United States
Environmental Protection
Agency

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

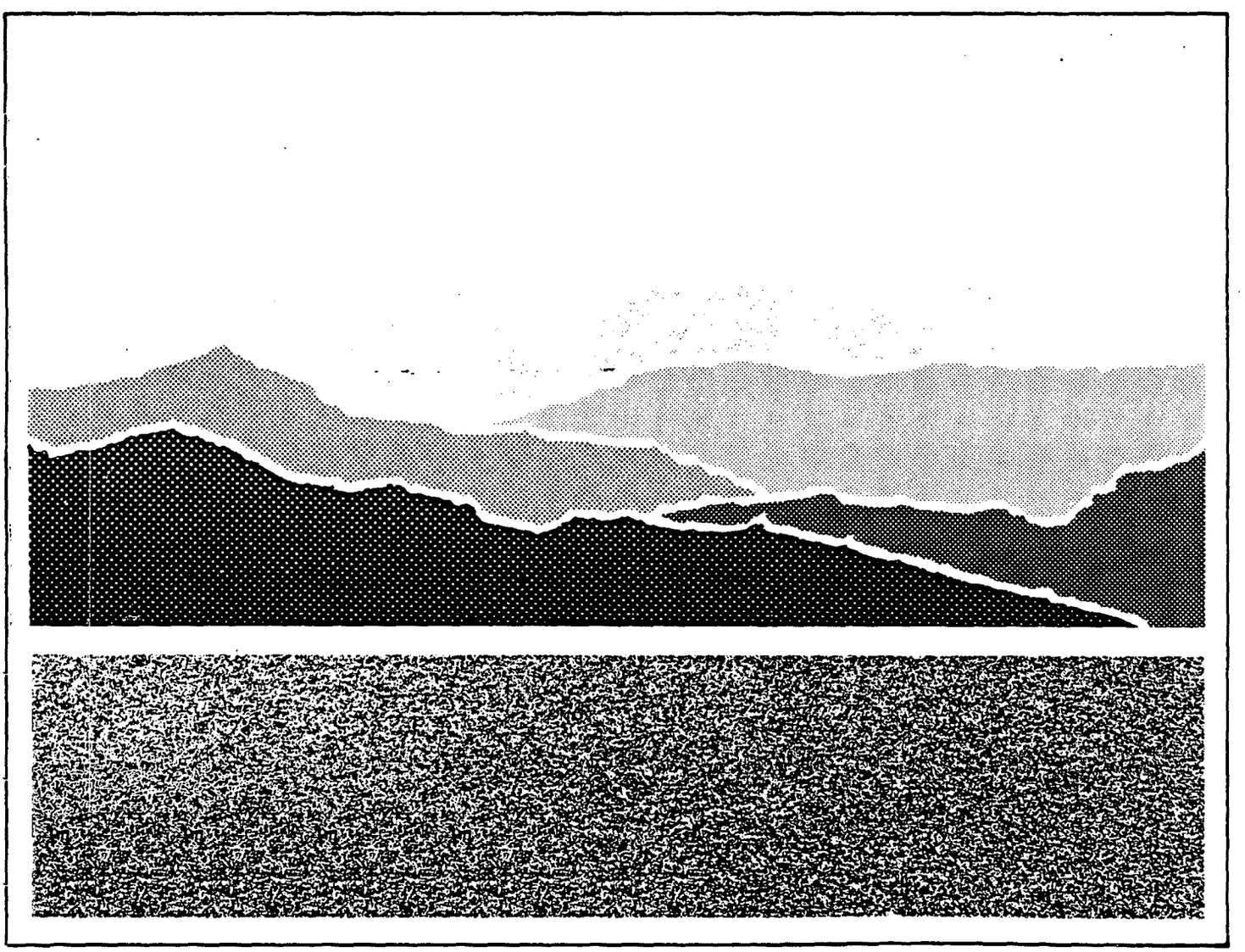
EPA 450/2-82-008
December 1983

EPA

APTI Course SI:453 Overview of PSD Regulations

Student Guidebook

Special slide/tape version



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Under Contract No.
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United States Environmental Protection Agency
Office of Air, Noise, and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, NC 27711

Notice

This is not an official policy and standards document. The opinions and selections are those of the authors and not necessarily those of the Environmental Protection Agency. Every attempt has been made to represent the present state of the art as well as subject areas still under evaluation. Any mention of products or organizations does not constitute endorsement by the United States Environmental Protection Agency.

Because of the complexity of the regulations dealt with in this document, the course material can provide only an overview. Any substantive decision on a particular case must be based on the current law and regulations and the facts of the case.

The provisions of the Clean Air Act and of EPA regulations are subject to change by Congress and EPA. This document reflects the law and regulations as of the date of publication only. Persons applying the rules must determine what provisions of law and regulation apply as of the date of application.

Introduction

This 15-hour self-instructional course will provide you with a comprehensive overview of regulations governing the prevention of significant deterioration (PSD) of air quality. You will have an opportunity to view eleven slide/tape presentations covering applicability determination, best available control technology (BACT) analysis, air quality analysis, additional impacts analysis, and agency review. We have also included, for your reference, a copy of the *Workshop Manual* used in the Environmental Protection Agency's 1980 PSD workshops, a copy of Title I, Part C of the Clean Air Act (as amended August 1977), and the EPA PSD regulations as of July 1981.

Instructions for Successful Completion of this Course

To successfully complete this course, we recommend that you follow these five steps.

1. Look over the questions on the examination. This will give you an idea of what to look for as you view the slide/tape presentations. (The exam should be included in your course materials. If it is not, please contact the Air Pollution Training Institute (APTI) at the address listed on page 3 of this guidebook.)
2. View, in order, the eleven slide/tape presentations.
3. Read the sections in the *Workshop Manual* pertaining to any topics about which you have questions.
4. Take the final examination.
5. Return the **final examination, the slides,** and the **audio cassettes** to APTI. You may keep the other materials. You will receive your examination grade by return mail. If you achieved a grade of 70 or above on your final exam, you will receive a course certificate, and you will be awarded 1.5 continuing education units (CEUs).

Course Materials

You should have received the following items in your package of course materials.

- Slide sets for Lessons 1 through 11.
- Audio cassettes for Lessons 1 through 11. (Note: A cassette may contain more than one lesson.)
- The *Prevention of Significant Deterioration—Workshop Manual.*
- A copy of Title I, Part C of the Clean Air Act (as amended August 1977).

If any of these items are missing, please contact the Air Pollution Training Institute at the address listed on page 3 of this guidebook.

Lesson number	Title	Viewing time
1	Introduction and Overview	33 minutes
2	Applicability Determination in the Application: I	20 minutes
3	Applicability Determination in the Application: II	22 minutes
4	BACT Analysis in the Application: I	23 minutes
5	BACT Analysis in the Application: II	26 minutes
6	Air Quality Analysis: I	30 minutes
7	Air Quality Analysis: II	38 minutes
8	Additional Impacts Analysis	27 minutes
9	Application Summary & Introduction to Agency Review	37 minutes
10	Agency Review of the Application: I	21 minutes
11	Agency Review of the Application: II	30 minutes

Using the Slides and Tapes

Each lesson has a set of 35-mm slides and an accompanying audio cassette. The audio cassette can be used in two ways. If your cassette player has a mechanism for synchronizing an audio cassette and 35-mm slides, you can use the side of the cassette marked "automatic advance." This will cause the slides to advance automatically while you listen to the tape. If you do **not** have equipment that automatically advances slides, you can use the side of the cassette marked "manual advance." In this case you will have to advance the slides yourself.

To use automatic-advance equipment:

- Advance to the first slide (it will read "FOCUS") and focus the image. Leave this slide on the screen; do **not** advance the slide tray.
- Place the cassette in the cassette player so that the side marked "automatic advance" will play.
- Turn on the cassette player. The slides will advance automatically as the tape plays.

To use manual-advance equipment:

- Advance to the first slide (it will read "FOCUS") and focus the image. Leave this slide on the screen; do not yet advance the slide tray.
- Place the cassette in the cassette player so that the side marked "manual advance" will play.
- Turn on the cassette player. Every time you hear a "beep" (tone), you should advance to the next slide.

Additional Information

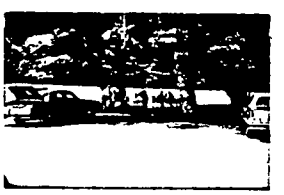
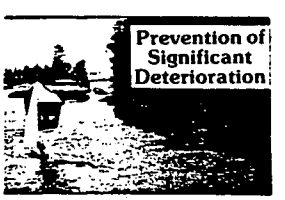
If you have any questions about the final examination or about any other parts of this course, please contact the Air Pollution Training Institute.

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

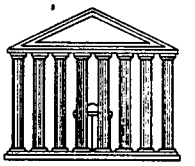
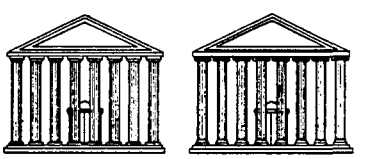
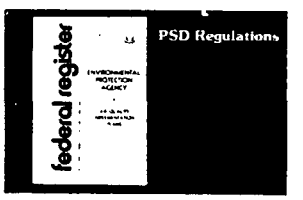
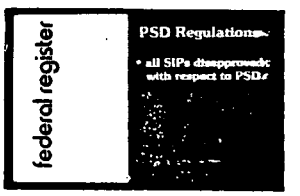
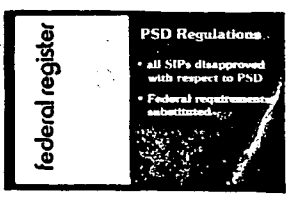
SI:453

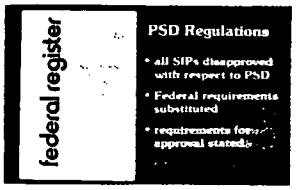
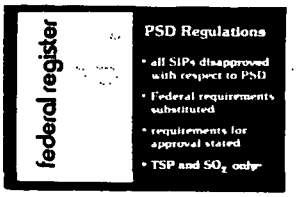
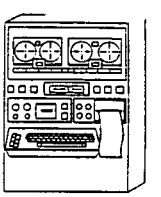
Lesson 1

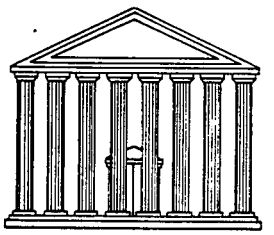
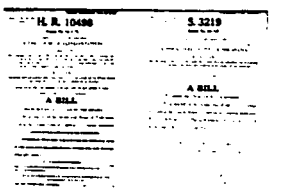
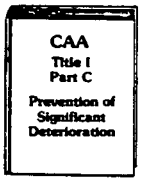
Introduction and Overview

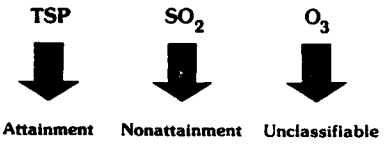
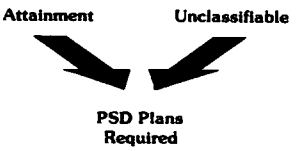
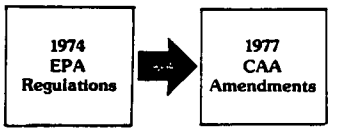
Slide	Script	Selected Visuals
1. (Focus)		FOCUS
2-7. (Introductory slides)		     

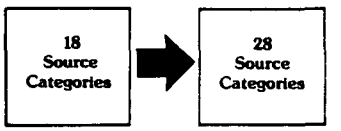
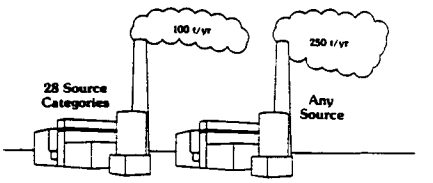
Slide	Script	Selected Visuals
8.	This course deals with the Prevention of Significant Deterioration of air quality. We will begin by introducing the key concepts and by presenting an overview of the course.	
9.	Our goal in this course will be to provide you with an understanding of ***key*** concepts in programs for the prevention of significant deterioration of air quality—known as PSD. You will also learn how permit review requirements apply, and what the basic steps of a review are.	• Key Concepts • Permit Review Requirements • Basic Steps of a Review
10.	Let's look first at the historical background of PSD as it is dealt with in the law and in EPA regulations. If we know something about the origins and growth of the PSD program, it will be easier to understand its purpose and nature.	
11.	In 1970, Congress passed amendments to the Clean Air Act. These amendments required States to submit State Implementation Plans—or SIPs. These plans were to ensure that the ***national*** ambient air quality standards were both attained and maintained.	1970 Clean Air Amendments • required SIPs to ensure NAAQS met and maintained
12.	As the amendments were being developed, committees of the House and Senate briefly discussed the question of how to deal with the air quality in areas where it was ***already better*** than the standards required it to be.	• how to deal with air quality in areas already better than standards 
13.	The Clean Air Act itself did ***not*** contain clear guidelines about the prevention of significant deterioration of air quality. However, those who supported a "non-degradation" policy later argued that prevention of significant deterioration was called for by a statement in the Act that read "to protect and enhance the quality of the Nation's air resources..."	"to protect and enhance the quality of the Nation's air resources..."
14.	In June of 1971, EPA proposed guidelines to help States prepare and submit their implementation plans. In these ***proposed*** guidelines, EPA ***did*** deal with requirements for the prevention of significant deterioration of air quality. ***But,*** because of comments from other Federal agencies, the ***final*** guidelines did ***not*** require States to have PSD provisions in their implementation plans.	1971 Proposed EPA Guidelines • did include PSD Final EPA Guidelines • did not include PSD

Slide	Script	Selected Visuals
15.	So, EPA went on to review and approve State Implementation Plans ***without*** considering whether or not they would prevent air quality deterioration up to the ambient standards.	• EPA SIP review and approval without consideration of PSD
16.	The scheduled date for EPA's final decision on State Implementation Plans was in May of 1972. Just before that date, Sierra Club and three other environmental groups filed suit in the Federal District Court for the District of Columbia. The purpose of the suit was to prevent EPA Administrator William Ruckelshaus from approving any implementation plan provisions that would ***permit*** significant deterioration of air quality.	 1972 *Sierra Club v. Ruckelshaus*
17.	The District Court accepted the Sierra Club's arguments, and ruled that EPA had to ***disapprove*** any parts of a State Implementation Plan that would have permitted significant deterioration of air quality. The Court did ***not,*** however, define "significant deterioration." Therefore, EPA had to adopt regulations which would define "significant deterioration," prevent it from occuring, and tell States what PSD provisions had to be in an approvable plan.	• court ruled in favor of Sierra Club • EPA had to: • define PSD • prevent it from occurring • tell states what provisions to include
18.	When EPA appealed the case, the District of Columbia Circuit Court of Appeals agreed with the District Court. The Supreme Court divided equally on the question, so the opinion originally written in the District Court became EPA's entire guidance. The amplification and adjustment that is usually added by higher courts was not available to help EPA frame its regulations.	Appeals Court / Supreme Court  • agreed with earlier ruling • divided equally
19.	In response to the Court's order, EPA issued PSD regulations in the December 5, 1974 *Federal Register*. These regulations influenced the shape of the PSD program.	
20.	The regulations that EPA adopted declared that every State's implementation plan was ***dis***approved with respect to PSD provisions.	
21.	In place of the missing PSD provisions, uniform ***Federal*** requirements were made a part of each plan.	

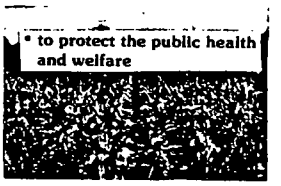
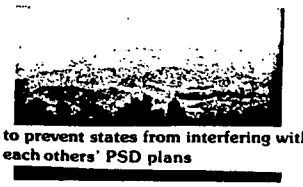
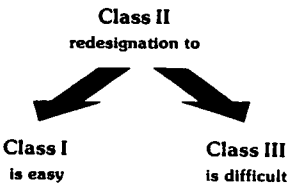
Slide	Script	Selected Visuals
22.	The regulations also stated ***what*** would be required in order for a State's plan to be approved.	
23.	The only two pollutants that were dealt with in the 1974 regulations were total suspended particulate matter—known as TSP (T-S-P), and sulfur dioxide—or SO_2 (S-oh-two).	
24.	"Significant deterioration" was defined in terms of a system of area classifications and permissible concentration increases called increments. The system covered all air quality control regions and the two pollutants TSP and SO_2.	**Significant deterioration...** • area classifications • increments **For:** • all AQCRs • TSP and SO_2
25.	In Class I areas, which are the most highly protected areas, only small increases in predicted TSP and SO_2 concentrations would be permitted. In Class II areas, larger concentration increases would be permitted. Under the 1974 regulations, Class III areas, which are the least protected, could have concentration increases up to the national secondary air quality standards. Initially, all "clean air" areas were put in Class II, but a State could change this designation to a I or a III.	**Class I** - small increases in concentration **Class II** - larger increases in concentration **Class III** - increases in concentration up to the secondary NAAQS
26.	The basic way that significant deterioration would be prevented was through a case-by-case review of proposals to construct new sources or modify existing ones. Eighteen point-source categories were listed for review.	• case-by-case review of proposals to construct or modify • 18 point-source categories
27.	Any ***new*** source or ***modification*** in one of these categories had to demonstrate that the best available control technology—BACT (B-A-C-T) or "bact"—would be installed.	
28.	A dispersion modeling analysis would predict how much the new source emissions would cause ambient pollutant concentrations to increase.	

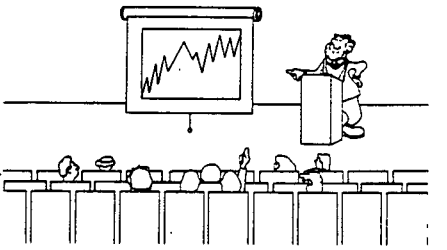
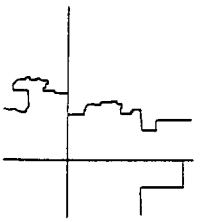
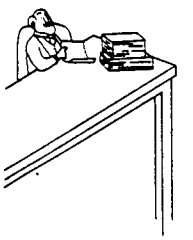
Slide	Script	Selected Visuals
29.	These final EPA regulations on PSD left both environmentalists and industrial developers ***dissatisfied.*** There were lawsuits from both sides.	
30.	Legislation was introduced to do away with PSD requirements. In this atmosphere of uncertainty, States were slow to take any action to assume responsibility for PSD or to reclassify areas.	
31.	By 1976, Congress was ready to take ***some*** action on PSD, along with other troublesome areas of the Clean Air Act.	
32.	The Clean Air Act Amendments of 1976 were very hotly debated in Congressional Committees and on the floor in both houses. The controversy over prevention of significant deterioration provisions was so strong that the bill amending the Clean Air Act never passed.	**1976** **CAA Amendments Bills** • hotly debated • did not pass
33.	When the 95th Congress convened in 1977, they began the amending process all over again. The result was the Clean Air Act Amendments of 1977.	 **1977** **CAA Amendments**
34.	The 1977 amendments confirmed that Congress did indeed intend PSD to be part of the national air pollution control program. They added a new Part C, "Prevention of Significant Deterioration of Air Quality," to Title I of the Clean Air Act. Part C was based largely on EPA's existing regulations, but it made some changes which we will briefly examine.	

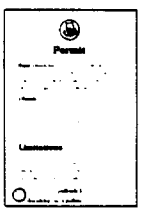
Slide	Script	Selected Visuals
35.	All of the new language in the Act describes requirements for State Implementation Plan provisions on PSD. EPA is supposed to control the program only when States don't have approvable plans. State action has been slow, however, so EPA regulations apply in many areas. Even where the State ***has*** an approved PSD plan, it is likely to follow EPA's model closely.	
36.	The first thing States had to do under the 1977 Amendments was to classify their Air Quality Control Regions—or AQCRs.	**Air Quality Control Regions (AQCRs)**
37.	For each AQCR, they had to make a formal finding as to whether it ***met*** National Ambient Air Quality Standards, did ***not*** meet them, or could not be classified using available data. With some legal complications, this classification applied to all ***criteria*** pollutants—in other words, those pollutants listed for ambient standards.	**Air Quality Control Regions (AQCRs)** • NAAQS met? • for all criteria pollutants
38.	An ***attainment*** area is one meeting a standard for any pollutant; a ***nonattainment*** area is one not meeting a standard.	**Attainment Area** • meets standard for pollutant **Nonattainment Area** • does not meet standard for pollutant
39.	For example, a region could be attainment for particulate matter, nonattainment for sulfur dioxide, unclassifiable for ozone, and so forth.	
40.	PSD plans had to be developed for both ***attainment*** and ***unclassifiable*** regions.	
41.	Congress used the PSD system EPA had developed in its 1974 regulations as a basis for the 1977 amendments. They made some changes, however, in turning the regulations into law. Specific numbers were agreed on by compromise for permissible increment values—but still for TSP and SO_2 only.	

Slide	Script	Selected Visuals
42.	The EPA regulations had allowed Class III areas to deteriorate to secondary ambient standards, but Congress now set Class III increments. The law did not allow ***any*** increase that would result in pollutant concentrations that would be higher than the ambient standard.	
43.	Certain areas where natural and scenic values were important were automatically put in Class I, the most highly protected class. These included large national parks and wilderness areas. Certain national parks must remain Class I, and reclassification of other Class I areas is restricted.	
44.	The process of reviewing proposals to construct major new sources or modifications is the principal means of carrying out the PSD program. It is the focus of most of the rest of this course. Congress was aware of the importance of the review process from EPA's experience, and made changes intended to increase the review process's scope and effectiveness.	
45.	The original list of ***18*** source categories was later expanded to include ***28*** source categories.	
46.	Any source in one of these categories emitting 100 tons (or more) per year of any pollutant is subject to PSD review. Furthermore, if a source is ***not*** on the list and emits 250 tons (or more) per year, that source, too, is subject to review.	
47.	A definition of "best available control technology"—BACT (B-A-C-T)—was written into the Act.	**Best Available Control Technology (BACT)**
48.	This level of emissions control is decided on a case-by-case basis, taking all costs and impacts into account to determine what is achievable for the proposed installation. BACT can never be ***less*** strict than New Source Performance Standards, and it applies to ***all*** pollutants regulated under the Clean Air Act.	**Best Available Control Technology (BACT)** • decided on case-by-case basis • takes cost/impacts into account • is never less strict than NSPS • applies to all pollutants regulated under CAA

Slide	Script	Selected Visuals
49.	The 1977 amendments added several increased technical requirements to PSD programs. One important change was that a source owner had to monitor the ambient air for a year before beginning construction on a new or modified source. Another change required EPA to adopt regulations on the pollution dispersion models used to predict ambient concentrations.	**Increased Requirements** • source owner had to monitor ambient air for a year before beginning construction • EPA required to adopt regulations on dispersion models
50.	There was no experience with a PSD program for pollutants other than TSP and SO_2. Therefore, Congress directed EPA to make a study of possible ways of preventing significant deterioration with respect to other pollutants, referred to as "Set II" pollutants. The study is to look at methods other than the increment method to see if there are other ways of carrying out PSD. As of late 1982, results of this study had not been completed, and the increment method is used only for TSP and SO_2.	• EPA to make study of way to prevent significant deterioration with respect to Set II pollutants
51.	Even after the 1977 Congressional action to amend the Clean Air Act, many aspects of the PSD program remained controversial and ambiguous. In 1978, two major lawsuits, involving both industry and environmentalists, were filed against EPA. The final decision in the more complex case, ***Alabama Power Co. vs. Costle,*** was issued by the District of Columbia Circuit Court of Appeals in December 1979. This decision settled many disputes about definitions and about how the Act applied to different construction and modification situations. EPA was required to change its regulations to agree with the court decision. It did so on August 7, 1980.	• *Alabama Power Co. v. Costle* • EPA required to change its regulations
52.	As a result of these actions by Congress, the executive branch, and the courts, we now have a mixture of statute law, administrative regulations, and court interpretations regulating the prevention of significant deterioration.	 • Statute Law  • Administrative Regulations  • Court Interpretations
53.	In the law—the Clean Air Act—we find statements of the ***fundamental purposes*** and ***basic procedural requirements*** of the PSD program. Although this part of the Act is detailed and complicated, it is basically like other parts. That is, the law mainly directs EPA to adopt and enforce administrative regulations to carry out the program that the Act calls for.	• Fundamental Purposes • Basic Procedural Requirements

Slide	Script	Selected Visuals
54.	Congress stated that the PSD provisions were written into the Clean Air Act for several related purposes. The first of these was to protect the public health and welfare from any adverse effects that might occur even though national ambient air standards were met.	
55.	Another reason was to make sure that the natural and recreational quality of parks and other scenic or historic areas was preserved.	
56.	Congress also wanted to ensure that there was a balance between economic growth and preservation of air quality: that neither was neglected because of the other.	
57.	A fourth reason for the PSD provisions was to prevent States from interfering with one another's PSD plans. All of these ends were to be met through a process which includes informed public participation in decision making.	
58.	As we noted above, the 1977 Amendments automatically put certain larger areas—like national parks, monuments, and wilderness areas—in Class I, the most highly protected category. Some areas are "frozen" in Class I; other scenic or recreational areas may be designated as only Class I or II, and some areas cannot be changed from Class II to Class III.	
59.	All other areas where the secondary National Ambient Air Quality Standards are met—or which cannot be classified—are initially put in Class II, but may be redesignated by the States to either Class I or Class III, except, as noted previously, there are some areas that cannot be redesignated from Class II to Class III.	
60.	The process by which States can redesignate PSD areas is rather complicated. While it is easy for a State to reclassify up—to Class I—redesignation to Class III, the least restrictive category, requires that the different branches and levels of government within the State agree to the redesignation. If Federal lands are included, the Federal Land Manager may take part.	

Slide	Script	Selected Visuals
61.	If a State wants to reclassify an area to Class III, it must first notify the public and hold hearings at which the public may present comments and arguments. The comments and arguments are to be made part of the official record on which the reclassification is based.	
62.	After the State completes its action to redesignate a PSD area, EPA reviews the record. EPA may disapprove the redesignation in only ***two*** cases: If there is an error of legal procedure, or if the action would violate a classification that is mandatory under the Act.	**EPA may disapprove the redesignation -** • **if there is an error of legal procedure** • **if the action would violate a mandatory classification**
63.	Changing the designation of an area can lead to disagreements between States or with Indian tribes.	 **Redesignation may lead to disagreements.**
64.	The Act provides that such disagreements will be resolved by the EPA Administrator.	 **Disagreements to be resolved by the EPA Administrator**
65.	Besides setting out the system for classifying and redesignating PSD areas, the Clean Air Act establishes emissions ***increments*** and ***ceilings*** for the three classes. A "baseline" concentration is set for new or modified sources.	• **emissions increments and ceilings**
66.	The ***increment*** is the amount that the concentration is allowed to increase over that baseline. There are different permissible increments for TSP and SO_2, and for area classifications and averaging times.	**Increment** • **the amount that the concentration is allowed to increase over a baseline concentration**
67.	As an example, here are the increments for TSP and SO_2 in Class I, II, and III areas. There are some other special increments for certain exceptional cases.	ALLOWABLE PSD INCREMENTS ($\mu g/m^3$) Pollutant / Time Period / Class I / Class II / Class III TSP • annual 5 19 37 TSP • 24-hour 10 37 75 SO_2 • annual 2 20 40 SO_2 • 24-hour 5 91 182 SO_2 • 3-hour 25 512 700

Slide	Script	Selected Visuals
68.	Remember that there is also a ***ceiling*** on increases—in no case may a change result in concentrations that are higher than the lowest applicable National Ambient Air Quality Standard.	**Ceilings** • changes may not result in concentrations higher than the lowest applicable NAAQS
69.	To meet the goals just set out, it is important to be able to predict the effects of proposed construction or modifications. For this reason, the heart of the PSD program is the process of ***developing*** and ***reviewing*** proposals for major construction or modification. This development and review process will be what we concentrate on in the body of this course.	**PSD Program** 
70.	The review process leads to the issuance of a ***permit*** to construct or modify, with Federally enforceable emission limitations attached. The limitations help ensure that the impact of the new operation will be no greater than was predicted in the review, and that the agency that issued the permit can make the source correct any violations.	 Limitations ensure that: • impact will be no greater than was predicted in the review • agency can make source correct violations
71.	The permit application review and analysis takes place in two places: within the agency and by the public. Much of the technical work must be done ***within*** the reviewing agency—the EPA, or State or local agencies that have received authority for the program from EPA. After this review, the agency must make the review data, analyses, and impact estimates available for ***public*** review and hearing. Comments received from the public are taken into account in issuing, denying, or putting conditions on the permit to construct or modify.	**Permit Application Review and Analysis** • within the agency • by the public
72.	Most of the workings of the permit review system are spelled out in EPA regulations found in 40 CFR 51.24. Before we go on to the details of these requirements, we should look at some basic concepts we will be using throughout the course.	**40 CFR 51.24**
73.	One of the major effects of the decision in ***Alabama Power*** was that it modified certain important definitions. Among these is the definition of ***potential to emit.*** Potential to emit is the maximum capacity of the source to emit a pollutant under its physical and operational design. We will look at this more closely in Lesson 2. In assessing potential to emit, we must consider air pollution control equipment and Federally enforceable restrictions on operating hours or types of material stored, burned, or processed.	**Potential to Emit** • maximum capacity to emit • given source's physical/ operational design

Slide	Script	Selected Visuals

74. Another definition that changed was that of a ***stationary source.*** A ***stationary source*** — subject to PSD review — is a building, structure, facility, or installation whose units fall within the same standard industrial grouping. The units must be located on contiguous or adjacent properties, and under the operating control of the same person or persons under common control.

Stationary Source

- building, structure, facility, or installation
- units fall within same standard industrial grouping
- located on contiguous/adjacent properties
- under operating control of same person/company

75. A ***major*** stationary source is one which is on the list of 28 categories given in the Act, ***and*** which emits 100 tons (or more) per year of ***any*** pollutant regulated under the Act. It is also any source which emits 250 tons (or more) per year of any regulated pollutant. If a ***modification*** to any source meets the definition of a major source, then the modification is reviewed as a major source.

Major Stationary Source

- on list of 28 categories
- emits 100 tons or more per year of any regulated pollutant
- emits 250 tons or more per year of any regulated pollutant

76. A ***major modification*** — also subject to PSD review — is a modification at a major stationary source which results in a ***significant increase*** in emissions of any regulated pollutant. "Significant increase" is defined in a detailed listing at 40 CFR 51.24(b)(23).

Major Modification

- modification at a major stationary source
- results in significant increase in emissions of any regulated pollutant

77. Finally, ***construction*** requiring review is defined as any physical change ***or*** change in method of operation that results in a change in the amount of actual emissions.

Construction

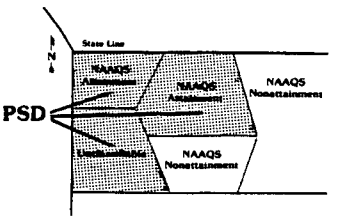
- any physical change or change in method of operation
- results in change in amount of actual emissions

78. Construction is ***commenced*** when all permits have been secured and when actual on-site construction work begins, ***or*** when a binding agreement for construction work is signed.

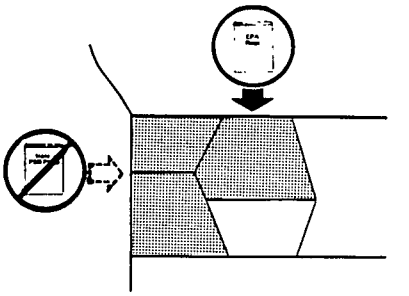
Commencement of Construction

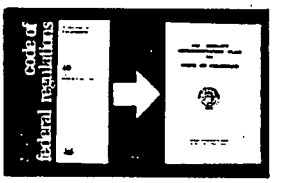
- when actual on-site construction work begins
- when a binding agreement for construction work is signed

79. The regulations we are studying apply geographically to all areas classified as either attainment or unclassifiable for any criteria pollutant.



80. If the State does ***not*** have an approved PSD implementation plan, EPA rules apply. However, EPA ***may*** delegate some or all authority to the State. If a State receives delegation, it must apply Section 52.21 as if it were the Administrator of EPA.



Slide	Script	Selected Visuals
81.	When a State ***has*** an approved PSD plan, its own rules apply, but these must follow conditions laid out in 40 CFR 51.24.	
82.	The sources to which PSD regulations apply are the ***major stationary*** sources we defined a little earlier. If such a source is constructed or modified, then a PSD review is required.	
83.	It is important to remember that PSD requirements apply to ***all*** pollutants regulated under the Clean Air Act—not just to the criteria pollutants. This means any pollutant which is regulated under New Source Performance Standards or National Emission Standards for Hazardous Air Pollutants must be controlled by BACT, and its air quality impacts must be assessed.	**PSD requirements apply to all regulated pollutants...** • NAAQS pollutants • NSPS pollutants • NESHAPs pollutants
84.	For the criteria pollutants, the review process must predict whether or not the proposed construction will cause pollutant concentrations to exceed any National Ambient Air Quality Standard. For TSP and SO_2, the reviewing agency must also determine how much of the available increment will be used up by the proposed operation.	**For criteria pollutants...** **Will NAAQS be exceeded?**
85.	To begin the review process, the organization proposing to build or modify a source submits to the reviewing agency a description of the proposal. This description includes the location, design, and operating specifications of the source. The construction schedule is outlined.	**Description of Proposed Construction/Modification** • location • design • operating specifications • construction schedule
86.	An analysis of the control technology is used to show whether or not the technology is the best available for each applicable pollutant.	• analysis of control technology is used to show if it is best available
87.	The organization must also submit air quality and meteorological data representative of the source site.	• organization must submit air quality and meteorological data

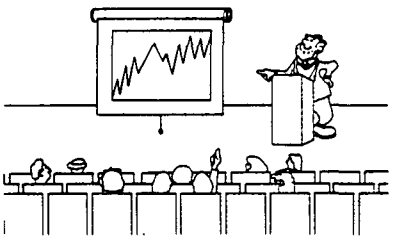
Slide	Script	Selected Visuals

88. On the basis of the information submitted, the reviewing agency verifies the BACT analysis. Generally, a reviewing agency evaluates the applicant's predictions of source impacts on NAAQS and on increment consumption. Further, the agency estimates the air quality impacts of all pollutants regulated under the Act. It also evaluates the effect of air quality impacts on visibility, soils, vegetation, and other air quality related values.

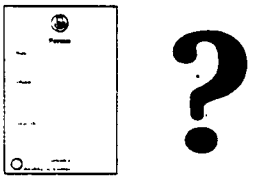
Reviewing Agency

- verifies BACT analysis
- evaluates impact prediction on NAAQS and increment consumption
- estimates impacts of all regulated pollutants
- evaluates effect of impacts on visibility/soils/vegetation

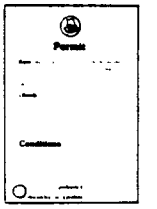
89. After completing its analyses, the reviewing agency makes its information and findings available to the public. A hearing is held, and a formal record made of all comments and arguments.



90. On this basis, the agency decides whether or not to issue a permit.



91. If it does issue a permit, conditions are attached to ensure that increment consumption is no more than planned, that ambient standards are not violated, and that other adverse impacts are avoided.



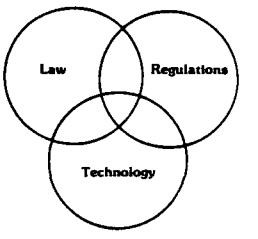
Conditions to ensure...

- increment consumption no more than planned
- NAAQS not violated
- other adverse effects avoided

92. After a permit application has gone through agency technical review, public hearing, and final agency action, it must undergo one more stage of review. If the State has an approved PSD plan, this review will be whatever State law calls for on administrative actions of this kind—perhaps an Environmental Board of Review. If EPA has delegated review duties to the State, EPA will review the permit process. This EPA review will be more or less detailed, depending on how much authority has been delegated to the State.

- ☑ Technical Review
- ☑ Public Hearing
- ☑ Final Agency Action
- ☐ Review

93. At least one thing is clear from this background discussion: we are dealing with a complicated subject where law, administrative regulations, and technology interact. We shall spend the balance of this course studying in more detail how this PSD system works.

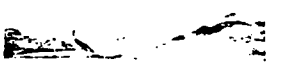
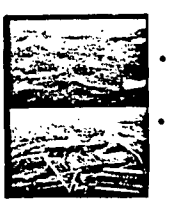


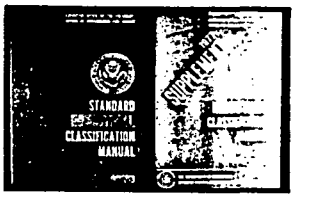
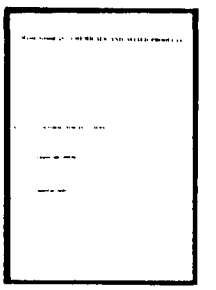
Slide	Script	Selected Visuals
94.	Remember that our overall ***goal*** for this course is to provide you with an understanding of key PSD concepts, and specific guidance on determining which review requirements apply to proposed sources and modifications, and how they are applied.	**Goals** • provide understanding of key PSD concepts • provide specific guidance on determining review requirements
95.	Our specific ***objectives*** are to make you able to: determine what proposed construction is subject to PSD review; determine what analyses must be performed; understand the procedures for required analysis; and understand review agency responsibilities and procedures.	• what construction is subject to PSD review • what analysis must be performed • the procedures for required analyses • review agency responsibilities and procedures
96.	In unravelling our topic, we will first look at what goes into a complete ***application*** to build or modify a major stationary source. We will discuss the applicant's obligation to determine whether or not PSD regulations apply to the source.	• the application
97.	We will go on to examine how the applicant describes and analyzes control technology to show that BACT is applied. We will then study air quality impacts analysis and analyses of other impacts.	• the application • description and analysis to show that BACT is applied • Air Quality Impacts and other analyses
98.	Coming at the topic from the other direction, we will contrast the reviewing agency's responsibilities and approach. We will see how the agency verifies geographic and pollutant applicability. We will look at how the agency checks the applicant's BACT analysis. We will see how the agency examines air quality and other impacts analyses, and whether it goes on to do further analyses of its own.	• the application • description and analysis to show that BACT is applied • Air Quality Impacts and other analyses • reviewing agency's responsibility and approach
99.	We will conclude the course with a lesson reviewing and summarizing the entire topic. When you are satisfied that you understand the material, you may take the multiple-choice final exam for course credit.	
100.	(Credit slide)	**Introduction and Overview** Technical Content: John Maroney Instructional Design: Monica Leslie Graphics: Betsy Huber Photography/Audio: David Churchill Narration: Rick Palmer
101.	(Northrop slide)	Development and production by: Northrop Services, Inc. under EPA Contract No. 68-02-3573

Slide	Script	Selected Visuals
102. (Northrop slide)		Based in part on the: 1980 PSD Workshops prepared for the U.S. Environmental Protection Agency Office of Air Quality Planning and Standards by TRW, Inc., Environmental Engineering Division with the assistance of Northrop Services, Inc. under EPA Contract No. 68-02-3174
103. (NET slide)		Northrop Environmental Training

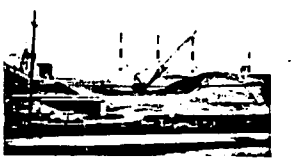
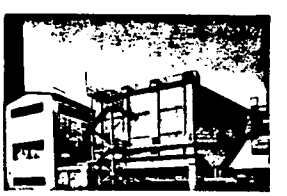
SI:453
Lesson 2

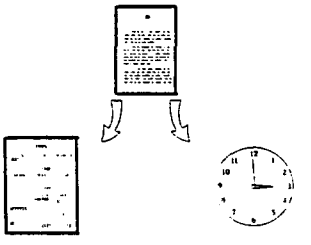
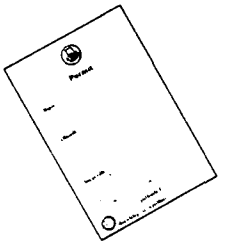
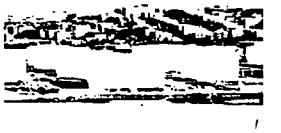
Applicability Determination in the Application: I

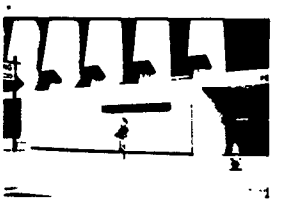
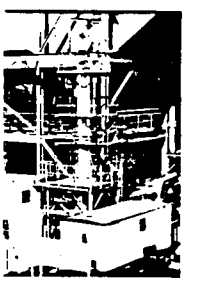
Slide	Script	Selected Visuals
1.	(Focus)	FOCUS
2.	(Introductory slide)	
3.	This is Lesson Two, "Applicability Determination in the Application, Part One."	Applicability Determination in the Application: I 
4.	In this lesson, we'll look at the beginning of the PSD application and review process. Before anything else happens under PSD law and regulations, someone has to decide whether or not PSD requirements even ***apply*** to the construction or change proposed.	 Do PSD requirements apply?
5.	Most of the time, this determination of applicability is made by the organization that wants permission to construct or modify—the ***applicant***.	
6.	In general, two things will determine ***whether*** PSD review applies to a source and ***what*** has to be reviewed.	• Does PSD review apply? • What has to be reviewed?
7.	The first is geographic location, the type of area in which the source is or will be located. The second is the size and nature of the source itself.	 • Type of Area • Size and Nature of Source
8.	In Lesson One, we saw that States had to designate all areas in their boundaries as ***attainment***, ***nonattainment***, or ***unclassifiable***. This designation depends on whether an area meets or does not meet a National Ambient Air Quality Standard for any ***criteria*** pollutant.	• Attainment • Nonattainment • Unclassifiable NAAQS met for criteria pollutant?

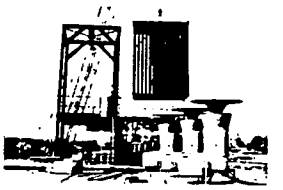
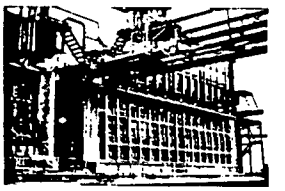
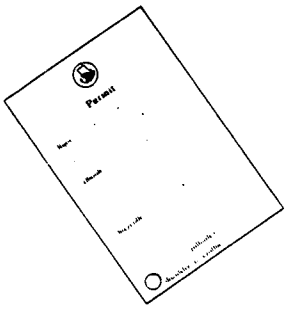
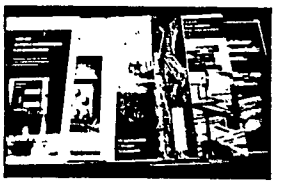
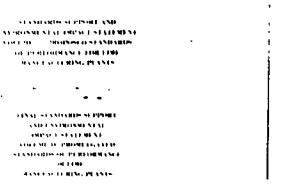
Slide	Script	Selected Visuals
9.	The designation can be different for different pollutants and it usually is. We will call any area that is either attainment or unclassifiable for any pollutant a ***PSD area*** for that pollutant.	**Attainment or Unclassifiable** **PSD Area** **Possible PSD Review**
10.	In general, PSD review requirements will apply to a source or modification that is major for a pollutant if the proposed location is a PSD area ***for that pollutant.*** We will turn to the definition of a major source or modification in a moment. If an area is ***nonattainment*** for a certain pollutant, special nonattainment area plan requirements will apply. Often, a proposed source will have to get PSD review for some pollutants and nonattainment plan review for others.	**PSD Review Required** • source or modification that is major for pollutant if in PSD area for that pollutant
11.	Within a PSD area, ***new major sources*** and ***major modifications*** are subject to PSD reviews. To understand what these sources and modifications are, we must first define some special terms—***source*** and ***emissions unit.*** Then we'll have to see what makes a source or a change to one, ***major.***	• **New Major Sources** • **Major Modifications**
12.	The PSD regulations define a ***stationary source*** in a special way. This definition can be condensed to all ***stationary emissions units***—in the same ***industrial grouping***—on ***contiguous*** or ***adjacent*** properties and under control of the same person (or persons under common control).	**Source** All stationary emissions units- in the same industrial grouping- on contiguous or adjacent properties- and under control of the same person (or persons under common control).
13.	An ***emissions unit*** is any part of a stationary source that emits—or has the potential to emit—***any pollutant*** regulated under the Clean Air Act. Notice that this includes ***any*** regulated pollutant, like hydrogen sulfide, regulated under New Source Performance Standards, or vinyl chloride, regulated under hazardous emission standards.	**Emissions Unit** • any part of a stationary source that emits - or has the potential to emit - any pollutant regulated under the CAA
14.	Most of the time, all the emissions units at one location will fall into the same ***industrial grouping,*** but this is not always so. The industrial groupings are defined as the "major groups" in a Commerce Department reference called the ***Standard Industrial Classification Manual.***	
15.	This manual assigns 4-digit codes to different types of industry. All activities within the same major group have Standard Industrial Codes that begin with the same two digits. For example, SIC 28 stands for Chemicals and Allied Products.	

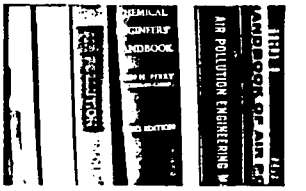
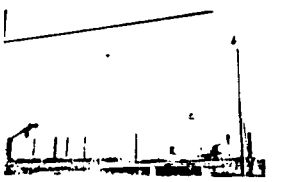
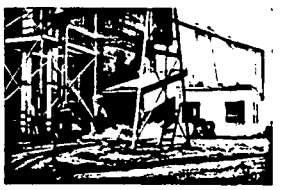
Slide	Script	Selected Visuals
16.	There is seldom any problem with determining if emission units are on "contiguous or adjacent properties."	
17.	Also, determining if emission units are under control of the same person (or persons under common control) isn't usually a difficult question.	
18.	One thing about defining a ***source*** may require a closer look, however. This is whether closely related activities of the same organization on the same property fall within the same SIC major grouping. If they are ***not*** in the same major grouping, they are considered to be ***more than one*** source. This can make a difference in ***whether*** PSD review is required, ***what kind*** of review it must be, and ***which units*** need review.	activities not in same major grouping ⬇ considered more than one source
19.	A mine-mouth coal-fired power plant, for instance, breaks down into two sources, mining operations and electric power generation.	Mine-mouth coal-fired power plant ↙ ↘ Mining Operations — Electric Power Generation
20.	When we want to determine if PSD review applies, our first step is to see how the definition of ***source*** fits the proposed construction or modification.	
21.	To ***define*** the source on which PSD review must be performed, we check which ***emissions units*** in the same SIC ***major grouping*** are on the ***same or adjacent sites,*** and under the same ***ownership*** or control.	To define source subject to PSD review... • emission units • major grouping • same or adjacent sites • ownership
22.	Our second step is to decide if the stationary source is ***major*** or not. We do this on the basis of the source's ***potential to emit*** pollutants regulated under the Clean Air Act. It will take us a few minutes to discuss what potential to emit is, and how it is estimated. Then, we will see how it is used to classify a source or modification.	Is the source major? • Potential to Emit (PE)

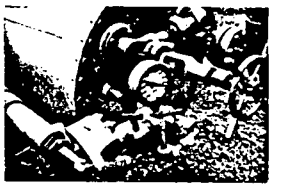
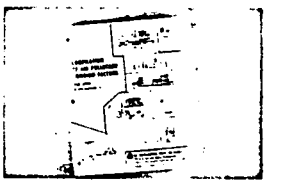
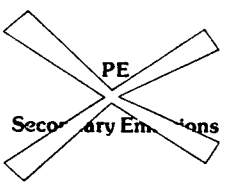
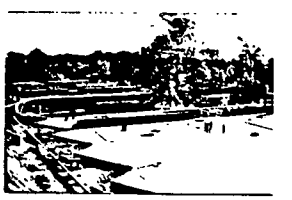
Slide	Script	Selected Visuals
23.	A brief definition of potential to emit is: "The capability—at maximum design capacity,	**Potential to Emit** • "the capability - at maximum capacity -
24.	to emit a pollutant,	to emit a pollutant -
25.	***after*** the application of air pollution control equipment,	after the application of air pollution control equipment -
26.	considering Federally enforceable permit restrictions." This definition needs considerable explaining. In places, it's even more complicated than it first sounds.	considering enforceable permit restrictions"
27.	Let's take the critical terms of the "potential to emit" definition one at a time. First is the capability of the source—at maximum design capacity—to emit ***any*** pollutant regulated under the Clean Air Act.	
28.	This means that we must have a way of ***estimating the emissions*** from the new source or modification. Remember, the source may not exist yet, so its emissions can't be measured directly.	
29.	The estimation is an engineering analysis; we'll look at it more closely in a moment.	
30.	Next, notice that potential to emit is figured ***after*** air pollution control equipment is applied.	
31.	This means that on top of emissions estimates for the new source or modification, we must estimate how ***efficient*** the control equipment will be.	How efficient is the control equipment?

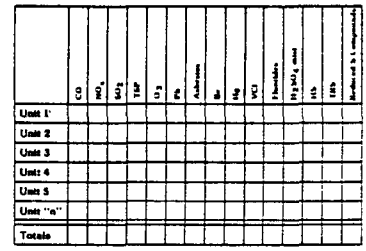
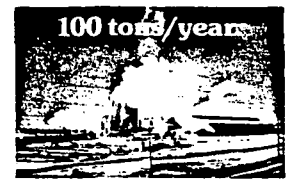
Slide	Script	Selected Visuals
32.	Last, remember we said potential to emit was figured at maximum design capacity.	
33.	But most sources don't operate at their full capacity all the time; few can. However, PSD is a program that requires assurance that its goals will be met.	
34.	One of the most important things affecting those goals is the actual potential to emit of a new source or modification. To make sure that a source will operate somewhere under its maximum emission rate, all day, every day, 8760 hours per year, we need ***Federally enforceable permit conditions***.	
35.	Federally enforceable permit conditions are operating rules written into the legal document that allows building or modifying the source and then operating it.	
36.	If an applicant intends to run a plant for only two shifts a day, about 16 hours, then they will have to agree to a ***permit condition*** limiting hours of operation. Otherwise, potential to emit has to be figured on 24-hour-a-day operation.	To base PE on 16-hour-a-day operation ⬇ Permit Condition - limiting hours of operation
37.	Similar limits could be written on materials burned or processed at the source, or substances stored at it.	

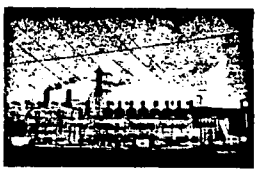
Slide	Script	Selected Visuals
38.	Any limit that isn't actually built into the way the source is made has to be ***Federally enforceable,*** that is, the control agency must be able to make the source do what the permit condition says by legal means: an administrative order or court order, for example.	
39.	We've just finished saying that we decide whether a source is ***major*** or not by figuring its ***potential to emit*** any pollutant controlled under the Clean Air Act.	**Is the source major?** • Potential to Emit (PE)
40.	The rate at which pollutants are emitted can be less than full-time, full-capacity, "dirty" rates *if* we allow for air pollution control equipment and Federally enforceable permit conditions.	**Less than full capacity rate if:** • control equipment • enforceable permit conditions
41.	We still need to see how the emission rates are figured and added up, and then what we compare the rates with. The process of calculating potential to emit for a source is an engineering analysis.	
42.	Someone with a solid technical knowledge of the kind of source we're interested in has to examine its operation unit by unit. In most cases, the analyst will estimate the potential to emit for each ***emission unit,*** and then add potentials for all the units that make up the whole source.	
43.	There are many ways of estimating the potential to emit of an emissions unit. The most accurate way is measurement by a ***performance test.***	**Performance Test**
44.	If we're talking about emissions units at a source that already exists, where a modification will be made, the test can be done on the units we're actually concerned with.	

Slide	Script	Selected Visuals
45.	Much of the time, however, we're concerned with emission units that haven't been built. We need ways of calculating what ***new*** emission units will do.	
46.	We can't always make a reliable performance test on existing emissions units, either. It may be very difficult or physically impossible.	
47.	So we may have to turn to different estimation methods for either a brand-new source ***or*** an existing one.	
48.	Some of the information we need for estimating potential to emit of an emission unit can be found in: —Federally enforceable ***emission limits***—regulations or permit conditions—for that unit.	
49.	—Emission data and ***guarantees*** from the vendor of the equipment.	
50.	—Data from ***Standards Support documents*** used by EPA to back-up national emission regulations.	

Slide	Script	Selected Visuals
51.	—Data from AP-42, EPA's ***Compilation of Air Pollutant Emission*** Factors.	
52.	—***Emission factors*** from technical articles and reference books.	
53.	—Completed questionnaires used by States to put together their emission inventories.	
54.	Using these methods of measurement and estimation, we can get at the potential to emit for "well-behaved" emissions units, the kind we think of immediately.	
55.	But there are other things which we have to count as emissions units. Some points and processes have ***fugitive emissions.***	
56.	The official definition of fugitive emissions says they are "those emissions which ***could not reasonably*** pass through a stack, chimney, vent, or other functionally equivalent opening."	
57.	What this boils down to is that fugitive emissions are substances that ***escape*** without a reasonable chance for conventional kinds of controls. Particulate fugitive emissions can come from units like coal piles, dusty roads, or quarries. There are certain exemptions concerning fugitive emissions that will be discussed later.	

Slide	Script	Selected Visuals
58.	Volatile organic fugitive emissions can come from leaks in refinery piping or chemical plant processing equipment.	
59.	There ***are*** ways of putting numbers on fugitive emissions though. Some emission factors are included in AP-42,	
60.	and a lot of studies have been done for EPA and trade organizations. The problem with using unofficial sources of emission factors, however, is that the applicant will have to convince the reviewing agency that the source is reliable.	
61.	One type of emissions not counted in totalling up potential to emit is ***secondary emissions.***	
62.	Secondary emissions are emissions that occur ***as a result*** of the construction or operation of the source or modification, but do not come from the source or modification itself. They do ***not*** include any emissions directly from any mobile source.	
63.	We are finally at a point where we can talk about potential emissions ***accounting***—that is adding up the potential to emit of each emissions unit to decide what size source we're dealing with. There is more to that than it sounds like.	**PE Accounting** • adding up the PE of each unit
64.	Remember that we said that different emissions units at the same place ***could*** make up different sources—like that mine-mouth power plant. If the emission units are different sources, we have to be sure to count the right units for the right source.	Mine-mouth coal-fired power plant Mining Operations Electric Power Generation

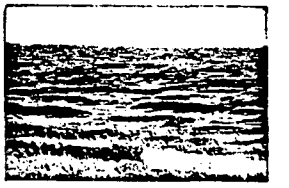
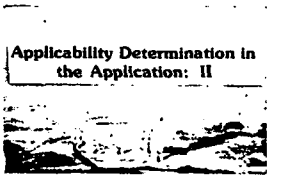
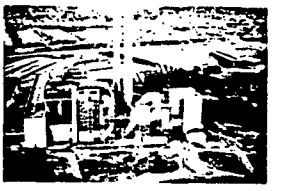
Slide	Script	Selected Visuals
65.	Another complication is that potential to emit has to be added up for ***each*** pollutant regulated under the Clean Air Act.	• PE accounting is pollutant-specific
66.	That includes six criteria pollutants, related to national ambient standards; nine other pollutants regulated under National Emission Standards for Hazardous Air Pollutants or New Source Performance Standards; and right now, five other pollutants that are listed but don't have final regulations. Since the list is open-ended, there may be more by the time you see this lesson.	**Pollutants** **Criteria** • Carbon Monoxide • Nitrogen Oxides • Sulfur Dioxide • Particulate Matter • Ozone • Lead **Noncriteria** • Asbestos • Beryllium • Mercury • Vinyl Chloride • Fluorides • Sulfuric Acid Mist • Hydrogen Sulfide • Total Reduced Sulfur • Reduced Sulfur Compounds
67.	OK—what we have now is a list 15 columns wide, one for each regulated pollutant. The list is as long as the number of emission units at our source. We add up the potential to emit ***by pollutant*** of all the emission units at the source, and come up with a total potential to emit ***for each pollutant*** at the source as a whole.	
68.	This potential to emit for the entire source is what we use to decide if the source is major or not. This is going to make a difference whether we are talking about a whole ***new*** source or a ***modification*** at an ***existing*** source.	• PE defines major status
69.	There is a double-barrelled definition for "major source." Congress made a list of 28 kinds of sources; large fossil-fuel-fired steam electric plants;	**28 Named Categories** 1. Fossil-Fuel Steam Electric Plants 2. Coal Cleaning 3. Kraft Pulp Mills 4. Portland Cement Plants 5. Primary Zinc Smelters 6. Iron and Steel Mills 7. Primary Aluminum 8. Primary Copper 9. Municipal Incinerators 10. Hydrofluoric Acid 11. Sulfuric Acid 12. Nitric Acid 13. Petroleum Refineries 14. Lime Plants
70.	Kraft pulp mills, etc., which EPA wrote into the PSD regulations.	**28 Named Categories (continued)** 15. Phosphate Rock 16. Coke Oven Batteries 17. Sulfur Recovery Plants 18. Carbon Black 19. Primary Lead 20. Fuel Conversion 21. Sintering Plants 22. Secondary Metal 23. Chemical Process 24. Fossil-Fuel Boilers 25. Petroleum Storage and Transfer 26. Taconite Ore 27. Glass Fiber 28. Charcoal
71.	If a source on this list emits or has the potential to emit ***100*** tons per year or more of any regulated pollutant, it is major.	

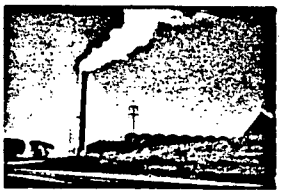
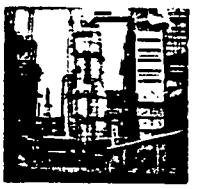
Slide	Script	Selected Visuals
72.	If a source ***not*** on the list emits or has the potential to emit ***250*** tons or more per year of any pollutant regulated under the Act, then ***it*** is major.	not on list + 250 tons/year ⬇ Major
73.	Sometimes, it isn't clear what category a source falls in. Neither Congress nor EPA gave sharp definitions to the sources named on the list. Differences in what a power plant burns, or what its heat input rate is, can decide whether it's measured against the 100 or 250 tons per year yardstick. It often helps to check the source definition in a New Source Performance Standard regulation that would apply if the source were on the list.	
74.	So far, we have discussed the basic building blocks for determining whether PSD review applies to a proposed new source or modification. They are: —What is the ***area classification?*** —What ***emission units*** make up the source or modification? —What is the total ***potential to emit*** of the proposed construction? —What does ***"major"*** mean for a new source or a modification?	• Area Classification • Emission Units • Potential to Emit • Major Source/Modification
75.	In the next lesson we will use these ideas to put together ***tests*** to determine ***whether*** PSD review applies to a proposal. And ***if*** it does, what kind and how much.	• Does PSD review apply? • If so, what kind and how much?
76.	(Credit slide)	Applicability Determination in the Application: I Technical Content: John Maroney Instructional Design: Monica Leslie Graphics: Betsy Huber Photography: Audio David Churchill Narration: Rick Palmer
77.	(Northrop slide)	Developed and produced by: Northrop Services, Inc. under EPA Contract No. 68-02-3573
78.	(Northrop slide)	Based in part on the: 1980 PSD Workshops prepared for the U.S. Environmental Protection Agency Office of Air Quality Planning and Standards by TRW Inc., Environmental Engineering Division with the assistance of Northrop Services, Inc. under EPA Contract No. 68-02-3174

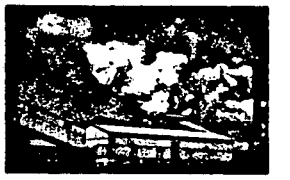
Slide	Script	Selected Visuals
79. (NET slide)		Northrop Environmental Training

SI:453
Lesson 3

Applicability Determination in the Application: II

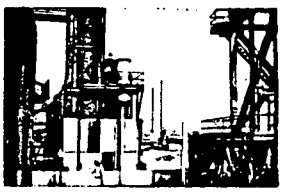
Slide	Script	Selected Visuals
1.	(Focus)	**FOCUS**
2.	(Introductory slide)	
3.	This is Lesson Three, "Applicability Determination in the Application, Part Two."	
4.	In the last lesson, we lined up the items of information we need to determine PSD applicability for a proposed new source or modification.	
5.	We looked at the ***classification*** of the area, PSD or nonattainment, for different air pollutants.	**Classification** • PSD • Nonattainment
6.	We saw how to ***define*** the new source or modification in terms of its ***emission units***. Then we added up the ***potential to emit*** pollutants for the whole proposed construction.	• Emission Units • Potential to Emit
7.	Finally, we took our first look at the general definition of "major source."	**Major Source**
8.	Now we have the pieces from which we can build three tests for applicability of PSD regulations. ***Test One***—for ***new*** or ***existing*** sources is pretty simple. It checks whether or not the source is major. ***Test Two and Test Three***—are more complicated and deal with emission ***changes*** at a source where a ***modification*** is proposed. These tests check for significant increases, and decide which pollutants require review.	**Test 1** Is the source major? **Test 2** Are there any significant increases? **Test 3** Which pollutants require review?

Slide	Script	Selected Visuals
9.	Test One just says: "Is the source, new or existing, ***major*** for at least one regulated pollutant?" If the source is major by the 100- or 250-ton criterion, we have to go ahead with a PSD review. If the source isn't major, and we aren't proposing a change so large it's a major source in itself, then no PSD review is needed.	**Test 1** **Is the source major?** • yes ➡ PSD review • no ➡ no PSD review
10.	But remember, a source that's major for ***any*** pollutant ***is*** a major source, unless, of course, the area is ***nonattainment*** for that pollutant. If so, the nonattainment area rules apply to the source for that pollutant.	**Major for any (Attainment) Pollutant** ⬇ **Major Source** **...regardless for what pollutant the area is PSD**
11.	The simplest case is an entirely ***new*** major stationary source in a PSD area. It will have to go through the rest of the PSD review process. Things are more complicated for ***modifications***.	
12.	To deal with modifications, we need some more definitions. The first one is "modification" itself.	
13.	A general definition says a modification is "any ***physical*** change in a stationary source, or change in its ***method of operation*** that would increase its ***actual*** emissions of any pollutant regulated under the Act." There are some detailed qualifications and exceptions to this general definition.	**Modification** • physical change • change in the method of operation ⬇ • net emissions increase
14.	Modifications that might require PSD review would include ***modified*** emissions units, ***new*** emissions units, or ***replacement*** emissions units.	• modified emissions units • new emissions units • replacement emissions units
15.	But not ***every*** modification, not even at a major source, has to receive PSD review. It is only ***major modifications*** that must be reviewed.	**Only major modifications require review.**

Slide	Script	Selected Visuals
16.	A "major modification" meets two conditions: it is a modification at a major source, ***and*** it "results in a ***significant net*** increase in emissions of any pollutant regulated under the Act."	**Major Modification** • at a major source • significant net emissions increase
17.	By now, we have a pretty good idea of what a major source is, so that doesn't raise much of a problem in our understanding what a major modification is. But now we have something new to deal with—a ***significant net increase*** in emissions. We have to deal with two loaded words: "significant" and "net."	**Significant Net Increase**
18.	"Significant" in this context means "it makes a difference to somebody," but how do you assign numbers to that idea? Well, it isn't a new problem in law and regulation.	
19.	The solution is to ***pick*** a number based on the best information available and call that "significant." This is what EPA has had to do in its PSD regulations.	
20.	For each pollutant regulated under the Clean Air Act, EPA has assigned a number of tons per year that will be treated as a significant increase.	**Significant Emission Rates** **(extracted from 40 CFR 51.24 (23)(i))** • Carbon Monoxide: 100 tons per year (tpy) • Nitrogen Oxides: 40 tpy • Sulfur Dioxide: 40 tpy • Particulate Matter: 25 tpy • Ozone: 40 tpy of volatile organic compounds • Lead: 0.6 tpy • Asbestos: 0.007 tpy • Beryllium: 0.0004 tpy
21.	These amounts range down from 100 tons per year for carbon monoxide to eight-tenths of a ***pound*** per year for beryllium.	**Significant Emission Rates** **(continued)** • Mercury: 0.1 tpy • Vinyl Chloride: 1 tpy • Fluorides: 3 tpy • Sulfuric Acid Mist: 7 tpy • Hydrogen Sulfide (H_2S): 10 tpy • Total Reduced Sulfur (including H_2S): 10 tpy • Reduced Sulfur Compounds (including H_2S): 10 tpy
22.	There's one further complication we have to keep in mind in talking about ***significant*** emission increases. It has to do with the special protection that Class I PSD areas must get.	

Slide	Script	Selected Visuals
23.	If a major source that plans a modification is within 10 ***kil***ometers of a Class I area, we have to do air dispersion modeling to find out if the change is significant. Usually, we don't get to modeling until we're evaluating all the air quality impacts of the source.	• major source • within 10 km of Class I area ⬇ **Air Dispersion Modeling**
24.	For a source within 10 ***kil***ometers of a Class I area, any ***emissions*** increase that will make the air quality model predict an increase in pollutant concentration greater than ***one microgram per cubic meter*** is significant.	**Special Criteria for Sources within 10 kilometers of a Class I Area** • any pollutants regulated under the Clean Air Act • any increase which impacts the Class I area by greater than 1 $\mu g/m^3$ (24-hour average)
25.	All right, now we have something to compare our net emission increases to, to see if they're significant. Next we have to decide what the ***net*** actual increase is. The process of counting up emission changes to arrive at this number is usually called "netting." It can be fairly involved.	**Netting** • counting up emission changes
26.	We can define "net actual increase" by a simple-looking formula. It is: Net increase ***equals*** actual change from new and modified units ***minus*** creditable, contemporaneous decreases, plus creditable contemporaneous increases. That's like telling you all bookkeeping is just running the basic accounting equation. The hard part is knowing what to plug in for each of the variables.	**Net Actual Increase** (change in actual emissions from proposed new and modified emission units) − (creditable contemporaneous decreases) + (creditable contemporaneous increases)
27.	Once again, let's attack the problem by taking the key words one at a time. ***Contemporaneous*** means "in the same time period."	**Contemporaneous** • in the same time period
28.	For PSD, this doesn't necessarily mean an increase or decrease is made at ***exactly*** the same time as a modification. They may happen during a "window" of time. Where EPA regulations apply, the "window" opens five years before legal ***commencement*** of construction of the change. It closes when the change actually produces emissions. An approved State PSD plan can define a reasonable period before the emissions increase as "contemporaneous."	**Time Window** • opens 5 years before commencement of construction • closes when change actually produces emissions • or a reasonable period in a State plan
29.	There are quite a few conditions on what emission changes are ***creditable***. The idea is to make sure that we get ***actual***, not "paper," decreases and increases credited to the net change.	**Creditable Changes** • actual - not "paper" - decreases and increases

Slide	Script	Selected Visuals
30.	For this reason, if a decrease results from an operation cutback, or something else that could be turned around, the decrease has to be ***Federally enforceable***.	**Decrease resulting from operation cutback must be Federally enforceable.**
31.	Along the same lines, decreases may be counted only once. If a decrease is applied to one permit application, it can't be used again on a later one.	**Decreases** • may be counted only once
32.	Also, the decreases have to be the ***same pollutant type*** as the other changes they're credited against and have ***similar effects*** on public health and welfare.	**Decreases** • may be counted only once • must be same pollutant type • must have similar effects
33.	When we start talking about specific pollutants, we have to remember that particulate matter and sulfur dioxide are special cases. They have air quality ***increments*** associated with them.	**TSP and SO_2** ⬇ **Increments**
34.	When we tie emission changes to other PSD requirements, like increments, we have to consider when the changes take place with respect to the ***baseline date***.	• when changes take place • with respect to the baseline date
35.	The baseline date ***is not*** connected with the construction of the source or modification we're analyzing. It's the "trigger" date for increment calculations that we'll be talking about under Air Quality Analysis.	**Baseline Date** • "trigger" date for increment calculations
36.	For now, keep in mind that the baseline date is triggered by the first application in the area for a PSD permit ***involving specific pollutants***. If there's one application for just particulate matter on one date, and for volatile organics a year later, your area will have baseline dates a year apart for those two pollutants. You ***could*** wind up with about 15 different baseline dates in one area, but it's not very likely. There is, however, some variability among State programs.	**Baseline Date** • "trigger" date for increment calculation • tied to specific pollutant
37.	There's a difference as to whether you can credit an emission change, depending on whether it's before or after the baseline date. With some detailed qualifications, changes ***before*** the baseline date are creditable ***only*** if they are directly tied to ***construction***, and at a major source.	**Before Baseline Date** Creditable only if: • tied to construction • at a major source
38.	If the change is ***after*** the baseline date, it may come from nonconstruction causes, like operating-level changes. Again, the regulations apply detailed qualifications to this simplified statement.	**After Baseline Date** • may come from nonconstruction causes

Slide	Script	Selected Visuals
39.	The process, ***netting***, that we just got through describing is not simple. People generally don't do it in their heads. It requires going over the existing source, and the proposed change, emissions unit by emissions unit, for every regulated pollutant.	
40.	You have to look at changes in the operating history of each unit for each pollutant. When you get through you add up the emission changes that come from modifying the source with all the other ***creditable contemporaneous*** changes.	
41.	The results of those additions (remember there's one for each pollutant) are the numbers we need for ***Test Two. Test Two*** asks: "Are there any ***significant*** net increases?"	**Test 2** Are there any significant net increases?
42.	If any pollutant has a significant net increase under Test Two, then we have to continue with PSD review. This is so even if the source is a major source for a completely different pollutant.	**Significant Net Increase** ⬇ **Continue with PSD review.**
43.	If we were dealing with a source that was major for hydrocarbons, for instance, and our proposed change significantly increased only suspended particulate matter emissions, we'd still have to do PSD review.	source major for HC + significant increase in TSP only ⬇ **PSD review anyway**
44.	One thing to keep in mind about significant net changes is this: a relatively small increase in emissions due to a modification can trigger a full PSD review at a major source.	**Relatively small increase due to modification can trigger full PSD review at major source.**
45.	To wrap up this segment on significant net increase, let's recall something we mentioned in passing earlier, and look at one strange effect of the rules. Both have to do with sources that are not major, and are proposing changes.	• not major • proposing changes
46.	If we're looking at a proposed change at an existing ***non-major*** source, then we aren't concerned with significant net increases. But we still have to think about emission increases from the modification. If the increases are big enough to meet major source criteria by themselves, 100 or 250 tons per year depending on category, then the ***modification*** has to be reviewed as a major source.	increases meet major source criteria ⬇ modification must be reviewed as major source

Date

ROUTING AND TRANSMITTAL SLIP

TO: *(Name, office symbol, room number, building, Agency/Post)*	Initials	Date
1.		
2.		
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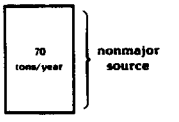
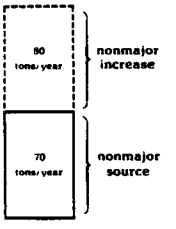
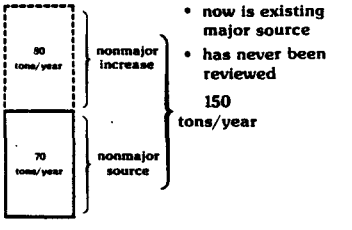
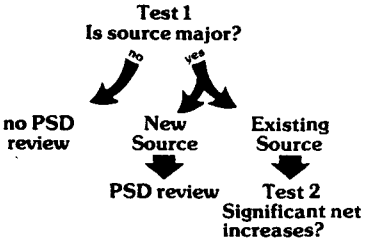
	Action		File		Note and Return
	Approval		For Clearance		Per Conversation
	As Requested		For Correction		Prepare Reply
	Circulate		For Your Information		See Me
	Comment		Investigate		Signature
	Coordination		Justify		

REMARKS

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: *(Name, org. symbol, Agency/Post)*	Room No.—Bldg.
	Phone No.

Slide	Script	Selected Visuals
47.	The strange situation comes up because changes at a ***non-major*** source can add up to create a major source that never got PSD review, but ***will*** need it for future significant changes. Let's look at a simplified example:	• changes at nonmajor source • add up to major source • never got PSD review ...but will need review if future significant changes
48.	Take a source that's on the list of 28 categories. It emits only 70 tons per year of some pollutant, so it's ***not*** major.	
49.	The proposal is to add operations that would increase emissions by 80 tons per year. The ***source*** isn't major, and the ***modification*** isn't either, so ***no*** PSD review is called for.	
50.	But when the change is complete, we've got an ***existing*** source, on the list of 28, with 150 tons per year of emissions. From now on, any significant net emission increase, for any regulated pollutant, will call for PSD review.	
51.	So far, we've described two sorts of things that call for PSD review, ***new major sources*** and ***major modifications***. ***Test One*** compares the new or existing source with criteria to decide if it's ***major*** or not. If the proposed ***new*** source is major we go on with PSD review. If the ***existing*** source is major, we go to ***Test Two***, to see if there is a ***significant net increase*** in ***actual*** emissions of any regulated pollutant. That's the point we've reached now.	
52.	Whether we're talking about a proposed new source or a modification we still have to determine what and ***how much*** PSD review will be done. ***Test Three*** will tell us that.	What and how much PSD review?
53.	***Test Three*** looks a lot like Test Two. It goes over the totals of ***emission increases*** from the new source or modification. But ***Test Two*** just asks for a modification, "Is there at least ***one*** significant net increase?" ***Test Three*** asks, "***Which*** pollutants have significant increases?" For each pollutant that comes out of ***Test Three***, that ***has*** a significant net increase we have to do the ***three analyses*** that PSD review involves.	Test 2 Is there at least one significant net increase? Test 3 Which pollutants have significant net increases?

Slide	Script	Selected Visuals
54.	Those three analyses are the topics of lessons of their own in this course. They are: Best Available Control Technology—BACT—Analysis, ***Air Quality*** Impact Analysis, and ***Additional*** Impacts Analysis.	**Three Analyses** • BACT Analysis • Air Quality Impact Analysis • Additional Impacts Analysis
55.	The process we've just described—deciding on the applicability of PSD review—is pretty complicated and time-consuming in itself. The analyses that applicability determination can lead to will be more complicated, time-consuming—and expensive. To keep applicants from having to do unnecessary and expensive work, the PSD regulations have some ***exemptions*** from review.	There are some exemptions from PSD review.
56.	A major exemption deals with the air quality ***monitoring*** related to air quality ***impacts*** analysis. We'll discuss it when we get to the air quality impacts lesson.	**Major Exemption** • monitoring related to Air Quality Impact Analysis
57.	We mentioned another exemption in passing in Lesson One and earlier in this lesson. It's important enough to mention again. When the States designate an area as nonattainment, attainment, or unclassifiable, it is for ***specific*** criteria pollutants.	Areas may be: • nonattainment • attainment • unclassifiable for specific criteria pollutants
58.	Many areas we're interested in are likely to be nonattainment for one or more pollutants and PSD for the rest.	Areas may be mixed • nonattainment for some • PSD for others
59.	In these "mixed" areas, PSD review has to be done for all the pollutants that do ***not*** make the area nonattainment, if PSD review is triggered by Test One and Test Two.	pollutants not making area nonattainment ⬇ potential PSD review
60.	But for the pollutants that ***do*** make the area nonattainment, special nonattainment area plan new source review applies. That's another story, one we're ***not*** going to deal with in ***this*** course.	pollutants not making area nonattainment ⬇ potential PSD review pollutants making area nonattainment ⬇ special new source review
61.	Another exemption keeps fugitive emissions from making some sources major. The basic idea is that certain sources that would be major ***only*** because quantifiable fugitive emissions bring their potential to emit over the line are exempt from PSD review.	If source is major only because of fugitive emissions ... Then source is exempt from PSD review

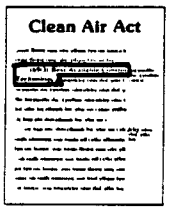
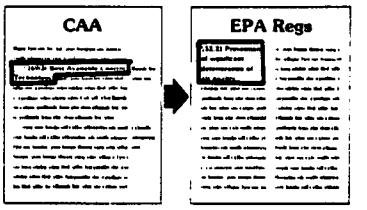
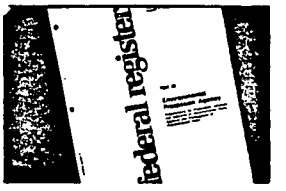
Slide	Script	Selected Visuals
	62. However, the exemption has an exemption of its own. Certain sources can't get out of PSD review this way. They are: those on the list of 28 categories, and those that were regulated by New Source Performance Standards or Hazardous Pollutant Standards as of August 7, 1980. That's the day the final PSD regulations were issued. That narrows the field of the fugitive emissions exemption, but some sources still qualify. There is, however, some difference among the States as to which NSPS or NESHAPS must be applied.	**Exemption does not apply to:** • 28 listed sources • sources regulated under NSPS or NESHAPs
	63. There is a very long and complicated list of other exemptions in the regulations, mostly at 40 CFR 52.21(i)(4). The general idea is to exempt from review those changes that are made to comply with a Federal law, that are temporary and unavoidable, or that are in the public interest.	**Exemptions** [40 CFR 52.21 (i)(4)] **Changes:** • made to comply with a Federal law • temporary and unavoidable • in the public interest
	64. The ***applicability determination*** process we've just gone through is the first big step in PSD review. It's also a critical one. Applicability determination decides ***if*** a source or modification will get PSD review. If it does get review, the process decides ***what pollutants*** the review will be done on.	**Applicability Determination** • Will a source get PSD review? • What pollutants will review deal with?
	65. For every ***new major source*** or ***major modification***, the applicant is going to have to do ***three analyses***. These will need to be done for ***each*** pollutant emitted in ***significantly increased*** amounts.	for every new major source or major modification ▼ three analyses for each pollutant emitted in significantly increased amounts
	66. The analyses are: Best Available Control Technology (BACT)—or bact—analysis. ***Air Quality*** Impact Analysis, for effects on air quality increments and standards; and ***Additional*** Impacts Analysis, for soils, vegetation, and visibility effects, especially on Class I areas. We'll take these up one by one in the following lessons.	• BACT Analysis • Air Quality Impact Analysis • Additional Impacts Analysis
	67. (Credit slide)	Applicability Determination in the Application: II Technical Content: John Maroney Instructional Design: Monica Leslie Graphics: Betsy Huber Photography Audio: David Churchill Narration: Rick Palmer
	68. (Northrop slide)	Developed and produced by: Northrop Services, Inc. under EPA Contract No. 68-02-3573

Slide	Script	Selected Visuals
69. (Northrop slide)		Based in part on the 1980 PSD Workshops prepared for the U.S. Environmental Protection Agency Office of Air Quality Planning and Standards by [illegible] with the assistance of [illegible] under EPA Contract No. 68-02 1174
70. (NET slide)		Northrop Environmental Training

SI:453
Lesson 4

BACT Analysis in the Application: I

Slide	Script	Selected Visuals
1. (Focus)		FOCUS
2-3. (Introductory slides)		 
4.	This is Lesson Four, "BACT Analysis in the Application, Part One."	BACT Analysis in the Application: I
5.	In Lessons Two and Three, we saw how an organization planning to build or modify an air pollutant source went about determining ***if*** PSD review requirements apply, and if so, ***what kind*** of review has to be done.	• PSD review? • What kind?
6.	The next major step, after deciding that PSD ***does*** apply and has to be done for specific pollutants is the Best Available Control Technology—B-A-C-T or BACT analysis. We can think of the BACT analysis as the real core of the whole PSD review process.	Best Available Control Technology (BACT) Analysis
7.	This is because the BACT analysis provides the information needed for the other two analysis steps: Air Quality Analysis and Additional Impacts Analysis.	BACT Analysis ⬇ • Air Quality Analysis • Additional Impacts Analysis
8.	The BACT analysis will also line up data the corporation needs for financial decision-making about the project. It also pulls together some of the most important facts needed to inform the public before the review goes to public hearing.	BACT Analysis ⬇ • financial decision making • public information

Slide	Script	Selected Visuals
9.	Best Available Control Technology is a very important term in PSD programs. It's so important that it is defined at some length in the Clean Air Act.	
10.	EPA regulations copy the Act's definition, with a few changes to fit programs run by the States or EPA.	
11.	Legal definitions are seldom easy reading. This one certainly isn't. It packs into a few words most of the ideas needed to deal with a complex concept. We'll spend all of this lesson "unpacking" what the definition means in terms of what you really do in a BACT analysis.	
12.	But you should hear the whole definition just once. Just listen for some of the key words and ideas. Don't expect to commit it to memory.	**Best Available Control Technology**
13.	The Clean Air Act says: "best available control technology" means an ***emission limitation—***	**BACT** • emission limitation
14.	"***based on*** the maximum degree of reduction of ***each*** pollutant subject to regulation under this Act—	**BACT** • emission limitation • maximum reduction of each pollutant
15.	"emitted from or which results from any ***major*** emitting facility, which the permitting authority,	**BACT** • emission limitation • maximum reduction of each pollutant • from major source

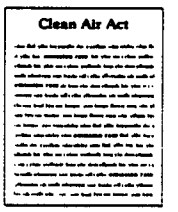
16.	"on a ***case-by-case basis,*** taking into account ***energy, environmental,*** and ***economic impacts*** and other ***costs,***	**BACT**
		• emission limitation
		• maximum reduction of each pollutant
		• from major source
		• case-by-case basis, considering:
		  • energy/environmental/economic impacts
		  • other costs

Slide	Script	Selected Visuals

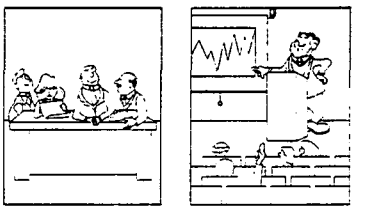
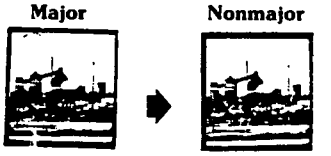
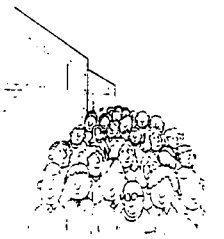
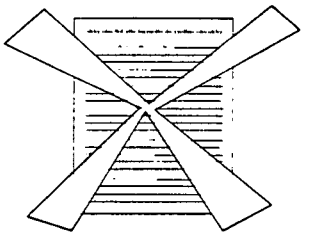
17.	"determines is ***achievable*** for such facility through application of production ***processes*** and ***available methods,*** systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of each such pollutant.	**BACT**
		• emission limitation
		• maximum reduction of each pollutant
		• from major source
		• case-by-case basis, considering:
		  • energy/environmental/economic impacts
		  • other costs
		• achievable, through:
		  • production processes
		  • available methods/systems/techniques

18.	"In ***no*** event shall application of 'best available control technology' result in emissions of any pollutant which will ***exceed*** emissions allowed by any applicable standard established pursuant to Section 111 or 112 of this Act."	**BACT**
		• emission limitation
		• maximum reduction of each pollutant
		• from major source
		• case-by-case basis, considering:
		  • energy/environmental/economic impacts
		  • other costs
		• achievable, through:
		  • production processes
		  • available methods/systems/techniques
		• emissions not to exceed standards

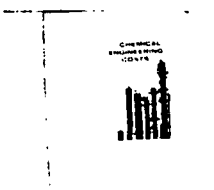
19.	Whew! That's what happens when you put everything you need to know in one paragraph. Let's start working on the definition—and what it implies—a few words at a time.	
20.	One thing that's easy to lose sight of as soon as you start running detailed analyses of technology, economics, and so forth, is that BACT is an ***emission limitation.***	**BACT** • emission limitation
21.	It's ***based on*** available control technology, but—whenever possible—it's an emission rate. The BACT rate is what will get written into the PSD permit as a ***Federally enforceable limitation.***	
22.	Of course, if there's no practical way to come up with a quantifiable emission rate, BACT conditions may involve something else. The "something else" could be specific kinds of processes, limitations on fuels or feed stocks, or work practice rules.	• kinds of processes • limitations on fuels/ feedstocks • work practice rules
23.	These can be especially important in dealing with fugitive emissions, like leaks and storage losses.	

Slide	Script	Selected Visuals
24.	In some cases, BACT ***could*** be specified in terms of specific control equipment, operated in a certain way. But the basic idea is that the emission rate is what you want from your BACT analysis. But, you might have to settle for something narrower and less quantitative—a how-to-comply directive, for instance.	**Emission Rate**
25.	This idea comes up often in the Clean Air Act. Whenever possible, emission controls are to be specified in allowable emission rates—under NSPS or NESHAPs, for instance. The source operator should be able to decide on the best way to achieve the allowable rates.	 **Clean Air Act**
26.	There's a difference with BACT analysis under PSD, however. It's the ***applicant***—the organization that wants to build or modify a source—that works up the emission rate that's offered as best available control technology. The reviewing agency can approve or disapprove the analysis, but the applicant ***does*** the analysis.	**BACT/PSD** • applicant determines emission rate • agency approves or disapproves
27.	With that in mind, it's not hard to remember that BACT analysis is case-by-case. What's been done at other plants can certainly ***help*** the analysis, but BACT is the best available for ***this*** plant, operating in ***its*** technical, economic, and so on, situation.	**BACT Analysis**  • case-by-case • this plant • its situation
28.	What takes most of the time and effort in BACT analysis is deciding what "best" and "available" mean for the proposed project. The definition in the Act outlines, in a few words, what's involved. EPA regulations and guidance expand the definition to cover concrete cases.	• "Best" • "Available"
29.	Let's begin with the definition of "best." Remember that the Act says BACT means the ***maximum*** degree of reduction of each pollutant regulated. Once again, we have to remember to deal with ***all*** the regulated pollutants that are emitted in significant amounts by the source.	**"Best"** • maximum reduction • each pollutant
30.	"Best" also means that the degree of control proposed goes beyond what's ***routinely*** applied to sources of this kind.	**"Best"** • maximum reduction • each pollutant • beyond routine application

Slide	Script	Selected Visuals
31.	To keep the control tight, the Act says BACT has to require limits ***at least*** as strict as New Source Performance Standards or National Emission Standards for Hazardous Air Pollutants—if any apply.	**"Best"** • maximum reduction • each pollutant • beyond routine application • at least as strict as NSPS/ NESHAPs
32.	But BACT is best ***available*** control technology. And "available" here means what can be ***achieved*** when you take into account energy, environmental and economic ***impacts*** and other ***costs***—including social costs.	**"Available"** Achievable, considering: • Energy Impacts • Environmental Impacts • Economic Impacts • Social Costs • Other Costs
33.	So besides examining control technology alternatives, a BACT analysis requires us to evaluate what the controls will ***cost***, in a very broad sense.	$ What will the controls cost?
34.	It isn't just the reasonableness of investment and operating costs for the company we have to consider.	
35.	We also have to analyze what effects different control strategies will have on society and the environment,	
36.	and what those effects are worth.	
37.	What do we want from a BACT analysis, then? Basically, ***information*** of different kinds for making different kinds of decisions.	BACT Analysis ⬇ Information
38.	Some of these decisions will be made within the organization making the application.	

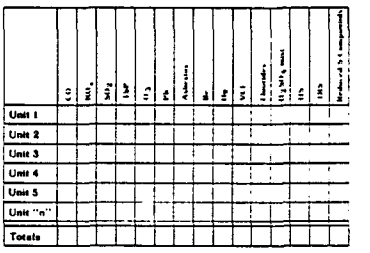
Slide	Script	Selected Visuals
39.	Some of them will be made by—or together with—the reviewing agency. And some will be made by public participation.	
40.	First of all, we want the BACT analysis to come out with the mixture of ***control*** equipment, processes, and operations to be used on the source. This is an important step in company investment decision making.	**Control** • equipment • processes • operations
41.	Second, we need the ***emissions data after*** controls have been applied. This information feeds all of the rest of the PSD analysis, especially the air quality-modeling-analysis, and the additional impacts analysis.	**Emissions Data** • after control
42.	Third, calculating emissions ***after*** control may have a surprising effect.	**Emissions Data** • after control surprising effect
43.	Since potential to emit is figured on the basis of ***controlled*** emissions, the applicant may find an appropriate mix of controls drops the source from PSD applicability. The source may become nonmajor, or emission increases may not be significant. This isn't the primary goal of BACT analysis, but it can be important in special cases.	Major Nonmajor 
44.	Fourth, the analysis of alternative control strategies, with costs to the company and costs and impacts that society and the environment will bear, are vital ***public information.*** This has value in itself, and has a practical effect when the permit application gets to the public hearing stage.	
45.	A BACT analysis is ***not*** like filling out a tax return. The applicant doesn't get any official form with blanks to fill in.	

Slide	Script	Selected Visuals
46.	Instead, engineers, accountants, and other specialists have to line up their facts and reasoning so that company executives, agency reviewers, and the public can check them. However, we ***can*** break the basic approach up into manageable pieces.	
47.	The BACT analysis starts by lining up the basic data to be examined. This is done in four steps that we will look at in more detail later. They are: One, Pollutant Applicability; Two, Emissions Unit Applicability;	**Steps** 1. Pollutant Applicability 2. Emissions Unit Applicability
48.	Three, Identification of Potentially Sensitive Concerns; and Four, Selection of Alternative Control Strategies.	**Steps** 1. Pollutant Applicability 2. Emissions Unit Applicability 3. Identification of Potentially Sensitive Concerns 4. Selection of Alternative Control Strategies
49.	When the sensitive concerns have been identified and the control alternatives lined up, the applicant can turn to three impact analyses. We'll also look at them in more detail later. The impact analyses are: One, Economic Impacts; Two, Energy Impacts; and Three, Environmental Impacts.	**Impact Analyses** • Economic Impacts • Energy Impacts • Environmental Impacts
50.	The applicant demonstrates compliance with the requirements of the PSD regulations step-by-step through this process. The "bottom line" won't be one big number adding up a BACT score. It will be an ***array*** of control alternatives, showing control efficiencies, costs to the company, costs to society and other effects.	**Impacts** Control Alternative / Economic / Environmental / Energy Best Next Best Other Base Case
51.	Sometimes, one set of controls will obviously be the best in terms of all these costs and impacts. Usually, however, it will be necessary to pick among alternatives with advantages and disadvantages, using ***two criteria*** for choice.	**Impacts** Control Alternative / Economic / Environmental / Energy Best Next Best Other Base Case
52.	For ***energy*** and ***economic*** costs, the criterion is ***reasonableness.*** What is reasonable is seldom easy to define.	**Energy/Economic Costs** • reasonableness

Slide	Script	Selected Visuals
53.	But comparison with what other companies—and communities—in similar circumstances have to pay for energy and controls will help. Also, some control alternatives will clearly be more reasonable than others. They'll be cheaper for about the same results.	
54.	For ***environmental*** factors, the criterion is a little more complicated. It always is for things that can't be measured directly in dollars. The idea is to keep to a minimum undesirable impacts and risks to all kinds of environmental values.	**Environmental Factors** • minimize undesirable impacts/risks
55.	Some risks or impacts may be so important that they force dropping a control alternative that looked good otherwise.	
56.	This sounds as though we're getting ahead of ourselves. Don't we do Air Quality Impact and Other Impacts Analyses later, as major components of PSD review? Yes, but we have to do brief, ***screening***-type checks in BACT analysis to make a choice of a final control strategy for ***detailed*** review. You don't ***expect*** the strategy that passes BACT analysis to fail the later stages. But there's no way to be sure without doing the detailed analyses.	**Now** **screening checks** **Later** **detailed analyses**
57.	The ***first step*** in BACT analysis is to consider ***pollutant applicability***. In other words, as we put together our list of control alternatives, ***what pollutants*** do we have to apply controls to?	1. Pollutant Applicability • What pollutants do we control?
58.	When dealing with a ***new*** major source, we must do BACT analysis for any pollutant regulated under the Act that is emitted in a ***significant quantity***.	**New Major Sources** • regulated pollutants • emitted in significant quantities
59.	At a major modification, any regulated pollutant emitted in a ***significantly increased*** amount calls for BACT analysis. These are the same significance levels we talked about in the last lesson—when we discussed Tests Two and Three for PSD review applicability.	**Major Modifications** • regulated pollutants • emitted in significantly increased amounts

Slide	Script	Selected Visuals

60. Remember from Lesson Two that we have to add up ***all*** emissions—stack and fugitive—of ***each*** regulated pollutant. If the total for the whole source is significant, that pollutant gets BACT analysis.

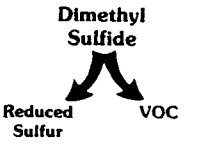


61. In adding up new emissions or increases by pollutant classification, we have to keep in mind something that isn't obvious at first glance. This is that some substances can fall into ***more than one*** pollutant category.

Some Substances

- more than one pollutant category

62. For example, take dimethyl sulfide, a not unusual emission. It's a reduced sulfur compound, so it has to be totalled under reduced sulfur. But it's ***also*** a volatile organic compound or VOC, so it has to be totalled again with all the other VOCs.



63. Closely connected with Step One—***pollutant*** applicability—is ***Step Two—emissions unit*** applicability. Our question here is: ***which emissions units*** does the BACT analysis have to deal with?

2. Emissions Unit Applicability

- **Which emissions units must be analyzed?**

64. The answer calls for close attention. For ***new*** major sources each emissions unit that emits ***any amount*** of a regulated pollutant has to apply BACT.

New Major Source

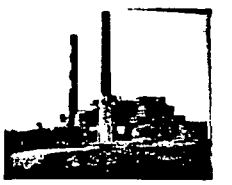
- any unit that emits any amount of a regulated pollutant

65. For ***modified*** sources, each modified unit that has ***any increase*** of a regulated pollutant has to apply BACT.

Major Modification

- any unit that shows any increase in emissions of a regulated pollutant

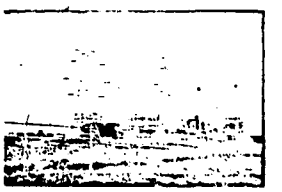
66. Notice that we said ***any*** emissions or ***any*** increase. Because ***each*** regulated pollutant has to be analyzed, we'll find many emission units—like fuel burning operations—that require BACT analysis for ***several*** pollutants.

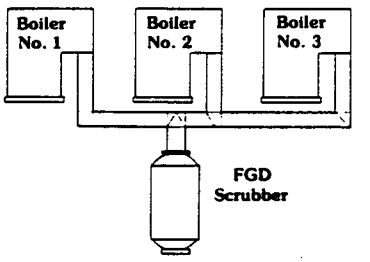


67. Also remember that it isn't just the neat well-behaved emissions and emissions units that need analysis. Sources of ***fugitive emissions*** have to be dealt with, too.

Fugitive Emissions

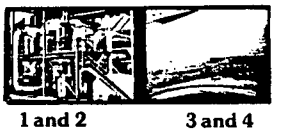
Slide	Script	Selected Visuals
68.	There are several important examples of fugitive emissions. For example, —Storage piles of coal, limestone, or other materials;	
69.	—Outdoor conveyor belts;	
70.	—Storage tanks for volatile organic liquids; and	
71.	—Valves and pumps that carry volatile organic compounds.	
72.	Usually, fugitive emissions from sources like these are affected by the weather. This makes them hard to ***quantify.***	
73.	Since this means that emission ***limits*** will also be hard to spell out in definite numbers, BACT for these fugitive sources generally takes a special form. Where ***quantifiable emission limits*** cannot be set, BACT is usually an ***equipment*** (design) standard, or a ***work practice*** standard, or both.	BACT may be: • equipment standard • work practice standard
74.	Don't forget, however, that for ***stack*** emissions—where rates are easier to quantify—BACT has two components. The analysis will produce an ***equipment*** standard, or a ***process*** (operation) standard, or both. Tied to what the analysis says the devices or operations can do will be Federally enforceable limits on allowable emissions from each unit. It is desirable to have both an emission standard and equipment or process standard where possible.	 • equipment standard • process standard • enforceable limits

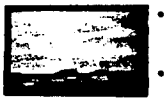
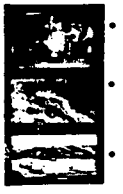
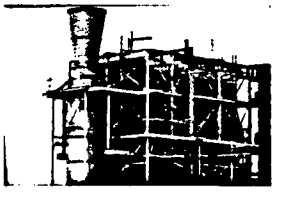
Slide	Script	Selected Visuals
75.	However, there ***are*** some exemptions from counting and analyzing emissions for BACT. Emissions units that produce only ***secondary*** emissions are exempt from BACT analysis. Remember that secondary emissions ***result*** from building or running the major source or modification, but ***don't come*** directly from it.	**Units producing only secondary emissions** • exempt from BACT analysis
76.	However, secondary emissions ***do not*** include: emissions from ships, trucks, and cars not on the plant site, taking goods or people to and from it.	
77.	And an example of secondary emissions that ***generally don't*** require BACT analysis are: increased emissions from a power plant due to greater electric demand, when the power plant is ***not*** part of the source.	
78.	But the applicant has to keep track of secondary emissions for a later stage of analysis. When we get to the Air Quality Analysis stage, we have to check whether secondary emissions threaten air quality ***standards*** or would consume an allowable ***increment.*** If secondary emissions ***present*** such a threat, control will have to be applied to eliminate that threat.	**Do secondary emissions threaten air quality standards?**
79.	When you put together the results of Step One—pollutant applicability—and Step Two—emissions unit applicability—you wind up with a lot of pieces of information. To deal with that information in a reasonable way, you have to put it into a form that makes sense.	
80.	There is no ***one best*** way to group emission units for the rest of BACT analysis. There is a general principle, however. ***Similar*** emissions units should be analyzed together.	**Similar emissions units should be analyzed together.**
81.	They may be "similar" because they're the same type of device, because they have similar kinds and amounts of emissions, or because they can use the same general kind of control.	**"Similar"** • same type of device • similar kinds and amounts of emissions • can use the same general kind of control

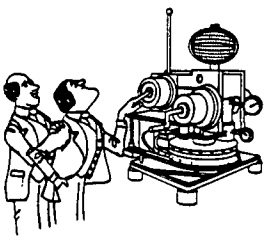
Slide	Script	Selected Visuals
82.	By treating similar units together, the applicant can usually cut control costs through "economies of scale."	• grouping similar units ⬇ • lower control costs
83.	For example, a source with ***three*** boilers as separate emissions units could plan ***one*** flue-gas desulfurization system to serve all three. The larger system should cost less—both to build and to operate—than three separate systems.	
84.	By applying Step One and Step Two, then grouping similar emissions units, we have assembled one kind of basic data for BACT analysis. This information has to do mostly with things ***inside*** the source.	**Steps** 1. Pollutant Applicability 2. Emissions Unit Applicability 3. Identification of Potentially Sensitive Concerns 4. Selection of Alternative Control Strategies
85.	In the next lesson we will start looking ***outside*** the source—as we discuss Steps Three and Four.	**Steps** 1. Pollutant Applicability 2. Emissions Unit Applicability 3. Identification of Potentially Sensitive Concerns 4. Selection of Alternative Control Strategies
86.	(Credit slide)	BACT Analysis in the Application: I Technical Content: John Maroney Instructional Design: Monica Leslie Graphics: Betsy Huber Photography/Audio: David Churchill Narration: Rick Palmer
87.	(Northrop slide)	Developed and produced by: Northrop Services, Inc. under EPA Contract No. 68-02-3573
88.	(Northrop slide)	Based in part on the: 1980 PSD Workshops prepared for the U.S. Environmental Protection Agency Office of Air Quality Planning and Standards by TRW, Inc., Environmental Engineering Division with the assistance of Northrop Services, Inc under EPA Contract No. 68-02-3174
89.	(NET slide)	Northrop Environmental Training

SI:453
Lesson 5

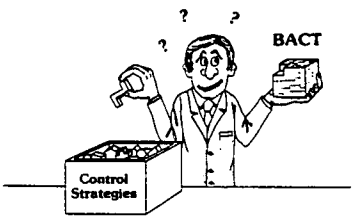
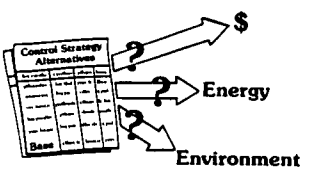
BACT Analysis in the Application: II

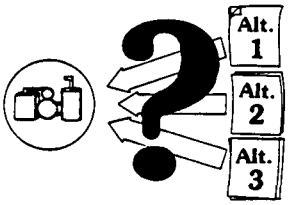
Slide	Script	Selected Visuals
1.	(Focus)	**FOCUS**
2.	This is Lesson Five, "BACT Analysis in the Application, Part Two."	**BACT Analysis in the Application: II**
3.	In the previous lesson, we outlined the overall shape of the Best Available Control Technology—BACT—Analysis. We emphasized that BACT Analysis is a ***case-by-case*** analysis done by the ***applicant***, and that it leads to ***emission limits*** for the new source or modification.	**BACT** • case-by-case • by the applicant • emission limits
4.	We talked about the ***four steps*** and ***three impact analyses*** that make up BACT Analysis. The ***four steps*** are: One, Pollutant Applicability Two, Emissions Unit Applicability Three, Identification of Potentially Sensitive Concerns, and Four, Selection of Alternative Control Strategies	1. Pollutant Applicability 2. Emissions Unit Applicability 3. Identification of Potentially Sensitive Concerns 4. Selection of Alternative Control Strategies
5.	The three impact analyses are: One, Economic Impacts Two, Energy Impacts, and Three, Environmental Impacts	• Economic Impacts • Energy Impacts • Environmental Impacts
6.	The criteria for measuring alternative control strategies are ***economic reasonableness*** and ***minimum undesirable impact*** on the environment.	**Alternative Control Strategies** • economically reasonable • minimal undesirable impacts
7.	At the end of the last lesson, we had finished describing Steps One and Two. They looked mostly at things ***inside*** the source. Now we're going to look more ***outside*** the source itself, as we go on to the remaining steps and the impact analyses.	 1 and 2 3 and 4
8.	Step ***Three*** is Identification of Potentially Sensitive Concerns. This means lining up a ***list*** of areas that can be affected by the source or modification. Estimation of the ***size*** of the effects comes later.	**3. Identification of Potentially Sensitive Concerns** • Which areas could be affected?

Slide	Script	Selected Visuals
9.	On the principle that "everything is connected to everything else," there could be an endless list of things that the source might affect. We need to narrow our list to concerns that are sensitive to operation of ***this*** source in ***this*** area.	 • this source • this area
10.	So our examination of potentially sensitive concerns is going to be ***very*** case specific.	• very case-specific • local area
11.	Looking at the ***local area***, we need to ask: "what effects can running this source have on local ***energy*** use, ***economics***, and ***environment***?" Whenever possible, we want to select measures of these effects that are ***quantifiable***—that tell us ***how much*** of an effect, not just "more" or "less."	What effects can source have on: • Energy • Economics • Environment
12.	All kinds of things could go on the potentially sensitive concerns list. The trick is to keep the list down to a manageable length, but count everything that's really important. Things that might go on the list for a given area could include: —labor supply, skilled or unskilled, —water availability and use, and —availability of certain fuels.	 • labor supply • water availability and use • availability of certain fuels
13.	At this point, we have a lot of data about the source and about the local area. Now we need to do something with it. That brings us to Step ***Four***, Selection of Alternative Control Strategies.	4. Selection of Alternative Control Strategies
14.	Of course, selecting control strategies is the meat of the BACT analysis. This is where engineering knowledge of the source, its various emissions units, and control techniques comes in. But we're not concentrating—in ***this*** course—on how to select appropriate control equipment.	
15.	What we want to know is how the applicant—given engineering expertise—arrives at ***best available*** control technology. And then, how the application supports the claim that the chosen strategy ***is*** BACT.	

Slide	Script	Selected Visuals
16.	The basic idea behind control strategy selection is that alternative control technologies should be ***technically feasible***. In practice, technically feasible controls are those that have been ***demonstrated*** to work. They have been tried and found to function efficiently on emission units just like the ones under study, or on similar units.	• technically feasible • demonstrated to work
17.	If the applicant plans to use control alternatives that ***haven't*** been demonstrated as technically feasible, but that might be ***more efficient*** and/or ***more economical*** than usual systems, these are ***innovative*** alternatives. The Clean Air Act and the regulations are set up to ***encourage*** use of innovative control technology.	
18.	What we're doing here is narrowing the scope of the analysis, trying to get a manageable set of alternatives to compare with each other. To have a "yardstick" for these comparisons, we need to set up a ***base case***.	**Base Case**

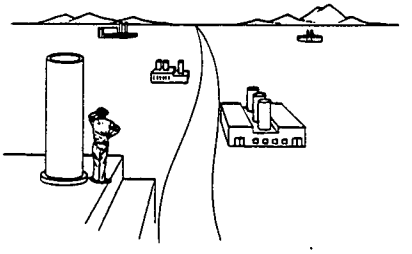
19.	The ***base case*** is the control strategy that would ***normally*** be applied to a source, if BACT were ***not*** required. The controls normally applied might be called for by:
	—other control regulations, State or Federal, or
	—the company's own practices, if they're stricter than what's required by non-PSD regulations.
		Base Case
		• normally used control strategy
		• called for by:
		  • other regulations
		  • company's own practices

20.	With a base case laid out, the applicant can arrange alternative control strategies by ***rank***. The rank order will be each strategy's control efficiency.	Applicant arranges control strategies by rank.
21.	This sounds as though lining up control strategies will automatically produce BACT. It won't. For one thing, there are usually several pollutants to deal with. A control that ranks high for, say, particulate matter isn't likely to rank as high for sulfur dioxide, for instance.	
22.	In addition, alternative control strategies still have to be analyzed for their economic, energy, and environmental impacts. So ranking control alternatives up from the base case is an important step in BACT analysis, but ***not*** the whole thing.	

Slide	Script	Selected Visuals
23.	It ***is*** possible that control strategy selection could stop with describing the base case. In some circumstances, the controls ***routinely*** applied will turn out to be the best available. Of course, the applicant will have to line up some ***strong*** evidence to prove this in the application.	**Sometimes routine controls are the best available.**
24.	Most of the time, however, there will be several alternatives for controlling regulated pollutants at the various emissions units. Information on these alternatives has to be assembled so that we're sure all reasonable possibilities are examined.	
25.	There are ***four*** kinds of alternative strategies that can be considered for any emissions unit. You won't always find one of each kind for each pollutant at each emissions unit, of course.	**4 Kinds of Alternative Strategies**
26.	The first—and most obvious—kind of control alternative is ***existing*** technology. This means control methods actually used on other units of the same type.	**4 Kinds** • existing technology
27.	The second kind—***transferable*** technology—is related to existing technology. It includes control methods used on units ***not*** exactly like the ones under analysis. These methods show promise of working efficiently when applied to ***this*** source.	**4 Kinds** • existing technology • transferable technology
28.	The third kind of control alternative is ***innovative*** technology. As we mentioned earlier, this includes control techniques that ***haven't*** been fully proven in routine use.	**4 Kinds** • existing technology • transferable technology • innovative technology
29.	The fourth kind of control alternative is an important one ***not*** to overlook. It is using a basic industrial process that is ***inherently lower polluting***.	**4 Kinds** • existing technology • transferable technology • innovative technology • inherently lower polluting technology
30.	An example is the ***dry*** precalcination process for manufacturing cement. It has significantly lower nitrogen oxide emissions than the alternative "wet" process.	**Cement Manufacturing** Wet Process → Dry Process Lower Emissions

Slide	Script	Selected Visuals

31. In looking for various kinds of control alternatives, the applicant has several places to look. The place that should come first to mind is the general locality of the proposed construction or modification. If BACT analyses have been made on similar facilities, and have been approved, then the earlier determinations are good guidance for a new analysis.



32. On a wider scale, EPA maintains a central "Clearinghouse" of BACT determinations—along with Lowest Achievable Emission Rate for nonattainment permits. Anyone putting together a list of control alternatives should check the BACT/LAER (lair) Clearinghouse Reports for similar cases.

EPA Clearinghouse on BACT/LAER Determinations

33. All of this useful information is what we said it was earlier, though—***guidance***. Since BACT is, by definition, determined case-by-case, what was BACT on an emissions unit in Oshkosh may ***not*** be on one just like it in Peoria.

Remember...

- Other determinations are only guidance.
- BACT is always case-specific.

34. That gets us through the four steps of assembling the data for the BACT Analysis. Remember, they were: Pollutant Applicability, Emissions Unit Applicability, Identification of Potentially Sensitive Concerns and Selection of Alternative Control Strategies.

1. Pollutant Applicability
2. Emissions Unit Applicability
3. Identification of Potentially Sensitive Concerns
4. Selection of Alternative Control Strategies

35. You should have noticed that a lot of work goes into these steps. We only suggested what ***kind*** of work, not what the details are. There's more work to be done now that the data's assembled.

36. With a reasonable list of alternative control strategies lined up, the applicant is ready to run three ***Impact Analyses*** on the alternatives. These are for: ***Economic*** Impacts, ***Energy*** Impacts, and ***Environmental*** Impacts.

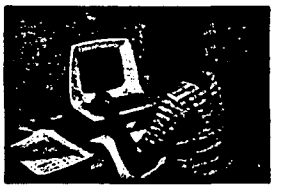
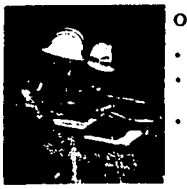
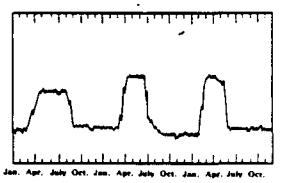
Analyses

- Economic Impacts
- Energy Impacts
- Environmental Impacts

37. This chart suggests how the impact analyses are set up. Don't get the idea that there's some official form like this somewhere to fill out. You ***will*** see charts like it summarizing parts of most applicants' BACT Analyses, of course. But also don't forget that you need a chart like this for ***each*** pollutant and ***each*** emissions unit—or small group of units—in the analysis.

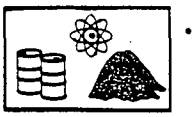
COMPARISON OF CONTROL ALTERNATIVES

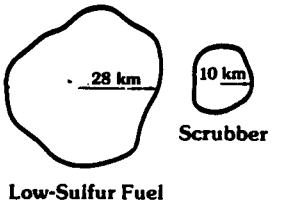
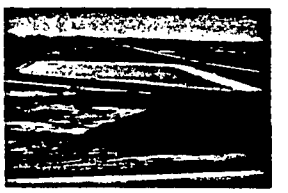
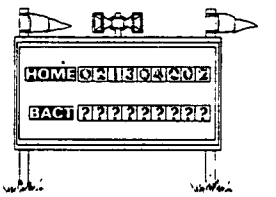
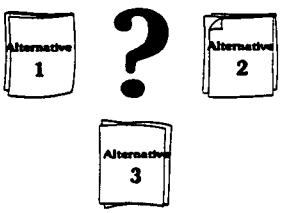
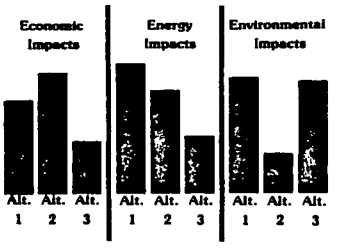
Alternative	Economic $/ton	Economic Other	Energy Btu/lb	Energy Other	Environmental Air Quality	Environmental Other
1						
2						
3						

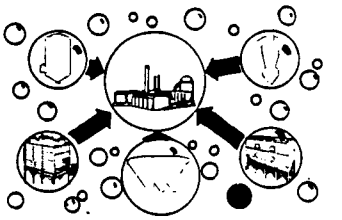
Slide	Script	Selected Visuals
38.	The first impact analysis within the BACT Analysis is ***economic***. In the Economic Impacts Analysis, the applicant makes an estimate of the ***approximate costs*** of different emission control alternatives.	**Economic Impacts Analysis** • estimate of approximate costs of different control alternatives
39.	There is a body of widely accepted techniques for estimating costs of engineering projects. These methods of engineering economics are generally applied to the BACT Economic Impacts Analysis.	
40.	The costs considered in estimating economic impacts of control alternatives are divided into ***capital costs*** and ***operating costs***.	• Capital Costs • Operating Costs
41.	The ***capital*** cost is the amount required to purchase and install the permanent equipment required for the control method. You can think of it as the "one-time" cost—but it usually gets paid in installments over a long period.	 Capital Costs • to purchase and install permanent equipment • "one-time" costs
42.	The ***operating*** costs are the ones that keep occurring. They pay for the labor, energy, and materials needed to keep the control process operating. Operating costs include normal day-to-day operations, routine maintenance, and some things you might not think of right away, like insurance premiums.	 Operating Costs • keep occurring • for labor, energy, and materials • normal day-to-day operations/ maintenance/etc.
43.	Remember that these control costs are being added up so that different methods can be ***compared*** with one another. This means that the costs have to be put in a format that allows comparison. One thing that must be done is to put all the costs on the same ***time*** basis.	
44.	Usually, all capital and operating costs are reduced to an ***annual*** basis. For some operations, there may be a cycle that makes more sense than the year. You have to use a combination of accounting methods and engineering principles based on experience to fit the costs into one time period.	

Slide	Script	Selected Visuals
45.	Another thing that has to be done to permit comparison of alternatives is to break out ***total*** and ***incremental*** costs.	**Costs** • Total • Incremental
46.	***Total*** cost is easy to grasp. It's ***all*** of the capital and operating expenses for each emissions unit, for one regulated pollutant.	**Total Cost** • all capital and operating expenses • for each emissions unit • for one regulated pollutant
47.	***Incremental*** costs measure how much is paid to reduce the ***last*** ton—or pound—of emissions. Both total and incremental costs can affect our judgement of what method produces more control for a given economic impact.	**Incremental Cost** • cost of reducing the last increment of emissions
48.	With the various costs of control alternatives lined up on a comparable basis, the economic impacts can be evaluated in terms of ***three factors***. They are: —pollution-specific costs, —additional product costs, and —ability to secure financing.	**Economic impacts evaluated in terms of:** • Pollution-Specific Costs • Additional Product Costs • Ability to Secure Financing
49.	It would be nice if costs assigned to each of these categories could be measured against a fixed yardstick. Unfortunately, there isn't one. However, there ***are*** ways of guiding judgements and of justifying choices among alternatives.	
50.	In the area of ***pollution-specific*** costs, many studies have been done on the dollar value of reducing a ton of emissions of a specific pollutant. Most of these studies have been for New Source Performance Standards, and are in the Background Information Documents for the standards.	**Pollution-Specific Costs** • studies done on $ value • found in Background Information Documents
51.	Studies used for pollution-specific cost appraisal will vary in reliability and applicability to the case at hand.	**Pollution-Specific Costs** • studies done on $ value • found in Background Information Documents • vary in reliability and applicability
52.	The BACT Analysis should cite and justify the studies used to develop pollution-specific costs.	**BACT Analysis should cite/justify studies used.**

Slide	Script	Selected Visuals
53.	The "bottom line" of the pollution-specific cost appraisal will be a comparison of ***estimated*** costs to control pollutant X with generally accepted ***reasonable*** costs for control of X.	**Cost Appraisal** Estimate: $ 5,000,000 Reasonable: $ 4,895,000
54.	The Economic Impacts Analysis looks at ***additional product costs***. These will be how much a control alternative ***adds*** to the price of the plant's finished products.	**Additional Product Costs** • how much a control alternative adds to the price of plant's finished product
55.	Additional product costs should be figured as a ***percentage*** of total manufacturing costs. This percentage can be used for comparison with the costs of other firms in the same market. If additional product costs put the applicant at a severe ***competitive disadvantage***, then this may justify preferring another control option.	**Additional Product Costs** • how much a control alternative adds to the price of plant's finished product • percentage
56.	The third item of the Economic Impacts Analysis considers ability to ***secure financing***. For most products, this is critical. Dollars and cents will count on this item, but other things will, too. The applicant will have to estimate how money lenders would judge the firm's ability to pay back on time. This can depend on control reliability, product markets, money markets, and many other factors.	**Ability to Secure Financing** • estimate of how money lenders would judge firm's ability to pay back
57.	As you can see, the Economic Impacts Analysis takes into consideration several different economic aspects. It adds up both ***capital*** and ***operating*** costs of control alternatives. It lines these costs up in terms of ***three factors***, so the applicant can judge the values affected. The three factors are: —pollution-specific costs, —additional product costs, and —ability to secure financing.	**Economic impacts evaluated in terms of:** • Pollution-Specific Costs • Additional Product Costs • Ability to Secure Financing
58.	The second impact analysis is for ***energy*** impacts. The form of the Energy Impacts Analysis is a lot like the economic one, but instead of dollars, here we're concerned with units of energy consumption. The amounts posted to the account for each control alternative will be in Btu's, kilowatt-hours, or the like.	**Energy Impacts** • units of energy consumption • BTUs/kWh

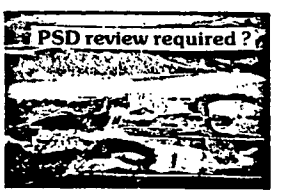
Slide	Script	Selected Visuals
59.	Only the ***direct*** energy impacts of a control alternative should be figured in. These energy requirements should be figured on a ***total*** and ***incremental***—per ton of reduction—basis, as for money costs.	• direct energy impacts • total • incremented
60.	Some forms of energy are easier than others to get in a given region. This means the Energy Impacts Analysis should look at what forms of energy a control alternative can use, and how much of those the region has available. For some applications, it will help to convert energy requirements to barrels of oil or tons of coal.	 • What forms of energy can be used?  • How much available in the region?
61.	We wrap up the impact analysis phase of the BACT Analysis with the ***Environmental*** Impacts Analysis. As we said before, this sounds like we're getting ahead of ourselves. The complete application will include detailed Air Quality and Additional Impacts Analyses. But right now we're looking at ***choices*** among several alternative control strategies. They have to be rated on the ***degree*** of their effect on the environment.	**Environmental Impacts** • degree of effect on environment
62.	***Detailed*** environmental assessment of the alternative chosen in the BACT Analysis will come later. One important aspect of that work will be air quality modeling. But an important part of our BACT Environmental Impacts Analysis is brief, comparative modeling of air quality effects of control alternatives.	• brief, comparative modeling of effects
63.	For each control alternative, we want to find the ***maximum ground-level concentrations*** of pollutants emitted. We also want to know the ***size*** of the area for which the pollutant impact is ***significant***. To simplify the problem, we normally use "worst-case" meteorology in the model.	For each control alternative: • maximum ground-level concentrations • size of area of significant impact • use "worst-case" meteorology for modeling
64.	This can get complicated, but look at a simple example. For a boiler, the choice is between low-sulfur fuel and a flue-gas desulfurization—FGD—scrubber. The FGD system produces much lower emissions. But the FGD stack plume is relatively cold—it reaches the ground sooner. The result is only a tiny difference in maximum ground-level concentrations of SO_2.	**AIR QUALITY COMPARISON** Control | Emissions | Impact ($\mu g/m^3$) | Impact Area (km) Low Sulfur Fuel | 1000 lb/hour | 45 | 28 FGD Scrubber | 400 lb/hour | 44 | 10

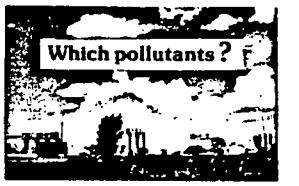
Slide	Script	Selected Visuals
65.	The big difference between the two controls is the size of the impact area. For low-sulfur fuel, the area of significant impact is 28 ***kil***ometers in radius. ***For the scrubber, the area has a 10 kilometer radius.*** That's a significantly smaller real impact, so the scrubber wins ***this*** comparison.	
66.	There are other environmental impacts that need to be accounted for. That scrubber we just discussed will produce sludge. Disposing of the sludge can affect water quality, land use, or both.	
67.	Just about any control alternative will have impacts on the environment—air, water, land—besides its emission reduction effects. These impacts have to be estimated, turned into hard numbers wherever possible, and used to rate control alternatives.	
68.	That brings us to the end of the ***outline*** of the BACT Analysis process. What you have seen is a description of how the applicant arranges data for the analysis, and what kinds of analysis get done. The frustrating part of an overview like this is that there's no ***one*** right answer, no overall BACT score.	
69.	The hard work in the BACT analysis is taking all the data combined into control alternatives and comparing them with one another.	
70.	The comparisons are made through the economic, energy, and environmental impact analyses. Control alternatives can score high on one analysis and low on another. Many combinations can be tried for even a medium-size source. The applicant has to ***judge*** what is better or worse. And then ***justify*** the judgement of what is BACT so the reviewing agency will agree.	

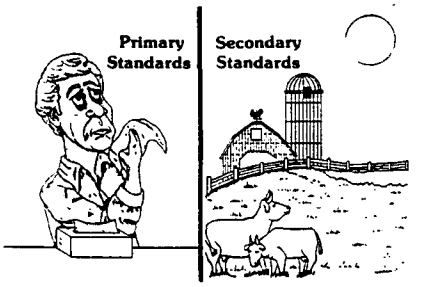
Slide	Script	Selected Visuals
71.	So we started Best Available Control Technology—BACT—Analysis with ***four steps*** of lining up data: —pollutant applicability, —emissions unit applicability, —identification of potentially sensitive concerns, and, —selection of alternative control strategies.	1. Pollutant Applicability 2. Emissions Unit Applicability 3. Identification of Potentially Sensitive Concerns 4. Selection of Alternative Control Strategies
72.	With the data assembled in alternative control strategies, the applicant is ready to run ***three analyses***: —economic impacts, —energy impacts, and —environmental impacts.	Analyses • Economic Impacts • Energy Impacts • Environmental Impacts
73.	By comparing the results of the analyses, pollutant by pollutant, for all the control alternatives, the applicant arrives at a set of controls for the whole source or modification. This is what goes into the application as BACT.	
74.	To get an idea of how the BACT analysis might be done on a simple case, briefly go over the example in the PSD ***Workshop Manual***. The example is on pages 1-B-14 through 37.	PSD Workshop Manual • pages I-B-14 through 37
75.	The emission rates and other data developed in the BACT analysis also go on to be the basis of the detailed analyses to follow. These are the ***Air Quality*** and ***Additional Impacts*** analyses. We will go on to them next.	• **Air Quality Impacts Analysis** • **Additional Impacts Analysis**
76.	(Credit slide)	BACT Analysis in the Application: II Technical Content: John Maroney Instructional Design: Monica Leslie Graphics: Leslie White Photography, Audio: David Churchill Narration: Rick Palmer
77.	(Northrop slide)	Developed and produced by: Northrop Services, Inc. under EPA Contract No. 68-02-3573
78.	(Northrop slide)	Based in part on the: 1980 PSD Workshops prepared for the U.S. Environmental Protection Agency Office of Air Quality Planning and Standards by TRW, Inc., Environmental Engineering Division with the assistance of Northrop Services, Inc under EPA Contract No. 68-02-3174

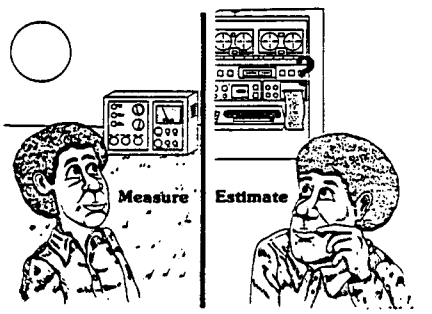
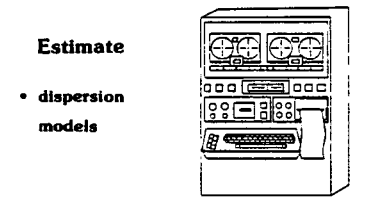
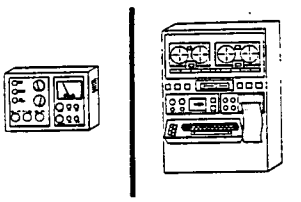
Slide	Script	Selected Visuals
79. (NET slide)		Northrop Environmental Training

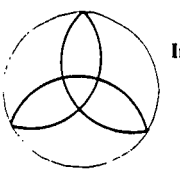
SI:453
Lesson 6
Air Quality Analysis: I

Slide	Script	Selected Visuals
1. (Focus)		FOCUS
2-5. (Introductory slides)		
		
		
		
6. This is Lesson 6, "Air Quality Analysis, Part One."		
7. In the lessons we just finished, we talked about determining ***whether*** PSD review had to be done for a new source or modification.		

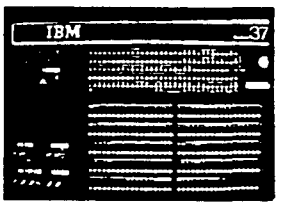
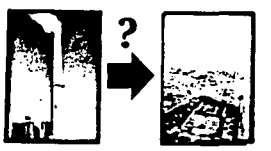
Slide	Script	Selected Visuals
8.	We saw how the applicant decides ***which pollutants*** the review has to deal with.	
9.	Then we went on to see how the applicant arrives at a set of ***emission limits*** which will reflect application of ***Best Available Control Technology*** — BACT.	
10.	All of this analysis so far has produced a large volume of data about the new source or modification ***itself***. Some of the source's ***impacts*** have been looked at, but mostly to feed back and adjust the source control strategy.	
11.	Now the application has become more solid. It describes new emission units with ***specific*** control devices — or processes — emitting ***specific amounts*** of pollutants per hour. If there are stacks, the stack height, exhaust gas velocity and temperature, and so on, are described in the application.	
12.	It is time to ***do*** something with all the data. The "something" has to do with the purposes of PSD programs we started out with. The Clean Air Act — and EPA's regulations under it — say that there are ***two*** ambient air quality measurements to be protected.	
13.	First — and most general — the new construction must not result in any violation of a National Ambient Air Quality Standard. We are concerned with these standards — NAAQS — for six ***criteria*** pollutants.	**Air Quality Analysis** **Must demonstrate:** • no NAAQS violation
14.	They are: total suspended particulate matter, sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone, and lead.	**Criteria Pollutants** • TSP • NO_2 • SO_2 • O_3 • CO • Pb

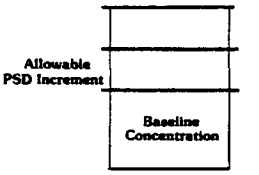
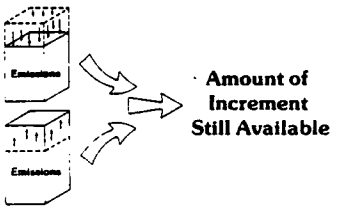
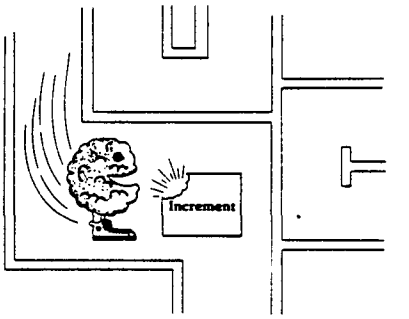
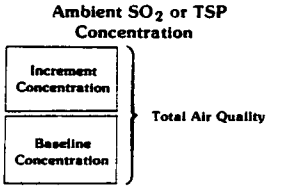
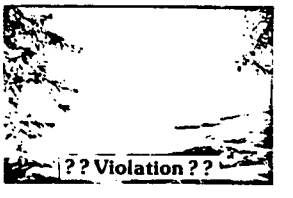
Slide	Script	Selected Visuals
15.	Remember that for each of these criteria pollutants, there can be a ***primary*** — health — standard and a ***secondary*** — welfare — standard.	
16.	Every standard has an ***averaging time*** over which measurements are taken. Any one pollutant can have both a primary and secondary standard for each of several averaging times.	ALLOWABLE CONCENTRATIONS ($\mu g/m^3$) Pollutant | Time Period | Controlling NAAQS | Class II Increment TSP • annual 75 19 • 24-hour 150 37 SO_2 • annual 80 20 • 24-hour 365 91 • 3-hour 1300 512
17.	The second requirement is that the new construction not cause a violation of an ***allowable increment.*** We mentioned in the first lesson that an increment is an ***increase*** in an ambient air quality concentration.	**Air Quality Analysis** **Must demonstrate:** • no NAAQS violation • no violation of allowable increments
18.	The Clean Air Act gives allowable increments for only total suspended particulate matter — TSP — and sulfur dioxide — SO_2. Besides these basic requirements — to protect the ***ambient standards*** for all ***criteria*** pollutants, and to protect ***increments*** for TSP and SO_2 — there is a more general requirement.	**Increments for only:** • TSP • SO_2
19.	This is to examine the effect on air quality of emissions of ***any*** pollutant regulated under the Clean Air Act.	**General Requirement** • to examine the effect on air quality of emissions of any pollutant regulated by the CAA
20.	The idea of air quality analysis centers on making ***decisions*** based on concentrations of pollutants in the ambient air.	**Decisions**
21.	We may be interested in ***standards*** reflecting the whole amount of pollutants to which people or things may be exposed. Or in ***increments,*** which are changes from what existed before. We can look at different pollutants, with concentrations averaged over different periods of time.	• Standards • Increments

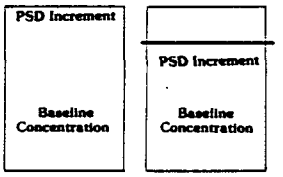
Slide	Script	Selected Visuals
22.	However, to make decisions based on concentration numbers, we have to ***get*** the numbers somehow. There are two basic ways to come up with the numbers—***measure*** or ***estimate.*** We may have measurements for the ***past***, and we can go out and do them for ***present.*** But if we want ***future*** concentrations to work on ***now,*** we have to estimate.	
23.	We ***estimate*** ambient air quality by using ***dispersion models.*** EPA provides dispersion models as an accepted method for predicting future air quality.	
24.	Both air quality ***monitoring*** and air quality ***modeling*** are highly technical arts. The PSD regulations lay down certain modeling and monitoring requirements for air quality analysis. They don't, however—in fact, they can't—tell the applicant ***how*** to do a step-by-step analysis of a particular proposal. Each PSD appliction is a different case.	
25.	This does ***not*** mean we can't lay down a general framework for air quality analysis, based on the regulations and experience. But, since a program of modeling and monitoring can involve many hours and dollars, the applicant needs to be careful.	
26.	A company planning to build a new major source in a remote area ***may*** have a fairly simple, straightforward air quality analysis situation.	
27.	One planning a major modification in an industrialized area is likely to find things more complicated. In either case, the applicant should get the reviewing agency to agree on an air quality analysis plan before spending a lot of time and money.	

Slide	Script	Selected Visuals
28.	Even after giving you all these cautions about air quality analysis being complex and case-by-case, there's still a lot that can be said about the process in general. We will describe ***five basic steps*** and ***three phases*** of the air quality analysis.	**Air Quality Analysis** • 5 Basic Steps • 3 Phases
29.	The purpose of organizing the analysis into these steps and phases is to have a ***systematic*** approach that will save as much time and money as possible.	**Systematic Approach** • saves time • saves money
30.	The ***five basic steps*** that we'll discuss further are: First. Define the ***impact area.*** This is the area affected by the new source or modification for ***each*** pollutant analyzed.	**Five Steps of Air Quality Analysis** • Define impact area
31.	Second. Establish ***inventory*** of other sources. For each pollutant analyzed, you need a quantitative listing of ***all*** sources adding to its concentration in the impact area.	**Five Steps of Air Quality Analysis** • Define impact area • Establish inventory of other sources
32.	Third. Determine ***existing*** ambient concentrations—for each pollutant in the analysis.	**Five Steps of Air Quality Analysis** • Define impact area • Establish inventory of other sources • Determine existing ambient concentrations
33.	Fourth. Perform ***screening*** analysis. That is, a fast and inexpensive modeling using very conservative assumptions. If this shows no problems, the next step can be much simpler.	**Five Steps of Air Quality Analysis** • Define impact area • Establish inventory of other sources • Determine existing ambient concentrations • Perform screening analysis
34.	And fifth. Determine projected air quality level. With an air quality dispersion model, ***project*** ambient concentrations of each pollutant analyzed.	**Five Steps of Air Quality Analysis** • Define impact area • Establish inventory of other sources • Determine existing ambient concentrations • Perform screening analysis • Determine projected air quality level
35.	To apply these steps of analysis, we divide the whole task of analysis into ***three phases.*** It depends on what pollutants we're looking at whether—and how extensively—any one phase applies. The phases don't separate out neatly, because doing some of the steps for one phase will overlap with another.	 **Three Interrelated Phases**

Slide	Script	Selected Visuals
36.	The three interrelated ***phases*** of air quality analysis are: One. Analyze increment consumption. How much of the available increment for TSP and SO_2 will be used by the new source or modification?	Air Quality Analysis • analyze increment consumption
37.	Two. Determine existing air quality. What are ***present*** values for ***all*** pollutants subject to the analysis? This can involve the use of ambient air monitoring or modeling where ambient data are not available.	Air Quality Analysis • analyze increment consumption • determine existing air quality
38.	And three. Project ***future*** air quality. This will involve dispersion modeling based on data from everything that went before. The air quality will have to be predicted at least for all the ***criteria*** pollutants involved in the analysis. The reviewing authority may decide that concentrations of some ***other*** pollutants have to be projected.	Air Quality Analysis • analyze increment consumption • determine existing air quality • project future air quality
39.	Before we go on to some of the details of air quality analysis, we need to examine a few more terms. These have to do with ***baseline concentrations*** and ***baseline areas.***	• Baseline Concentrations • Baseline Areas
40.	We have to deal with ***baselines*** because PSD is concerned with significant ***change.*** Change has to be measured from conditions at a certain point in time for a specific area.	Change Baseline ?
41.	Complications arise because things start from different points for different areas with several pollutants. Scarcity of data can add to the complexity.	
42.	When we talk about "significant deterioration" of air quality, we mean an ***increase*** in the ambient concentration of some pollutant. But an increase ***from what?*** The ***baseline concentration*** is the ambient concentration—of TSP or SO_2, remember—over which ***increment*** is figured for each of these two pollutants.	
43.	Baseline, increment, and total ambient concentrations are related by a simple-looking equation. In principle, it is: ***increment*** plus ***baseline*** equals ***total*** concentration. If you know any two, you can get the third by addition or subtraction. However, in actual practice this is almost never the case.	Increment Concentration + Baseline Concentration Approximate Total Air Quality Theoretical Ambient SO_2 or TSP Concentration

Slide	Script	Selected Visuals
44.	What makes things more complicated is the special definitions of what counts for baseline concentration and increment consumption. Neither one is directly measured.	• Baseline Concentration • Increment Consumption
45.	***Baseline concentration*** is an ***adjusted*** ambient concentration. It is the adjusted ambient concentration of TSP or SO_2 in the PSD area at a baseline ***date***.	Baseline Concentration • ambient concentration • of TSP or SO_2 • at the baseline date
46.	That date is the first date after August 7, 1977 when the first ***complete PSD application*** is submitted for a major source or major modification in the area.	Baseline Date • after August 7, 1977 • date of first complete PSD application
47.	To get the baseline concentration from existing ambient monitoring data, ***adjustments*** have to be made. To adjust concentration measurements, you have to do air quality modeling—more or less sophisticated—to apply effects of ***emission changes*** to what was measured. If ambient measurements ***already*** reflect these changes, of course, they aren't counted again.	
48.	As we go over these adjustments, you'll see that they're related to the adding up—netting—of emissions. But keep clearly in mind that what we're interested in now is the ***effect*** of emission changes on ambient ***concentrations***.	
49.	The baseline concentration has to be adjusted for two kinds of emission changes. The first kind is ***actual*** emission changes that result from construction at ***major*** stationary sources. If this construction commenced ***after*** January 6, 1975, then the emissions consume the increment.	 Emission Changes • Actual • Construction Commenced • after 1/6/75 and before baseline date
50.	The second kind of emission changes figured into baseline concentration are ***projected*** changes. They are the ***allowable*** emissions from ***major*** sources that commenced construction ***before*** January 6, 1975.	 Emission Changes • Projected • Construction Commenced • before 1/6/75 • not operating by the baseline date

Slide	Script	Selected Visuals
51.	The baseline ***concentration*** gives us a foundation for building ***increment consumption.*** The increment—or increase—in TSP and SO_2 concentrations results from different kinds of emissions changes. The basic idea is that what ***doesn't*** count for adjusting baseline ***does*** count toward using up increment.	
52.	So, the amount of increment still available is changed by emissions increases or decreases that result from construction at ***major*** sources. These changes count if they occur ***after*** January 6, 1975.	
53.	Also, emissions increases and decreases from ***all*** stationary sources increase or decrease the amount of increment available, if the emissions ***changes*** take place ***after*** the baseline date.	
54.	The basic intent of the Clean Air Act is to apply ***actual*** increases or decreases in emissions to determine how much increment remains available. This isn't always possible, however. Where actual operating data just isn't available, ***allowable*** emission rates may be used in increment calculations.	**Available Increment** • actual increases/decreases • allowable emission rates
55.	We've already said that ***total*** ambient concentration is the sum of ***baseline*** and ***increment*** concentrations. By addition or subtraction, you can get any one from the other two. But often, it is hard to get exact numbers for one or more of these values.	
56.	What the applicant is really interested in—and what the reviewing agency is checking for—is whether new emissions will result in either of two kinds of ***violation.*** Emissions from the proposed source or modification must not cause a violation of the allowable ***increment.*** They must also not result in a violation of any National Ambient Air Quality Standard.	

Slide	Script	Selected Visuals
57.	Very often, it's possible to check for NAAQS and allowable increment violations without knowing the exact baseline concentration.	
58.	That brings us to the question of what these limits—the ambient standards and allowable increments—are.	What are the limits?
59.	Remember, for the moment we're talking only about particulate matter and sulfur dioxide.	TSP, SO_2
60.	The National Ambient Air Quality Standards are set by EPA for each of the ***criteria*** pollutants. They can be primary or secondary, and be for different ***averaging times.***	NAAQS • set by EPA • for criteria pollutants • primary or secondary • for different averaging times
61.	As an absolute limit on deterioration of ambient air quality, we're interested in the ***lowest*** ambient standard, whether it's primary or secondary. For brevity, we'll refer to that lowest concentration as the "controlling" NAAQS.	"Controlling" NAAQS • lowest ambient standard • primary or secondary
62.	This table gives a quick summary of typical limiting concentrations. On the left, we have the "controlling" NAAQS—whether primary or secondary—for TSP and SO_2 for different averaging times. On the right, we've picked the Class II increments as the most usual limits on increases in ambient concentrations.	ALLOWABLE CONCENTRATIONS ($\mu g/m^3$) Pollutant / Time Period / Controlling NAAQS / Class II Increment TSP • annual 75 19 TSP • 24-hour 150 37 SO_2 • annual 60 20 SO_2 • 24-hour 365 91 SO_2 • 3-hour 1300 512
63.	Remember that we said that every PSD area in the country is ***classified*** as Class One, Two, or Three. There are different ***allowable increments*** for each PSD Class.	ALLOWABLE PSD INCREMENTS ($\mu g/m^3$) Pollutant / Time Period / Class I / Class II / Class III TSP • annual 5 19 37 TSP • 24-hour 10 37 75 SO_2 • annual 2 20 40 SO_2 • 24-hour 5 91 182 SO_2 • 3-hour 25 512 700
64.	As you can see, the ***smallest*** allowable increases are set for Class ***One*** areas. These areas are typically national or international parks, wilderness areas, and other areas of natural or scenic value.	ALLOWABLE PSD INCREMENTS ($\mu g/m^3$) Pollutant / Time Period / Class I / Class II / Class III TSP • annual 5 19 37 TSP • 24-hour 10 37 75 SO_2 • annual 2 20 40 SO_2 • 24-hour 5 91 182 SO_2 • 3-hour 25 512 700

Slide	Script	Selected Visuals

65. The Clean Air Act automatically put into Class ***Two*** those areas that weren't on the ***mandatory*** Class One list. As you can see, Class Two areas can accept considerably larger increases than can Class One.

ALLOWABLE PSD INCREMENTS ($\mu g/m^3$)

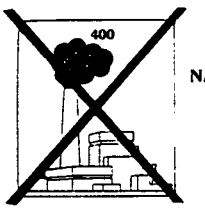
Pollutant	Time Period	Class I	Class II	Class III
TSP	• annual	5	19	37
	• 24-hour	10	37	75
SO_2	• annual	2	20	40
	• 24-hour	5	91	182
	• 3-hour	25	512	700

66. We mentioned in Lesson One that the States have to take special legal action to ***re***designate Class ***Two*** areas to Class ***Three.*** Class Three areas can accept larger increments than can Class Two or One. This ***can*** mean that more industrial development is possible in Class Three areas.

ALLOWABLE PSD INCREMENTS ($\mu g/m^3$)

Pollutant	Time Period	Class I	Class II	Class III
TSP	• annual	5	19	37
	• 24-hour	10	37	75
SO_2	• annual	2	20	40
	• 24-hour	5	91	182
	• 3-hour	25	512	700

67. It's very important to remember, however, that new emissions must ***not*** take the area over ***any*** National Ambient Air Quality Standard.



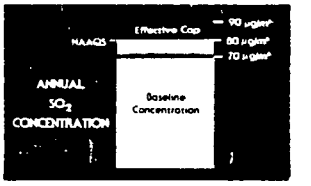
NAAQS = 365 $\mu g/m^3$
(SO_2 24-hr.)

68. Let's look at what the dual limitations of allowable increment and NAAQS mean in one simple case. We'll consider sulfur dioxide limits in a Class Two PSD area.

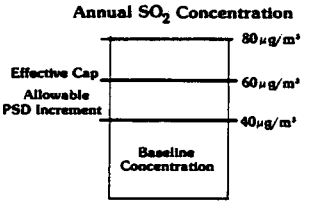
Dual Limitations

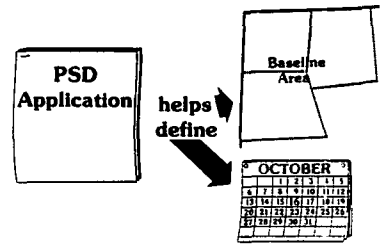
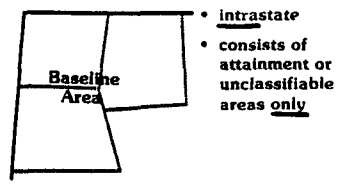
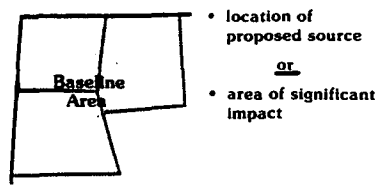
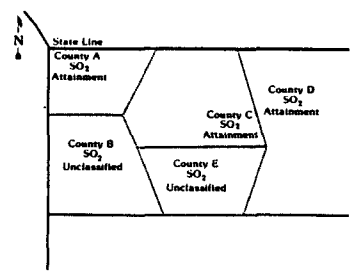
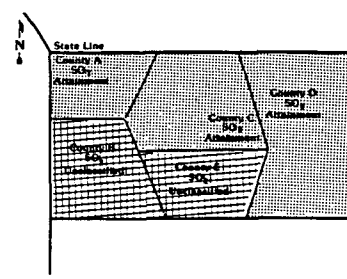
- **Allowable Increment**
- **NAAQS**

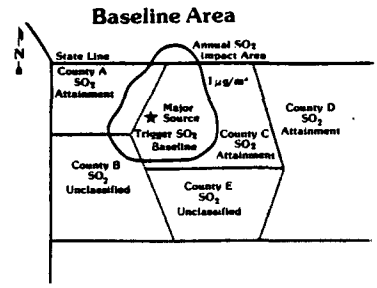
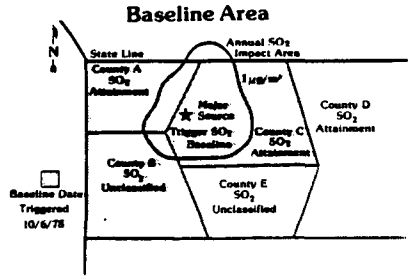
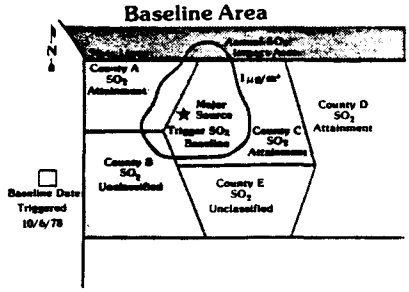
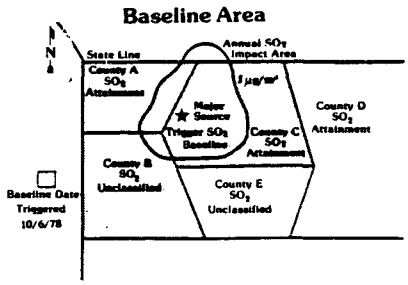
69. First, suppose that the ***baseline*** concentration is ***70*** micrograms per cubic meter, annual average, for SO_2. The allowable annual increment for SO_2 in a Class Two area is ***20*** micrograms per cubic meter. 70 plus 20 gives us 90. Does that mean that we can add enough emissions to take the ***projected*** annual ambient SO_2 reading to 90 micrograms per cubic meter? ***No.*** We have an "effective cap" at the primary NAAQS of ***80*** micrograms per cubic meter. Projected annual concentrations can't go past the controlling NAAQS.

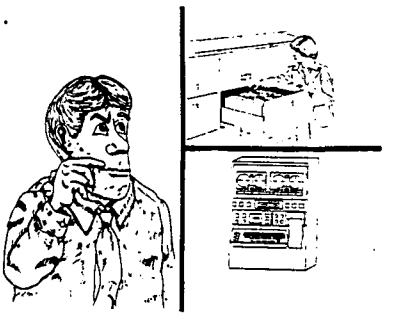
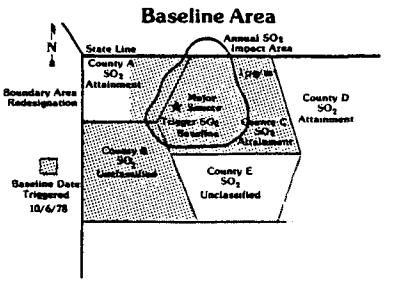


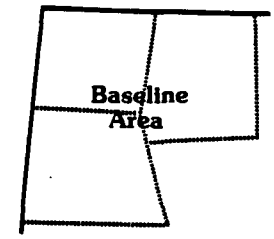
70. Now, suppose the baseline for the same area is computed at ***40*** micrograms of SO_2 per cubic meter, annual average. This time, an increase of the allowable increment—20—gives us an SO_2 concentration of ***60*** micrograms per cubic meter. This ***60*** is the "effective cap" in this case. The space between that cap and the NAAQS is the part of the "air resource" that the Clean Air Act is protecting from significant deterioration.



Slide	Script	Selected Visuals
71.	The last item that we're going to discuss by way of preliminary, before we start outlining the Air Quality Impacts Review process, is ***baseline area.*** We were taking it for granted, when we talked about baseline ***concentration*** and ***increments,*** that we knew what area these concentrations were measured or modeled over.	**Baseline Area**
72.	What happens when the first source after August 7, 1977 makes a complete PSD application is that it helps define the baseline ***area,*** as well as set the baseline ***date.***	
73.	The concept of baseline area starts out fairly simple. First, the baseline area is ***intra***state—it doesn't cross State lines. Second, it's made up ***only*** of areas designated ***attainment*** or ***unclassifiable.*** Usually, these are smaller than whole Air Quality Control Regions.	
74.	Third—and this introduces some complications—the baseline area is where the proposed source or modification is located, ***or*** will have a ***significant impact.***	
75.	For this purpose, a ***significant*** impact is a concentration increase of at least ***one microgram*** per cubic meter, annual average.	**Significant Impact** • concentration increase of at least 1 $\mu g/m^3$, annual average
76.	To illustrate how a source creates a baseline area, let's take a simple example. We'll look at a 5-county area at the western end of an imaginary State. We'll talk only about SO_2 status for this example.	
77.	This State has—until now—designated its attainment and nonattainment areas on a county-by-county basis. All five western counties are PSD areas. Counties A, C, and D are ***attainment,*** and B and E are ***unclassifiable.***	

Slide	Script	Selected Visuals
78.	On October 6, 1978, a new major source files a complete PSD application to the permit reviewing agency. The application proposes construction in County C, with significant sulfur dioxide emissions. Since County C is a PSD area—attainment—the baseline date is triggered everywhere in County C. But ***other*** areas also come into the baseline area.	
79.	Air quality dispersion modeling shows that the proposed source will have a significant impact—at least one microgram per cubic meter—inside the line shown on the map. This irregular area overlaps Counties A and B, and the neighboring State on the north.	
80.	The definition says the baseline area (shown in blue) is ***intra***state, so this application does ***not*** trigger the baseline date in the State to the north. The ***impact*** of the source may have to be accounted for, though. We'll deal with that question later.	
81.	Counties A and B become part of the same baseline ***area*** as County C. Baseline concentrations, emission changes, and increment consumption for all three will be figured from October 6, 1978.	
82.	This is a good time to recall something we said in passing earlier. We are going to count ***increment consumption*** in this baseline ***area*** from the baseline ***date*** for certain kinds of emission changes.	**Count increment consumption:** • in baseline area • from baseline date • for certain changes
83.	These changes will include major source construction and modification commenced after January 6, 1975, ***plus all other*** emission changes that occurred since the baseline date.	• major source construction/modification • plus all other emission changes since baseline date

Slide	Script	Selected Visuals
84.	This business of different starting dates and affected areas, with different classes of emission changes, can get complicated. But in real situations, the agency can set up a tracking system which will account for what changes count against what increments, and where.	
85.	Finally, look at the western part of County A. Some of it is not inside the area where the proposed new source has a significant SO_2 impact. If the State wanted to—and there might be good reason to want to—it could redraw the "attainment-nonattainment" area boundaries. Our map shows one simple change in County A. Its western half has been made a new, separate, designated area.	
86.	This is a new PSD area. It would probably be attainment. If reliable air quality data had been available for only the eastern part of the county, the new area ***might*** be unclassifiable. At any rate, it is ***out***side of the significance area for the proposed new source. This means the baseline date has ***not*** been triggered for this new area, for SO_2. It will go along under ***pre***baseline rules until a complete PSD application triggers ***its*** baseline.	
87.	As usual for the topic of PSD, carefully setting out preliminary ideas has taken a lot of explaining. We began this lesson by talking about what the PSD program has to protect—the National Ambient Air Quality ***Standards*** and the allowable ***increments*** for TSP and SO_2.	**PSD program protects:** • NAAQS • allowable increments for TSP and SO_2
88.	Then we went on to break the Air Quality Analysis process into ***five basic steps*** and ***three*** phases.	**Air Quality Analysis** • 5 Steps • 3 Phases
89.	The five ***steps*** are: —Define the ***impact area,*** —Establish ***inventory*** of other sources, —Determine ***existing*** ambient concentrations, —Perform ***screening*** analysis, and —Determine ***projected*** air quality.	**Five Steps of Air Quality Analysis** • Define impact area • Establish inventory of other sources • Determine existing ambient concentrations • Perform screening analysis • Determine projected air quality level

Slide	Script	Selected Visuals
90.	The three overlapping ***phases*** are: —Analyze increment consumption, —Determine existing air quality, and —Determine projected ***future*** air quality.	**3 Phases (overlapping)** • Analyze increment consumption • Determine existing air quality • Determine projected future air quality
91.	Then we talked about ***baseline concentration*** and how it relates to the National Ambient Air Quality Standard and the allowable increment.	**Baseline Concentration**
92.	We finished this lesson with an explanation of the ***baseline area.*** It is the area where the baseline ***date*** is triggered—for one or more pollutants—by a complete PSD application. This ***baseline area*** is basically administrative—it's where certain ***rules*** for tracking emission changes and increments apply. Be careful to keep it separate in your mind from the ***impact*** area that we'll discuss first in the next lesson.	
93.	In the next lesson, we'll outline how the steps and phases of the Air Quality Analysis are applied by the applicant in a PSD application.	**Next ...** **How steps/phases are applied in a PSD application.**
94.	(Credit slide)	**Air Quality Analysis: 1** Technical Consent: John Maroney Instructional Design: Monica Leslie Graphics: Leslie White Photography/Audio: David Churchill Narration: Rick Palmer
95.	(Northrop slide)	Developed and produced by: **Northrop Services, Inc. under EPA Contract No. 68-02-3573**
96.	(Northrop slide)	Based in part on the: **1980 PSD Workshops** prepared for the U.S. Environmental Protection Agency Office of Air Quality Planning and Standards by TRW, Inc., Environmental Engineering Division with the assistance of Northrop Services, Inc under EPA Contract No. 68-02-3174
97.	(NET slide)	Northrop Environmental Training

SI:453
Lesson 7
Air Quality Analysis: II

Slide	Script	Selected Visuals
1. (Focus)		FOCUS
2-5. (Introductory slides)		   
6. This is Lesson Seven, "Air Quality Analysis, Part Two."		
7. In the previous lesson, we laid out the basic ideas involved in performing the Air Quality Analysis required in a PSD application. Now we are going to outline the steps which make up the analysis itself.		Air Quality Analysis

Slide	Script	Selected Visuals
8.	The emphasis here is on ***outline***, because the process is long, involved, and potentially expensive. Air Quality Analysis ***may*** involve designing, building, and operating an air quality monitoring network. It ***usually*** involves extensive data gathering, planning for dispersion modeling, and running computer dispersion models at one or more levels of complexity.	**Air Quality Analysis** **Maybe** • designing, building, and operating a monitoring network **Usually** • data gathering • dispersion modeling
9.	We'll organize our discussion of the Air Quality Analysis process in terms of the ***five*** basic ***steps*** of the analysis. Recall that they are: —define the ***impact area*** —establish ***inventory*** of other sources —determine ***existing*** ambient concentrations —perform ***screening*** analysis —determine ***projected*** air quality.	**5 Steps** 1. Define the impact area 2. Establish inventory of other pollutant sources 3. Determine existing ambient concentrations 4. Perform screening model analysis 5. Determine projected air quality
10.	Each of these steps can have greater or lesser importance in any of the ***three phases*** of Air Quality Analysis. The ***phases*** address organizing the analysis data to meet the requirements of the PSD program. Remember that they can overlap, since doing one part of the analysis can answer several questions at once.	**3 Phases** • organizing the analysis data
11.	The three ***phases*** of analysis are: —analyze ***increment*** consumption, —determine ***existing*** air quality, and —project ***future*** air quality.	**3 Phases** 1. Analyze increment consumption 2. Determine existing air quality 3. Project future air quality
12.	The ***first*** step in Air Quality Analysis is defining the ***impact area.*** In the previous lesson, we looked at ***one*** kind of impact of a proposed new source or modification.	**1. Define the impact area**
13.	There, we wanted to know whether—for any one pollutant—the ***annual*** average concentration was predicted to increase by at least one microgram per cubic meter. In any PSD ***area*** where the predicted concentration increased by that much, the ***baseline date*** was triggered.	**For one pollutant...** **If:** annual average concentration increase ≥ 1 $\mu g/m^3$ **Then:** baseline date triggered
14.	Now, we have to look at air quality impacts for more than one ***pollutant,*** and more than one ***averaging time.***	**More than one...** • pollutant • averaging time
15.	We ask a somewhat complicated question—is there a ***significant*** impact from ***this pollutant*** for any ***averaging time*** for which an NAAQS is set?	**Is there significant impact?**

Slide	Script	Selected Visuals

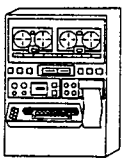
16. What we mean by ***significant*** impacts for different pollutants and averaging times is easiest to see in a table. For the pollutants listed, you can see that EPA has assigned a significance level for various averaging times. These times are those for which a national ambient standard is set.

Significant Impacts ($\mu g/m^3$)

Pollutant	Averaging Period				
	Annual	24-hour	8-hour	3-hour	1-hour
TSP	1	5	–	–	–
SO_2	1	5	–	25	–
NO_x	1	–	–	–	–
CO	–	–	500	–	2000

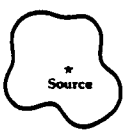
17. The applicant gets the data on concentrations of these pollutants from ***dispersion modeling***. An EPA ***recommended*** mathematical model is run, using the proposed emissions, for each of the averaging times that applies to each pollutant.

Dispersion Modeling

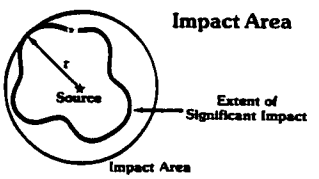


- recommended model
- using proposed emissions
- for each averaging time
- for each pollutant

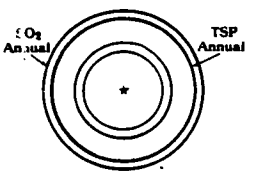
18. This gives an outline—usually irregular—of the area where source emissions produce at least the significant-impact levels of ambient concentration.



19. To simplify the rest of the Air Quality Analysis process, we make the impact area more regular. This is done by taking the source as a center, and drawing a circle around it with a radius equal to the greatest distance of a significant impact.



20. This still leaves us with a different circle for each pollutant and averaging time. When the differences are not ***very*** great, the applicant will usually consolidate impact areas. This is done by taking the largest of the impact-area circles that are ***close*** to the same size, and using it as the basis for emission inventory, modeling, monitoring, and so on.



21. We mentioned the use of dispersion modeling briefly earlier, under BACT Analysis. But now we're talking about beginning an extended and intensive modeling effort.

- extended, intensive modeling

22. Before undertaking such an effort, the applicant needs to make a ***plan*** and get the reviewing agency's agreement on it.

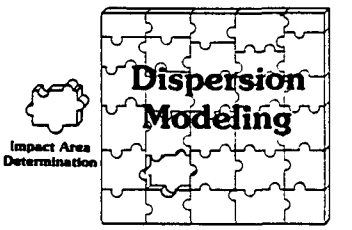
Slide	Script	Selected Visuals

23. As a minimum, for the modeling that determines the impact area, the applicant should get the reviewing agency to concur on three things:
    - —selection of an appropriate ***dispersion model,***
    - —use of ***meteorological data*** that are adequate and representative, and
    - —which ***techniques*** and ***assumptions*** will be used in the analysis.

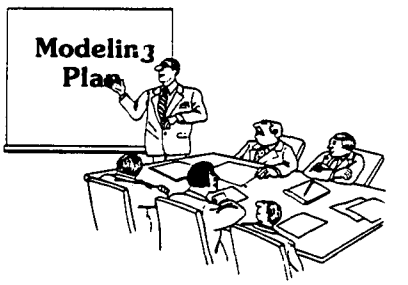
Reviewing agency must agree on...

- dispersion model
- meteorological data
- techniques/assumptions

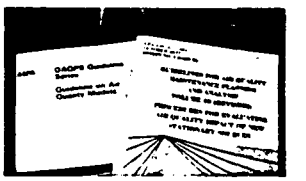
24. However, determining the impact area is only one part of the modeling effort that goes into the Air Quality Analysis. It should be ***consistent*** with the rest of the dispersion modeling activity. This will save effort, time, and money, and avoid later confusion.



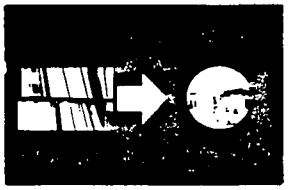
25. The best thing for the applicant to do before going ahead with any detailed dispersion modeling is to draw up a ***modeling plan*** or protocol, and get the reviewing agency to agree on it.



26. The modeling plan should be based on guidance in the latest versions of three EPA publications:
    - —***Guideline*** (revised) ***on Air Quality Models***,
    - —Regional Workshops on Air Quality Modeling: A Summary Report, and
    - —Volume Ten of the Guidelines for Air Quality Maintenance Planning and Analysis Series entitled ***Procedures for Evaluating Air Quality Impact of New Stationary Sources***.

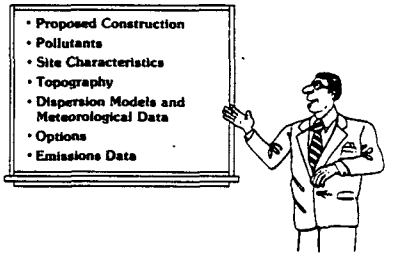


27. Published guidance ***can't*** cover the different circumstances of every new source or modification proposal. It is very important that the applicant make clear in the dispersion modeling plan the things that will affect how modeling will be applied in ***this*** proposal.



Slide	Script	Selected Visuals

28. The modeling plan should include ***at least*** the following items:
    - —the nature of the ***proposed construction,***
    - —the ***pollutants*** to be modeled,
    - —the ***site*** characteristics—such as buildings,
    - —the ***topography*** within fifty kilometers of the site,
    - —the ***dispersion models*** proposed for use, and the ***meteorological data*** to be used with them,
    - —the ***options*** to be used within the general dispersion models, and
    - —the ***emissions data*** to be "plugged into" the dispersion models.



29. On that ***last*** item, let's turn our attention back to impact area determination, and finish it up. There are two things to remember about the ***emission data*** from the proposed construction used to determine the impact area. They are: ***which*** emissions are included, and ***what rate*** should be used.

Emissions Data

- Which emissions?
- What rate?

30. The impact area determination must be based on ***all direct*** emissions from the new source or modification. These include ***stack*** emissions and ***quantifiable fugitive*** emissions. But ***temporary*** emissions—like those from construction activity—do ***not*** need to be included.

Which emissions?

- all direct emissions
  - stack
  - fugitive
- no temporary emissions

31. The emission ***rate*** used in impact area determination should be the "worst case." That will usually be the ***maximum*** rate. But the way the source operates—and things like stack velocity or temperature, and stack height—might produce higher concentrations at lower emission rates. An experienced modeler can usually check for suspicious spots in a "worst case" situation with calculations that can be done quickly by hand.

What rate?

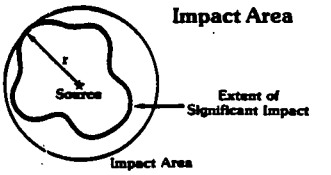
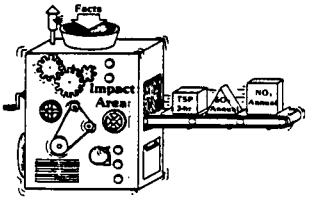
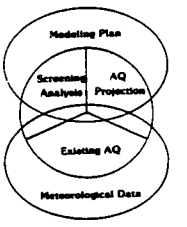
- "worst case" (usually the maximum)

32. ***Meteorological*** data will be used in the preliminary modeling for setting the impact area and in the later, more detailed modeling of the Air Quality Analysis itself.

33. The data used should be both ***representative*** and ***typical.***

Meteorological Data

- representative
- typical

Slide	Script	Selected Visuals
34.	***Representative*** means the meteorological data should ***represent*** the weather at or near the source. ***Typical*** means the data should cover a period of time when conditions are "normal" for the area—not a drought or a deluge, not a "dust bowl" year, for instance.	
35.	The actual measured meteorological data should come from one of two reliable sources, either: —site-specific meteorological monitoring, or —the National Weather Service station closest to the site.	Meteorological data should come from... • site-specific monitoring • nearby NWS station
36.	For ***on-site*** data, the applicant has to show that the meteorological data they have gathered are for one year prior to receipt of application, unless the reviewing authority determines that a shorter period is adequate.	Site-Specific Monitoring Data  • one year (or determined period)
37.	If the data are from a nearby representative National Weather Service station, ***five years*** of data will usually be required.	Site-Specific Monitoring Data  • one year (usually)  • five years
38.	That gets us through the outline of the first step in Air Quality Analysis—defining the impact area. You should notice things about this step that we mentioned earlier.	
39.	The process is fairly ***complicated.*** What will happen for any given proposal depends very much on the facts of that case. The applicant may find ***no*** significant impacts for some pollutants or averaging times. They may come up with ***different*** areas for several different pollutants and times.	
40.	Things done for impact area determination ***overlap*** with other steps. The ***modeling plan*** will cover screening analysis, air quality projection, and possibly ***existing*** air quality. The ***meteorological data*** will also apply to these other steps.	

MEMORANDUM
OF CALL

Previous editions usable

TO:

☐ YOU WERE CALLED BY– ☐ YOU WERE VISITED BY–

OF (Organization)

☐ PLEASE PHONE ▶ ☐ FTS ☐ AUTOVON

☐ WILL CALL AGAIN ☐ IS WAITING TO SEE YOU

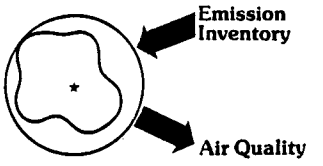
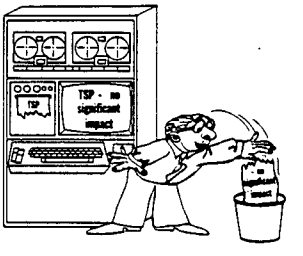
☐ RETURNED YOUR CALL ☐ WISHES AN APPOINTMENT

MESSAGE

RECEIVED BY	DATE	TIME

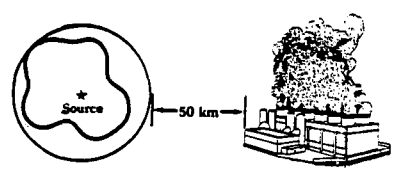
63-110 NSN 7540-00-634-4018 **STANDARD FORM 63** (Rev. 8-81)
Prescribed by GSA
FPMR (41 CFR) 101—11.6

☆ U.S.G.P.O.: 1984-421-529/409

Slide	Script	Selected Visuals
41.	The impact area itself is basic to the remaining steps of Air Quality Analysis. It is ***primarily*** for the impact area that the emission inventory is assembled, and air quality is measured or projected.	
42.	The ***second*** step in Air Quality Analysis is to establish an ***inventory*** of ***other*** pollutant sources.	2. Establish inventory of other pollutant sources
43.	The question immediately comes to mind—***What*** other sources? Where? For what pollutants? Somehow, the job of emission inventory has to be kept to a reasonable size, so it can be done adequately in the time available for a PSD application.	• What other sources? • Where? • What pollutants?
44.	Once again, the principle is to concentrate on things that make a ***difference.*** The answer to the question, "what pollutants?" is fairly straightforward. The inventory will cover those ***criteria*** pollutants that will have ***significant impacts.*** It may have to include ***non-criteria*** pollutants if there are—or could be—high concentrations of them, threatening public health or welfare.	Pb, CO, O_3, TSP, SO_2, NO_x • criteria pollutants that have significant impacts
45.	This again involves ***preliminary*** dispersion modeling in the process—mostly the modeling done to determine the impact area. Generally, if this modeling shows ***no significant impact*** from a criteria pollutant, that pollutant can be dropped from emissions inventory and other analysis requirements.	
46.	However, there's an important exception to this dropping of criteria pollutants from inventory and analysis. If the proposed source or modification is located near a ***Class One*** area, a full analysis may have to be made for any pollutant with more than a ***one microgram*** per cubic meter impact on the Class One area. This one-microgram impact is for a short averaging time—twenty-four hours. That makes it a pretty sensitive "trigger" for expanded review.	
47.	After deciding ***which*** pollutants to inventory, we still have questions of ***where, what sources,*** and ***how.*** To help decide these questions, we break the overall emissions inventory into ***three types.***	3 Types of Inventories

Slide	Script	Selected Visuals
48.	The size and nature of each ***type*** of emissions inventory will depend on the particular situation under study. The three types of inventory are: —***increment-consuming*** emissions of particulate matter and sulfur dioxide,	**3 Types of Inventories** • increment-consuming emissions of TSP and SO_2
49.	—all ***existing*** emissions that affect air quality in the impact area, and	**3 Types of Inventories** • increment-consuming emissions of TSP and SO_2 • existing emissions affecting air quality in impact area

50.	—any emissions from emission units that have ***permits,*** but aren't operating yet, ***if*** they will affect impact-area air quality.	**3 Types of Inventories**
		• increment-consuming emissions of TSP and SO_2
		• existing emissions affecting air quality in impact area
		• emissions from units with permits
		  • if not yet operating
		  • if will affect impact-area air quality

51.	We will discuss the requirements for the ***increment-consuming*** inventory in a little more detail than the other two. All emission inventories have some features in common. The most important are identifying ***emissions units*** and getting ***emission rates*** for them, for each pollutant covered.	**Common Features** • identification of emissions units • getting emission rates
52.	Doing an increment-consuming inventory assumes that we've reached the point where an air quality analysis is needed for ***TSP*** or ***SO_2***—or both. It also assumes that there is a ***significant impact*** for one or both of them.	**Increment-Consuming Inventory** • AQ analysis needed for TSP and SO_2 • significant impact
53.	The increment-consuming inventory should include all particulate matter and sulfur dioxide emissions, ***within*** the impact area, that can consume increment.	• TSP and SO_2 emissions, <u>within</u> impact area, that can consume increment
54.	It should also include emissions ***outside*** the impact area that may have a ***significant impact*** within the area.	• TSP and SO_2 emissions, within impact area, that can consume increment • emissions, <u>outside</u> impact area, that may have significant impact within area
55.	This can mean considering large sources as far as fifty ***kil***ometers away from the applicant's impact area.	

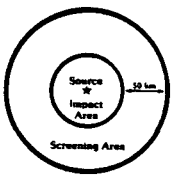
Slide	Script	Selected Visuals

56. It generally works out that for ***short-term*** increments—24-hour and 3-hour averaging times—only increment-consuming emissions ***within*** the impact area need counting. However, on an ***annual*** basis, large sources up to fifty ***kil***ometers away can have impacts inside the applicant's impact area.

Short-Term
- count emissions within

Annual
- consider sources outside

57. To determine which sources outside the impact area need to be counted, the applicant can set up an additional ***screening area.*** This area is a ring that extends up to fifty ***kil***ometers beyond the impact area.



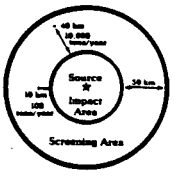
Emissions Inventory Screening Area

58. Only ***some*** of the sources in the screening area need to have their increment-consuming emissions inventoried. To decide ***which*** ones, the applicant considers:
    - —annual emissions of the source,
    - —potential ambient air quality impacts, and
    - —the source's distance from the impact area.

Sources in Screening Area

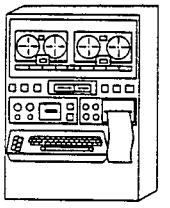
Consider:
- annual emissions
- potential impacts
- distance from impact area

59. For example, a source that emits ***one hundred*** tons per year, located ***ten kil***ometers from the impact area, could generally be dropped from the inventory. Its impact on air quality inside the area would be insignificant. But a ***ten thousand*** ton per year source at ***forty kil***ometers would probably have to be inventoried.



Emissions Inventory Screening Area

60. Those two examples are ***not*** intended to be rules of thumb. The applicant can apply a fairly simple ***screening model*** technique to sources outside the impact area.

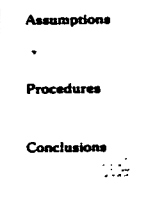


Screening Model

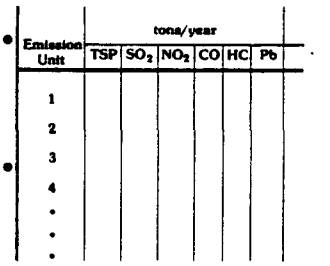
61. The results of the simple modeling procedure will indicate whether or not a source's emissions have to go into the emission inventory.

Slide	Script	Selected Visuals

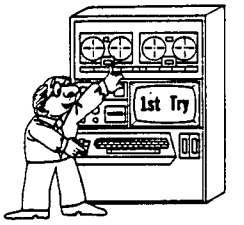
62. Like any other modeling application, this calls for a written record of assumptions, procedures, and conclusions. This ***documentation*** lets the reviewing agency check what's been done.



63. Within the impact area, and for the identified sources outside the impact area, the applicant prepares a list of ***emission units*** for the applicable pollutants. For each ***unit,*** an emission ***rate*** is needed, since the emission rate is one of the basic inputs to an air quality model.



64. For the first attempt at running the increment-consumption inventory and analysis, ***allowable*** emissions should be used. In most cases, ***allowable*** emissions—what regulations or permit conditions allow—will be greater than ***actual***, sometimes ***much*** greater.



- use allowable emissions

65. There are two reasons for using allowable emissions on the first try:
    - —it is easier to get allowable rates from State emission files, and
    - —analysis based on allowable rates will give more conservative results.

- easier to get allowable rates from State emission files
- will give more conservative results

66. These reasons are important because the air quality analysis should be ***reliable*** and ***economical.*** State emission files are the proper source for emission data in the application. If the applicant has to go beyond these files, the data will be less reliable and cost more time and money to get.

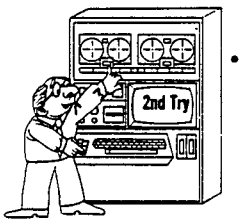
An AQ analysis must be...

- reliable
- economical

67. Also, a ***conservative*** analysis is usually less expensive and more persuasive. It says, "We can show we'll be in compliance with the regulations, even using ***pessimistic*** estimates." When this approach works, it saves the time and effort required to get more detailed actual information. And it indicates that there's a "margin of safety" in the compliance demonstration based on allowable emissions data.

A conservative analysis is...

- less expensive
- more persuasive

Slide	Script	Selected Visuals
68.	***But***—applicants ***can't*** always demonstrate they won't use up available increment, using ***allowable*** emissions data on other sources. In that case, another try must be made, using ***actual*** emissions data.	 • use actual emissions

69.	These are harder to get. Often, State engineering personnel and employees at other sources have to be interviewed. The applicant will have to build a ***reviewable record*** of where the actual data came from, and how.	• harder to get
		• must build reviewable record
		  • where data obtained
		  • how data obtained

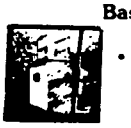
70.	The two other kinds of emissions inventory—***existing*** emissions, and expected ***permitted*** emissions—are generally similar to the increment-consuming inventory. They are compiled to show that no National Ambient Air Quality Standard will be violated.	3 Types of Inventories
		• Increment-consuming emissions of TSP and SO_2
		• existing emissions affecting air quality in impact area
		• emissions from units with permits
		  • if not yet operating
		  • if will affect impact-area air quality

71.	In both of these emissions inventories, we have to deal with ***all*** of the criteria pollutants that would have a ***significant impact*** from the proposed construction. This opens the list up from the TSP and SO_2 of the increment-consuming inventory. But it limits the inventory, too. The applicant has to inventory other sources' emissions ***only if*** the new source or modification will have a significant impact from emissions of those pollutants.	• all criteria pollutants that would have significant impact
72.	For the inventory of ***existing*** emissions, ***actual*** emissions should be counted, if actual data are available. This is to tie what is coming out of existing sources to what ambient air monitors would measure. Of course, for emissions units that have permits, but aren't operating yet, the only available emissions data are their potential to emit.	Inventory of Existing Emissions  • actual emissions, for operating sources • potential to emit, for sources not yet operating
73.	The ***third*** of the five steps in Air Quality Analysis is to ***determine existing ambient concentrations.***	3. Determine existing ambient concentrations
74.	Basically, this is a matter of ***monitoring*** ambient air quality, but ***adjustments***—using dispersion modeling—may be needed.	3. Determine existing ambient concentrations • monitoring air quality • but adjustments may be needed

Slide	Script	Selected Visuals

75. Ambient air quality monitoring is a major component of the art and science of air pollution control. We can't deal with it in detail here. Despite all the complications, we want to keep in mind that the ***basic purpose*** is to find out what is the ***existing situation*** that will be affected by the proposed change.

Basic Purpose



- determine existing situation

76. The regulations require the applicant to include up to ***one year*** of ***preconstruction*** monitoring data in the application. The pollutants that have to be monitored are any ***criteria*** pollutants the source would emit in ***significant amounts.*** This doesn't include nonmethane hydrocarbons. Some ***noncriteria*** pollutants ***may*** also have to be monitored, if the reviewing agency determines it is necessary.

One Year of Data (generally)

- preconstruction
- criteria pollutants
  - significant amounts (less NMHC)
- noncriteria pollutants—possibly

77. The general rule is that if the proposed new source or modification will have a ***significant increase*** in emissions of a pollutant, continuous monitoring data will be required. This not only includes air-quality data but may also include on-site meteorological data collection for input to an air quality dispersion model in the later Air Quality Analysis steps.

General Rule...

If:
proposed source/modification will have significant increase

Then:
continuous monitoring will be required

78. There are exceptions to keep this requirement from being too burdensome. The regulations list a set of air quality values and averaging times. If the source's ***predicted impact or*** the ***existing*** air quality readings are lower than these, the reviewing agency ***can*** say no monitoring is needed for that pollutant.

Exception

If predicted impact or existing readings are lower than listed values, reviewing agency can say no monitoring is needed.

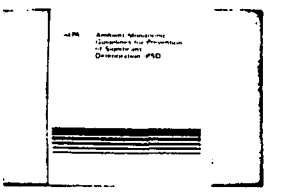
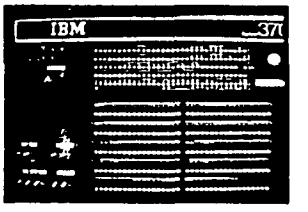
79. This exception means that before the applicant does anything else on monitoring, it should estimate ***source impacts*** and ***total existing*** air quality for the area.

- source impacts
- total existing air quality

80. There are ***two ways*** to satisfy the preconstruction monitoring requirements. ***First,*** the applicant can use ***existing*** continuous monitoring data collected by an air pollution control agency. ***Second,*** the applicant may have to conduct its own ***site-specific*** monitoring program. How much of each approach is used depends on the quantity and quality of available data.

2 Ways to Satisfy Requirements

- use existing monitoring data
- collect site-specific monitoring data

Slide	Script	Selected Visuals
81.	To decide ***when*** and ***where*** monitoring is required, ***what pollutants*** must be monitored, and ***whose*** monitoring data will be acceptable, the applicant must consider many factors. The reviewing agency also has to take part in making the monitoring decisions. These decisions will be based on the EPA regulations and on guidance in the ***Ambient Monitoring Guidelines for PSD.***	
82.	If the applicant is going to use ***existing*** monitoring data, it must make sure the data meet certain ***criteria.*** These criteria are: —One, sufficiency, or completeness, —Two, representativeness, and —Three, reliability.	**Criteria for Existing Data** • sufficiency/completeness • representativeness • reliability
83.	Air pollution control agencies—Federal, State, and local—have been gathering air quality data for years. But the data on file may not meet the requirements of PSD Air Quality Review. Using the ***Guideline,*** the applicant and reviewing agency must check whether the data meet the criteria.	
84.	Are there ***enough*** data for analysis? Do they ***represent*** the source site and impact area? Can they be ***relied*** upon?	• Enough data for analysis? • Do they represent site/ impact area? • Can they be relied upon?
85.	If existing data can***not*** be used, the applicant is going to have to carry out a program of ***site-specific monitoring.*** In addition to selecting, buying, and running appropriate monitoring ***equipment,*** there are two major ***procedural*** aspects of the requirements. They are: —site selection and —quality assurance.	**Site-Specific Monitoring** • selecting/buying/running equipment • site selection • quality assurance
86.	***Site selection*** involves deciding on the ***number*** and ***location*** of monitors. It will call for dispersion modeling to decide what points within the impact area are most appropriate. For PSD application monitoring, the sites should represent the ***highest projected*** concentrations in the impact area.	**Site Selection** • number of monitors • location of monitors • dispersion modeling

Slide	Script	Selected Visuals

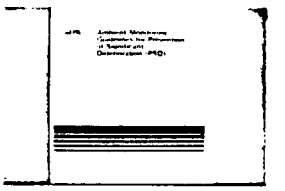
87. ***Quality assurance*** is a system for making sure the air quality data collected are consistent and reliable. The Federal requirements for air monitoring quality assurance are spelled out in Appendix B to 40 CFR Part 58.

Quality Assurance

- making sure data are consistent and reliable
- 40 CFR Part 58, Appendix B

88. Appendix B requires the applicant who monitors air quality to draw up a detailed quality assurance plan. The plan has to be approved by the permit-reviewing authority.

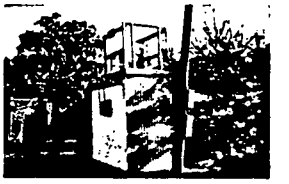
89. The monitoring program itself calls for a detailed ***monitoring plan,*** which the reviewing authority needs to comment on and approve. The ***five elements*** of this plan are laid out in the EPA ***Ambient Monitoring Guidelines*** for PSD, which describe them in detail.



90. They are:
    - —One, Network description,
    - —Two, Monitor-***site*** description,
    - —Three, Monitor (equipment) description,
    - —Four, Sampling ***program*** description, and
    - —Five, Quality assurance program.

1. Network Description
2. Monitor Site Description
3. Equipment Description
4. Sampling Program Description
5. Quality Assurance Program

91. The preconstruction monitoring program is another point in the PSD permit application process where large volumes of information are gathered.



92. This information has to be used by the applicant in decision making. The reviewing agency has to go over it. To make the information useful, it has to be presented in a rational ***format.*** The exact format will be specified by the reviewing agency.

93. At a minimum, the monitoring data should be set out in a ***summary*** format. This will arrange pollutant concentrations by averaging time and frequency. For pollutants like SO_2, NO_2, or particulate matter, this means giving both the highest concentration and highest second-highest concentration for averaging times of less than one year.

Highest and Highest Second-Highest Concentrations ($\mu g/m^3$)

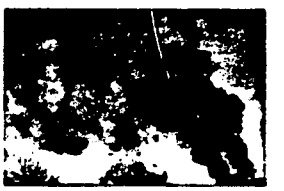
Pollutant	Time Period	Maximum	Second-Highest
SO_2	• 3-hour	329	277
	• 24-hour	68	61
	• annual	12	—
NO_2	• annual	29	—
PM	• 24-hour	110	101
	• annual	51	—

Slide	Script	Selected Visuals
94.	Of course, ***actual*** monitoring data—as recent as possible—is preferred for the Air Quality Analysis. But the analysis also has to account for the effects of emissions that are already ***permitted,*** but that ***didn't occur*** during the monitoring period.	
95.	To do this, the actual monitoring data must be ***adjusted.*** The applicant adjusts monitoring data by applying information from the ***emissions inventory*** to an appropriate ***dispersion model.***	
96.	Once again, we've reached a point where the ***data*** for an analysis have been gathered and organized. The ***impact area***—or areas—have been defined, ***emissions inventory*** and ***existing air quality*** data have been compiled. The remaining two steps of Air Quality Analysis involve applying the assembled data to see what happens to ***increment*** consumption and air quality ***standards*** with the new operation.	
97.	The ***fourth step*** in Air Quality Analysis is to perform a ***screening*** model analysis. A ***screening*** air quality dispersion model may ***not*** require extensive computer time or sophisticated equipment to run. It produces ***approximate*** results, and is normally designed to be ***conservative.*** In certain circumstances, no further modeling may be required.	4. Perform a screening model analysis • does not require extensive computer time or sophisticated equipment • produces approximate results • is conservative
98.	The applicant will get ***three pieces*** of essential data from the screening analysis. They are: —One, an approximation of the ***maximum*** impacts downwind of the source, —Two, a general idea of the ***location*** of the maximum impacts, and —Three, quick, preliminary results.	Benefit of Screening Analysis • approximation of maximum downwind impact • a general idea of the location of maximum impact • quick preliminary results
99.	This analysis is a lot like the ***impact area*** determination. However, here we're using the ***complete*** emissions inventory that fits the analysis, not just the ***changes*** from the new source or modification.	Total Emissions Inventory

Slide	Script	Selected Visuals

100. For the screening analysis, then, the applicant should count three kinds of emissions:
   —***stack*** emissions,
   —***fugitive*** emissions that are ***quantifiable,*** and
   —***secondary*** emissions, ***if*** they are quantifiable ***and*** are expected to affect impact-area air quality.

101. In dealing with ***stack*** emissions, we have to remember that EPA has ***Good Engineering Practice***—GEP—stack height regulations. Some stacks that appear in the emissions inventory may be taller than GEP heights. For those stacks, a GEP height has to be figured, using procedures from the EPA *Guideline on Air Quality Models*. This is the stack height that must be used in both the screening and refined modeling procedures.



102. The conservative and approximate results of the screening model ***may*** indicate that ***no*** PSD increment or air quality standard is threatened. On the other hand, the screening analysis may show that more than the available increment will be used up, or an ambient standard will be violated. If screening shows any kind of violation, then a ***refined*** modeling analysis ***must*** be done.

If:
screening predicts a violation

Then:
refined analysis must be done

103. If the screening analysis does ***not*** indicate using more than available increment, or exceeding an ambient standard, then the applicant can reach an ***agreement*** with the reviewing agency. The agreement will be to accept the screening model results as conservative projections of source impacts. In this case, the applicant may not have to do a ***refined*** modeling analysis.

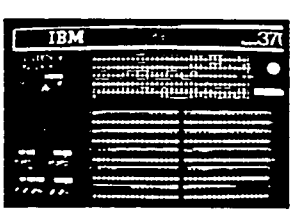
If:
screening predicts no violation

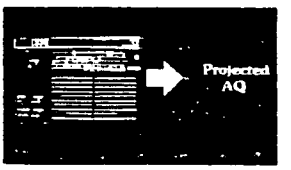
Then:
agency may accept screening results as projections

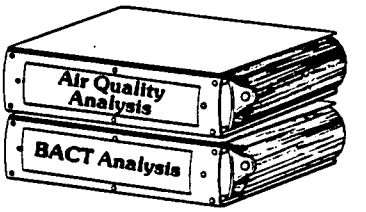
104. In some cases, however, screening analysis may ***not*** show a clear situation where no increment or standard is threatened. In these cases, the applicant must go on to the ***fifth***—and last—step in Air Quality Analysis. That is to ***determine projected air quality levels*** by means of a ***refined*** air quality dispersion model:

5. Determine projected air quality

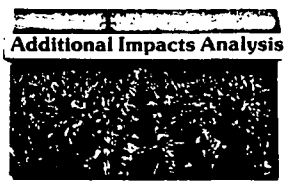
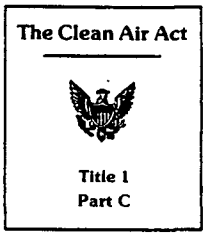
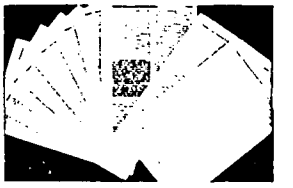
105. The refined analysis itself is a fairly complicated procedure involving computer use. The details are too complex to deal with here. However, all the data-gathering steps we've talked about so far were leading up to this point.

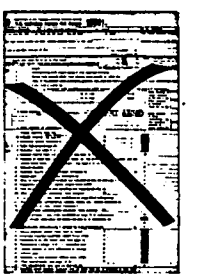


Slide	Script	Selected Visuals
	106. Because no two cases of refined modeling application are exactly alike, the applicant may find it advisable to design a special plan, following the EPA *Guideline on Air Quality Models* or any supplemental State guidance. We mentioned this plan earlier, and remarked that it is essential that the applicant develop the plan, propose it to the reviewing agency, and get agency agreement on it.	**Refined Modeling Analysis** • should adhere to modeling guidelines • work closely with review agency modeling contact
	107. In specific cases, special modeling considerations may come up. These could include: —using some alternative model that is better suited to this application, —problems of modeling in complex terrain, or —modeling pollutant sources that are not points—but rather are lines or areas.	• alternative models • complex terrain • line or area sources
	108. Here again, it is essential for the applicant to get agency agreement on a detailed modeling plan before committing itself to a complex and expensive modeling program.	
	109. The result of refined modeling will be projected air quality data. The exact form will depend on the model. In any case there will be concentrations for certain averaging times at points in the impact area. These are compared with available increments or ambient standards to detect any violations.	
	110. In this lesson and the previous one, we have described one of the most important analysis steps in the PSD application process: Air Quality Analysis. Put simply, it is a way of seeing what will happen to air quality if the proposed source or modification is constructed.	
	111. The Air Quality Analysis can be broken down into ***five*** analysis ***steps*** and ***three*** interrelated ***phases.*** The five ***steps*** are: —One, define the ***impact area,*** —Two, establish ***inventory*** of other sources, —Three, determine ***existing*** ambient concentrations, —Four, perform ***screening*** analysis, and —Five, determine ***projected*** air quality—by refined modeling, if needed.	**5 Steps** 1. Define the impact area 2. Establish inventory of other pollutant sources 3. Determine existing ambient concentrations 4. Perform screening model analysis 5. Determine projected air quality

Slide	Script	Selected Visuals
112.	The three ***phases*** are: —One, analyze ***increment*** consumption, —Two, determine ***existing*** air quality, and —Three, project ***future*** air quality.	**3 Phases** 1. Analyze increment consumption 2. Determine existing air quality 3. Project future air quality
113.	With the results of this analysis and the BACT Analysis, the applicant has assembled, probably, a quite bulky document. What remains to be done now is the Additional Impacts Analysis and detailed agency review.	
114.	(Credit slide)	**Air Quality Analysis: II** Technical Content: John Maroney Instructional Design: Monica Leslie Graphics: Leslie White Photography/Audio: David Churchill Narration: Rick Palmer
115.	(Northrop slide)	Developed and produced by: Northrop Services, Inc. under EPA Contract No. 68-02-3573
116.	(Northrop slide)	Based in part on the: **1980 PSD Workshops** prepared for the **U.S. Environmental Protection Agency** **Office of Air Quality Planning and Standards** by TRW, Inc., Environmental Engineering Division with the assistance of Northrop Services, Inc. under EPA Contract No. 68-02-3174
117.	(NET slide)	Northrop Environmental Training

SI:453
Lesson 8
Additional Impacts Analysis

Slide	Script	Selected Visuals
1.	(Focus)	FOCUS
2.	This is Lesson Eight, "Additional Impacts Analysis."	
3.	We have just gone over some very detailed and demanding requirements for PSD permit applications. These requirements come from Title One, Part C of the Clean Air Act, and from EPA regulations that carry out the Act.	
4.	We have already discussed determination of ***applicability,*** Best Available Control Technology ***(BACT) analysis,*** and ***air quality analysis.*** The regulations spell out in considerable detail the requirements for these analyses. EPA Guidelines go on to show how to do these important steps.	• Applicability determinations • BACT Analysis • Air Quality Analysis
5.	Our ***last*** stage in the application process—Additional Impacts Analysis—is somewhat different. These ***are*** definite requirements in the Act to deal with effects other than increment consumption and ambient air standards. However, they are ***not*** very detailed.	 • Additional Impacts Analysis
6.	In about seventeen and a half pages of EPA PSD regulations, the subsection "Additional Impact Analyses" takes up about a third of one column on one page.	
7.	This ***doesn't*** mean that Additional Impacts Analysis is a lot less important than everything else, something the applicant can toss off as an afterthought. It ***does*** mean that the analysis has to be carefully planned to fit the situation.	• planned carefully to fit the situation

Slide	Script	Selected Visuals
8.	From the law and regulations, we can learn that Additional Impacts Analysis is concerned with determining air pollution impacts ***on*** three things— —soils, —vegetation, and —visibility.	**Additional Impacts Analysis** • soils • vegetation • visibility
9.	The air pollution that has these impacts comes ***from***— —emissions from the new source or modification, ***and*** —emissions resulting from associated growth.	 • new source/ modification • associated growth
10.	There are ***three basic purposes*** for the Additional Impacts Analysis. They are: One, assist Best Available Control Technology—***BACT***—decision making, Two, inform the ***general public*** of potential air quality-related impacts, and Three, provide the ***Federal Land Manager*** with information on potential Class One area impacts.	**Purposes** 1. Assist BACT decision making 2. Inform the general public 3. Provide Federal Land Manager with information
11.	When you take all of these considerations together, you get something pretty broad and general. But the requirement for Additional Impacts Analysis is more specific. It probably wouldn't be useful to look at ***all*** the effects of everything on everything else, even if there were enough time and money to do it.	
12.	By now, this should sound familiar. We want to narrow the scope of our analysis to where we get useful, significant information with the time and other resources available. For this analysis, however, there is very little in the way of required format. A "fill in the blanks" approach won't work.	
13.	But the applicant ***can*** decide what ***kind*** of analysis is needed, how to ***organize*** it, and what ***method*** to use.	• kind of analysis • organization • method

Slide	Script	Selected Visuals

14. These decisions about the overall direction and methods of Additional Impacts Analysis can be made easier by keeping ***six basic points*** in mind. They are:
    First, the ***depth*** of the analysis,
    Second, the ***public information*** elements,
    Third, what ***triggers*** review,
    Fourth, the focus on ***concentration-impact relations,***
    Fifth, the need for full ***documentation,*** and
    Sixth, the ***flexibility*** of possible approaches.

    1. Depth
    2. Public Information
    3. Triggers
    4. Concentration-Impact Relations
    5. Documentation
    6. Flexibility

15. First, the ***depth*** of the analysis depends on the ***expected impacts.*** Every applicant must do an Additional Impacts Analysis. But the analysis does ***not*** have to be equally deep in different cases. ***How deep*** the analysis goes in any particular area depends on many things, most importantly:
    —the ***quantity*** of emissions,
    —the ***existing*** air quality, and
    —the ***sensitivity*** of local soils, vegetation, and visibility to effects of the emissions.

    1. Depth
    - quantity of emissions
    - existing air quality
    - sensitivity of soils, vegetation, and visibility

16. Common sense suggests that small emission increases will not produce major impacts. However, the applicant ***must*** survey the impact area and make sure it can actually expect "no significant impact." The conclusion has to be documented, so it can be checked.

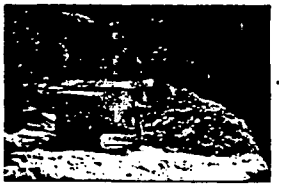
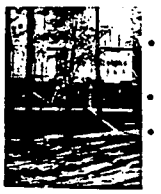
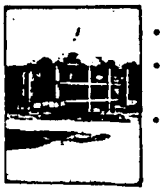
17. Second, ***public information*** is one of the primary goals of the Additional Impacts Analysis. The general public will be taking part in the permit process through hearings and comments on the record. The public is ***most*** interested in how the proposed project will effect things directly connected to their daily lives and well-being. The analysis should address these impacts in a way the public can understand.

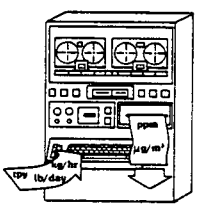
    2. Public Information
    - effect on daily lives and well-being

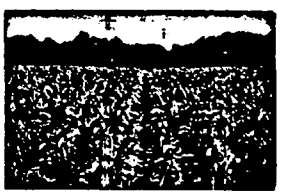
18. Potential impacts on ***Class One*** areas should get special, thorough treatment.

Slide	Script	Selected Visuals
19.	Third, the review may be ***triggered*** for both ***criteria*** and ***noncriteria*** pollutants. The Additional Impacts Analysis has to consider the effects of ***all*** pollutants under review—on soils, vegetation and visibility.	**3. Triggers** • criteria pollutants • noncriteria pollutants
20.	Fourth, and closely related to that last point, the analysis deals with the ***effect*** of each pollutant under review on air quality-related values. This means the applicant has to explore ***concentration-impact relations***—how concentrations of these pollutants are related to changes in soils, vegetation, and visibility.	**4. Concentration-Impact Relations** • effect on air-quality-related values • how concentrations are related to changes in soils/vegetation/visibility
21.	In analyzing the effects of all the pollutants under review, the applicant has to remember that ***two kinds*** of emissions must be accounted for. They are: —***direct*** emissions from the new source or modification itself, and —***secondary*** emissions from residential, commercial, or industrial growth associated with the project.	 • new source/ modification • associated growth
22.	Fifth, full ***documentation*** is very important to the Additional Impacts Analysis. The analysis creates a public record of fairly complex and ***un***obvious reasoning on technical topics. Both the public and the reviewing agency need to be able to go over the analysis point by point to check facts, assumptions, and conclusions.	**5. Documentation** • public record of: • facts • assumptions • conclusions
23.	Sixth, there is considerable ***flexibility*** in doing an Additional Impacts Analysis and documenting the results. We'll go through ***one*** basic method for approaching the analysis here, but it ***isn't*** the only way. There is no "cookbook" approach to Additional Impacts Analysis. What ***is*** important is that the applicant ***recognize*** all significant factors and their impacts, and carefully ***analyze*** them.	**6. Flexibility** • there is no "cookbook" approach • must recognize/analyze all significant factors
24.	There are ***three component analyses*** that make up the Additional Impacts Analysis: —a ***Growth*** Analysis —a ***Soils and Vegetation*** Impact Analysis, and —a ***Visibility Impairments*** Analysis.	**Additional Impacts Analysis** • Growth Analysis • Soils and Vegetation Impact Analysis • Visibility Impairments Analysis

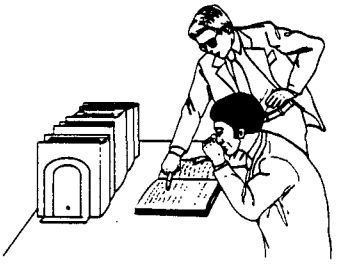
Slide	Script	Selected Visuals
25.	The ***Growth Analysis*** has to come first. It produces basic information for the other two component analyses. The growth analysis itself breaks down into ***three elements:*** —projection of ***associated growth*** in the impact area, —***estimates of emissions*** caused by permanent growth, and —analysis of ***air quality*** resulting from these emissions.	**Growth Analysis** • projection of associated growth • estimates of emissions • analysis of air quality
26.	To ***project*** the growth ***associated*** with building and operating the new source or modification, we need to consider ***three kinds*** of growth: ***industrial, commercial,*** and ***residential.***	
27.	We also need a ***starting*** place for projecting growth. We describe the existing base in terms of ***two kinds*** of ***support factors:*** —Local Support Factors, and —Industrial Support Factors.	• Local Support Factors • Industrial Support Factors
28.	***Local*** support factors are related primarily to ***population*** and its growth. They include: —the existing ***housing*** supply and its ability to expand, and —the ***commercial*** base for supporting residential growth—construction companies, suppliers, and so on.	
29.	***Industrial*** support factors are tied more closely to the running of the source ***itself.*** They include: —raw materials suppliers, —utility and power suppliers, and —maintenance and support services.	
30.	There are many good sources for basic information on existing Local and Industrial Support Factors. These include: —State agencies (like the Department of Commerce), —regional planning offices, —local Chambers of Commerce, —Environmental Impact Statements, and —PSD applications previously prepared by other applicants.	**Sources of Information** • State agencies • Regional planning offices • Chambers of Commerce • Environmental Impact Statements • PSD applications

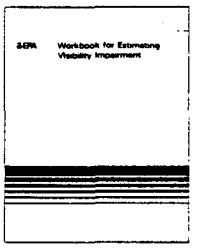
Slide	Script	Selected Visuals
31.	All this information on support factors indicates what exists ***now***. The next step is to ***project*** how much ***new growth*** must take place to support the new source or modification. Some of the same organizations that provided the baseline data can help in making this projection.	
32.	A new operation can result in ***residential*** growth. How much growth depends—among other things—on: —the work force available now, —the number of new employees, and —the current housing supply.	 • current workforce • new employees • housing supply
33.	There is likely to be more or less ***industrial*** growth to support the new operation. Important elements for projecting growth in local industry and commerce include: —the kinds and amounts of raw materials needed, —the water, sewer, and power needs of the source, and —other goods, services, and maintenance requirements.	 • raw materials • water/sewer/ power needs • goods/services/ maintenance requirements
34.	The different kinds of projected growth feed into the ***second*** element of the Growth Analysis, ***emissions estimates***. In some ways, this is like the inventory of other sources used in the overall Air Quality Analysis.	
35.	Anywhere that specific industrial or commercial operations, or emissions units within them, can be identified, "hard" engineering estimates should be used.	
36.	Keep in mind, however, that we're talking about ***projections***—estimates of growth that ***may*** take place. It may be necessary to estimate future emissions from things like population growth. For example, there are rough rules for projecting dry-cleaning use, and therefore volatile organic emissions, from population figures.	

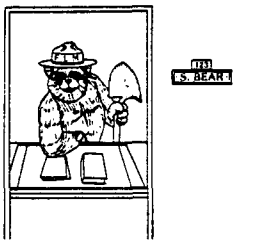
Slide	Script	Selected Visuals
37.	Emission estimates can be made on the basis of many ***information sources,*** including: —equipment manufacturers' specifications and guidelines, —AP-42, the EPA *Compilation of Emission Factors* —other PSD applications, or —comparisons with existing facilities.	
38.	All of these projected emissions will be those from ***permanent, stationary*** sources. ***Temporary*** sources and ***mobile*** sources are excluded from the analysis.	
39.	At this point, the applicant has a fair handful of data. It has to be put together so some use can be made of it. The putting-together involves adding up the ***projected-growth*** emission estimates and the emission estimates for the ***source.*** Together, these are inputs for the next element of the Growth Analysis.	
40.	The ***third*** element of the Growth Analysis is projecting ***air quality*** resulting from the emissions that come from the source and associated growth.	
41.	This ***isn't*** doing the whole Air Quality Analysis part of the application process all over again. For one thing, there may be several ***noncriteria*** pollutants to be considered here. For another thing, we have a mix of ***projected emissions*** data ranging from "hard" to "soft."	
42.	Without going deep into the details, we can say that the projected ***total*** emissions data are plugged into appropriate air pollution dispersion ***models.*** The computer then generates projections of ***ground-level concentrations*** of the pollutants under review. These concentrations are part of the information package for Additional Impacts Analysis. They also feed the next component analysis—Soils and Vegetation.	

Slide	Script	Selected Visuals
43.	This second component analysis uses the results of air quality modeling as a basis to estimate the effects of air pollution on soils and plants in the impact area.	**Soils and Vegetation Analysis** • estimates effects on soils and plants
44.	Different air pollutants can have a variety of effects on plants. Some of these are caused by pollutants absorbed directly from the air, and some indirectly, by way of water and soil. The effects show up as things like premature bud loss, leaf necrosis (tissue death), and plant death.	
45.	When ambient pollutant concentrations are high, ***acute*** effects—short-term, possibly severe—often appear.	
46.	But lower levels of exposure over long periods of time can have serious effects, even if they're usually less obvious. The damages, in terms of loss of money or enjoyment, from long-term, low-level exposure, can be worse than from acute effects.	
47.	A suggested approach to Soils and Vegetation Analysis breaks the task down into ***three elements:*** —a ***survey*** of soil and vegetation types, —***projection*** of future ambient pollutant concentrations, and —***correlation*** of concentrations with effects.	• survey of soil and vegetation types • projection of future ambient concentrations • correlation of concentrations with effects
48.	The ***survey*** of soil and vegetation types in the impact area should include all vegetation of any value—whether ***commercial*** or ***recreational*** value.	• survey of soil and vegetation types • all vegetation - commercial or recreational
49.	It's not likely that the applicant will have to do the whole survey "from scratch." Much of the information-gathering has probably already been done by ***conservation groups, State agencies,*** and ***universities.*** It should be readily available from them.	Information probably available from: • conservation groups • State agencies • universities

Slide	Script	Selected Visuals
50.	A summary of the soil and vegetation survey for a lowland part of a typical southern State might look something like this.	**Soil and Vegetation Survey** **Soil Types** • sandy loam • loam • silt loam **Vegetation Types** • loblolly pine • southern red oak • soybeans • corn
51.	The ***second*** element of the Soils and Vegetation Analysis—projection of future ambient pollutant concentrations—should also come mostly from work already done. The Air Quality Analysis of the application process and the air quality projections of the Growth Analysis provide maximum and time-averaged figures for ***criteria*** and ***noncriteria*** pollutants.	• projection of future ambient concentrations • information usually already available • for criteria and noncriteria pollutants
52.	The ***third*** element of Soils and Vegetation Analysis is ***correlation*** of ambient concentrations with effects. It will call for the applicant to do some research. There is a lot of scientific literature on the damage that different air pollutants can do to various plants. There is ***no*** single, agreed-upon method for predicting ***how much*** damage to exactly ***what kinds*** of plants will result from certain levels of pollutants.	• correlation of concentrations with effects • will require research • there is no one single, agreed-upon method for predicting damage
53.	The applicant can turn to the ***scientific literature*** for research results on relations of pollutant concentrations to effects. Also, the same ***conservation groups, State agencies,*** and ***university*** departments that had soil and vegetation survey information are likely to be able to help on predicting effects.	• scientific literature • conservation groups • State agencies • universities
54.	As a general rule, ***criteria*** pollutant concentrations below the secondary ambient standards ***won't*** have harmful effects. However, there are exceptions to watch out for.	Criteria pollutant concentrations below secondary NAAQS usually are O.K.
55.	Certain ***sensitive*** species of plants and types of soil ***can*** show damage at lower levels. Examples are alfalfa and soybeans. These sensitive items should be caught and "flagged" on the soils and vegetation survey.	 • sensitive species can show damage at lower levels
56.	The ***noncriteria*** pollutants need to be approached more cautiously. Some of them can cause soil or plant damage at pretty low ambient concentrations, over a period of time.	Noncriteria pollutants may cause damage at pretty low concentrations.

Slide	Script	Selected Visuals
57.	***Fluorides,*** for example, can cause this kind of leaf-tissue death at levels around ***half*** a microgram per cubic meter over a thirty-day period.	
58.	It's important, again, to ***document*** the Soils and Vegetation Analysis. Its ***results*** aren't simple. Its ***methods*** are likely to be special for this case. Both the general ***public*** and the reviewing agency have to be able to go over data, reasoning, and conclusions.	
59.	The ***third*** and last component analysis of the Additional Impacts Analysis is the ***Visibility Impairments*** Analysis.	
60.	"Visibility" generally means how well people can see. It includes ideas of ***how much*** of what there is to be seen can be seen, and ***how far.*** The Clean Air Act says that "visibility impairment" includes reduction in visual ***range*** (distance) and atmospheric ***discoloration.***	**Visibility Impairments Analysis** • how much can be seen • how far one can see
61.	Visibility impairment has to be assessed for any area on which the proposed source or modification has an impact. But the analysis is especially concerned with visibility effects on Class One areas. The Clean Air Act requires special plans and procedures for protecting visibility in mandatory Federal Class One areas.	
62.	A suggested approach to Visibility Impairments Analysis breaks it down into ***three elements:*** One, an ***initial screening*** for possible effects of emissions on visibility, Two, a more refined ***modeling*** analysis, ***if*** needed, and, Three, a description of the area's ***visual quality.***	• initial screening • deeper modeling analysis • description of visual quality

Slide	Script	Selected Visuals
63.	Class One area impacts may be estimated using EPA's *Workbook for Estimating Visibility Impairment*, which is available from NTIS as PB81 157885. The *Workbook's* methods are applicable to Class One ***and*** other areas.	
64.	The *Workbook* outlines a ***three-level*** screening procedure. Levels One and Two are preliminary screening, while Level Three is application of a computer modeling analysis.	**3 - Level Screening Procedure** I, II } Preliminary Screening III } Computer Modeling Analysis
65.	Level ***One*** visibility screening is a ***simplifying*** approach. It's intended to screen out emission sources that have little potential for adverse effects on visibility. For each source a standard calculation is made that relates emissions to visibility impact. The results are compared with a standard screening value. If the result for a source is ***less*** than the screening value, the source can be dropped from further visibility analysis. A ***higher*** value indicates potential visibility impacts. For such sources, further analysis is required.	**Level I Screening** • simplifying • standard calculation for each source compared to a standard value
66.	Level ***Two*** visibility screening is conservative. It uses assumed worst-case meteorological conditions. However, more information on the source, topography, and visual range and meteorology in the region is applied. The analysis can be done by hand calculations, using reference tables and charts. It can also be done as a fairly simple computer run of EPA's PLUVUE Model.	**Level II Screening** • conservative • uses "worst-case" meteorological conditions • hand calculations or PLUVUE Model run
67.	Level ***Three*** of the ***Workbook's*** screening procedure corresponds to what we've called a ***more refined modeling*** analysis. If the Level One and Two screenings indicate a possible visibility impairment, the applicant should do a ***full*** run of the PLUVUE Model. This will call for complete emissions, meteorological, and other regional data. The output will be a more accurate projection of visibility impacts, in terms of ***how severe*** and ***how often.***	**Level III Screening** • more refined modeling analysis • full run of PLUVUE Model

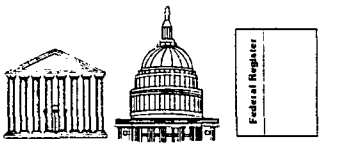
Slide	Script	Selected Visuals
68.	To wrap up the Visibility Impairment Analysis, the applicant should assemble a description of the area's ***visual quality.*** This description should include any ***scenic vista*** that has ***public appeal*** or ***aesthetic value.***	Applicant should assemble a description of area's visual quality — including scenic vistas with: • public appeal • aesthetic value
69.	It should be obvious that there's no mechanical method for deciding what is or isn't "scenic" or "aesthetic." But there is an area of general agreement on what kinds of changes definitely would or wouldn't harm an area's visual quality. The visual quality description should, at least, address these ***consensus*** values.	
70.	If a ***Class One*** area might be affected, the applicant should contact the ***Federal Land Manager.*** Federal agencies that manage lands in Class One areas have formally identified visibility values in the areas. They will also have detailed information that will assist the applicant to prepare the Visibility Impairments Analysis.	Federal Land Manager 
71.	The Visibility Impairments Analysis is the third and last component of the overall Additional Impacts Analysis.	Additional Impacts Analysis ☑ Growth Impacts Analysis ☑ Soils and Vegetation Impacts Analysis ☑ Visibility Impairments Analysis
72.	The important points to remember about the Additional impacts analysis include: —one major purpose is to ***inform the public*** of environmental impacts from a proposed new source or modification.	• provide public information
73.	—the impacts to be examined are ***on soils, vegetation,*** and ***visibility,***	• provide public information • examine impacts on soils, vegetation, and visibility
74.	—the impacts can come ***from*** emissions from the new project ***or*** from associated growth.	• provide public information • examine impacts on soils, vegetation, and visibility • impacts may be from new sources or associated growth

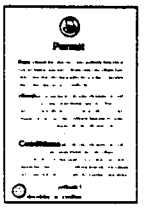
Slide	Script	Selected Visuals
75.	The Additional Impacts Analysis is made up of ***three component*** analyses: —Growth Analysis, —Soils and Vegetation Analysis, and —Visibility Impairments Analysis.	**Additional Impacts Analysis** • Growth Analysis • Soils and Vegetation Impact Analysis • Visibility Impairments Analysis
76.	Each component analysis develops information for the next step. Since there is no "cookbook" for doing these analyses, it is very important that the applicant ***document*** each step. The public and the reviewing agency should be able to see the facts, assumptions, and reasoning that lead to each conclusion.	**Applicant must document each step.**
77.	The Additional Impacts Analysis completes the PSD application process. In the next lesson, we'll briefly review the steps to a complete application, and discuss how the reviewing agency takes up ***its*** responsibilities.	**Next...** **Reviewing Agency Responsibilities**
78.	(Credit slide)	**Additional Impacts Analysis** Technical Content: John Maroney Instructional Design: Monica Leslie Graphics: Leslie White Photography/Audio: David Churchill Narration: Rick Palmer
79.	(Northrop slide)	**Developed and produced by:** **Northrop Services, Inc. under EPA Contract No. 68-02-3573**
80.	(Northrop slide)	**Based in part on the:** **1980 PSD Workshops** prepared for the **U.S. Environmental Protection Agency** **Office of Air Quality Planning and Standards** by TRW, Inc., Environmental Engineering Division with the assistance of Northrop Services, Inc. under EPA Contract No. 68-02-3174
81.	(NET slide)	Northrop Environmental Training

SI:453

Lesson 9

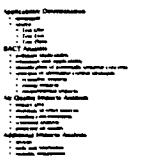
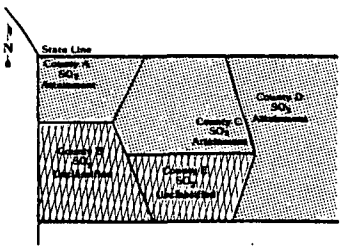
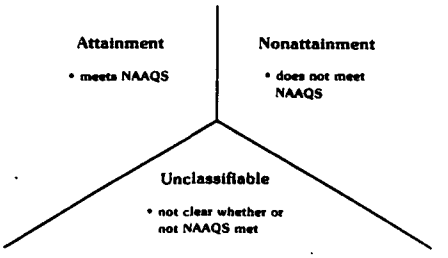
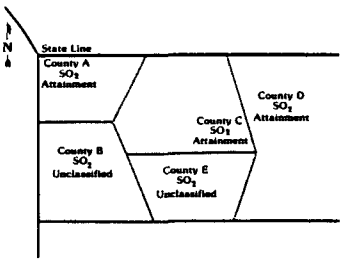
Application Summary & Introduction to Agency Review

Slide	Script	Selected Visuals
1.	(Focus)	FOCUS
2.	This is Lesson Nine, "Application Summary and Introduction to Agency Review."	Application Summary and Introduction to Agency Review
3.	In the previous lesson, we outlined the last step of the PSD application process—Additional Impacts Analysis. We discussed a suggested approach to meeting the flexible requirements of this analysis.	☑ Applicability Determination ☑ Best Available Control Technology Analysis ☑ Air Quality Analysis ☑ Additional Impacts Analysis
4.	Now that we've finished up the application process, it's time to ***review*** the major steps and points to remember in that process. We have spent much more time on the ***applicant's*** work in putting together the application than we will on the ***reviewing agency's*** work in reviewing it. We want to understand why this is so. So this lesson will go on to contrast the ***responsibilities*** of the applicant and the reviewing agency in dealing with an application for a proposed new source or modification.	Applicant's Responsibility / Reviewing Agency's Responsibility 
5.	We began by tracing some of the development of the concept of Prevention of Significant Deterioration—PSD. Through court decisions, amendments to the Clean Air Act, and changes in EPA regulations, we have arrived at the present system.	
6.	This system works to ***prevent*** significant increases in air pollution in areas where the air quality is already ***better*** than National Ambient Air Quality Standards.	
7.	At the same time, the system provides a ***margin*** for growth and development.	

Slide	Script	Selected Visuals
8.	The major mechanism for carrying out PSD is to require ***new major sources*** or ***major modifications*** in PSD areas to file a detailed application for a ***permit*** before beginning construction.	
9.	The reviewing agency checks the application to be sure it meets PSD requirements.	
10.	With a ***complete,*** satisfactory application, and after a public hearing, the agency issues a permit. The permit contains ***Federally enforceable conditions*** to make certain the new operation will comply with PSD requirements, and ***remain*** in compliance.	
11.	The ***application*** is the key to this process. It is a detailed ***engineering analysis*** done ***by the applicant.***	 • engineering analysis • done by the applicant

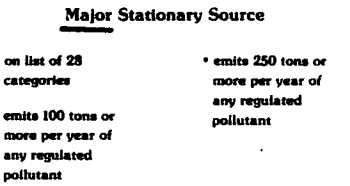
12.	It examines regulatory, technical, and environmental-impact questions raised by construction of the new source or modification. It shows how construction and operation will be carried out to meet legal and regulatory requirements.	
		• examines
		  • regulatory
		  • technical
		  • environmental-impact questions
		• shows how construction/operation will be carried out

13.	The applicant puts the PSD application together in a step-by-step way. Each step provides information and go—no-go signals for the next.	 • step-by-step process
14.	The major steps in assembling the complete application are these four: • Applicability Determination, • Best Available Control Technology Analysis, • Air Quality Analysis, and • Additional Impacts Analysis.	4 Steps • Applicability Determination • Best Available Control Technology Analysis • Air Quality Analysis • Additional Impacts Analysis

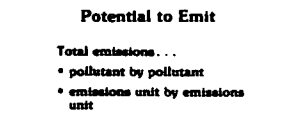
Slide	Script	Selected Visuals
15.	Each major step breaks down into smaller steps. Some of these are directly called for by the law and regulations. Some are simply efficient ways of getting the answers needed to meet the law and regulations.	
16.	We began with the ***Applicability Determination.*** The first thing we saw was that applicability asked two kinds of questions. First, ***where*** will the proposed construction be? Second, ***what is*** the proposed construction? That is, there is: • ***Geographic*** applicability, and • ***Source*** applicability.	**Applicability** • Where will construction be? • What is the construction?
17.	***Geographic*** applicability depends on the ***classification*** of the area where the new source or modification will be built. Under Section 107 of the Clean Air Act, the States have to classify all of their Air Quality Control Regions. They can break them up and classify the parts.	
18.	The classifications—which can be different for each ***criteria pollutant***—are: • Attainment—***meets*** the National Ambient Standard, • Nonattainment—does ***not*** meet the national standard, and • Unclassifiable—information doesn't show whether or not it meets the standard.	
19.	***Attainment*** and ***unclassifiable*** areas are PSD areas. The PSD regulations apply ***geographically*** within their borders. The more complicated question is ***source*** applicability.	
20.	We saw that PSD review requirements apply to ***major*** new stationary sources, or to ***major modifications*** to stationary sources. The definition of ***major stationary source*** was important for both new sources and modifications.	**Major...** • new stationary sources • modifications

Slide	Script	Selected Visuals

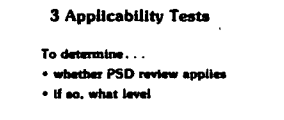
21. A ***major*** stationary source is one of two things:
    - a source on the ***list*** of twenty-eight categories, with ***potential to emit one hundred*** tons or more per year of any regulated pollutant, or
    - any ***unlisted*** source with potential to emit ***two hundred fifty*** tons or more per year of any regulated pollutant.



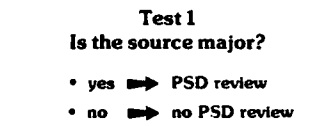
22. This took us on to the definition of ***potential to emit.*** We do accounting of potential to emit for whole sources by totalling up emissions:
    - ***pollutant*** by ***pollutant***—for any pollutant regulated under the Clean Air Act, and
    - ***emissions unit*** by ***emissions unit***—with ***control*** equipment operating normally.



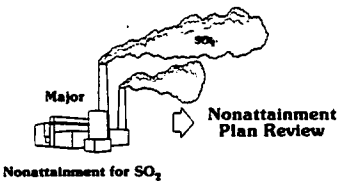
23. Using the definitions of major source and potential to emit, we can set up ***three applicability tests.*** These tell us ***whether*** PSD review applies to proposed construction, and if it does, ***what level*** of review.



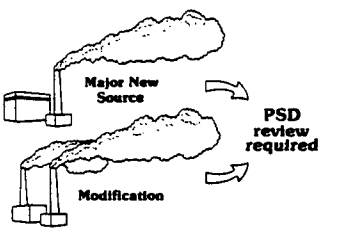
24. ***Test One*** asks: "Is the source—new ***or*** existing—***major*** for at least one regulated pollutant?" The ***total*** potential to emit for each pollutant is compared with the 100- or 250-ton criterion. If the source is major for ***any one*** pollutant, it's a major source, and the PSD review has to go on to its next steps.



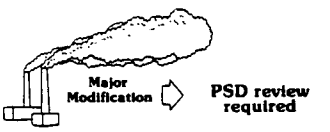
25. The important ***exception*** to the rule in Test One applies only if the area is ***nonattainment*** for a pollutant that makes the source major. For ***that pollutant,*** the source has to undergo the special nonattainment area plan review.



26. So, if a proposed ***new*** source meets Test One—it's a major source for an applicable pollutant—PSD review applies. Or, if a ***modification*** all by itself would be a major source, PSD review applies.



27. But for any ***other*** modification to have PSD review apply, it has to be a ***major modification.*** A major modification is a change ***at a major source*** that results in a ***significant net increase*** in emissions of any pollutant regulated under the Clean Air Act.



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28.	We examined the ***emission levels*** set by EPA as significant for the pollutants regulated under the Act. We noted the special case for emissions that have a one microgram per cubic meter or greater impact on ***Class One*** areas.	
29.	We also went over the fairly complicated business of ***netting.*** In netting, the emission changes from the modification are added up with all the ***creditable contemporaneous*** emission changes for each pollutant.	**Netting** • counting up creditable, contemporaneous emission changes
30.	***Test Two*** takes these numbers and asks, "Is there ***at least one*** pollutant with ***significant net increases*** in ***actual*** emissions?" If there is, we have a major modification, and PSD review applies.	**Test 2** Are there any significant net increases?
31.	***Test Three*** goes beyond the question of ***whether*** PSD review applies to a new source or modification, to ***what*** review and ***how much.*** It asks: "***Which*** pollutants have significant increases?" For ***each*** pollutant that does have a significant increase, the applicant has to perform the ***three analyses*** of the PSD application process.	**Test 3** **Which pollutants have significant net increases?**
32.	As we saw, these three analyses are: • Best Available Control Technology—BACT—Analysis, • Air Quality Analysis, and • Additional Impacts Analysis.	• Best Available Control Technology (BACT) Analysis • Air Quality Analysis • Additional Impacts Analysis
33.	Any proposed new source or modification that comes through the applicability determination with a finding that PSD review applies goes on to the next step. That step is ***BACT Analysis.***	**Best Available Control Technology (BACT) Analysis**
34.	We called the BACT Analysis the core of the PSD application process. This isn't—as we saw—because everything is finished when you get through with BACT. It's because BACT Analysis lines up ***information*** for the other two analysis steps and for corporate decision making on the project.	**BACT Analysis** ⬇ • information for other analyses • information for corporate decision making
35.	Our first step in understanding BACT Analysis was to take apart the Clean Air Act ***definition*** of Best Available Control Technology. And the first thing we hit on there was what kind of thing BACT is. It is an ***emission limitation,*** based on what can be accomplished with the best available technology.	**BACT** is an **emission limitation.**

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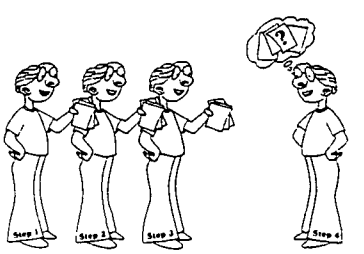
36.	The ideas of ***emission limitation, best,*** and ***available*** shape the way BACT is proposed in an application, and the analysis. If possible, BACT will be an ***enforceable emission rate*** to go into the permit. Only if something makes quantifying the rate impractical will you find a fall-back to fuel limits, work practice standards, or the like.	**BACT** • enforceable emission rates • fuel limits • work practice standards
37.	The question of what limits are ***best*** is settled ***case-by-case.*** BACT is the best for the project being considered, in its particular technical and economic situation.	**BACT Analysis** • case-by-case • this plant • its situation
38.	It's the ***maximum*** degree of reduction of each regulated pollutant, when ***availability*** is considered.	**"Best"** • maximum reduction • each pollutant
39.	When we turn to what ***available*** means, we find that it's what can be achieved taking into account ***energy, environmental,*** and ***economic*** impacts, and other ***costs.***	**"Available"** Achievable, considering: • Energy Impacts • Environmental Impacts • Economic Impacts • Social Costs • Other Costs
40.	Keeping in mind that there's no pre-printed form—like a tax return—to fill out, we divided the job of BACT Analysis into ***four steps*** and ***three impact analyses.***	**BACT Analysis** • 4 Steps • 3 Impact Analyses
41.	The ***four steps*** are: One, Pollutant Applicability, Two, Emissions Unit Applicability, Three, Identification of Potentially Sensitive Concerns, and Four, Selection of Alternative Control Strategies.	**Steps** 1. Pollutant Applicability 2. Emissions Unit Applicability 3. Identification of Potentially Sensitive Concerns 4. Selection of Alternative Control Strategies
42.	The ***three impact analyses*** are: One, Economic Impacts, Two, Energy Impacts, and Three, Environmental Impacts.	**Impact Analyses** • Economic Impacts • Energy Impacts • Environmental Impacts
43.	In Step ***One, Pollutant*** Applicability, we found that for a ***new*** source, any pollutant emitted in a ***significant quantity*** requires BACT Analysis.	**New Major Sources** • regulated pollutants • emitted in significant quantities

Slide	Script	Selected Visuals
44.	For a ***modification,*** any pollutant emitted in ***significantly increased*** amounts gets BACT Analysis.	**Major Modifications** • regulated pollutants • emitted in significantly increased amounts
45.	In Step ***Two, Emissions Unit*** Applicability, the question is: "Which ***emissions units*** get BACT review?"	**2. Emissions Unit Applicability** • Which emissions units must be analyzed?
46.	For ***new*** sources, the answer is each emissions unit that emits ***any amount*** of a regulated pollutant.	**New Major Source** • any unit that emits any amount of a regulated pollutant
47.	For ***modifications,*** each emissions unit with ***any increase*** in a regulated pollutant has to apply BACT.	**Major Modification** • any unit that shows any increase in emissions of a regulated pollutant
48.	Remember that in Steps One and Two, ***fugitive*** emissions have to be dealt with, but ***secondary*** emissions are generally exempt.	**Units producing only secondary emissions** • exempt from BACT analysis
49.	Steps Three and Four of BACT Review take the information from Steps One and Two and apply it to things outside the source.	
50.	Step ***Three*** is Identification of Potentially Sensitive Concerns. In Step Three, the applicant lists the specific factors in the local area that may be affected by building and operating the new source or modification.	**3. Identification of Potentially Sensitive Concerns** • Which areas could be affected?
51.	These factors include ***energy*** use, ***economics,*** and the ***environment.***	**What effects can source have on:** • Energy • Economics • Environment
52.	Remember that Steps One through Three ***gathered*** the information needed for the BACT Analysis. The quantitative evaluation and comparison comes in Step ***Four***—Selection of Alternative Control Strategies.	

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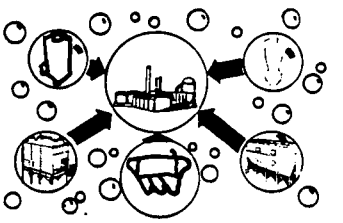
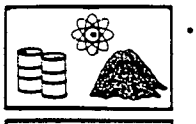
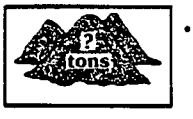
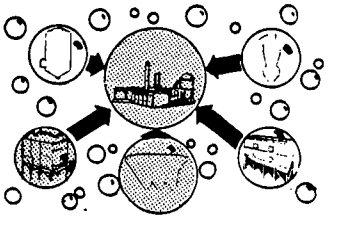
53.	It is in Step Four that the applicant does an analysis of the different methods of control that are ***technically feasible*** on the source. The alternative control methods are compared with the ***base*** case—the controls that would ordinarily be used.	**4. Selection of Alternative Control Strategies** • analysis of technically feasible methods
54.	The applicant ***ranks*** control alternatives against the base case and each other. The ranking is in terms of efficiency and effectiveness of control for the pollutants under review.	**Applicant ranks control alternatives against base case and each other.**
55.	The alternative control strategies can be based on ***existing*** control technology or ***transferable*** technology.	**4 Kinds** • existing technology • transferable technology
56.	In some cases, the applicant might examine ***innovative*** control methods,	**4 Kinds** • existing technology • transferable technology • innovative technology
57.	or industrial processes that are ***inherently lower polluting.*** Data on these alternatives can be drawn from other companies in the area, previously approved PSD applications, or the EPA BACT/LAER Clearinghouse.	**4 Kinds** • existing technology • transferable technology • innovative technology • inherently lower polluting technology
58.	These four steps have set up a list of different mixes of controls that might be applied to the new source or modification. They are arranged in order of how well they control the significant pollutants from the source.	
59.	The applicant performs ***three Impact Analyses*** to see what effects would come from installing and operating each alternative.	**Analyses** • Economic Impacts • Energy Impacts • Environmental Impacts
60.	In the ***first*** analysis, ***Economic*** Impacts Analysis, the applicant rates the control alternatives against each other in terms of their ***costs.***	**Economic Impacts Analysis** • estimate of approximate costs of different control alternatives

Slide	Script	Selected Visuals
61.	Both ***capital*** and ***operating*** costs are reduced to a common time base and compared.	• Capital Costs • Operating Costs
62.	***Total*** and ***incremental***—last-unit—costs provide bases for comparison.	**Costs** • Total • Incremental
63.	In the Economic Impacts Analysis, the applicant considers three measures of cost for ***reasonableness:*** • pollution-specific costs, • additional product costs, and • ability to secure financing.	**Economic impacts evaluated in terms of:** • Pollution-Specific Costs • Additional Product Costs • Ability to Secure Financing
64.	In the ***second*** impacts analysis, ***Energy*** Impacts, the applicant estimates the direct energy needs of control alternatives. These energy needs are compared with available forms and amounts of energy in the region.	 • What forms of energy can be used?  • How much available in the region?
65.	The ***third*** and final impacts analysis is for ***environmental*** impacts. The applicant compares maximum effects—usually under worst-case conditions—of alternative controls on ambient air concentrations.	**Environmental Impacts** • degree of effect on environment
66.	Other impacts—on land, air, and water—must be listed, evaluated, and compared.	
67.	By comparing the results of the analyses, pollutant by pollutant, for all the control alternatives, the applicant arrives at a set of controls for the whole source or modification. This set of controls is what is presented in the application as BACT.	

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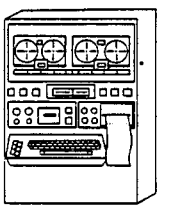
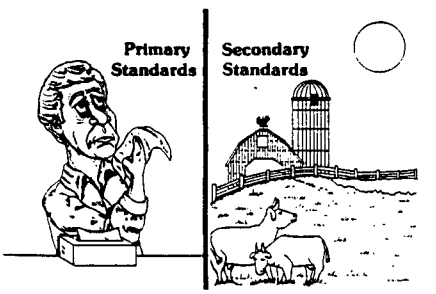
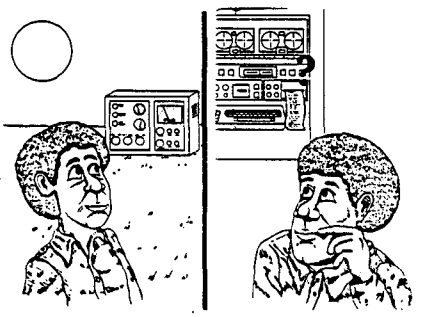
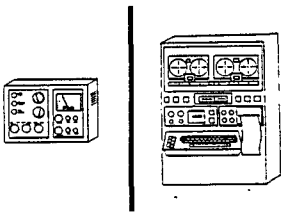
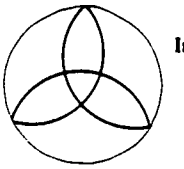
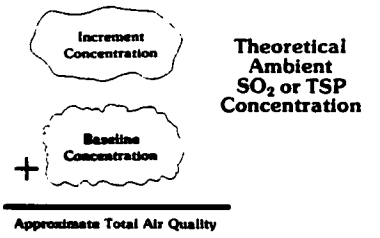
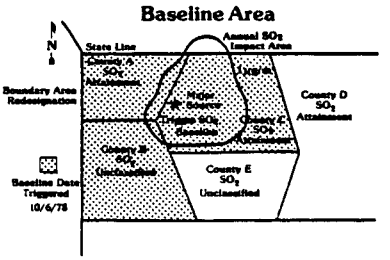
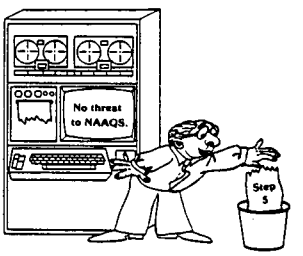
68.	With the BACT Analysis complete, the applicant has decided on a definite set of controls for the new source or modification. The next thing to do is project the environmental ***effects*** of operating with these controls. These detailed projections are made in the next two major steps of the PSD application process—Air Quality Analysis and Additional Impacts Analysis.	• **Air Quality Impacts Analysis** • **Additional Impacts Analysis**
69.	The ***Air Quality*** Analysis concentrates on the impact of the new emissions on National Ambient Air Quality ***Standards*** and on allowable PSD ***increments.***	• Standards • Increments
70.	In addition, the analysis will check the effect on air quality of emissions of ***any*** applicable pollutant regulated under the Clean Air Act.	**General Requirement** • to examine the effect on air quality of emissions of any pollutant regulated by the CAA
71.	The Air Quality Analysis uses dispersion modeling techniques to predict how increased emissions will affect ambient air quality.	• dispersion models 
72.	These effects might include possible violations of ***primary*** or ***secondary*** National Ambient Air Quality Standards for one or more of the ***criteria*** pollutants. The possible violations might be for ***averaging times*** from annual down to one hour.	
73.	For two pollutants—particulate matter and sulfur dioxide, TSP and SO_2—the Air Quality Analysis also checks ***increment*** consumption. There are maximum permissible increases—increments—in ambient concentrations of TSP and SO_2.	**Increments for only:** • TSP • SO_2
74.	There are different maximum increments for each Class of PSD area, and for each averaging time for which there is an ambient standard.	

Slide	Script	Selected Visuals
75.	The ambient ***monitoring*** and dispersion ***modeling*** that go into Air Quality Analysis are complex technical disciplines.	
76.	We noted, when we discussed the analysis process, that the applicant should prepare detailed ***plans*** for review agency concurrence before spending large sums on monitoring or modeling.	
77.	Although the Air Quality Analysis process is quite complicated, we were able to get some understanding of how it works by breaking it into ***five basic steps*** and ***three*** interrelated ***phases.***	**Air Quality Analysis** • 5 Basic Steps • 3 Phases
78.	The five ***steps*** are: First. Define the ***impact area*** — the area affected by the new emissions for each pollutant analyzed.	**Five Steps of Air Quality Analysis** • Define impact area
79.	Second. Establish ***inventory*** of other sources — a quantitative listing of all sources adding to the concentration of each pollutant analyzed.	**Five Steps of Air Quality Analysis** • Define impact area • Establish inventory of other sources
80.	Third. Determine ***existing*** concentrations — for each pollutant in the analysis.	**Five Steps of Air Quality Analysis** • Define impact area • Establish inventory of other sources • Determine existing ambient concentrations
81.	Fourth. Perform ***screening*** analysis.	**Five Steps of Air Quality Analysis** • Define impact area • Establish inventory of other sources • Determine existing ambient concentrations • Perform screening analysis
82.	Fifth. Determine ***projected*** air quality levels — using dispersion modeling.	**Five Steps of Air Quality Analysis** • Define impact area • Establish inventory of other sources • Determine existing ambient concentrations • Perform screening analysis • Determine projected air quality level

Slide	Script	Selected Visuals
83.	The work of applying the five steps of Air Quality Analysis can be divided into ***three phases,*** which are interrelated and can overlap. As we saw, for instance, a lot of the work in analyzing ***increment consumption*** and ***projecting*** future air quality for TSP and SO_2 overlaps.	 Three Interrelated Phases
84.	The three ***phases*** are: One. Analyze ***increment*** consumption. How much of the available increments will be used by the new source or modification?	Air Quality Analysis • analyze increment consumption
85.	Two. Determine ***existing*** air quality—present values for ***all*** pollutants subject to analysis. Both monitoring and modeling may be involved.	Air Quality Analysis • analyze increment consumption • determine existing air quality
86.	Three. Project ***future*** air quality. This calls for dispersion modeling for at least the ***criteria*** pollutants involved in the analysis. The reviewing agency may call for projections of some ***other*** pollutant concentrations.	Air Quality Analysis • analyze increment consumption • determine existing air quality • project future air quality
87.	We went on to examine the relations of ***baseline areas, baseline concentrations, increments,*** and ***total concentrations.***	• Baseline Areas • Baseline Concentrations • Increments • Total Concentrations
88.	The relation in principle to remember was: baseline plus increment equals total concentration. But it's also very important to remember that analysis can go ahead with some uncertainties about the baseline data.	 Theoretical Ambient SO_2 or TSP Concentration Increment Concentration Baseline Concentration Approximate Total Air Quality
89.	The baseline ***concentration*** is the foundation over which increment consumption for TSP and SO_2 is figured. It's an ***adjusted*** concentration, which means both monitoring and modeling can be involved. The adjustments are there to take into account ***major*** source emissions that should be counted against ambient concentrations as of the baseline ***date.***	Baseline Concentration • ambient concentration • of TSP or SO_2 • at the baseline date

Slide	Script	Selected Visuals
90.	The ideas of baseline ***date*** and baseline ***area*** are closely tied together. The baseline ***date*** is a "triggering" date for counting baseline concentrations and subsequent increment consumption. The actual date is the day the first complete PSD application is received after August 7, 1977.	**Baseline Date** • date of first complete PSD application • after August 7, 1977
91.	It applies to an ***area*** within one State. The area is made up of all designated PSD areas—attainment or unclassifiable—touched by the first major source's line of ***significant annual impact.***	**Baseline Area** 
92.	When we examined the procedures for carrying out the Air Quality Analysis procedure, we saw that there are several areas where the applicant has to go into considerable depth: Dispersion modeling calls for a ***modeling plan,*** agreed on by the reviewing agency. Data on existing air quality, in most cases, require on-site monitoring, described in a ***monitoring plan,*** also agreed on by the reviewing agency. To go with the air quality data, we need ***meteorological*** data, which may be available from official records. But they may have to be collected on site by the applicant.	• modeling plan • on-site monitoring • meteorological data
93.	When the data are all pulled together, the applicant does dispersion modeling.	
94.	If this fourth step, ***screening*** analysis, shows no threat to National Ambient Air Quality Standards or available increments, it may not be necessary to do the fifth step.	

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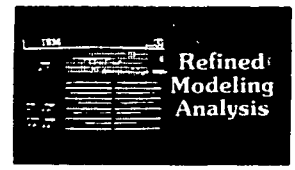
95. Generally the screening analysis will produce:
    Approximate ***maximum*** concentrations downwind of the source,
    A general idea of the ***location*** of maximum concentrations, and
    Quick, preliminary results.

Screening analysis yields . . .

- approximate maximum concentration downwind
- general location of maximum concentration
- quick, preliminary results

96. If screening results do not clearly show that there is no problem with ambient standards or increments, the fifth step—***refined*** modeling analysis—will be necessary. Refined analysis will call for careful planning, computer time, and money.

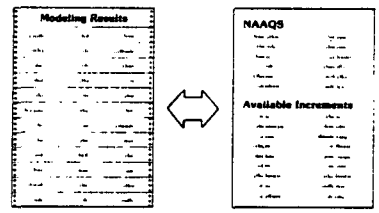


97. Refined analysis in accordance with the EPA *Guideline on Air Quality Models* will produce:
    - projected ***concentrations***,
    - for specific ***averaging times***,
    - at a set of ***points***—receptors—in the area modeled.

Refined analysis yields . . .

- projected concentrations
- for specific averaging times
- at a set of points

98. These can be compared in detail with the corresponding ambient standards or available increments.



99. Depending on your point of view, you could argue that either Air Quality Analysis or BACT Analysis is the most complicated stage of the application process. We won't try to settle that here. However, the ***fourth*** and last stage we looked at is somewhat different.

4 Steps

- Applicability Determination
- Best Available Control Technology Analysis
- Air Quality Analysis
- Additional Impacts Analysis

100. ***Additional Impacts*** Analysis is not spelled out in great detail in the Clean Air Act or EPA regulations.

101. What kind of analysis and how much has to be done depend greatly on the PSD Class of the area affected and on special conditions in the area.

Kind of analysis and how much depend on:

- PSD class of the area
- special conditions in the area

102. Additional Impacts Analysis looks at the effects of the new source or modification on three things: ***soils***, ***vegetation***, and ***visibility***.

Additional Impacts Analysis

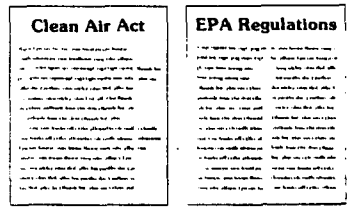
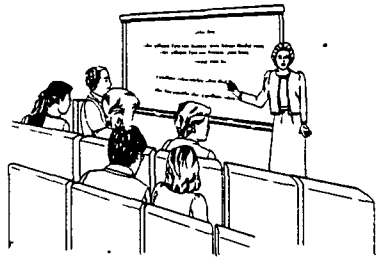
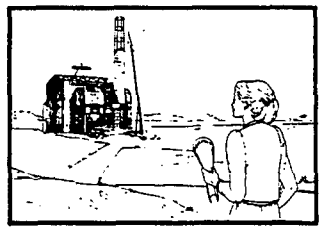
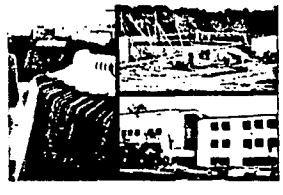
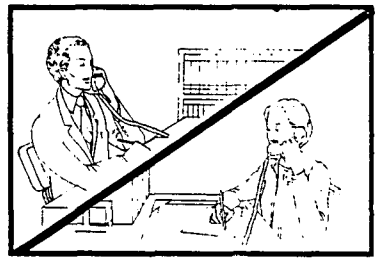
- soils
- vegetation
- visibility

Slide	Script	Selected Visuals
103.	The emissions that affect these may come from the new source or modification *itself,* or from ***associated growth.***	
104.	The applicant makes the Additional Impacts Analysis for ***three basic purposes:*** One, to assist its own decision making on Best Available Control Technology—BACT, Two, to inform the general ***public*** of potential air-quality-related impacts, and Three, to provide the ***Federal Land Manager*** with information on potential Class One area impacts.	**Purposes** 1. Assist BACT decision making 2. Inform the general public 3. Provide Federal Land Manager with information
105.	Making decisions on what and how much to analyze, we saw, could be made easier by keeping ***six basic points*** in mind.	1. Depth 2. Public Information 3. Triggers 4. Concentration-Impact Relations 5. Documentation 6. Flexibility
106.	First, the ***depth*** of the analysis depends on the nature and degree of expected impacts. They, in turn, depend on the ***quantity*** of emissions, ***existing*** air quality, and the ***sensitivity*** of the area.	1. Depth • quantity of emissions • existing air quality • sensitivity of soils, vegetation, and visibility
107.	Second, the analysis should ***inform the public*** of things they need to know to take part in the decision-making process.	2. Public Information • information necessary for taking part in decision-making process
108.	Third, the analysis may be ***triggered*** for both criteria and noncriteria pollutants.	3. Triggers • criteria pollutants • noncriteria pollutants
109.	Fourth, the analysis deals with ***effects*** of each pollutant under review on air-quality-related values. This involves examining ***concentration-impact relations*** for ***direct*** and ***secondary*** emissions resulting from the project.	• effects on air-quality-related values • concentration-impact relations
110.	Fifth, full ***documentation*** of all the Additional Impacts Analysis is important for both legal and public information reasons.	5. Documentation • for legal information reasons • for public information reasons

Slide	Script	Selected Visuals
111.	Sixth, the approach to the analysis is ***flexible.*** It has to fit the situation.	**6. Flexibility** • has to fit the situation
112.	We saw that the overall task of Additional Impacts Analysis can be broken down into ***three component analyses.*** They are ***Growth*** Analysis, ***Soils and Vegetation*** Impact Analysis, and ***Visibility Impairments*** Analysis.	**Additional Impacts Analysis** • Growth Analysis • Soils and Vegetation Impact Analysis • Visibility Impairments Analysis
113.	The Growth Analysis ***projects associated*** growth in the area, estimates ***emissions*** caused by permanent growth, and analyzes ***air quality*** resulting from the emissions.	**Growth Analysis** • projection of associated growth • estimates of emissions • analysis of air quality
114.	The Soils and Vegetation Impact Analysis uses the projected air quality values to predict how soils and vegetation in the area will be affected.	**Soils and Vegetation Analysis** • estimates effects on soils and plants
115.	Since different areas can have very different problems, this will call for a ***survey*** of soil and vegetation types, ***projection*** of ambient concentrations, and ***correlation*** of concentrations with effects.	• survey of soil and vegetation types • projection of future ambient concentrations • correlation of concentrations with effects
116.	The Visibility Impairments Analysis is especially important where a Class One area may be affected.	

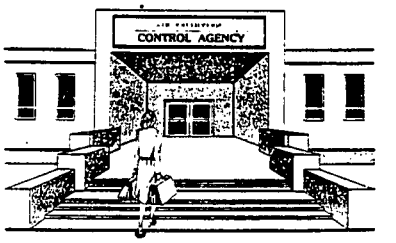
117.	It uses special kinds of dispersion ***modeling*** to estimate the effects of new emissions on the impacted area. It compares these effects with ***existing*** visibility and the special ***value*** of visibility in the area.	• uses dispersion modeling to estimate effects of new emissions
		• compares effects with:
		  • existing visibility
		  • special value of visibility

118.	What we just finished describing—Applicability Determination, BACT Analysis, Air Quality Analysis, and Additional Impacts Analysis—is what the ***applicant*** does. Why this focus on the applicant?	 • Applicability Determination • BACT Analysis • Air Quality Analysis • Additional Impacts Analysis

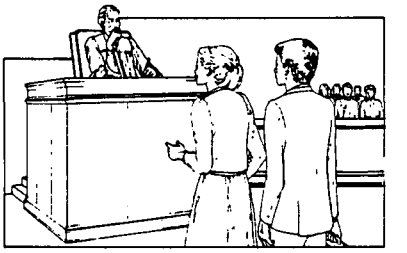
Slide	Script	Selected Visuals
119.	The answer to why the focus is on the applicant is found in the Clean Air Act and supporting EPA regulations.	
120.	Each of the steps we've spelled out is part of the ***demonstrations*** the applicant is required to make. The law and regulations repeatedly say things like: "The owner or operator of such facility ***demonstrates*** . . . that emissions from construction or operation of such facility will not cause, or contribute to air pollution in excess of" increments, national ambient standards, or other emission limitations.	"The owner or operator of such facility demonstrates . . ."
121.	The legal burden is put on the applicant—the organization wanting to build or modify. It has to justify its possible using up of part of a public resource—the available increment of air quality for each pollutant that meets the significance test.	
122.	Building and operating the new source or modification is something we presume the applicant does, first of all, for its own benefit. For this reason, the applicant has an incentive to meet the requirements of PSD permit application.	
123.	But the new operation can benefit others, too. It can provide jobs, goods, services, and a market that were not previously available.	
124.	So getting the new operation in place and running may also be a subject of legitimate interest to government at one or more levels. This means that government agencies may ***help*** the applicant with parts of the application. Sometimes the agency that can help is the same one that will review the application; often it is not.	

Slide	Script	Selected Visuals

125. None of this, however, takes away the basic responsibility of the applicant. That is to prepare and defend a technically sound, ***complete*** proposal. The application has to show how the new source or modification will operate to comply with the requirements of the PSD program.



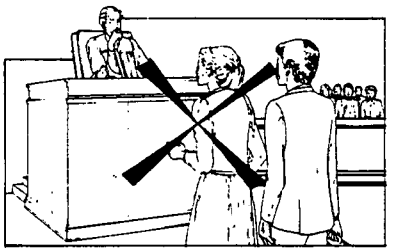
126. We have seen the steps that the applicant performs to put together a sound, complete application. In some ways, it is like a legal brief in a law suit. It assembles the facts and arguments which the applicant claims will show why it should have a permit to build and run an operation as described.



127. If we don't push the comparison too hard, we can say the applicant is like the plaintiff in a civil law suit. It has the burden of ***proof***. The application has to convince an unbiased observer that the proposed operation will comply with the law and regulations. It also has the burden of ***going forward*** with the action—to produce the facts and arguments to support its case, without waiting to be asked specific questions.

- burden of proof
- burden of going forward

128. This is a good time to remind ourselves this is ***not*** a lawsuit. We're talking about the administrative processing of a permit application. With that comment in mind, we can ***roughly*** compare the reviewing agency's role with that of a judge.

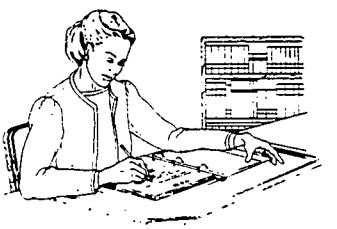
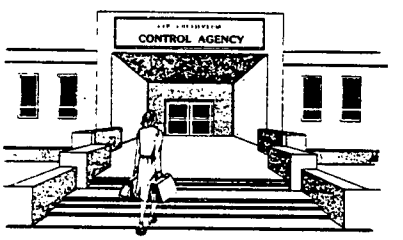
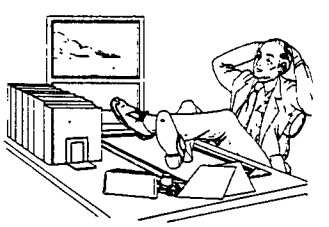


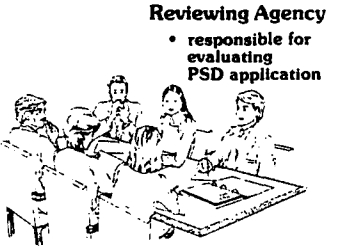
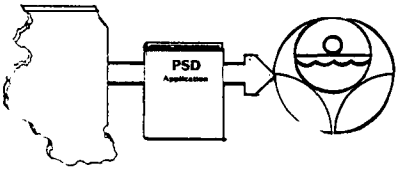
129. When the agency has a complete application in hand, it has to become that "unbiased observer" we mentioned a moment ago. The agency has to ***examine*** the facts and arguments advanced by the applicant. If, after following procedures set down by law, it decides the applicant should have its permit, then it has to write a ***decision***. The decision reviews why the agency is convinced by the application, and sets out the terms of the permit.

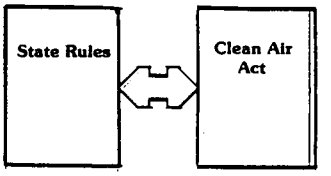
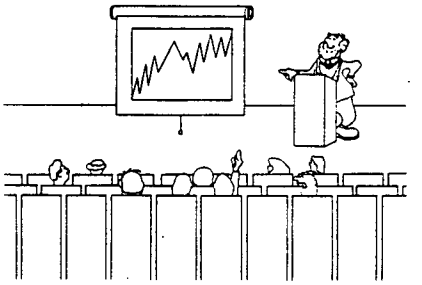
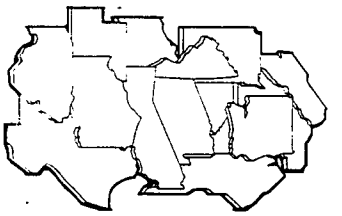
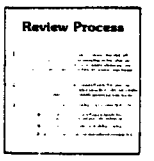
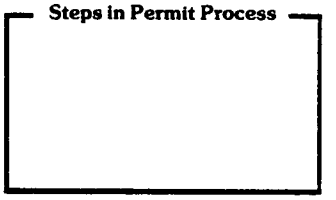
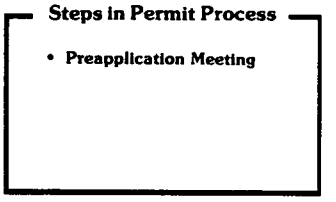
Slide	Script	Selected Visuals
130.	If the agency decides the applicant should ***not*** have a permit, it has to write a justification of that decision. It may be a denial, or it may be a requirement for more evidence and argument.	
131.	In the next lesson, we will look briefly at how the reviewing agency organizes and carries out its responsibilities in the PSD application-review process.	Coming up next... the agency's role
132.	(Credit slide)	Application Summary and Introduction to Agency Review Technical Content: John Maroney Instructional Design: Monica Leslie Graphics: Betsy Hebert, Kathy Ward Photography/Audio: David Churchill Narration: Rick Palmer
133.	(Northrop slide)	Developed and produced by: Northrop Services, Inc. under EPA Contract No. 68-02-3573
134.	(Northrop slide)	Based in part on the: 1980 PSD Workshops prepared for the U.S. Environmental Protection Agency Office of Air Quality Planning and Standards by TRW, Inc., Environmental Engineering Division with the assistance of Northrop Services, Inc. under EPA Contract No. 68-02-3174
135.	(NET slide)	Northrop Environmental Training

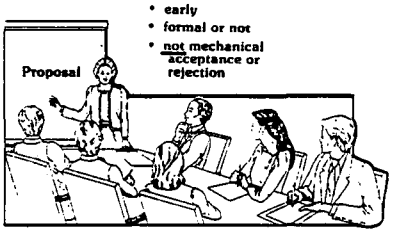
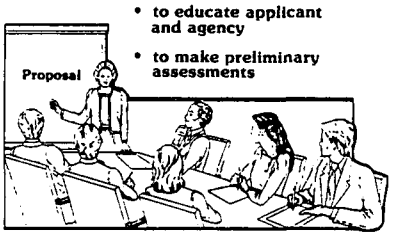
SI:453
Lesson 10

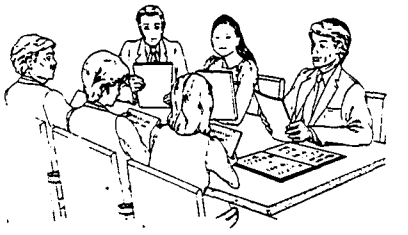
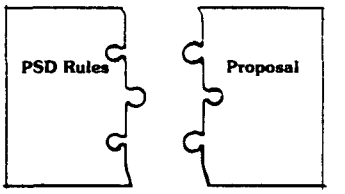
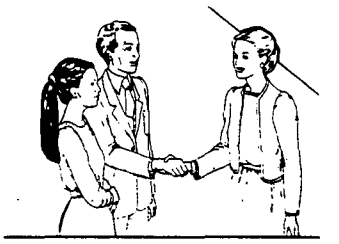
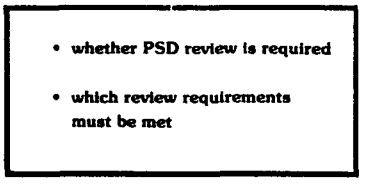
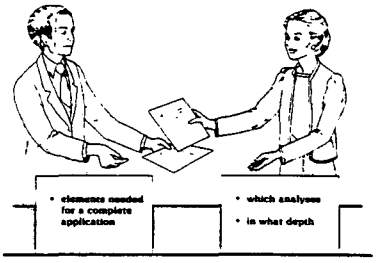
Agency Review of the Application: I

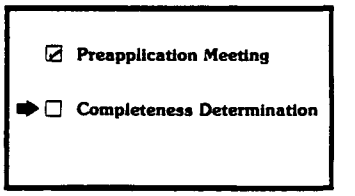
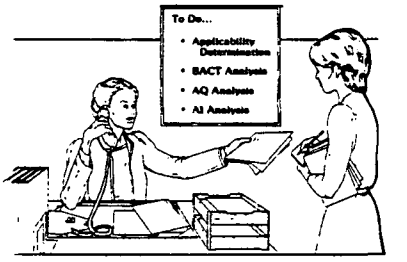
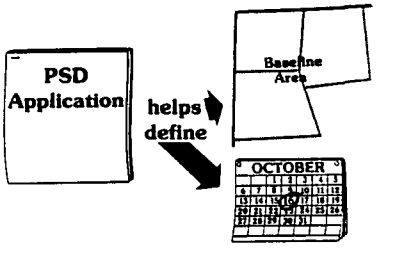
Slide	Script	Selected Visuals
1.	(Focus)	FOCUS
2.	This is Lesson Ten, "Agency Review of the Application, Part One."	Agency Review of the Application: I
3.	Up to now, we've concentrated on the ***applicant's*** part in the process that leads to a PSD permit for a proposed new source or modification. In the last lesson, we reviewed the applicant's steps in developing a sound, complete application.	
4.	The applicant carries the burden of convincing the reviewing agency that the new source or modification should get a PSD permit. It's the applicant who is in the best position to know the technical and financial details of the source and possible emission controls for it. The law and regulations say the applicant has to ***demonstrate*** that the new operation will comply with PSD requirements.	
5.	Specifically and concretely, this means the applicant must: perform all the required ***analyses,*** ***document*** the results clearly and concisely in the permit application, ***apply*** best available control technology where it's required, and ***comply*** with all permit conditions.	• perform analyses • document results • apply BACT • comply with permit conditions
6.	However, the reviewing agency doesn't get to take it easy just because the applicant has all this responsibility. The agency ***isn't*** supposed to do the applicant's job, but it ***is*** supposed to do its own job.	

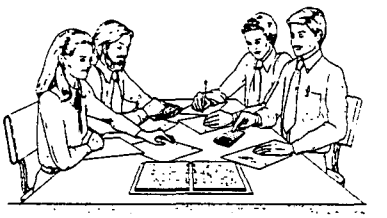
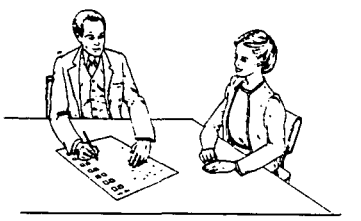
Slide	Script	Selected Visuals
7.	The reviewing agency is responsible for ***evaluating*** the PSD application systematically, thoroughly, and expertly.	
8.	It's also responsible for using the application and review process to ***manage air quality*** in the region, helping to balance economic growth and use of the air resource.	
9.	The Clean Air Act and EPA regulations do ***not*** spell out detailed steps that each agency doing PSD reviews has to go through.	
10.	There are several reasons for this. The most important reason is that the PSD program is supposed to be carried out by the States as part of their implementation plans under the Act.	
11.	Over the past few years, this has worked out so that we have four PSD review situations: States with their ***own*** PSD permit authority, States with ***full delegated*** authority from EPA, States with ***partial delegated*** authority from EPA, and States where ***EPA*** does the review and issues the permits.	States may have... • their own permit authority under a SIP • full delegated authority from EPA • partial delegated authority from EPA • no authority—EPA does the review and issues the permit
12.	In partial delegation, State or local agencies do most of the review and send the package to EPA to issue the permit and to enforce it.	

Slide	Script	Selected Visuals
13.	The rules that a State agency follows in permit review have to be ***compatible*** with the Clean Air Act.	
14.	They have to get the results the Act calls for, and make sure certain essential legal bases—like public participation—are touched.	
15.	But the rules grow out of ***State*** law and practices at least as much as out of the Clean Air Act. This means they can be different in some ways from State to State.	
16.	We did say that the reviewing agency is responsible for a ***systematic*** review. The process shouldn't have to be reinvented every time a new application comes in. And applicants are entitled to know what they have to do and what to expect from the agency.	 The review process should be systematic.
17.	If you combine logical requirements of what needs to be done with basic legal essentials, you get a suggested five-step process for the reviewing agency. These five steps are:	
18.	One, preapplication meeting,	

Slide	Script	Selected Visuals
19.	Two, completeness review,	**Steps in Permit Process** • Preapplication Meeting • Completeness Review
20.	Three, preliminary determination,	**Steps in Permit Process** • Preapplication Meeting • Completeness Review • Preliminary Determination
21.	Four, public review and comment, and	**Steps in Permit Process** • Preapplication Meeting • Completeness Review • Preliminary Determination • Public Review and Comment
22.	Five, final determination—including methods for compliance checks.	**Steps in Permit Process** • Preapplication Meeting • Completeness Review • Preliminary Determination • Public Review and Comment • Final Determination
23.	The ***preapplication meeting*** can shape the whole application and review process. It should take place early in the applicant's planning to build or modify. This meeting may be more formal or less so, depending on agency standing rules and policy. However, it should ***not*** be just a mechanical acceptance or rejection of paperwork reviewed before the meeting.	**Preapplication Meeting** • early • formal or not • not mechanical acceptance or rejection 
24.	The purpose of this meeting is to ***educate*** the applicant and the agency, and to make some ***preliminary assessments.***	• to educate applicant and agency • to make preliminary assessments 

Slide	Script	Selected Visuals
25.	The educating at the preapplication meeting should run in both directions. Of course, the applicant has had an opportunity to read agency regulations and application instructions.	
26.	Agency staff has seen a written outline of the project proposal for new construction or modification.	
27.	But the meeting is about ***whether*** and ***how*** these fit each other.	
28.	Based on the project proposal and information exchanged at the meeting, the agency and the applicant should come to an agreement on a ***preliminary assessment.***	
29.	This assessment is used to help decide ***whether*** PSD review is required, and if so, ***which*** specific review requirements must be met.	
30.	The preliminary assessment resulting from the preapplication meeting provides essential information for both parties. It tells the ***applicant,*** in outline, what engineering analyses have to be done, and in what depth. It spells out for ***agency*** staff what elements will be needed for a ***complete*** application.	

Slide	Script	Selected Visuals
31.	A lot happens between the preapplication meeting and the agency's ***second*** review step, the ***completeness determination.***	
32.	This is the time when the applicant does its detailed Determination of Applicability, BACT Analysis, Air Quality Analysis, and Additional Impacts Analysis. Of course, many questions and answers may be exchanged between the agency and the applicant, and perhaps with other government agencies.	
33.	But when the agency receives what claims to be a ***complete*** PSD permit application, it has to concentrate special effort and time on reviewing that package. It also has to begin work on involving other participants in later stages of review—for instance, at this point the Federal Land Manager must be notified if a Federal Class I area will be affected.	
34.	Completeness is a very important word in PSD permit processing. A ***complete*** PSD application can start several clocks running. The maximum time between the declaration of a complete application and the issuing or denying of a permit is set by the Clean Air Act as one year.	
35.	Remember that the baseline date for each pollutant in an area is triggered by receipt of the ***first complete*** PSD application for that pollutant. An earlier complete application ***may*** have priority for using available increment over a later one. In some agencies, the permit must be issued or denied within a rather short fixed time after receiving a complete application.	

Slide	Script	Selected Visuals
36.	The EPA regulations say a complete application "contains all of the information necessary for processing the application."	"...all of the information necessary for processing the application"
37.	In talking about State agency review, the regulations say this ***doesn't*** mean the agency can't ask for or accept ***additional*** information.	
38.	But remember we said that a PSD permit application isn't a fill-in-the-blanks sort of thing. The reviewing agency can't just go through a form—or a bundle of forms, like a complicated tax return—and see if all the blocks are filled in. To check an application for completeness, the agency has to have some of their technical staff go through it. These engineers or technicians need to have the kind of knowledge and experience that makes them able to judge whether an application contains all the information necessary to process it.	
39.	This gives the agency a fairly difficult job to begin with. The idea at this stage is ***not*** to launch a detailed evaluation of the project described by the application. What ***is*** needed is a quick, reliable determination that the agency has enough information in hand to proceed to its detailed analysis.	
40.	Much of the effort in the completeness review focuses on evaluating the applicant's determination of ***applicability***. Important yes-no questions of applicability should be dealt with in the ***pre***application meeting stage.	
41.	But there are still questions of ***what*** review and ***how much*** must be done for specific units within the proposed construction or modification.	• What review? • How much review?

Slide	Script	Selected Visuals

42. There are ***five areas*** of concentration in the agency's evaluation of applicability. They are:
    First, ***identification*** of the source and proposed construction,
    Second, examination of ***emissions estimates***,

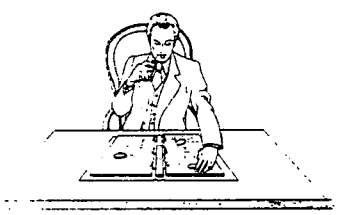
1. Identification of the Source
2. Examination of Emissions Estimates

43. Third, examination of ***location***,
    Fourth, checking of the ***applicability tests***, and
    Fifth, examination of ***exemptions***.

1. Identification of the Source
2. Examination of Emissions Estimates
3. Examination of Location
4. Checking of the Applicability Tests
5. Examination of Exemptions

44. In going over the application for completeness, the agency's reviewer will be helped considerably by having experience with other applications. A ***checklist*** like the one suggested in Appendix Two of the PSD *Workshop Manual* is also a great help.

45. The reviewer needs to know what common ***omissions*** and ***errors*** to check for.



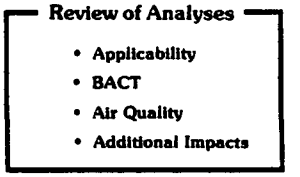
46. These happen most often in the areas of ***source definition*** and making ***emissions estimates***. A careful check of which ***emissions units*** are counted and how their emissions are ***estimated*** and ***netted*** is in order.

- Which emissions units are counted?
- How are their emissions estimated and netted?

Slide	Script	Selected Visuals

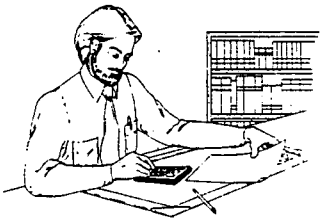
47. Because completeness determination has such legal significance, many agencies will issue a ***formal notice*** to the applicant and the public when they decide they have a complete application. From this point, agency review goes on and intensifies, leading to the next step that is seen by the applicant and public—***preliminary determination.***

48. Before the agency can issue a preliminary determination, it has to review each of the applicant's engineering analyses:
    - —Applicability,
    - —Best Available Control Technology,
    - —Air Quality, and
    - —Additional Impacts.

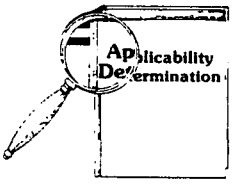


49. All of these reviews are ***internal.*** They take place within the reviewing agency.

50. As we have so often emphasized before, the application is a detailed engineering analysis performed ***by the applicant.*** The agency does ***not*** do an analysis ***for*** the applicant, and shouldn't just ***re***-do the various analyses in the review.



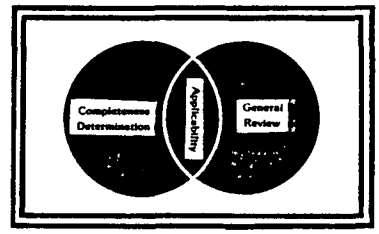
51. The ***completeness*** determination concentrated on the information and conclusions in the applicant's ***applicability*** determination. This is because of the important questions of which units to include and what level of review to do on them.



52. But completeness review has to go on to check for data in each of the major analysis steps.

Slide	Script	Selected Visuals

53. There is also an overlap from the completeness determination into the general review. The agency has to go over the Applicability Determination at a more stringent level of detailed technical review before going on to review of the BACT Analysis.

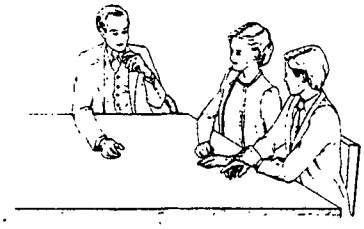


54. In reviewing the Best Available Control Technology Analysis, the agency has to keep in mind that the applicant is ***proposing*** a set of emissions limitations. The agency reviewer may believe that ***more stringent*** controls can be achieved within the BACT criteria. Any such decision must be based on solid factual information, for example from the EPA Clearinghouse or technical reports.

Review of BACT Analysis

- reviewer must keep in mind that applicant is proposing emission limitations
- more stringent controls may be achievable

55. Disagreements on the specific continuous emissions reduction representing BACT may call for requests for additional information, informal meetings, and negotiation.



56. Of course, reviewing the BACT Analysis requires engineering knowledge and experience. There are ***four questions*** that guide the application of that knowledge and experience:
    - Is the analysis ***complete?*** This applies to both pollutant coverage and emissions units.

☐ Is the analysis complete?

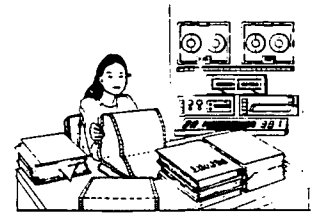
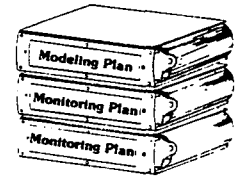
57. - Is the analysis ***thorough?*** This deals with identifying alternatives and looking at them deeply enough.

☐ Is the analysis complete?
☐ Is the analysis thorough?

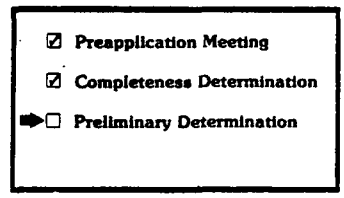
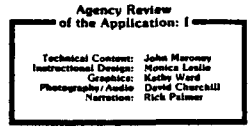
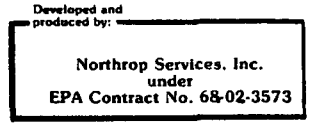
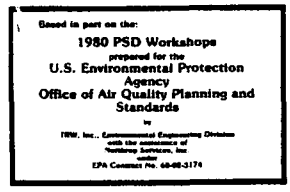
58. - Are the ***cost estimates*** used reasonable?

☐ Is the analysis complete?
☐ Is the analysis thorough?
☐ Are the cost estimates reasonable?

Slide	Script	Selected Visuals
59.	—Has the applicant made a good faith effort in ***proposing BACT?***	☐ Is the analysis complete? ☐ Is the analysis thorough? ☐ Are the cost estimates reasonable? ☐ Has applicant made good-faith effort?
60.	To get a "yes" answer to these questions, the reviewer may have to get more information from the applicant. When, finally, all the answers are "yes," the agency can write up BACT as ***Federally enforceable permit conditions*** specifying a system of ***continuous emission*** reduction.	☑ Is the analysis complete? ☑ Is the analysis thorough? ☑ Are the cost estimates reasonable? ☑ Has applicant made good faith effort? Agency can write up: • enforceable permit conditions Specifying: • continuous emission reduction
61.	In moving on to reviewing the ***Air Quality Analysis,*** the agency may have to call on reviewers with different skills and experience—in dispersion modeling. These reviewers are looking at ***six critical items*** in the application:	Review of Air Quality Analysis • agency may have to call on reviewers who have knowledge of dispersion modeling
62.	—Which ***pollutants*** require air quality analysis,	• which pollutants require analysis
63.	—A clear ***description*** of the source or modification,	• which pollutants require analysis • clear description of source or modification
64.	—Dispersion ***model*** selection and use,	• which pollutants require analysis • clear description of source or modification • dispersion model selection and use

Slide	Script	Selected Visuals
65.	—***Existing*** air quality determination,	• which pollutants require analysis • clear description of source or modification • dispersion model selection and use • existing air quality determination
66.	—***Class One*** area impacts, if any, and	• which pollutants require analysis • clear description of source or modification • dispersion model selection and use • existing air quality determination • Class I area impacts
67.	—***Compliance*** with National Ambient Air Quality Standards and allowable increments.	• which pollutants require analysis • clear description of source or modification • dispersion model selection and use • existing air quality determination • Class I area impacts • compliance with NAAQS and allowable increments
68.	For the Air Quality Analysis review, the agency is likely to be working with large volumes of data, on paper and in computer files.	
69.	If the application is for a source of some complexity and size, there are likely to be detailed ***Modeling*** and ***Monitoring Plans.*** The details of these plans should have been worked out in preapplication meetings. In the review stage, the agency is checking to see that the plans have been carried out, and have produced usable information.	
70.	As far as possible, the agency keeps its review of Air Quality Analysis limited to ***checking*** of data and procedures. Doing over the applicant's calculations could be expensive and time-consuming, especially in the area of dispersion modeling.	**Checking of Data and Procedures**

Slide	Script	Selected Visuals
71.	Since the ***Additional Impacts*** Analysis has such flexible basic requirements, the agency also has to be flexible in its approach to reviewing it. The professional backgrounds of the reviewers and the amount of time and effort required will vary with the pollutants to be dealt with and the areas that are affected.	**Review of Additional Impacts Analysis** • agency should be flexible in its approach to the review
72.	Also, the Additional Impacts Analysis doesn't compare projected impacts with fixed levels of acceptability, the way NAAQS or increment impact analysis does. With Additional Impacts, the idea is to ***present clearly*** the projected effects of the source and associated activity, so ***informed value choices*** can be made about them. So the reviewer has to ask not only, "Is the analysis technically correct?" but, "Can the public ***understand*** the results?"	**Big question...** "Can the public understand the results?"
73.	For these reasons, the reviewer has ***four*** special ***questions*** to ask in going over the steps of the applicant's Additional Impacts Analysis: One, is the ***description*** of soils, vegetation, and visibility in the impact area both ***clear*** and technically accurate?	1. Is the description of the impact area clear and accurate?
74.	Two, are the projected ***impacts*** correctly estimated, and does ***documentation*** back up the projections?	2. Are the projected impacts correctly estimated and does documentation back them up?
75.	Three, are the data presented logically, so the reviewer and the public can follow the reasoning? This would include starting with a ***growth*** analysis, then presenting an ***emissions*** projection, and continuing with a ***soils and vegetation*** analysis, and then a ***visibility*** analysis.	3. Is the data presented logically? • Growth Analysis • Emissions Projection • Soils and Vegetation Analysis • Visibility Analysis
76.	Four, does the analysis ***make clear*** to everyone—applicant, reviewer, and public—the potential impacts of the proposed construction?	4. Does the analysis make clear the potential impacts of the proposed construction?

Slide	Script	Selected Visuals
77.	At this point, it isn't hard to see that the agency is getting its internal review process set to move to the next big step. That is the ***third*** step in the overall review process, ***preliminary determination***. We'll begin with that step in Lesson 11.	
78.	(Credit slide)	
79.	(Northrop slide)	
80.	(Northrop slide)	
81.	(NET slide)	

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Lesson 11

Agency Review of the Application: II

Slide	Script	Selected Visuals
1.	(Focus)	FOCUS
2.	This is Lesson Eleven, "Agency Review of the Application, Part Two."	Agency Review of the Application: II
3.	In the previous lesson, we began to talk about the reviewing agency's role in the PSD permit process. We emphasized the applicant's responsibility to produce as an application a thorough ***engineering analysis*** of the proposed new source or modification.	• applicant to propose a thorough engineering analysis of proposed new source or modification
4.	The reviewing agency, we said, is responsible for ***evaluating*** the application through a process of thorough, expert, and systematic review.	• reviewing agency to evaluate the applicant through review that is: • thorough • expert • systematic
5.	We then examined the first two steps in this review process: the ***preapplication meeting*** and the ***completeness review.***	1. Preapplication Meeting 2. Completeness Review
6.	After the agency receives an application and determines that it's complete, it carries out the detailed ***internal review*** that leads to the ***preliminary determination.*** In this lesson, we will examine the last three steps of the agency review: Three, preliminary determination, Four, public review and comment, and Five, final determination. Then we will briefly review the PSD process as a whole.	3. Preliminary Determination 4. Public Review and Comment 5. Final Determination

Slide	Script	Selected Visuals
7.	The preliminary determination is the reviewing agency's statement of its initial judgement of what to do about the proposed new source or modification.	• initial judgement
8.	This judgement is based on the expert review of the application by agency staff.	
9.	The determination states the agency's ***conclusions*** about whether the applicant should get a PSD permit, or not, but it does much more.	• states agency's conclusions about whether or not applicant should get PSD permit
10.	The preliminary determination is a ***legal notice*** to those who will be involved in the next major step—public review and comment.	• legal notice • to those involved in public review and comment
11.	These participants include the applicant, other government agencies, and the general public.	
12.	The notice of determination has to do more than state the agency's preliminary ***conclusions***. It has to summarize the ***data*** and the ***reasoning*** leading to those conclusions.	Notice of determination must... • state preliminary conclusions • summarize data and reasoning

Slide	Script	Selected Visuals

13. Because the preliminary determination is, among other things, a legal notice, its exact form will be different from one jurisdiction to another. However, there are things that need to be covered in ***any*** notice of preliminary determination. A simple example format is given in Appendix One of the PSD *Workshop Manual.*

Example of format for preliminary determination can be found in:

PSD Workshop Manual
Appendix 1

14. The suggested format organizes the necessary information into ***five sections.*** Some are very short, others longer. The sections are:
    One, Applicant identification,
    Two, Location of proposed source or modification,
    Three, Project description,
    Four, Source impact analysis, and
    Five, Conclusions.

1. Applicant Identification
2. Location of Proposed Source or Modification
3. Project Description
4. Source Impact Analysis
5. Conclusions

15. The ***first*** section, applicant ***identification,*** is the shortest. It just states who—corporation, partnership, persons, or whatever—has applied for the PSD permit. It also gives the mailing address for reaching the applicant.

1. Applicant Identification

- who has applied for the permit
- mailing address

16. The ***second*** section is only a little longer. There is usually more than one way to describe the ***location*** of the proposed source or modification. These have to do with where it is legally, where it is on the map, how you would get to it, and what kind of mental picture you can form of it. You'll usually find at least three methods of describing location:
    - Political subdivision—county, parish, borough, or the likes,
    - Map coordinates, and
    - Street or road location.

2. Location of Proposed Source or Modification

- political subdivision
- map coordinates
- street or road location

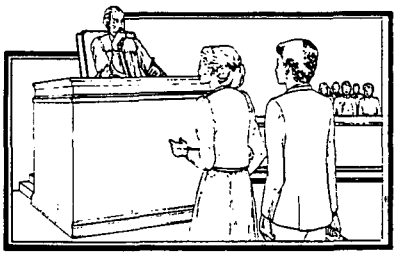
17. The ***third*** section is ***project description.*** This is ***not*** very detailed. It aims at an overview of the proposed project, with necessary technical data coming later. The emphasis should be on the amount—or change in amount—of fuel burned or product processed.

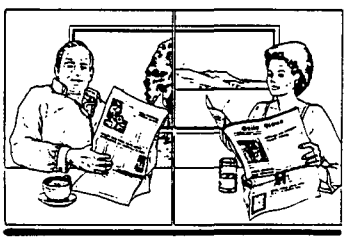
3. Project Description

- overview
- emphasis on amount - or change in amount - of fuel burned or product processed

Slide	Script	Selected Visuals
18.	The ***fourth*** section, source ***impact analysis,*** is likely to be much longer than the others. It is a summary of the results of the application's analysis steps and the agency's review. Whether you're preparing one of these or trying to read it, it's important to remember that it's a ***summary.*** The detailed technical information that backs up the analysis is a matter of public record, available in the application and agency records.	4. Source Impact Analysis • summary of analysis steps and review process
19.	Exactly what goes into the source impact analysis depends on the source and the review it received. The analysis should begin with a short introduction describing: • ***What*** items the application was reviewed for, • ***Why*** these items were reviewed, • What portions of the ***regulations*** apply to the review, • Which ***pollutants*** make the source or modification major, and • What air quality ***standards*** and ***increments*** apply to the air quality review.	• what items reviewed for • why • what regulations apply • which pollutants • what AQ standards/ increments apply
20.	The source impact analysis goes on to summarize each of the analyses in the application, together with the agency's conclusions from its review of the analyses.	• summarizes each analysis
21.	At each stage, a reader should be able to tell: • What was analyzed, • What method was applied, • What data, alternatives, and so on, were used, and • What the ***result*** was, both from the applicant's analyses and the agency review.	• what was analyzed • what method was applied • what data, etc., were used • what the result was

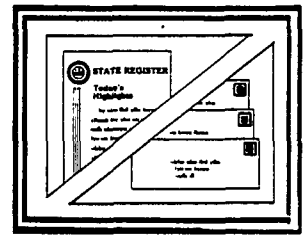
22.	This means the preliminary determination summary will boil down ***Applicability, BACT*** Analysis, ***Air Quality*** Analysis, and ***Additional Impacts*** Analysis to a few pages. The guiding principle is to ***inform*** the persons who will take part in the public review and comment process. They need to know what the ***issues*** are, what ***arguments*** are raised about the issues, and what ***facts*** and expert judgements back up the arguments.	• inform persons involved in public review and comment about:
		  • issues
		  • arguments
		  • facts

Slide	Script	Selected Visuals
23.	The ***fifth*** and final section of the preliminary determination summary is ***conclusions.*** The first thing it should deal with is whether or not the agency recommends ***approval*** of the permit application. Then the agency says ***why*** it recommends approval or disapproval, citing the specific parts of the application and review record involved.	5. Conclusions • does the agency recommend approval? • why or why not
24.	If the agency recommends approval, the conclusions go on to spell out proposed ***permit conditions.***	• permit conditions
25.	These are legally binding means to make sure the new source or modification does the things that keep it within the requirements of the PSD regulations.	
26.	Permit conditions will include: • Federally enforceable emission limitations reflecting BACT,	• emission limitations reflecting BACT
27.	• Design, work practice, or other standards where quantitative emission limits can't be set,	• emission limitations reflecting BACT • design, work practice, or other standards
28.	• A method to check emission levels after startup, and	• emission limitations reflecting BACT • design, work practice, or other standards • method to check emission levels after startup

Slide	Script	Selected Visuals
29.	• Methods for checking compliance with limitations during the term of the permit.	• emission limitations reflecting BACT • design, work practice, or other standards • method to check emission levels after startup • methods for checking compliance with limitations
30.	From here, things move on to the ***fourth*** overall step, ***public review and comment.***	☑ Preapplication Meeting ☑ Completeness Review ☑ Preliminary Determination ➡☐ Public Review and Comment
31.	EPA has a special set of regulations dealing with this.	EPA Regulations
32.	The States that process PSD permits have their own individual laws and regulations.	State Regulations
33.	Lawyers usually sum up the requirements of such rules under the words ***notice and hearing.*** These work out to ***information,*** opportunity to ***participate,*** and knowledge of the ***outcome.***	"Notice and Hearing" • information • opportunity to participate • knowledge of the outcome
34.	Some of the routine notice is made when the application is received and when the applicability determination is made. When the preliminary determination is issued, very extensive notice is required.	NOTICE
35.	The agency has to notify the ***public*** — by advertisement in a newspaper of general circulation where the project is — about four items: — the application, — the agency's preliminary determination, — the expected degree of increment consumption, and — the opportunity to comment at a public hearing or in writing.	

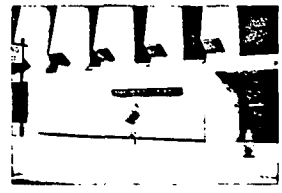
Slide	Script	Selected Visuals

36. For most agencies, there will be more notice than this, including publication in an official register and mailings to associations and interest groups. The notice is generally brief, summarizing the results of the preliminary determination, increment consumption, and the opportunity to comment, in writing or in person.



37. At the same time, the agency notifies any other parties who might take part in the permit hearing. Of course, this includes the applicant. It also includes EPA, government officials responsible for the place where the project is, other State and local air pollution control agencies, city and county chief executives, and other concerned officials.

38. The brief notice has to be backed up by making more information available. At a minimum, this means there is one place in the region where the construction will take place where people can go to examine the public comment package.



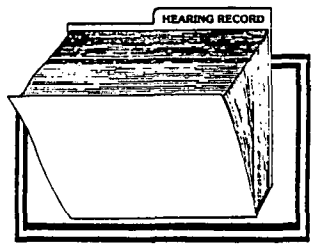
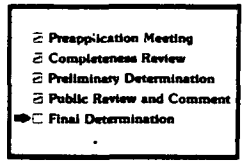
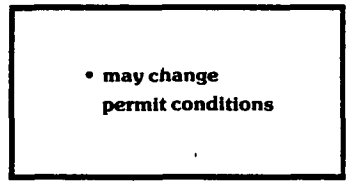
39. This has to include at least:
    - The applicant's complete application and any other information submitted,
    - The preliminary determination, and
    - Copies or summaries of any other information used by the agency to make its preliminary determination.

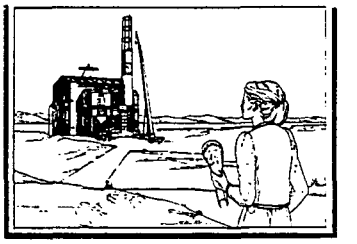
- complete application
- preliminary determination
- copies/summaries of other information used in preliminary determination

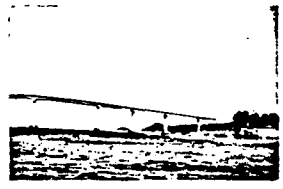
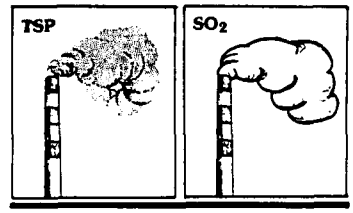
40. That was ***notice.*** ***Hearing*** means that everyone who received notice is entitled to ***comment*** on the agency's proposed action. They can do this by submitting written testimony, or they can appear before the hearing examiner, board or panel and give oral testimony.

41. Comments can address:
    - air quality impacts,
    - alternatives to the source,
    - control technology, or
    - anything else that relates to the PSD effects of the project.

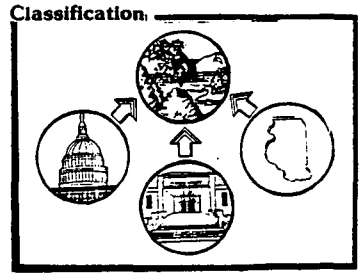
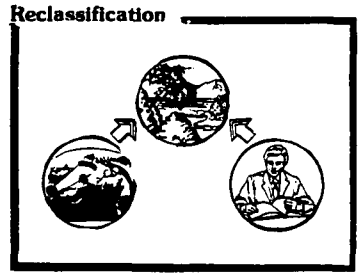
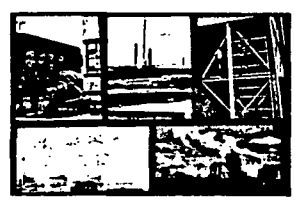
- air quality impacts
- alternatives to the source
- control technology
- other

Slide	Script	Selected Visuals
42.	There may be several public hearings for a major project with extensive impacts. The comment ***record*** is always held open for a period of time that was spelled out in the notice.	
43.	When the agency has received all the comments, it has to reach a ***final*** decision by a time that was also given in the notice.	
44.	Based on public comments, the agency makes its ***final determination*** of whether or not to issue a permit.	
45.	It may change the permit ***conditions*** it proposed if there are convincing arguments to do so in the hearing record.	
46.	Everyone who took part in the process is entitled to know its outcome. The agency notifies the applicant, the public, and other officials of its permit decision in the same way it gave notice of its preliminary determination. The record of hearings and comments is made available at the same places that the preliminary public comment package was.	
47.	With step ***five,*** the final determination, the agency can legally issue the PSD permit to the applicant. (We'll assume they qualify. Otherwise, the process may start over, or go to the courts.)	

Slide	Script	Selected Visuals
48.	The ***permit*** is a legally binding document that spells out all of the basic obligations the applicant has under PSD. It also contains all of the ***conditions*** needed to make sure the source is built and operated to meet the regulatory requirements.	**Permit** • legally binding document • spells out all basic obligations • contains all conditions
49.	With approved permit in hand, the applicant is entitled to commence construction on the new source or modification. When the construction is complete, the source can legally operate as long as it meets the conditions of the permit.	
50.	We've come a long way to get that permit into the applicant's hand. We paused after talking about how the applicant builds the application to review the major technical points of the application process. Now, let's back off a little and review very broadly where we've been.	
51.	We started out by talking about what Prevention of Significant Deterioration is and where it came from.	Prevention of Significant Deterioration
52.	From 1970 to 1977, there was continuing controversy and litigation over the meaning of the words, "protect and enhance the quality of the Nation's air resources," in the Clean Air Act.	"protect and enhance the quality of the Nation's air resources"
53.	EPA promulgated PSD regulations in 1974 in response to a court order in the *Sierra Club versus Ruckelshaus* lawsuit.	EPA Regulations 1974 *Sierra Club v. Ruckelshaus*
54.	Those regulations stirred up argument, but they also laid the groundwork for the thinking that went into the PSD provisions of the Clean Air Act Amendments of 1977.	1977 Clean Air Act Amendments

Slide	Script	Selected Visuals
55.	The basic idea behind those first regulations and the Amendments is fairly simple. We have National Ambient Air Quality Standards to protect the public health and welfare from the effects of air pollution.	National Ambient Air Quality Standards
56.	***But*** there are many areas where air quality is ***better*** than some of the ambient standards.	
57.	Such areas shouldn't be allowed freely to deteriorate toward ***just meeting*** the standards without informed decisions being made about what's being traded for the loss of superior air quality.	
58.	That's where the word ***significant*** came in. It's impractical and undesirable to try to "freeze" ambient air quality.	"significant"
59.	In general, we want it to get better, or not get enough worse to ***make a difference*** to us.	• better or • not enough worse to make a difference to us
60.	Much of the complication in the law and regulation has to do with deciding what makes that difference.	
61.	Congress adopted the idea of ***allowable increments*** for two pollutants, TSP and SO_2.	

Slide	Script	Selected Visuals
62.	An increment is an ***increase*** in the concentration of a pollutant.	Increment • increase in the concentration of a pollutant
63.	The law sets maximum allowable increases of TSP and SO_2 concentrations for different ***averaging times*** and different ***classes***—One, Two, or Three—of PSD ***areas.***	Increment • increase in the concentration of a pollutant • over different averaging times • for different classes of areas
64.	The Clean Air Act requires EPA to adopt regulations to prevent significant deterioration for the other criteria pollutants—carbon monoxide, ozone, nitrogen dioxide, and lead. EPA's system doesn't have to use increments for these pollutants, but it can.	
65.	Closely tied to the increment idea is the designation of PSD ***areas*** and area ***classifications.***	• PSD areas • area classifications
66.	Any area that is ***attainment***—or that ***cannot be classified*** as attainment or nonattainment—for any National Ambient Air Quality Standard is a PSD area for that pollutant.	Attainment Unclassifiable PSD area
67.	PSD areas come in three ***classes,*** depending on how strictly they are protected. Class ***One*** areas have ***small*** allowable increments and other special protections, including restrictions on redesignation and special permit review considerations.	Class I – small allowable increments – and other protections
68.	Class ***Three*** areas have the ***largest*** available increments.	Class I – small allowable increments – and other protections Class III – largest increments

Slide	Script	Selected Visuals
69.	Class ***Two*** areas fall in between.	Class I – small allowable increments – and other protections Class II – in between Class III – largest increments
70.	But no matter what an area's class is, no increase is allowed to take the area over ***any*** ambient standard.	Ambient standards may never be exceeded.
71.	Deciding what class an area will be is a job divided among Congress, Federal agencies, and the States.	Classification 
72.	***Re***classification requires public participation and agreement from certain important parties, like Federal Land Managers.	Reclassification 
73.	The method for ensuring that the ambient standards, increments, and other values are protected is case-by-case review of proposed ***new sources*** of air pollutants or ***modifications*** to them.	
74.	The Clean Air Act lays down some of the basic features of this new source review process for PSD.	

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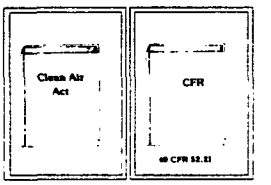
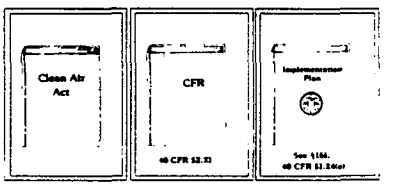
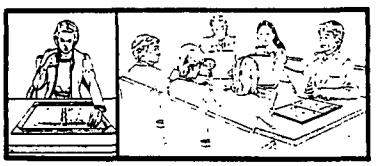
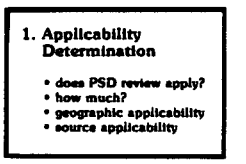
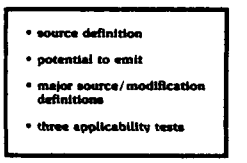
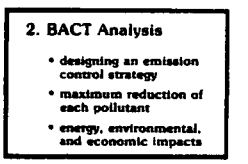
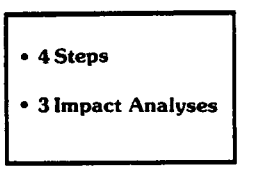
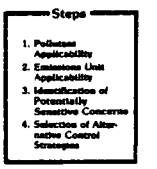
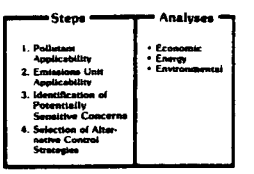
75.	EPA describes ***its*** review procedures in its regulations at 40 CFR 52.21.	
76.	State Implementation Plans must provide for prevention of significant deterioration of air quality. The regulatory requirements for PSD SIPs are at 40 CFR 51.24.	
77.	To understand generally how this process for reviewing proposed new sources or modifications works, we broke it down into several parts. First, we concentrated on how the applicant—the organization that wants to build the project—puts together its ***permit application.***	
78.	Second, we turned to how the government agency responsible for issuing the permit ***reviews*** that application.	
79.	In fact, we spent most of our time on the application process. The reason for this emphasis is straightforward. The application is a detailed ***engineering analysis*** by the applicant. Its purpose is to demonstrate that the proposed construction can meet all PSD requirements. If the application can persuade the reviewing agency and public, the applicant gets a permit. If not, no permit.	The Application . . . a detailed engineering analysis
80.	The application, we saw, is made up of ***four major steps:*** One, Applicability Determination, Two, Best Available Control Technology Analysis, Three, Air Quality Analysis, and Four, Additional Impacts Analysis.	1. Applicability Determination 2. BACT Analysis 3. AQ Analysis 4. AI Analysis

Slide	Script	Selected Visuals
81.	The ***first*** major step, ***Applicability*** determination, is concerned with ***whether*** PSD review applies to the project, and if it does, ***how much.*** The key questions had to do with ***geographic*** applicability—is the area attainment or unclassifiable?—and ***source*** applicability—is the source or modification major?	
82.	To answer these questions, we saw that the applicant had to deal with a number of topics. The most important of these were: • Source definition, • Potential to emit pollutants regulated under the Clean Air Act, • Major source and modification definitions, and • Three applicability tests.	
83.	The ***second*** major step, BACT Analysis, is concerned with designing an emission control strategy for the new emission units. The analysis arrives at a set of emission limits that reflect the ***maximum*** degree of reduction of ***each*** pollutant regulated under the Clean Air Act. To decide whether a reduction is ***achievable,*** the analysis considers ***energy, environmental,*** and ***economic*** impacts. You should note that BACT applied to new applications does change over time, as technology advances.	
84.	The BACT Analysis is organized into ***four steps*** for assembling the data, and ***three impact analyses.***	
85.	The ***four steps*** of BACT Analysis are: One, Pollutant Applicability, Two, Emissions Unit Applicability, Three, Identification of Potentially Sensitive Concerns, and Four, Selection of Alternative Control Strategies.	
86.	The alternative control strategies are tested and ranked by ***three Impact Analyses:*** • Economic, • Energy, and • Environmental.	

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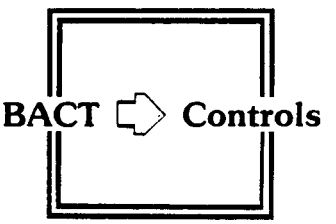
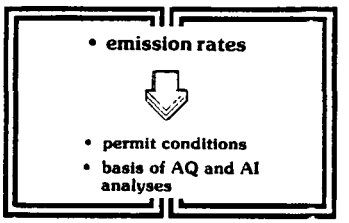
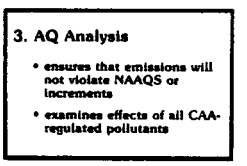
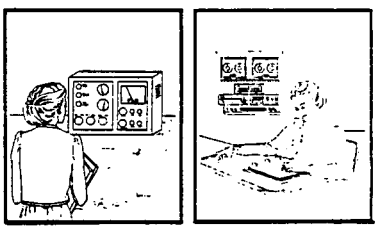
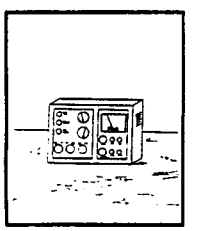
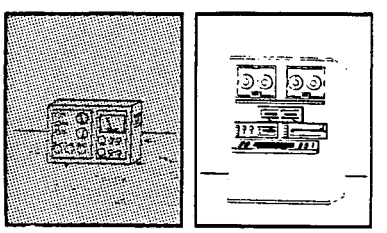
87.	The product of the BACT Analysis is a decision on a set of controls to apply on the emission units of the new source or modification.	
88.	Projecting the operation of the source with these controls produces a set of ***emission rates*** for the pollutants under study. These emission rates are proposed ***permit conditions***, and they are also the basis of the two following analyses, Air Quality and Additional Impacts.	
89.	The ***third*** major step in the application process is Air Quality Analysis. It aims at making sure that emissions from the new operation will not violate any National ***Ambient*** Air Quality ***Standards*** or allowable ***increments.*** It also examines the effects on air quality of emissions of any pollutant regulated under the Clean Air Act.	
90.	Data on air quality can be obtained by ***measurement*** or ***estimation.***	
91.	Some measured data that goes into the ***baseline*** air quality may be available from government monitoring, but the ***applicant*** may have to actually monitor air quality.	
92.	***Estimated*** air quality—present or future—is obtained from dispersion ***modeling.***	

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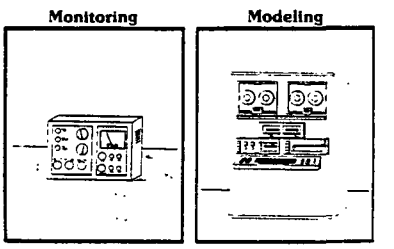
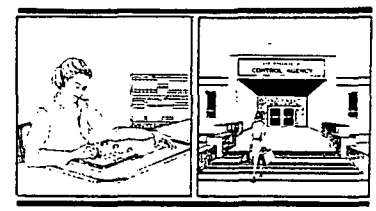
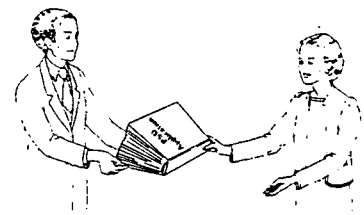
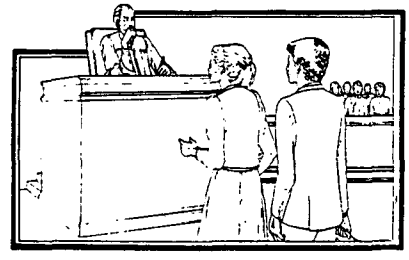
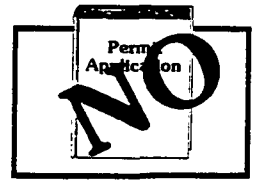
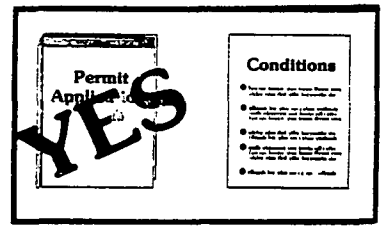
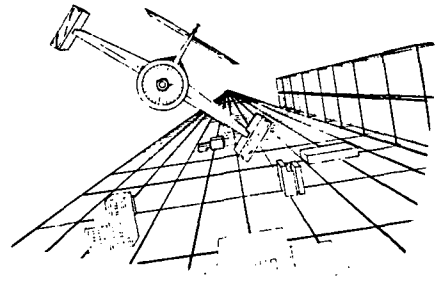
93.	This means that, generally, the applicant has to put together ***two plans*** for Air Quality Analysis: a ***Monitoring*** Plan and a ***Modeling*** Plan.	
94.	The complicated work of measuring and estimating air quality data is organized into ***five basic steps*** and ***three*** interrelated ***phases.***	• 5 Basic Steps • 3 Phases
95.	The ***five steps*** are: One, Impact area definition, Two, Emission inventory compilation. Three, Existing concentration determination, Four, Screening analysis, and Five, Air quality projections.	1. Impact Area Definition 2. Emission Inventory Compilation 3. Existing Concentration Determination 4. Screening Analysis 5. Air Quality Projections
96.	The ***three*** interrelated ***phases*** are: One, Increment consumption analysis, Two, Existing air quality determination, and Three, Projected air quality analysis.	1. Increment Consumption Analysis 2. Existing Air Quality Determination 3. Projected Air Quality Analysis
97.	The Air Quality Analysis produces a detailed description of present and future ambient concentrations of the pollutants studied. This is important for showing that the proposed project will not exceed any standards or increments. It is also important for the final step of the application process.	• detailed description of present and future ambient concentrations of pollutants
98.	The ***fourth*** major step in the application, Additional Impacts Analysis, is concerned with the effects of the source on air-quality-related values. These are: ***soils, vegetation,*** and ***visibility.***	4. AI Analysis • effects on air-quality-related values • soils, vegetation, and visibility
99.	The Additional Impacts Analysis is put together from ***three component analyses:*** • Growth Analysis, • Soils and Vegetation Impact Analysis, and • Visibility Impairment Analysis.	• Growth Analysis • Soils and Vegetation Impact Analysis • Visibility Impairment Analysis

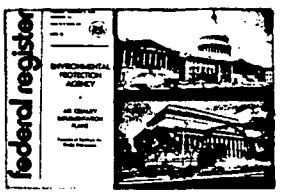
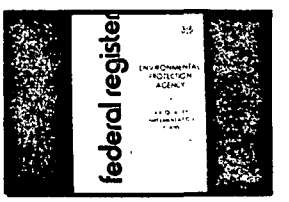
Slide	Script	Selected Visuals

100.	The Additional Impacts Analysis produces a description of how the proposed project's operation will affect ***values*** — both economic and esthetic — in the impact area.	• how proposed project will affect values:
		  • economic
		  • esthetic

101.	This provides needed data for BACT decision-making, public information, and Federal Land Managers' decisions.	• provides needed data for:
		  • BACT decisions
		  • public information
		  • Federal Land Manager's decisions

102.	We moved on from the completed application to the reviewing agency's role in the PSD application and review process. The emphasis was again on the ***applicant's*** responsibility to produce a complete engineering analysis in the application.	
103.	We began the last lesson with a general description of the agency review process, and concluded that description at the beginning of this lesson.	
104.	Actually, the agency's work begins ***before*** it receives an application. However, the heavy work comes after the application is received.	
105.	We broke the review down into ***five steps:*** One, Preapplication meeting, Two, Completeness review, Three, Preliminary determination, Four, Public review and comment, and Five, Final determination.	☐ Preapplication Meeting ☐ Completeness Review ☐ Preliminary Determination ☐ Public Review and Comment ☐ Final Determination

Slide	Script	Selected Visuals
106.	The agency review results in a legally binding administrative decision.	
107.	The agency may decide to ***disapprove*** the permit. If it does, the applicant will have to decide whether to change its plans for the proposed source or modification, or pursue some alternative plan.	
108.	An ***approved*** permit will carry ***conditions*** to make sure the project is built and operated in accordance with PSD program requirements.	
109.	This completes what we have to say about the PSD law and regulations in this course. It's been pretty long and complicated. You may feel you've learned more than you ever wanted to know about the subject.	
110.	But in fact, we've really only done what we promised in the course title—we've given you an ***overview***. Behind every paragraph of what we've said here, there are chapters of greater detail.	
111.	There's no denying the PSD program is complicated. If you're going to work with it, you'll have to read guidelines, journal articles, official notices, applications, and even court cases.	

Slide	Script	Selected Visuals
112.	The best way to pick up ***some*** information will be to talk with people who work with PSD every day.	
113.	And one last thing—be ready for the program to ***change.*** Some changes may be big and sweeping; you should see something about them in the news.	
114.	But some may seem small and technical, and still have a major effect on what ***you're*** interested in. Those, you may have to watch the *Federal Register* for. Good luck with your continued learning.	
115.	(Credit slide)	Agency Review of the Application: II Technical Content: John Maroney Instructional Design: Monica Leslie Graphics: Kathy Ward Photography/Audio: David Churchill Narration: Rick Palmer
116.	(Northrop slide)	Developed and produced by: Northrop Services, Inc. under EPA Contract No. 68-02-3573
117.	(Northrop slide)	Based in part on the: 1980 PSD Workshops prepared for the U.S. Environmental Protection Agency Office of Air Quality Planning and Standards
118.	(NET slide)	Northrop Environmental Training