under the Act. A major modification subject to PSD review is defined as "any physical change or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the Act."

As shown in Table 2-2, a significant emission rate has been established for each pollutant regulated under the Act. These rates range from 100 tons/yr for CO to less than 1 lb/yr for beryllium. To determine if a significant emission increase has occurred, one must evaluate the net change in the actual emissions that may have resulted from the modification. In evaluating

TABLE 2-1. NAMED PSD SOURCE CATEGORIES

1. Fossil fuel-fired steam electric plants of more than 250 million Btu/h heat input
2. Coal cleaning plants (with thermal dryers)
3. Kraft pulp mills
4. Portland cement plants
5. Primary zinc smelters
6. Iron and steel mill plants
7. Primary aluminum ore reduction plants
8. Primary copper smelters
9. Municipal incinerators capable of charging more than 250 tons of refuse per day
10. Hydrofluoric acid plants
11. Sulfuric acid plants
12. Nitric acid plants
13. Petroleum refineries
14. Lime plants
15. Phosphate rock processing plants
16. Coke oven batteries
17. Sulfur recovery plants
18. Carbon black plants (furnace process)
19. Primary lead smelters
20. Fuel conversion plants
21. Sintering plants
22. Secondary metal production plants
23. Chemical process plants
24. Fossil-fuel boilers (or combinations thereof) totaling more than 250 million Btu/h heat input
25. Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels
26. Taconite ore processing plants
27. Glass fiber processing plants
28. Charcoal production plants

TABLE 2-2. SIGNIFICANT EMISSION RATES[a]

Pollutant	Emission rate, tons per year
Carbon monoxide	100
Nitrogen oxides	40
Sulfur dioxide	40
Particulate matter	25
Ozone (VOC)	40 (of VOC's)
Lead	0.6
Asbestos	0.007
Beryllium	0.0004
Mercury	0.1
Vinyl chloride	1
Fluorides	3
Sulfuric acid mist	7
Hydrogen sulfide (H_2S)	10
Total reduced sulfur (including H_2S)	10
Reduced sulfur compounds (including H_2S)	10
Any other pollutant regulated under the Clean Air Act	Any emission rate
Each regulated pollutant	Emission rate that causes an air quality impact of 1 $\mu g/m^3$ or greater (24-h basis) in any Class I area located within 10 km of the source

[a]Extracted from 40 CFR 52.21(b)(23).

the net change, certain contemporaneous emission changes must be considered with the increase from the modification. All changes are assessed on the basis of actual emissions. Actual emission estimates are generally based on 1) reasonable engineering assumptions regarding actual emission levels over a 2-year history, or 2) permitted allowable emissions determined on a site-specific, case-by-case basis. The net increase is calculated by the following formula:

Net increase: = Change in actual emissions from the proposed new and modified emission unit - [(minus) creditable contemporaneous actual emission decreases + (plus) creditable contemporaneous actual emission increases].

To be contemporaneous, a change in actual emissions must have occurred after January 6, 1975. The change must also occur within a period beginning 5 years before the date construction is scheduled to commence on the proposed modification and ending with the modification. Figure 2-1 shows a procedure for determining a creditable contemporaneous change. In general, to be creditable the following must occur:

- Reduction must be Federally enforceable under the applicable SIP or PSD review authority on and after the date the construction on the modification begins.
- Reduction must occur before construction of the new or modified emission units.
- Reductions must be of the same pollutant type and must be qualitatively equivalent in their effects on public health and welfare.

Any change, whether an increase or decrease, cannot be credited more than once. Also, a change in SO_2 or PM that does not affect the allowable PSD increment consumption is not creditable. In summary, any change that occurs after the established baseline date may be considered for possible credit as a contemporaneous change.

The second applicability test involves comparing the change in emissions against the significant levels to determine if the modification results in a significant emission increase. A significant increase at a major stationary source constitutes a major modification subject to PSD review.

Applicability tests must be performed for <u>each</u> regulated pollutant emitted from the proposed construction. For PSD review to be required, the

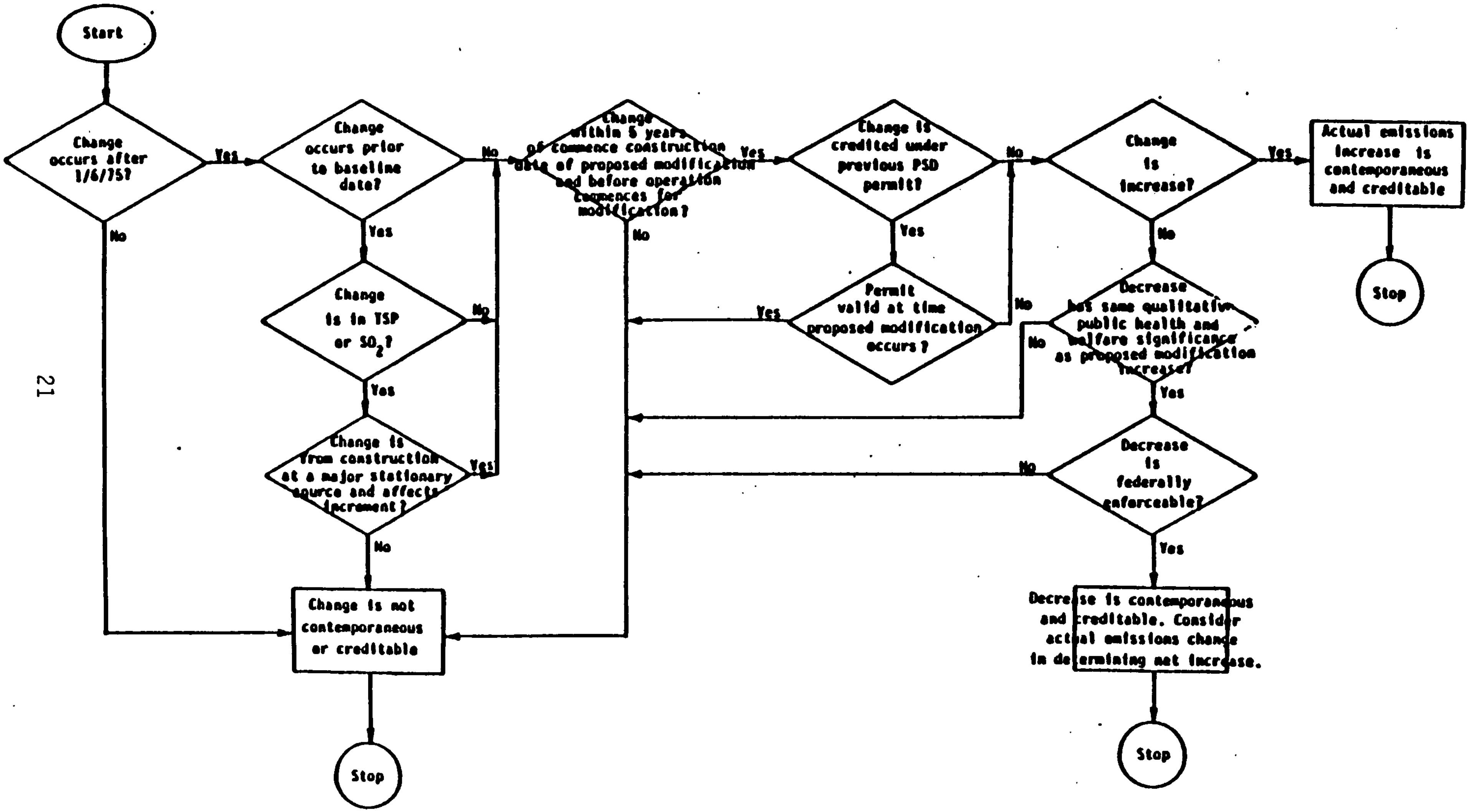

Figure 2-1. Creditable contemporaneous changes.[1]

criteria for each test need only be satisfied for one pollutant and not necessarily for the same pollutant that makes the source major.

Emission increases at existing minor sources must also be examined for applicability to PSD review as a modification in and of itself could be major because the modification could increase emissions by greater than 100 or 250 tons/yr. In addition, a modification could make the source a major source because the emissions at the source accumulate. Thus, a minor source would become a major source as a result of the modification and although the modification which caused the source to be a minor source would not be subject to PSD, all future significant increases would be subjected to PSD review.

2.3 POLLUTANT APPLICABILITY DETERMINATION[1,2]

The PSD review requirements only apply in certain geographic areas of the country. Specifically, PSD applies to construction in those areas designated as attainment or unclassified areas for any criteria pollutant. Construction involving only pollutants for which an area is designated as nonattainment does not require a PSD permit. The construction, however, would be subject to the nonattainment provisions of the applicable SIP. The nonattainment requirements are discussed in Lesson 3.

As noted previously, applicability determinations are pollutant-specific; That is, the emissions accounting and geographic applicability to determine PSD applicability must be conducted separately for each pollutant emitted by the new source or modification subject to regulation under the Act. Currently, 17 pollutants (6 criteria pollutants and 11 noncriteria pollutants) are regulated by the Act. These pollutants are listed in Table 2-3.

After it has been determined that a new or modified source is subject to PSD review, the net actual emission increase for each pollutant must be compared against the significance criteria (Table 2-2). PSD review must be conducted for each pollutant for which a significant net increase occurs.

Applicability is determined through a systematic approach that subdivides the applicability determination process into discrete steps. New source applicability involves five such steps. Applicability for modifications follows a similar procedure and requires two additional steps. Table 2-4 presents the five steps for new source applicability and the seven steps

TABLE 2-3. REGULATED POLLUTANTS

Criteria pollutants	Noncriteria pollutants
Carbon monoxide	Aresenic (inorganic)
Nitrogen oxides	Asbestos
Sulfur dioxide	Benzene
Particulate matter	Beryllium
Ozone (regulated VOC)	Mercury
Lead	Vinyl chloride
	Fluorides
	Sulfuric acid mist
	Hydrogen sulfide (H_2S)
	Total reduced sulfur (including H_2S)
	Reduced sulfur compounds (including H_2S)

TABLE 2-4. STEPS TO DETERMINING APPLICABILITY

New Sources

1. Define the source.
2. Estimate the source's potential to emit.
3. Determine if the source is a major stationary source.
4. Determine what review requirements must be met.
5. Evaluate any exemptions.

Modified Sources

1. Define the existing source and understand the proposed modification.
2. Estimate the existing source's potential to emit.
3. Determine if the existing source is a major stationary source.
4. Determine the net emissions change due to the modification after considering creditable contemporaneous changes.
5. Determine whether a significant net emissions change has occurred.
6. Determine what review requirements must be met.
7. Evaluate any exemptions.

for modified source applicability. More information on applicability determinations can be found in SI 453 and the PSD Workshop Manual (EPA-450/2-80-081).

New major source and major modifications subject to the PSD regulations must meet the following preconstruction review requirements:

- BACT Analysis
- Air Quality Impact Analysis
- Additional Impact Analysis.

Applicable control technologies and environmental impacts for each pollutant are evaluated through these analyses. In some cases, site-specific ambient air quality monitoring may be required as part of the air quality impact analysis.

2.4 BACT PROPOSAL AND ANALYSIS[1,2]

The BACT analysis is an important step in the PSD review process for several reasons. A BACT analysis and the results it produces provide a large portion of the input data for analyses of the air quality and the additional impacts. In some cases, the results of the BACT analysis may indicate that application of efficient emission controls may exempt the proposed construction from PSD review altogehter. In addition, a comprehensive, correctly prepared BACT analysis enables an applicant to develop sufficient information to serve as the basis for corporate decisions concerning possible control strategies and simultaneously to serve as an information source to the public that would be potentially affected by the construction of the proposed source. Figure 2-2 is a flow diagram of the major elements of the BACT analysis process.

In conducting a BACT analysis, the following criteria must be considered: 1) the energy and economic costs of emission controls should be considered reasonable and 2) direct and residual risks with, and impacts on, environmental factors must be considered. The BACT analyses for the same types of emission units and the same pollutants in different locations or situations may determine the need to apply different control strategies at

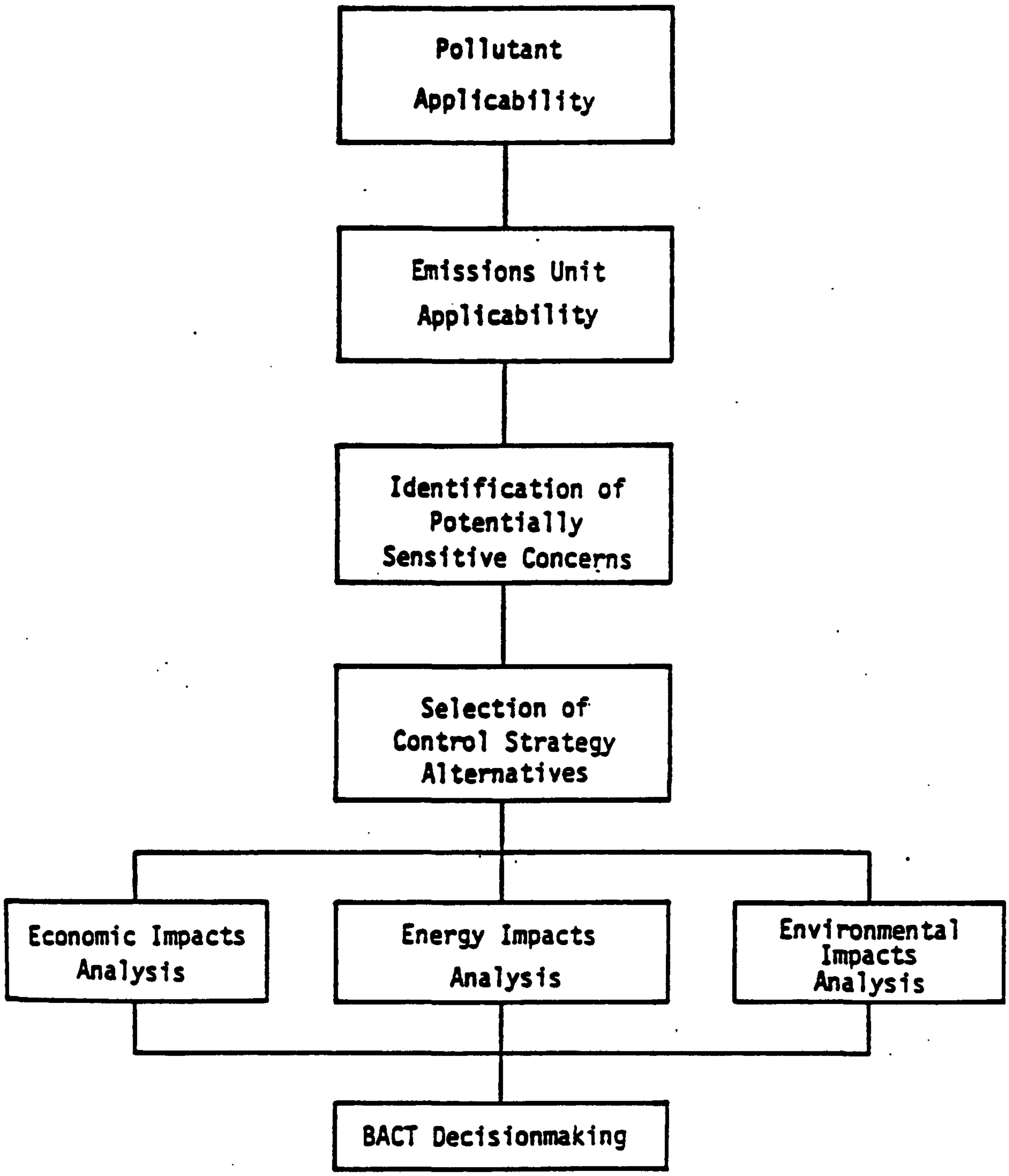

Figure 2-2. BACT process.[1]

the different sites based on site-specific factors. Therefore, a BACT determination is a case-by-case process.

The first step in the BACT analysis process is the determination of pollutant applicability. As discussed previously, all emissions at the source must be accumulated to determine if significant emissions for each pollutant will occur. This includes both stack and fugitive emissions. Also, emissions of regulated pollutants that fall into two or more categories must be accumulated in each category. For example, some reduced sulfur compounds, such as dimethyl sulfide, are also volatile organic compounds (VOC's). Because VOC's and reduced sulfur compounds are regulated as separate categories of pollutants, dimethyl sulfide emissions are accumulated in both categories.

The second step in the BACT analysis involves the determination of the emission unit applicability. All emissions units involved in a major modification or a new major source that emit or increase emissions of the applicable pollutants must undergo a BACT analysis. Because each applicable pollutant must be analyzed, many emissions units, such as combustion sources, must undergo BACT analysis for more than one pollutant.

Fugitive emissions units also must be included in a BACT analysis. The following are examples of these units:

- Valves, flanges, and pumps
- Coal, limestone, and other storage piles
- Conveyors or transport facilities
- Volatile organic liquid storage vessels.

Because fugitive emissions are difficult to quantify, BACT for these sources usually consists of equipment or work practice standards or a combination of both rather than a quantifiable allowable emission rate. For stack emissions, however, BACT consists of equipment and/or process standards and an enforceable allowable emission limit.

Emissions units that produce only secondary emissions are exempt from the BACT analysis process. The following are examples of emission units that produce secondary emissions:

- Offsite vehicles and vessels coming to and from a major stationary source
- Increased utility boiler emissions caused by increased electrical demand
- Increased offsite vehicular emissions caused by an increased number of employees.

If, however, the air quality impact analysis reveals that secondary emissions may cause potential NAAQS or increment violations, additional controls would have to be applied to eliminate the potential for such violations.

Similar emissions units should be analyzed together to consider the benefits associated with "economy of scale." For example, a flue gas desulfurization (FGD) system serving three boilers will cost less than three separate FGD systems, one for each boiler.

All affected emissions units which emit pollutants above the de minimis levels, regardless of size, must undergo BACT analysis. In light of the criterion of economic reasonableness, however, an analysis should only be as extensive as the quantity of pollutants emitted and the associated ambient air impacts. Experience has shown that extremely high costs are associated with the installation and operation of highly effective emission controls at facilities that emit small amounts of pollutants.

The third step is to identify areas of potentially sensitive concerns. A primary purpose of BACT is to minimize the consumption of PSD increment and thus expand the affected area's potential for future economic growth. Therefore, the identification of potentially sensitive concerns involving energy, economic, and environmental factors is an important part of the BACT process. Furthermore, because of the case-by-case approach of a BACT analysis, local concerns should be considered. All potentially sensitive air quality concerns should apply specifically to the case under review. Insofar as possible, they should be quantifiable so the possible impacts of various control alternatives can be compared.

The fourth step involves the selection of alternative control strategies. One important part of the BACT analysis is the identification of applicable alternative control strategies. Information on possible alternative control strategies and their emission reduction efficiencies can be obtained from industry surveys and from EPA literature that describes the application of emission control techniques.

In selecting an alternative control strategy, the source must first determine its technical feasibility. A technically feasible control strategy is one that has been demonstrated to function efficiently on identical or similar processes. Control techniques that have not been so demonstrated but could achieve greater emission reductions (or efficiency) than those currently in use are classified as innovative control techniques. To encourage their use, the PSD regulations provide special consideration for innovative control techniques.

A base case should be established against which the alternative control options could be ranked and considered quantitatively. The base case would be the control option that, in the absence of BACT decisionmaking, would normally have been applied. The choice of the base case may be dictated by other existing regulations, or by company practice standards or choices, if the latter provides a greater degree of emission reduction than that required by existing regulations such as NSPS, NESHAPS, etc.

With the creation and analysis of a base case, alternative control options affording a greater degree of continuous emission reduction than the base case can now be ranked in order of control efficiency and analyzed accordingly. The only exception to this requirement would be when applicant has demonstrated that the chosen control strategy (i.e., the base case) provides the highest degree of emission reduction available. This would preclude the requirement for an analysis of alternative options. The various alternative control strategies can represent existing technology, transferable emission control technology, and innovative control technology. Processes that inherently produce less pollution should also be considered as alternatives.

Familiarity with previous BACT determinations can serve as a guide for review and consideration of the proposed control options. A helpful source of this information is the BACT/LAER Clearinghouse. Because BACT is a case-by-case decision, however, similar emission units at different sources may require significantly different control options.

After an alternative set of control options have been identified, each option must be analyzed. The analysis must include 1) an economic impact analysis, 2) an energy impact analysis, and 3) an environmental impact analysis. These analyses should identify quantifiable impacts.

Table 2-5 is an example of a table that can be used to conduct the impact analyses. The completed form enables both the Agency and the applicant to compare the results of the impact analyses.

The economic impacts analysis addresses all the costs of emission control. Traditional engineering and accounting procedures should be used to calculate the capital costs. Where necessary, standard engineering assumptions should be used. Information on equipment costs can be found in several sources, such as a current Chemical Engineering Equipment Buyers' Guide. U.S. Internal Revenue Service criteria should be used to determine equipment life expentancy.

All standard operating costs, from labor costs to insurance costs, should be determined. The expected escalation of these costs over the life of the control equipment should be incorporated into these cost determinations. The costs of rectifying problems created by the control technique also should be estimated; for example, the sludge disposal costs of sludge-producing scrubbers should be examined.

For consistency and ease of comparison, and in recognition of changing or variable tax environments, all data should be reported on a "before-taxes" basis. Some special tax situations may be of significant economic importance, however; these situations should be noted, and their estimates should be provided in addition to the "before-taxes" data. An example of such a situation would be a significant tax advantage for certain energy-conservation projects.

Determination of the relative economics of the alternative control options should include a comparison of both total and incremental annual costs of the options to demonstrate the incremental costs of residual emission reduction. Incremental costs entail a comparison of the emission reduction costs of two or more control options. Pollutant quantity reduction should be determined on an annual or some other logical, cyclical basis that permits a realistic calculation of emissions that considers maintenance or any other downtime associated with the emission unit being reviewed. The alternative control option being analyzed is assumed to be operating in full compliance with the expected allowable emission and permit limitations. In

TABLE 2.5. COMPARISON OF CONTROL STRATEGY ALTERNATIVES[1]

POLLUTANT: ______		ECONOMIC IMPACTS			ENVIRONMENTAL IMPACTS			ENERGY IMPACTS		
Control alternative	Percent reduction	$/ton incremental	$/ton total	Impact on sensitive issues	Maximum G.L.C.'s[a,b]	Impact areas (km)	Impact on sensitive issues	Btu/ton incremental	Btu/ton total	Impact on sensitive issues
1. Best	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
2. Second highest	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
3. Other	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
4. Base case	( )	______	( )	( )	( )	( )	( )	______	( )	( )

[a]G.L.C. is ground-level concentration.

[b]Units of $\mu g/m^3$ - specify averaging period.

the case of alternative control strategies that abate emissions of more than one applicable pollutant, the control costs should be divided among all applicable pollutants and then included in each pollutant's analysis.

Significant impacts of the following economic factors should be considered in the BACT analysis: 1) pollution-specific costs (dollars per ton of emissions controlled), 2) additional product costs (cents per unit of production), and 3) the ability to secure financing for the alternative control strategy. Although no universally accepted criteria exist for determining the dollar value of the elimination of a ton of a particular pollutant, information is available on the value of various emissions reductions that EPA and affected industries generally agree are reasonable. This information can be found in the background information documents (BID's) issued by EPA to support NSPS. An NSPS is designed to reflect the degree of emission reduction achievable through the application of the best technological system of continuous control taking into consideration the cost of achieving the emission reduction and any nonair quality health and environmental impact and energy requirements. If information and data in these documents are used to compare pollutant control costs, the procedures and assumptions used in the case-by-case analysis should be identical to those used in the NSPS development. Through a survey of relevant BID's, general guidelines can be developed for estimating the cost to control a particular pollutant. All BID information used in the BACT analysis should be cited for future reference.

Additional product costs resulting from the alternative control strategies also should be included in the economic impact analysis. The percentage of total manufacturing costs that the cost of additional emission control represents should be included in this evaluation. This information will determine if, and to what degree, the applicant will be at a competitive disadvantage in the marketplace because of the cost of an alternative control option. For example, if an additional 5 cents per pound of product for emission control creates an intolerable increase in product cost, this information should be considered in making the BACT determination.

The ability to secure financing is also a critical consideration. If an applicant's plans to expand a plant require outside financing, additional financing required for an alternative control strategy may jeopardize the financing of the entire project.

The second analysis to be conducted for each alternative control strategy addresses energy impacts. Because the dollar value of energy costs can be significant, the energy impact analysis actually should be conducted before the economic impact analysis, although energy is just one of the elements considered in the latter analysis. The energy impact analysis should consider only direct energy consumption, not indirect energy impacts. Direct energy impacts should also be evaluated on both a total and a pollutant-specific basis.

As in the economic analysis, energy impacts should be determined and analyzed on both an absolute and an incremental cost basis. Because energy costs consist of fuel usage, they should be converted to Btu's and barrels-of-oil equivalents. Finally, in some cases, the combustion of fuels to provide energy for alternative control strategies might result in direct emissions of pollutants. These emissions, however, should be considered in the environmental impact and air quality analyses.

Consideration of environmental impacts is essential to the primary purpose of a BACT analysis, which is to minimize the consumption of PSD increments and to preserve the ambient concentrations of criteria pollutants so as to maintain the potential for future economic growth.

The environmental impact analysis should include an air quality impact analysis. It should consider the maximum ground-level impact and ground-level concentrations that could result from the emissions from the proposed new source or modification after each alternative control strategy is applied, as well as the size of the area significantly affected by these increased emissions (i.e., the impact area).

Using a modeling analysis of worst-case conditions, the maximum ground-level impacts and ground-level concentrations resulting from the hypothetical application of each alternative should be determined. This analysis is also used to determine the impact area of each alternative. Using the worst-case approach produces an analysis of the risks associated with the pollutant concentration for the exposed population. For example, consider a situation in which the use of low-sulfur fuel is compared with the use of an FGD system to control SO_2 emissions from a boiler. Although the SO_2 emissions resulting from an FGD system may be significantly less than from the burning of low-sulfur fuel, because of different stack parameters, dispersion modeling showed resulting SO_2 ambient impacts to be essentially the same in both cases. Because the FGD system achieves a lower SO_2 emission rate, however, the impact area of the FGD system would be significantly smaller and therefore affect less population. This factor may be significant in the analysis.

The applicant also should consider any other significant environmental impacts that result from the application of specific alternative control strategies. Scrubbers, for example, may affect water quality and land use, whereas strategies involving cooling towers may affect visibility. Such impacts should be discussed and summarized along with other pertinent data.

2.5 AMBIENT AIR QUALITY ANALYSIS[1,2]

A key element of the PSD review process is the air quality analysis. The source must demonstrate that neither NAAQS nor an allowable PSD increment will be violated as a result of the emissions from a new major source or a major modification subject to the PSD requirements. An air quality analysis must be conducted for each regulated pollutant subject to PSD review that is expected to be emitted from the proposed construction or one whose emission is expected to increase significantly. An air quality analysis is also required in certain cases involving insignificant pollutant emissions from sources located near Class I areas.

The five basic steps in an air quality analysis are:

1. Defining the impact area of the proposed major source or major modification for each applicable pollutant
2. Establishing appropriate inventories of each applicable pollutant from all sources contributing to air quality in the impact area
3. Determining existing ambient air concentrations of those pollutants
4. Performing a screening analysis for each applicable pollutant
5. Determining projected air quality resulting from emissions of applicable pollutants.

Depending on the amount and types of regulated pollutants subject to an air quality analysis, may include as many as three separate but interrelated phases:

1. Performance of an increment consumption analysis for proposed sulfur dioxide and particulate matter emissions for comparison with allowable increments

2. Determination of existing air quality for all pollutants subject to the air quality analysis

3. Analysis of projected future air quality for all applicable criteria pollutants and any applicable noncriteria pollutants that the reviewing authority determines should be evaluated. The purpose of this phase is to determine if any NAAQS violation or very high ambient concentration of noncriteria pollutants will result that may pose a threat to health or welfare.

Where increments exist for sulfur dioxide and particulate matter, the ambient air quality analysis consists of two components, baseline concentration and increment concentration.

Baseline concentration is the adjusted ambient concentration at a given location at the time after August 7, 1977, when the first complete PSD application was submitted for a proposed major source or for major modifications subject to EPA's PSD regulations as amended August 7, 1980. The adjustment to this ambient concentration compensates for the impacts of actual emission changes resulting from construction of major stationary sources commencing after January 6, 1975. The baseline concentration also includes projected emissions of major sources whose construction commenced before January 6, 1975, but were not in operation as of the baseline date. Conversely, increment concentration is, generally that portion of ambient air concentration in an area that results from:

- Increases and decreases in emissions from major stationary sources resulting from construction that began after January 6, 1975
- Increases and decreases in emissions from all stationary sources occurring after the baseline date.

Increment consumption and expansion are usually based on actual emissions. If little or no operating data are available, however, as in the case of permitted emission units not in operation at the time of the increment analysis, the allowable emission rate must be used. In addition, if allowable emissions are the result of a case-by-case new source review, the PSD applicant may presume, subject to the approval of the reviewing agency, that allowable emissions may be used to represent actual emissions.

To obtain a permit, the source must demonstrate that the proposed emissions in conjunction with other applicable emissions will not cause or contribute to violations of the allowable increment and the NAAQS for SO_2 and PM. Both increment and total ambient concentration standards exist for annual and 24-hour periods, as shown in Table 2-6. In addition, a 3-h allowable increment and NAAQS exist for SO_2. The NAAQS are defined in terms of total ambient pollutant concentrations that are not to be exceeded more than once per year for other than an annual time period. Allowable increments are defined as maximum allowable increases in ambient air concentrations that also are not to be exceeded more than once per year for other than an annual time period.

TABLE 2-6. ALLOWABLE CONCENTRATIONS FOR SO_2 AND PM ($\mu g/m^3$)

Pollutant/time period	Controlling NAAQS	Class II increment
Particulate Matter		
° Annual	75	19
° 24-hour	150[a]	37[a]
Sulfur Dioxide		
° Annual	80	20
° 24-hour	365[a]	91[a]
° 3-hour	1,300[a]	512[a]

[a]Not to be exceeded more than once a year.

As indicated in the PSD regulations, all PSD areas are to be classified as Class I, Class II, or Class III areas, and different allowable increments of SO_2 and PM concentrations have been established for each type of area (Table 2-7). The most restrictive allowable increments are for Class I areas, which represent certain international and national parks and wilderness areas. All other PSD areas have initially been designated as Class II areas. Under certain conditions and with the concurrence of its Governor and legislature, a State can designate a Class II area as Class III

TABLE 2-7. ALLOWABLE PSD INCREMENTS (μg/m³)

	Class I	Class II	Class III
Sulfur Dioxide			
° Annual	2	20	40
° 24-hour	5[a]	91[a]	182[a]
° 3-hour	25[a]	512[a]	700
Total Suspended Particulate Matter			
° Annual	5	19	37
° 24-hour	10[a]	37[a]	75[a]

[a]Not to be exceeded more than once a year.

and thereby allow greater potential for industrial growth. Under no circumstances can air quality deteriorate beyond levels allowed by the NAAQS, regardless of the area's compliance status with applicable increments. An example is a Class II area for which the annual SO_2 baseline concentration is determined to be 70 micrograms per cubic meter. Although the allowable PSD increment permits the annual SO_2 concentration to increase by 20 micrograms per cubic meter, a PSD applicant must demonstrate that, as a result of operation of the new major source or modification, the SO_2 concentration in that area will not increase beyond the NAAQS of 80 micrograms per cubic meter, an increase of only 10 micrograms. On the other hand, if the annual SO_2 baseline concentration in the area is only 40 micrograms per cubic meter, the PSD applicant must demonstrate that SO_2 air quality will not deteriorate beyond 60 micrograms per cubic meter in that area. In the latter case, demonstration of compliance with the allowable PSD increments also demonstrates that the NAAQS for annual SO_2 concentration will not be violated.

As previously noted, the baseline concentration is established in an area for a given pollutant as of the date after August 7, 1977, on which a complete PSD application that is subject to the 1980 amended PSD regulations is submitted. The baseline date is established for a given pollutant only if the increase in emissions of that pollutant is significant. For example, a PSD application for a new major source or modification that proposes significant SO_2 emissions but insignificant PM emissions will trigger the establishment of the SO_2 baseline date only. Therefore, the baseline dates for SO_2 and particulate matter may be different in the same area.

The area in which the baseline date is triggered by a PSD permit application is known as the baseline area. The extent of a baseline area is confined to intrastate areas and the area or areas designated as attainment or unclassified under Section 107 of the Act in which the proposed major source or major modification is located or will have a significant impact. This baseline area includes all portions of any Section 107 area that the source emissions affect. For this purpose, such an impact is defined as an annual increase in ambient concentrations of the applicable pollutant of at least 1 microgram per cubic meter. Under Section 107 of the Act, all areas of the country have been given either an attainment, a nonattainment, or an unclassified designation for each criteria pollutant.

Figure 2-3 demonstrates the baseline concept. A new major source with significant SO_2 emissions proposes to locate in County C and submits a complete PSD application to the appropriate reviewing authority on October 6, 1978. A review of the SO_2 attainment designation reveals that attainment status is listed by individual counties in the State. County C is designated attainment for SO_2 and the source proposes to locate there; therefore, the baseline date for SO_2 is triggered for all portions of that county. Dispersion modeling of proposed SO_2 emissions in accoradance with approved methods reveals that the annual SO_2 impact area of the proposed source extends into Counties A and B. The baseline date is thus triggered in all parts of these two counties also. Although the proposed emissions will consume the SO_2 increment in the State to the north, the baseline date remains untriggered unless it has been previously triggered by a PSD permit application in that Section 107 area of the other State. Note that increment-consuming emissions affect the increment concentration at all places where they have an ambient impact regardless of the baseline date, including out-of-state areas.

Most emissions changes that will affect the increment occur at major stationary sources; therefore, the most significant date to consider for increment tracking is January 6, 1975, the date after which emissions

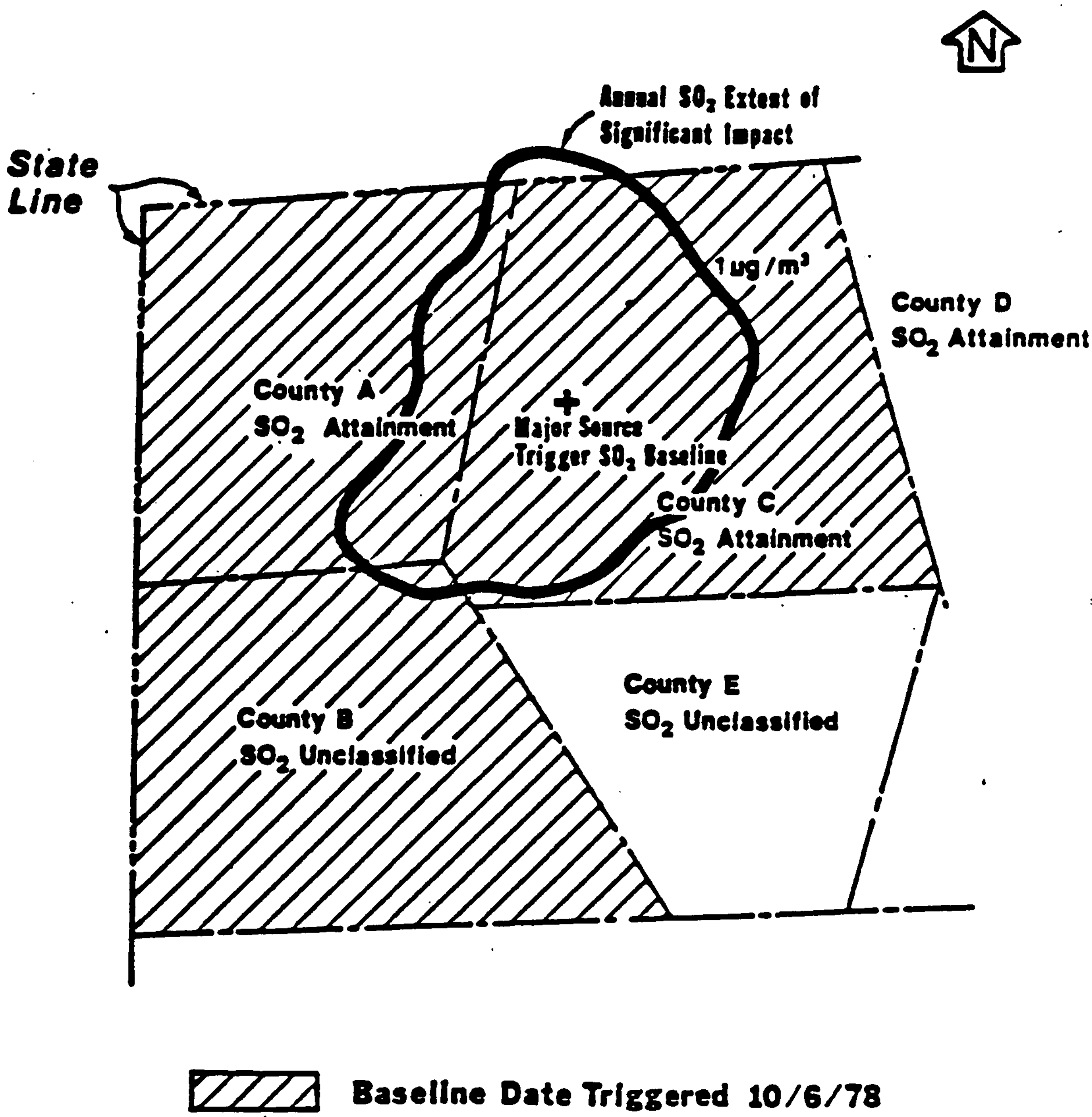

Figure 2-3. Example 1 of baseline area concept.[1]

resulting from construction at major stationary sources affect the increment. Once triggered, the baseline date establishes the time after which all other emissions changes at stationary sources affect the increment. A State, however, may propose and be granted approval to redesignate the boundaries of a Section 107 area. This action may "untrigger" the baseline date and thus reduce the inventory of emissions in the redesignated area that affects increment. For example, as shown in Figure 2-4, part of County A has been redesignated as separate the Section 107 area after the baseline date had been triggered. If the baseline date has not been established by another PSD application in the redesignated portion of the area, the SO_2 emission changes occurring after October 6, 1978, from minor and area sources and nonconstruction-related activities at all sources in this area will be transferred into the baseline concentration. Under no circumstances can any boundary of the redesignated area intersect the line around the annual impact area of the source triggering the baseline date.

The previous example demonstrated the effect of the annual impact area of a PSD source triggering the baseline date. For all sources and modifications subject to PSD review, impact areas of applicable pollutants should also be established, but for another reason. They should be determined where the proposed emissions will produce significant ambient concentrations in order to determine compliance with applicable ambient air standards and increments. The impact area should be established for each applicable pollutant for each averaging time for which an NAAQS exists. As shown in Figure 2-5, the impact area is a circular area whose radius is equal to the greatest distance from the source at which approved dispersion modeling shows the proposed emissions will have a significant impact. Table 2-8 gives the values of significant ambient air impacts.

Before continuing with the impact area determination, the design heights of stacks proposed to be constructed or otherwise used to emit pollutants subject to the air quality analysis should be addressed. The good engineering practice (GEP) stack height regulations include specific equations and methods for use in determining GEP stack heights. Unless the applicant can demonstrate by acceptable methods that the stack or stacks must be constructed at a height that exceeds the height determined by the GEP formula, dispersion modeling must be performed at the actual or GEP stack height,

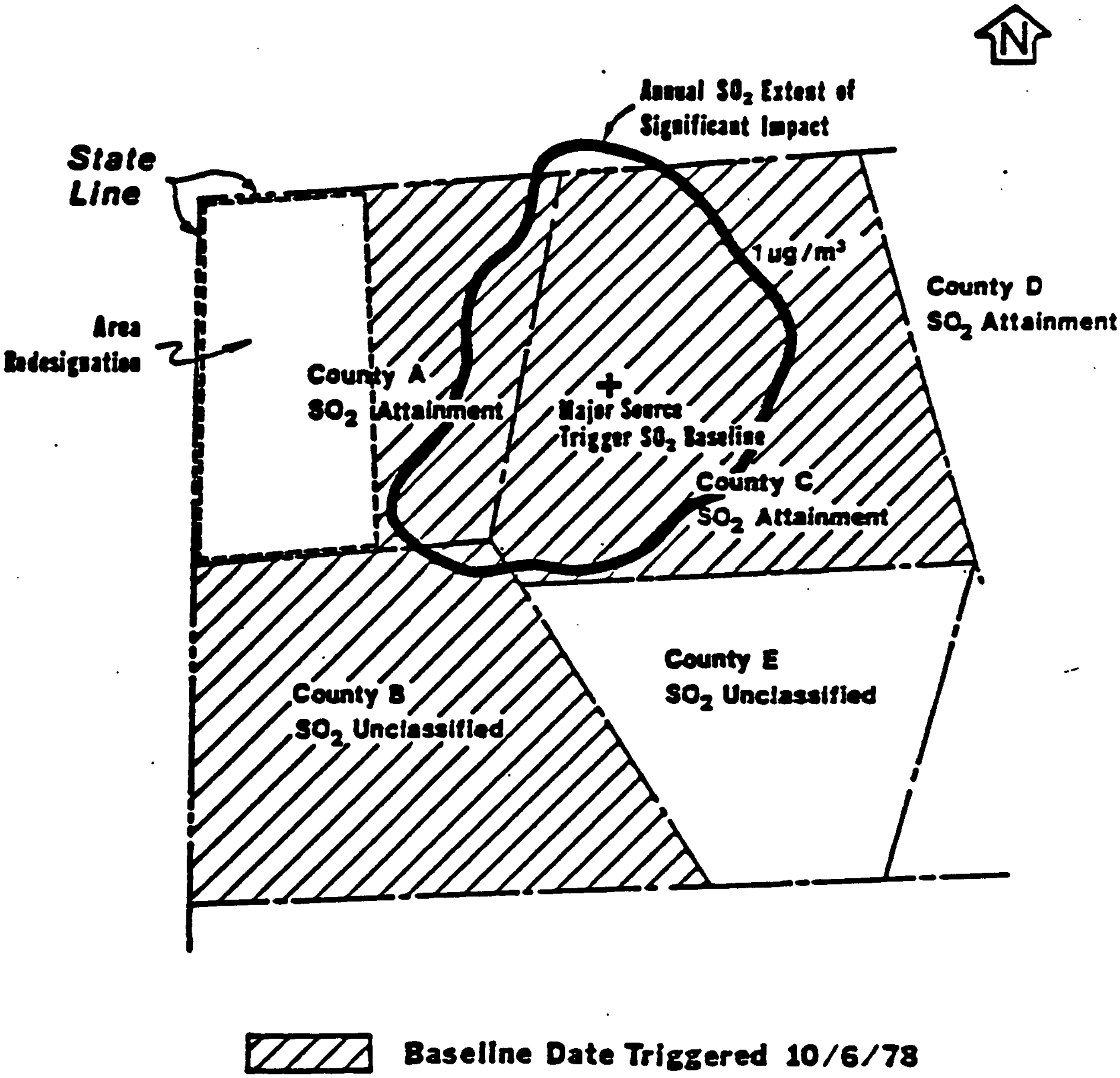

Figure 2-4. Example 2 of baseline area concept.[1]

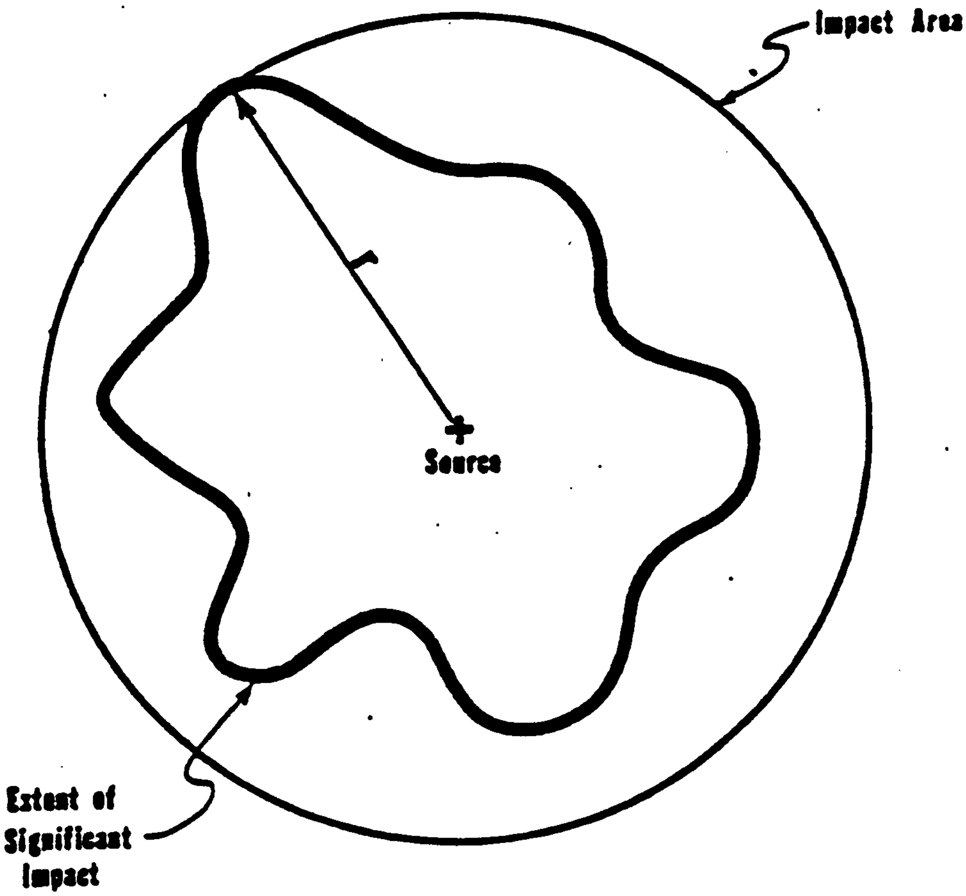

Figure 2-5. Impact area.[1]

TABLE 2-8. SIGNIFICANCE LEVELS FOR AIR QUALITY IMPACTS

Pollutant	Averaging time				
	Annual, μg/m³	24-hour, μg/m³	8-hour, mg/m³	3-hour, μg/m³	1-hour mg/m³
SO_2	1	5		25	
TSP	1	5			
NO_2	1				
CO			0.5		2

whichever is lower. If a source proposes increasing existing stack height in conjunction with a proposed modification, it will have to demonstrate through acceptable methods (fluid modeling or field studies) that the additional height is required to avoid excessive concentrations due to downwash. If, on the other hand, the actual stack height is significantly less than the GEP height, excessively high concentrations could result from downwash. In such a case, there must be a dispersion modeling demonstration that no violations of any increment or NAAQS will result from downwash. The Huber-Snyder downwash calculation method incorporated into some dispersion models is an acceptable technique for this purpose.

The latest revisions of EPA documents Guideline on Air Quality Models and the Guidelines for Air Quality Maintenance Planning and Analysis, - Volume 10 and the Air Pollution Training Courses on Dispersion Modeling, 423 and SI410, provide acceptable dispersion modeling procedures. Because the air quality analysis must be conducted on a case-by-case basis, a dispersion modeling plan should be submitted to the reviewing agency for comment and concurrence before conducting detailed analyses. The dispersion modeling plan should include at least the following information:

- Nature of proposed construction
- Pollutants to be modeled
- Site characteristics
- Topography within 50 kilometers of site

- Proposed dispersion model and meteorological data
- Proposed use of dispersion model options
- Emissions data.

Determination of the impact area of the proposed new source or modification must include all direct emissions, including both stack and quantifiable fugitive emissions of the applicable pollutants. Temporary emissions, however, such as those related to construction, need not be considered.

The dispersion model input emission data should be based on the worst-case condition for the time period of concern. The worst-case condition is generally the maximum emission rate. Depending on operating and stack characteristics, however, the worst-case condition may not be represented by the maximum emission rate.

If used actual measured meteorological data should be obtained from either site-specific meteorological monitoring or the National Weather Service station closest to the site. If onsite data are used, the selected period should be demonstrated to be typical of the area. If, for example, a chosen period indicates abnormally high amounts of rainfall, that period may not be typical. If National Weather Service information is used, 5 years of meteorological data will generally be required for input into the dispersion models.

If preliminary dispersion modeling demonstrates that proposed emissions of a criteria pollutant will have no significant impacts, further air quality analysis of that pollutant will generally not be required unless the source is located near a Class I area. In such a case, an air quality analysis of the pollutant may be required if the proposed emissions are expected to exceed 1 microgram per cubic meter on a 24-hour basis in the Class I area.

Depending on the specific pollutant predicted to result in a significant impact, three inventories of emissions may have to be established:

1. An inventory of increment-consuming PM or SO_2 emissions.
2. An inventory of all existing emissions of applicable pollutants having an effect on air quality in the impact area of the proposed emissions.
3. An emission inventory of applicable pollutants from permitted emission units not yet operating that may affect the air quality in the impact area.

If an air quality analysis is required for PM and SO_2 emissions, and both pollutants are predicted to have significant impacts, an increment inventory should consist of all PM and SO_2 increment-consuming emissions within the impact area and those emissions outside the impact area that could have a significant impact within the impact area. Thus, a source may have to consider large sources as far away as 50 kilometers outside its own impact area for increment-consuming emissions. On a short-term basis such as a 24-hour or a 3-hour period, the applicant generally need only identify those increment-consuming emissions within the respective impact area. For annual impact determinations, however, large emission sources as far as 50 kilometers from the impact area may have to be considered because of their impact within the applicant's area of impact.

As shown in Figure 2-6, the annular ring outside the impact area is called the screening area. In determining which emission sources in the screening area should be added to the emission inventory, three criteria should be considered: 1) annual emissions of the source, 2) degree of ambient impact, and 3) distance from the impact area. For example, a source emitting 100 tons per year and located 10 kilometers from the impact area generally can be excluded from the inventory because its effect on air quality in the impact area is expected to be insignificant. On the other hand, a source emitting 10,000 tons per year source and located 40 kilometers from the impact area would probably have to be considered in the increment analysis. A simple screening modeling analysis can be used to justify the exclusion of certain emissions from this analysis. Such exclusions should be justified and documented.

After the emission units to be included in the emission inventory have been identified, the emission rates must be determined for input into the proper dispersion model. Although allowable PSD increment consumption is based on actual emissions, the first effort to perform an increment analysis should be based on allowable emissions for the following reasons:

1. Allowable emissions rates are more readily available from State emission files.

2. The resulting analysis will be more conservative.

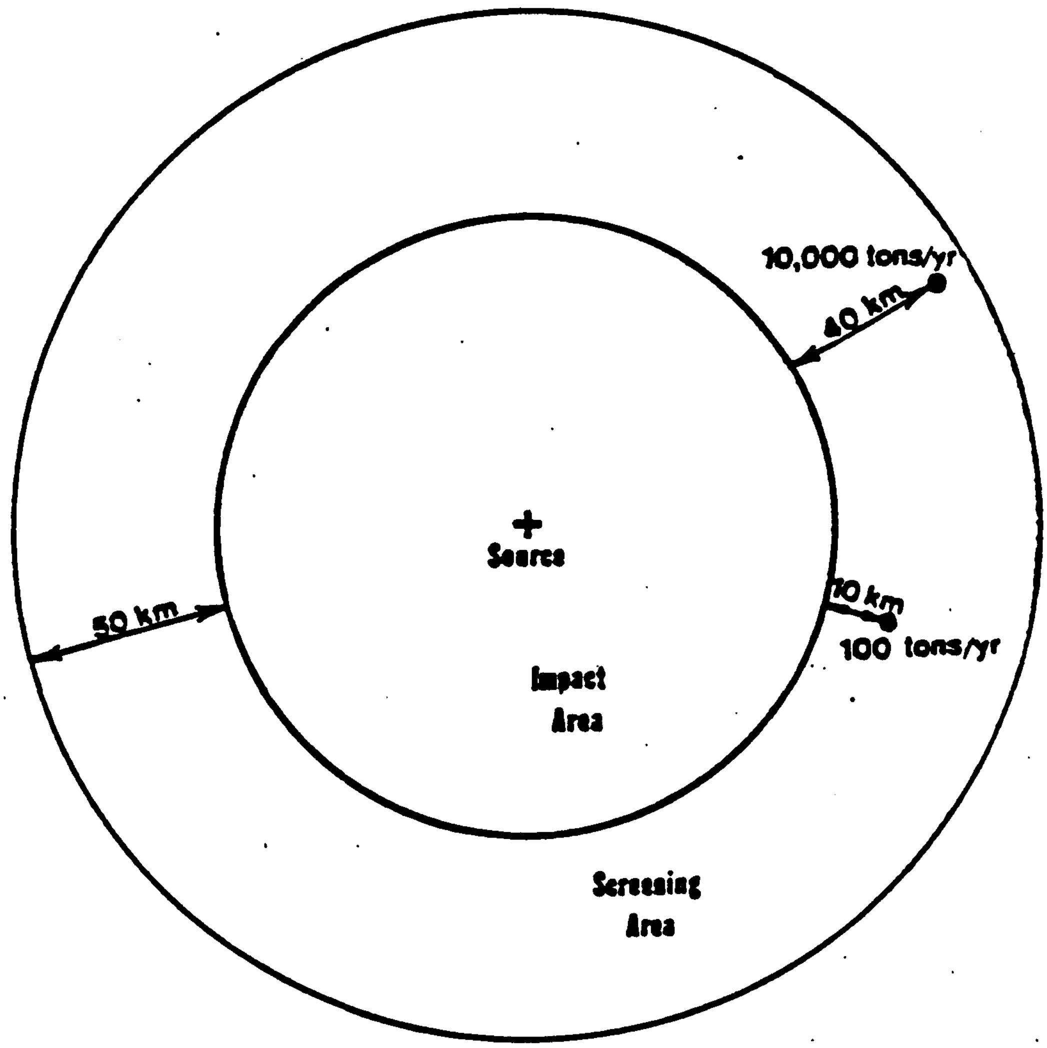

Figure 2-6. Emissions inventory screening area.[1]

State air emission files are the proper source of emission information. If dispersion modeling with allowable emissions fails to demonstrate compliance with allowable PSD increment consumption, actual emissions data should be used.

Emission inventories for the last two categories are needed to demonstrate compliance with the applicable NAAQS and should be gathered and compiled in a similar manner as the increment emissions inventory. For existing sources, this inventory should be based on actual emissions if data are available. Actual emissions should be used in this case to reflect the impact that would be detected by ambient air monitors. When permitted emission units are not yet in operation, the allowable emission rates must be used.

Perhaps one of the most critical aspects of PSD review is the requirement that the source owner provide up to 1 year of preconstruction monitoring data. This requirement applies to all applicable criteria pollutants (with the exception of nonmethane hydrocarbons) that the source would emit in significant amounts; however, it may apply to some noncriteria pollutants as well. Generally, continuous ambient air monitoring data will be required for all criteria pollutants whose emissions will increase significantly. If, however, predicted impacts or existing air quality in the source's impact area are less than the significant levels, then, at the Administrator's discretion, site-specific monitoring may not be required. Therefore, the first step in determining monitoring requirements is to estimate source impacts on the air quality and to determine the total existing air quality in the area.

A source can satisfy the monitoring requirement in two ways. First, under certain conditions, the applicant may rely on existing continuous monitoring data collected by Federal, State, or local air pollution control agencies. Second, the source can conduct site-specific monitoring for those pollutants that the proposed source is expected to emit in significant amounts. The EPA has published specific guidelines for monitoring in the latest revision of Ambient Monitoring Guidelines for Prevention of Significant Deterioration. Meteorological monitoring is generally required during site-specific monitoring.

Before using existing data, the applicant must first verify that the data meet certain criteria: 1) sufficiency or completeness, 2) representativeness, and 3) reliability. Although State and local agencies have generally monitored ambient air quality for several years, all the data collected are not necessarily adequate for the preconstruction analysis required under PSD. The ambient monitoring guidelines and the PSD review agency should be consulted for the minimum requirements on the usefulness of the data.

When site-specific monitoring is necessary, the requirements focus on site selection and quality assurance. The site selection process involves dispersion modeling analyses of existing sources and of the proposed emissions to locate ambient air monitors.

The primary requirement for site-specific monitoring is that the owner or operator of the proposed source meet the quality assurance requirements of Appendix B to 40 CFR Part 58 during the operation of monitoring stations. The quality control program developed by the organization operating the monitoring network must be described in detail, be suitably documented, and be approved by the permit-granting authority.

Long before a monitoring program begins, the source should submit a monitoring plan to the permit-granting authority for comment and approval. The monitoring plan should include, at a minimum, a description and discussion of the following items: 1) the network, 2) the monitoring site, 3) the monitor, 4) the sampling program, and 5) the quality assurance program. The EPA guidelines on PSD monitoring describe these requirements in greater detail.

After collecting and screening the data, the source should integrate the monitoring results into the air quality analysis. The amount of data and manner of presentation in the application depend on the requirements of the permit-granting authority. At a minimum, the data should be presented in a summary format showing highest and second highest concentrations for pollutants with short-term standards and the appropriate long-term average associated with each standard. These concentrations effectively describe the existing ambient concentrations within the impact area that are attributable to actual emissions from existing sources.

In many cases, monitoring data may have to be adjusted to compensate for new emissions permitted in the impact area but not occurring during the monitoring period. The emissions inventory used for adjusting the monitoring data should be gathered in the previously described manner and should be used to adjust the monitoring data by proper dispersion modeling procedures.

In conclusion, all applications for a PSD permit subject to the requirements of the air quality impact analysis must include complete and accurate analyses to ensure compliance with the NAAQS and the PSD increments. To demonstrate compliance, the source must:

1. Define the impact area
2. Compile an emission inventory
3. Determine existing air quality
4. Determine the projected air quality.

2.6 ADDITIONAL IMPACTS ANALYSIS[1,2]

All sources requiring a PSD permit must prepare an additional impacts analysis for each pollutant subject to review. This analysis is concerned with determining the air pollution impacts on soils, vegetation, and visibility caused by emissions from the source or modification under review and the emissions resulting from any associated growth.

The three basic purposes of an additional impacts analysis are:

1. To determine the effects of emissions of the applicable criteria and noncriteria pollutants to assist in BACT decisionmaking
2. To inform the general public of potential air quality-related impacts
3. To help provide the Federal land manager with information regarding potential impacts on Class I areas.

Although every source seeking a PSD permit must perform an additional impacts analysis, the depth of such analysis generally depends on the quantity of emissions, the existing air quality, and the sensitivity of those emissions on local factors such as soils, vegetation, and visibility. The need for a rigorous additional impacts analysis is aimed primarily at those new major sources and major modifications that may reasonably be expected to have a significant impact on these factors.

Small increases in emissions in an area are not expected to have any major impacts on soils, vegetation, and visibility. Nevertheless, the impact areas of new major sources and major modifications must be surveyed to verify and document the expectation of "no significant impact."

A primary goal of the additional impacts analysis is to provide public information. Therefore, the source should prepare an analysis that will provide the public with an assessment of the relevant environmental air pollution impacts that could occur in the area affected by emissions of the pollutants subject to review. Any potential air pollution impacts on Class I areas are especially important and these impacts should be assessed thoroughly.

An additional impacts analysis is triggered whenever emissions of pollutants will occur in significant quantities or be increased significantly. Thus, both criteria and noncriteria pollutants may trigger an additional impacts analysis.

Determining the air pollution effects on soils, vegetation, and visibility generally requires an analysis of the projected ambient air concentrations and an evaluation of the potential impacts. The analysis must encompass potential impacts of direct emissions from the new major source or major modification and secondary emissions from associated residential, commercial, or industrial growth. It is important that this analysis be fully documented.

It should be noted that no "hard and fast" formula, format, or "cookbook" approach to an additional impacts analysis currently exists. What is most important is that all significant factors and the resulting impacts are recognized and carefully analyzed.

The additional impacts analysis is made up of three component analyses: 1) a growth analysis, 2) a soils and vegetation impact analysis, and 3) a visibility-impairment analysis.

2.6.1 Growth Analysis

The growth analysis should be considered first because it provides information essential to the other analyses. The elements of the growth analysis include:

1. A projection of the associated industrial, commercial, and residential growth that will occur in the area.

2. An estimate of the air pollution emissions generated by associated permanent growth.

3. An air quality analysis that includes these estimates. The results from this analysis become the basis for determining the extent of the air pollution impacts in the affected area.

To determine the first element in the growth analysis, which is the projection of associated growth in the impact area, the source should first consider the availability of two types of support factors, local support factors and industrial support factors. Examples of local support factors include the area's ability to house new employees and the commercial industries currently within the area that are available to support residential growth. For example, a large new major source that causes a permanent population growth may result in new housing developments and associated air emissions. Examples of industrial support factors include industries that provide goods and services related to the source or modification. These might include large industries that provide raw materials and smaller industries that provide maintenance and other support. For instance, a new major source using coal for fuel may attract coal mining operations for support.

After the source has assessed the residential, commercial, and industrial services already existing in the area, the next step is to predict how much new growth must occur to support the source or modification under review. The amount of residential growth will depend on the size of the available work force, the number of new employees required, and the availability of housing in the area. Industrial growth refers to those industries providing goods and services, maintenance facilities, and other large industries necessary for the operation of the source or modification under review.

Having completed this portrait of expected growth, the source must develop an estimate of the air pollution that is likely to evolve from permanent residential, commercial, and industrial growth. Excluded from consideration are emissions from temporary and mobile sources. To generate emission estimates, the source should consult such sources as manufacturer's specifications and guidelines, AP-42, and other PSD applications.

The source should arrive at an analysis of projected air quality by taking the air pollution estimates from all the variables of growth already surveyed and combining these estimates with the estimates of applicable pollutant emissions expected to be produced directly as a result of the source or modification. The combined estimate, through the modeling process, serves as the input to the air quality analysis. What emerges is a prediction of the ground-level concentration of pollutants generated by the source and any associated growth.

2.6.2 Soils and Vegetation Analysis

The manifestations of air pollution impacts on soils and vegetation can be seen in such occurrences as premature bud loss, failure of flowering, leaf necrosis, and plant death. Although high ambient concentrations can produce readily apparent effects, many deleterious effects also can occur from subtle but chronic exposure to pollutants over a long period of time. Such time-delayed impacts can ultimately prove to be more harmful in some cases.

A suggested informational basis for an analysis of air pollution impacts can be obtained by conducting a survey of the kinds of soil and vegetation found in the impact area. This survey should include all vegetation with any commercial or recreational value. Surveys of this nature usually have already been performed for the area and are readily available from conservation groups, State agencies, and universities. Such a comprehensive listing of the various kinds of soils and vegetation would allow the source to determine air pollution impacts by use of the method discussed in the following paragraph.

The modeling results of an air quality analysis conducted to demonstrate compliance with NAAQS, will provide the source with estimates of the maximum ambient air concentrations for criteria pollutants under review in the impact area. For applicable noncriteria pollutants, the source should project future ambient air concentrations. By consulting scientific literature, the source can assess the impacts of applicable pollutants on the various soils and vegetation in the impact area by correlating the known ambient air concentrations of pollutants with the kinds of soil and vegetation found in the area. The source should document all conclusions.

For most soils and vegetation, ambient air concentrations of criteria pollutants below the NAAQS will have no harmful effects. Some sensitive vegetation species and soil types, however, may experience harmful effects at low ambient air concentrations (e.g., soybeans and alfalfa). For this reason, the suggested initial soil and vegetation survey serves as an important basis for the analysis. Noncriteria pollutants can produce harmful effects at generally lower concentrations than the criteria pollutants.

2.6.3 Visibility Impairment Analysis

In the visibility impairment analysis, there is a special concern with Class I area impacts, as well as with impacts that occur within the area affected by applicable emissions. The Clean Air Act specifically requires plans and procedures for maintaining the visual quality within Class I areas. A good visibility impairment analysis should include the following components:

1. An initial screening of emission sources that examines the possibility of visibility impairment.
2. If warranted, a more in-depth analysis involving computer models.
3. A determination of the visual quality of the area.

To complete a successful visibility impairment analysis, the source should use the procedures contained in the Workbook for Estimating Visibility Impairment. This workbook presents a screening procedure designed to expedite the analysis of emission impacts on the visual quality of an area. Although the workbook was designed for Class I area impacts, the outlined procedures are also generally applicable to other areas. The following subsections present brief synopses of the screening procedures.

Screening Procedures: Level 1--

The Level 1 visibility screening analysis is a series of conservative calculations designed to identify those emission sources that have little potential for adversely affecting visibility. Calculated values relating source emissions to visibility impacts are compared with a standardized screening value. Those sources for which calculated values are greater than the screening criteria are judged to have the potential for visibility impairments. When this occurs, a Level 2 analysis is undertaken.

Screening Procedures: Level 2--

The Level 2 screening procedure is similar to the Level 1 analysis in that its purpose is to estimate impacts during worst-case meteorological conditions; however, more specific information regarding the source, topography, regional visual range, and meteorological conditions is assumed to be available. The analysis involve the use of hand calculations, reference tables and figures, or a computer-based visibility model called the "plume visibility model."

Screening Procedures: Level 3--

If the Level 1 and 2 screening analyses indicate the possibility of visibility impairment, a more detailed Level 3 analysis is undertaken in with the aid of the plume visibility model and meterological and other regional data. The purpose of the Level 3 analysis is to provide an accurate description of the magnitude of the impacts and its frequency of occurrence. The procedures for using the plume visibility model are described in the "User's Manual for the Plume Visibility Model."

As part of the visibility impairment analysis, the source is urged to provide a description of the visual quality of the area, which should include a discussion of any scenic vista in the area that may have public appeal or aesthetic value. What constitutes "scenic" and "aesthetic" is always open to the consideration of differing tastes. Nevertheless, a broad consensus, however, does generally exist in most as to what occurrences would or would not affect the visual beauty of an area.

2.7 REVIEW OF COMPLETED PSD PERMIT APPLICATION[1,2]

The reviewing authority is responsible for carrying out the requirements of the PSD regulations. The broad goal of PSD is to prevent significant air quality deterioration in clean air areas and, at the same time, to provide a margin for future industrial growth.

In the PSD review process, the source is responsible for 1) performing all required analyses, 2) documenting the results in a clear and concise form in the permit application, 3) applying BACT where required, and 4) maintaining compliance with all permit conditions.

The role of the reviewing authority is to evaluate the preconstruction analysis performed by the source for compliance with statutory requirements and to manage regional air quality through a collective assessment of industrial growth. By following these procedures, the reviewing authority meets its responsibility through the preconstruction permitting process. Because PSD regulations place the burden of analysis on the source, the engineering analysis provided must show that air quality standards and available increment will not be threatened and that BACT is applied. The reviewing authority's thorough evaluation of the analyses presented in the application is instrumental in maintaining the opportunity for future industrial growth in a particular area.

The reviewing or permitting authority is not expected to redo an incomplete or unsatisfactory application. Analysis and thorough documentation are the responsibility of the source. When an incomplete application is submitted or the analyses presented do not adequately demonstrate compliance with PSD requirements, the source should be notified and required to correct any deficiencies.

The major steps in implementing the permit process are:

- The preapplication meeting
- Completeness review
- Preliminary determination
- The opportunity for public review and comment
- The final determination with corresponding compliance checks.

During the preapplication meeting, the reviewing authority should make a preliminary assessment of applicability to determine whether a PSD review is necessary and what PSD review requirements must be met. An assessment of applicability made at this time outlines the engineering analyses that must be performed. Also, the PSD applicability assessment is the starting point of the completeness review of a submitted application.

The reviewing authority is responsible for both the application review and the development of the preliminary determination. The preliminary determination has a dual purpose: 1) it provides a comprehensive air-quality-related environmental assessment of the key impacts of a proposed expansion;

and 2) it provides the general public with a description of the project's impacts, requirements, and compliance demonstration. Figure 2-7 is a suggested format for a preliminary determination.

The last step in the review process is the publication of a public notice and a request for public comment on the preliminary determination. After the public comment period or public hearings are closed and the public comments have been evaluated, the reviewing authority must complete the process by making a final determination of approval, approval with conditions, or disapproval. Before a final determination is made, public comments should be made available to the source for the opportunity to provide responses to the reviewing agency. The methods for compliance checks must be included with the final determination.

The first step in the actual permit review process is to identify the source and understand the proposed construction. This entails having the answers to certain questions. For example, has the source correctly defined the proposed new or existing source according to PSD definitions? If a modification to an existing source is involved, has the source fully described the physical change or the proposed change in the method of operation of the source, and has he or she identified all additional new and modified emissions units? One helpful suggestion for a reviewer attempting to verify the information submitted by an applicant is to list the emissions units proposed for construction. For modifications, a listing of new and modified emissions units and emissions units involved in any associated contemporaneous changes is useful. Listing all existing emissions units also can help to define the existing source. Frequently, a source may be unaware that it contains more emission units than those addressed in the application. For example, cooling towers are often ignored as a source of future hydrocarbon (HC) emissions. For a general understanding of a process or source type that is new to a review engineer, AP-40 and AP-42 should be consulted. These publications will help to broaden the reviewer's understanding of the proposed project.

The next major step in applicability review is to check the source's emissions estimates. Any discrepancies in the emission estimates that are not identified and corrected, may result in an incorrect applicability determination. The keys the reviewer should use for evaluating the emission estimates are as follows:

PRELIMINARY DETERMINATION SUMMARY CONTENTS AND FORMAT

I. APPLICANT'S NAME
MAILING ADDRESS

II. PROPOSED SOURCE OR MODIFICATION LOCATION

- County or Parish
- UTM coordinates or longitude and latitude
- Street or road location

III. PROJECT DESCRIPTION

Generalized description of the project, including process weight rate, whether new, or modified. Emphasis should be on capacity or firing rate.

IV. SOURCE IMPACT ANALYSIS

This section should introduce those items for which the application was reviewed:

A. <u>BACT</u>

This section must discuss the applicant's proposed BACT. The alternatives must be discussed for each facility that emits (or increases the emissions of) an applicable pollutant. If the proposed BACT results in emissions different from any applicable NSPS, the rationale must be given.

B. <u>Increment Analysis</u>

This section must contain the following minimum information:

1) Computer model used, highlighting any modifications and stating why it was used and whether it was approved for use
2) If applicant used resulting highest or second-highest values, 5 years meteorological data must be used. State whether the numbers reflect highest or highest, second-highest values
3) The maximum impact area for TSP and/or SO_2
4) List of other increment-consuming sources in the impact area and the source of this information such as the applicant or State agency
5) The maximum increment consumed as a result of the application

Figure 2-7. Preliminary determination summary format.[1] (continued)

C. NAAQS Analysis

This section must contain a brief explanation of how the source reached its conclusion; for example, which monitor provided the background readings and which other sources in the area were modeled. This case-by-case analysis must demonstrate that good engineering logic was used. The results should be in tabular form and show background plus other sources' contributions plus the applicant's contribution and the resultant sum to arrive at the predicted worst-case.

The analysis should also, state whether the source has demonstrated the application of GEP to all emitting stacks and that no NAAQS violations are expected to occur as a result of downwash.

D. Soils, Vegetation, Visibility

This section should include a summary of the source's statement regarding any effected harm to any of the above. Appropriate references and studies the source used to reach its conclusions should be cited.

E. Growth Impacts

A statement should be included regarding any deterioration of air quality due to secondary emissions from associated industry, local rush hour traffic from its employees, future phases of the project. etc.

Also, a statement should be made here about availability of future growth and the increment consumed by this project.

F. Class I Area Analysis

State what impact, if any, will result from the project. Also state whether the source is (or is not) within 100 km of any Class I area.

V. CONCLUSIONS

This section should begin with a recommendation of approval or disapproval and present the items of correspondence upon which the recommendation is based.

The remainder of this section deals with specific permit conditions:

1. Applicant will verify all emissions within 90 days of startup according to EPA methods of 40 CFR 60....etc.

Figure 2-7. Preliminary determination summary format.[1] (continued)

2. Provide a table of allowable emissions, BACT, etc. For example:

TSP facility	BACT	% Pollutant reduction	Allowable emission

3. For power-generating stations, the applicant should provide a description of final design and received EPA approval before ordering equipment.

4. Any other condition(s) needed to ensure that EPA is not allowing any emissions greater than those on which the modeling results were based. This might include shutdown of equipment being replaced when new equipment is started up, etc.

5. Appropriate compliance methods should be cited.

Figure 2-7. Preliminary determination summary format.[1] (continued)

1. Make sure that every regulated pollutant that the source will emit is listed, and that each affected emission unit is evaluated.

2. Check the basis for the potential to emit and for actual emissions estimates. Do all assumptions conform with the PSD definitions? Are they reasonable or conservative in an engineering sense? Did the source use less than maximum capacity for these estimates without demonstrating the existence of enforceable restrictions?

3. Determine if the source presented the accumulated increases and decreases for all emission units located at the source. Were the quantifiable fugitive emissions included where necessary? Will the described modification affect emissions units that are not discussed?

4. Keep in mind that all claimed emissions changes must be contemporaneous and creditable.

5. Finally, verify that the source's estimates of potential emissions and the "net change" in actual emissions are reasonable and consistent with definitions given in the PSD regulations.

The third major step in applicability review is to evaluate the location of the proposed construction. This entails such questions as: Has the source considered all Class I areas which are in that locale? Is the proposed construction site in or near a nonattainment area for any pollutant or an area of known increment violation for particulate matter or SO_2?

The fourth step is to perform the applicability tests outlined previously. This entails ascertaining whether the applicant correctly applied these tests, to determine if the proposed source is subject to PSD review, and deciding what requirements must be met.

The final step in determining applicability is to examine any exemptions claimed by the source. In many cases, the conditions on which exemptions are based are those that affect Class I areas, nonattainment areas, and known areas of increment violations.

Several areas associated with the PSD permit process should receive special attention. These areas are discussed briefly in the following paragraphs.

Source definition can be a problem in an application. Sometimes the owner will incorrectly define the source. For example, the owner may consider only the new and modified emission units as the source. Although this is consistent with many State plans, it is inconsistent with the PSD regulations. The definition includes all existing emissions units at a location that are associated under the same two-digit SIC code. It should be noted that source definitions for preconstruction review under nonattainment provisions are not identical to PSD source definitions.

More subtle items in source definition occur at large complexes that are proposing additions to the existing source. For these sources, the reviewing authority should check files for previous source determinations conducted at the same location and for determinations on similar sources. Permitting personnel should contact the enforcement personnel to verify existing emissions units and to gain an overall understanding of the source operation.

Another problem area in a PSD application occurs in the emissions estimates. Estimates of both the potential emissions and the actual emissions may be incomplete. For example, some emission units that should be included may be overlooked or ignored, and pollutants regulated under the Clean Air Act may be excluded from the estimated emissions. Again, this is generally a definition problem. Also, pollutants may be missing from the estimated emissions because the applicant is unaware that PSD review applies to all pollutants regulated under the Act. In many cases applicants may concentrate on SO_2 and PM, the pollutants for which increments have been established and ignore the other pollutants. Another common oversight is to concentrate on the criteria pollutants and to forget to present emission estimates for the noncriteria pollutants regulated by the Act.

A similar problem occurs with estimated emissions for equipment that has a dominant pollutant. Examples are rock dryers, grain dryers, and asphalt plants, which emit large quantities of PM. Some applicants focus on these emissions and overlook the emissions from combustion products released through fuel consumption to provide process heat. Nitrogen oxides, CO, SO_2, hydrocarbons (HC), and all other regulated pollutant emissions must be estimated.

The experience of the reviewer is important in detecting these oversights, but an overall awareness of common problems in PSD analyses is also helpful. A pollutant checklist similar to that shown as Figure 2-8 is useful in eliminating these potential problems.

When checking a source's emissions estimates, the reviewer may find the applicant failed to include estimates for fugitive emissions. Quantifiable fugitive emissions estimates must be presented if they are expected to occur. A source may be eligible for an exemption if its fugitive emissions caused it to be designated a major source. This exemption applies only to sources other than those included in the 28 named categories and those regulated under Sections 111 or 112 of the Act. Quantifiable fugitive emissions are considered in all other emissions estimates, including calculations of actual emissions and net changes in actual emissions, to determine the level of PSD review required.

Another common concern is the use of inappropriate emission factors. The reviewer can check these factors by consulting the emission estimates in other applications or by examining BACT/LAER Clearinghouse reports for similar source types. Identifying mistakes caused by overestimation of emissions can reduce review requirements and, in some cases, can eliminate the need for a PSD review. Consequently, reviewers should also closely scrutinize estimates and the basis for estimates when the total source emissions fall just below the 100/250 tons/yr criterion or when the net increase in actual emissions falls just below the defined significance level.

Finally, the definitions of potential emissions and actual emissions are sometimes misunderstood. The reviewer can check these definitions in the PSD

Check	Pollutant	Significant net increase, tons/yr
___	CO	100
___	Nitrogen oxides	40
___	SO_2	40
___	PM	25
___	Ozone (VOC)	40
___	Lead	0.6
___	Asbestos	0.007
___	Beryllium	0.0004
___	Mercury	0.1
___	Vinyl chloride	1
___	Fluorides	3
___	Sulfuric acid mist	7
___	Hydrogen sulfide (H_2S)	10
___	Total reduced sulfur (including H_2S)	10
___	Reduced sulfur compounds (including H_2S)	10

Figure 2-8. Checklist for pollutants regulated under the Clean Air Act.[1]

regulations or the application guidance package. When an incorrect definition is used, an extensive revision to emissions estimates is often required.

Another emissions estimating error is pertinent only to potential emissions. Estimates of potential emissions are often based on average rather than maximum capacity operation. The only time maximum capacity operation should not be used in estimates of potential emissions is when there are enforceable restrictions on a source's ability to emit a pollutant. Any restrictions claimed by an applicant must be federally enforceable.

Two concerns are associated with estimating the net change in actual emissions. First, the source may fail to accumulate all the creditable contemporaneous increases that have occurred at the source in the previous 5-year period or other period as defined by the permit-granting authority. Also some decreases may be claimed that do not meet the criterion of contemporaneous. Decreases that are not federally enforceable cannot be credited in determining the net emissions change.

The second concern is the misinterpretation of actual operating data. Sometimes the assumptions used in calculating actual emissions are not indicative of actual operating records. The application should fully document the operating data on which actual emissions estimates are based. As a check, the reviewer should consult State emission inventory questionnaires. A questionnaire response made on the basis of actual operating data may be available for that particular plant site or a plant of similar type .

The reviewer uses the BACT analysis submitted by the applicant to establish the PSD permit conditions that will specify the operation of the control strategy for the source or modification under review. The reviewer's primary responsibility is to determine the best emissions strategy to balance the environmental benefits gained from applying pollution control technology with the prudent use of energy and justifiable industrial expenditures. To achieve this goal, the reviewer considers the following questions with regard to the BACT analysis:

- Is the analysis complete? The analysis must be pollutant- and emissions-unit-specific because each affected new or modified emissions unit must be evaluated with respect to each pollutant subject to PSD review. Major emissions sources should be emphasized; however, the requirement for enforceable continuous limits remains, even for relatively minor emissions units. In general, the attention of the analysis should be focused where it can produce the most environmental benefits.
- Is the analysis thorough? Has the source evaluated the range of demonstrated options, including alternatives, that may be transferable or innovative? The source need not evaluate control alternatives that would result in greater emissions than those proposed as BACT.
- Are the cost estimates that appear in the analysis reasonable? Do they appear to contradict cost expectations and experience?
- Has the applicant made a good-faith effort in proposing BACT?

The BACT must be a system of continuous emission reduction. The source will suggest the control technology, but the reviewer is ultimately responsible for establishing the permit conditions that specify the operation of the control systems. Therefore, permitted emission rates must be specified on the basis of both total and specific allowable emissions. The total allowable emission rate (pounds per hour) of a unit is the expected emission rate when the unit is operating at its maximum capacity. Because BACT is a system of continuous emission reduction, however, the allowable emissions must also consider the required control strategy at all other operating levels. This is generally done by specifying, wherever possible, the allowable emissions in terms of process unit variables such as material processed or fuel consumed, or even by specifying an allowable pollutant concentration in the stack gases. Allowable emissions in units such as pounds per million Btu or pounds per ton of product serve this purpose. No BACT can be any less stringent than any applicable NSPS, NESHAP, or other SIP limitations. Therefore, the reviewer must ensure that the total system proposed by the applicant and the permit conditions are enforceable.

It is the reviewer's responsibility to specify enforceable equipment or work practice standards when emissions are expected but are not measurable. To make BACT enforceable and continuous, the reviewer should realistically consider the reliability of the control systems. For example, he or she should consider the average efficiency (not the maximum efficiency) of a control and if necessary should devise compliance and monitoring systems that are repeatable and straightforward.

Reviewers should also note that some sources might be motivated to propose allowable emissions that the reviewer believes to be excessive. Although trying to eliminate the last ounce of allowable emissions from a proposed allowable emission rate is inefficient, one of the prime objectives of PSD is to require emission control strategies that force the evolution of pollution control technology. Industrial motivation to force this technology will be reduced if allowable emissions can easily be met with a large margin of safety.

The permitting authority is also responsible for reviewing the PSD permit applications to ensure that all aspects of the air quality analyses are addressed. The steps in air quality analysis review include:

- A determination and quantification of those pollutants for which air quality review is required
- A clear description of the proposed source or modification
- A review of modeling techniques
- A determination of existing air quality
- A check for impact on Class I areas
- A comparison of analyses results with the national ambient air quality standards and allowable increments.

All regulated pollutants that may be emitted in significant quantities from the proposed source or modification are subject to an air quality review. The pollutants that must be part of the air quality review are generally identified in the applicability analysis, which determines if the proposed construction is subject to review and what analyses must be performed if a PSD permit is to be issued.

The model presented by the source is a mathematical representation of a physical situation. A clear picture of the physical setting of the proposed source is a prerequisite to a proper review of the mathematical representation. Such an understanding should encompass all facets of the proposed source or modification. A description of all emission units, including allowable emissions, stack parameters, location, and nearby tall buildings is required. The review must also ensure the inclusion of all sources of fugitive emissions in the proposed project.

If the project is a modification, changes in actual emissions at the source must be established and carefully documented. The reviewing authority should carefully check all these changes to determine whether they are reasonable and in agreement with State files.

A plot plan can be useful in determining emission unit location and possible critical meteorology. It will assist the reviewer in the analysis of source interaction and building downwash effects. In many cases, the applicant will make what he or she considers conservative assumptions in performing dispersion modeling. The plot plan will help the reviewer determine if these assumptions are indeed conservative.

If the source has submitted a modeling plan, a quick check will provide the review engineer with the information necessary to determine if the plan is complete. He or she should compare the procedures outlined in the PSD application with those in the modeling plan. This is especially important if a modeling plan has been approved with conditions and stipulations.

The modeling data presented in the source's application should be complete and accurate. To check for completeness and accuracy, the reviewer should:

- Determine which models were used
- Ensure that all sources are included in the inventory
- Examine allowable and actual emissions for proper treatment
- Check meteorological data used
- Review modeling assumptions used
- Check GEP stack height regulations with respect to the operation.

All modeling results presented by the source should be substantiated by computer printouts from the modeling analysis. The reviewer should verify that an appropriate model has been used and applied properly and that the data presented are complete and accurate.

The job of the reviewer is critical to the preservation of the NAAQS and the PSD increments. The reviewer should address all data presented by the source to certify that a thorough analysis of the predicted air quality around the source in question has been conducted. The following critical items should be reviewed with respect to air quality impacts:

- A determination of those pollutants for which a review is required
- A clear description of the proposed source or modification
- The proper selection and use of models
- A determination of existing air quality
- An analysis of any impacts on a Class I area
- A demonstration of compliance with the NAAQS and PSD increments by a careful examination of all results.

The PSD regulations require air quality analyses for both criteria and noncriteria pollutants that are emitted or whose emissions are increased in significant amounts. The predicted ambient air concentrations are used as a basis for assessing the extent of soil, vegetation, and visibility impacts. Because NAAQS for noncriteria pollutants do not exist, the additional impacts analysis plays a major role in establishing the air quality impacts of these pollutants.

Finally, the reviewer should note that applicants have a great deal of flexibility in their approach to an additional impacts analysis. It is the reviewer's responsibility to determine if the source's analysis has been completed with sufficient depth to determine potential significant effects on soils, vegetation, and visibility resulting from air quality impacts. The reviewer must rely on information presented by the applicant as well as on his or her own experience in determining the adequacy of the analysis.

In a growth analysis it is important that the reviewer query regional planning offices or other State agencies to verify the data presented by the applicant. The reviewer may also check other PSD applications that are similar to the one under review. In addition, the reviewer should be able to delineate those types of situations that could lead to associated growth. In many cases, the reviewer must rely on data presented by the source to determine the type and amount of expected growth. If insufficient data are presented for review, the reviewer should request additional information from the applicant.

If the reviewer agrees with the projected growth analysis, the next step is to assess the data on air pollution that may result from this growth. Temporary growth, such as a construction work force, does not necessarily apply; therefore, data on emissions from temporary growth are generally not considered. The reviewer should verify the projected emissions be referring to manufacturer's specifications and guidelines or by comparing the data with similar examples of growth and emissions found in other PSD applications. The reviewer also should verify that all significant quantifiable emissions projected in the growth analysis are considered in the modeling analysis; both applicable criteria and noncriteria emissions should be modeled. If no growth is projected to result from the introduction of a new source or modification, no growth-related air quality impacts will occur. Once the reviewer has a clear understanding of expected growth and its impacts, the next consideration should be the analysis of the soils and vegetation.

The soils and vegetation analysis examines the effect of predicted ambient air concentrations on soils and vegetation. Because the source could have approached the analysis from a variety of viewpoints, the reviewer must check any analysis for accuracy and credibility.

A source who has followed the suggested method of analysis will provide a categorization of the soil and vegetation types found naturally in the area. The reviewer should verify that this list is accurate and comparable to the assessments of other conservation groups, State agencies, or universities. The soils and vegetation survey is very important and should emphasize the sensitive species in the area.

Reviewers should examine the modeling data presented in the PSD application to determine the maximum pollutant concentrations of each applicable pollutant in the impact area. The modeling should include applicable criteria and noncriteria pollutants. The source should present predictions, supported by scientific literature, of the effects of maximum concentration of pollutants on the types of soils and vegetation found within the impact area. Good references include the EPA Air Quality Criteria Documents and a U.S. Department of the Interior document entitled Impacts of Coal-Fired Power Plants on Fish, Wildlife, and Their Habitats.

For criteria pollutants with maximum predicted concentrations that are less than the secondary NAAQS, the impact on most soils and vegetation usually will be negligible. Some sensitive species of plants may be directly affected by these lower concentrations, however, and the list of vegetation for a particular area should emphasize these sensitive species. The reviewer must check any supporting documentation provided to ensure that the conclusions of the applicant are correct.

In the last step, the reviewer should assess the source's visibility impacts analysis. Air pollution visibility impacts include visible stack emissions, mists associated with cooling towers, and any transformation of pollutants involved in atmospheric chemistry.

An assessment of visibility impacts, as in the case of all additional impacts analyses, is based on comprehensive data presented by the source. Data correlating emissions with visibility impacts must be properly applied. Currently, the suggested method for completing the visibility impairment analysis is to use the screening techniques outlined in the Workbook for

Estimating Visibility Impairment. If the source has used the workbook as a guide, the reviewer should verify all the calculations and conclusions presented. If the source used a different method of analysis, the reviewer should check to see that the analysis is correct and should verify the source's conclusions by performing a separate visibility screening analysis.

For large sources of emissions that may result in visibility impairments, sources have been urged to use the plume visibility model. The reviewer should consult with a meteorologist, as appropriate, to verify both the proper application of the model and the results submitted by the applicant. The reviewer also should be familiar with the User's Guide for the Plume Visibility Model.

A major goal of the additional impacts analysis is to provide the local community with information that demonstrates how a new source will affect the enjoyment derived from the area. Areas that contribute to the common aesthetics of a community should be part of the application. The reviewer is responsible for ensuring the descriptive nature of the information presented in the application.

The source also must submit an expanded visibility impairment analysis when primary or secondary emissions affect Class I areas or other areas of scenic beauty. Any potential impacts on Class I areas must be reviewed in a manner that adequately addresses the impacts on the recreational and scenic beauty of these areas.

After the reviewer has carefully examined all data on additional impacts, he or she must decide whether a particular applicant has met the standards of the review. This decision is based on the following:

- Whether the applicant has given the reviewer a clear and accurate portrait of the soils, vegetation, and visibility in the proposed impact area.
- Whether the applicant has provided adequate documentation of the potential impacts on soils, vegetation, and visibility resulting from applicable pollutant emissions.
- Whether the data were presented in a logical manner (i.e., beginning with a growth analysis, followed by a visibility analysis, etc.).

- Whether the applicant, the reviewer, and the affected community understand the potential additional impacts posed by the proposed source.

During the review process, the reviewer must determine if sufficient information has been supplied. A data summary sheet (Figure 2-9) will help in this assessment. Once an application is determined to be complete, the agency has a maximum time period within which to complete the PSD review.

The date a complete application is received generally determines permitting priority. Mistakenly identifying an application as complete may be unfair to another source in the same area.

Additional information sometimes necessitates a reevaluation of previously reviewed analyses, which is redundant and cost-inefficient. Therefore, emphasis on a thorough completeness review can expedite the overall PSD review process, minimize effects on construction schedules, reduce agency resource expenditures, and aid in the proper management of air quality resources.

COMPANY NAME:______________________ REVIEW DATE:__________

PSD NUMBER:__________ NMS or MM (circle one) REVIEWER:__________

BRIEF PROJECT DESCRIPTION ______________________

____

I. DETERMINATION OF APPLICABILITY

For Proposed Construction, PSD Review - Applies - Does Not Apply - Undetermined* (Circle One)

*The following information is needed to complete the determination: ____________

____

REVIEW REQUIREMENTS ARE AS FOLLOWS (if subject to review):

Pollutant	BACT	Monitoring	AQ	Add'l Impacts	Net Emissions Increase (T/yr)
PM					
SO_2					
NO_x					
CO					
O_3(VOC)					
Other____					
Other____					

SIGNATURE OF REVIEWER:______________________

1. POTENTIAL EMISSIONS DATA SUMMARY FOR THE SOURCE (proposed new source or the existing source for a proposed modification):

Pollutant	PE[a] (T/yr)	Emission Units	Basis for Estimates[b] hrs/day	hrs/yr	% Capacity	Emissions Factor	Actual[c] (T/yr)	Allowable[c] (T/yr)
PM								
SO_2								
NO_x								
CO								
O_3(VOC)								
Other____								
Other____								

a. The source is a ____ 28-listed source or is a ____ non-28-listed source (100/250 major emissions criteria respectively).

b. If less than 8760 hrs/yr and 100%, do enforceable restrictions exist? ___yes ___no.

c. If PE, actual and allowable are not equal, explain why: ______________

____

____

2. NET CHANGES IN ACTUAL EMISSIONS? (for modifications only).

Describe modification including previous or planned emissions changes:

____

____

____

Pollutant	New & Mod. Units (T/yr)	Creditable Contemp. Increases (T/yr)	Creditable Contemp. Decreases[a] (T/yr)	Net Change in actual (T/yr)	Significance Criteria[b] (T/yr)
PM					25
SO_2					40
NO_x					40
CO					100
O_3(VOC)					40 (VOC)
Other____					
Other____					

a. Are decreases ensured by enforceable restrictions? ___yes ___no.

b. Is the source within 10 km of any Class I area? ___yes ___no.
If so, is maximum air impact (discussed below) ≥ 1 ug/m3 (24-hr)? ___yes ___no.

c. The baseline date(s) for this area are:______________________.

d. Do claimed emissions changes occur: 1) after 1/6/75 ___yes ___no;
2) after baseline date ___yes ___no (Note: Prebaseline changes must be due to construction at a MSS).

e. The area is designated non-attainment for what pollutants? ______________

Figure 2-9. PSD completeness data summary/review worksheet.

LESSON 3

NONATTAINMENT AREAS REQUIREMENTS

Goal: To familiarize you with the nonattainment NSR requirements.

Objectives: At the end of the lesson, you should be capable of the following:

1. Understanding the nonattainment area applicability requirements
2. Reviewing the Lowest Achievable Emission Rate (LAER) proposal and analysis
3. Understanding the offset requirements
4. Understanding the noninterference with reasonable further progress (RFP) requirement
5. Understanding the requirement that all sources within the State must be in compliance.

3.1 INTRODUCTION

Part D of the Clean Air Act sets forth the SIP requirements for nonattainment areas, i.e., those areas that are classified under Section 107 as not currently attaining the NAAQS as demonstrated by monitored data or calculated by air quality modeling.

Section 172 of Part D identifies several SIP requirements associated with growth and NSR. Section 172(a)(1) states that an approved SIP demonstrating attainment by the prescribed date is a prerequisite to approving major construction. Section 172(b)(5) requires that the SIP expressly identify and quantify the emissions allowed for the operation and construction of major sources in the area. Section 172(b)(6) calls for the development of an appropriate permit system for new major sources. Finally, Section 172(b)(11)(A) requires that the SIP contain special new source procedures when attainment beyond 1982 (not to exceed 1987) is allowed for ozone or CO.

This special program is to weigh the benefits and analyze the alternatives to approving this source relative to the need for attaining the ozone and CO NAAQS as expeditiously as practicable.

Section 173 outlines the details of the NSR system called for in 172(b)(6). Section 173(1) identifies the two options for approving major construction without jeopardizing attainment. Section 173(1)(A) states that by new source operation the total allowable emissions from existing sources, new minor sources, and the proposed source must be less than those allowed under the SIP at the time of new source application so as to be consistent with reasonable further progress (RFP). RFP means annual incremental reductions in emissions of the applicable air pollutant that are sufficient, in the judgment of the Administrator, to provide for attainment of the applicable NAAQS by the prescribed date.

Section 173(1)(B) alternatively allows approval of major construction if such construction not cause or contribute to a violation the Section 173 allowance for growth. Section 173 also requires that major construction in a nonattainment area must apply LAER and all other major sources under common ownership of the source within the State must be in compliance with the applicable SIP. Section 171(3) defines the term LAER for any source as that rate of emissions that reflects:

- The most stringent emission limitation contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable
- The most stringent emission limitation achieved in practice by such class or category of source, whichever is more stringent.

In no event shall the application of LAER permit a proposed new or modified source to emit any pollutant in excess of the amount allowable under the applicable NSPS.

Section 51.18 set forths the minimum NSR requirements associated with an acceptable SIP. Each SIP must set forth the legally enforceable procedures to enable the State or local agency to determine whether the new or modified source will result in violations of the applicable portions of the control strategy or interfere with attainment and maintenance of a NAAQS.

The SIP must include procedures for preventing the construction if violations are noted. The SIP must also provide for the submission of the following information:

- Nature and amount of emissions to be emitted
- Location, design, construction, and operation of the source.

The State's procedures must indicate that any approval to construct or modify shall not relieve the owner or operator of his responsibility to comply with the control strategy. The procedures must also provide an opportunity for public comment on the information submitted by the source.

The following definitions or more stringent definitions as set forth in 51.18 must be contained in the SIP:

- "Stationary source" means any building, structure, facility, or installation that emits or may emit any air pollutant subject to regulation under the Act.
- "Building, structure, or facility" means all of the pollutant-emitting activities that 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 if they belong to the same "Major Group" (i.e., that have the same two-digit code) as described in the Standard Industrial Classification Manual, 1972, as amended by the 1977 Supplement (U.S. Government Printing Office stock numbers 4101-0066 and 003-005-00176-0, respectively).
- "Installation" means an identifiable piece of process equipment.
- "Potential to emit" means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design only if the limitation or its effect on emissions is federally enforceable. Secondary emissions do not count in determining a stationary source's potential to emit.
- "Major stationary source" means:
    - Any stationary source of air pollutants that emits, or has the potential to emit, 100 tons per year or more of any pollutant subject to regulation under the Act.

- Any physical change that would occur at a stationary source not qualifying as a major stationary source, if the change by itself would constitute a major stationary source.

° "Major modification" means any physical change in a major stationary source or any change in its method of operation that would result in a significant net emissions increase of any pollutant subject to regulation under the Act.

- Any net emission increase that is considered significant for volatile organic compounds shall be considered significant for ozone.

- A physical change or change in the method of operation shall exclude:

(1) Routine maintenance, repair, and replacement.

(2) Use of an alternative fuel or raw material by reason of an order under Sections 2(a) and (b) of the Energy Supply and Environmental Coordination Act of 1974 (or any superseding legislation) or by reason of a natural gas curtailment plan pursuant to the Federal Power Act.

(3) Use of an alternative fuel by reason of an order or rule under Section 125 of the Act.

(4) Use of an alternative fuel at a steam generating unit to the extent that the fuel is generated from municipal solid waste.

(5) Use of an alternative fuel or raw material by a stationary source which the source was capable of accommodating before December 21, 1976, unless such change is prohibited under any federally enforceable permit condition that was established after December 21, 1976, pursuant to 40 CFR 52.21 or under regulations approved pursuant to 40 CFR 51.18 or 40 CFR 51.24 or the source is approved to use under any permit issued under regulations approved pursuant to this section.

(6) An increase in the hours of operation or in the production rate, unless such change is prohibited under any federally enforceable permit condition that was established after December 21, 1976, pursuant to 40 CFR 52.21 or regulations approved pursuant to 40 CFR 51.18 or 40 CFR 51.24.

(7) Any change in ownership at a stationary source.

° "Net emissions increase" means the amount by which the sum of the following exceeds zero:

- Any increase in actual emissions from a particular physical change at a stationary source or a change in the method of operation.

- Any other increases and decreases in actual emissions at the source that are contemporaneous with the particular change and are otherwise creditable.

An increase or decrease in actual emissions is considered contemporaneous with the increase from the particular change only if it occurs before the date the increase from the particular change occurs. An increase or decrease in actual emissions is creditable only if it occurs within a reasonable period, to be specified by the reviewing authority, and the reviewing authority has not relied on it in issuing a permit for the source under regulations approved pursuant to this section, which permit is in effect when the increase in actual emissions from the particular change occurs.

An increase in actual emissions is creditable only to the extent that the new level of actual emissions exceeds the old level.

A decrease in actual emissions is creditable only to the extent that:

- The old level of actual emissions or the old level of allowable emissions, whichever, is lower, exceeds the new level of actual emissions.

- It is federally enforceable at and after the time that actual construction on the particular change begins.

- The reviewing authority has not relied on it in issuing any permit under regulations approved pursuant to 40 CFR 51.18, or the State has not relied on it in demonstrating attainment or RFP.

- It has approximately the same qualitative significance for public health and welfare as that attributed to the increase from the particular change.

An increase that results from a physical change at a source occurs when the emissions unit on which construction occurred becomes operational and begins to emit a particular pollutant. Any replacement unit that requires shakedown becomes operational only after a reasonable shakedown period (not to exceed 180 days).

° "Emissions unit" means any part of a stationary source that emits or would have the potential to emit any pollutant subject to regulation under the Act.

° "Reconstruction" will be presumed to have taken place where the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost of a comparable entirely new stationary source. Any final decision as to whether reconstruction has occurred shall be made in accordance with the provisions of 40 CFR 60.15(f)(1)-(3). In determining LAER for a reconstructed stationary source, the provisions of 40 CFR 60.15(f)(4) shall be taken into account in assessing whether a NSPS is applicable to such stationary source.

- "Fixed capital cost" means the capital needed to provide all the depreciable components.

- "Secondary emissions" means emissions that would occur as a result of the construction or operation of a major stationary source or major modification, but do not come from the major stationary source or major modification itself. For the purpose of this section, secondary emissions must be specific, well defined, quantifiable, and have an impact on the same general area as the stationary source or modification that causes the secondary emissions. Secondary emissions may include, but are not limited to:

  - Emissions from ships or trains coming to or from the new or modified stationary source

  - Emissions from any offsite support facility that would not otherwise be constructed or increase its emissions as a result of the construction or operation of the major stationary source or major modification.

- "Fugitive emissions" means those emissions that could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening.

- "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 indicated rates for these pollutants:

  Carbon monoxide: 100 tons/yr
  Nitrogen oxides: 40 tons/yr
  Sulfur dioxide: 40 tons/yr
  Particulate matter: 25 tons/yr
  Ozone: 40 tons/yr of VOC's
  Lead: 0.6 tons/yr.

- "Allowable emissions" means the emissions rate of a stationary source calculated by using the maximum rated capacity of the source (unless the source is subject to federally enforceable limits that restrict the operating rate or hours of operation or both) and the most stringent of the following:

  - The applicable standards set forth in 40 CFR Part 60 or 61.

- Any applicable SIP emissions limitation, including those with a future compliance date.

- The emissions rate specified as a federally enforceable permit condition, including those with a future compliance date.

° "Actual emissions" means the actual rate of emissions of a pollutant from an emissions unit as determined in accordance with the following:

  - Actual emissions as of a particular date shall equal the average rate, in tons per year, at which the unit actually emitted the pollutant during a 2-year period preceding the particular date and that is representative of normal source operation. The reviewing authority shall allow the use of a different time period upon a determination that it is more representative of normal source operation. Actual emissions shall be calculated by using the unit's actual operating hours, production rates, and types of materials processed, stored, or combusted during the selected time period.

  - The reviewing authority may presume that the source-specific allowable emissions for the unit are equivalent to the actual emissions of the unit.

  - For any emissions unit that has not begun normal operations on the particular date, actual emissions shall equal the unit's potential to emit on that date.

° "LAER" means, for any source, the more stringent rate of emissions based on the following:

  - The most stringent emissions limitation contained in the implementation plan of any State for such class or category of stationary source, unless the owner or operator of the proposed stationary source demonstrates that such limitations are not achievable.

  - The most stringent emissions limitation that is achieved in practice by such class or category of stationary source. This limitation, when applied to a modification, means the LAER for the new or modified emissions units within the stationary source. In no event shall the application of this term permit a proposed new or modified stationary source to emit any pollutant in excess of the amount allowable under an applicable new source standard of performance.

° "Federally enforceable" means all limitations and conditions that are enforceable by the Administrator, including those requirements developed pursuant to 40 CFR Parts 60 and 61, requirements within any applicable SIP, and any permit requirements established pursuant to 40 CFR 52.21 or under regulations approved pursuant to 40 CFR 51.18, or 51.24.

- "Begin actual construction" means, in general, initiation of physical onsite construction activities on an emissions unit that are of a permanent nature. Such activities include, but are not limited to, installation of building supports and foundations, laying of underground pipework, and construction of permanent storage structures. With respect to a change in method of operating, this term refers to those onsite activities other than preparatory activities that mark the initiation of the change.

- "Commence" as applied to construction of a major stationary source or major modification means that the owner or operator has all necessary preconstruction approvals or permits and has:

  (a) Begun, or caused to begin, a continuous program of actual onsite construction of the source to be completed within a reasonable time.

  (b) Entered into binding agreements or contractual obligations, which cannot be cancelled or modified without substantial loss to the owner or operator, to undertake a program of actual construction of the source to be completed within a reasonable time.

- "Necessary preconstruction approvals or permits" means those permits or approvals required under Federal air quality control laws and regulations and those air quality control laws and regulations that are part of the applicable SIP.

- "Construction" means any physical change or change in the method of operation (including fabrication, erection, installation, demolition, or modification of an emissions unit) that would result in a change in actual emissions.

The State's NSR program must establish a baseline for determining credit for emission reductions as the emission limits under the applicable SIP in effect at the time the application to construct is filed, except that the offset baseline shall be the actual emissions of the source from which offset credit is obtained, where:

- The demonstration of RFP and attainment of ambient air quality standards is based on the actual emissions of sources located within a designated nonattainment area for which the preconstruction review program was adopted.

- The applicable SIP does not contain an emissions limitation for that source or source category.

The NSR nonattainment program must also provide that:

- Where the emissions limit under the applicable SIP allows greater emissions than the source's potential to emit, emissions offset credit will be allowed only for control below this potential.

- For an existing fuel combustion source, credit shall be based on the allowable emissions under the applicable SIP for the type of fuel being burned at the time the application to construct is filed. If the existing source commits to switch to a cleaner fuel at some future date, emissions offset credit based on the allowable (or actual) emissions for the fuels involved is not acceptable, unless the permit is conditioned to require the use of a specified alternative control measure that would achieve the same degree of emissions reduction if the source were switch back to a dirtier fuel at some later date. The reviewing authority should ensure that adequate long-term supplies of the new fuel are available before granting emissions offset credit for fuel switches.

- Emissions reductions achieved by shutting down an existing source or permanently curtailing production or operating hours below baseline levels may be credited, provided the work force to be affected has been notified of the proposed shutdown or curtailment. Source shutdowns and curtailments in production or operating hours occurring prior to the date the new source application is filed generally may not be used for emissions offset credit. Where an applicant, however, can establish that it shut down or curtailed production after August 7, 1977, or less than 1 year prior to the date of permit application (whichever is earlier) and the proposed new source is a replacement for the shutdown or curtailment credit, such shutdown or curtailment may be applied to offset emissions from the new source.

- No emissions credit may be allowed for replacing one hydrocarbon compound with another of lesser reactivity, except for those compounds listed in Table 1 of EPA's "Recommended Policy on Control of Volatile Organic Compounds" (42 FR 35314, July 8, 1977).

- All emission reductions claimed as offset credit shall be federally enforceable.

- Procedures relating to the permissible location of offsetting emissions shall be followed that are at least as stringent as those set out in 40 CFR Part 51 Appendix S, Section IV.D

- Credit for an emissions reduction can be claimed to the extent that the reviewing authority has not relied on it in issuing any permit under regulations approved pursuant to 40 CFR 51.18 or the State has not relied on it in demonstrating attainment or RFP.

The NSR program may also provide that the nonattainment provisions do not apply to a source or modification that would only be a major stationary source or major modification if fugitive emissions, to the extent quantifiable, are considered in calculating the potential to emit and the source does not fall into to any of the following categories:

- Coal cleaning plants (with thermal dryers)
- Kraft pulp mills
- Portland cement plants
- Primary zinc smelters
- Iron and steel mills
- Primary aluminum ore reduction plants
- Primary copper smelters
- Municipal incinerators capable of charging more than 250 tons of refuse per day
- Hydrofluoric, sulfuric, or nitric acid plants
- Petroleum refineries
- Lime plants
- Phosphate rock processing plants
- Coke oven batteries
- Sulfur recovery plants
- Carbon black plants (furnace process)
- Primary lead smelters
- Fuel conversion plants
- Sintering plants
- Secondary metal production plants
- Chemical process plants
- Fossil-fuel-fired boilers (or combination thereof) with a heat input totaling more than 250 million British thermal units per hour
- Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels

- Taconite ore processing plants
- Glass fiber processing plants
- Charcoal production plants
- Fossil-fuel-fired steam electric plants with a heat input of more than 250 million British thermal units per hour
- Any other stationary source category that, as of August 7, 1980, is being regulated under Section 111 or 112 of the act.

Finally, the NSR program must contain enforceable procedures that provide the following:

- Approval to construct shall not relieve the owner or operator from complying with all applicable provisions of the plan and any other requirements under local, State, or Federal law.
- At such time that a particular source or modification becomes a major stationary source or major modification solely by virtue of a relaxation of any enforcement limitation that was established after August 7, 1980, on the capacity of the source or modification otherwise to emit a pollutant (such as a restriction on hours of operation) the requirements of regulations approved pursuant to this section shall apply to the source or modification as though construction had not yet commenced on the source or modification.

3.2 LAER REQUIREMENT

As mentioned previously, Section 171(3) defines LAER in terms of the "best SIP" limit or "best in-practice" control that is achievable by the source undergoing review--not to be less stringent than an applicable NSPS. The following discussion provides additional insight into the terms "Best SIP" and "in- practice."

"Best SIP" means that limit of the highest stringency that the source is capable of meeting considering all limits that are currently part of an approved SIP; i.e., if a State has extraordinary regulatory measures incorporated into its SIP that are designed to preclude the construction of a certain source type, these applications need not define LAER. In addition, SIP's with BACT requirements are not applicable in the abstract. Only where specific limits exist within these regulations or where a BACT-type regulation has been implemented for a similar source would this type of regulation be applicable. The EPA-promulgated requirements are, or course, part of the applicable SIP. Finally, "equipment standards" can substitute for emission limitations when the latter have typically not been prescribed. Note that the limits need only to have been prescribed for a source and existing in a SIP to be eligible for consideration. If, however, a limit has not yet been tested through source operation, the "achievability" of the limit must be carefully considered.

"In practice" means controls that have been demonstrated for that exact source type or one of similar general function. Although this interpretation does not preclude the use of "control technology transfer," in many cases the need to offset new source emissions consistent with RFP will often cause sources voluntarily to advance the state-of-the-art for control technology. Thus, control transfer is not likely to be needed in most cases.

3.3 STATEWIDE COMPLIANCE REQUIREMENT

Section 173(3) requires that all other major sources (100 tons/yr potential) owned or operated by the applicant in the same State are in complaince with the applicable emission limits and standards under the Act. In responding to this requirement, the reviewing authority must ensure that major sources under common ownership or operational control with the proposed one in the same State be in compliance (or on enforceable schedules) with all established SIP limits at the time of new source approval.

3.4 CONSISTENCY WITH RFP

Section 173(1) basically outlines two options for accommodating major source growth in SIP's without jeopardizing the attainment mandate. Section 173(1)(A) allows a form of offset policy to be conducted on a case-by-case basis. In general, this offset regulation is decidedly more restrictive than is EPA's Interpretative Ruling (Appendix S, 40 CFR 51). In addition to subjecting sources on the basis of their increased emission potential, it requires new major sources to offset not only their emissions but also those of minor point sources that have come into the area since 1979 (which have not already been offset). More importantly, the decrease in allowable emissions that Section 173(1)(A) must be consistent with RFP. This effectively changes the baseline for offsets from the stated SIP at the time of application to the attainment SIP because RFP can in no way jeopardize attainment.

In implementing the Section 173(1)(A) option, a SIP must consider the following items: 1) the proposed reductions are not otherwise needed to provide for or maintain attainment; 2) the offsets would be transacted on a tons/yr actual emissions basis; 3) the offsetting reductions will be accomplished on or before the time of new source operation; 4) the reductions come from sources in the emission inventory used for approved control strategy; and 5) the amount of the proposed reductions is sufficient to offset both the emissions reductions directly associated with the proposed source construction and those emissions attributed to minor point sources that have come into the area since the last RFP milestone was met.

It should be noted that item No. 2 is consistent with how RFP is primarily tracked and will require the establishment of new enforceable tons/yr limits for the reducing sources. An exception to this is when only short-term violations of the TSP or SO_2 standards are at stake. In this case, maximum emissions on a lbs/h basis should be used together with a new air quality benefit criterion. Note that in the general case of tons/yr transactions the net air quality benefit constraint does not have to be considered. However, a reviewing authority would be ill-advised to approve new sources that worsen air quality trends since RFP and attainment status are linked with air quality trends.

Use of the case-by-case offsets NSR option does not affect the shape of the RFP schedule. Permitting of new major growth in a nonattainment area, however, does complicate the tracking procedures for RFP. In general, when satisfactory offsets are obtained, emission tracking will not be affected until the new sources come into operation or the offsetting reductions actually occur. This is true because no actual emissions would have occurred and the SIP would not have allowed any net increase in emissions to occur. It should be noted that if RFP is not met, the sanctions imposed would override the permitting authority of systems developed under Section 173(1)(A) or Section 173(1)(B).

A second option open for allowing major construction is described under Section 173(1)(B). Under this option, a growth allowance system can be set up that allows major sources to be approved as long as they would not exceed the available growth allowance.

Implementation of this program for accommodating new sources includes several inherent requirements: 1) there must be a sizable amount of reductions accomplished by the time the system is in operation; 2) the reductions in the amount must all be beyond those needed for attainment; 3) no major growth can be permitted beyond that accommodated within the growth allowance available at the time of source application; 4) accomplished reductions are eligible for addition to the growth allowance, whereas new sources as approved reduce the amount of allowance available for approving future new sources; 5) the available growth allowance is consumed or augmented on an actual basis; and 6) no further major construction approvals can be issued if RFP has not been met.[3]

LESSON 4

MAJOR ELEMENTS OF PERMIT REVIEW

Goal: To familiarize you with the three elements of permit review that should be addressed prior to preparing a permit.

Objectives: Upon completing this lesson, you should be capable of the following:

1. Listing the three major elements of permit review
2. Listing the major stumbling blocks in applicability determinations
3. Describing the goal of technical review
4. Describing the recommendations that may occur from permit review.

4.1 INTRODUCTION

The permit review process involves three distinct elements or major areas that are necessary precursors for technically sound and legally enforceable permits: 1) applicability determination, 2) technical review, and 3) conclusions and recommendations. They are not mutually exclusive because decisions in one area may affect the other two. Nevertheless, each is discussed as an individual element with special emphasis on how this element may affect the other elements.

4.2 CHECK FOR COMPLETENESS

Before any work on the permit review can begin, the application should be checked for completeness. This may mean comparing submitted data against a checklist to ensure that all the necessary information is avaialble for review. A more general definition of completeness is that the permit application contains the data and information needed for the level of review required under the regulations. Different sources require different levels of review based on the applicability determinations. Although a permit application appears to be complete, this does not preclude the agency from making further requests for information if the need arises. However, once the completeness is determined, the permit review process can begin.

4.3 APPLICABILITY DETERMINATIONS

The previous lessons have discussed the regulatory requirements under the various programs for PSD, Nonattainment Review, NSPS, and NESHAPS, as well as SIP requirements that may apply. A source could be subject to the regulatory requirements and emission limits for all of these programs; thus, it be necessary for the permit review engineer to be familiar with the requirements of each program.

The first effort in the review of an application for a proposed new or modified source is to determine what regulations apply to the source. This step in the permit review process is essential because it not only dictates what regulations apply, but may also dictates what level of review must be conducted, what must be included in the review, and what permit conditions must be applied. For example, based on its geographic location, its area of impact, and potential to emit a regulated pollutant, the new or modified source may be classified as subject to PSD, Nonattainment Area Review, or not subject to review because it falls under a "minor" source or de minimis increase classification. Proper application of the criteria of each program is essential to proper source classification.

Most applicability determination problems are associated with determining sources that are not subject to review. Audits indicate that most determinations indicating that a source is major or is otherwise subject to review are generally correct. Determining the potential to emit and arriving at the net emissions, however, are probably the most likely problem areas that can cause an improper applicability determination. The permit reviewer should be cautioned that the proper interpretation of these procedures is necessary to determine what level of review is applicable. Although not required by the regulations, a negative declaration of applicability to PSD and Nonattainment Area Review, including documentation demonstrating that the source is not subject to review, is one alternative for providing a check on the applicability process.

4.4 TECHNICAL REVIEW

Once the applicability determination has been conducted and it has been determined whether the source is subject to NSR, the necessary considerations for PSD review or Nonattainment Review are relatively clear with regard to the BACT/LAER requirements, ambient impact analysis, etc. For a source that has been determined to be "minor," however, the requirements are less clear and beyond the applicability determination, no further review is required under Federal programs. This does not mean, however, that the source is not subject to other State requirements and that technical review for both process and control equipment is required.

4.4.1 Process Equipment Review

Much of the guidance provided associated with NSR is concerns control technology analyses, economic considerations, and ambient impact modeling. To date, little or no emphasis is placed on process review beyond the data required for the applicability determination and potential to emit. The NSR programs for PSD and Nonattainment Review can be viewed as special subsets of an overall review that should take place for each source. In a technical review, the review of the process equipment design is often neglected.

The purpose of the process review is to determine if the process equipment and uncontrolled emission parameters appear compatible with the control equipment operating parameters. The difficulty in reviewing process-related data is that it is unreasonable to expect a permit engineer to be knowledgeable of all the many different processes. In addition, a certain intimidation factor enters into the review in that the source or the equipment designer is more familiar with the operating principles than the permit reviewer, although legitimate questions or concerns may need to be addressed. Each reviewer, however, must remember that he or she is not trying to design the equipment, but merely to discern if there are any obvious problems.

In reviewing a process, the reviewer may reasonably expect to require answers to the following questions:

- What process is to be used to generate the final product?
- What raw materials are used?
- What are the physical or chemical reactions?

- What are the products?
- What pollutants are emitted from the process, in what quantities, and under what conditions (temperature, pressure, etc.)?
- Have any alterations been made in the processes to produce the final product that will affect the type and quantity of pollutants?
- Do any identifiable raw material characteristics affect the emission rate or uncontrolled gas conditions? If so, what are they?
- Are there identifiable parameters in the process operation that affect emission rate or uncontrolled gas conditions? If yes, what?
- Can these parameters be separated into major and minor categories based on their effects on emissions?
- Can major parameters be easily measured?
- Can some other outside influences or considerations significantly affect the emission rate?
- Do the pollutant characteristics and uncontrolled emission rates given in the permit application match what is known about the process?
- Can variations in identified parameters significantly affect the control equipment performance?

Underlying this very general listing of questions to which the reviewing agency should have answers are two additional concerns: how will the necessary process information be obtained and how much information is needed to conduct a comprehensive review without being unreasonable in terms of requiring the submission of every possible piece of data? Only data on those factors that have the potential for significantly changing emissions should be considered. An example is provided to illustrate the type of information that should be obtained in conducting a process technical review.

EXAMPLE:

PERFORM A PROCESS REVIEW FOR A NITRIC ACID PLANT

For purposes of this example, it is not important whether the source is subject to review under PSD or Nonattainment, or perhaps not subject to review at all. This process would be analyzed in the following manner regardless of applicability.

Question 1) What is the process?

At first glance, it appears that the answer is nitric acid production. That, however, is the product not the process. The permit application itself might reveal the nature of the process. The permit review engineer should ask himself/herself "What do I know about nitric acid production?" and "How do I gain more information if needed?" In addition to the permit application, information resources include EPA and non-EPA documents, journals, other inspectors or permit reviewers, and even personnel at the source if specific questions arise. The information sources will indicate that an ammonia oxidation process (AOP) is used.

Question 2) What raw materials are used?

The permit application or one of the other information sources will indicate that the raw materials are ammonia and air.

Question 3) What are the physical or chemical reactions?

Ammonia is vaporized and "burned" catalytically to react NH_3 (ammonia) with air to form NO_2 (nitrogen dioxide) and H_2O (water). The NO_2 dissolves in water to form nitric acid (HNO_3) and to produce nitrous oxide (NO). Nitrous oxide is oxidized by air to form more NO_2. The reaction never goes to "completion," i.e., the NO compounds are never completely absorbed. These reactions typically occur under a pressure greater than 100 psig.

Question 4) What are the products?

The product is nitric acid, which is produced by absorbing NO_2 in water in an absorption tower. Further research would indicate that production (in tons/day) is expressed as though the nitric acid was 100 percent HNO_3. Actually, the nitric acid varies in strength from 50 to 70 percent HNO_3 (the balance is water).

Question 5) What pollutants are emitted and under what conditions?

The pollutants are NO_2 and NO. The gas stream is typically less than 150°F and under slight pressure after a pressure recovery turbine.

Question 6) Have any alterations been made in the processes that affect the type and quantity of pollutants?

This question should help the reviewer formulate what operating parameters may be important to the emissions. In this example, no major process alterations have been made. Variations occur primarily in operating pressure, in absorption capacity, and in cooling of the absorbing solution (water) to increase acid strength. The basic AOP process, however, is unchanged.

Question 7) Do any identifiable raw material characteristics affect the emission rate or uncontrolled gas conditions? If so, what are they?

In this example, the answer is no. The characteristics of ammonia and air do not vary much during nitric acid production.

Question 8) Do any identifiable parameters in the process operation affect the emission rate or uncontrolled gas conditions? If so, what are they?

In this example, several factors that may affect the emission rate. First, operating pressure during the catalytic burning of ammonia affects the amount of NO_2 absorbed to form nitric acid; higher pressure favors increased absorption and increased formation of NO_2. Also, the temperature of the absorption solution affects the amount of NO_2 absorbed to form nitric acid; greater absorption occurs during lowered temperature. For this reason, cooling water is supplied to the absorption column to remove the heat generated by the reaction to form nitric acid and; in some cases, the absorption solution is chilled. The operating rate is generally held constant with a little variation over short time periods.

Question 9) Can these parameters be separated into major and minor categories based upon their effect on emissions?

In this case, the parameters cited above can be subdivided into major and minor in terms of their effect on emissions. The major parameters having the greatest effect are operating pressure of the absorption column and the temperature of the absorbing solution because variations in these values significantly affect the quantity of NO_x compounds that leave the absorption column. Other parameters such as catalyst condition and the pressure of the catalyst, are considered to have only minor effects on NO_x emissions.

Question 10) Can the major parameters be easily measured?

Yes, temperature and pressure are easily monitored by the plant and are typically monitored as part of the normal operating instrumentation.

Question 11) Can some other outside influences or considerations significantly affect the emission rate?

The answer to a question such as this may require experience or good information sources for prediction of the likelihood of occurrence. In this case, a possible outside influence could affect emissions. High ambient temperatures could cause the cooling or chilled water system to function inadequately for plant production and result in significant increases in the NO_x emissions.

Question 12) Do the pollutant characteristics and uncontrolled emission rates given in the permit application match what is known about the process?

This is a judgment call made by the reviewer who checks to see if any obvious mistakes have been made in the application.

Question 13) Can variations in the identified parameters significantly affect the control equipment performance?

Although a complete answer to this question would require an analysis of the control equipment the following is a qualitative answer. For example, if the nitric acid plant were using process control to control emissions, the answer would be yes, and that might require special permit conditions. For this example, however, the installation of external abatement equipment is assumed. Because no major variation in gas flow is expected and operating pressures will be nearly constant, the control equipment can be expected to operate well during normal process variations.

This series of questions can be asked and answered for nearly any process, whether it be a nitric acid plant, coal-fired boiler, asphalt plant, or vinyl chloride polymer facility, to help the permit reviewer identify key operating characteristics that are important to control equipment performance and emission rates. Initially, the permit reviewer may be unable to find the answer to every question regarding every process. The background knowledge obtained, however, should enable the reviewer to find other sources to answer the remaining questions.

4.4.2 Control Equipment Review

Once the process review has been completed and the important operating characteristics identified, the review of control equipment can begin. The major focus during this review is to examine the application for an obvious mismatch between process conditions and control equipment. It is not the intent of this section to provide a list of items to be reviewed for each major type of control equipment. Many other sources of information are available to the reviewer for that purpose, although there are fewer control equipment technologies than process technologies. As in the review of process equipment, however, a general set of questions is useful for analysis of control equipment performance.

The purpose of control equipment review is to determine if the control equipment is compatible with the process operation and capable of reducing emissions to the levels required by the applicable regulations. The review may also include such factors as maintenance considerations, instrumentation, spare parts, and design characteristics for maintaining continuous compliance. The questions that require answers include:

- What pollutants are to be controlled and under what conditions?
- What type(s) of control equipment are to be used to control emissions?
- What control equipment design parameters are useful in determining performance?
- What are the values for these design parameters, and how do they compare with typical design values?
- Do any of the design values seem deficient?
- What design factors aid in continuous compliance?
- What process operating parameters significantly affect the operation of the control equipment?
- What control equipment operating parameters are important in defining or monitoring performance, and are they (or will they be) monitored?
- Can any outside influences or considerations significantly affect emissions?
- Does the control equipment appear to match to the process to obtain desired control efficiency?

Of course, some parameters will always be important regardless of the type of control equipment. For example, gas flow rate, temperature, pollutant concentration, and control efficiency will be important regardless of what pollutant is being controlled and what control equipment is being used. Other parameters will relate only to a specific type of control device (e.g., liquid-to-gas ratio for a scrubber or the aspect ratio for an ESP). Obtaining answers to the questions listed above, however, will lead the reviewer to the information necessary for a complete evaluation of the control equipment.

EXAMPLE:

CARBON BED ADSORBERS WITH STEAM STRIPPING ON A ROTOGRAVURE PRINTING OPERATION

Question 1) What pollutants are to be controlled and under what conditions?

The application indicates that the pollutants to be controlled are toluene and cyclohexanol solvents evaporated from the printing inks used by the printing press. Gas flow, temperature (125°F), and concentration are also given.

Question 2) What types of control equipment are to be used to control the emissions?

The application proposes four carbon beds for adsorption of the VOC compounds. One of the four carbon beds will always be off-line for bed regeneration using steam.

Question 3) What control equipment design parameters are useful in determining performance?

At this point, the reviewer decides how much he or she knows about the control equipment and where to obtain more information if needed to identify the parameters that are important to performance. In this example, gas velocity through the beds, temperature, humidity, solvent molecular weight, solvent capacity per bed, and concentration are all important parameters.

Question 4) What are the design values for these parameters and how do they compare with typical design values?

The application may not explicitly list the design parameters, and calculations may be necessary to generate site-specific values for comparison with typical values.

Question 5) Do any of the design values seem deficient?

Failure of the values given in the application to compare favorably with typical design or good engineering practice values may be grounds for denying the permit application if a satisfactory resolution of the issue is not obtained from the source. The reviewer must be sure, however, that there are no calculation errors on his or her part.

Question 6) What design factors aid in continuous compliance?

This is a case-by-case judgment of items such as extra installed capacity, good access for maintenance, etc.

Question 7) What process operating parameters significantly affect the operation of the control equipment?

This answer should be identical to that found during the process review. In this example, the area of inked surface and the number of colors used (particularly yellow ink) have a major effect on the amount of VOC to be captured and controlled.

Question 8) What control equipment operating parameters are important in defining or monitoring performance, and are they (will they be) monitored?

For this example, the concentration leaving the bed, temperature, pressure drop across the bed, and bed cycle times are important.

Question 9) Can any outside influences or considerations significantly affect emissions?

Again, previous experience and good information sources are essential to defining these "unusual" conditions. For this example, considerations might include proper application and maintenance of a lint filter to prevent dust from plugging the carbon bed, adequate cooling and condensing capacity in hot weather for recovering solvent rather than overloading the beds, and an awareness of other contaminants that may cause adsorption problems.

Question 10) Does the control equipment appear to match the process and be capable of obtaining the desired control efficiency?

By answering this question we are ready to proceed to the next step in permit review.

4.5 RECOMMENDATIONS BASED ON PERMIT REVIEW

The last phase of any permit review process involves a series of recommendations concerning permit issuance or denial. These recommendations, which form the basis for the actual permit, are the result of the applicability determination and technical review. In general, the three possible recommendations concerning the permit are: 1) issuing the permit without special conditions, 2) issuing the permit with special conditions, and 3) denial of the permit.

1. Issuing a permit without special conditions usually applies to smaller sources that do not need to meet a large number of requirements to maintain compliance because of adequately designed equipment. "Standard" permit conditions, however, would be included.

2. Issuing the permit with special conditions may include permit conditions ranging from an enforceable method of keeping a source "minor" to an extensive list of requirements and emission limits.

3. Denial of a permit is justified when program requirements are not or will not be fulfilled or serious doubts exist regarding the source's ability to comply. In some instances, however, a source may not be subject to NSR, but be subject to the NSPS, and the agency is unable to stop construction of capital equipment that

could not comply with the NSPS emission limits. Because of the nature of the regulatory requirements for NSPS, no review of plans is required and failure to comply can be proven only by the performance test.

Additional recommendations for special conditions may include:

- Operating and monitoring requirements and malfunction reporting.
- Recordkeeping requirements for both process and control equipment.

4.6 SUMMARY

The major elements of a permit review include the applicability determination, technical review, and recommendations. A basic review process has been outlined for reviewing technical specifications regardless of source type. Requirements for additional review under PSD review and Nonattainment Area Review can be viewed as special subsets of this basic review process. When the requirements of the review have been fulfilled and the review is complete, recommendations should be made for permit issuance and content. These recomendations form the basis for the next step, writing the permit.

REVIEW EXERCISE

1. Although not required by the regulations, ________________ can serve as a check on applicability.

   a. An application review
   b. A de minimis review
   c. Pollutant-by-pollutant review
   d. A negative declaration

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2. True or False? Minor sources should undergo technical review.

1. d. A negative declaration

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3. In performing a process review of a source, the permit engineer should consider only data on parameters that ______________.

   a. Can vary significantly
   b. Have the potential for significantly changing emissions
   c. Are likely to occur
   d. b and c
   e. a and b

2. True

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4. A permit application should ______________ before any permit review process begins.

   a. Include all permit fees
   b. Be cross-checked with the regulations
   c. Be complete
   d. None of the above

3. d. b and c

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5. The two areas most likely to cause problems in an applicability determination are ____________ and ______________.

   a. Potential to emit, netting of emissions
   b. Emissions offsets, potential to emit
   c. Emissions offsets, netting of emissions
   d. Ambient monitoring requirements, emissions offsets

4. c. Be complete

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5. a. Potential to emit, netting of emissions

LESSON 5

CONSIDERATIONS FOR WRITING A SUCCESSFUL PERMIT

Goal: To familiarize you with the major factors to be considered prior to writing a successful permit.

Objectives: At the end of this lesson, you should be capable of the following:

1. Stating the major legal considerations in permit writing
2. Recalling the benefits of written technical review procedures
3. Recalling key written procedures to enhance the permit review process
4. Recognizing the importance of addressing waste disposal in permit writing
5. Recognizing the importance of proper permit preparation documentation.

5.1 INTRODUCTION

A program for NSR is required under 40 CFR 51.18 and followup inspection procedures, are required under 40 CFR 51.19. These regulations do not specifically require a permit system to be in place to carry out the review; however, they do require a review system with the legal authority to disapprove any plans that would violate ambient air criteria. Most agencies accomplish this by a permit system for construction and/or operation. Some agencies already had a permit system in place prior to the NSR program and extended the regulatory requirements and legislative authority to cover new and modified sources. Other agencies have only recently added a permit system, one that applies to new sources only. This section will discuss some of the legal and procedural issues that should be considered prior to writing the permit.

5.2 LEGAL AUTHORITY

The requirement for an NSR program is cited in 40 CFR 51.18. Most often this is translated as a system for issuance or denial of a permit to construct or modify a major source. There is no requirement for a permit system for minor sources; however, there is the requirement for the agency to write Federally enforceable conditions that ensure the maintenance of ambient air quality criteria. In other words, if a source is deemed "minor" because of a restriction in operating hours the amount of product throughput, etc., a method must be established to ensure that the source remains "minor." For agencies with Federally approved SIP's, NSR is totally integrated into the program. An agency may also have partial delegation for technical review if it lacks the necessary enabling legislation to issue permits.

One difficulty that occurs involves determining what is included in the approved SIP regulations. In some cases, the material submitted with the SIP revision package was not included in the Federal Register notice and therefore is not part of the Federally enforceable program. If some uncertainty exists as to whether regulations are Federally approved, the appropriate Federal Register notice must be consulted to determine what is and is not included in the SIP.

5.2.1 Administrative Procedures

The procedures that must be followed for PSD review and nonattainment review are fairly consistent from plan to plan. Although there are certain rules and exceptions that must be followed, there is some room for interpretation. Basically, however, the procedure for determining what type of review is necessary is the same for each major source. In the case of minor sources not subject to review, however, there are no guidelines for source review after the applicability determination. Although the technical review for the process and control equipment should be similar to that for PSD and nonattainment sources, there are generally only a few guidelines available to determine how a minor or existing source should perform given the process and control equipment design information. In addition, the permit reviewer must be aware of any time limit restrictions built into a permit review system, any requirements for notification by the source, any public notice and comment, and the appeal of a permit or its conditions. Both minimum and maximum time limits may be included in the administrative procedures as well as consequences for missing permit review deadlines.

5.2.2 Approval and Denial of the Permit Application

Essential to the NSR program is the ability to approve or disapprove construction or modification of a major source. If there is cause to believe that the source may violate a NAAQS or PSD increment, the agency must have the legal authority to disapprove the plans as submitted. This legal authority should also be extended to minor sources as well, although such authority is not always provided.

In addition, most regulations typically restate the source's responsibility to meet the emission limits and other regulatory requirements even though the agency approved the plans. This prevents a potentially nonenforceable situation in which the source is not accountable for failure of equipment and violations of the applicable emission limit because the agency had approved the plans.

5.2.3 Permit Modification

Legal means should be provided to modify the construction and/or operating permit when deemed necessary after permit expiration and renewal. Although a comprehensive permit can and usually does address most operating situations, it cannot take every possible variation into account . Specific modifications may include monitoring, recordkeeping, and reporting of operating parameters; additional continuous emission monitoring; and specific requirements for operation and maintenance of process and/or control equipment. Clarification of procedures and definitions of startup, shutdown, and malfunction also may be necessary if they present a problem, provided the agency can further define malfunction under its legal authority. Permit modifications may also allow the deletion of unneeded, unwarranted, or unattainable permit conditions (e.g., mutually exclusive emission limits that cannot be met simultaneously because the necessary technology does not exist).

5.2.4 Stack Test Requirements

Consideration should be given to whether test methods and testing frequency can be written into the permit. In most cases, the test method to be used certainly should be written into a permit. Frequency of testing will depend on the agency's goals and the interpretation of agency regulations. Although it is more difficult to outline operating conditions prior to the test, it is also easier to assign operating limits after a test. Test conditions are best left to the test protocol. Test results, on the other hand, may indicate optimum process and control equipment characteristics that can be written into the permit after the test.

5.2.5 Permit Revocation

The threat of permit revocation is inherent in permit issuance. It is seldom used, however, although theoretically, it is easier to revoke or suspend a permit and cite a source for failure to have a valid permit than it is to test, file a notice of violation, and take action to recieve judicial relief. The legislative authority to issue a permit, however, does not automatically mean that the agency can revoke the permit. That authority must also be granted to the agency in its enabling legislation.

5.2.6 Permit Expiration and Renewal

Permits are generally of limited duration and subject to periodic renewal. Permits should be reviewed and renewed at least every 5 years; however, 2 to 3 years is more typical. With the advent of permit fee systems, permit renewal may be annual. Procedures should be outlined to allow adequate time for permit renewal as old permits expire.

5.2.7 Restrictions on Emission Limitations

The emission limits that some agencies specify in a permit may be restricted to the appropriate NSPS based on their enabling legislation. Therefore, unless proposed by the source, these agencies cannot impose a BACT limit that is more strict than the applicable NSPS and therefore these agencies must rely on enforceable limitations on production rates and hours of operation to limit a source's impact on ambient air quality or otherwise to disapprove the application. Agency personnel should be aware if such conflicts exist.

5.3 WRITTEN PROCEDURES FOR TECHNICAL REVIEW

The preceding lesson presented the logical process for determining what information is necessary to review process and control equipment parameters.

In practice, it is advantageous for an agency to have prepared formal procedures for the review of at least the major control equipment groups. Because this is rarely done, however, reviews of permit applications may be inconsistent and permit requirements may be both inconsistent and unjustifiable. Although it may be more difficult to establish guidelines for basic process data in an application, the major control equipment groups generally do have guidelines for critical parameters, which should be followed. It is to an agency's benefit to have written procedures describing how the data are to be handled and used.

5.3.1 Confidential Information

Because potentially confidential information may be received as a result of the permit review process, a system should be established to handle such sensitive information. This should consist of a locked file, a controlled-access system, and written procedures for handling information as it is received and for preventing its return to the public domain without proper review. A good rule of thumb regarding confidential information is: "If it is not essential to describing performance or emissions.....don't obtain it."

The liability in releasing confidential information can be substantial. The consequences for an individual's releasing confidential information can include loss of job, fines, and criminal penalties. An individual also may face a civil suit for damages as a result of such a release. The agency also may face future difficulties in obtaining data that may be essential to its permit review if it is unable to safeguard confidential business information. Agency personnel should be aware of procedures for safeguarding confidential information and the consequences of its release. The agency should incorporate formal, written procedures to be followed in all cases, and it should also be aware of any other regulatory requirements that may conflict with the protection of confidential information.

5.3.2 Process/Control Equipment Review Procedures

The goal of the technical review of process and control equipment is threefold: 1) to determine what the controlled and uncontrolled emissions will be, 2) to determine if the match between the process and proposed control equipment is compatiable and will result in meeting the emission limits, and 3) to determine what parameters can influence potential emissions and if these parameters can be measured or monitored. To the extent possible, an agency should establish guidelines and written procedures for the permit writer to follow to help ensure that the basic data are reviewed in a consistent manner. It is unreasonable to expect an agency to produce permit review guideline documents for every industrial classification. An agency, however, may consider standardizing procedures for certain process classifications that are prevalent in its jurisdiction (e.g., asphalt plants, gasoline bulk loading terminals, or industrial boilers). These guidelines may be as simple as checklists or as extensive as guideline documents with recommended design parameter ranges. In addition to assuring consistent technical review, formalized procedures can also lead to more consistent permit conditions in the issued permit.

It is recommended that permit reviewers keep the emission point under review in perspective with the rest of the source if there are multiple emission points. In the event of an obvious or apparent mismatch between proposed or existing equipment selection and operation or process conditions, there may be justification for closer scrutiny of the emission point. An example of a review that had lost sight of this perspective was uncovered several years ago during a file review of a coal-fired powerplant. The source included several existing units in addition to new units under construction. The source had decided to replace its existing ash-handling system with a pneumatic conveying system with a fabric filter for final control. The new ash-handling system was to handle all the ash from the existing boilers as well as from the new boilers and electrostatic precipitators (ESP's) under construction. The source had rebuilt and modified the existing ESP to achieve substantial emissions reduction. Although the information on this source filled nearly four file cabinet drawers almost all of it (and the apparent concern of the agency) dealt with a conservatively designed fabric filter for ash handling. The files included little or no information on the boilers or ESP's (only one passing reference to one of the ESP's). Although it was true that the potential uncontrolled emission rate was substantial, this example showed a complete disregard for a balanced approach to permit review. The reason for this situation was not determined, but certainly a lack of understanding of the process and control equipment operation was a contributing factor.

5.4 WASTE DISPOSAL

The permits and the review processes that have been concentrated on throughout this manual have dealt most often with air discharge permits. It is relatively rare for a reviewer to be concerned with water pollution, solid wastes or hazardous wastes. Nevertheless, the permit reviewer should at least conduct a material balance in relation to the applicable control equipment and follow the various effluent streams to their ultimate disposal points. The results of such a procedure may be valuable in alerting personnel within other regulatory disciplines to potential concerns and in avoiding problems with the discharge of materials in a manner that is unacceptable.

Most of the technical review of control equipment concerns itself with the efficiency of the removal of contaminants from the effluent stream. The material that is captured represents a concentration of pollutants that may contain toxic or potentially toxic materials. Technical review should also include a check for acceptable disposal methods consistent with regulatory goals and requirements. Several examples can illustrate the importance of such a review.

5.4.1 Example No. 1

A woodworking facility replaces an existing cyclone on its sanding and planing operation with a fabric filter. The dust is relatively fine, and the older cyclone could not efficiently control emissions, the fabric filter, however, does a good job of removing the sawdust from the gas stream. The dust discharge from the fabric filter is tied into an existing pneumatic conveying system that feeds a woodwaste boiler with the dust and woodwaste from the various plant operations. Unfortunately, the dust-separating device on the pneumatic conveying system is a low-efficiency cyclone that is unable to separate the sander/planer dust, and it is discharged at this point at a rate greater than that for the existing cyclone that was replaced.

5.4.2 Example No. 2

An ESP designed with an inadequate dust conveying system caused hopper pluggage and poor ESP performance. In an effort to reduce the conveying problems, the system was modified so that the dust would free-fall into a bin through a chute. This allowed a bucket front-end loader access to scoop up the dust periodically and transport it across the plant site to a dust disposal area. The area below the ESP is subject to strong winds, which cause the dust to blow out of the open bins. In addition, the dust is also lost during transport to the disposal site. Unfortunately, the dust contains a high concentration of lead and other heavy metals. Review of the initial design and subsequent modifications did not take these factors into account.

5.5 DOCUMENTATION PROCEDURES

A primary area of weakness in some permit review processes is a lack of adequate documentation. A permit review file should be self-explanatory from the receipt of an application to the issuance of a permit. A system auditor should be able to determine what information was submitted; to evaluate the applicability determination; and to evaluate the technical review and all underlying assumptions, justifications, and conclusions used to issue the permit. The documentation procedure may include checklists, narrative, and calculations. One major objective of the permit review process is to review the accuracy of all data submitted by the source and to note any serious discrepancies between what is proposed and what may actually exist. Although even the best permit review process cannot be expected to foresee every difficulty or possible combinations of circumstances that may occur, adequate and proper documentation will indicate what was initially proposed and considered and may be essential to the justification of any permit modification, to denial of a permit or to the support of conditions written into the permit.

REVIEW EXERCISE

1. True or False? Adequate permit review guidelines exist for both major and minor sources.

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2. Essential to the NSR program is the ability to _____________ construction or modifications of a major source. a. Administer b. Specify c. Disapprove d. All of the above	1. False
3. The authority to revoke a permit must be granted to an agency __________________. a. In the Clean Air Act b. In the *Federal Register* c. By the courts d. In its enabling legislation	2. c. Disapprove
4. Permits to operate should be reviewed and renewed at least every ______ years. a. 5 b. 3 c. 1 d. 8	3. d. In its enabling legislation
5. A good rule-of-thumb for handling confidential information is: "If it is not essential to describing performance or emissions.... ______. a. Safely file it for later review b. Return it c. Do not obtain it d. Safely dispose of it	4. a. 5
6. True or False? It is not advisable to establish written procedures for technical review because this would place excessive restrictions on the permit writer.	5. c. Do not obtain it
7. With regard to waste disposal of pollutants, a ____________ should be performed in relation to the control equipment. a. Reference method test b. Cost/benefit analysis c. Separate efficiency calculation d. Material balance	6. False

8. A primary concern of the permit reviewer is that residual pollutants collected by the control equipment may contain __________ materials.

a. Toxic
b. Valuable
c. Reentrained
d. Unprocessed

7. d. Material balance

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8. a. Toxic

LESSON 6

ELEMENTS OF EFFECTIVE PERMIT WRITING

Goal: To familiarize you with the general legal, administrative, and technical elements that should be considered before writing a permit.

Objectives: At the end of this lesson, you should be capable of the following:

1. Recalling the essential legal authorities required for an effective permit
2. Discriminating between clear, concise, and specific permit conditions and those lacking the same
3. Identifying meaningful and reasonable permit conditions
4. Identifying the essential elements to include in the technical specifications of a good permit
5. Recalling the most effective emission limit values to use in a permit
6. Recalling administrative considerations involved in permitting.

6.1 INTRODUCTION

In the previous sections, the importance of applicability determinations, elements of the permit review process, supporting legal authority, and permit review procedures have been discussed. The end results of these are the recommendations and conclusions that determine whether a permit is issued and what conditions will be written into the permit. The permit that is issued may be seen as an extension of the regulations that define, as clearly as possible, what is expected of the source. The permit also provides an opportunity to accommodate site-specific factors that the regulations may not address adequately.

The particular requirements for permit content vary from agency to agency and depend on the type of permit issued. The emphasis placed on permit review usually differs for sources subject to PSD review, Nonattainment Area Review, and minor new or modified sources. Although the requirements of the permit review process may vary, the general approach to permit writing is similar. The final goal is to write an effective and enforceable permit that provides a mechanism to protect the ambient air quality within the regulatory requirements and to help ensure continuous compliance with emission standards.

Permit content also may differ depending on whether it is a permit to construct, a permit to operate, or a combined permit for both construction and operation. The requirements of 40 CFR 51.18 do not require an operating permit system; however, they do require a system 1) to review new and modified sources for their potential impacts on ambient air quality, 2) to establish emission limits that will be consistent with these potential impacts, and 3) to prevent construction where impacts exceed regulatory limits. Thus, a minor source or an existing source, may not need a permit at all unless the agency requires one. For sources subject to review, a properly written permit to construct also becomes a defacto operating permit. Combined construction/operating permits are, perhaps, the most difficult to write because the key operating parameters and emission characteristics may not be well defined before construction. The basic elements of each type of permit, however, are similar.

6.2 GENERAL GUIDELINES IN PERMIT WRITING

A permit may be viewed as an extension of the regulations reflecting the results and conclusions of the permit review process. The permit should be a stand-alone document that identifies the emissions units to be regulated, establishes emission limits to be met, specifies methods for determining compliance and/or excess emissions, and outlines the procedures necessary to maintain continuous compliance with the emission limits. Because of the number of conditions that it may incorporate, a permit can become relatively complex. These conditions, however, are necessary to make the permit an effective tool in maintaining compliance. This lesson explains several guidelines that can be followed to reduce the complexity of the permit and still maintain its effectiveness.

6.2.1 Legal Authority

First, the legal authority to specify certain permit conditions must be incorporated into the permit system. Whereas some have argued that a source that accepts a permit without challenge is legally bound to meet the permit conditions, the ability to enforce a violation of those permit conditions may be compromised if the legal authority is not granted or implied in the regulations. Several potential problem areas include the specification of emission limits on nonregulated pollutants, the specification of certain operating parameters, restrictions on operation of particular process equipment, and the specification of a spare parts inventory. The following are examples of these situations:

- Specification of emission limits on nonregulated pollutants to limit the amount of hydrochloric acid produced at a municipal incinerator. In this case, the agency might establish an emission limit to restrict acid rain potential. The limit may be challenged, however, because it is arbitrary and, as a nonregulated pollutant, not within the legal authority of the agency.

- Specification of an operating parameter that is nonattainable or necessary to achieve compliance with an emission limit, e.g., specification of an operating temperature of 1500°F for an incinerator when 1300°F will meet the emission limit. It may be difficult to justify a permit condition if compliance is demonstrated under conditions other than those specified by the permit.

- An example of the specification of inappropriate permit conditions is the requirement that an ESP's voltage controls be maintained on "automatic" under all circumstances. Occasionally, an ESP may be unable to accommodate changes in dust characteristics with controls set on automatic and is better able to operate under manual control. In this case, requiring operation on automatic is tantamount to operating in violation of a particulate standard, and it is unlikely that the agency can require operation under these conditions.

- A condition written in the permit requires that a complete change of fabric filter bags be on hand in the source's spare parts inventory. Whereas this may be a reasonable requirement for a fabric filter containing less than 100 bags, it is unlikely that the agency has the authority to require the same of a facility whose fabric filter uses 1000 to 2000 bags because of the cost of such a requirement.

These examples also point out the second general guideline for writing effective permits.

6.2.2 Reasonable and Meaningful Permit Conditions

A reasonable and meaningful permit condition is one that provides some indication or assurance of compliance with emission limitations or otherwise furthers continuous compliance goals. Requiring measurement, monitoring, or recordkeeping of certain parameters is one way of demonstrating continuous compliance with emission limits and ambient air quality goals. For example, it may be reasonable and meaningful to specify a maximum production time of 8 h/day to maintain compliance with ambient air quality standards, or to limit sulfur content in fuel, the amount of product produced, or raw materials consumed. These kinds of permit requirements demonstrate a method of ensuring that emission limits are met. Specification of process and control equipment parameters also offers a surrogate method of determining compliance, particularly when the parameter values chosen are at or near those needed to achieve and maintain compliance. The parameters chosen to be monitored and recorded, however, should have a demonstrable correlation with compliance. For example, scrubber pH should not be selected for monitoring and maintaining at some value unless operating at a different value could result in noncompliance with an emission limitation.

In constructing a permit and selecting reasonable and meaningful permit conditions, the permit writer should ask himself/herself if the permit condition can indeed be achieved. If the condition can be met, is it a direct indicator of compliance or a method of maintaining continuous compliance? If it is an indirect indicator, how indirect is it, and is there a better indicator? These questions require considerable informed judgment on the part of permit reviewer. The permit reviewer and the source are unlikely to foresee every possible situation or be aware of every key parameter. It is more desirable, however, to specify permit conditions that are reasonable to the source, objective, easily determined, and produce meaningful data or results than it is to specify a permit whose conditions are unenforceable and meaningless.

6.2.3 Clear, Concise, and Specific Permit Conditions

Permit conditions should be written as clearly and directly as possible and state precisely what is expected of the source. They should contain as few exceptions or conditional statements as possible. The permit should state what is to be measured, recorded, or reported; what the emission standards are, and how these standards are to be met. The permit itself, should include no explanation or justification as to why a permit condition is specified, and each condition should leave as little room as possible for interpretation. Permit conditions also should be grouped together into some logical order and not cover more than one area at a time to minimize confusion. The following is an example of the same permit condition demonstrating progressively clearer and more concise statements of what is expected of the source and how it is to be accomplished.

EXAMPLE:

Poor - "Source shall install monitoring equipment for the scrubber." This requirement is not specific, and it is not clear as to what type of monitoring equipment is to be installed.

Better - "Source shall install differential pressure gauges across the scrubber throat." This indicates what kind of gauge or monitoring equipment is required and where it is to be placed.

Best - "Source shall install and maintain differential pressure instrumentation to monitor pressure drop across the scrubber throat." This statement completes the requirement by indicating exactly what parameter is to be measured, and it specifies continuous maintenance of the measurement device.

6.3 SPECIFIC GUIDELINES IN PERMIT WRITING

Any permit can be divided into the following six distinct areas:

1. Legal authority
2. Technical specifications
3. Definition of compliance
4. Excess emissions
5. Administrative procedures
6. Other site-specific conditions.

Some permit conditions included in each of these categories can be considered standard permit conditions, i.e., included in nearly every permit. Others are more specific and require variations depending on the unique requirements of an individual source.

6.3.1 Legal Authority

The first provision of the permit is the specification of the legal authority to issue the permit. Generally, this includes a reference to enabling legislation and to the legal authority to issue and enforce the conditions contained within the permit. This standard condition is usually common to nearly all permits. Also generally included under legal authority is a specification or reiteration of the right to establish, enforce, and periodically modify specific permit conditions. A specific citation of effective and expiration dates of the permit are also included under legal authority.

The length of time that a permit is valid depends on several factors. For example, a permit to construct a source may have to cover a relatively long period of time if the source is new and the time required for its construction is lengthy. Operating permits can be issued to cover much shorter periods. Generally, the validity of an operating permit should not exceed a period of 5 years, even though the agency may have the right to modify the permit if it is deemed necessary. It is usually more common for operating permits to be valid for a period of 2 to 3 years. This practice is diminishing, however, and annual permit renewal is becoming more common as annual permit fees are incorporated into agency functions. Although annual permit renewal will increase the number of permit applications to consider, it will also increase the frequency at which permit conditions can be reviewed and modified to reflect actual conditions at the source and to reflect agency concerns.

6.3.2 Technical Specifications

The permit should include a listing of the sources or emission units to be regulated under the permit. This listing should include a brief process description for those sources when the conventional terminology does not provide an adequate description of the process. A similar guideline can also be established for control equipment, however, the use of trade names should be avoided in descriptions of equipment that is subject to regulation under the permit.

For some sources, the listing of individual emission units can be extensive. When this is the case, it may be simpler to divide one permit into several permits that cover different areas. This may increase the number of permits to be tracked per source, but it also tends to shorten each permit and allows for better identification of individual emission units in the field during stack tests or inspections. The permit's technical specifications also include the emission limitations. The emission limitation values incorporated into a permit condition are either those specified in a regulation (SIP, NSPS, NESHAP) or those resulting from PSD review or nonattainment NSR. When the source is in a regulated category, the emission limit should be presented in units of the standard for that category (e.g., pounds per million British thermal units or pounds per ton of production, etc.). Most NSPS emission limitations, for example, are specified in quantity of allowed emissions per quantity of production.

In general, it is a good idea to address the emission limit in two different ways with one value serving as an emission cap. This latter value is the one that reflects the results of air quality modeling and is usually expressed as maximum mass/time (e.g., pounds/hour). For existing sources, the agency may not have the legal authority to specify this value. Also for some minor sources not subject to PSD review, some question may exist as to whether such a second value can be specified. Nevertheless, it is important that the emission limits reflect all the conditions in the permit application. If the application assumes limited hours of production or limited materials of production, these should also be stated as permit conditions along with methods to measure or monitor these requirements.

For new or modified sources subject to PSD review, these two emission limits represent values for both continuous application of BACT and values needed to protect ambient air quality. The permit writer should keep in mind that the source must comply with <u>both</u> values to demonstrate compliance.

EXAMPLE:

> As a permit condition, the emission limit might be set at 0.05 lb/10^6 Btu <u>and</u> at a maximum of 60 lb/h. Both emission rates are equivalent <u>if</u> the source operates at 1200 x 10^6 Btu/h. Below this heat input rate, the 0.05 lb/10^6 Btu value assures that BACT is continuously applied. Above 1200 x 10^6 Btu/h, the 60 lb/h limit applies representing the conditions used for ambient modeling. The

permit condition should be written so that the most stringent value always applies.

Units of the emission limit should also be easily measured. Values such as pounds per hour and pounds per unit of production are favored over values more difficult to measure, such as tons/year. In some cases, however, a tons/year limit may be imposed in addition to the pound/hour limit as an overall cap on the emissions. Even pound/day values are not considered good practice because these units may be outside the testing procedures to demonstrate compliance.

In addition, if the values selected for the emission limits are different from those specified in the regulatory limits, the authority to set such values should be cited. Although this is not usually a problem for new sources and modifications, it can be a problem in permits for existing sources. When published regulatory limits differ from those in the permit, it may be necessary to establish the legal authority to set such a value; otherwise, such numbers appear to be baseless.

EXAMPLE:

An existing source is subject to an emission limit as determined by maximum production on a process weight formula published in the regulations. Using this formula, the source contends that it is subject to a 150 lb/h emission limit. The issued permit states a 90 lb/h limit. That limit is not legally enforceable if the agency does not have the legal authority to establish a lower limit, regardless of whether the source accepts the permit. Citing a regulation that allows the establishment of a lower emission limit establishes the legal authority to specify a limit different from the published limit and eliminates the possibility that it was merely a calculation error. The emission limit may still be challenged, but the legal authority to specify a different emission limit will have been cited.

The last item included under technical specifications is an operation and maintenance (O&M) plan for process and/or control equipment. Currently greater interest exists in identifying O&M procedures in the permit as part of the permit conditions rather than a more general O&M requirement or the submittal of an O&M plan. Although O&M procedures may be very site-specific, they generally include periodic checks and recordkeeping. Minimal O&M guidelines are usually provided by equipment manufacturers. Other technical documents on specific control equipment also may be useful in establishing O&M procedures.

6.3.3 Compliance Determination

The permit should state how compliance with the emission limit is to be determined. This includes, but is not limited to, the test method(s) to be used to determine compliance and the reference date for each test method. This date is important because changes in the method over time may change how much pollutant must be measured. On the other hand, specifying a test date has, on occasion, specified a test method with mistakes or without refinements that improve the test method and its accuracy. If a test method has remained unchanged for a period of time and is not likely to change in the future, it is usually adequate to cite the test method without a promulgation date. If the test method has been changed or is likely to change in a manner that alters the amount of pollutant measured, the test method promulgation date should be specified.

Emission tests, both initial and followup, are usually conducted at "representative" conditions. Defining representative conditions is beyond the scope of this manual and sometimes can be a highly objective and arbitrary judgment. Even specifying worst-case (nonmalfunction) operating conditions as a test requirement can be difficult for any given source. Although specifying operating conditions for the test may give some assurance that the equipment can do the job under these conditions, the establishment of test parameters probably should be left to a test protocol developed outside of the permit.

More important, however, is the use of test data to establish a baseline and to identify and quantify surrogate process or control equipment parameters that have some correlation with emissions. Identifying these surrogate parameters may require several tests to establish a correlation, and only those parameters that exhibit such a correlation with emissions should be used. One example is a mass/opacity correlation, which is developed on a site-specific basis as an indicator of continuous compliance. In this instance, care must be taken that a common reference condition be applied to concentrations used to construct the correlation in order to avoid dilution problems (e.g., concentrations referenced to percentage O_2 or CO_2) so dilution problems are avoided.

Parameters that are monitored either continuously or continually should be specified in the permit, including averaging time for continuously monitored data or frequency of data recorded for continually (periodic) monitored data. Whenever possible, "never to exceed" values should be specified for surrogate compliance parameters. If surrogate compliance parameters are used to determine continuous compliance, values should be specified that correlate with emissions that are easily determined. Also, O&M should be specified for the monitoring instruments such as zero, span, and other periodic checks to ensure that valid data are obtained.

6.3.4 Excess Emissions

When emissions exceed the emission limits determined by a performance test, from surrogate parameters, or from continuous emission monitors, some action is required by the source. Permit conditions outlining reporting requirements, actions to be initiated, and time limits for correction should be included in the permit. Simply stated, the permit conditions should indicate that excess emissions from the source require corrective action by the source to restore the emissions to compliance levels. These are usually standard conditions in most permits.

Excess emission permit conditions also may include exemptions from startup, shutdown, and malfunctions. These should be as specific as possible. In recent years, there has been more interest and greater emphasis on limiting abuse of the malfunction and startup/shutdown exemptions. Although the definition of a malfunction is very site-specific, every effort should be made to include adequate definitions of both preventable and nonpreventable malfunctions. Requirements may include reporting the malfunction duration, severity, and cause; taking interim and corrective actions; and taking actions to prevent recurrence. The overall goal is to prevent a malfunction condition from becoming a standard operating condition.

6.3.5 Administrative Procedures

Most administrative procedures are usually standard among permits. These administrative procedures include:

- Recordkeeping and reporting, including all continuous monitoring data, excess emission reports, malfunctions, and surrogate compliance data.

- Notification requirements for performance tests, malfunctions, etc.

- Actions to be taken if noncompliance with emission limits is determined.

- Specification of administrative procedures for noncompliance determinations, penalties, hearings, and appeals (includes time limits for action/response).

- Specification of procedures to revoke, suspend, or modify the permit.

- Specifications for handling confidential business information.

- Specification of source's requirement to meet emission limits set forth in the permit.

6.3.6 Other Permit Conditions

From time to time, it may be necessary to outline specific permit conditions that do not fit into the standard categories. Because they are so site-specific, they can be collectively grouped into the "others" category. Some examples include:

- Definition of nonstandard terminology or units or abbreviations unique to a given facility. Some words have special meanings when used in reference to a specific industry. Clarification of these nonstandard words, units, or abbreviations help minimize confusion.

- Definition or specification of procedures to determine process related variables or parameters. Examples include coal analysis, correlation between black liquor fired in a recovery boiler and paper production, etc.

- Specification of ambient monitoring requirements.

- Specification of site-specific operation and maintenance procedures; for example, requiring a warmup of 10 minutes for a fabric filter or transformer/rectifier set adjustment once per shift on an ESP to accommodate a site-specific operating condition.

6.4 SUMMARY

A permit is only as good as the conditions specified for achieving and maintaining continuous compliance with emission limits. A permit cannot ensure compliance or foresee every contingency. It can, however, be a stand-alone document that specifies what is allowed and required and how that is to be accomplished. Selecting proper permit conditions requires knowledge of the regulatory requirements and regulatory limits placed upon the permit writer, a complete and accurate permit application, and knowledge of technical factors relating to the process and control equipment, and process economics. It is hoped that the document that emerges will be a useful tool in maintaining compliance and ambient air quality criteria.

REVIEW EXERCISE

1. Because key operating parameters and emission characteristics may not be well defined, ______________ can be the most difficult to write.

   a. Permits to construct
   b. Permits to operate
   c. Combined construction/operating permits
   d. Minor source permits

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2. True or False? The legal authority to specify permit conditions should be incorporated into the permit system.

   1. c. Combined construction/operating permits

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3. Generally, the length of time an operating permit is valid should not exceed ___ years.

   a. 5
   b. 1
   c. 10
   d. None of the above

   2. True

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4. Which of the following emission limit values is more easily determined by source testing?

   a. lb/ton
   b. lb/day
   c. lb/h
   d. lb/10^6 Btu

   3. a. 5

---

5. Which of the following is generally not included in the technical specifications of a permit?

   a. Emission test protocol
   b. Emission limits
   c. List of emission units
   d. Operation and maintenance conditions or plan

4. c. lb/h

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6. Emission testing is usually conducted at ______________ conditions.

   a. Malfunction
   b. Optimum
   c. Representative
   d. Reference

5. a. Emission test protocol

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6. c. Representative

LESSON 7

PERMIT FOLLOWUP/RENEWAL

Goal: To familiarize you with the need to interface permit review and writing with other agency functions such as source inspections, performance testing, and computerized tracking systems.

Objectives: At the end of this lesson, you should be capable of:

1. Identifying the difference in focus between inspection of new and existing sources.
2. Discussing the importance of defining representative conditions for performance testing.
3. Recalling the potential contributions of the source inspector to the permit review process.
4. Discussing the importance of performance test results as they relate to the permitting process.
5. Discriminating between the different functions and advantages of various computerized source data tracking systems.

7.1 INTRODUCTION

The goal of permit writing is to provide a tool that helps ensure the source's long-term continuous compliance and protection of the NAAQS. Completing the task of writing a permit, however, does not guarantee compliance with established emission limits, and a permit application alone may not provide a complete picture of equipment performance at the source. The agency must rely on other tools in conjunction with the permit to help achieve continuing compliance. These include source inspections, performance tests, and data tracking and handling systems. These tools are part of an integral process of which permit review and writing is only one part of the overall NSR process.

The goals of source inspection, performance testing, and data tracking differ depending on whether the permit is for a new or modified source or if it is a renewal of a previous permit. The distinction between the two is that a new or modified source will not have an operating history or a baseline established, whereas an existing source will. For the new source, performance testing and inspection provide a time to compare actual equipment and performance with that proposed in the application. During permit renewal, however, these data are used for refinement and adjustment of the permit conditions. Although the underlying purposes may differ, the tools available to the agency are the same and so is the overall goal of continuing compliance.

7.2 SOURCE INSPECTION RESULTS

One of the resources available to the permit engineer is the source inspector. The inspector often is the agency resource with the most day-to-day contact with the source. A good inspector can provide a wealth of information to the permit review process with first-hand knowledge of processes and control equipment, operation and maintenance procedures, source line and management personnel, and source history (including compliance strengths and deficiencies).

Because the inspector frequently operates out of a branch in the agency separate from that of the permit engineer, this valuable resource is often either not readily available for use in the review process or it is overlooked. The source inspector may be the only means by which compliance can be determined without emission testing; thus, it becomes the inspector's responsibility to ascertain whether compliance can be met on a continuous basis.

For various reasons, process parameters and control equipment efficiencies may, and often do, change over time, and the inspector can provide verification and often quantification of these conditions that may be of use in the permit review process. It is vital that the first-hand knowledge and experience of the inspector be used to improve the permit-writing process and to help achieve continuing compliance goals. Inspection of a new source or modification can verify that the capital equipment and process conditions required in the permit are the same as those actually occurring after start-up.

Combining the regulatory knowledge and engineering skills of the permit engineer with the first-hand observations and informed conclusions of the inspector produces a more complete and accurate assessment of actual conditions at the source and, it is hoped, a better permit.

The difference between the emphasis placed on permitting a new sources as opposed to that placed on permitting an existing source is most evident in the use of inspections as part of the permit process. Although the major goal may be the same (i.e., to determine if the permit requirements are being achieved and to assess the compliance status of the source), the type of information to be gathered is different.

Inspection of a new or modified source may occur prior to startup (upon completion of construction) or some time after the startup and shakedown of the process. During the initial inspection, specific tasks to be accomplished include:

- A check to see if the installed equipment is the same as that proposed in the application and for which the permit was issued. Although it is probably less common to see a different piece of equipment than was proposed in a PSD or nonattainment review application than in cases involving minor sources, it does happen. Sometimes "equivalent" equipment is not truly equivalent.

- An assessment of construction practices. Drawings and specifications do not always reflect the actual situation, and "field" modifications can and do occur that may limit performance.

- An evaluation of continuous compliance factors. Again, drawings and specifications may not always account for other factors. For example, access doors may be provided on control equipment for routine maintenance, but support structures or railings prevent them from being opened.

- A check to see that all instrumentation for monitoring process or control equipment parameters has been installed and is operational.

- An evaluation of test port locations.

The initial inspection may also be the best time for gathering the data necessary to establish both baseline and representative conditions for future performance testing. Equipment (both process and control) may be designed for one set of conditions, but may not be operated in the same way on a day-to-day basis. For example, the control equipment may have been designed for maximum capacity conditions but the process is rarely operated at capacity. Depending on the type of control equipment, it may be unable to perform as well as it could at full load conditions. This would also be helpful to know when defining representative test conditions.

Inspection of existing sources for permit renewal provides a different focus. Although all inspections should be conducted with a view towards documenting the operating characteristics and operating history of the source, an inspection conducted prior to permit renewal should provide the most up-to-date performance review of the source. When combined with the data from previous inspections, performance tests, and malfunction and excess emission reports, the information gained from such an inspection can help the inspector make recommendations that can be incorporated into the new permit to "fine tune" or refine the permit to the present operating characteristics of the source. Some specific areas of interest include:

- Changes in operation that have occurred over time. These may include hours of operation and product or raw material characteristics that affect control equipment performance and emissions.
- Changes in maintenance practices and levels of malfunctions. These may lead to specific changes in recordkeeping, maintenance, and reporting practices under special permit conditions.
- Changes in monitoring and reporting requirements. Based on the operating characteristics, an evaluation should be conducted as to whether to add or delete the monitoring requirements.
- Definitions of specific limits for startup, shutdown, and malfunctions if these periods cause frequent problems.

The permit renewal process may also require a performance test to demonstrate compliance with emission limits as well as the validation of surrogate indicators of compliance to document any changes that may have occurred over a period of time. This updating and clarification process may also reflect changes in agency policy that have occurred since the permit was issued. Information from the performance tests and the inspection results should be a valuable resource for the permit review engineer. In this way, data from actual operating experience are recycled through the system to improve the permit writing process.

7.3 EMISSION TEST RESULTS

The permit to construct and/or operate is, in effect, a contractural agreement licensing the source to discharge air contaminants into the atmosphere. Other permits, for water-borne pollutants and toxic or hazardous wastes, may be necessary in conjunction with these activities. The permit establishes limits for these activities beyond which the source is liable in terms of civil and possibly criminal penalties. The agency acts not only as the issuing authority, but also as the enforcement authority, whose responsibility it is to ensure that the source does not violate the contract by exceeding the emission limits set forth in the permit. As previously discussed, surrogate indicators of compliance may be used to discover a variance from baseline or representative process or control equipment operating practices. In these cases, a deviation in one or more surrogate indicators of compliance may be grounds for a determination of noncompliance with specific permit requirements. In many cases, however, an emission test is the only available legal method for determining compliance with the emission limits set forth in the permit. In these cases, the accuracy, representativeness, timeliness, and legitamacy of a test are of paramount importance.

Whether the permit issued is a permit to construct or a permit to operate, the contractural agreement between the issuing agency and the source is binding for the life of the permit. Therefore, the source must comply with the conditions set forth in the permit at all times and under all conditions except for those expressly granted in the permit (malfunction, start-up, shutdown, etc.). The performance test provides a comparison of actual emissions and operating practices with the emission limitations contained in the permit and with the conditions (process and control equipment) under which the emissions occurred. Regardless of the purpose of the emission test, the results must be representative of actual operating practice and demonstrate the capability of the source to comply with the emission limitations under these conditions.

Whether the enforcement agency or the source is conducting the test, the test method to be used should be cited in the permit, either by reference or point by point. This practice ensures that all procedures are legally enforceable and that unauthorized variance from cited procedures cannot be used to demonstrate compliance with an emission limit.

As a means of ensuring that emission test results are actual indicators of compliance with the emission limits, the emission units to be reported (pounds/ton, pounds/hour, etc.) from the emission test should be expressly cited in the permit. The enforcement agency should exercise care to see that the source does not report test results in inappropriate values. Where more than one emission limit exists, reported test results should be compared with the permit limits value by value.

The goal of continuing compliance also dictates strict adherence to quality assurance procedures. This not only applies to laboratory quality assurance procedures for periodic emission testing, but also to continuous monitoring requirements. Particular care should be given to examining the source's quality assurance procedures for continuous emission monitoring data. Factors such as data quality, frequency, and data omissions with and without justifiable cause (i.e., malfunctions, lapses in data reporting, etc.) should be reviewed.

Specific test procedures, variations from accepted test methods, and specific operating conditions of the process and control equipment are important parts of the performance test, but they are better suited to a written test protocol developed prior to the test and outside the permit itself.

The emission test protocol is a step-by-step plan by which the emission test is to be conducted. This plan designates specific process and control equipment parameters to be followed during the test as well as actual testing procedures. Because new sources have no operating history on which to base representative or typical operating conditions, such conditions may have to be estimated in in the test protocol. When this occurs, these conditions should be confirmed as source history develops. In the case of existing sources, however, previous operating conditions and test results can be used to establish a case-by-case determination of representative conditions for each performance test.

By specifying test protocol items directly in the permit, the issuing agency may restrict its ability to test under different conditions. For example, if a given permit specifies that all emission testing shall be conducted at maximum process load, verification of emission rates at reduced loads (which, over time, may have become typical defacto operating conditions) may be preempted. Stating that the performance test be conducted under "representative" conditions, however, gives the agency the flexibility to have tests performed under conditions other than maximum process load.

One of the most important considerations in determining whether a source remains in compliance with permitted emission limits on a continuous basis is the source's ability to maintain control equipment efficiency and related process conditions regardless of whether these conditions are inherently stated in the permit. Initial engineering analyses conducted to determine both potential uncontrolled and controlled emissions will most likely not represent actual contemporary conditions at the source because of "normal" variations in process conditions, control equipment age, maintenance, and modifications. As changes occur, the issuing/enforcement agency must be aware of the influences these changes will have on potential emissions. So that the necessary flexibility will be retained to determine compliance under these conditions, emission testing must be able to accommodate changes in the process and in control equipment efficiency. Accurate emission testing is very helpful in correlating process and control equipment variances with changes in actual emissions and thereby establishing grounds for future permit modifications or permit renewal conditions.

For example, a BACT analysis for a source subject to PSD does not simply require a specific control device. The BACT requires not only the existence of the control device, but its continuous operation at design efficiency to attain and maintain (where possible) a specific emission rate. Because control device efficiency is a function of both pollutant capture efficiency and uncontrolled emission rate, BACT must consider potential changes in process conditions and control device O&M. It is not enough to assume that one compliance test under optimum conditions when the equipment is initially installed will necessarily ensure continuing compliance.

The role of emission testing may also change as the goals of the issuing/enforcement agency change. The permit should enable the agency to modify the test protocol and reporting requirements of the source in order to reflect any such changes. Source operating history, for example, may require the agency to redefine test goals for the following reasons: 1) to reestablish representative conditions, 2) to establish the uncontrolled emission rates of specific process units vented to a common stack, 3) to establish baseline conditions for proposed modifications, 4) to determine current control device efficiency, 5) to cross-check continuous moniotoring emission results, or 6) to correlate actual emissions with surrogate emission indicators (mass vs. opacity, etc.).

Finally, any emission testing program is only as good as its documentation. Whether the emission testing is performed by the issuing/enforcement agency or by the source, legal enforcement of permit emission limits and conditions depends on accurate, adequate, and retrievable documentation. Because considerable time may elapse between actual testing and any potential legal action or redress, proper documentation is critical.

It is the responsibility of the permit writer to ensure that the emission limits, general permit conditions, and specific permit conditions be constructed in such a way as to allow the agency the flexibility to ensure continuing compliance and to give the source to understand exactly what is expected in terms of its responsibility with respect to the specific permit conditions.

7.4 COMPUTERIZED TRACKING SYSTEMS

Permit development support data, routine inspection details, and results of testing and monitoring for all sources under an agency's jurisdiction create large volumes of data. The potential usefulness of these data is directly proportional to their immediate availability to permit reviewers, inspectors, and enforcement staff. Modern, data management systems lend themselves to this task. The reality of implementing such a system, however, is another matter. The most successful uses of data management systems are those that "grow up" with the data base, in other words, where new data acquisition begins with a new data base management system (no historical data to retrofit). This, however, is usually not the case for permit files.

Although some agencies may use the filebox method, many use the EPA's Compliance Data System (CDS). In addition some agencies have developed their own or modified commercial data management systems to support permitting, renewal, inspection, and enforcement activities.

7.4.1 Compliance Data System

The EPA developed the CDS in 1972 to assist their Regional Offices in implementing their enforcement programs. It was designed to provide users with the capability to store, update, and retrieve information on all sources placed in the system.

The Regional Offices and some State agencies use CDS for the following purposes:

1. To provide an accurate and easily accessible inventory of sources subject to Federal and State emission regulations and their compliance status.

2. To develop enforcement strategies by providing summaries of the compliance status of sources tracked in the CDS system.

3. To provide a means of tracking numerous Federal, State, and local enforcement actions, both for historical and future scheduling purposes.

4. To assist the Region in the preparation of various national reporting requirements.

5. To provide data to the States for fulfilling various reporting requirements to the Region.

The CDS is operated on EPA's National Computer Center (NCC) mainframe computers and is available via remote terminal devices. The system is not designed to store large quantities of parametric monitoring data; instead, it is a management information system for tracking compliance and enforcement information in an easily accessible manner.

The inventory of sources in CDS should correspond to those sources registered in the National Emission Data System (NEDS). Whereas NEDS contains parametric and relatively static emission data for sources, CDS contains the considerably more dynamic compliance and enforcement data for these facilities. The NEDS source numbering system is used by CDS for a majority of its sources. In addition, the NEDS source number is carried as a retrievable data element for all CDS sources.

A number of State permit tracking systems are compatible with CDS. Some States that use the Enforcement Management System (EMS) or a State version of

CDS, use converter programs that reformat EMS data to meet CDS input specifications. With the EMS-to-CDS converter, compliance and enforcement information from a State is placed directly into CDS with little data input preparation needed on the part of the Region. The Region is still required to verify data accuracy through quality control procedures.

A number of output utilities called "Reports" are built into the CDS system that may be of use to the States and other premitting jurisdictions. Principally, the Quick Look Report and the Source Data Report are of use to State and local agencies in addition to the enforcement and compliance tracking capabilities of CDS. Quick Look is designed to print only certain data elements for selected sources. Although all these data are of value, report requirements can often best be met by specifying a few user-selected data elements in a user-specified format. Source Data Reports supply a complete listing of all data on the system for a specific source. For all output utilities, the user can specify the order and control the format of the output.

7.4.2 Comprehensive Data Handling System

Several agencies have installed the Comprehensive Data Handling System (CDHS) made available through EPA. The CDHS incorporates a CDS-type software package as well as the State's Emission Inventory System (EIS), which is the State's own version of NEDS. The types of reports available are similar to those in CDS and NEDS and includes a "Quick Look" type data retrieval format.

Some agencies have chosen to use the NCC rather than operate their own hardware systems. When this is the case, they operate in much the same way as when the Regional Offices update their own State files for CDS or EIS. The advantage of this approach is that software modifications are made by EPA, and all of the update and data storage costs are borne by EPA. Some of the retrieval account costs are often paid through the § 105 grants to the States.

7.4.3 BACT/LAER Information System

The EPA maintains a data base software system called the BACT/LAER Information System (BLIS) to provide information on BACT/LAER determinations. The purposes of BLIS are:

- To provide State and local agencies with current control technology determinations.
- To summarize recent determinations for sources of a similar size and nature.
- To provide data on the specific emission limits imposed on new or modified sources across the country.

The system depends on submission of determinations by State and local agencies. Although the information is requested by EPA, the submission of information is voluntary.

The BACT/LAER Clearinghouse determinations in the BACT LAER Information System (BLIS) are published annually by EPA or are available through a computer terminal and telephone hookup to the NCC. The Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, can provide more information on system access.

7.4.4 Other Systems

Some agencies maintain their own computer-based systems to provide an emission inventory of sources in their jurisdiction. The data carried in this type of system can be a more precise listing of processes and control equipment as well as a listing of fugitive emission sources around a facility. In addition, other data, such as yearly production, hours of operation, and stack data, can be stored in such a system and updated annually. This type of system is usually a hybrid of both CDS and NEDS and contains elements of both. As in CDS and NEDS, however, there is a general inability to load parametric data from inspections into the system for future use during permit renewal or inspection followup.

Computerized systems specifically used for permits generally fall into one of two categories: 1) those that track permit expiration and compute fees, and 2) those that are word-processing-based and allow selection or creation of specific permit conditions. A system for tracking permits is useful for those agencies responsible for overseeing a large number of sources. The computer output can list several months in advance those permits that are about to expire, which allows the agency to schedule inspections, stack tests, etc. These systems generally cannot or do not contain much in the way of operating or design data for the use of the inspector or the permit review and they are usually limited to simple calculations such as permit fees.

Agencies that write a large number of permits and use many special permit conditions may find a word-processing-based computerized permit writing system to be advantageous. The standard provisions that will be included in all permits can be loaded as fill-in blanks that allow the permit writer to select from a list or to create, if necessary, permit conditions that are appropriate for the source under review. The advantage of such a system is that it can aid in quickly constructing and writing a permit with special conditions as well as provide more uniform treatment of sources and the use of consistent permit language. The disadvantage of such a system is the potential for selecting unnecessary or incorrect permit requirements, as selection of permit conditions from a menu may not be as accurate as creating original permit conditions for each source.

Unfortunately, no single system currently allows the incorporation of key design information, operating information, stack test results, inspection results, and source operating history into one data base.

7.5 SUMMARY

Post-permitting efforts such as performance testing, inspections, and data management are necessary to the achievement and maintenance of continuing compliance goals. Whereas such activities may occur independent of the permit review process, their effectiveness may depend on how the permit was originally written and the degree of specificity included in the permit conditions. The permit writer should rely on the actual experiences of the source inspector and on performance test data for the further refinements and upgrading of individual permits and the permit-writing procedures.

The actual process of permit review and permit construction is not simple. It requires a knowledge of the regulations and the ability to interpret them. It also requires the ability to review technical data, to locate available resources of information when needed, to draw appropriate conclusions, to make recommendations, and to write a permit with conditions that are enforceable and meaningful and represent a balanced approach to continuous compliance. A good permit is an important tool for meeting various program requirements and for maintaining source compliance. As a tool, however, it can only be as effective as the quality of its construction.

REVIEW EXERCISE

1. The agency inspector is typically not responsible for permit review. The inspector, however, can be a valuable resource to permit review personnel because:

   a. The inspector has first-hand knowledge of the source
   b. Only the inspector knows what test methods can be used to demonstrate compliance
   c. The inspector can inspect both new and existing sources
   d. None of the above

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2. The primary purpose of the initial inspection of a new source is to ________________.

   a. Establish a working relationship with source management personnel
   b. Verify installation of equipment as specified in the permit
   c. Evaluate previous operating performance
   d. Observe performance tests

1. a. The inspector has first-hand knowledge of the source

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3. The results of inspections, performance tests, malfunction, and excess emission reports should be ______________.

   a. Kept in a locked file and treated as confidential information
   b. Kept for 2 years and then disposed of
   c. Used to refine or fine-tune the permit conditions during permit renewal
   d. Used to establish the validity of the performance test requirements

2. b. Verify installation of equipment as specified in the permit

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4. The specification of operating conditions, malfunction, and excess emission reports should be ________________.

   a. Kept in a locked file and treated as confidential information
   b. Kept for 2 years and then disposed of
   c. Used to refine or fine tune the permit conditions during permit renewal
   d. Used to establish the validity of the performance test requirements

3. c. Used to refine or fine tune the permit conditions during permit renewal

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5. CDS is not designed to ________________.

   a. Provide an inventory of sources and their compliance status
   b. Maintain design parameters for future review
   c. Assist in various reporting requirements
   d. a. and b.
   e. a. and c.

4. b. Kept for 2 years and then disposed of

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6. The BACT/LAER Information System (BLIS) ________________.

   a. Calculates emission rates from design data for BACT/LAER determinations
   b. Provides agencies with current control technology determinations
   c. Provides data on specific emission limits imposed across the country
   d. a. and b. only
   e. b. and c. only

5. b. Maintain design parameters for future review

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6. e. b. and c. only

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