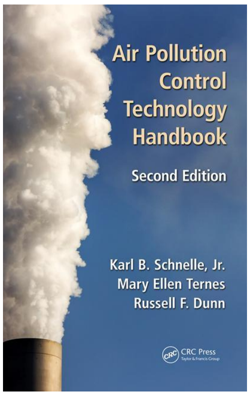

Air Pollution Control Technology Handbook

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Air Permits for New Source

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3 Air Permits for New Source

A facility that proposes to add or modify a source of air pollution may be required to obtain an approved air permit before starting construction of the new source. Local regulations define the permit requirements for small sources. Federal regulations define the air permit application requirements for major stationary sources. The process for evaluation and approval of a new major source permit application is called *new source review* (NSR). It covers permits for new major sources in both attainment, called *prevention of significant deterioration* (PSD) permits, and nonattainment area (NAA) permits. Although remaining in *draft* form for the past 25 years, when read with the current NSR regulations, Environmental Protection Agency (EPA)'s *New Source Review Workshop Manual* continues to provide excellent guidance for preparing an air permit application.[1,4]

Permit requirements are specific for each pollutant, including each criteria pollutant, precursors to tropospheric ozone (i.e., volatile organic compounds), and each hazardous air pollutant. Depending on the quantity of each pollutant emitted, each may be subject to a local regulation or to federal regulations for NSR.

3.1 ELEMENTS OF A PERMIT APPLICATION

In general, an air permit application will include the following:

- Facility information
- Description of the new source of air pollution
- Estimated quantities of each pollutant
- Applicability determination (if a major source is being considered)
- Description of air pollution control devices and justification for selection
- Effect on ambient air pollutant concentration
- Other impacts

Local regulatory agencies may provide forms that detail the required information explicitly and succinctly. A major NSR requires a large amount of discussion, so simple forms are not appropriate for the wide variety of circumstances and the long discussions of pertinent subjects. Instead, the required elements of the permit application are presented in chapters of a document with appendices for supporting information (e.g., detailed dispersion modeling output).

Although local requirements for small sources may not require as much detailed information as major sources, a similar evaluation process often is used. Many local agencies require a best available control technology (BACT) analysis for selection of controls for small sources styled in the same manner and using the same approach as required for major sources.

Interestingly, a permit application for a new major source in a NAA may require less information than a PSD permit application in an attainment area. The reason is because some of the information, such as cost-effectiveness of control equipment and PSD increment consumption, is moot. Control equipment for new sources in a NAA must meet lowest achievable emission rate, where cost-effectiveness is not a consideration.

3.1.1 Applicability

Applicability must be evaluated to determine which regulations apply to a new source. Three basic criteria are considered: (1) whether the source emissions are sufficiently large to cause the source to be considered a *major* stationary source; (2) if the source is in an attainment area; and (3) if *significant* amounts of specific pollutants will be emitted.

A stationary source is considered to be *major* if the *potential to emit* (PTE) exceeds the specified major source threshold. The threshold for industrial categories listed in Table 3.1 is 100 tons per year (tpy) of any regulated pollutant except the listed hazardous air pollutants. For all other industrial categories, the threshold is 250 tpy. However, as discussed in Chapter 2, the emission threshold for a *major* source is reduced in ozone NAAs, bringing smaller facilities into the scrutiny of federal NSR requirements in those areas.

TABLE 3.1
PSD Source Categories with Major Source Threshold of 100 tpy

Fossil-fuel-fired steam electric plants of more than 250 MBTU/h heat input
Coal cleaning plants (with thermal dryers)
Kraft pulp mills
Portland cement plants
Primary zinc smelters
Iron and steel mill plants
Primary aluminum ore reduction plants
Primary copper smelters
Municipal incinerators capable of charging more than 250 tons of refuse/day
Hydrofluoric, sulfuric, or nitric acid plants
Petroleum refineries
Lime plants
Phosphate-rock processing plants
Coke oven batteries
Sulfur recovery plants
Carbon black plants (furnace plants)
Primary lead smelters
Fuel conversion plants
Sintering plants

(*Continued*)

TABLE 3.1 (*Continued*)
PSD Source Categories with Major Source Threshold of 100 tpy

Secondary metal production plants
Chemical process plants (not including ethanol production by natural fermentation)
Fossil fuel boilers (or combinations thereof) totaling more than 250 MBTU/h heat input
Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels
Taconite ore processing plants
Glass fiber processing plants
Charcoal production plants

3.1.1.1 Potential to Emit

PTE is the amount of pollution that a facility is capable of emitting at the maximum design capacity of the facility, except as constrained by federally enforceable conditions. The PTE is determined separately for each pollutant. Federally enforceable conditions are permit restrictions that can be verified, such as installed air pollution control equipment at prescribed efficiency, restrictions on hours of operation, and restrictions on the raw materials or fuel that is burned, stored, or processed. The facility must be able to show continual compliance (or noncompliance) with each limitation through testing, monitoring, and/or recordkeeping.

3.1.1.2 Fugitive Emissions

Fugitive emissions, to the extent that they are quantifiable, are included in the PTE for the sources listed in Table 3.1 and considered in subsequent impact analysis. Fugitive emissions are those that cannot be reasonably collected and passed through a stack, vent, or a similar opening. Examples include particulate matter from coal piles, roads, and quarries, and volatile organic compound emissions from leaking valves, flanges, and pump seals at refineries and organic chemical plants.

3.1.1.3 Secondary Emissions

Secondary emissions are not considered as part of the PTE. They are associated with the source, but are not emitted from the source itself. For example, a production increase from a new cement plant could require increased emissions at the adjacent quarry owned by another company. Increased secondary emissions at the quarry would not be included in the cement plant's PTE. However, if they are specific, well-defined, quantifiable, and impact the same general area as the cement plant, they would be considered in the discussion of the cement plant's ambient impacts analysis.

3.1.2 Significant Emission Rates

The significant emission rate thresholds, often called the *PSD trigger*, for federal NSR for specific pollutants are listed in Table 3.2. In attainment areas, any new or modified source emissions at a major source facility that increases the PTE of any of these pollutants by the significant emission rate triggers the requirement for a PSD permit.

TABLE 3.2
Significant Emission Rates for Federal New Source Review

Pollutant	Significant Emission Rate (tpy)
Carbon monoxide	100
Nitrogen oxides (all oxides of nitrogen)	40
Sulfur dioxide	40
Particulate matter	25
PM_{10}	15
$PM_{2.5}$	10
Ozone (as volatile organic compound or nitrogen oxides)	40
Lead	0.6
Fluorides	3
Sulfuric acid mist	7
Hydrogen sulfide	10
Total reduced sulfur compounds including H_2S	10
Municipal waste combustor organics 3.5×10^{-6}	
Municipal waste combustor metals 15	
Municipal waste combustor acid gases 40	
Municipal solid waste landfill emissions 50	

There is a second criterion for significant emission threshold. If any new major stationary source is constructed within 10 km of a Class I area and if the potential emissions would increase the 24-h average concentration of any regulated air pollutant by 1.0 μg/m^3 or more, then a PSD review is triggered.

3.1.3 Modification

A *modification* is generally a physical change or a change in the method of operation that results in an increase of air pollutant emissions, and an NSR for a modification is treated in the same way as for a new source. Existing sources that are not modified generally are *grandfathered* with no change in their existing pollution controls, although existing sources in NAAs may be required to install reasonably available control technology (RACT) for criteria pollutants, and existing sources of hazardous air pollutants may be regulated by the maximum achievable control technology standards for hazardous air pollutants as discussed in Chapter 2.

A modification is subject to PSD review only if the existing source is a *major* stationary source and if the net emissions increase of any pollutant emitted by the source is equal to or greater than the *significant emission rate*. The regulations do not define *physical change* or *change in the method of operation* precisely. However, they specifically exclude certain activities:

- Routine maintenance, repair, and replacement
- A fuel switch due to an order under the Energy Supply and Environmental Coordination Act of 1974 (or any superceding legislation) or due to a natural gas curtailment plan under the Federal Power Act

- A fuel switch due to an order or rule under Section 125 of the Clean Air Act
- A switch at a steam generating unit to a fuel derived in whole or in part from municipal solid waste
- A switch to a fuel or raw material, which (a) the source was capable of accommodating before January 6, 1975, so long as the switch would not be prohibited by any federally enforceable permit condition established after that date under a federally approved state implementation plan (SIP) (including any PSD permit condition) or a federal PSD permit or (b) the source is approved to make under a PSD permit
- Any increase in the hours or rate of operation of a source, so long as the increase would not be prohibited by any federally enforceable permit condition established after January 6, 1975, under a federally approved SIP (including any PSD permit condition) or a federal PSD permit
- A change in ownership of a stationary source

3.1.4 Emissions Netting

In determining the change in emissions that result from a modification at an existing source, other contemporaneous increases and decreases can be considered. A facility may increase NO_x emissions with one project, and decrease NO_x emissions at nearly the same time with another project. The net NO_x emissions may be less than the significant emission rate for NO_x, and the projects could *net out of PSD*. Avoiding the scrutiny of a PSD permit approval process may have advantages for the facility, including different agency jurisdiction for the review, fewer agencies involved in the process, and no PSD increment evaluation. The advantage to the environment is the incentive for reducing emissions, while allowing improvements at existing facilities to proceed.

The net emissions change equals the emissions increases associated with the proposed modification minus source-wide creditable contemporaneous emissions decreases plus source-wide creditable contemporaneous emissions increases. The increases and decreases are changes in actual emissions (not permitted or potential emissions). They must be at the same major source facility. They cannot be traded between facilities and the netting equation is pollutant specific.

The contemporaneous time period is defined by federal regulations as five years before the date that construction on the proposed modification is expected to commence. Changes older than the contemporaneous period are not considered. Many states to which jurisdiction for the PSD program has been delegated by the EPA have developed regulations with different time periods for the definition of contemporaneous. Where approved by the EPA, these time periods are used. Establishing the exact dates for the contemporaneous time period can be very important and a bit difficult to determine. Since the date that construction will commence is unknown when the permit application is prepared and reviewed, the scheduled date may be used. The date of increases and decreases is set when the changed emission unit becomes operational, which may be after a reasonable shakedown period that does not exceed 180 days.

3.1.4.1 Netting Example

A major source proposes a modification to its facility that would result increasing the PTE by 35 tpy NO_x, 80 tpy SO_2, and 25 tpy particulate matter less than 10 μm (PM_{10}). Two years ago, the facility incorporated a smaller modification that increased the PTE by 30 tpy NO_x, 15 tpy SO_2, and 5 tpy PM_{10}, all of which were less than the significant amounts that would trigger a PSD review for that modification. Three years ago, the facility made a change that decreased actual emissions by 10 tpy NO_x, 50 tpy SO_2, and 20 tpy PM_{10}. The facility applied for and received emission reduction credits for the decreased emissions.

Since the proposed increase in NO_x emissions of 35 tpy is less than the significant amount of 40 tpy, a PSD review for NO_x is not required. The net increase in potential SO_2 emissions is 45 tpy (+80 + 15 − 50), which is greater than the PSD trigger and a PSD review for SO_2 is required. The net increase in potential particulate matter emissions is +10 tpy (+25 + 5 − 20), which is less than the PSD trigger and a PSD review for PM_{10} is not required.

3.2 BEST AVAILABLE CONTROL TECHNOLOGY

The Federal NSR program requires that BACT be applied to major new sources and major modifications in attainment areas. Many local agencies also require that BACT be applied to smaller new sources of air pollution. Often, the selection of control technology does not depend on whether a PSD review is triggered because the same control technology will be required in any case.

BACT is a technology-based standard that can be met by available technology. Typically, it is specified in an air permit as a maximum emission rate or concentration that can be monitored and verified. Frequently, one will read or hear a vendor's advertisement that their technology is BACT for a type of emission source. More precisely, they mean that their technology usually is accepted by permitting agencies as the technology that will be used to control emissions to a specified limit. BACT is determined on a case-by-case basis as the technology that will provide the maximum degree of reduction taking into account energy, environmental, and economic impacts and other costs. The permit applicant proposes BACT for the proposed project and provides a detailed BACT analysis to support their proposal. The permitting agency reviews the permit application for completeness and accuracy, and may approve the proposed technology and emission limitation, reject it, or request more information.

BACT may be differentiated from other acronymed technologies. RACT applies to retrofits for existing sources in NAAs, while BACT applies to new and modified sources. Lowest achievable emission rate applies to new and modified sources in NAAs, while BACT applies to areas that are in attainment of the National Ambient Air Quality Standards (NAAQS). Maximum achievable control technology applies to hazardous air pollutants from industrial point sources, while BACT applies to criteria pollutants. Generally available control technology applies to hazardous air pollutants from area sources, which is any stationary source of hazardous air pollutants that is not a major source.

Some local agencies adopt additional distinctions for control technologies. Best available retrofit control technology is used in California for existing sources in NAAs, just like RACT. It may be difficult to distinguish between best available retrofit control technology and RACT, although both are based on judgment resulting from an evaluation of the source and situation, and best available retrofit control technology is sometimes more stringent than RACT for a given source type.[2] Toxic BACT is used by some local agencies for new sources of toxic air pollutants.

Cost-effectiveness is a very important part of BACT, whereas it is not considered when selecting the lowest achievable emission rate for new sources in NAAQS NAAs. One also frequently anticipates permitting agencies to be looking for a specific cost-effectiveness, expressed as dollars per ton of pollutant removed, when they accept BACT. Agencies, meanwhile, are reluctant to establish a firm threshold for cost-effectiveness, because a BACT analysis is more than a simple economic evaluation and needs to take other criteria into account. This makes it difficult for an applicant to judge what an agency considers to be cost-effective. Precedent, both locally and nationally, can be used as a guide.

The EPA has adopted a *top down* methodology for determining BACT. This means that the control technology with the highest degree of pollutant reduction must be evaluated first. If that technology meets all of the criteria for feasibility, cost-effectiveness, air quality impacts, and other impacts, it is determined to be BACT for the proposed new source and the analysis ends. If not, the next most effective control technology is evaluated for BACT. The *top down* approach is rigorous and is driven using the highest reduction technology that is considered cost-effective by the agency rather than more cost-effective compromises that would be desired by an applicant.

As a minimum level, BACT must at least meet the emission limitations of new source performance standards. Established new source performance standards have already been based on a thorough technology and economic evaluation. But as control technology improves, BACT may become more stringent than new source performance standards.

3.2.1 Step 1: Identify Control Technologies

First, potential control technologies are identified. The potential technologies include those that are used outside of the United States and those that are used for similar emission sources. Innovative control technologies may be included, but if a technology has not been commercially demonstrated and if it is not commercially available, then it is not considered to be a potential for *available* control technology.

This step takes some research. As a minimum, research should include EPA's Office of Air Quality Planning and Standards Technology Transfer Network Clean Air Technology Center RACT/BACT/ lowest achievable emission rate Clearinghouse (www.epa.gov/ttn/catc). Agencies use this database to post permit application emission limits, technologies, and restrictions for other agencies and applicants to use for just this purpose. Technical books and journals are another common source of technology information. Internet searches now can be quite valuable. Control equipment vendors often are invaluable sources of information, although one must bear in mind their vested interest in selling their equipment. Environmental consultants often are hired to prepare permit applications because of their prior knowledge of control technologies and permit application requirements. Less common, but acceptable, sources of information include technical conference reports, seminars, and newsletters.

Agencies typically expect a reasonably complete list, but it does not have to be exhaustive. Agency personnel use their own knowledge of the industry to check for completeness, and will request additional information for a potential technology if they believe a good possibility has been left out.

3.2.2 Step 2: Eliminate Technically Infeasible Options

Some of the potential control technologies may not work in the specific application being proposed. To be technically feasible, the control technology must be available and applicable to the source. Technical infeasibility may be based on physical, chemical, or engineering principles. Technical judgment must be used by the applicant and the reviewing agency in determining whether a control technology is applicable to the specific source.

For example, while modifying a process heater, low NO_x burners might not be able to be retrofit into the heater due to its configuration. The longer flame length produced by low NO_x burners may impinge on the back wall of the heater.

Demonstrating unresolvable technical difficulty due to the size of the unit, location of the proposed site, or operating problems related to specific circumstances could show technical infeasibility. However, when the resolution of technical difficulties is a matter of cost, the technology should be considered technically feasible, and let the economic evaluation determine if the cost is reasonable. There may be instances where huge cost can solve many problems. Judgment should be exercised to avoid wasteful effort in detailed economic evaluations that don't stand a chance of being reasonable.

3.2.3 Step 3: Rank Remaining Options by Control Effectiveness

All remaining control technologies that are not eliminated during Step 2 are ranked in order of control effectiveness for the pollutant under review. While seemingly straightforward, two key issues must be addressed in this step. The first is ensuring that a comparable basis is used for emission-reduction capability. Calculating potential emissions on a basis of mass per unit production, that is, pounds SO_2/MBTU heat input, can help.

A more difficult problem arises for control techniques that can operate over a wide range of emission performance levels, depending on factors such as size (e.g., a large electrostatic precipitator versus a small one) and operating parameters (e.g., scrubber recirculation rate and reagent concentration). Every possible level of efficiency does not have to be analyzed. Again, judgment is required. Recent regulatory decisions and performance data can help identify practical levels of control. This reduces the need to analyze extremely high levels in the range of control. By spending a huge amount of money and installing a huge electrostatic precipitator, an extremely high particulate removal efficiency is theoretically possible. However, as discussed in Chapter 24, there are practical limitations to theoretical performance. Demonstrated performance is critical to the evaluation of available technology. Also, it is generally presumed that demonstrated levels of control can be achieved unless there are source-specific factors that limit the effectiveness of the technology. This eliminates the need to analyze lower levels of a range of control.

3.2.4 Step 4: Evaluate Control Technologies in Order of Control Effectiveness

Starting with the feasible technology having the highest pollutant removal performance, the technology is evaluated for energy, environmental (other than air quality, which will be analyzed in detail in another section of a new source permit application), and economic impacts. Both adverse and beneficial effects should be discussed, and supporting information should be presented.

3.2.4.1 Energy Impacts

Many control technologies either consume or produce energy or change the amount of energy that is produced by the process. Thermal oxidation of volatile organics in a concentrated gas stream may be an example of energy production if that energy can be recovered and put to use.

Energy and energy conservation is considered by the government to be important to the economy of the nation, and the energy analysis assures that energy has been considered. However, quantitative thresholds for energy impacts have not been established, so it is difficult to reject a technology based on energy alone. There may be a circumstance where the required energy is not available at the proposed source. The cost of energy will be considered separately in the economic evaluation.

The energy evaluation should consider only direct energy consumption by the control technology. Indirect energy consumption that should not be considered includes the energy required to produce the raw materials for the control technology (e.g., the heat required to produce lime from limestone) and for transportation of raw materials and by-products.

3.2.4.2 Environmental Impacts

This section of the BACT analysis provides information about environmental impacts other than air quality. A detailed discussion of pollutant concentration in ambient air must be provided separately in the air permit application. This discussion of environmental impacts includes topics such as creation of solid or hazardous waste (e.g., as by-products of the control technology or as spent catalyst), wastewater, excess water use in an area with inadequate supply, emissions of unregulated air pollutants, and destruction of critical habitat. It also contains an evaluation of impacts on visibility. Both positive and negative impacts should be discussed.

That a control technology generates liquid or solid waste or has other environmental impacts does not necessarily eliminate the technology as BACT. Rather, if the other impacts create significant environmental problems, there may be a basis for elimination. Site-specific and local issues may define what problems are considered to be *significant*.

3.2.4.3 Economic Impacts and Cost-Effectiveness

This section tends to be more objective than Sections 3.2.4.1 and 3.2.4.2 because costs are quantified in terms of dollars spent per ton of pollutant reduced. The focus is the cost of control, not the economic situation of the facility.

The primary factors required to calculate cost-effectiveness, defined as dollars per ton of pollutant reduced, are the emission rate, the control effectiveness, the annualized capital cost of the control equipment, and the operating cost of the control equipment. With these factors, the cost-effectiveness is simply the annualized capital and operating costs divided by the amount of pollution controlled by the technology in one year.

Estimating and annualizing capital costs are discussed in Chapter 7. Total capital cost includes equipment, engineering, construction, and startup. Annual operating costs include operating; supervisory; maintenance labor, maintenance materials, and parts; reagents; utilities; overhead and administration; property tax; and insurance.

In addition to the overall cost-effectiveness for a control technology, the incremental cost-effectiveness between dominant control options can be presented. The incremental cost-effectiveness is the difference in cost between two dominant technologies divided by the difference in the pollution emission rates after applying these two technologies. An extraordinarily high incremental cost-effectiveness can be used as justification that a control technology having only slightly higher removal efficiency than the next technology, but which has significantly higher cost, is not cost-effective.

The incremental cost-effective approach sometimes can be used to establish the practical limits for technologies with variable removal efficiency. For example, an electrostatic precipitator with 98% removal efficiency may be considered by an applicant to be cost-effective. But to achieve 99.5% efficiency, a much larger and more expensive precipitator would be required. The large additional cost for a small improvement in efficiency is not cost-effective.

3.2.5 Step 5: Select BACT

Step 4 is repeated for each technology in order of the control effectiveness established in Step 3 until one of the technologies is not eliminated by the evaluation. The most effective level of control that is not eliminated by the evaluation is proposed by the applicant to be BACT. It is not necessary to continue evaluating technologies that have lower control effectiveness.

The permitting agency will review the application for completeness and accuracy, and is responsible for assuring that all pertinent issues are addressed before approving the application. The ultimate BACT decision is made by the agency after public comment is solicited and public review is held and comments are addressed.

3.3 AIR QUALITY ANALYSIS

Each PSD source or modification must perform an air quality analysis to demonstrate that its new pollutant emissions would not violate either the applicable NAAQS or the applicable PSD increment. To determine if a new industrial source of air pollution can be established in any area, the projected increase in ambient pollutant concentration must be determined using dispersion modeling. If the proposed source is large and if there is any doubt that either the allowed increment could be exceeded or that the NAAQS could be approached, air permitting agencies may require up to two years of ambient air monitoring to establish accurate background concentrations. Additional monitoring may be required after the source starts up to ensure that modeling calculations did not underpredict the effect of the new source.

3.3.1 Preliminary Analysis

A preliminary dispersion modeling analysis is first performed to: (1) determine whether the applicant can forego further air quality analyses for a particular pollutant; (2) allow the applicant to be exempted from ambient monitoring data requirements; and (3) determine the impact area within which a full impact analysis must be carried out. The levels of significance for air quality impacts in Class II areas are listed in Table 3.3. If a proposed source is located within 100 km of a Class I area, an impact of 1 μg/m^3 on a 24-h basis is significant. If the projected increase in pollutant concentration is less than the significance level for the appropriate time averaging period, then it is considered *insignificant*, and an evaluation of PSD increment consumption is not required. Also, the available increment is not reduced by projects having an insignificant impact, so future PSD increment analyses can neglect these small projects.

Sometimes a simple, conservative screening model can be used to quickly demonstrate that a new source is insignificant. The SCREEN model can be downloaded from the EPA's Office of Air Quality Planning and Standards Technology Transfer Network web page (http://www.epa.gov/ttn/). This model applies conservative default meteorological conditions so meteorological data input is not required. As a result, it calculates conservatively high ambient pollutant concentrations.

TABLE 3.3
Significant Impact Levels for Air Quality Impacts in Class II Areas

	Time Averaging Period				
Pollutant	**Annual**	**24 h**	**8 h**	**3 h**	**1 h**
SO_2	1 μg/m^3	5 μg/m^3	–	25 μg/m^3	7.8 μg/m^3
PM_{10}	1 μg/m^3	5 μg/m^3	–	–	–
$PM_{2.5}$	0.3 μg/m^3	1.2 μg/m^3	–	–	–
NO_2	1 μg/m^3	–	–	–	7.5 μg/m^3
CO	–	–	500 μg/m^3		2000 μg/m^3
O_3	–	–	–	–	–[a]

[a] No significant ambient impact concentration has been established. Instead, any net emissions increase of 100 tpy of volatile organic compound subject to PSD would be required to perform an ambient impact analysis.

A more complex model that uses local meteorological data can be used to calculate the impact of a source on local ambient air quality, with more realistic results than are obtained from a screening model. The ISCST and ISCLT (Industrial Source Complex Short Term and Long Term) models often are used, with AERMOD now preferred. Many commercial pollutant dispersion models use the ISC model as the base for the calculations and add input/output routines to make them user-friendly and to display results attractively.

3.3.2 Full Analysis

A full impact analysis is required when the estimated increased in ambient pollutant concentration exceeds the prescribed significant ambient impact level. The full analysis expands the scope of the dispersion modeling to include existing sources and the secondary emissions from residential, commercial, and industrial growth that accompanies the new activity at the new source or modification. The full impact analysis is used to project ambient pollutant concentrations against which the applicable NAAQS and PSD increments are compared.

3.4 NSR REFORM

In July 1996, the EPA proposed revisions to the NSR program.[4] The goals of the reform were to reduce the regulatory burden and to streamline the NSR permitting process. According to the EPA, the proposed revisions would reduce the number and types of activities at a source that would be subject to major NSR review, provide state agencies with more flexibility, encourage the use of pollution prevention and innovative technologies, and address concerns related to permitting sources near Class I areas. However, not everyone agreed with EPA's assessment of the value of the reforms. Significant debate, particularly the applicability of major NSR to modification of existing sources,[3] delayed adoption of the 1996 proposal until December 2002, followed by years of litigation, which defeated several of the reforms, but allowed several more to remain. Significant elements of NSR reform that survived judicial challenge include more flexible methods of determining baseline emission, emission increases, and permitting. Now, emission sources can determine baseline actual emissions as the emission rate during any consecutive 24-month period within 10 years prior to the proposed change. Emission increases resulting from the proposed change utilize actual emissions compared to projected actual emissions (*actual-to-projected-actual*). Also, emission sources can now create *plantwide applicability limits*, which function as facility-wide emissions caps allowing operational flexibility beneath the emissions cap.