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PSD PERMIT APPLICATION GUIDANCE DOCUMENT

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

AIR PROTECTION BRANCH

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This DRAFT does not address the 2017 updates to Appendix W.

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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 to the development of their PSD applications in Georgia. It also generally describes the PSD application review process followed by Georgia 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 a Georgia EPD Air Protection Branch Staff Member (table below) for further guidance regarding preparing and submitting a PSD air permit application in Georgia.

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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 major stationary source 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 EPD 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 EPD PSD state rule is specified in state rule 391-3-1-.02(7). Georgia 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 reference in state rule 391-3-1-.02(7). An electronic copy of the "*Georgia PSD Integrated Rule*" may be found at http://epd.georgia.gov/air/psd-permitting-resources.

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

2- PSD Applicability

A PSD applicability determination, as discussed in this section, is the process of determining whether a preconstruction review should be conducted by, and a permit issued to, a proposed new source or a modification of an existing source by Georgia EPD, pursuant to PSD requirements.

There are two basic criteria in determining PSD applicability. The first criterion is whether the proposed project would locate, or the modified source is located in a PSD area. This is further discussed in Section 2.1. The second and primary criterion is whether the proposed project meets the definition of a major stationary source or major modification to an existing stationary source. A new source is classified as a major stationary source if it has the potential to emit any regulated NSR pollutant under the Clean Air Act (CAA) in amounts equal to or exceeding specified major source thresholds [100 or 250 tons per year (tpy)] which are predicated on the source's industrial category. [Refer to Chapter 2.2 for further discussion.] A major modification is a physical change or change in the method of operation at an existing major stationary source that causes a significant "net emissions increase" at the source of any regulated NSR pollutant.

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 (referred to as "PSD area") in which the new unit or major modification will be constructed for all applicable criteria pollutants. More information about the current attainment status of all Georgia counties may be found at http://epd.georgia.gov/air/national-ambient-air-quality-standards-and-nonttainment-areas. Permitting requirements for a criterial pollutant for which the county is classified as nonattainment 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 Definition of Regulated NSR Pollutant

PSD applicability should include a review of all applicable pollutants that meet the definition of "regulated NSR pollutant". The term "regulated NSR Pollutant" is defined Georgia Rule 391-3-1-.02(7)(2)(ix) in lieu of 40 CFR 52.21(b)(50) and includes the following:

1. Any pollutant for which a national ambient air quality standard has been promulgated,
2. Precursors for the purpose of NSR include:
   a. Volatile organic compounds and nitrogen oxides are precursors to ozone in all attainment and unclassifiable areas.
   b. Sulfur dioxide is a precursor to $PM_{2.5}$ in all attainment and unclassifiable areas.
   c. Nitrogen oxides are presumed to be precursors to $PM_{2.5}$ in all attainment and unclassifiable areas, unless the State demonstrates to the Administrator's satisfaction or EPA demonstrates that emissions of nitrogen oxides from sources in a specific area are not a significant contributor to that area's ambient $PM_{2.5}$ concentrations.
3. Any pollutant that is subject to any standard promulgated under section 111 of the Act;
4. Any Class I or II substance subject to a standard promulgated under or established by title VI of the Act;
5. Any pollutant that otherwise is subject to regulation under the Act as defined in paragraph 40 CFR 52.21(b)(49).
6. Notwithstanding paragraphs 40 CFR 52.21(b)(50) [Georgia Text 391-3-1-.02(2)(7)(a)(2)(ix)] of this section, the term regulated NSR pollutant shall not include any or all hazardous air pollutants either listed in section 112 of the Act, or added to the list pursuant to section 112(b)(2) of the Act, and which have not been delisted pursuant to section 112(b)(3) of the Act, unless the listed hazardous air pollutant is also regulated as a constituent or precursor of a general pollutant listed under section 108 of the Act.

7. Particulate matter (PM) emissions, $PM_{2.5}$ emissions and PM_{10} emissions shall include gaseous emissions from a source or activity which condense to form particulate matter at ambient temperatures. On or after January 1, 2011 (or any earlier date established in the upcoming rulemaking codifying test methods), such condensable particulate matter shall be accounted for in applicability determinations and in establishing emissions limitations for PM, $PM_{2.5}$ and PM_{10} in PSD permits. Compliance with emissions limitations for PM, $PM_{2.5}$ and PM_{10} issued prior to this date shall not be based on condensable particular matter unless required by the terms and conditions of the permit or the applicable implementation plan. Applicability determinations made prior to this date without accounting for condensable particular matter shall not be considered in violation of this section unless the applicable implementation plan required condensable particular matter to be included.

2.2.2 Definition of Source (i.e., Scope of Stationary Source)

For purposes of PSD a stationary source is any "building, structure, facility, or installation" which emits or may emit any air pollutant subject to regulation under the CAA. "Building, structure, facility, or installation" means all the pollutant-emitting activities which (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 stationary source. In accordance with prior Georgia 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, conveyors, or taxiways)
- Shared Operational Relationships (common parking or service areas, workforce, security, etc.)
- Distance Between Operations
- Functional Interrelatedness of emission units (i.e., Summit Decision, 6th Circuit)

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.

2.2.3 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. The source is considered a major modification to an existing minor stationary source if its total facility-wide PTE is greater than the established major source thresholds for any regulated NSR pollutant.

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 stationary source in future permitting actions.

Georgia EPD's *"Procedure to Calculate a Facility's PTE and to Determine its Classification, August 2008"* provide the procedures on how PTE is calculated and can be found at http://epd.georgia.gov/air/documents/potential-emit-guidelines.

As defined in the federal PSD regulations, fugitive emissions are those ". . . which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening." To the extent they are quantifiable, fugitive emissions should not be included in the PTE when one is determining whether a stationary source is a "major stationary source" or major modification to an existing minor stationary source, as defined in state rule 391-3-1-.02(7)(2), unless it belongs to one of the 28 listed industrial source categories in Table 2-1, or unless the source is regulated under Section 111 of the Clean Air Act (New Source Performance Standards, NSPS) or Section 112 of the Clean Air Act (National Emissions Standards for Hazardous Air Pollutants, NESHAP) as of August 7, 1980.

EPA has established different major source threshold levels for different types of industries, and Georgia 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 pollutants. For all other industries outside the 28 industrial categories, the major source threshold level is 250 tpy.

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

Table 2-1: Source Categories That Have a 100 tpy Major Source Threshold	
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
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[1] (definition of this industrial grouping is not based on the definition defined in the *Federal Register* in 2007)
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

2.2.4 Definition of Major Modification at an Existing Major Stationary Source

A PSD review is triggered for a modification to an existing major stationary source, if both a significant emissions increase and a significant net emissions increase criteria are met. 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

[1] On 5/1/2007 EPA increased the major source threshold of emissions from a source category entitled *Certain Ethanol Production Facilities* from 100 to 250 tpy for determination of PSD applicability. The NRDC petitioned EPA to reconsider this NSR rule revision (i.e., the Ethanol Rule Provisions) on 7/2/2007. On 4/24/2008, EPA denied NRDC's petition.

EPA noted in a letter to Georgia EPD, dated October 26, 2010, EPA does not intend to take any action on approving the 2007 NSR *Ethanol Rule Provisions* as noted in this footnote due to a petition to reconsider the rule and other instructions from EPA Headquarters. EPA Headquarters is reconsidering this portion of the NSR rule despite EPA's 2008 denial of the petition from NRDC.

increase over a contemporaneous five-year period is often referred to as "Step 2" of the analysis. The term "significant", in this case refers to the following emission thresholds in Table 2-2:

Table 2-2: Definition of term "Significant"

Pollutant	Emission Rate
Carbon Monoxide (CO)	100 tpy
Nitrogen Oxides (NOx)	40 tpy
Sulfur Dioxide (SO_2)	40 tpy
Particulate matter (PM), filterable	25 tpy
PM less than 10 microns in diameter (PM_{10}), filterable plus condensable	15 tpy
PM less than 2.5 microns in diameter (direct $PM_{2.5}$), filterable plus condensable	10 tpy
Ozone (precursor volatile organic compounds, VOCs)	40 tpy
Ozone (precursor NOx)	40 tpy
Fluorides	3 tpy
Sulfuric Acid Mist	7 tpy
Hydrogen Sulfide (H_2S)	10 tpy
Total Reduced Sulfur (including H_2S)	10 tpy
Municipal waste combustor organics[2]	3.2 E-06 megagrams per year (Mg/yr) or 3.5 E-06 tpy
Municipal waste combustor metals[3]	14 Mg/yr or 15 tpy
Municipal waste combustor acid gases[4]	36 Mg/yr or 40 tpy
Municipal solid waste landfills emissions[5]	45 Mg/yr or 50 tpy
Any regulated NSR Pollutant not listed in this table, excluding ozone depleting substances.	>0

[2] Measured as total tetra-through octa-chlorinated dibenzo-p-dioxins and dibenzofurans.
[3] Measured as PM.
[4] Measured as SO_2 and hydrogen chloride (HCl).
[5] Measured as nonmethane organic compounds (NMOC).

Table 2-2: Definition of term "Significant"	
Pollutant	**Emission Rate**
Significant means any emissions rate or any net emissions increase associated with a major stationary source or major modification which would construct within 10 kilometers (km) of a Class I area and have an impact on such area equal to or greater than 1 microgram per cubic meter on a 24-hour average.	

To the extent they are quantifiable, fugitive emissions should be included in the PTE when one is determining whether a project at an existing major stationary source is a major modification, as defined in state rule 391-3-1-.02(7)(2).[6]

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 CFR 52.21(a)(iv)) projects a significant emissions increase will follow the construction of a new unit or project at an existing unit. The netting procedures can be found in the definition of the term net emissions increase in state 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

[6] The inclusion of fugitive emissions to the extent quantifiable are included in a stationary source's PTE when determining whether a physical or operational change in a major modification regardless of the source category that the emission source belongs to per the 2002 NSR Reform rule. The 12/19/2008 NSR amendment (i.e., the Fugitive Emissions Rule) reversed this policy; however, the 12/19/2008 NSR amendments are stayed indefinitely.

determine PSD applicability for the project. The basis for the netting emission calculations should be clearly discussed and supported in the permit application.

2.3 Calculating Changes In Emissions

Changes in emissions should be calculated by comparing “baseline actual emissions” (BAE) to “projected actual emissions” (PFA) or PTE. The Georgia EPD definitions of BAE and PFA are unique to Georgia and there are defined in state rule 391-3-1-.02(7) and restated in Appendix C of this document. 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 requirement. 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 (Georgia 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 Georgia 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 Georgia 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 Georgia 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 state 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 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 operation 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 startup, 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 regulation 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=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 review.

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. This is further discussed in Section 4 of this document.

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. This is further discussed in Section 5 of this document.

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 EPD 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 Georgia EPD will prepare to accompany the draft PSD permit.

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 [Georgia 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 [Georgia 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 Control Options
Step 3 – Rank Remaining Technically Feasible Control Options

Step 4 – Evaluate Remaining Control Technologies

Step 5 – Select BACT

Step – 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 options 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 applicant 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 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 option. 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 NOx @ 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^{o}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 conclusions of the BACT assessment and the reason of selecting BACT should be logically explained. BACT must also address startup and shutdown scenarios. Please consult your Georgia EPD contact 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 **project**s, 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 "clarification memoranda" issued by EPA and maintained on its dispersion modeling Support Center for Regulatory Atmospheric Modeling (SCRAM) website (http://www3.epa.gov/scram). In addition, EPA has established and periodically updates the *AERMOD Implementation Guide*, 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://www3.epa.gov/scram. The *Guideline* recommends the use of the AERMOD modeling system for PSD modeling to determine impacts on receptors within short range (or near-field) 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.

Section 5.7 of this document provides a list of U.S. EPA user's guides and clarification memoranda pertinent to Section 5 of this document.

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.

Table 5-1 specifies the components of a PSD modeling exercise that should be considered by the applicant for their applicability.

Table 5-1 Components of PSD Modeling

Modeling Components that Should be Considered	Section of Document
Class II areas:	
Significance modeling	5.2 5.4
NAAQS modeling	5.3, 5.4
PSD increment modeling	5.3, 5.4
Visibility modeling	5.5, 6.X
Class I areas:	
Significance modeling	5.5.2
PSD Increment Modeling	5.5.3
Impacts on Air Quality Related Values (AQRVs)	5.5.3
Visibility Modeling	5.5.X

5.1 Modeling Protocol and Pre-Application Meeting

The applicant should submit a modeling protocol ("protocol") to Georgia EPD at least one month prior to a pre-PSD application meeting. Protocols are critical as they establish the specific procedures to be followed for the PSD Class I and Class II modeling analyses, as applicable, and establish any non-default methods to be used in the evaluation. The protocol should include the following criteria noted in Table 5-2. If the criteria noted is not applicable the protocol should so state and why.

Table 5.2 Criteria to be addressed by PSD Modeling Protocol Submitted to GA EPD	
Document Section	**Protocol Criteria to be Addressed**
5.1.1	Identification of the dispersion models used as well as visibility models
5.1.2	The meteorological data to be used and its representativeness
5.1.2	Coordinate System and Receptor Grid
5.1.3	Impacts of Building Downwash and GEP
5.1.4	Modeled emissions and stack parameters
5.1.5	NOx modeling, ozone and secondary $PM_{2.5}$ formation
5.1.6	Use of non-default modeling options
5.1.7	Class I: Significance Modeling, PSD Increments, AQRV Analysis
5.1.8	Submittal Instructions for Protocol
6.X	Model used for Toxics Impact Assessment
6.X	Additional Impact Analysis
6.X	Class II Visibility Modeling

The protocol should outline how the modeling will incorporate all elements included in Section 5 of this guidance document. The protocol should identify any site-specific issues that may involve any non-typical sources or dispersion 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 protocol should be submitted to Georgia EPD Data and Modeling Unit ("DMU") for their review. Next, the applicant should schedule a pre-PSD application meeting with Georgia EPD staff. This meeting will be held after Georgia EPD's DMU has had at least one month to review the protocol. Please refer to Section 5.1.8 for further information regarding submittal of the modeling protocol.

5.1.1 Developing the Protocol – Identification of Class I and Class II Models Used

Class I and Class II dispersion modeling should be completed using the current regulatory version of AERMOD for near-field receptors (≤ 50 km from the project site). This includes any Class I area that is less than or equal to 50 km from the project site. Identification of Class I areas is further discussed in Section 5.3.X. There are two input data processors that are regulatory components of the AERMOD modeling system (AERMET and AERMAP). Other non-regulatory components of this system include AERSURFACE and BPIPPRIM. Table 5-3 provides information on each data processor:

Table 5-3 AERMOD Data Processors

Data Processor	**Description**
AERMET	A meteorological preprocessor for organizing meteorological data into a format suitable for use by AERMOD.
AERMAP	AERMAP is a terrain preprocessor for AERMOD. AERMAP processes commercially available Digital Elevation Data and creates a file suitable for use within an AERMOD control file. This file would contain elevation and hill-height scaling factors for each receptor in the air dispersion study.
AERSURFACE	A data processor tool that processes land cover to determine the surface characteristics for use in AERMET.
BPIPPRIME	Building Profile Input Program (BPIP) is a PC-based program designed to incorporate the concepts and procedures expressed in the Good Engineering Practice (GEP) technical support document, *Guideline for Determination of Good Engineering Practice Stack Height, 1985, U.S. EPA*, building downwash guidance, and other related references that correctly calculate building heights (bh) and projected building widths (pbw) for simple, multi-tiered, and groups of structures.

Table 5-3 AERMOD Data Processors	
Data Processor	**Description**
	The PRIME tool is an algorithm for calculating downwash values for input into the PRIME algorithm which is contained in such models as AERMOD.

Dispersion modeling may be required for Class I area receptors located ≥ 50 km and ≤ 300 km from the project site. In such cases, dispersion modeling should be completed using the current regulatory version of CALPUFF. There are two input data processors that are regulatory components of the AERMOD modeling system (CALMET and CALPOST). Table 5-4 provides information on each data processor:

Table 5-4 CALPUFF Data Processors	
Data Processor	**Description**
CALMET	Computes micrometeorological parameters at modeling grid receptors from surface meteorological data and upper air data.
CALPOST	Processes CALPUFF output files summarizing the results of the CALPUFF simulation. CALPOST is also capable of using the concentrations of sulfates and/or nitrates and/or particulate matter from CALPUFF to compute parameters related to measures of visibility.

5.1.1 Developing the Protocol – Meteorological Data Selection

Georgia EPD has provided the most recent five years of meteorological data at http://epd.georgia.gov/air/dispersion-modeling-information. Users can select and download the meteorological files for the appropriate meteorological station based on the country where the proposed project is located for use in AERMOD. Georgia EPD created the AERMOD ready meteorological data by processing two sets of five years of meteorological data for various combinations of ASOS surface and upper air station pairings. The meteorological files were processed using AERMET, AESURFACE and AERMINUTE.

Representativeness Determination

As part of the protocol submittal, the applicant must provide a demonstration that the meteorological data provided by Georgia EPD is representative of the project site. The determination of representativeness should include a comparison of the surface characteristics which include albedo, Bowen ratio, and surface roughness between the National Weather Service (NWS) measurement site and the source location, coupled with a determination of the importance of those differences relative to predicted concentrations. 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.

The applicant should use AERSURFACE to complete a comparison between the surface characteristics of the area surrounding the facility and the area around the meteorological station. If the comparison shows significant differences in surface characteristics, the application should consult the Georgia EPD DMU to discuss the possibility of using an alternative meteorological data set.

The AERSURFACE utility requires the input of land cover data from the U.S. Geological Survey (USGS) National Land Cover Data 1992 archives (NLCD92) which can be downloaded as seamless data for user-specified domains from the Multi-Resolution Land Characteristics (MRLC) Consortium (http://www.mrlc.gov/nlcd92_data.php). AERSURFACE currently does not support the use of 2001, 2006, or 2011 NLCD data.

When using AERSURFACE, the applicant should follow the general guidance outlined in the *AERSURFACE User Guide* 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 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 "wind" (*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 Georgia EPD and is outside the scope of this document. Additional guidance concerning on-site monitoring can be found in EPA's "*Meteorological Guidance for Regulatory Modeling Applications*" – February 2000 as listed in Section 5.7.

5.1.3 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 the NAD83 datum. 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 fence line, 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 Georgia 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 spacing's may be used if the ultimate design value is determined to the nearest 100 meter resolution by re-modeling with a small 100 meter 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 Multi-Resolution Land Characteristics Consortium (MRLC)

Viewer (http://www.mrlc.gov/viewerjs) for use in the AERMAP program. The data is usually in ArcGrid format. The user can use ArcGis tool to convert it to *.tiff format for use in the AERMAP program. To ensure data consistency between site UTMs and the USGS data set, NAD83 datum should be used throughout all the modeling analyses.

5.1.4 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*. 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) and 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 fence line, 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.

5.1.5 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* 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.

5.1.6 Developing the Protocol – NOx Modeling, Ozone and Secondary $PM_{2.5}$ Formation

NOx Modeling

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. 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.

Ozone Ambient Impact Assessment and Secondary $PM_{2.5}$ Impact Assessment

Impacts on ozone and secondary $PM_{2.5}$ vary with location, distance from the source, season of the year, and many other factors. Following EPA's proposed revision to the *Guideline*, Georgia EPD recommends that the applicant use a "two-tiered" demonstration approach to address single-source impacts on ozone and secondary $PM_{2.5}$. The first tier involves the use of existing technical information to evaluate the relationships between precursor emissions and source impacts. The second tier involves the application of sophisticated chemical transport models consistent with the EPA single-source modeling guidance listed in Section 5.7 of this document. The second tier approach should only be considered after attempting the first tier approach. The details associated with the selected approach should be included in the modeling protocol.

5.1.7 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.

5.1.7 Class I Modeling Analysis

For any Class I areas within 300 km of the project site, the protocol should address the Class I significance modeling assessment, impacts on Air Quality Related Values, and impacts on visibility. This section of the protocol should address the following criteria, as applicable:

Table 5-5 Criteria to be Included in Protocol for Class I Area Analyses, as applicable	
Criteria	**Description**
Class I areas	Identify each and every Class I area that is within 300 km of the project site. Be sure to include any written communication with the applicable Federal Land Manager (FLM).
Screening analysis	Identify models used to predict concentrations for use in the significance modeling, impacts on AQRVs, and impacts on visibility. In addition provide a discussion of the coordinate system used in the modeling.
FLM	Any written correspondence with FLM.

5.1.8 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 5.1.7 of this document. The applicant should submit a copy of the modeling protocol to Georgia EPD at least once month prior to any pre-PSD application meeting. The applicant should schedule a pre-PSD application meeting with Georgia EPD air permitting staff. If the modeling protocol is approvable as submitted, Georgia EPD will approve it prior to or during the pre-PSD application meeting. If Georgia EPD identifies any concerns regarding the submitted modeling protocol, Georgia EPD will provide a list of the additional information needed for approval prior to or during the pre-application meeting. Georgia 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 modeling analysis involves two distinct phases: (1) a significance modeling analysis (Section 5.2) and (2) a cumulative impact analysis (Section 5.3). The significance analysis models only the significant increase (as stated in Table 2-2) 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 SILs in the significance modeling 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 CFR 51.165(b)(2). Table 5-6 lists the Class II SILs for all PSD pollutants.

Table 5-6. 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[7]
PM_{10}	1	5	--	--	--
$PM_{2.5}$	--	--	--	--	--
NO_2	1	--	--	--	7.5[8]
CO	--	--	500	--	2,000

[7] Interim 1-hour NO_2 SIL set by Georgia EPD.
[8] Interim 1-hour SO_2 SIL set by Georgia EPD.

The SILs for NO_2 (1-hour) and SO_2 (1-hour) are "interim SILs" and have not been promulgated. These "interim SILs" are derived based on information contained in EPA guidance memos noted in Section 5.7 that pertain to the NO_2 and SO_2 NAAQS. The use of "interim SILs" require additional documentation for their use. The applicant should review EPA guidance or rulemaking to ensure that changes have not been made to these SILs.

5.2.1 Model Runs for Significance Analysis

Modeled Emission Rates

In the Class II significance modeling analysis, 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 (modeled as a positive emission rate), whichever is lower, 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 protocol and PSD 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

Exhaust conditions (stack height, exhaust flow rates, temperatures, etc.) for the past actual conditions should be based on the 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.

Running the Model

The AERMOD model is run for each pollutant emitted in significant quantities, as defined in Table 2-2, for each respective averaging time as listed in Table 5-6. 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.

In the case of 1-hour NO_2 and 1-hour SO_2 evaluations, EPA guidance states that the applicant should determine the maximum 1-hour NO_2 and 1-hour SO_2 concentration at each receptor per year. Next 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. Further information about evaluating 1-hour NO_2 and 1-hour SO_2 impacts, as applicable, is provided in Section 5.7 under "NO_2 NAAQS" and "SO_2 NAAQS" subject headings.

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. Further information regarding "cumulative impact modeling analysis" is provided in 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 5-7). 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 Georgia 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 5-7. Significant Monitoring Concentrations (40 CFR 52.21(i)(5))

Pollutant	Averaging Period	Significant Monitoring Concentration ($\mu g/m^3$)
Carbon Monoxide	8-Hour	575
PM_{10}	24-Hour	10
$PM_{2.5}$	24-Hour	--
SO_2	24-Hour	13
Lead	3-Month	0.1
Fluorides	24-Hour	0.25
Total Reduced Sulfur	1-Hour	10
Hydrogen Sulfide	1-Hour	0.2
Reduced Sulfur Compounds	1-Hour	10
NO_2	Annual	14
Ozone	N/A	N/A[9]

5.2.3 Ozone Ambient Impact 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. Georgia EPD operates ozone monitors at numerous

[9] No *deminimis* 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.

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.

The requirement posed in the Draft New Source Review Workshop Manual (EPA, 1990) to conduct this analysis changed in 2002. The requirement use to be triggered by a proposed project with a projected net increase of VOC emissions in excess of 100 tpy. Since 2002, the requirement is triggered by proposing a project with a projected net increase of VOC or NOx emissions in excess of 100 tpy [40 CFR 52.21(i)(5)(i)].

An ozone ambient impact analysis consists of two parts as further described in the Table 5-8:

Table 5-8 Ozone Ambient Impact Analysis

Part	**Ozone Ambient Impact Analysis - Component**
1	Identify existing ozone ambient monitors near the project area. Discuss how the data are representative, current, and collected appropriately. The term “representative” means that the data are representative of potential ozone impacts of the facility. The term “current” means the data have been collected recently (at least 3 of the last 6 years of record exists. The term “collected appropriately” means the data have been collected and subject to appropriate quality assurance and quality control measures.
2	List the design value for the past 3 to 6 years from the monitoring site(s) identified in Part 1 above. The term “design value” means the three-year average of the annual 4th highest 8-hour average ozone concentrations. Discuss any trends with respect to attainment status.

Table 5-8 Ozone Ambient Impact Analysis	
Part	**Ozone Ambient Impact Analysis - Component**
	Discuss the estimated influence of the proposed project on the attainment status. Applicants may use a nearby monitor(s) to establish an ambient level, and then adjust that level by comparing traffic data, population data, and other emissions-indicator data in the vicinity of the monitor(s) with similar data in the area of their project to suggest that, with more or less population, miles-traveled, and anthropogenic emission sources, higher or lower ozone ambient concentration would be expected, respectively.

5.2.4 Significant 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. The *Guideline* recommends the examination of alternative, anticipated operating scenarios in order to determine the worst-case scenario for modeling. 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 partial load capacity will result in significantly higher emissions and/or a decrease in the height of the models' predicted plume rise[10]. 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 or 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-hour NO_2 and 1-hour SO_2

[10] Per the *Guideline on Air Quality Models (40 CFR 51, Appendix W)*

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.

Documentation of each alternative operating scenario

Each scenario should be well-documented, including:

- The reason(s) why the operating scenario may be important to the application,
- The worst-case duration of each type of startup emission period,
- Short-term, hour-by-hour variations in pollutant emission rates and stack parameters during such scenarios,
- An estimate of the portion of a worst-case year, or the number of startup periods per year, each scenario may be employed,
- If the project startup scenario is predicted to exceed applicable PSD significance levels, this scenario (assuming it is worst-case) should be modeled with the off-site inventory to demonstrate refined NAAQS and PSD increment conformance. In addition, the scheduling of the startup scenario in the PSD modeling exercise should be clearly explained,
- A discussion of how the U.S. EPA modeling guidance on intermittent emissions may apply, and
- If the applicant does not expect to operate at less than capacity, a discussion of such expectation should be included in this analysis.

5.3 Class II Cumulative Impact Analysis

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 a 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. 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-hour NO_2 and 1-hour SO_2 (see Section 5.3).

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-hour NO_2, the 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 www3.epa.gov/scram.

5.3.1 Determination of the Significant Impact Area

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 a 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-hour NO_2 and 1-hour SO_2.

5.3.2 Develop Off-Site Modeling Inventory

The next step is to determine the off-site inventory for that pollutant. The initial off-site inventory radius is the radius of the pollutant-specific largest SIA (except for 1-hour NO_2 and 1-hour SO_2) plus 50 km.

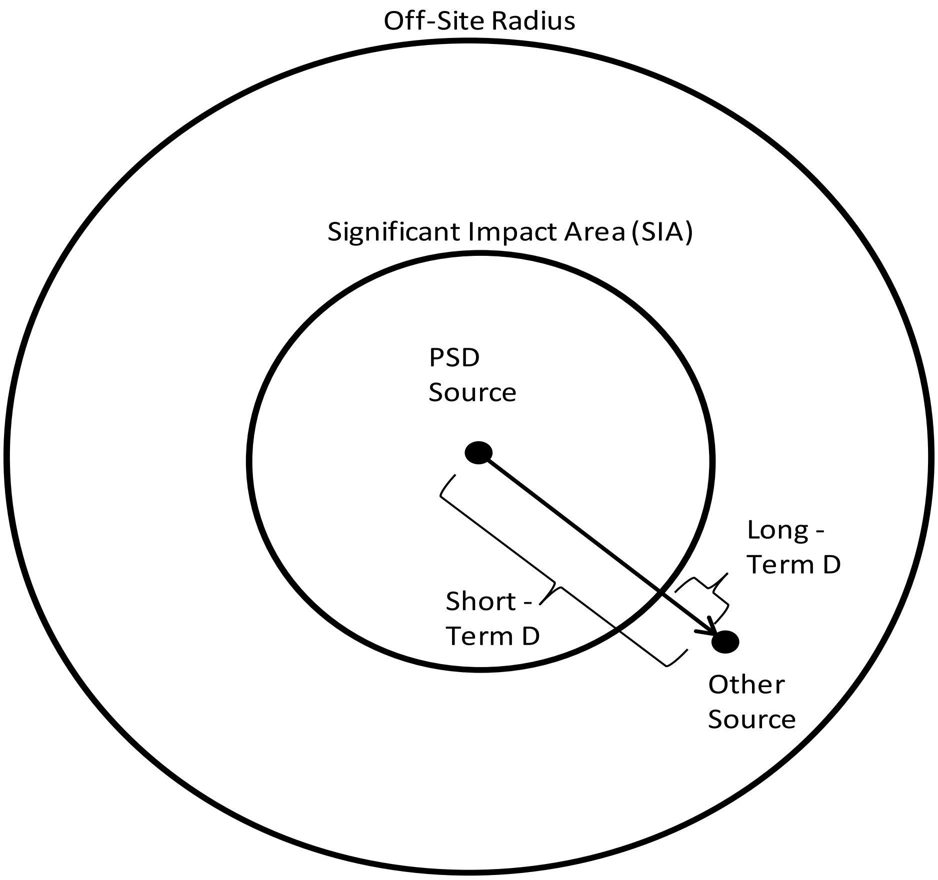
Georgia EPD has created a "PSD Modeling Tool" which provides an off-site inventory for the applicable pollutants based on the location of the source being proposed. The Georgia EPD "PSD Modeling Tool" can be accessed at https://psd.georgiaair.org/inventory/. The inventory developed by this tool should be the basis for any PSD Modeling submitted to Georgia EPD.

5.3.1 Develop Off-Site Modeling Inventory: 20D Rule

The modeling 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 per year. In employing this source screen 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 per year 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.

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

This process should be repeated for each pollutant for which the 20D technique is utilized as an inventory screening method. The U.S. EPA has cautioned PSD applicants regarding the use of the 20D rule for the 1-hour NO_2 and 1-hour 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 1-hour NO_2 NAAQS, which is generally applicable for the 1-hour SO_2 standard as well. Further clarification memoranda on this topic are listed under the "NO_2 NAAQS" and "SO_2 NAAQS" headings in Section 5.7 of this document.

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.

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 Georgia EPD at http://epd.georgiaair.gov/air/dispersion-modeling-information/. 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 in modeling should be based on the PTE or allowable emission rate (whichever is lower). Long-term emissions of all sources included in the modeling should be based on the PTE or allowable emission rate and may consider annual operating factors. Table 5-9 lists the promulgated NAAQS for each PSD pollutant as well as a summary of the model results that are typically used for comparison to the NAAQS value.

Table 5-9. National Ambient Air Quality Standards (NAAQS) 40 CFR Part 50 (µg/m³ unless otherwise noted)

Pollutant	Averaging Period	Primary NAAQS	Secondary NAAQS	Model Value Used for Comparison to NAAQS
SO_2	1-Hour	196	None	Refer to Section 5.7 for “SO_2 NAAQS” Modeling Guidance
	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	Refer to Section 5.7 for “$PM_{2.5}$ NAAQS” Modeling Guidance
	Annual	12	15	Refer to Section 5.7 for “$PM_{2.5}$ NAAQS” Modeling Guidance
NO_2	1-Hour	188	None	Refer to Section 5.7 for “NO_2 NAAQS” Modeling Guidance
	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	0.070 ppm	0.070 ppm	Not modeled
Pb	Rolling 3 month	0.15	0.15	Refer to Section 5.7 for “Pb NAAQS” Modeling Guidance

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 Section 7.2.1 of the *Guideline*.

Lead NAAQS

The primary lead NAAQS is 0.15 µg/m³ on a rolling three-month average evaluated over a 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 entitled LEADPOST 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://www3.epa.gov/scram/dispersion_prefrec.htm/.

Background Ambient Concentrations

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. The latest background concentrations can be found at http://epd.georgiaair.gov/air/dispersion-modeling-information/.

5.3.3 PSD Class II 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 times). 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://epd.georgia.gov/air/dispersion-modeling-information.

If no date is listed, then the minor source baseline date has not yet been triggered. Under $PM_{2.5}$ permit modeling 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. Georgia EPD requires the model assessment of $PM_{2.5}$ increments, as such increments have been adopted into the Georgia Rule 391-3-1-.02(7) 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 5-10 provides the major source baseline dates and trigger dates for each pollutant.

Table 5-10. 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 of consumption can also occur due to changes in applicable stack parameters (which can occur without associated emission reductions).

Table 5-11 lists the promulgated PSD Class II 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 5-11. 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 Class II PSD increment or the NAAQS standards. If this is the case, the applicant should carry out additional modeling to determine the project contributions 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 emissions 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 fence line 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 entitled *Ambient Air* specified in Section 5.7. It will be considered that conformance with the applicable standard in ambient air has been demonstrated.

If the receptor showing exceedances 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 MAXFILE 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 July 5, 1988 U.S. EPA memo specified in Section 5.7.

Exceedances of the 24-hour $PM_{2.5}$, 1-hour NO_2, and 1-hour SO_2 NAAQS are addressed in U.S. EPA clarification memoranda listed in Section 5.7 for each NAAQS.

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 Georgia 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. The U.S. EPA's *Guideline*, 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 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 PSD Increment Analysis

In addition to evaluating the project's impact on Class II areas, the applicant must also evaluate the projects impact on nearby Class I areas (located within 300 km of the project site). Class I project impacts include various modeling approaches suitable for estimating pollutant concentrations at Class I areas including the individual and cumulative impacts of the proposed and/or existing sources on Class I PSD Increments, air quality related values (AQRVs), and visibility.

Although Georgia 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 Georgia EPD is the permitting authority, the applicant should copy Georgia EPD modeling staff on all correspondence with the FLMs.

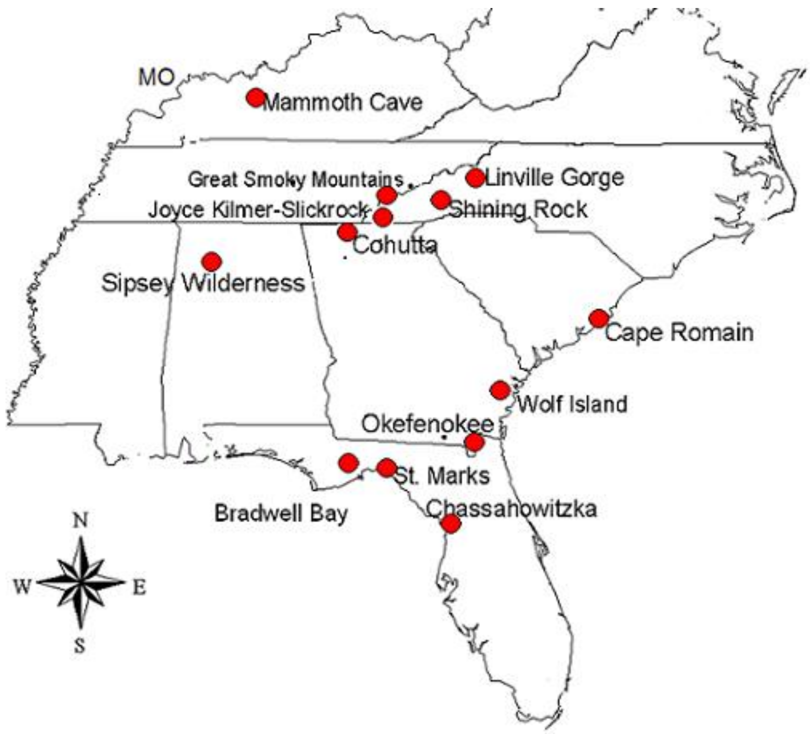
5.5.1 Class I Areas of Interest for Georgia Facilities

First, the applicant should determine the distance from the site to all nearby Class I areas. 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):

Federal Agency	Name of Class I Area
Fish & Wildlife Service	Wolf Island Wilderness Area
Fish & Wildlife Service	Okefenokee Wilderness Area
Fish & Wildlife Service	Cape Romain Wilderness Area
Fish & Wildlife Service	Saint Marks
Fish & Wildlife Service	Chassahowitzka National Wildlife Refuge, FL
US Forest Service	Shining Rock Wilderness Area
US Forest Service	Joyce Kilmer-Sliderock Wilderness Area
US Forest Service	Linville Gorge Wilderness Area
US Forest Service	Sipsey Wilderness
US Forest Service	Bradwell Bay[11]
National Park Service	Great Smoky Mountains National Park
National Park Service	Mammoth Cave National Park, KY

[11] 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 Class I Significance Analysis

The PSD Class I modeling analysis includes two distinct phases: (1) a significance modeling analysis (Section 5.6) and (2) a cumulative impact analysis (Section 5.7). 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 on receptors in Class I areas resulting from existing off-site sources and growth associated with the proposed new major stationary source or major modification.

A cumulative Class I impact analysis is not required for a particular pollutant when emissions of that pollutant from a proposed major stationary source or major modification located within 300 km of the proposed project site would not increase ambient concentrations by more than prescribed applicable SILs. A Class I 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 SILs in the significance modeling analysis.

The Class I SILs are specified in Table 5-12.

Table 5-12. Significant Impact Levels for Class I Areas (µg/m^3)			
Pollutant	**Averaging Period**		
	3-hour	**24-hour**	**Annual**
SO_2	1.00	0.1	0.08
PM_{10}	N/A	0.3	0.2
$PM_{2.5}$	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 PSD Class I increments.

The applicant should be sure to provide discussion of the following criteria if the proposed project is located within 300 km of a Class I area including the source of PM speciation profile data (if any), ambient air quality concentrations of O_3 and NH_3, and the optional settings of each model or utility program to be used.

Applicable guidance for significance increment-only assessments using the CALPUFF model is documented in the IWAQM Report (Refer to Section 5.7).

Significance Screening for Projects Located $\geq$ 50 km to $\leq$ 300 km from Any Class I Area

If the FLM(s) have confirmed no project AQRV analysis will be required, the applicant may assess Class I significance via the following procedures. The applicant should be sure to provide discussion of the following criteria including the source of PM speciation profile data (if any), ambient air quality concentrations of O_3 and NH_3, and the optional settings of each model or utility program to be used.

Screening Technique: The applicant can use the AERMOD model as a screening technique to determine if CALPUFF modeling is necessary. This will usually consist of adding all net project emissions (NOx, SO_2, SO_4, PM_{10}) not including fugitives, and venting them using the lowest stack height of the project in the AERMOD model to a downwind receptor located at 50 km from the project. 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). Adjust each pollutant's 1-hour concentration at this receptor by 0.8 to derive a 3-hour average concentration, by 0.2 to derive a 24-hour average concentration, and 0.06 to derive an annual average concentration, as may be necessary. Compare the maximum impact of each pollutant (NO_2, SO_2, SO_4, PM_{10}, $PM_{2.5}$), as applicable, to the Class I significant impact levels specified in Table 5-12.

If the modeled concentrations at 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.

If this approach is too conservative, repeat the modeling with five years of project Class II meteorological data using AERMOD to 20 1-km, or 1-degree, -spaced (polar) receptors located on an arc at 50 km from the project between the project and each Class I area. The design concentration for significance modeling is the maximum-modeled concentration. Compare the maximum impact of each pollutant (NO_2, SO_2, SO_4, PM_{10}, $PM_{2.5}$), as applicable, to the Class I significant impact levels specified in Table 5-12.

If AERMOD screening at 50 km from the project is too conservative, and the Class I area is more than 50 km from the project site, Class I area significance must be assessed using the CALPUFF modeling system. If the Class I increment CALPUFF screening analysis shows values that exceed the Class I SILs, the applicant will need to perform a refined Class I PSD increment analysis for the Class I area in question which is discussed further in Section 5.5.3.

Significance Screening for Projects Within 50 km from Any Class I Area

Screening Technique: This evaluation should be completed using the AERMOD model used for Class II significance 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 screening technique will usually consist of adding all net project emissions (NOx, SO_2, SO_4, PM_{10}) not including fugitives, and venting them using the lowest stack height of the project in the AERMOD model to a downwind receptor located at 50 km from the project. 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). Adjust each pollutant's 1-hour concentration at this receptor by 0.8 to derive a 3-hour average concentration, by 0.2 to derive a 24-hour average concentration, and 0.06 to derive an annual average concentration, as may be necessary. Compare the maximum impact of each pollutant (NO_2, SO_2, SO_4, PM_{10}, $PM_{2.5}$), as applicable, to the Class I significant impact levels specified in Table 5-12.

If the modeled concentrations at 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 approach is too conservative, repeat the modeling with five years of project Class II meteorological data using AERMOD to 20 1-km, or 1-degree, -spaced (polar) receptors located on an arc at 50 km from the project between the project and each Class I area. The design concentration for significance modeling is the maximum-modeled concentration. Compare the maximum impact of each pollutant (NO_2, SO_2, SO_4, PM_{10}, $PM_{2.5}$), as applicable, to the Class I significant impact levels specified in Table 5-12.

If the Class I increment AERMOD screening analysis shows values that exceed the Class I SILs, the applicant will need to perform a refined Class I PSD increment analysis for the Class I area in question which is discussed further in Section 5.5.3.

5.5.3 Cumulative Class I Area Modeling Analysis

Modeling Protocol: The applicant should submit a separate Class I Cumulative Analysis Modeling Protocol for projects which have been found to exceed Class I increment significance levels or FLM AQRV screening thresholds. [Refer to Section 5.6 for further discussion about AQRVs.] Such a cumulative modeling protocol should contain any proposed off-site emissions inventory screening techniques. It may also contain any discussion which the applicant considers to possibly mitigate the need for a cumulative analysis. The design concentration for a cumulative increment modeling is the same as the design concentration for Class II increment modeling: maximum-modeled annual over five years for annual averages, and highest second-high for short-term averages.

Applicable guidance for increment-only refined assessments using the CALPUFF model is documented on pages 9 through 10 of the IWAQM Report. Deviations from this guidance should be described for approval in the cumulative increment modeling protocol. Following approval by Georgia EPD, proceed with the respective pollutant cumulative increment consumption analyses using the Class I increment levels tabulated in 40 CFR 52.21(c).

CALPUFF Meteorological Data: Use of the VISTAS-prepared CALMET 4-km grid meteorological data of 2001-2003 will expedite review of CALPUFF modeling of sites in the VISTAS area. The U.S. Fish & Wildlife Service, revised these data most recently in July, 2007 to be compatible with the EPA/FLM-approved CALPUFF 5.8 modeling system. Since the FLMs created these data, they are not likely to expedite review of geographically overlapping, and potentially older meteorological data sets prepared by others. The use of this data is an example of an acceptable deviation from the referenced guidance. The DOMAIN 4 meteorological data (2001-2003) prepared for VISTAS should be used for all CALPUFF modeling in Georgia. Georgia EPD prefers use of a computational grid which is the same as the entire DOMAIN 4 meteorological grid. Georgia EPD can provide these meteorological data if the potential modeler will send use a minimum 400 GB portable hard drive with a postage-paid return address label.

If you have questions about AQRV issues, we suggest you pose the question to the appropriate FLM directly. Georgia EPD should be copied and/or involved on all FLM correspondence regarding project-permitting procedures. If your question is limited to Class I increment consumption, please direct it to Georgia EPD.

The applicant should not proceed independently to a 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 technique may be requested by the FLM.

5.6 Class I AQRV Impact Analysis

The AQRV's are those special attributes of a Class I area that deterioration of air quality may adversely affect. Examples of AQRV's include flora and fauna, water, visibility, cultural-archaeological and paleontological and odor[12]. When a proposed major source's or major modification's modeled emissions may affect a Class I area, the applicant analyzes the source's anticipated impact on visibility and provides the information needed to determine its effect on the area's other AQRV's. Typical parameters used to address AQRV's includes visibility, ozone, and deposition.

5.6.1 Establishing the "Q/D" Metric

Screening techniques that would provide information regarding whether a project's emissions would be exempt from an AQRV impact review involves the "Q/D" metric. For the Q/D metric, allowable total emissions (Q) in tons per year are divided by distance to key receptors.[13] The allowable total emissions (Q) is the summation of total SO_2, NOx, PM_{10}, and H_2SO_4 annual emissions in tons per year, based on a 24-hour maximum allowable emissions. The parameter D is in units of kilometers from the Class I modeling receptor.

[12] *Federal Register* (45 FR 43003, June 25, 1980).

[13] As part of its Regional Haze Regulation, the U.S. EPA introduced the Q/D metric as a screening criteria for its BART guidelines.

In cases where a source's operations which generate visibility-affecting emissions are limited to time periods shorter than a year, the short-term potential to impact visibility may not be adequately expressed by the Q/D metric. Because visibility is an AQRV that is sensitive to immediate short-term conditions, in order to apply the Q/D metric screening tool, these types of sources need to first adjust the tons per year emissions to reflect what the emissions would be if the source operated year-round.

5.6.2 Initial Screening Criteria

Based on the FLM's FLAG Report Revised, Section 3.2, 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 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.

5.6.3 Visibility and AQRV Impact 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 98^{th} 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 referenced in Section 5.7. 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.)

5.6.4 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 1 analysis utilizes the VISCREEN model. The total emissions of particulates (including sulfate) 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 the change in the color difference index (ΔE) and contrast between the plume and the viewing background. Values of ΔE and plume contrast (“C”) are based on the concentrations of fine primary particulates (including sulfates), nitrogen dioxide, and the geometry of the observer, target, plume, and the position of the sun.

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 Class I protocol must be submitted to Georgia EPD modeling staff for review.

5.7 References for Section 5

1. New Source Review Workshop Manual (EPA 1990)

2. The *Guideline on Air Quality Models* (40 CFR Part 51 Appendix W)

3. *AERMOD Implementation Guide*, August 2015

4. *AERSURFACE User Guide*, January 2013, OAQPS, EPA-454/B-08-001

5. *Meteorological Guidance for Regulatory Modeling Applications*, February 2000, OAQPS, EPA-454/R-99-005

6. *Users Guide for the AERMOD Terrain Preprocessor (AERMAP)*, October 2004, OAQPS, EPA-454/B-03-003

7. *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulation)*, June 1985, OAQPS, EPA-450/4-80-023R

8. *User's Guide to the Building Profile Input Program*, April 2004, OAQPS, EPA-454/R-93-038

9. The *Plume Rue Model Enhancements (PRIME)Algorithm*

10. Scire, Joseph C., Strimaitis, David G., Yamartino, Robert J., *A User's Guide for The CALPUFF Dispersion Model (Version 5)*, Earth Tech Inc., January 2000

11. Scire, Joseph C., Robe, Francoise R., Fernau, Mark E., Yarmartino, Robert J., *A User's Guide for the CALMET Meteorological Model (Version 5)*, Earth Tech Inc., January 2000

<u>Single Source Modeling Guidance Documents</u>

12. *Guidance on the use of models for assessing the impacts from single sources on secondary formed pollutants ozone and* $PM_{2.5}$, July 2015, OAQPS, EPA-454/P-15-001

13. *Guidance for* $PM_{2.5}$ *Permit Modeling*, May 2014, OAQPS, EPA-454/B-14-001

Guidance on $PM_{2.5}$ NAAQS

14. *Guidance for $PM_{2.5}$ Permit Modeling*, May 2014, OAQPS, EPA-454/B-14-001

15. *Circuit Court Decision on $PM_{2.5}$ Significant Impact Levels and Significant Monitoring Concentration – Questions and Answers*, U.S. EPA OAQPS, March 4, 2013.

Guidance on NO_2 NAAQS

16. *Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO_2 National Ambient Air Quality Standard*, U.S. EPA Memorandum from OAQPS-R. Chris Own and Roger Brode, September 30, 2014

17. *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard*, U.S. EPA Memorandum from OAQPS-Tyler Fox, March 1, 2011

18. *Guidance Concerning the Implementation of the 1-hour NO_2 NAAQS for the Prevention of Significant Deterioration Program*, U.S. EPA Memorandum from OAQPS – Stephen D. Page, June 29, 2010

19. *Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard*, U.S. EPA Memorandum from OAQPS-Tyler Fox, June 28, 2010

Guidance on SO_2 NAAQS

20. *Guidance Concerning the Implementation of the 1-hour SO_2 NAAQS for the Prevention of Significant Deterioration Program*, U.S. EPA Memorandum from OAQPS – Stephen D. Page, August 23, 2010

21. *Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality Standard*, U.S. EPA Memorandum from OAQPS – Tyler Fox, August 23, 2010

Guidance on Pb NAAQS

22. *Draft Technical Note – Dispersion Modeling for Lead (Pb) Sources*, U.S. EPA OAQPS, February 5, 2009

23. LEADPOST, U.S. EPA Post-Processor for calculating the design values for the lead NAAQS (rolling 3-month averages) at https://www3.epa.gov/scram001/dispersion_prefrec.htm

Off-Site PSD Modeling Inventory

24. Georgia EPD has created a "PSD Modeling Tool" which provides an off-site inventory for the applicable pollutants based on the location of the source being proposed. The tool can be accessed at https://psd.georgiaair.org/inventory

25. *Screening Threshold Method for PSD Modeling North Carolina Air Quality Section – 20D Rule*, State of North Carolina Department of Natural Resources and Community Development, July 22, 1985

Ambient Air

26. *Ambient Air Definition*, September 21, 1987, US EPA

27. *Ambient Air*, U.S. EPA from Robert D. Bauman-Chief to Gerald Fontenot, Chief of Air Programs Branch, Region VI, October 17, 1989.

28. *Interpretation of "Ambient Air" in Situations Involving Leased Land Under the Regulations for Prevention of Significant Deterioration (PSD)*, June 22, 2007, US EPA

Analysis of Modeled Exceedances

29. *Air Quality Analysis for Prevention of Significant Deterioration (PSD)*, U.S. EPA from Gerald A. Emison, Director – OAQPS to Thomas J. Maslany, Director of AQMD, July 5, 1988.

Class I Areas

30. *Federal Land Managers' Air Quality Related Values Work Group (FLAG) – Phase I Report – Revised (2010)*, Natural Resource Report NPS/NRPC/NRR-2010/232

31. IWAQM Phase II Summary Report and Recommendations for Modeling Long Range Transport Impacts, EPA-454/R-98-019, December 1998

Table 5-13: PSD Modeling Parameters for Georgia

Pollutant	PSD SER (tpy)	Averaging Period	Class II SIL ($\mu g/m^3$)	NAAQS [$\mu g/m^3$ (ppmv)]		Class II Increment ($\mu g/m^3$)	PSD SMC ($\mu g/m^3$)	Class I SIL ($\mu g/m^3$)	Class I Increment ($\mu g/m^3$)	Additional Impacts Threshold ($\mu g/m^3$)
				Primary	Secondary					
PM10	15	24-hr	5	150 [e]	Same	30 [b]	10	0.3	8 [b]	NA
		Annual	1	None [f]	None[f]	17		0.2	4	NA
PM2.5	10	24-hr	1.2	35	35	9 [b]	Vacated[j]	0.07	2 [b]	NA
		Annual	0.3	12	15	4		0.06	1	NA
CO	100	1-hr	2000	40,000 (35) [b]	None	NA	NA	NA	NA	NA
		8-hr	500	10,000 (9) [b]	None	NA	575	NA	NA	NA
		1-week	NA	NA		NA	NA	NA	NA	1,800,000
SO_2 (PM2.5)	40 (40)	1-hr	7.8[k] (0.003) [d]	196 (0.075) [a,k]	None	NA	NA	NA	NA	917
		3-hr	25	None	1300 (0.5) [b]	512 [b]	NA	1.0	25 [b]	786
		24-hr	5	365 (0.14) [b,c]	None	91 [b]	13	0.2	5 [b]	NA
		Annual	1	80 (0.03) [c]	None	20	NA	0.1	2	18
NO_2 (PM2.5)	40 (40)	1-hr	7.5[k] (0.004) [d]	188.7 (0.1) [i,k]	None	NA	NA	NA	NA	NA
		4-hr	NA	NA	NA	NA	NA	NA	NA	3760
		8-hr	NA	NA	NA	NA	NA	NA	NA	3760
		1-month	NA	NA	NA	NA	NA	NA	NA	564
		Annual	1	100 (0.053)	Same	25	14	0.1	2.5	100
Lead(Pb)	0.6	Rolling 3-month avg	NA	0.15	Same	NA	0.1	NA	NA	1.5
Ozone	40 (VOC)	8-hr	NA	0.070[l]	Same	NA	NA	NA	NA	NA
Non-HF	3	24-hr	NA	NA	NA	NA	0.25	NA	NA	0.5

Table 5-13: PSD Modeling Parameters for Georgia										
Pollutant	**PSD SER (tpy)**	**Averaging Period**	**Class II SIL (µg/m³)**	**NAAQS [µg/m³ (ppmv)]**		**Class II Increment (µg/m³)**	**PSD SMC (µg/m³)**	**Class I SIL (µg/m³)**	**Class I Increment (µg/m³)**	**Additional Impacts Threshold (µg/m³)**
				Primary	**Secondary**					
Fluorides										(10-day avg)
Hydrogen Sulfide (H2S)	10	1-hr	NA	NA	NA	NA	0.2	NA	NA	NA
Total Reduced Sulfur (TRS)	10	1-hr	NA	NA	NA	NA	10	NA	NA	NA
Reduced Sulfur Compounds (RSC)	10	1-hr	NA	NA	NA	NA	10	NA	NA	NA

Notes:
a – Achieved when the 99th percentile of the annual distribution of the daily maximum 1-hour average concentrations over the number of years modeled is < standard.
b – Not to be exceeded more than once a year.
c – To be revoked 1 year after designations for 1-hour standard (08/23/2010).
d – Recommended Interim SIL.
e – Achieved when the expected number of days/year, over the years modeled, with 24-hour average concentration greater than the standard is < 1.
f – Revoked NAAQS (9/30/10)
g – Achieved when the average of the annual 98th percentile 24-hour concentration averaged over the years modeled is < standard.
h – Achieved when the average of the annual mean concentration over the number of years modeled is < standard.
i – Achieved when the 98th percentile of the annual distribution of the daily maximum 1-hour average concentrations averaged over the number of years modeled is < standard.
j – Vacated due to DC court decision in Jan 22, 2013.
k – Values in ug/m3 are estimates. These may change when values and/or ppm to ug/m3 conversion procedures are provided by EPA.
l – The 2015 standard (the 2008 8-hr Ozone standard is 75ppb)

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 Air Toxics Analysis

PSD projects must also include an assessment for compliance with Georgia EPD toxics modeling procedures. This is a state-only requirement and is not part of the PSD program. This assessment should follow the existing Georgia EPD guidance concerning toxics modeling, *Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions* (updated 2017) found at https://epd.georgia.gov/air/dispersion-modeling-information. 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, Georgia EPD should be contacted.

6.2 Class II Area Visibility Analysis

The Class II Area visibility analyses should be completed for airports, stack 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 and 1-hour, PM_{10} – 24-hour, $PM_{2.5}$ – annual and 24-hour, SO_2 – annual and 1-hour). 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 E of this document.

6.3 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 vegetation within appropriate SIAs 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 concentrations 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-Hour) SIA that can be used for screening levels to determine if there is a potential for vegetative stress.

For some applications, Georgia 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 type 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:

Document Title	Publisher
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. Gov't Print Office, 1978
A Screening Procedure to Evaluate Air Pollution Effects on Class I Wilderness Areas	U.S. Forest Service
Air Quality in the National Parks	This is a National Park Service report which lists numerous studies on the biological effects of air pollution on vegetation.

6.4 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 and 24-hour averages) and the 1-hour average NO_2 and 1-hour average SO_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.

6.5 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 Georgia EPD 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 one of the following EPD representatives alerting them that a PSD application will be submitted to the Division.

Chemicals Unit – Heather Brown	heather.brown@dnr.ga.gov
Minerals Unit – Hamid Yavari	hamid.yavari@dnr.ga.gov
NOx Unit – James Eason	james.eason@dnr.ga.gov
VOC Unit – Manny Patel	manny.patel@dnr.ga.gov
Permitting Program Manager – Eric Cornwell	eric.cornwell@dnr.ga.gov
Data and Modeling Unit – Yan Huang, Ph.D.	yan.huang@dnr.ga.gov

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 Georgia EPD requires to complete the review. By doing so, the time needed to review the application is minimized. Georgia EPD will request the applicant to submit certain information regarding the project to ensure a productive meeting. The submittal should be provided to Georgia EPD at least one month prior to the meeting and include the information presented in Appendix A of this document.

During the meeting, Georgia EPD and the applicant will discuss the general approach of the emission calculations, BACT assessment, modeling protocol, and modeling results (if available). Georgia 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. At the conclusion of this meeting, a timetable should be committed to by both Georgia EPD and the applicant for submittal of a complete application and issuance of the PSD 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 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 applicable Georgia EPD representative. 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 the Georgia EPD website. The applicant should submit one public version if submittal confidential information in accordance with Georgia EPD guidance located at http://epd.georgia.gov/air/documents/confidential-information. 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).

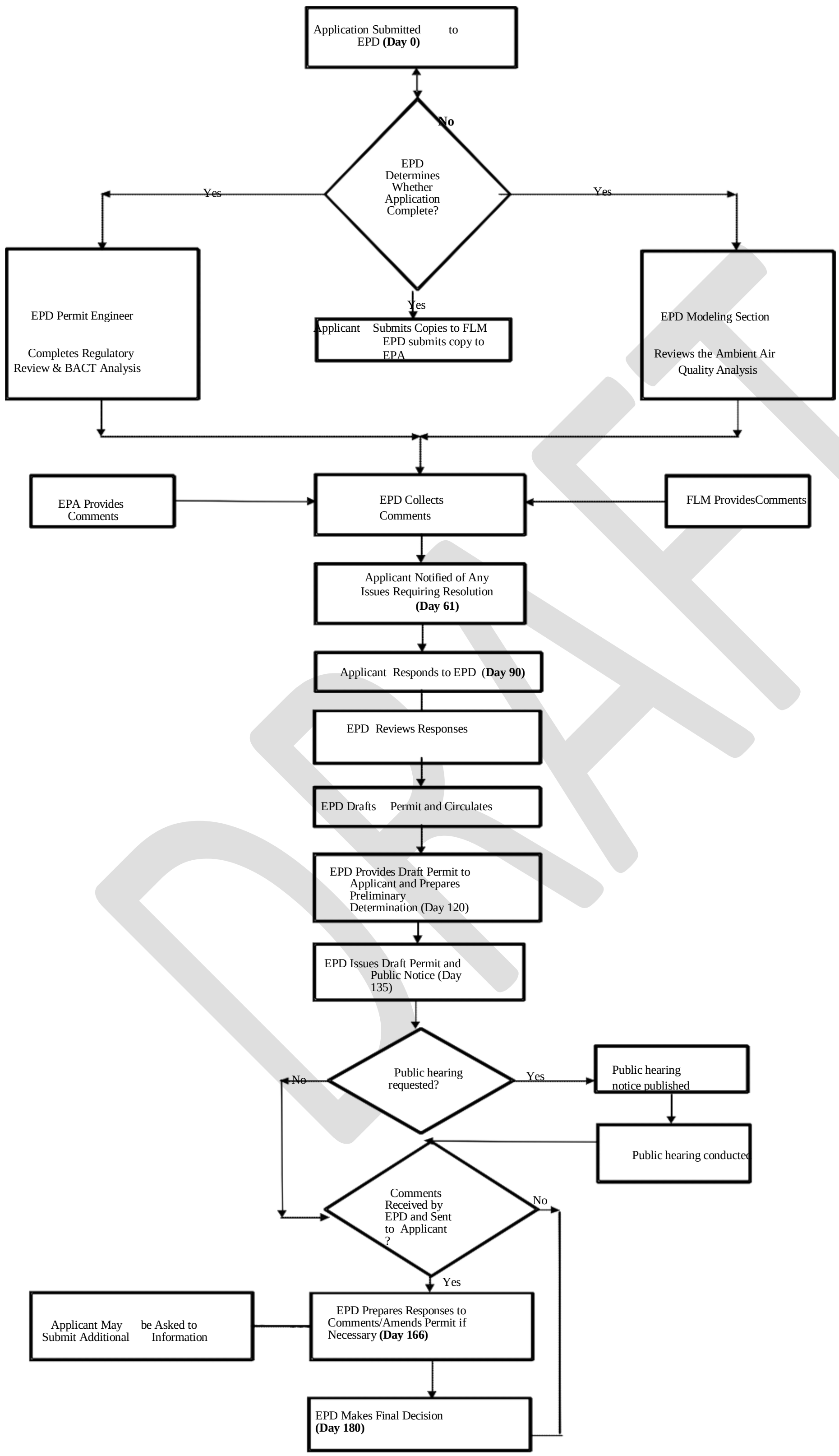
The applicant should submit the PSD application to the address below:

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

7.3 PSD Permit Application Review Process

It is the Georgia 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 Georgia EPD. 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 applicants and those which involve a public meeting and/or public hearing as part of the public participation process will take longer. 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 and Support Program (to review the ambient air quality analysis submitted with the application). In approximately, 60 days, Georgia EPD will inform the applicant of any issues requiring resolution and the applicant should respond to Georgia EPD within 30 days. Georgia 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 application will be addressed by Georgia 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, Georgia EPD will make a final decision on the application.

Figure 7-1. PSD Application Review Process



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APPENDIX A PRE-APPLICATION MEETING INFORMATION CHECKLIST

Pre-Application Element	Description	Included?
Dispersion Modeling Protocol	Project Description and Site Location	
Dispersion Modeling Protocol	Preliminary PSD Applicability Analysis	
Dispersion Modeling Protocol	Model Selection, Land Use Analysis, Building Downwash Analysis, Modeling Options	
Dispersion Modeling Protocol	Meteorological Station Selection and Representative Analysis	
Dispersion Modeling Protocol	Model Receptor Grids Description and Terrain Analysis	
Dispersion Modeling Protocol	Definition of the **project** fence line Definition of ambient air boundary	
Dispersion Modeling Protocol	Determination of the Significant Impact Area	
Dispersion Modeling Protocol	NAAQS Modeling Analysis Plan	
Dispersion Modeling Protocol	PSD Increment Modeling Analysis Plan	
Dispersion Modeling Protocol	Class I Area Modeling Requirements including any Communication with the FLMs	
Dispersion Modeling Protocol	Ozone Impact Analysis	
Dispersion Modeling Protocol	Alternative Operating Scenarios Modeling	
Dispersion Modeling Protocol	Preconstruction Monitoring Requirement Analysis	
Dispersion Modeling Protocol	Toxics Analysis – List of TAPs to be included	
Dispersion Modeling Protocol	Additional Impacts Analysis	

APPENDIX B-PSD APPLICATION COMPLETENESS CHECKLIST

Appendix B PSD Application Completeness Checklist		
Application Element	**Description**	**Included? Or N/A**
Introduction	Scope of Stationary Source	
	Project Emissions Summary	
Process Description	Process Description & Process Flow Diagram	
Emission Calculation Methodology	How are emissions for New Units Calculated?	
	How are **Baseline Actual Emissions** for Existing Units Calculated?	
	How are Projected Actual Emissions for Existing Units Calculated?	
	What is the Project's Significant Emissions Increase?	
	Contemporaneous Period Project Net Emissions Summary	
	Identification of Modeled Emission Rates (lb/hr) for each pollutant and applicable emission unit that is part of the proposed project. Calculations supporting the mass emission rates.	
Regulatory Review	PSD Applicability	
	NSPS	
	MACT	
	State Rules	
	Other, as applicable	
BACT Analysis	Step 1 – Identify Alternative Emission Control Techniques	
	Step 2 – Technical Feasibility Analysis	
	Step 3 – Ranking the Technically Feasible Alternatives to Establish a Control Hierarchy	
	Step 4 – Evaluating Remaining Control Technologies	
	Step – 5 Selecting BACT	
Modeling Analysis	Approved Modeling Protocol	
	Site Layout	

Appendix B **PSD Application Completeness Checklist**		
Application Element	**Description**	**Included? Or N/A**
	Building Downwash Analysis	
	Receptor Grids Analysis	
	Meteorological Representativeness Analysis	
	Significance Modeling Analysis – Definition of the Significant Impact Area	
	Off-Site Emission Inventory, discuss any changes to the default modeling inventory provided by Georgia EPD	
	20D Calculations –Refer to Section 5.3.1 for data elements that must be included in the application.	
	NAAQS Modeling Analysis	
	PSD Increment Modeling Analysis	
	Ozone Impact Analysis	
	Preconstruction Monitoring Requirement Analysis	
	Alternative Operating Scenarios Modeling	
	Air Toxic Modeling	
	Class I Area AQRV Analysis	
	Class I Area Increment Analysis	
Additional Impacts Analysis	Class II Visibility Impacts	
	Vegetation/Soils Impact	
	Construction Impacts	
	Demographics Impacts	
Proposed Permit Conditions	For BACT Pollutants	
Georgia EPD SIP Construction Forms	As applicable	
Title V	GEOS file, as applicable	
Acid Rain	Phase II Permit Application, where applicable	
Cross-State Air Pollution Rule	Application, where applicable	
Exhibits	Emission Calculations in detail	
Site Layout	Point Source Locations Identification of Fugitive Sources	

Appendix B PSD Application Completeness Checklist		
Application Element	**Description**	**Included? Or N/A**
	Receptor Grids in UTM Coordinate System Site Building Dimensions and Coordinates for the BPIP Analysis Fence line and Ambient Air Boundaries	
Class I Area Analysis	FLM Correspondence	

APPENDIX C-GLOSSARY OF TERMS

This glossary does not contain an exhaustive list of terms used in the PSD regulation. Please refer to Georgia Rule 391-3-1-.02(7) for an up to date glossary of terms used in the PSD regulation.

Ambient Air [40 CFR 50.1(e)]: That portion of the atmosphere, external to buildings, to which the general public has access.

Baseline Actual Emissions: In lieu of the definition as specified in 40 CFR 52.21(b)(48), Georgia Rule 391-3-1-.02(7)(a)2(i) defines this term as follows:

(i) "Baseline actual emissions: means the rate of emissions, in tons per year, of a regulated NSR pollutant, as determined in accordance with Georgia Rule 391-3-1-.02(7)(a)2.(i).

(I) For any existing electric utility steam generating unit, baseline actual emissions means the average rate, in tons per year, at which the unit actually emitted the pollutant during any consecutive 24-month period selected by the owner or operator within the 5-year period immediately preceding when the owner or operator begins actual construction of the project. The Director shall allow the use of a different time period upon a determination that it is more representative of normal source operation.

I. The average rate shall include fugitive emissions to the extent quantifiable, and emissions associated with startups, shutdowns, and malfunctions. However, fugitive emissions and/or emissions associated with startups, shutdowns, and malfunctions shall or may be excluded in accordance with the following subparagraphs A and B.

A. If fugitive emissions or emissions from startups, shutdowns, and/or malfunctions during the consecutive 24-month period selected by the owner or operator are not quantifiable and are therefore not included in the calculation of baseline actual emissions, then fugitive emissions or emissions from startups, shutdowns, and/or malfunctions, respectively, shall not be included in the calculation of projected actual emissions [as defined in subparagraph (7)(a)2.(ii) of this rule].

B. The owner or operator may elect to omit malfunctions from the calculation of baseline actual emissions. If the owner or operator elects to do so, then malfunctions shall also be omitted from the calculation of projected actual emissions [as defined in subparagraph (7)(a)2.(ii) of this rule].

II. The average rate shall be adjusted downward to exclude any non-compliant emissions that occurred while the source was operating above an emission limitation that was legally enforceable during the consecutive 24-month period.

III. For a regulated NSR pollutant, when a project involves multiple emissions units, only one consecutive 24-month period may be used to determine the baseline actual emissions for the emissions units being changed. A different consecutive 24-month period can be used for each regulated NSR pollutant.

IV. The average rate shall not be based on any consecutive 24-month period for which there is inadequate information for determining annual emissions, in tons per year, or for which there is inadequate information for adjusting this amount downward to exclude any non-compliant emissions as required by subparagraph (7)(a)2.(i)(I)II. of this rule.

V. If any physical change(s) or change(s) in the method of operation subsequent to the consecutive 24-month period selected by the owner or operator resulted in a permanent change in the basic design parameter [as defined in subparagraph (7)(a)2.(viii) of this rule], not including the voluntary addition of air pollution control equipment or increase in removal or collection efficiency of existing air pollution control equipment, and thus resulted in a corresponding reduction in actual emissions of a regulated NSR pollutant, the baseline actual emissions shall be adjusted downward by a proportional reduction in emissions in tons per year or lbs/unit of production.

VI. The average rate shall be adjusted downward to exclude any emissions that would have exceeded an emission limitation with which the major stationary source must currently comply, had such major source been required to comply with such limitations during the consecutive 24-month period. However, if an emission limitation is part of a Maximum Available Control Technology (MACT) standard that the Administrator of U.S. EPA has proposed or promulgated under 40 CFR, Part 63, the baseline actual emissions need only be adjusted if the Division has taken credit for such emission reductions in an attainment demonstration or maintenance [sic] plan consistent with the requirements of 40 CFR, Part 51.165(a)(3)(ii)(G).

(II) For an existing emissions unit (other than an electric utility steam generating unit), baseline actual emissions means the average rate, in tons per year, at which the emissions unit actually emitted the pollutant during any consecutive 24-month period selected by the owner or operator within the 10-year period immediately preceding either the date the owner or operator begins actual construction of the project, or the date a complete permit application is received by the Division for a permit required under this paragraph or by the reviewing authority for a permit required by a plan, whichever is earlier.

I. The average rate shall include fugitive emissions to the extent quantifiable, and emissions associated with startups, shutdowns, and malfunctions. However, fugitive emissions and/or emissions associated with startups, shutdowns, and malfunctions shall or may be excluded in accordance with the following subparagraphs A and B.

A. If fugitive emissions or emissions from startups, shutdowns, and/or malfunctions during the consecutive 24-month period selected by the owner or operator are not quantifiable and are therefore not included in the calculation of baseline actual emissions, then fugitive emissions or emissions from startups, shutdowns, and/or malfunctions, respectively, shall not be included in the calculation of projected actual emissions (as defined in subparagraph (7)(a)2.(ii) of this rule).

B. The owner or operator may elect to omit malfunctions from the calculation of baseline actual emissions. If the owner or operator elects to do so, then malfunctions shall also be omitted from the calculation of projected actual emissions [as defined in subparagraph (7)(a)2.(ii) of this rule].

II. The average rate shall be adjusted downward to exclude any non-compliant emissions that occurred while the source was operating above an emission limitation that was legally enforceable during the consecutive 24-month period.

III. The average rate shall be adjusted downward to exclude any emissions that would have exceeded an emission limitation with which the major stationary source must currently comply, had such major stationary source been required to comply with such limitations during the consecutive 24-month period. However, if an emission limitation is part of a Maximum Achievable Control Technology (MACT) standard that the Administrator of U.S. EPA has proposed or promulgated under 40 CFR, Part 63, the baseline actual emissions need only be adjusted if the Division has taken credit for such emissions reductions in an attainment demonstration or maintenance plan consistent with the requirements of 40 CFR, Part 51.165(a)(3)(ii)(G).

IV. For a regulated NSR pollutant, when a project involves multiple emissions units, only one consecutive 24-month period may be used to determine the baseline actual emissions for all the emissions units being changed. A different consecutive 24-month period can be used for each regulated NSR pollutant.

V. The average rate shall not be based on any consecutive 24-month period for which there is inadequate information for determining annual emissions, in tons per year, or for which there is inadequate information for adjusting this amount downward to exclude any non-compliant emissions as required by subparagraph (7)(a)2.(i)(II)II or III. of this rule.

VI. If any physical change(s) or change(s) in the method of operation subsequent to the consecutive 24-month period selected by the owner or operator resulted in a permanent change in the basic design parameter [as defined in subparagraph (7)(a)2.(viii) of this Rule], not including the voluntary addition of air pollution control equipment or increase in removal or collection efficiency of existing air pollution control equipment, and thus resulted in a corresponding reduction in actual emissions of a regulated NSR pollutant, the baseline actual emissions shall be adjusted downward by a proportional reduction in emissions in tons per year or lbs/unit of production.

(III) For a new emissions unit, the baseline actual emissions for purposes of determining the emissions increase that will result from the initial construction and operation of such unit shall equal zero; and thereafter, for all other purposes, shall equal the unit's potential to emit [as long as the unit remains a “new emissions unit” as defined in 40 CFR, Part 52.21(b)(7)(i)].

(IV) For a PAL for a stationary source, the baseline actual emissions shall be calculated for existing electric utility steam generating units in accordance with the procedures contained in subparagraph (7)(a)2.(i)(I) of this rule, for other existing emissions units in accordance with the procedures contained in subparagraph (7)(a)2.(i)(II) of this rule, and for a new emissions unit in accordance with the procedures contained in subparagraph (7)(a)2.(i)(III) of this rule. For existing emission units, the baseline actual emissions shall be based on any consecutive 24-month period selected by the operator within the appropriate PAL baseline period. For existing electric steam generating units, the PAL baseline period is the 5-year period (or different period allowed by the Director that is more representative or normal source operation) immediately preceding submission of a complete PAL application to the Division. For other existing emission units, the PAL baseline period is the 10-year period immediately preceding submission of a complete PAL permit application to the Division.

Basic Design Parameter: In lieu of 40 CFR 52.21(b)(33)(iii) of the definition of "replacement unit" as specified in 40 CFR 52.21(b)(33), the following shall apply per Georgia Rule 391-3-1-.02(7)(a)2.(viii):

The replacement does not alter the basic design parameters of the process unit. Basic design parameters are defined as follows:

(I) Except as provided in Georgia Rule 391-3-1-.02(7)(a)2.(viii)(III), for a process unit at a steam electric generating facility, the owner or operator may select as its basic design parameters 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 content shall be used for determining the basic design parameter(s) for a coal-fired electric utility steam generating unit.

(II) Except as provided in Georgia Rule 391-3-1-.02(7)(a)2.(viii)(III), the basic design parameter(s) for any process unit that is not at a steam electric generating facility are maximum rate of fuel or heat input, maximum rate of material input, or maximum rate of product output. Combustion process units will typically use maximum rate of fuel input. 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.

(III) If the owner or operator believes the basic design parameter(s) in Georgia Rule 391-3-1-.02(7)(a)2.(viii)(I) and is (are) not appropriate for a specific industry or type of process unit, the owner or operator may propose to the Division an alternative basic design parameter(s) for the source's process unit(s). If the 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 parameter(s).

(IV) The owner or operator shall use credible information, such as results of historic maximum capability tests, design information from the manufacturer, or engineering calculations, in establishing the magnitude of the basic design parameter(s) specified in subparagraphs Georgia Rule 391-3-1-.02(7)(a)2.(viii)(I) and (II).

(V) If design information is not available for a process unit, then the owner or operator shall determine the process unit's basic design parameter(s) using the maximum value achieved by the process unit in the five-year period immediately preceding the planned activity.

(VI) Efficiency of a process unit is not a basic design parameter.

Demand Growth Emissions: See Projected Actual Emissions

Potential to Emit: [40 C.F.R. § 52.21(b)(4), as incorporated in Georgia Rule 391-3-1-.02(7)(a)2.(v) with changes]

Potential to emit means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable or enforceable as a practical matter.

Projected Actual Emissions: In lieu of the definition of “projected actual emissions” as specified in 40 CFR 52.21(b)(41), the following shall apply per Georgia Rule 391-3-1-.02(7)(a)2.(ii):

(I) “Projected actual emissions” means the maximum annual rate, in tons per year, at which an existing emissions unit is projected to emit a regulated NSR pollutant in any one of the 5 years (12-month period) following the date the unit resumes regular operation after the project, or in any one of the 10 years following that date, if the project involves increasing the emissions unit's design capacity or its potential to emit that regulated NSR pollutant and full utilization of the unit would result in a significant emissions increase or a significant net emissions increase at the major stationary source.

(II) In determining the projected actual emissions under subparagraph (7)(a)2.(ii)(I) (before beginning actual construction), the owner or operator of the major stationary source:

I. Shall consider all relevant information, 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 State Implementation Plan; and

II. Shall include fugitive emissions to the extent quantifiable and emissions associated with startups, shutdowns, and malfunctions. However, fugitive emissions and/or emissions associated with startups, shutdowns, and malfunctions shall or may be excluded in accordance with the following subparagraphs A, B, and C.

A. If projected fugitive emissions or emissions from startups, shutdowns, and/or malfunctions are not quantifiable and are therefore not included in the calculation of projected actual emissions, then fugitive emissions or emissions from startups, shutdowns, and/or malfunctions, respectively, shall not be included in the calculation of baseline actual emissions [as defined in subparagraph (7)(a)2.(i) of this rule].

B. The owner or operator may elect to omit malfunctions from the calculation of projected actual emissions. If the owner or operator elects to do so, then malfunctions shall also be omitted from the calculation of baseline actual emissions [as defined in subparagraph (7)(a)2.(i) of this rule].

C. If the project involves increasing the emissions unit's design capacity or its potential to emit that regulated NSR pollutant and the increase in projected emissions associated with startups, shutdowns, and malfunctions is not proportional to the increase in the emission unit's design capacity or its potential to emit that regulated NSR pollutant, the owner or operator must include with the information required under subparagraph (7)(b)15.(i)(I) of this rule documentation that supports the projected emissions associated with startups, shutdowns, and malfunctions subsequent to completion of the project; and

III. May exclude, in calculating any increase in emissions that results from the particular project, that portion of the unit's emissions following the project that an existing unit could have accommodated during the consecutive 24-month period used to establish the baseline actual emissions under subparagraph (7)(a)2.(i) of this rule and that is also unrelated to the particular project, including any increased utilization due to product demand growth (the increase in emissions that may be excluded under this subparagraph shall hereinafter be referred to as "demand growth emissions");

A. If the project involves increasing the emissions unit's design capacity or its potential to emit that regulated NSR pollutant, the owner or operator shall either:

(A) not exclude demand growth emissions, or

(B) must include in the information required under subparagraph (7)(b)15.(i)(I) of this paragraph, documentation that demand growth emissions are emissions that the emissions unit could have accommodated during the consecutive 24-month period used to establish the baseline actual emissions, are not related to the particular project, and are due to product demand growth; must have documentation supporting the portion of the emissions increase that is due to demand growth; and, following the change, must be able to track the emissions increase due to demand growth; or

IV. In lieu of using the method set out in subparagraphs (7)(a)2.(ii)(II)I. through III. of this rule, may elect to use the emissions unit's potential to emit, in tons per year, as defined under paragraph (b)(4) of 40 CFR, Part 52.21.

Regulated NSR Pollutant: In lieu of the definition of "Regulated NSR pollutant" as specified in 40 CFR 52.21(b)(5), the following shall apply per Georgia Rule 391-3-1-.02(7)(2)(ix):

(I) Any pollutant for which a national ambient air quality standard has been promulgated and any pollutant identified under this paragraph (b)(50)(i) as a constituent or precursor for such pollutant. Precursors identified by the Administrator for purposes of NSR are the following:

I. Volatile organic compounds and nitrogen oxides are precursors to ozone in all attainment and unclassifiable areas.

II. Sulfur dioxide is a precursor to $PM_{2.5}$ in all attainment and unclassifiable areas.

III. Nitrogen oxides are presumed to be precursors to $PM_{2.5}$ in all attainment and unclassifiable areas, unless the State demonstrates to the Administrator's satisfaction or EPA demonstrates that emissions of nitrogen oxides from sources in a specific area are not a significant contributor to that area's ambient $PM_{2.5}$ concentrations.

(II) Any pollutant that is subject to any standard promulgated under section 111 of the Act;

(III) Any Class I or II substance subject to a standard promulgated under or established by title VI of the Act;

(IV) Any pollutant that otherwise is subject to regulation under the Act as defined in paragraph 40 CFR 52.21(b)(49).

(V) Notwithstanding paragraphs 40 CFR 52.21(b)(50) [Georgia Text 391-3-1-.02(2)(7)(a)(2)(ix)] of this section, the term regulated NSR pollutant shall not include any or all hazardous air pollutants either listed in section 112 of the Act, or added to the list pursuant to section 112(b)(2) of the Act, and which have not been delisted pursuant to section 112(b)(3) of the Act, unless the listed hazardous air pollutant is also regulated as a constituent or precursor of a general pollutant listed under section 108 of the Act.

(VI) Particulate matter (PM) emissions, $PM_{2.5}$ emissions and PM_{10} emissions shall include gaseous emissions from a source or activity which condense to form particulate matter at ambient temperatures. On or after January 1, 2011 (or any earlier date established in the upcoming rulemaking codifying test methods), such condensable particulate matter shall be accounted for in applicability determinations and in establishing emissions limitations for PM, $PM_{2.5}$ and PM_{10} in PSD permits. Compliance with emissions limitations for PM, $PM_{2.5}$ and PM_{10} issued prior to this date shall not be based on condensable particular matter unless required by the terms and conditions of the permit or the applicable implementation plan. Applicability determinations made prior to this date without accounting for condensable particular matter shall not be considered in violation of this section unless the applicable implementation plan required condensable particular matter to be included.

Source: [Georgia Rule 391-3-1-.01]
"Source" or "facility" means any property, source, facility, building, structure, location, or installation at, from, or by reason of which emissions or air contaminants are or may reasonably be expected to be emitted into the atmosphere. Such terms included both real and personal property, stationary and mobile sources or facilities, and direct and indirect sources or facilities, without regard to ownership, and both public or private property. An "indirect" source or facility is a source or facility which attracts or tends to attract activity that results in emissions of any air pollutant for which there is an ambient air standard.

APPENDIX D - INTERNET LINKS OF INTEREST

Georgia EPD Air Protection Branch	http://epd.georgia.gov/air
Georgia EPD PSD Permitting Resources Dispersion Modeling Information List of Sources in Georgia Georgia PSD Integrated Rule List of Minor Source Baseline Dates PSD Modeling Inventory Tool (Generates an off-site inventory)	http://epd.georgia.gov/air/psd-permitting-resources
Georgia EPD Dispersion Modeling Resources Toxic Impact Assessment Spreadsheet AAC Spreadsheet Georgia Air Dispersion Modeling Guidance Georgia AERMET Data Georgia ISC Meteorological Data Georgia Background Data Toxics Impact Assessment Guideline Guideline for Modeling PM_{10} Ambient Concentration in Areas Impacted by Quarry Operation Producing Crushed Stone	http://epd.georgia.gov/air/disperion-modeling-information
Georgia Nonattainment Areas	http://epd.georgia.gov/air/national-ambient-air-quality-standards-and-nonattainment-areas
Georgia Ambient Monitoring Data	http://amp.georgiaair.org

APPENDIX E – GEORGIA EPD GUIDELINE FOR CONDUCTING A CLASS II AREA VISIBILITY ANALYSIS

A list of potentially sensitive visible plume receptors, along with their distances and their azimuth to the **source**, should be tabulated in the Modeling Protocol submitted to Georgia EPD for each applicable permitting **project**. Such a tabulation should include all airports and airstrips, state parks, and state historic sites located within 50 km of the **project source**. Potentially sensitive receptors located beyond the largest **significant** impact distance of any visibility-affecting pollutants such as PM_{10}, $PM_{2.5}$, NOx, and SO_2 are eliminated from further analysis on that basis.

The appropriate background visual range (VISCREEN user's guide, page 26) should be referenced in the Modeling Protocol. If the background visual range is not considered to be uniform over the area of distribution of **project**-specific sensitive receptors, the background visual range for each receptor should be listed with the receptor distance and azimuth tabulation in the Modeling Protocol. The Ambient Ratio Method should not be used to adjust the emission rate of NO_2 in the analysis of visible plume impacts with VISCREEN. The VISCREEN model contains an adjustment to approximate NO_2 from potential NOx emissions.

Level I (VISCREEN) Modeling: Identify the Distance Beyond Which Sensitive Receptors are Predicted to be Un-Affected by Facility Emissions.

1. Set observer distance = shortest distance between sensitive receptor and on-site **source**s. Run VISCREEN under F, 1m/s conditions and Level I defaults using **facility-wide PTE emission rates** associated with the **project**.

   The only criteria required for most coastal Georgia **project**s are those 'within the sensitive receptor [Class I Area]" with a SKY background.

2. Repeat for each sensitive receptor until the Visible Plume (NOT Class I) Screening Threshold Criteria (STC) are met, OR until the distance exceeds 50 km without meeting

the STC. The distance beyond which the facility plume passes the screening criteria (D_{vis}, which must be < 50 km), is the distance beyond which only un-affected sensitive receptors are located. Such unaffected receptors beyond this distance require no further analysis, though they should be identified in the Class II Modeled Air Quality Assessment (along with the azimuth and distance to the facility) as among the set of sensitive receptors within 50 km of the facility. Report such identified receptors (those in excess of D_{vis}, but within 50 km of the **source**) as passing Level I.

Level II (VISCREEN) Modeling- Refining Visible Plume Impacts of Sources Unable to Pass Level I by Analysis of Persistence of Worst-Case Meteorological Conditions and Wind Directions

1. If using pre-processed meteorological data (ISCST3-compatible, containing wind flow vectors), identify the azimuth of the wind flow vector from the facility to each sensitive receptor. If processing raw meteorological data, identify the azimuth of the wind direction upwind of the facility that would cause the plume to be directed toward the sensitive receptor (wind flow vector +180^0).

2. For each sensitive receptor's associated 22.5^0 wide sector and model met data year, determine the worst-case meteorological conditions which occur in the 5-year modeled data set (as the least dispersive condition with a 1% cumulative frequency of occurrence, in accordance with the VISCREEN Model Tutorial). This worst-case 1% cumulative frequency of occurrence (WC1%CF) will be determined from each modeled year of data by 22.5^0 wind direction sector and by 6-hour time block of each day, and will be ranked in sequence by the increasing value of the product of the Pasquill-Gifford stability-specific σ_z times the wind speed of the condition under evaluation (see VISCREEN model tutorial available on the www.epa.gov/scram001 website).

NOTE: Conditions requiring more than 12-hours of travel time from the facility to the receptor, calculated on the basis of mid-class wind speeds, are exempted from contributing to the WC1%CF (i.e., for 1 m/s winds, 0.5 m/s is the mid-class speed.

Distance = 0.00005 km/s*3600 s/hr = 21.6 km). Thus for receptors in excess of 21.6 km from the **source**, there is no need to evaluate visible impacts under 1 m/s wind speed conditions. Some sensitive receptors may pass under stability class F, 2 m/s conditions on this basis (revised Level I analysis), without involving an analysis of the WC1%CF.

3. Run Level II VISCREEN modeling for each sensitive receptor with the sector-appropriate pre-determined worst-case annual cumulative frequency of occurrence meteorological condition using Level I defaults and facility-wide **PTE** emission rates associated with the **project**. Sensitive receptors which pass this manner of Level II analysis should be tabulated with the worst-case meteorological conditions under which no visible plume impacts were predicted.

4. Other Level II alternative techniques may also be implemented, such as adjustment of the emissions data, ambient ozone datum, and discussions of infeasible alignments of light **source**, emission **source** and sensitive receptor (See Level III Analysis, below).

<u>**Level III Analysis** – Refined Analysis of Potential Visible Plume Impacts</u>

1. Run PLUVUE II with facility-wide, worst-case stack parameters, **PTE** emission rates associated with the **project** and worst-case meteorological conditions (OR F, 1 m/s) [Due to the complexity of the PLUVUEII model and the lack of sufficient guidance for such studies, a PLUVUE modeling protocol should be submitted to Georgia EPD prior to conducting such an assessment and is subject to Georgia EPD approval], AND/OR,

2. Analyze the important geometric relationships between, for instance, the azimuth from the setting or rising sun and the plume azimuth from facility to observer, as presented in the 'Results' output file of the Level II (VISCREEN model. NOTE: In the instance of sensitive receptors located in excess of 1-hour travel time (at mid-wind speed class velocities) from the facility, it is not required to include night-time (E and F) stabilities in <u>sunset</u> analyses, since EPA allows nighttime stabilities to persist for no more than one

hour prior to sunset. Plumes may be established overnight under these stabilities, so a sunrise analysis including E & F stabilities is required of this level of assessment.

Evaluation should continue for each plume/sensitive receptor, until ALL worst-case plume/sensitive receptors sets can be expected to meet the screening threshold criteria for visible plume impairment.

NOTE: All VISCREEN modeling should be conducted with facility-wide **PTE** emission rates associated with the **project**. If the "plume" is indicated to be visible by Level III modeling, Georgia EPD approval may be south to assess selected **source**s by **source** grouping (those of substantial difference in plume centerline height, for instance).

Ultimately, there may be circumstances and sensitive receptors which are found to potentially form plume blight. These situations should be discussed with Georgia EPD Data and Modeling Unit to ascertain whether the area, intensity, frequency, or duration of such occurrences is critical.