GEORGIA EPD PSD PERMIT APPLICATION

GUIDANCE DOCUMENT

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym	Definition
AOI	Area of Impact
ARM	Ambient Ratio Method
AQRV	Air Quality Related Value
BACT	Best Available Control Technology
BAE	Baseline Actual Emissions
BPIP	Building Profile and Input Program
CEMS	Continuous Emission Monitoring System
COMS	Continuous Opacity Monitoring System
CO	Carbon Monoxide
EPA	U.S. Environmental Protection Agency
EPD	Georgia Environmental Protection Division
FLAG	Federal Land Managers' Air Quality Related Values Work Group
$\mu g/m^3$	micrograms per cubic meter
km	kilometers
LAER	Lowest Achievable Emission Rate
lb/MMBtu	pounds per million British Thermal Units
MACT	Maximum Achievable Control Technology
MMscf	million standard cubic feet
MWC	Municipal Waste Combustor
NAAQS	National Ambient Air Quality Standards
NED	National Elevation Data
NESHAP	National Emission Standards for Hazardous Air Pollutants
NLCD	National Land Cover Data
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxides
NSPS	New Source Performance Standards
NSR	New Source Review
NWS	National Weather Service
OLM	Ozone Limiting Method

Acronym	Definition
PAL	Plantwide Applicability Limitation
Pb	Lead
PM	Particulate Matter
PM_{10}	Particulate Matter less than 10 micrometers in diameter
$PM_{2.5}$	Particulate matter less than 2.5 micrometers in diameter
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
PVMRM	Plume Volume Molar Ratio Method
RBLC	RACT/BACT/LAER Clearinghouse
SIA	Significant Impact Area
SIL	Significant Impact Level
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
tpy	tons per year
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compounds

PURPOSE AND INTENDED USE OF THIS DOCUMENT

This guidance document is intended to address issues typically encountered with a Prevention of Significant Deterioration (PSD) permit application. It does not establish binding regulatory requirements, but exists to guide PSD permit applicants in the development of their PSD applications in Georgia. It also generally describes the PSD application review process followed by EPD. To the extent any guidance contained herein conflicts with duly promulgated statutes and regulations or the Georgia State Implementation Plan, those requirements will control. Any examples provided in this document are hypothetical and offered for general illustration purposes only. The examples do not address all potential permitting issues that may arise. This guidance does not address the permitting requirements for sources located in nonattainment areas, or sources that do not trigger PSD. In addition, the guidance will not address the permitting of greenhouse gas (GHG) emissions. Permit applicants are advised to consult the EPD PSD Facilitator for further guidance regarding permitting requirements for greenhouse gas emissions. Bolded terms in the text of this guidance are defined by regulation, and a glossary of those regulatory definitions is provided as **Appendix C**.

1 INTRODUCTION

The Clean Air Act requires the Environmental Protection Agency (EPA) to adopt National Ambient Air Quality Standards (NAAQS) and identify any areas within the country that fail to meet those standards. EPA has adopted a NAAQS for six pollutants, known as "criteria" pollutants, and has designated any areas failing to meet these standards as "nonattainment" areas. The Clean Air Act Amendments of 1977 included the Prevention of Significant Deterioration (PSD) program, which imposes permitting requirements for the construction of new facilities and "**major modifications**" at existing facilities in attainment areas. The purpose of the program is to prevent the degradation of ambient air quality in attainment areas and to address ambient air quality concerns associated with other non-criteria pollutants, while still allowing for industrial and commercial growth.

EPA has adopted regulations to implement the PSD program. Following litigation over EPA's initial PSD regulations, most states initially adopted the 1980 version of EPA's PSD program and obtained approval to act as the PSD permitting authority. As the PSD permitting authority, states have the right to implement the PSD program within their borders in a manner that differs from federal regulations, so long as the program is not inconsistent with the federal regulations and has been approved by EPA. Georgia has adopted its own PSD program, which varies somewhat from the federal regulations. This type of PSD program is known as a SIP-approved program. Permit decisions are made in accordance with state law and regulations. The Georgia PSD Program is specified in state rule 391-3-1-.02(7) and EPD has created a document entitled the "Georgia PSD Integrated Rule" which serves to illustrate those portions of 40 CFR 52.21 which are not adopted by referenced in Georgia Rule 391-3-1-.02(7). An electronic copy of the "Georgia PSD Integrated Rule" may be found at http://www.georgiaair.org/airpermit/html/sspp/psdresources.htm.

This guidance document contains suggested procedures, tools, and references to assist facilities in preparing complete PSD permit applications and help ensure a thorough permit review in a timely manner.

2 PSD APPLICABILITY

A PSD pre-construction air quality permit is required when construction of a **new emissions unit**, or a **project** at an **existing emissions unit** (i.e., one that is a **physical change or change in the method of operation**), results in a **significant emissions increase** and a **significant net emissions increase** in the annual emission rate of a **regulated NSR pollutant**. The calculation of a **significant emission increase** attributable to the project under review is often referred to as "Step 1" of the analysis, while the calculation of a significant net emissions increase over a contemporaneous five-year period is often referred to as "Step 2" of the analysis. The term "**regulated NSR pollutant**" refers to pollutants covered by the New Source Review (NSR) program (of which PSD is a part), and includes any pollutant subject to regulation under the Clean Air Act, with the exception of hazardous air pollutants covered by Section 112 of the Clean Air Act. The PSD applicability analysis differs depending on whether the **project** involves a new unit or a **major modification** of an existing unit, as explained in this section.

2.1 LOCAL AREA ATTAINMENT STATUS

The first step in determining the applicability of PSD permitting requirements is to determine the attainment status of the area in which the new unit or **major modification** will be constructed for all **regulated NSR pollutants**. A map of all the nonattainment counties for all criteria pollutants can be found at the link provided in **Appendix D** to this guidance document. Permitting requirements for for a regulated NSR pollutant for which the county is classified as nonattainment are are governed by the nonattainment NSR program, which will not be addressed in this guidance.

2.2 DETERMINE THE STATUS OF THE SOURCE (PSD MAJOR OR MINOR)

2.2.1 Scope of the Stationary Source

Only **major stationary sources** of **regulated NSR pollutants** are potentially subject to PSD permitting requirements. For purposes of PSD, the term **stationary source** is defined to include all pollutant-emitting activities that (i) belong to the same Major Group (same first two digits of SIC code), (ii) are located on one or more contiguous or adjacent properties, and (iii) are under common ownership or control. Multiple activities or operations must meet all three criteria to be considered a single major **source**. In accordance with prior EPD guidance, **source** determinations must be considered on a case-by-case basis and take into account all relevant facts and circumstances, some of which are listed below.

Although meeting one or more of these factors does not necessarily indicate multiple activities must be permitted as a single **source**, these factors should be considered in making that determination:

Factors That May Indicate Facilities Are "Contiguous or Adjacent:"

- Physical Connections (dedicated rail lines, pipe lines, roadways, conveyers, or taxiways)
- Shared Operational Relationships (common parking or services areas, workforce, security, etc.)
- Distance Between Operations

Factors That May Indicate Facilities Are Under "Common Control:"

- Dependency (whether one operation can function without the other)
- Landlord-Tenant Relationship (if either the landlord or the tenant is entered into a contract-for-services relationship which is integral to or contributes to the output provided by the other)
- Common Workforce (common executives, managers, or other employees)
- Support Services (shared administrative services such as payroll, security, parking, etc.)
- Shared Equipment (shared production, maintenance, or support equipment)
- Shared Pollution Controls (common pollution control equipment)
- Legal Responsibility (whether one operation is responsible for environmental compliance for all)

A frequent question, however, particularly at large industrial complexes, is how to deal with multiple **emissions units** at a single location that do not fall under the same two-digit SIC code. In this situation the **stationary source** is classified according to the primary activity at the site, which is determined by its principal product (or group of products) produced or distributed, or by the services it renders. Facilities that convey, store, or otherwise assist in the production of the principal product are called support facilities. An **emissions unit** serving as a support facility for two or more primary activities (**stationary sources**) is to be considered part of the primary activity that relies most heavily on its support.

The applicant should fully document the scope of the **stationary source** as part of a complete PSD permit application.

2.2.2 Definitions of Major Stationary Source and Major Modification

Once the scope of the **stationary source** has been determined, the owner or operator must determine whether that **stationary source** is a major **source**. A **source** is considered a **major stationary source** if its total facility-wide **Potential to Emit (PTE)** is greater than the established major **source** thresholds for any **regulated NSR pollutant**. EPD's "Procedure to Calculate a Facility's PTE and to Determine its Classification, August 2008" provides the procedures on how PTE is calculated and can be found at http://georgiaair.org/airpermit/downloads/otherforms/infodocs/pteguide.pdf.

EPA has established different major **source** threshold levels for different types of industries, and EPD has adopted those thresholds into its air quality regulations. Table 2-1 lists 28 industrial categories in which the PSD major **source** threshold is 100 tons per year (tpy) of any one **regulated NSR pollutant** (Note: This does not mean the sum total of all **regulated NSR pollutant**s). For all other industries outside the 28 categories, the major **source** threshold level is 250 tpy. Fugitive emissions:

- should not be included in determining whether a stationary source is a "major stationary **source**", as defined in Georgia Rule 391-3-1-.02(7)2., unless it belongs to one of the 28 listed **source** categories, or unless the **source** was regulated under Section 111 of the Clean Air Act (New Source Performance Standards) or Section 112 of the Clean Air Act (National Emissions Standards for Hazardous Air Pollutants) as of August 7, 1980.
- should be included in determining whether a physical change in or a change in the method of operation of a "major stationary source" that would trigger the classification of "major modification" as defined in Georgia Rule 391-3-1-.02(7)2. [76 FR 17548, March 30, 2011][1].

Table 2-1. Source Categories That Have a 100 tpy Major Source Threshold	
1	Fossil fuel-fired steam electric plants > 250 MMBtu/hr heat input
2	Coal cleaning plants (with thermal dryers)
3	Kraft pulp mills
4	Portland cement plants
5	Primary zinc smelters
6	Iron and steel mill plants
7	Primary aluminum ore reduction plants (with thermal dryers)
8	Primary copper smelters
9	Municipal incinerators capable of charging > 250 tons of refuse per day
10	Hydrofluoric acid plants
11	Sulfuric acid plants
12	Nitric acid plants
13	Petroleum refineries

[1] This definition applies because EPA stayed and is in the midst of reconsidering the 2008 Fugitive Emissions Rule.

Table 2-1. Source Categories That Have a 100 tpy Major Source Threshold	
14	Lime plants
15	Phosphate rock processing plants
16	Coke oven batteries
17	Sulfur recovery plants
18	Carbon black plants (furnace process)
19	Primary lead smelters
20	Fuel conversion plants
21	Sintering plants
22	Secondary metal production plants
23	Chemical process plants (which does not include ethanol by natural fermentation included in NAICS codes 32193 or 312140)
24	Fossil-fuel boilers (or combinations thereof totaling) > 250 MMBtu/hr heat input
25	Petroleum storage and transfer units with a total storage capacity > 300,000 barrels
26	Taconite ore processing plants
27	Glass fiber processing plants
28	Charcoal production plants

Major **sources** must determine whether construction of a new unit or **projects** at an existing unit trigger PSD by causing both a **significant emissions increase** and a **significant net emissions increase**, as described further below. Conversely, minor **sources** generally need only determine if a State construction permit will be required for such activities. State construction permits are governed by Ga. Comp. R. & Regs. r. 391-3-1-.03, but will not be addressed further in this guidance. However, if a minor **source** performs a **project** or constructs a new unit that in and of itself would be a major **source** (i.e., emissions increase for any **regulated NSR pollutant** from the **project** or from the new unit are above the relevant 100/250 tpy threshold), then the entire **stationary source** not only becomes major, but it must also obtain a PSD pre-construction permit for that **project** or new unit. In contrast, if the **project** at the minor **source** would increase the **source's** PTE to above major **source** levels, but the increase attributable to the **project** would not exceed the major **source** threshold on its own, a PSD permit is not required. The **source** will be considered a major **source** in future permitting actions.

Another type of "**significant**" emissions threshold is defined as any emissions rate at a new **major stationary source** (or any **net emissions increase** associated with a modification to an existing **major stationary source**) that is constructed within 10 kilometers of a Class I area, and which would increase the 24-hour average concentration of any regulated pollutant in the Class I area by 1 microgram per cubic meter or greater. Exceedance of this threshold triggers PSD review.

2.3 CALCULATING CHANGES IN EMISSIONS

Changes in emissions should be calculated by comparing **baseline actual emissions** to **projected actual emissions** or **potential to emit** as defined in Georgia's air quality regulations. This calculation is often referred to as "Step 1" in the process of calculating emissions increases to determine PSD applicability, although "Step 2," the calculation of a significant net emissions increase, is only necessary if the calculation required under "Step 1" results in a significant emissions increase. The regulations require new units to utilize the "actual-to-potential" test, while existing units are authorized to utilize either the "actual-to-projected-actual" or the "actual-to-potential" emissions test. If a **project** involves both construction of a new unit and a change to an existing unit, each unit must be analyzed separately in accordance with the regulations and the increases must be added together to determine the total emissions increase attributable to the **project**. The proper method for calculating emissions increases from new units and existing units is addressed below.

The basis for all emission calculations should be clearly discussed and supported in the permit application.

2.3.1 New Emission Units

The PSD regulations require **new emission units** to use the "actual-to-potential" test, which requires a comparison of **baseline actual emissions** to the unit's **potential to emit** (PTE). For purposes of determining PSD applicability for the initial construction of a new unit, the actual-to-potential calculation requires **baseline actual emissions** to be zero. As such, new major **sources** of a **regulated NSR pollutant** will likely trigger PSD permitting requirements. However, for **projects** constructed at a new unit after it begins operation but within the first two years of operation (while the unit is still classified as a new unit), **baseline actual emissions** are equal to the unit's PTE. Thus, **projects** proposed at new units after initial construction but before two years expire will only trigger PSD permitting requirements if they result in an increase in the unit's PTE, so long as the second project does not indicate an intent to circumvent PSD permitting requirements. Calculation of a new unit's PTE follows the same general procedures as referenced in determining the major **source** status (EPD's "Procedure to Calculate a Facility's PTE and to Determine its Classification, August 2008"). If a **source** does not plan to operate the unit at maximum operating capacity and is willing to accept enforceable emission limitations to lower its PTE, PTE may be calculated using that enforceable emission limitation. Such limitations may include a limit on the maximum hours per year of operation, a maximum fuel consumption limitation (e.g., MMscf natural gas/yr), a maximum production rate (e.g., tons product/yr), or some other parameter directly related to emissions, or a direct limit on emissions with appropriate record keeping and/or monitoring to make the emission limit practically enforceable.

2.3.2 Existing Emission Units

The PSD regulations require that when calculating emissions increase from an **existing emission unit,** the "actual-to-projected-actual" test be used, which requires a comparison of **baseline actual emissions** to either **projected actual emissions** or the unit's PTE. For process units already in operation at a major **source** that will undergo a **physical change or change in the method of operation**, **baseline actual emissions** are defined as an average emissions rate, in tons per year, during any consecutive 24-month period selected by the owner or operator within a specified baseline look-back period immediately preceding the **project**. The baseline look-back period for most **sources** is the ten-year period immediately preceding the date that the owner or operator begins actual construction of the **project** or the date a complete permit application is received by EPD. Electric utility steam generating units, however, are limited to a five-year baseline look-back period and may only look back from the beginning of actual construction (not the permit application submittal), although EPD has the authority to allow electric utility steam generating units to use a different time period that is more representative of normal **source** operation. A different baseline period can be chosen for each pollutant. However, once a baseline period is chosen for a specific pollutant, that same baseline must be used for emissions of that pollutant from all other units affected by the **project**.

Baseline actual emissions must be based on actual data. The data may include Continuous Emission Monitoring System (CEMS) data, if available, but may also include operational data that can be used to calculate emissions based on emission factors (e.g., EPA AP-42 emission factors), stack tests, mass balance equations, or other methods, as appropriate. The basis for the **baseline actual emission** calculations should be clearly discussed and supported in the permit application.

The emission rate determined for the baseline period must be adjusted downward in three circumstances in order to calculate **baseline actual emissions**. First, **baseline actual emissions** cannot include non-compliant emissions (exceeding a then-existing emission limitation). Thus, any non-compliant emissions must be deducted from the 24-month emissions baseline period selected by the owner or operator of the **source**. Second, **baseline actual emissions** must exclude any emissions that would have exceeded an emission limitation with which the **source** must currently comply (that was adopted after the 24-month baseline selected, but before the **project**), unless the new emission limit is part of a Maximum Achievable Control Technology (MACT) standard. If the new emission limitation is part of a MACT, **baseline**

actual emissions need only be adjusted if the EPD has taken credit for those emission reductions in an attainment demonstration and maintenance plan submitted to the EPA. Third, a downward adjustment to **baseline actual emissions** may be necessary if a unit has conducted a **project** in the interim between the 24-month baseline selected and the **project** being reviewed, and that interim **project** resulted in a permanent reduction in a **basic design parameter** for the unit. The definition of **basic design parameter** is found in Georgia Rule 391-3-1-.02(7)(a)2.(viii). For a process unit at a steam electric generating facility, the owner or operator may select as its **basic design parameter** either maximum hourly heat input and maximum hourly fuel consumption rate or maximum hourly electric output rate and maximum steam flow rate. When establishing fuel consumption specifications in terms of weight or volume, the minimum fuel quality based on British Thermal Units (Btu) content shall be used for determining the **basic design parameter(s)** for a coal-fired electric utility steam generating unit.

The **basic design parameter(s)** for any process unit that is not at a steam electric generating facility is its maximum rate of fuel or heat input, maximum rate of material input, or maximum rate of product output. For sources having multiple end products and raw materials, the owner or operator should consider the primary product or primary raw material when selecting a **basic design parameter**. The owner or operator may propose to Georgia EPD an alternative **basic design parameter** If the Georgia EPD Director approves of the use of an alternative **basic design parameter(s)**, he or she shall issue a permit that is legally enforceable that records such **basic design parameter(s)** and requires the owner or operator to comply with such parameters.

The baseline emissions should include fugitive emissions and emissions associated with startups, shutdowns, and malfunctions to the extent quantifiable; however, if fugitive emissions and/or emissions associated with startups, shutdowns, and malfunctions are not quantifiable, they may be excluded. The applicant may elect to omit malfunctions from the calculation of **baseline actual emissions**; however, if they are excluded then they should also be omitted from the calculation of **projected actual emissions**.

For existing units, **projected actual emissions** may be calculated based on the unit's highest projected annual emission rate, in tons per year, in any one of the 5 years (12-month periods) following the date the unit resumes regular operation after the **project**. For **projects** that involve increases to a unit's PTE or to its design capacity (essentially, its **basic design parameter**), **projected actual emissions** must be based on the highest expected annual emission rate projected for the 10 years (12-month periods) following the resumption of regular operations. Existing units also have the option of relying on PTE to calculate

projected actual emissions as well. However, regardless of the calculation method used, **projected actual emissions** calculations do not result in enforceable emission limits for the **source**.

Projected emissions following a **project** must be determined based on the best information available to the **source**, including but not limited to historical operational data, the company's own representations, the company's expected business activity and the company's highest projections of business activity, the company's filings with the State or Federal regulatory authorities, and compliance plans under the approved Georgia state implementation plan. **Sources** may exclude any emission increases that are not attributable to the **project**, but rather attributable to other independent factors such as demand growth, referred to in the regulations as **demand growth emissions**. A unit may only exclude **demand growth emissions** if it could have accommodated those emissions increases during the baseline period selected and the expected emissions increases are unrelated to the project being reviewed. For many **sources**, a comparison of projected emission increases, following the **project** to the emissions that would occur without the **project** (i.e., even if the **project** is not completed) can be helpful in quantifying **demand growth emissions**, but the specific calculations for each **source** will vary depending on the type of **source** being evaluated and the data available for projecting expected emissions increases. Another acceptable method of calculating **demand growth** involves estimating the emissions that a unit could have accommodated (but did not actually emit during its baseline period), based on historical peak monthly productions that occurred during at least one month in the baseline period (although other time periods may be used as appropriate).

2.3.3 Summary of Emissions Test

To determine the emissions change attributable to a new unit or a **project** at an existing unit, **baseline actual emissions** must be subtracted from **projected actual emissions** for each unit undertaking a **physical change or change in the method of operation**; a positive result constitutes an emissions increase. The equation below summarizes the emissions test required for determining PSD applicability for new units or **projects** at existing units:

$$FE-DG = PAE$$

$$PAE-BAE = \text{Change in Emissions}$$

Where: FE = "Future Emissions" projection (PTE for new units; for existing units, future highest 12-month period of emissions projected, before excluding demand growth

DG = "Demand Growth" emissions (zero for new units; for existing units, projected changes in emissions that the unit could have accommodated during the baseline period and that are unrelated to the project)

PAE = "Projected Actual Emissions"

BAE = "Baseline Actual Emissions" (after making any adjustments required by the definition of Baseline Actual Emissions)

If multiple units are affected by a **project**, the total emissions change attributable to the **project** is the sum of the difference between the **projected actual emissions** and the **baseline actual emissions** for each **existing emissions unit**. However, that total must also account for any increases in operating levels at other units that will not be directly affected by the **project**, but which may experience increased operations as an indirect result of the **project**. The emissions increases attributable to such units may be calculated incrementally by multiplying the increased production level expected by an appropriate emissions factor for the pollutant being reviewed.

2.4 SIGNIFICANT EMISSIONS INCREASE

Major **sources** must determine whether construction of a new unit or **projects** at an existing unit trigger PSD by causing both a **significant emissions increase** and a **significant net emissions increase**, as described further below. If the emissions increase associated with construction of a new unit or a **project** at an existing unit is projected to exceed any of the thresholds listed in Table 2-2, the **project** may not be constructed until the **source** obtains a final PSD permit addressing the pollutants that will significantly increase following the **project**.

Table 2-2 . Significant Emission Rate Thresholds [40 CFR 52.21(b)(23)]

Regulated NSR Pollutant (Note)	PSD Significant Threshold (tpy)
Carbon Monoxide	100
Nitrogen Oxides	40

Regulated NSR Pollutant (Note)	PSD Significant Threshold (tpy)
Sulfur Dioxide	40
Particulate Matter (PM)	25
Particulate Matter (PM_{10}) (filterable plus condensable PM_{10})	15
Particulate Matter ($PM_{2.5}$) (filterable plus condensable $PM_{2.5}$)	10
Ozone (VOCs)	40
Lead	0.6
Fluorides (excluding hydrogen fluoride)	3
Sulfuric Acid Mist	7
Hydrogen sulfide (H_2S)	10
Total reduced sulfur (including H_2S)	10
Reduced sulfur compounds (including H_2S)	10
MWC Organics (total Dioxins and Furans)	3.50×10^{-06}
MWC Metals (as PM)	15
MWC Acid Gases (as SO_2 and HCl)	40
MWC Landfill emissions (non-methane organic compounds)	50
a regulated NSR pollutant not listed above, excluding ozone depleting substances	>0

Note: The applicant needs to determine whether emissions of greenhouse gases (expressed as CO_{2e}) are a regulated NSR pollutant for the project. Such a discussion and determination is not part of the scope of this guidance document.

2.5 CONTEMPORANEOUS NETTING

Contemporaneous netting is often referred to as "Step 2" in the PSD applicability analysis because it is only relevant if the analysis required under "Step 1" (defined in 40 C.F.R. § 52.21(a)(iv) and described in Section 2.3) projects a **significant emissions increase** will follow the construction of a new unit or project at existing unit. The netting procedures can be found in the definition of the term **net emissions increase** in Georgia Rule 391-3-1-.02(7)(a)2.(xi).

To complete a netting analysis, all **contemporaneous** and **creditable** emission increases and decreases must be combined with the increase directly attributable to the **project** to determine the total net emissions change for the **project**. The **contemporaneous** period begins five years prior to the date construction is expected to commence and ends when the emissions increase from the **project** occurs (i.e., the resumption of regular operations following the **project**). Netting analyses should be prepared pollutant-by-pollutant, and only for those pollutants the **project** is expected to increase significantly. Once netting is completed, the final emission calculations must be compared to the same significance levels specified in Table 2-2 to determine PSD applicability for the **project**. The basis for the netting emission calculations should be clearly discussed and supported in the permit application.

3 THE ELEMENTS OF A PSD PERMIT APPLICATION

Once PSD permitting requirements apply, the owner or operator of the **source** must submit a permit application addressing the regulatory requirements that will apply to the **source** – including the regulatory requirements imposed by the PSD program as well as any other regulatory requirements that may apply. The primary components of the permit application required by the PSD program include the control technology requirement and an ambient air quality analysis. The control technology analysis entails demonstrating that **best available control technology** (BACT) will be applied for each **significant** pollutant to be emitted by each emission unit triggering PSD permitting requirements. For the ambient air quality analysis, the applicant generally must use computer models to assess the potential impact of the **project** on ambient air quality and demonstrate that no NAAQS and PSD increment will be exceeded. If the modeling initially demonstrates that any applicable NAAQS and/or PSD increment may be exceeded, adjustments to the **project** or refinement of default modeling settings may be necessary.

The assessment of all other applicable regulatory requirements is also required. Applicability may depend on the size and nature of the **project**, the quantity and type of pollutants attributable to the **project** and the location of the **source**.

Appendix B of this guidance document provides a description of the necessary application content for a Georgia PSD permit application upon initial submittal to Georgia EPD. If the application is deemed significantly incomplete, it may be returned to the applicant. The application content in Appendix B is in a format similar to the Preliminary Determination that EPD will prepare to accompany the draft permit issued for public comment. (See http://www.georgiaair.org/airpermit/downloads/mobilearea/publicaffairs/Understandingapbpermits.pdf for more information on the process for public notice and comment.)

4 BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

Any **major stationary source** or **major modification** subject to PSD must conduct an analysis to ensure the application of ***best available control technology***. Federal PSD regulations, as incorporated by reference in Georgia Rule 391-3-1-.02(7), define BACT as:

> *… an emission limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under the Clean Air Act, which would be emitted from any proposed* ***major stationary source*** *or* ***major modification****, which the [EPD] Director, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such* ***source*** *or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of each such pollutant. In no event shall application of* ***best available control technology*** *result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR Parts 60 and 61. If the [EPD Director] determines that technological or economic limitations on the application of measurement methodology to a particular* ***emissions unit*** *would make the imposition of an emission standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of* ***best available control technology****. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results.*

EPA guidance recommends BACT to be determined for a particular **source** according to a "top-down" analysis. The top-down process provides that available control technologies be ranked in descending order based on control effectiveness. Applicants should propose the most stringent alternative as BACT, unless it can be demonstrated that the technology is not appropriate in that particular case, due to technical infeasibility or potential energy, environmental, or economic impacts. If the most stringent technology is eliminated, then the next most stringent alternative is considered until the most appropriate control strategy is selected and proposed as BACT for the **source**. BACT determinations are pollutant-specific and unit-specific and are conducted on a case-by-case basis. BACT for one **source** may differ from BACT for another **source**, even though the two processes may be very similar.

4.1 WHAT EMISSION UNITS REQUIRE A BACT ANALYSIS

The BACT requirement applies to each individual new or modified **emissions unit** that emits a pollutant for which a **significant net emissions increase** would occur as defined in Table 2-2. Individual BACT determinations are performed for each pollutant subject to a PSD review emitted from the same emission unit. Consequently, the BACT determination must separately address, for each regulated pollutant with a **significant** emissions increase at the **source**, air pollution control for each **emissions unit** or pollutant emitting activity subject to review. BACT need not be applied to **emissions units** that will not undergo a **physical change or change in the method of operation** or for emission units that are not projected to have an actual emission increase.

4.2 KEY CONCLUSIONS OF A BACT ASSESSMENT

At the conclusion of a BACT assessment, the applicant should propose the control technology to be used and related emission limitations or work practice standards based on that technology. The conclusions of the BACT assessment should describe:

- **Proposed control technology.** The control technology is the basis of the BACT determination. The analysis centers around this control technology selection and determines the emission limit or work practice standard.
- **Emission limit.** The emission limit is based on the selected control technology, as applied to the **source**. This emission limit is most commonly in a form that is production rate independent [e.g., pound of emission per ton of production (lb/ton), pound of emission per unit of heat input (lb/MMBtu), control efficiency (%), or concentration (ppm)]. The emission limit can also be expressed as a work practice standard where a numerical emission limit is not practical. If so, this should be justified in the application.
- **Averaging time associated with the emission limit.** Many factors may need to be considered in determining appropriate averaging times, including but not limited to the averaging time for the NAAQS being addressed, process variability, raw material variability, control device response time, and proposed monitoring techniques.
- **Proposed testing, monitoring, reporting and recordkeeping provisions** are not required components of the BACT assessment contained in a PSD permit application. In order to ensure that any BACT limit is practically enforceable, the permit must include sufficient monitoring, reporting and recordkeeping provisions to allow the agency to verify compliance with each BACT emission limit (or work practice standard). Accordingly, it is recommended that a PSD permit applicant include specific monitoring, reporting and/or recordkeeping provisions (e.g., CEMS, stack test method, parametric monitoring, etc.) in the BACT assessment conclusions.

4.3 KEY STEPS IN A TOP-DOWN BACT ANALYSIS

The key steps in determining BACT for a **project**, consistent with those outlined in the Draft New Source Review Workshop Manual (1990), include:

Step 1 – Identify All Control Technologies

Step 2 – Eliminate Technically Infeasible Options

Step 3 – Rank Remaining Technically Feasible Control Options

Step 4 – Evaluate Remaining Control Technologies

Step 5 – Select BACT

Step 1 – Identify All Control Technologies

The primary objective of Step 1 is to identify all "available" control options for the emission unit in question. An add-on control is considered available if it has been demonstrated in practice and to be potentially applicable to the source, given the physical and chemical characteristics of the pollutant stream being controlled at the **source** under consideration (i.e., gas stream temperature, pollutant concentration, etc.). Available control technologies can include those that have been used in other **source** categories and countries. Control technologies previously identified as the lowest achievable emission rate (LAER) in nonattainment areas should also be included in this step of the analysis, but may be eliminated in later steps of the top-down BACT process. The following are some examples of a few resources for information on available control technology options:

- The EPA RACT/BACT/LAER Clearinghouse (RBLC)
- EPA's NSR Technology Transfer Network website
- Other Federal and State NSR permits, permit applications, and associated reports (for the past ten years)
- Discussions with control technology vendors and design engineers
- Discussions with State Air Protection Branch personnel regarding similar determinations
- EPA NSR Spreadsheets that document permitted performance specifications
- Literature search of recent control technology for similar units
- EPA Clean Air Markets Division emissions database information
- Discussions with environmental engineers at locations with similar units
- Published technical papers

As part of a control technology assessment, the applicant may find a lower emitting process that achieves the same purpose of the original process. This alternative process should be considered in the BACT analysis just so long as it does not "redefine the **source**."

Step 2 – Eliminate Technically Infeasible Options

In the second step, the technical feasibility of the control options identified in step one is evaluated with respect to the **source**-specific (or emission unit-specific) factors. A demonstration of technical infeasibility should be clearly demonstrated and should show, based on physical, chemical, and engineering principles, that technical difficulties would preclude the successful use of the control option on the **emissions unit** under review. Technical infeasible control options are then eliminated from further consideration in the BACT analysis.

For example, in cases where the level of control in a permit is not expected to be achieved in practice (e.g., a **source** has received a permit but the **project** was canceled, or every operating **source** at that permitted level has been physically unable to achieve compliance with the limit), and supporting documentation showing why such limits are not technically feasible is provided, the level of control (but not necessarily, the technology) may be eliminated from further consideration. However, a permit requiring the application of a certain technology or emission limit to be achieved for such technology usually is sufficient justification to assume the technical feasibility of that technology or emission limit.

Step 3 – Rank Remaining Technically Feasible Control Options

In Step 3, all remaining control alternatives not eliminated in Step 2 are ranked and then listed in order of overall control effectiveness for the pollutant under review, with the most effective control alternative at the top. A list should be prepared for each pollutant and for each **emissions unit** (or grouping of similar units) subject to a BACT analysis. The list should present the array of control technology alternatives and should include the following types of information:

- control efficiencies (percent pollutant removed);
- expected emission rate (tons per year, pounds per hour, lb/MMBtu, ppm, lb/ton);
- expected emissions reduction (tons per year);

However, an applicant proposing the top control alternatives need not provide cost and other detailed information in regard to other control options. In such cases, the applicant should document, to the satisfaction of the review agency and for the public record, that the control option chosen is indeed the top option.

Step 4 – Evaluate Remaining Control Technologies

After the identification of available and technically feasible control technology options, the energy, environmental, and economic impacts are considered to arrive at the final level of control. At this point the analysis presents the associated impacts of the control option in the listing. For each option the application is responsible for presenting an objective evaluation of each impact. Both beneficial and adverse impacts should be discussed and, where possible, quantified. In general, the BACT analysis should focus on the direct impact of the control alternatives.

If the applicant accepts the top alternative in the listing as BACT, the applicant proceeds to consider whether impacts of unregulated air pollutants or impacts in other media would justify selection of an alternative control options. If there are no outstanding issues regarding collateral environmental impacts, the analysis is ended and the results proposed as BACT. In the event that the top candidate is shown to be inappropriate, due to energy, environment, or economic impacts, the rationale for this finding should be documented for the public record. The next most stringent alternative in the listing becomes the new control candidate and is similarly evaluated. This process continues until the technology under consideration cannot be eliminated by any **source**-specific environmental, energy, or economic impacts which demonstrate that alternative to be inappropriate as BACT.

The applicant's economic analyses should be performed in accordance with any applicable EPA data or industry standard economic data. The applicant should provide a reference (and a hardcopy of the reference when requested) in the application for each piece of economic data used in the analyses.

Step 5 – Select BACT

The highest ranked and most effective control option not eliminated in Step 4 is selected and proposed as BACT for that pollutant and emission unit. Once the control technology is selected, the final step is to determine an appropriate emission limit for this control technology. This limit could take several forms:

- Control efficiency (e.g., percent pollutant removed)

- Maximum outlet concentration (e.g., ppm NO_x @ 3% O_2)
- Mass of pollutant per unit of production (e.g., lb/ton of pulp or lb/MW-hr)
- Mass of pollutant per unit of heat input (e.g., lb/MMBtu)
- Mass rate of pollutant (e.g., lb/hr)

When a numerical emission limit is not possible or appropriate, BACT may take the form of a work practice standard. The selection of a work practice standard should be directly related to the process and the emission of the pollutant being regulated. Typical work practice standards that are appropriate for BACT determinations include:

- Maximum operating temperature (e.g., dryer inlet temperature does not exceed 300°F)
- Material input restriction (e.g., A maximum of 30% softwood as raw material)
- Maximum hourly processing rate limit, set to assure that a tipping point is not exceeded where emissions become excessive
- Oxidizer temperature
- Boiler tuning
- Limits on VOC content

Once an emission limit is determined, a method of compliance demonstration must be included in the permit (and permit application) to verify that the limit is achieved. Compliance demonstrations typically take the form of stack testing, emission monitoring, and/or monitoring of operating parameters. A proper averaging time should be selected for these operating or monitoring parameters. In selection of this averaging time, both the process and the emission standard or air quality standard must be considered.

The selection of BACT should clearly demonstrate that the applicant has thoroughly reviewed all reasonable control options. The applicant should provide data, or references to data, that support the conclusion of the BACT assessment and the reason for selecting BACT should be logically explained. BACT must also address startup and shutdown scenarios. Please consult the PSD Facilitator for further information on how to address startup and shutdown in a BACT determination if needed. In the documentation, the applicant should provide information, if reasonably available, regarding the BACT emission limit for similar **projects**, stack test or CEMS data supporting the limit, and emission calculations supporting the limit. In particular, data from RBLC (including RBLC emissions data) should be presented in the application.

5 AMBIENT AIR QUALITY ANALYSIS

This section outlines the procedures to be followed in completing an air quality modeling analysis as part of a PSD permit application. This section is based on the EPA guidance outlined in the New Source Review Workshop Manual (EPA 1990), the *Guideline on Air Quality Models* (40 CFR Part 51 Appendix W) (referred to hereinafter as "*Guideline*"), and guidance and "clarification memoranda" issued by EPA and maintained on its dispersion modeling Support Center for Regulatory Atmospheric Modeling (SCRAM) website (http://www.epa.gov/ttn/scram/). In addition, EPA has established, and periodically updates the *AERMOD Implementation Guide (AIG)*, which "provides information on the recommended use of AERMOD to address specific issues and concerns related to the implementation of AERMOD for regulatory applications", which can be found at http://www.epa.gov/ttn/scram/dispersion_prefrec.htm#aermod. The *Guideline* recommends the use of the AERMOD modeling system for PSD modeling to determine impacts on receptors within short range transport of the modeled **source** (within 50 km). In addition, EPA periodically releases "clarification memoranda" that provide specific guidance for using models to demonstrate compliance with applicable standards following current technical and policy guidance.

A **source** that is subject to PSD is required to conduct an air quality analysis of the ambient air impacts associated with the **project**. The purpose of the analysis is to demonstrate that the emissions from a proposed new **major stationary source** or **major modification**, in conjunction with applicable emissions increases and decreases from existing and "proposed" new off-site **sources**, will neither cause nor contribute to a violation of the NAAQS or PSD increments. "Proposed" new off-site sources are defined as those sources which have received PSD permits but have not yet begun to operate, as well as any complete PSD applications for which a permit has not yet been issued. In the latter case, applicants must account for emissions that will occur at sources whose complete PSD application was submitted as of thirty days prior to the date the proposed source files its PSD application. There are separate increment standards for Class I areas (Federal protected lands) and Class II areas (all other areas). PSD modeling is required only for the following pollutants if they trigger PSD: $PM_{2.5}$, PM_{10}, SO_2, NO_2, Pb and CO. PSD Applicability is discussed in Section 2 of this document.

The PSD modeling analysis involves two distinct phases: (1) a significance analysis and (2) a cumulative impact analysis. The significance analysis models only the **significant** increase in potential emissions of a pollutant from a proposed new **major stationary source**, or the **significant net emissions increase** of a pollutant from a proposed **major modification**. The results of this significance analysis determine whether the applicant must perform a cumulative impact analysis, involving the estimation of background pollutant concentrations resulting from existing off-site **sources** and growth associated with the proposed new **major stationary source** or **major modification.**

A cumulative impact analysis is not required for a particular pollutant when emissions of that pollutant from a proposed **major stationary source** or **major modification** would not increase ambient concentrations by more than prescribed applicable significant impact levels (SIL). A cumulative impact analysis is required for any pollutant for which the proposed **major stationary source's** or **major modification's** estimated ambient pollutant concentrations exceed prescribed significant impact levels in the significance modeling analysis.

5.1 MODELING PROTOCOL AND PRE-APPLICATION MEETING

The applicant should submit a modeling protocol to EPD at least one month prior to a pre-PSD application meeting. Modeling protocols are critical as they establish the specific procedures to be followed for the modeling analysis and establish any non-default methods to be used in the evaluation. The modeling protocol should include the following:

- Identification of the pollutants undergoing a PSD review;
- The models to be used in the analysis;
- The meteorological data to be used and an explanation of why they are representative of the site;
- Receptor spacing;
- Building downwash;
- Toxics pollutants to be included in the analysis and how they will be modeled;
- How the additional impacts analysis, including the Class II visibility analysis, will be conducted.

The modeling protocol should also include a discussion about the existing Class I areas within a 300 km range from the **project** site and how the Class I analysis will be addressed, and in general should outline how the modeling will incorporate all elements included in this guidance document. The protocol should identify any site-specific issues that may involve any non-typical **sources** or modeling techniques to be used by the applicant. Modeling of non-default options should be discussed with EPA's Region 4 New Source Review modeling expert. In addition, the protocol should address any changes in rules and/or guidance that have occurred after the development of this document and how they will be addressed. When complete, the modeling protocol should be submitted to EPD for their review. Next, the applicant should schedule a pre-PSD application meeting with EPD staff by contacting the PSD Facilitator. This meeting will be held after EPD's Data and Modeling Unit (DMU) has had at least one month to review the modeling protocol. Please refer to Section 5.1.6 for further information regarding submittal of the modeling protocol.

Modeling should be completed using the current regulatory version of AERMOD, AERMET to prepare meteorological data, AERMAP to develop receptor elevations, and BPIP-PRIME to determine building downwash parameters included in the model. The most recent version of the models, as posted on the EPA SCRAM website (http://www.epa.gov/ttn/scram/), should be used for all analyses.

5.1.1 Developing the Protocol - Meteorological Data Selection

The first step in the process is to complete and submit the questionnaire in **Appendix E** to EPD's DMU. **Appendix E** provides EPD with the required information needed to select the most appropriate meteorological station in terms of representativeness and data completeness. After review of this questionnaire and discussion with the applicant or the applicant's representative, EPD will develop and provide the AERMOD-ready meteorological files of the weather observing stations agreed upon. Such files may be used during all the subsequent modeling analysis, depending on the representativeness determination.

Representativeness Determination

Surface characteristics include albedo, Bowen ratio, and surface roughness. Albedo is the fraction of total incident solar radiation reflected by the surface back to space. Bowen ratio is an indicator of surface moisture. Surface roughness is related to the height and areal density of obstacles that can block the wind flow and is theoretically the height at which wind velocity is zero.

EPD will provide the applicant with three different sets of AERMOD ready meteorological data and each data set will be based on a different surface roughness value (0.05, 0.5, and 1.0). The applicant should then use AERSURFACE to complete a comparison between the surface characteristics of the area surrounding the facility and those around the meteorological station. As part of the protocol submittal, the applicant should identify and justify the meteorological data set selected that most closely matches the average surface roughness value at the project site.

The AERSURFACE utility requires the input of land cover data from the U.S. Geological Survey (USGS) National Land Cover Data 1992 archives (NLCD92). If newer land cover data is made available and is compatible with AERSURFACE, the applicant may be required to use the newer data. The applicant should consider changes in land use at both the meteorological station and the proposed plant site since 1992 as well as the changes that will occur at the site as a result of the proposed **project**. For example, if the proposed site is a greenfield site, it would be appropriate to include an assessment of how any land clearing and facility construction may impact the surface roughness characteristics at the site. If there are differences between the NLCD database and the current land use, additional discussions with the agency may be needed to address these issues. Consideration of meteorological station land use should be based on the time period during which the surface meteorological data that is to be used in the model was collected.

When using AERSURFACE, the applicant should follow the general guidance outlined in the AERSURFACE User Guide (January 2008) and *AERMOD Implementation Guide*. Surface roughness should be evaluated for the area within a default 1 km radius of the site. If another study area is used, the applicant should submit a justification. Albedo and Bowen ratio should be evaluated within a default domain of a 10 km by 10 km square region centered on the site.

Site-Specific Meteorological Data

In most cases, modeling can be completed using five years of National Weather Service (NWS) meteorological data. The *Guideline* indicates that if one year, up to five years, of site specific data are available, these data are preferred for use in air quality analyses. If complex "winds" (*Guideline*, Section 7.2.8) near the project site are considered to have the potential to influence local wind persistence or otherwise affect the dispersion of emissions from the project, the collection of site specific meteorological data may be required. The use of site-specific or alternate meteorological data will require review and coordination with EPD and is outside the scope of this document. Additional guidance concerning on-site monitoring can be found in EPA's "Meteorological Monitoring Guidance for Regulatory Modeling Applications" – February, 2000 at http://www.epa.gov/scram001/guidance/met/mmgrma.pdf.

5.1.2 Developing the Protocol - Coordinate System and Receptor Grid

Coordinate System

The protocol should specify the coordinate system used in the modeling. Measures should be taken to ensure that all modeling coordinates (stack/fugitive model locations, building locations, and receptors) use the Universal Transverse Mercator (UTM) system with NAD83 datum. Potentially significant discontinuities in coordinates for **sources** and receptors may occur with different datums (e.g., NAD27 or NAD83). Furthermore, it is critical that the NAD83 datum is used consistently for other portions of the modeling analysis. For example, both the AERMAP and AERSURFACE programs use databases that are based on specified datums. It is therefore critical that all input and output from these models are based on NAD83. Similarly, when modeling off-site **sources** for NAAQS and PSD increment analyses, it is important that the datum used for off-site sources be consistent with the datum used for onsite **sources**. This ensures that the locations of the stacks at different sites are accurate in relation to each other.

Receptor Locations

The protocol should discuss receptor locations for the modeling. An air quality modeling assessment must be performed in all locations of "**ambient air**", which the EPA defines in 40 CFR 50.1(e) 17 as 'that portion of the atmosphere, external to buildings, to which the general public has access'. To limit public access to a facility's property, the EPA generally requires that a fence or some other barrier or means of restricting access to the property be present. It is critical that the receptors in the model be placed on the ambient air boundary and not the property line. On a case-by-case basis, geographical barriers may preclude public access and can therefore be used to define the **ambient air** boundary. The **ambient air** boundary used for the modeling must be shown on the required site plan, and the model receptor grid must start at the **ambient air** boundary. If the **ambient air** boundary is different than the fenceline, this variation should be clearly documented in the modeling protocol and permit application.

Receptors should be placed along plant roads that have public access and waterways that form a boundary on the facility. The applicant should consult GA EPD and/or review EPA guidance to determine appropriate **ambient air** boundaries in situations involving lease agreements or other circumstances when the boundary is not evident.

Receptor Grid Spacing and Extent

Model receptors should be spaced along the **ambient air** boundary and should extend outward from the facility to ensure that the maximum impact location and the significant impact distance are located within an area of 100 meter spacing. Model receptors at 100 meter spacing should extend outward from the facility at least 2 km in all directions but may need to extend even further to ensure the final maximum concentration is determined within an area of 100 meter spacing. The AERMOD modeling system includes AERSCREEN which can be used to provide a very rough estimate how far out a receptor grid system may have to extend. Alternatively, larger grid spacings may be used if the ultimate design value is determined to the nearest 100 m resolution by re-modeling with a small 100-m grid around a more coarsely resolved design concentration.

Determination of Receptor Elevations

Model receptors must be processed in the UTM coordinate system with the current version of AERMAP to develop terrain elevations and critical slope parameters. National Elevation Data (NED) can be downloaded from the National Map Seamless Server (http://seamless.usgs.gov/index.php), for use in the AERMAP program. When downloading the data, the user should define the area for the receptors by highlighting an area of 50 kilometers from the **project** site. This area is larger than the area to be modeled to ensure that terrain features, even if not within the receptor grid, are included in the AERMAP analysis that calculates elevations and hill height scales for each receptor. The user should also "modify the data request" so that the data are downloaded in a *.tiff format for use in the AERMAP program. To ensure datum consistency between site UTMs and the USGS data set, NAD83 datum should be used throughout all the modeling analyses.

5.1.3 Developing the Protocol - Impacts of Building Downwash and GEP

The protocol should also include an assessment of Good Engineering Practice (GEP) as defined in the EPA "*Guideline* for Determination of Good Engineering Practice Stack Height (Technical Support Document For the Stack Height Regulation)" – June 1985 (http://www.epa.gov/ttn/scram/guidance/guide/gep.pdf). The AERMOD modeling should include the downwash impacts from on-site buildings as appropriate. The most recent version of the Building Profile and Input Program (BPIP) with PRIME algorithms should be used for the evaluation. The BPIP program needs to be run using the same coordinate system as the rest of the modeling (i.e., UTM NAD83). The protocol should state how building coordinates were obtained for use in the program as well as ground level elevations and building heights. As part of the permit application, the applicant should include a scaled and gridded drawing that identifies all on-site buildings included in the BPIP analysis, all stack locations, fugitive emission points, the facility fenceline, **ambient air** boundary, and a map of receptor coordinates used in the modeling. When completing the modeling, it should be noted that in some cases the building conditions in the past (or future) are not the same as those that currently exist. In these cases, if a plant has different buildings than in the past or will be constructing or removing new buildings in the future, the building coordinates for the various time periods need to be used in the BPIP program in order to provide proper building dimensions to match the time period that the emissions represent.

5.1.4 Developing the Protocol - Modeled Emissions and Stack Parameters

As part of the permit application and modeling protocol, the applicant should provide preliminary emission estimates and identify the basis for all emission rates used in the modeling analysis (i.e., stack testing, continuous emissions monitor data, AP-42 emission factor). Modeled emission rates should be representative of all averaging periods for which impacts are being determined. The emission rate used in the modeling analyses to establish maximum short-term concentrations (24 hours or less) should be appropriate for the specific averaging period. In some cases, an emission unit can have multiple limits for a single pollutant depending on the averaging period. Therefore, it is critical that the emission rate used for each averaging period matches the modeled averaging period. Table 8-2 of the *Guideline on Air Quality Models* (40 CFR 51 Appendix W) provides guidance on how the project emission rates should be calculated for the modeling analysis. The *AERMOD Implementation Guide* provides specific guidance concerning stack parameters and how they should be modeled including horizontal discharges, stacks with rain caps, **sources** venting air at ambient conditions, and the modeling of area and volume fugitive sources.

The applicant should include both point sources (e.g., stacks) as well as quantifiable, fugitive emission sources. USEPA AP-42 is a common resource for emission factors for fugitive emissions, but other resources or quantification approaches may be appropriate. Fugitive emissions from paved roads are not required to be included in the modeling analysis due to the difficulties in quantifying and modeling such, especially short-term periods. Furthermore, paved roads complying with Georgia Rule 391-3-1-.02(2)(n) are expected to have trivial emissions, and impacts are generally isolated to receptors adjacent to the road. Special care should be taken to appropriately develop the emissions values for each of the dispersion model analyses. This is discussed in more detail in Sections 5.2 and 6.1.5.

5.1.5 Developing the Protocol – Non-Default Modeling Options

If any non-default options are proposed to be used in the modeling, those options should be thoroughly discussed in the protocol with technical data that support why those options are being proposed. In some cases, these options may need to be reviewed by EPA's Region 4 modeling expert. Examples of some non-default options are provided in Section 5.4.

5.1.6 Protocol Submittal

The applicant should submit a modeling protocol that describes the scope of the **project**, states which pollutants are likely to trigger PSD, and the overall modeling approach as defined in Sections 5.1.1 through 5.1.5 of this document. The applicant should submit a copy of the modeling protocol to Georgia EPD at least one month prior to any pre-PSD application meeting. The applicant should schedule a pre-PSD application meeting with EPD staff by contacting the PSD Facilitator. If the modeling protocol is approvable as submitted, EPD will approve it prior to or during the pre-PSD application meeting. If EPD identifies any concerns regarding the submitted modeling protocol, EPD will provide a list of the additional information needed for approval prior to or during the pre-application meeting. EPD will generally approve or disapprove the modeling protocol within 10 days of receiving the additional information.

5.2 CLASS II SIGNIFICANCE ANALYSIS

The PSD Class II **source** impact analysis is a two-step process. First, the permit applicant conducts air dispersion modeling to estimate ambient impacts solely from the **emissions units** for which emissions were quantified as part of the applicability analysis, also known as "significance modeling." The results of this significance modeling are then compared to applicable "significant impact levels (SILs)," which are set forth in 40 C.F.R. § 51.165(b) (2). Table 5-1 lists the Class II SILs for all PSD pollutants.

Table 5-1. Class II Significant Impact Level Concentrations (µg/m^3)

Pollutant	Annual	24-Hour	8-Hour	3-Hour	1-Hour
SO_2	1	5	--	25	7.8
PM_{10}	1	5	--	--	--
$PM_{2.5}$	0.3	1.2	--	--	--
NO_2	1	--	--	--	7.5
CO	--	--	500	--	2,000

The SILs for NO_2 (1-hr) and SO_2 (1-hr) are "interim SILs" and have not been promulgated. These "interim SILs" are contained in EPA's June 29, 2010[2] and August 23, 2010[3] guidance memos and require

[2] "Guidance Concerning the Implementation of the 1-hour NO_2 NAAQS for the Prevention of Significant Deterioration Program " located at http://www.epa.gov/nsr/documents/20100629no2guidance.pdf

additional documentation for their use. The applicant should review recent EPA guidance or rulemaking to ensure that changes have not been made to these SILs.

5.2.1 Model Runs for Significance Analysis

The AERMOD model is run for each pollutant emitted in significant quantities (see Section 2.4) for each respective averaging time as listed in Table 5-1. The highest modeled concentration result for all five years of modeled data for each pollutant is then compared to the SIL level in the table to determine if the **ambient air** impact is considered significant. However, in the case of 1-hour NO_2, 1-hour SO_2, and 24-hour $PM_{2.5}$ evaluations, EPA guidance states that the applicant should determine the maximum 1-hr NO_2 and SO_2 concentration and the maximum 24-hr $PM_{2.5}$ concentration at each receptor per year, then average those values on a receptor-specific basis over the 5 years of meteorological data and select the highest of the averaged values to compare with the appropriate SIL. The specific procedures for completing these evaluations can be found in the following documents:

NO_2: http://www.epa.gov/nsr/documents/20100629no2guidance.pdf

and

http://www.epa.gov/region07/air/nsr/nsrmemos/appwno2_2.pdf

$PM_{2.5}$:
http://www.epa.gov/region7/air/nsr/nsrmemos/pm25memo.pdfSO_2:
http://www.epa.gov/region07/air/nsr/nsrmemos/appwso2.pdf

The values are then compared to the SILs to determine if a cumulative impact modeling analysis is required for any pollutant. If a SIL is not exceeded for any pollutant or averaging period, no further modeling is required to demonstrate compliance.

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[3] "Guidance Concerning the Implementation of the 1-hour SO_2 NAAQS for the Prevention of Significant Deterioration Program" located at http://www.epa.gov/region07/air/nsr/nsrmemos/appwso2.pdf.

In the significance modeling, the emission rate for new **sources** should be based on the unit's future maximum emissions or allowable emissions, whichever is lower, for both short-term and long-term averaging periods, as applicable. Existing **sources** that are being modified that will see a change in emissions as a result of the proposed **project** are modeled for both their past actual emissions (based on normal operations over the previous two years and modeled as a negative emission rate) and future maximum emission rate or allowable emissions, whichever is lower (modeled as a positive emission rate) after the proposed **project** is complete. These emission rates are evaluated for each PSD pollutant and each averaging period as applicable and supported by appropriate justification in the modeling protocol and permit application. It should be noted that because modeling uses past actual emissions (based on the most recent two years of operation), the emission changes may be different from the emission rates used for the PSD applicability calculations which allows more flexibility in choosing the baseline period (previous ten years for non-EGUs and previous five years for EGUs). In addition, PSD applicability is based on annual emissions (i.e., tons per year), while the emission rates input to the model are based on short-term emissions (i.e., pounds per hour) matched to the averaging period of the analysis. The default modeling emission limit for a pollutant with a BACT limit for the same averaging period as the NAAQS is the BACT limit. However, lower emissions limits for NAAQS/increment may be used and specified in the permit as NAAQS/Increment limits, not BACT. For NAAQS/increment with different averaging times than BACT, the specific emission limits and averaging times should be specified in the permit for NAAQS/increment modeling. The determination of past actual and future emissions (and allowable emissions, when applicable) should be well documented and included with the permit application.

Exhaust conditions (stack height, exhaust flow rates, temperatures, etc.) for the past actual conditions should be based on actual stack conditions that were representative during that time period. Future conditions should reflect the units' exhaust parameters after the proposed modifications are completed with the unit operating at maximum emission rates.

For detailed guidance on modeling to demonstrate compliance with NAAQS and PSD increment, the applicant should consult the EPA NSR Workshop Manual, Chapter C, sections II and IV. Information describing Figures C-4 and C-5 [EPA NSR Workshop Manual] should be of particular value. It should be noted that the guidance included therein is not completely applicable for the 1-hr NO_2, 1-hour SO_2, and for the $PM_{2.5}$ NAAQS. For these pollutants and averaging periods, the applicant should consult the latest guidance memoranda posted by EPA on the website of the Support Center for Regulatory Atmospheric Modeling (SCRAM) at www.epa.gov/ttn/scram or the Prevention of Significant Deterioration (PSD) for Particulate Matter Less than 2.5 Micrometers ($PM_{2.5}$) – Increments, Significant Impact Levels (SILs) and

Significant Monitoring Concentration (SMC): Final Rule (75 FR 202, 64863-64907) (a.k.a. $PM_{2.5}$ SIL, SMC, & Increment Rule).

Emissions of nitrogen oxides (NOx) from combustion **sources** are primarily in the form of NO (even though the mass emission rate for NOx is commonly based on the molecular weight of NO_2). The NO emissions are eventually oxidized into NO_2 as it is transported through the atmosphere. Since the NAAQS is developed for NO_2, a modeling methodology is needed to properly account for how much of the NO is converted to NO_2 as it proceeds to the downwind receptors. The most conservative approach is to assume that 100% of the NOx emitted is converted to NO_2 (called the Tier I approach). The *Guideline* also allows for the use of the Ambient Ratio Method (ARM) which uses a default 0.75 NO_2-to-NOx ratio (Tier II approach) for the annual averaging period. Recent US EPA guidance concerning applicability of the *Guideline* for the 1-hour NO_2 NAAQS suggests a default 0.80 NO_2-to-NOx ratio should be applied for the new short-term standard. More complex, non-default methods are discussed further in Section 5.4 of this guidance.

If the significance analysis indicates that ambient concentrations will exceed a PSD SIL for any pollutant and averaging period, then the applicant must determine the extent of the geographical area for which the impacts exceed the SIL. This is referred to as determining the "significant impact area" (SIA). The applicant must then perform a "cumulative impact analysis" in the SIA for that pollutant and averaging period. This cumulative impact analysis expands on the significance analysis by considering all emissions from the site and other existing off-site **sources** in the SIA including units that have been permitted but have not yet been constructed. It may also need to consider other sources outside the **project's** SIA (SIA + 50 km) that can be predicted to cause significant impacts in the **project's** SIA, as discussed further in Section 5.3. The results from the cumulative analyses are used to determine compliance with the NAAQS and PSD increments. The applicant should keep in mind that if there is a need to do cumulative impact analyses for a pollutant, the largest SIA should be used for all averaging periods, with the exception of the 1-hr NO_2 and 1-hr SO_2 (see Section 5.3).

5.2.2 Significant Monitoring Concentrations

In addition to comparing the significance modeling results to the SILs, the applicant must also compare the results to the Significant Monitoring Concentrations for each pollutant (see Table 5-2). If the maximum modeled concentration exceeds the significant monitoring concentrations, the applicant must conduct ambient monitoring for the pollutant or provide justification that the existing monitoring network currently operated by EPD provides representative data of PSD quality. The applicant should provide an evaluation of the monitors in place and provide justification for why additional site-specific monitoring should not be required.

Table 5-2. Significant Monitoring Concentrations [40 CFR 52.21 (i)(5)]

Pollutant/Averaging Period	Significant Monitoring Concentration ($\mu g/m^3$)
Carbon Monoxide: 8-hr average	575
PM_{10}: 24-hour average	10
$PM_{2.5}$: 24-hour average	4
Sulfur dioxide: 24-hr average	13
Lead: 3-month average	0.1
Fluorides: 24-hr average	0.25
Total reduced sulfur: 1-hr average	10
Hydrogen sulfide: 1-hr average	0.2
Reduced sulfur compounds: 1-hr average	10
Nitrogen dioxide: annual average	14
Ozone	Note 1

Note 1: No *de minimis* air quality level is provided for ozone. However, any **net emissions increase** of 100 tons per year or more of volatile organic compounds or nitrogen oxides subject to PSD would be required to perform an ambient impact analysis, including the gathering of ambient air quality data.

5.2.3 Ozone Analysis

If the proposed **project** will result in a net VOC or NOx emission increase greater than 100 tons per year, the PSD rule requires an evaluation to determine whether pre-construction monitoring is warranted for ground level ozone. Pre-construction monitoring of ozone can be waived if representative data for the area are available. EPD operates ozone monitors at numerous locations across the state. In those cases, the applicant should evaluate available monitors to determine if the results from one or more of these ozone monitors could be considered to be representative of the current ozone background for the site. The applicant should consider both VOC and NOx increases in comparison to existing levels in the area around the plant. **Appendix F** provides draft EPD guidance for conducting an Ozone Ambient Impact Analysis in Georgia.

5.2.4 Significance Evaluations for Special Considerations

In addition to modeling full load operations, the applicant may need to evaluate other operating scenarios that could have different dispersion characteristics. Whether these other operating conditions need to be evaluated depends upon their frequency of occurrence, magnitude of emissions, and the potential exposure at nearby receptors.

Various Load Modeling

Initial modeling should be based on all **sources** operating at maximum steady-state conditions. In some cases, maximum ambient air concentrations may be associated with operating levels less than 100% because of higher emissions associated with reduced loads or as a result of different stack conditions that result in less dispersion. As a result, maximum concentrations resulting from stack parameters reflecting operating levels of other reasonably anticipated operating loads (examples could include 25%, 50%, and 75% loads) may also need to be addressed if operating the facility in a partial load capacity will result in significantly higher emissions and/or a decrease in the height of the models' predicted plume rise. Relevant stack test parameter data or data from engineering estimates should be incorporated in a modeling analysis for the varying load models. The need to assess varying operating loads will depend on the equipment being installed and the frequency at which the equipment would operate at reduced loads. The suggested load modeling for a **project** should be outlined in the modeling protocol and permit application for the **project**.

Startup/Shutdown Modeling

Similarly, in some cases the applicant should address the impact of startup and shutdown operations if emission levels are greater than those emission levels being permitted or flue gas conditions could result in poorer dispersion relative to steady state operations. This may be the case if control devices are not operational during a portion of the startup period. Whether assessments are required for these conditions depends on the expected number of startups, the averaging period for the pollutant, if emissions are expected to be significantly greater during startup, and if the emissions can be reliably quantified for the startup or shutdown conditions. If it is decided that such an assessment is required, then the proposed techniques for modeling startups and shutdowns should be outlined and discussed in the modeling protocol and permit application.

Alternate Operating Scenarios

If an emission unit has multiple fuels or has a backup fuel that are not often used but may be used in case of curtailment or other circumstances, a separate modeling analysis for each scenario may be warranted. If the use of a backup fuel has emissions of any pollutant that are higher than the emissions when using the primary fuel, then this alternative operating scenario should be modeled. This reasoning does not only apply for the use of alternative fuels but in a general sense, if an emission unit has higher emissions of any pollutant under an alternate operating scenario than under the primary operating scenario, then the alternate operating scenario should be modeled. An exception might apply for the 1-hr NO_2 and 1-hr SO_2 NAAQS depending on the frequency of occurrence of the alternative scenario. The applicant should check the latest EPA guidance applicable to these two pollutants and averaging periods. If it is decided that such an assessment is required, then the proposed techniques for modeling alternate operating scenarios should be outlined and discussed in the modeling protocol and permit application.

Additional guidance regarding alternate operating scenarios, startups, and shutdowns is provided in **Appendix G** of this document.

5.3 CUMULATIVE IMPACT ANALYSIS

The first step in the cumulative impact analysis is to determine the SIA for each pollutant that exceeds its SIL. The applicant should determine the distance from the location of the main **source** or if there are several **sources** of similar emission rate from the geographical center of these **sources**, to the farthest receptor with a concentration equal to or greater than the corresponding SIL. The area bound by this distance in all directions from the site is the SIA and should be determined for each pollutant and each averaging period for the modeled concentrations equal or greater than the SIL. If there is need to do cumulative modeling for each pollutant, the largest SIA determined for any averaging period should be used for all averaging periods, with the exception of the 1-hr NO_2 and 1-hr SO_2.

The next step is to determine the off-site inventory for that pollutant. The applicant should prepare the offsite inventory and **Appendix J** of this document provides guidance on the preparation of such an inventory.

5.3.1 20D Rule

The emission inventory can result in a large number of off-site **sources** that can result in excessive modeling processing time in some cases. Unless special considerations dictate otherwise, the applicant may use the "20D Rule" to eliminate **sources** based on their distance from the site in kilometers and quantity of emissions in tons/yr. In employing this **source** screening technique, the applicant should first identify all **sources** that are located within 2 km from each other. The emissions of these **sources** should be grouped together for the 20D evaluation. All sources within the SIA are exempt from the 20D screening and must be modeled.

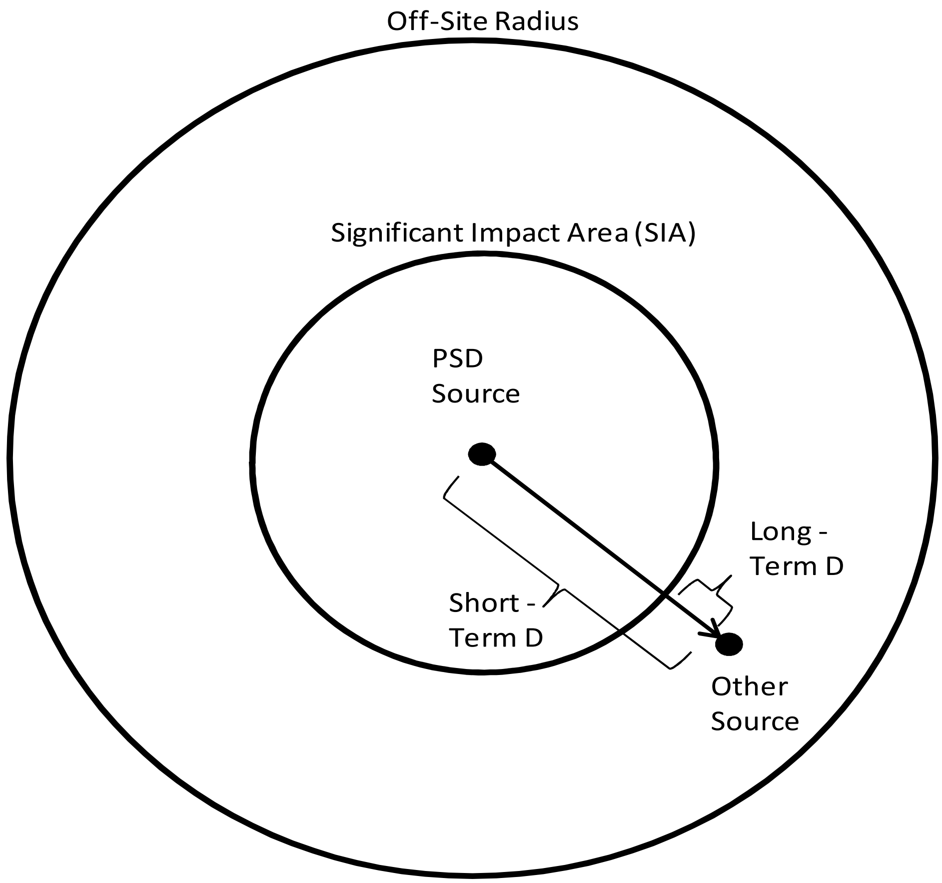
For determining whether a **source** or group of **sources** can be excluded from modeling based on 20D, emissions from all stacks within a single facility as well as other facilities that are located near one another should be totaled. The total permitted emissions in tons/yr for the pollutant undergoing refined modeling from each of these groups of **sources** should be calculated. For long-term models (annual), if the total emissions for the group of **sources** calculated are less than twenty times the distance from the **source** to the *SIA,* the **source** can be eliminated from the modeling analysis. For short-term models (24-hour or shorter), if the total emissions for the group of **sources** are less than twenty times the distance from the **source** to the *site,* the **source** can be eliminated from the modeling. Figure 5-1 illustrates how the comparisons should be made. No **source** within the significant impact area can be eliminated in this manner. This process should be repeated for each pollutant for which the 20D technique is utilized as an inventory screening method.

US EPA has cautioned PSD applicants regarding the use of the 20D rule for the 1-hour NO_2 and SO_2 NAAQS and has placed more significance on the use of alternate methods, professional judgment and coordination with the permitting authority regarding the nearby **sources** that should be included in the model. Please refer to the most recent clarifying guidance concerning applicability of the *Guideline* to the new 1-hour NO_2 NAAQS, which is generally applicable for the 1-hour SO_2 standard as well.

http://www.epa.gov/region07/air/nsr/nsrmemos/appwno2_2.pdf

Finally, if the applicant uses the 20D rule to screen out **sources**, the procedure and the emissions for each facility should be documented and included in the application. This information should be provided to EPD in an electronic unlocked Excel spreadsheet showing all formulae. The spreadsheet information must include the facility name and AIRS#, modeled name abbreviation, facility-wide allowable emissions for each pollutant in tons per year, facility UTM coordinates, distance of facility from the project in kilometers, distance of the facility from the SIA in kilometers, and shading to indicate which facilities within 2 km of each other were combined for the 20D screening. The initial off-site inventory radius is the radius of the pollutant-specific largest SIA (except for 1-hr NO_2 and SO_2) plus 50 km.

Figure 5-1. "20-D" Rule Screening Technique



For Annual average: If Emissions in TPY < 20 x DLT (Long Term D), then you can exclude the source

For Short Term (< 24 hr) average: If Emissions in TPY < 20 x DST (Short Term D), then you can exclude the source

5.3.2 National Ambient Air Quality Standards (NAAQS) Modeling

The NAAQS are maximum concentration "ceilings" measured in terms of the total concentration of a pollutant in the atmosphere. Compliance with any NAAQS by modeling is based upon the total estimated air quality, which is the sum of the ambient estimates resulting from existing **sources** of air pollution, the modeled ambient impact caused by the applicant's proposed emissions increase and background concentrations provided by GA EPD. The NAAQS modeling evaluation should include all modified and new **sources** of the pollutant being modeled, all other **sources** of the pollutant emitted at the site, as well as all off-site **sources** of the pollutant within the SIA, and other **sources** outside the SIA as identified in Section 5.3.1. Short-term emissions for all **sources** included in the modeling should be based on the future maximum emission rate or allowable emission rate (whichever is lower). Long-term emissions of all **sources** included in the modeling should be based on the future maximum or allowable emissions rate and may consider annual operating factors. Table 5-3 lists the promulgated NAAQS for each PSD pollutant for each pollutant as well as a summary of the model results that are typically used for comparison to the NAAQS value.

Table 5-3. National Ambient Air Quality Standards (NAAQS) 40 CFR Part 50 (µg/m^3 unless otherwise noted)

Pollutant	Averaging Period	Primary NAAQS	Secondary NAAQS	Model Value Used for Comparison to NAAQS
SO_2	1-Hour	197	None	See EPA's memo*
	3-Hour	None	1300	High Second High
	24-Hour	365	None	High Second High
	Annual	80	None	Highest
PM_{10}	24-Hour	150	150	High Sixth High
	Annual	Revoked	Revoked	NA
$PM_{2.5}$	24-Hour	35	35	See EPA memo**
	Annual	15	15	See EPA memo ***
NO_2	1-Hour	188	None	See EPA memo***
	Annual	100	100	Highest
CO	1-Hour	40,000	40,000	High Second High
	8-Hour	10,000	10,000	High Second High
O_3	8-Hour	0.075 ppm	0.075 ppm	Not modeled
Pb	Rolling 3 month	0.15	0.15	See EPA documentation for Lead post processor for AERMOD

* http://www.epa.gov/region07/air/nsr/nsrmemos/appwso2.pdf

** http://www.epa.gov/region7/air/nsr/nsrmemos/pm25memo.pdf

*** http://www.epa.gov/nsr/documents/20100629no2guidance.pdf

The NAAQS modeling will be completed for a total of five years of National Weather Service (NWS) or other off-site meteorological data or at least one year of near-site or on-site meteorological data, if available. The specific modeled concentration (plus background ambient monitored concentration) to be used for comparison to each NAAQS is discussed in 40 CFR 51, Appendix W, section 7.2.1 (Design Concentrations) or as indicated below.

1-hour SO_2 NAAQS: The modeled 1-hour SO_2 concentration that is compared to the *SO_2 NAAQS* is based on the 99th percentile of the annual distribution of daily maximum 1-hour concentrations averaged across the number of years modeled. The detailed procedure for determining this value is outlined in the memo found at:

http://www.epa.gov/region07/air/nsr/nsrmemos/appwso2.pdf.

1-hour NO_2 NAAQS: The modeled 1-hour NO_2 concentration that is compared to the *NO_2 NAAQS* is based on the 98th percentile of the annual distribution of daily maximum 1-hour concentrations averaged across the number of years modeled. The detailed procedure for determining this value is outlined in the memo found at:

http://www.epa.gov/region07/air/nsr/nsrmemos/appwno2_2.pdf

$PM_{2.5}$ NAAQS: The procedures for determining the modeled value for comparison to the *$PM_{2.5}$ NAAQS* is outlined in the memo found at:

http://www.epa.gov/region7/air/nsr/nsrmemos/pm25memo.pdf

Lead NAAQS: On October 15, 2008, EPA revised the primary *lead NAAQS* from 1.5 µg/m^3 on an individual calendar quarterly (three-month) average basis to 0.15 µg/m^3 (rolling three-month average evaluated over three-year period). The rolling three-month average considers each of the 12 three-month periods associated with a given year. The AERMOD model cannot provide a rolling three-month average. However, EPA has developed a post-processor that should be used to determine the maximum rolling three-month averages over the five-year period of the meteorological data modeled. The post-processor can be found at:

http://www.epa.gov/ttn/scram/models/aermod/leadpost.zip.

Once modeling for the NAAQS is completed, the modeled results should be added to the background ambient concentrations to determine a maximum impact for comparison to the NAAQS. EPD modeling staff should be contacted to provide the appropriate background concentrations for use in the modeling or the applicant may recommend appropriate background concentrations.

5.3.3 PSD Increment Modeling

Unlike NAAQS, the PSD increment is the increase in concentration that is allowed to occur above a baseline concentration for a specific pollutant. The baseline concentration is defined for each pollutant (and relevant averaging time). All facility emissions of each pollutant subject to PSD for which PSD increments have been established must be evaluated to determine the individual **source** emissions that consume increment and to include these **sources** in the PSD increment modeling analysis. For PM_{10} and SO_2, all **source** emission increases that have occurred since the Minor Source Baseline Date was established for the county in which the **source** is located must be modeled. **For NO_2, the minor source baseline date was established for the entire state on May 5, 1988.** Therefore, all source NOx emission increases that have occurred since this date must be modeled. Also, **major stationary sources** whose actual emissions have increased (as a result of construction) before the Minor Source Baseline Date but on or after the Major Source Baseline Date must be included in the modeling. (See page C.48 of the NSR Workshop Manual for further guidance.) This same approach should be followed for any other counties located within the off-site inventory radius of the **project**. The minor source baseline dates for each Georgia county can be found at:

http://www.georgiaair.org/airpermit/downloads/sspp/psdresources/minor_source_baseline_dates.pdf.

If no date is listed, then the minor source baseline date has not yet been triggered. Under recent $PM_{2.5}$ guidance from EPA, new county-level minor source baseline dates for the annual and 24-hour $PM_{2.5}$ increments will be established when a **source** applies for a PSD permit any time on or after the new trigger date for $PM_{2.5}$, October 20, 2011. EPD requires the model assessment of $PM_{2.5}$ increments,as as such increments have been adopted into the Georgia Rules for Air Quality Control if the project triggers the need for a cumulative impact analysis for $PM_{2.5}$. Major sources with $PM_{2.5}$ emission increases associated with construction after the Major Source Baseline date (10/20/2010) will consume $PM_{2.5}$

increment. For detailed guidance on modeling to demonstrate compliance with the PSD increment, the applicant should consult the EPA NSR Workshop Manual, Chapter C, sections II and IV.

The off-site emission inventory will identify the status of each specific emission unit as a consumer, an expander, or a baseline **source** (a **source** that existed prior to the baseline date, which therefore does not need to be included in the PSD increment modeling). Major **sources** in existence prior to the Major Source Baseline Date are excluded from the PSD increment modeling analysis unless they have undergone a physical change associated with construction after the Major Source Baseline date. Table 5-4 provides the major source baseline dates and trigger dates for each pollutant.

Table 5-4. Major Source Baseline Dates		
Pollutant	**Major Source Baseline Date**	**Trigger Date**
PM_{10}	January 6, 1975	August 7, 1977
$PM_{2.5}$	October 20, 2010	October 20, 2011
SO_2	January 6, 1975	August 7, 1977
NO_2	February 8, 1988	February 8, 1988

Pre-baseline date (non-increment consuming) emissions for **project sources** should be based on their actual emissions during the baseline period (two-year average of actual emissions prior to the Major/Minor Source Baseline date, as applicable) while future emissions for **project sources** should be based on their proposed permitted emission rates. Non-**project** PSD **sources** (both onsite and off-site) should be modeled based on the difference between their current allowable emissions and their actual emissions as of their minor **source** baseline date (or major **source** baseline date for **major stationary sources** undergoing construction before the minor **source** baseline date). Increment expansion is derived like the pre-baseline emissions (two years of average actual emissions immediately prior to the applicable baseline date), but those emissions have (since the applicable baseline date) permanently ceased or have decreased with a commensurate permit limitation. Increment expansion or consumption can also occur due to changes in applicable stack parameters (which can occur without associated emission reductions).

Table 5-5 lists the promulgated PSD increments for each PSD pollutant as well as a summary of the model results that are used for comparison to the PSD increment value.

Table 5-5. PSD Increments - (µg/m^3 unless otherwise noted) 40 CFR 52.21 (c)				
Pollutant	**Averaging Period**	**PSD Class II Increment**	**PSD Class I Increment**	**Model Value Used for Comparison to NAAQS**
SO_2	3-Hour	512	25	Highest Second High
	24-Hour	91	5	Highest Second High
	Annual	20	2	Highest
PM_{10}	24-Hour	30	8	Highest Second High
	Annual	17	4	Highest
$PM_{2.5}$	24-Hour	9	2	Highest Second High
	Annual	4	1	Highest
NO_2	Annual	25	2.5	Highest

5.3.4 Analysis of Modeled Exceedances

In some cases, the modeling may identify exceedances of either the PSD increment or the NAAQS standards. If this is the case, the applicant should carry out additional modeling to determine the **project** contribution to those individual receptors that exceed the standard during each averaging period and for each temporal event during which an exceedance is predicted.

When conducting a NAAQS or PSD increment analysis for a permitted Facility A, and a concentration exceeding the corresponding standard is predicted, the following procedures should be followed. If the receptor showing exceedance is located within the ambient air boundary of another Facility B, then this area is not **ambient air** for B, hence Facility B emission should be removed and the analysis should be re-modeled- for NAAQS or PSD increment- with the same receptor grid. If the second run shows no exceedances, this indicates that the modeled exceedances of the first run were caused by the emissions contribution of Facility B inside their own ambient air boundary. The area within Facility B's fenceline is not **ambient air** for Facility B's employees. If Facility B shuts down, there will continue to be no exceedance of ambient air standards. This approach eliminates the contribution from the plant's own **sources** on **ambient air** and is outlined in the memo found at http://www.epa.gov/region07/air/nsr/nsrmemos/ambiet2.pdf. It will be considered that conformance with the applicable standard in **ambient air** has been demonstrated.

If the receptor showing exceedance is located elsewhere outside the ambient air boundary of the permitted facility A and outside all other facilities' ambient air boundaries, but there is doubt as to whether the exceeding value is caused by facility A or another nearby facility, the significance analysis (facility A alone) should be re-modeled only for the troubled receptor. This model iteration should be run to seek all occurrences of **project** impacts at the exceeding receptor, by date and time (OU MAXIFILE and/or CO EVENTFIL). If the second run shows that the corresponding SIL was not exceeded, or it was exceeded but always at a different time than the exceedance of the first run, this means that the emissions of the permitted **project** (Facility A) do not cause or contribute to the modeled NAAQS or PSD increment exceedance since they do not have a significant impact at that particular location or at that particular time. At those receptors for which the **project's** modeled concentrations are below the significant impact levels, the **project** will be considered to have an insignificant impact and will not be included in the determination of the maximum concentration. This evaluation should consider both the receptor location and modeled time period of the exceedance. This procedure is further outlined in the memo found at: http://www.epa.gov/region07/air/nsr/nsrmemos/reaffirm.pdf

Exceedances of the 24-hour PM2.5, 1-hour NO2, and 1-hour SO2 NAAQS are addressed in an EPA clarification memo found at: http://www.epa.gov/region07/air/nsr/nsrmemos/appwn02_2.pdf

5.4 NON-DEFAULT MODELING OPTIONS

The procedures outlined above follow all the default modeling procedures. There may be, however, situations where the applicant may need to consider non-default options. When using these non-default options, the modeler will need approval from GA EPD modeling staff and may need to receive approval from EPA Region 4 prior to their use. The following outlines a few scenarios where non-default modeling options may be used. EPA's *Guideline on Air Quality Models* (40 CFR 51 Appendix W), *AERMOD Implementation Guide*, and guidance memos should be consulted for use of these options.

5.4.1 Urban Modeling Option

The AERMOD model allows the user to incorporate the effects of increased surface heating from an urban area on pollutant dispersion under stable atmospheric conditions. The user defines the input parameters for the urban area with the URBANOPT keyword. A default value of 1 meter is used for urban surface roughness length in the estimation of enhanced nighttime turbulence and is considered appropriate for most applications. However, use of a value other than 1 meter is considered a non-default regulatory option and its application may require approval from EPA Region 4 as an alternate model prior to use.

5.4.2 NOx/NO_2 Ambient Ratio Method

As noted previously, the AERMOD model can be used assuming 100% conversion from NOx to NO_2 (Tier I) or 75% (Tier II) for the annual averaging period and 80% for the 1-hour averaging period. The AERMOD model also incorporates two processing options for modeling the conversion of NOx emissions to NO_2: Plume Volume Molar Ratio Method (PVMRM) and Ozone Limiting Method (OLM). These modeling options require the use of ozone monitoring data and ratios of NO_2 to NOx emissions in each modeled stack. If the applicant wishes to use one of these processing methods, the modeling protocol will need to outline the proposed parameters to be used. EPA Region 4 must be contacted for approval of the use of these NOx modeling options as alternative modeling techniques prior to submittal of the modeling protocol.

5.4.3 Decay Function

AERMOD also allows for a decay function for SO_2. The HALFLIFE and DCAYCOEF key words can be used to account for this decay, but the use of the function and the variables will require approval from EPA Region 4.

5.5 CLASS I ANALYSIS

In addition to evaluating the **project's** impact on Class II areas, the applicant must also evaluate the **project's** impact on any nearby Class I areas. Although EPD is the permitting authority for emission **sources** in Georgia, the Federal Land Manager (FLM) will take the lead on reviewing the potential impact of the proposed new **major stationary source** or **major modification** on any nearby Class I areas (within 300 km of the project). Applicants should contact the relevant FLM directly to ensure the FLM receives a copy of the permit application with sufficient time to review and comment. Since EPD is the permitting authority, the applicant should copy GA EPD modeling staff on all correspondences with the FLMs.

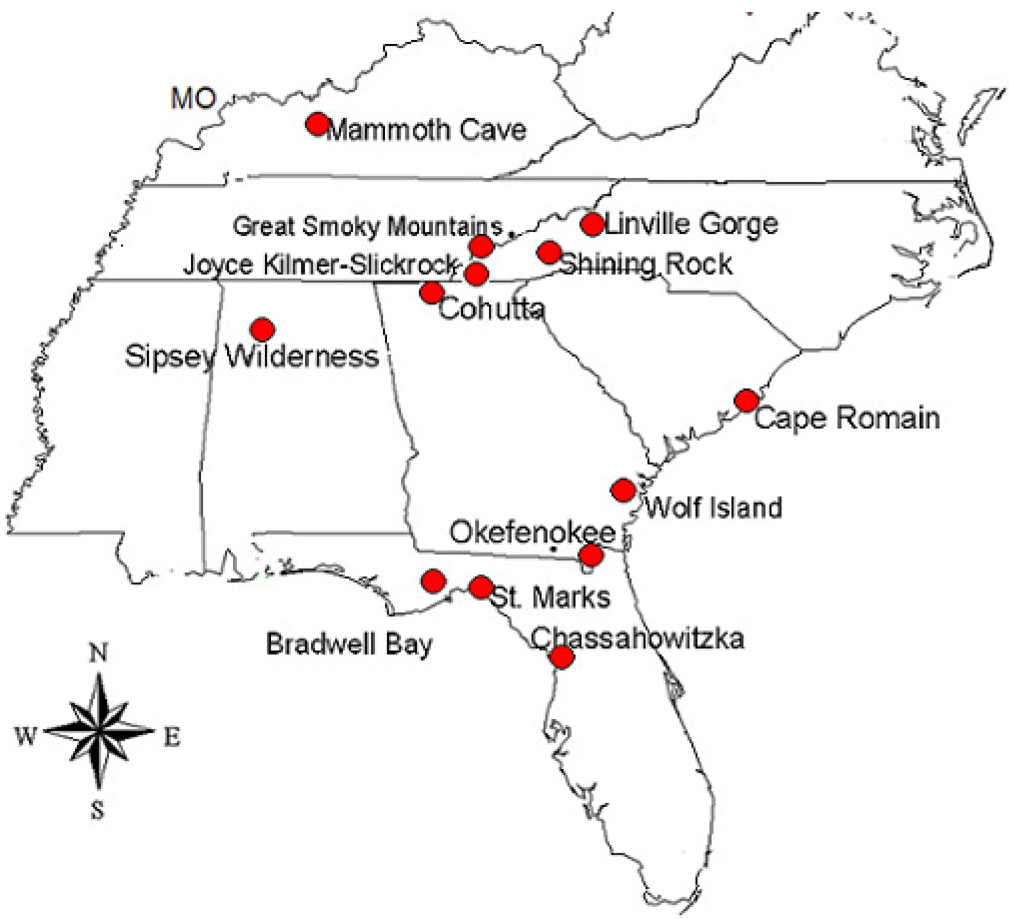
5.5.1 Initial Screening

First, the applicant should determine the distance from the site to all nearby Class I areas. An evaluation should be completed for all Class I areas located within 300 km of the site. These Class I areas are termed "mandatory" because Section 162(a) prohibits the states or the EPA from redesignating these areas to any less protective classification. Class I areas within and near Georgia include (see Figure 5-2):

- Wolf Island Wilderness Area (Fish & Wildlife Service);
- Okefenokee Wilderness Area (Fish & Wildlife Service);
- Cape Romain Wilderness Area (Fish & Wildlife Service);
- Shining Rock Wilderness Area (Forest Service);
- Great Smoky Mountains National Park (National Park Service);
- Joyce Kilmer-Slickrock Wilderness Area (Forest Service);
- Cohutta Wilderness Area (Forest Service);
- Linville Gorge Wilderness Area (Forest Service);
- Sipsey Wilderness (Forest Service);
- Saint Marks (Fish & Wildlife Service);
- Bradwell Bay (Forest Service)*;
- Mammoth Cave National Park, KY (National Park Service); and
- Chassahowitzka National Wildlife Refuge, FL (Fish & Wildlife Service)

*In 1980, Bradwell Bay, Florida was excluded for purposes of visibility protection as federal Class I areas. However, it may need to be evaluated for other potential impacts.

Figure 5-2: Class I Areas within 300 km of Georgia



5.5.2 Q/D Evaluation and Documentation For Class I Areas >50 km from the Site

Based on the FLMs' Air Quality Related Values Work Group (FLAG) Report Revised 2010[4], Class I evaluations for visibility and AQRV's are not required for a facility if the Q/D ratio for the **project** is less than or equal to 10 (as long as the Class I area is beyond 50 km from the site). The Q in the Q/D equation is based on the increase in all visibility affecting pollutants (NO_x, SO_2, PM, and H_2SO_4) calculated on the basis of maximum 24-hr emissions in tons/yr resulting from the **project** and the D is based on the distance (km) from the site to the Class I area. The applicant should include a table identifying the site location, and the location of each Class I area in UTMs along with a Q/D value for each. If the Q/D is less than 10, it is expected that no further review will be required. However, the representative FLM of each Class I area will need to be contacted to provide them with the Q/D calculation for confirmation. The applicant should include with the permit application a copy of all correspondence with each FLM along with confirmation that the Class I area does not require additional review.

5.5.3 Visibility and AQRV Screening Modeling For Class I Areas >50 km from the Site

If the **project's** Q/D exceeds 10, then the FLM may require CALPUFF modeling to demonstrate that visibility within the Class I area is not significantly impacted (i.e., the change in the 98th percentile of the 24-hour average light extinction for each year modeled is less than 5% over the annual average national conditions for the Class I area). In addition, the applicant will also have to evaluate the deposition of sulfur and nitrogen compounds compared to acceptable levels of 0.010 kilograms/hectare/year (kg/ha/yr) for Class I areas in the eastern United States. In addition, the FLM may request an assessment of potential ozone formation due to the projected emissions and what impact they may have on the plant life within the Class I area. Details on how to conduct these studies are provided in the FLAG document. The applicant should contact the appropriate FLM for guidance on conducting these analyses and review the applicable CALPUFF guidance documents prior to attempting the modeling. (Note that the version of CALPUFF approved by the FLM and EPA for long-range transport impacts assessment may not be the latest version of CALPUFF available.)

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[4] http://www.nature.nps.gov/air/Pubs/pdf/flag/FLAG_2010.pdf

5.5.4 Visibility Modeling For Class I Areas <50 km from the Site

If a Class I area is located within 50 km of the site, it is considered a near-field receptor and the CALPUFF model is no longer appropriate to use. To address visibility concerns in the near field rather than assessing the haze that may be caused by the proposed emissions, plume blight is analyzed (the visibility of the plume leaving the stacks and obscuring the view of the Class I area or in the Class I area). Two models are available to make this assessment: VISCREEN and PLUVUE. A Level I analysis utilizes the VISCREEN model. The total emissions of particulate and nitrogen oxides are entered into the model along with the distance from the site to the Class I area and the distance from the Class I area to a hypothetical observer. The FLM should be consulted to determine the appropriate visual range to be input to the model. The model calculates a ΔE, which is a measure of the color of the plume and C which is a measure of the contrast of the plume. If $\Delta E < 2.0$ and the absolute value of C is less than 0.05, then the plume is considered not to be visible. If the calculated values are greater than these criteria, a Level II analysis should be conducted. In Level II, non-default values regarding particle size and properties can be selected as well as weather conditions (wind speed and stability class) that represent less than absolute wind conditions (1% of the worst stability/wind speed combination). If the calculated values still exceed the criteria, a Level III analysis is conducted using the PLUVUE model. Use of the PLUVUE model accounts for stack conditions and dispersion that is not incorporated into VISCREEN and real weather data is used to run the model. Stricter criteria are used in Level III: $\Delta E < 1.0$ and the absolute value of C is less than 0.02. The applicant should review the FLAG document and the respective model guidance prior to submitting a modeling protocol to the FLM when conducting these near-field analyses. Also, a copy of the protocol must be submitted to GA EPD modeling staff for review.

5.5.5 Class I Increment Evaluation

Separate from the evaluations conducted for the FLM, the PSD applicant must complete an assessment of the **project's** impact on Class I PSD increment. This evaluation is similar to the Class II significance analysis in that it starts with an initial assessment of just the incremental impact from the proposed **project's** emissions and those maximum concentrations are then compared to the Class I significant impact levels shown in Table 5-6.

Table 5-6. Significant Ambient Air Quality Impacts for Class I Areas ($\mu g/m^3$)			
Pollutant	**Averaging Period**		
	3-hour	**24-hour**	**Annual**
SO_2	1.00	0.20	0.08
PM_{10}	N/A	0.32	0.16
$PM_{2.5}$	N/A	0.07	0.06
NO_2	N/A	N/A	0.10

If these values are not exceeded, no additional evaluation is required for Class I increment. For Class I areas located within 50 km of the site, this evaluation should be completed using the AERMOD model used for Class II modeling with a set of receptors taken from the National Park Service website at http://www.nature.nps.gov/air/maps/receptors/index.cfm.

The AERMOD model is a near field model (within 50 km). Therefore, if the Class I area is located greater than 50 km away from the site, then the applicant should use the CALPUFF model to assess the increase in each pollutant triggering a PSD review. However, if CALPUFF modeling is not required for AQRV assessment by an FLM, the applicant can use the AERMOD model as a screening technique to determine if CALPUFF modeling is necessary. AERMOD can be run with a set of polar receptors located 50 km from the facility at 1-degree intervals (starting and ending generally at 10 degrees on either side of the azimuth to the Class I area from the project site). If all these receptors are below the Class I significance levels, it can reasonably be concluded that modeling conducted with receptors within the Class I areas would also be expected to be less than their respective SILs. If this screening technique doesn't result in values below the SIL's, then CALPUFF significance modeling is required. Guidance on running the CALPUFF model can be found in the FLAG guidance document. If the Class I increment CALPUFF screening analysis shows values that exceed the Class I SILs, the applicant will need to perform a refined PSD increment analysis for the Class I area in question. For this assessment, the applicant will need to develop a PSD increment inventory within 300 km of the Class I area. In this case, it is recommended that an evaluation of both Georgia and/or neighboring states be conducted to determine if a PSD increment inventory for the Class I area already exists.

Additional guidance for conducting a Class I analysis in Georgia is provided in **Appendix H** of this document. The applicant should not independently proceed to refined Class I increment assessment without communicating the significance modeling results to EPA and the affected FLMs. A refined increment assessment protocol or alternative mitigating techniques may be requested by the FLM.

6 ADDITIONAL IMPACT ANALYSES

In addition to the BACT analysis and the Ambient Air Quality analysis, there are other analyses that are required. The PSD air quality application should mention each of the following areas and address the concern to the level that would ensure the public that impacts to the environment have been minimized.

6.1.1 Air Toxics Analysis

PSD **projects** must also include an assessment for compliance with EPD toxics modeling procedures. This is a state-only requirement and is not part of the PSD program. This assessment should follow the existing EPD guidance concerning toxics modeling, *Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions*. Assessing compliance with toxics pollutants is a critical part of the permitting process. If during this review, questions arise concerning the development of Allowable Ambient Concentrations or the methods for calculating emissions of toxic compounds, EPD should be contacted.

6.1.2 Class II Area Visibility Analysis

The Class II Area visibility analyses should be completed for airports, state parks, and state historic sites located within the **project's** largest calculated SIA as determined by the PSD modeling evaluation for Class II visibility-affecting pollutants, i.e., NO_2 (annual) or PM_{10} (24-hr). This analysis would be performed beginning with a screening procedure similar to that outlined in the EPA document *Workbook for Estimating Visibility Impairment*. The screening procedure is divided into three levels. If no visibility-affecting pollutants exceed their SILs, then a Class II visibility analysis is not required. Additional guidance for conducting a Class II Area visibility analysis is provided in **Appendix I** of this document.

6.1.3 Soils and Vegetation Analysis

PSD regulations require an assessment of other possible impacts, including secondary impacts on soils and vegetation within appropriate SIAs. An analysis should be completed to assess the potential impact of vegetative stress in the area of the proposed plant as outlined in the EPA document *A Screening Procedure for the Impact of Air Pollution Sources on Plants, Soils, and Animals*. This document provides ambient concentration levels of SO_2, NO_2, CO, fluorine, copper, vanadium, boron, and zinc (the latter four elements should be assessed within the extent of the PM_{10} 24-hr SIA) that can be used for screening levels to determine if there is a potential for vegetative stress.

For some applications, EPD may request a more refined analysis. Such an evaluation might include an inventory of the soil and vegetation types found in the impact area. This inventory should include all vegetation with any commercial or recreational value, and may be available from conservation groups, state agencies, and universities. For most types of soil and vegetation, ambient concentrations of criteria pollutants below the secondary NAAQS will not result in harmful effects. However, there are sensitive vegetation species (e.g., soybeans and alfalfa) that may be harmed by long-term exposure to low ambient air concentrations of regulated pollutants for which there are no NAAQS. For this review, the applicant may want to reference the following documents:

- *Impacts of Coal-Fired Plants on Fish, Wildlife, and Their Habitats* (Dept. of the Interior, Fish and Wildlife Service, National Power Plant Team, U.S. Govt. Print. Off., 1978),
- *A Screening Procedure to Evaluate Air Pollution Effects on Class I Wilderness Areas* (U.S. Forest Service), and/or
- *Air Quality in the National Parks* (National Park Service report which lists numerous studies on the biological effects of air pollution on vegetation).

6.1.4 Growth Analysis (Demographics)

This analysis consists of an estimation of the associated industrial, commercial, and residential source growth that will occur in the area due to the proposed project and an estimate of the air emissions generated by this growth. Increases in human population and associated activities (e.g., road traffic, other industrial growth, etc.) may contribute to air pollution. If such activities are projected to occur within the SIA(s) assessed for the pollutant(s) emitted by the project, the estimated emissions of such growth should be considered in the refined air quality impact assessment for the respective pollutant(s) including $PM_{2.5}$ (annual & 24-hr average) and the 1-hr average SO_2 and NO_2 standards.

The net growth in population due to the project and ancillary support activities should be estimated as a percentage of the existing population of the county or affected counties. The potential for such population growth to warrant associated increases in public facilities (such as schools) or commercial facilities (such as shopping centers) should be evaluated and discussed. Emissions increases due to, for instance, increased activity at new or existing mines to supply material to the project should be included in the refined NAAQS modeled assessment.

6.1.5 Construction Impacts

Typically, an air permit application does not need to include an evaluation of air emissions associated with construction activities. However, if the **project** requires considerable earth moving, paving and/or erection of large structures, the application may need to address air emissions of those construction activities and how they might be mitigated. The application may need to address fugitive dust emissions and what practices will be in place to protect local residents from such emissions. If the **project** calls for erection of a concrete batch plant, that too may need to be assessed and practices proposed to minimize those emissions. In addition, if the **project** calls for the operation of large machinery or other fuel burning activities over an extended period, then an assessment of these combustion emissions should be made to determine if there would be a potential for local residents to be impacted by the emissions.

7 PSD PERMIT APPLICATION SUBMISSION AND REVIEW PROCEDURES

In order to apply for a permit, the owner or operator of the **stationary source** must submit a permit application addressing all air quality regulatory requirements that will apply to the **source** – including the regulatory requirements imposed by the PSD program as well as any other regulatory requirements that may apply. Note that if new applicable regulatory requirements become effective before issuance of a final permit, the permit applicant may need to supplement or revise the permit application to address those new requirements.

7.1 PRE-APPLICATION MEETING

The applicant (or representative) should make initial contact with the EPD PSD facilitator alerting them that a PSD application will be submitted to the agency. In this initial contact, the applicant should identify who they are (name of company and location), the type of facility involved, and briefly describe the **project** including emission units involved and the pollutant(s) that will require a PSD review. The Division and the applicant will then discuss the details of submitting a modeling protocol and decide on a date of a pre-application meeting. The purpose of the meeting is to ensure that the applicant will submit an application that is complete and contains all the information that EPD requires to complete the review. By doing so, the time needed to review the application is minimized. The PSD facilitator will request the applicant to submit certain information regarding the **project** to ensure a productive meeting. The submittal should be provided to EPD at least one month prior to the meeting and include the information presented in **Appendix A** of this document.

During the meeting, EPD and the applicant will discuss the general approach of the emission calculations, BACT assessment, modeling protocol, and modeling results (if available). EPD will provide information regarding pending changes to the regulations or the air quality status of the area that could affect the permitting of the **project**. The EPD Data and Modeling Unit (DMU) will provide the meteorological data to be used in conducting the dispersion modeling and detailed comments, if not already provided before the pre-application meeting. At the conclusion of this meeting, a timetable should be committed to by both EPD and the applicant for submittal of a complete application and issuance of the permit.

7.2 APPLICATION SUBMISSION PROCEDURES

After the pre-application meeting, the applicant should begin the preparation of the PSD permit application in the format that covers all of the elements described in this guidance. The format should follow the specifications noted in **Appendix B** of this guidance. Any issues encountered in the preparation process that require resolution or conflict with decisions made in the pre-application meeting should be brought to the attention of the PSD facilitator. The applicant should submit all components of a PSD application, as noted in **Appendix B** of this guidance. If the application is deemed significantly incomplete, it may be returned to the applicant. The applicant should submit five complete identical versions of the PSD permit application in hardcopy form and five electronic copies suitable for uploading to EPD website. The applicant should submit one public version if submitting confidential information in accordance with Georgia EPD guidance located at http://www.georgiair.org/airpermit/downloads/otherforms/confinfo.pdf. The applicant should also include within the electronic files an Excel spreadsheet with all the emissions calculations and off-site emissions inventory development in the form of active formulas (not a "values only" version). This will expedite EPD's review process.

The applicant should submit the PSD application, to the address below:

Stationary Source Permitting Program
Air Protection Branch
Georgia Environmental Protection Division
4244 International Parkway, Suite 120
Atlanta, Georgia 30354

7.3 PSD PERMIT APPLICATION REVIEW PROCESS

It is the EPD's goal to complete the review and issue a PSD permit in a timely manner upon receipt of a complete PSD application. Figure 7-1 provides a general overview of the review process within the agency. The timeframes in Figure 7-1 are targets based on applications that follow this guidance, are complete when submitted, result in prompt responses to requests for additional information, and involve very little, or no, public opposition. More complicated applications and those which involve a public meeting and/or public hearing as part of the public participation process will take longer. The first step in the process is for the PSD facilitator to determine the completeness of the application. If any elements are missing or there appear to be inconsistencies in the application, the applicant will be contacted to make corrections. Once deemed complete, the applicant will be informed and directed to send a copy to each FLM, if appropriate, and the U.S. EPA Region 4. The application will be reviewed concurrently by the Stationary Source Permitting Program (to assess the PSD applicability, BACT and other regulatory reviews) and the Planning

& Support Program (to review the ambient air quality analysis submitted with the application). In approximately 60 days, the PSD facilitator will collect any comments from both sections along with any comments that EPA or the FLM may have provided. The applicant will be informed of any issues requiring resolution and should respond within 30 days. EPD will then review the applicant's comments and continue to draft a preliminary determination and draft permit. Once completed, the draft permit and preliminary determination may be sent to the applicant for review. Any comments on the draft permit by the applicant will be addressed by EPD and a Preliminary Determination and draft permit will be issued for a 30-day public comment period. If there are any comments received from the public, the applicant may be asked to submit additional information to respond to the comments as necessary. Georgia EPD may also hold a public hearing upon request from the public. This would most likely extend the comment period at least 30 days. Upon addressing the comments, EPD will make a final decision on the application.

Figure 7-1. PSD Application Review Process