NORTH CAROLINA
PSD
MODELING
GUIDANCE

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NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF AIR QUALITY
PERMITTING SECTION
AIR QUALITY ANALYSIS BRANCH

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1.0 INTRODUCTION

As identified and paraphrased from the "EPA New Source Review Workshop Manual, (Draft) October 1990"[1], (NSRWM), an applicant for a PSD permit is required to conduct an air quality analysis of the ambient impacts associated with the construction and operation of a proposed new source or modification. The purpose of the air quality analysis is to demonstrate that new emissions emitted from a proposed major stationary source or major modification, in conjunction with other applicable emissions from existing sources (including secondary emissions from growth associated with the new project), will not cause or contribute to a violation of any applicable NAAQS or PSD increment. Ambient impacts of TSP and North Carolina toxics must also be evaluated. The PSD pollutants to be evaluated are identified in section 2.0.

The North Carolina PSD modeling guidance is based on the guidance provided in the EPA PSD NSRWM and 40 CFR Ch. I (7-1-97 Edition) Appendix W to Part 51 – Guideline on Air Quality Models, henceforth referred to as EPA Modeling Guidelines. The NC guidance also includes specific modeling requirements and recommendations as defined by the North Carolina PSD permitting program.

The guidelines presented in this document may change at any time as new guidance or new air quality modeling techniques become available. For the latest changes in NC DAQ guidance, refer to the "Alert Page" located on the AQAB web site, which can be found at: http://daq.state.nc.us/Offices/Permits.

2.0 PSD Regulated Pollutants

Pollutants subject to PSD review are those regulated under the clean air act ((40 CFR 52.21(b)(23)) and whose annual emissions as a result of the new or modified source(s) exceed the *significant* emission rates (SERs) defined in Table A-4 of the NSRWM and listed below in Table 2.

Table 2. PSD Regulated Pollutants / Significant Emission Rates

Pollutant	Emissions Rate (tons/year) [a]
Carbon Monoxide (CO)	100
Nitrogen Oxide (NO_2)	40
Sulfur Dioxide (SO_2)	40
PM_{10}	15
$PM_{2.5}$	10
Ozone (VOC)[b]	40 (VOCs)
Lead	0.6
Asbestos	0.007
Fluorides	3
Sulfuric Acid Mist	7
Total Reduced Sulfur Compounds (including H_2S)	10

[a] if the major source is located within 10 kilometers of any Class I Area, any emission or emissions increase that results in an increase of 1 ug/m^3 (24 hour average) in the Class I Area.

[b] a net emissions increase of 100 tons or more per year of VOC is subject to PSD; however, ozone is currently evaluated at a regional level within DAQ and is not further evaluated within the confines of PSD.

Pollutants subject to PSD review must be modeled to determine compliance with the applicable NAAQS and PSD increment. Pollutants with annual emission rates less than the SERs are not subject to PSD; however, they are subject to North Carolina air quality regulations and may be required to be modeled to determine compliance with the applicable NC Air Quality Standards (NCAQS). Further details and specific pollutant modeling requirements are discussed during the PSD pre-application meeting.

3.0 PSD Pre-application Meeting / Modeling Protocol

PSD Pre-application Meeting

A PSD pre-application meeting is required prior to submitting the modeling protocol and modeling analyses. The pre-application meeting is held to discuss project specifics with the appropriate permitting engineer and modeling staff to identify project specific permitting and modeling requirements.

PSD specific pre-application meeting requirements are listed at the following website http://daq.state.nc.us/permits/psd/docs/pr1.doc. This document should be filled out and provided to the PSD/Special Projects point of contact prior to the meeting. If Class I area requirements are specified, DAQ will forward the proposed emission rate increases/decreases to the applicable Federal Land Manager (FLM) contact for discussion of specific Air Quality Related Values (AQRV) visibility and/or deposition modeling requirements.

PSD Modeling Protocol

Prior to submitting the PSD application and modeling analysis, the applicant is required to submit a modeling protocol to the DAQ AQAB. The modeling protocol should provide sufficient detail to ensure the PSD modeling requirements described in this document and the NSRWM will be met. The following is a list of suggested topics to be included in the modeling protocol for discussion and review:

a. proposed model(s) and non regulatory options (if any);
b. modeling methodology
c. meteorology;
d. receptor network / ambient air / fenceline-property line;
e. terrain;
f. pollutants / averaging periods / emission rates;
g. preliminary / full impact analysis;
h. NAAQS / PSD increment analysis;
i. background concentrations;
j. preconstruction monitoring;
k. significant impact area (SIA) / offsite source inventories (NAAQS, PSD increment);
l. additional impact analysis (growth, soils and vegetation, visibility impairment);
m. class I area impact analysis (areas evaluated, model(s), model input assumptions, class I increments, Air Quality Related Values (AQRVs)).

In response to advancements made in the science of air quality dispersion modeling, dispersion models and modeling methodology are revised and updated on a continual basis. To ensure these changes are reflected in the PSD modeling demonstration, the modeling plan is only valid for a period of 90 days from the date of approval. If the modeling analysis is expected to be submitted after the modeling plan expiration date, a protocol "approval extension request" or a revised protocol should be submitted to AQAB.

4.0 Preliminary Impact Air Quality Analysis

The preliminary impact air quality analysis is conducted to determine if a full impact air quality analysis is needed and to define the impact area within which a full impact analysis is conducted.

Class II Area Preliminary Impact Analysis

The Class II Area preliminary analysis evaluates only the significant increase (project increase) in potential emissions of a pollutant from a proposed new source, or the significant net emissions increase of a pollutant from a proposed modification. The modeled results, High-First-High (H1H), of the preliminary analysis are compared to the PSD Significant Impact Levels (SILs) as shown in Table 4.1 to determine whether the applicant must perform a full impact air quality analysis as described in section 5.0.

Pollutant Emissions and Worst Case Operating Conditions

For a new facility, the significant impact determination must evaluate all facility emissions including quantifiable fugitive emissions resulting from the proposed new sources. For existing facilities, the modeled emissions include contemporaneous emission increases and decreases from the modified sources. Emissions decreases are modeled as negative emissions.

Worst case operating conditions for each source should be used in the preliminary impact analysis. These conditions are those resulting in the maximum offsite site ambient impacts and are determined by evaluating alternative operating conditions of 50% and 75% in addition to the normal 100% load condition. Start up and shut down operations and the operation of auxiliary boilers/equipment must be accounted for when determining the worst case operating conditions.

Significant Impact Levels (SILs)

Using the modeling methodology described in section 4.1, the highest modeled pollutant concentration for each averaging time is compared to the SILs shown in Table 4-1. If the highest modeled concentrations for any pollutant and averaging period evaluated are less than the applicable SIL, a full impact air quality analysis is not required for that pollutant and averaging period; however, these pollutants may still be subject to further review as part of the PSD additional impact analysis requirements. Further details and specific requirements are discussed during the PSD pre-application meeting.

Significant Impact Area (SIA)

If the highest modeled concentrations are greater than the SIL, a full impact analysis will be required and is conducted for the significant impact area (SIA). The SIA is a circular area with a radius extending out to the most distant point where the modeling predicts a significant ambient impact (not to exceed 50 kilometers) and represents the geographical area for which the NAAQS and PSD increment analysis is conducted. The SIA is defined for each pollutant for each averaging period.

Table 4-1. Class II Area Significant Impact Levels (ug/m^3)					
Pollutant	Annual	24-hour	8-hour	3-hour	1-hour
SO_2	1	5	-	25	10[c]
TSP[a]	1	5	-	-	-
PM_{10}	1	5	-	-	-
$PM_{2.5}$	0.3[c]	1.2[c]	-	-	-
NO_2	1	-	-	-	10[c]
CO	-	-	500	-	2000
O_3	-	-	-	-	[b]

[a] TSP is no longer a PSD criteria pollutant and therefore not subject to PSD review; however, TSP is a regulated North Carolina criteria pollutant with a state air quality standard (SAAQS) equal to the old NAAQS.

[b] a net emissions increase of 100 tons or more per year of VOC is subject to PSD; however, ozone is currently evaluated at a regional level within the DAQ Planning Section and is not further evaluated within the confines of PSD.

[c] Interim 1-hr SIL Established by DAQ.

Class I Area Preliminary Impact Analysis

All facilities undergoing PSD review in North Carolina must consider their potential impacts on one or more of the eight Federal Class I areas identified in Table 4-2. The appropriate Federal Land Manager (FLM) is contacted during or shortly after the initial PSD pre-application meeting to evaluate the need for a Class I Air Quality Related Value (AQRV) air quality analysis (regional haze and deposition). The FLM will typically request evaluation of regional haze and deposition impacts if they believe the project emissions and distance from the respective Class I area warrant an impact assessment. The applicant responsibility to conduct a Class I analysis is based on the results of the Class I area preliminary impact or Significant Impact Level (SIL) analysis and, where appropriate, the Class I PSD increment analysis. If the FLM does not request a Class I analysis, DAQ will not request any further Class I evaluation.

Table 4-2. Class I Areas	
Class I Area	Location
Linville Gorge National Wilderness Area	**NC**
Great Smoky Mountains National Park	**NC**
Joyce Kilmer Slickrock National Wilderness Area	**NC**
Shining Rock National Wilderness Area	**NC**
Swanquarter National Wildlife Refuge	**NC**
Cape Romain National Wildlife Refuge	**SC**
James River Face Wilderness Area	**VA**
Cohutta Wilderness Area	**GA**

When a Class I AQRV analysis is requested by the FLM, the applicant will be required to

initially conduct the Class I SIL analysis for each pollutant and averaging period of concern. This analysis is conducted to evaluate the impact of the new or modified source emissions on the applicable Class I areas and to determine if a more comprehensive analysis (e.g., Class I area PSD increment) is required. If the SIL is not exceeded, no additional Class I analysis is required. If the SIL is exceeded for any pollutant, a Class I area PSD increment analysis is required for that pollutant (see Section 5.0, Class I Areas, Increment Analysis).

The preliminary impact analysis requirements will be discussed during the PSD pre-application meeting and finalized after consultation with the applicable FLM(s). Note: DAQ requests applicants coordinate all FLM related discussions through DAQ and not directly with the FLM.

Significant Impact Levels (SILs)

The Class I area SIL levels are shown in Table 4-3 and represent the pollutant concentration thresholds used to determine if a more comprehensive Class I area analysis (PSD increment) is warranted.

Table 4-3. Class I Areas SILs
(ug/m^3)

Pollutant	Averaging Period	SIL
SO_2	Annual	.08
	24-hr	.2
	3-hr	1
	1-hr	[b]
PM_{10}	24-hr	0.32
	Annual	0.2
$PM_{2.5}$	Annual	[a]
	24-hr	[a]
NO_2	Annual	.1
	1-hr	[b]

[a] Class I SILs have been proposed but not yet finalized.
[b] No Class I SIL available.

Air Quality Related Values (AQRVs)

When an AQRV analysis is requested by the appropriate FLM and both the Class I SIL and Class I PSD increment analysis results exceed the SIL and PSD increment, respectively, an AQRV preliminary analysis is conducted using guidance established by DAQ and the FLM FLAG 2000 document. The preliminary analysis is conducted to demonstrate that the change in visibility (delta-deciview) at the Class I area as a result of the new or modified emission sources will not exceed 0.5. If the delta-deciview exceeds 0.5, a full analysis (see section 5.0, Class I Areas) including offsite source contributions must be conducted.

5.0 Full Impact Air Quality Analysis

A full impact analysis consists of separate analyses for the NAAQS and PSD increments and will consider emissions from the proposed source(s) or source modifications, any existing on site sources, offsite sources, and for the NAAQS analysis, background concentrations. The full impact analysis is conducted for Class II (NAAQS and PSD increment) and Class I (PSD increment and AQRVs) areas.

Class II Areas

NAAQS Emissions

All facility emissions of the PSD criteria pollutant subject to PSD must be modeled. The emission rates must reflect the maximum allowable operating conditions as expressed by the federally enforceable emissions limit, operating level, and operating factor for each applicable pollutant and averaging time. Note: operating levels less than 100 percent of capacity may also need to be modeled where differences in stack parameters associated with the lower operating levels could result in higher ground level concentrations. Also note: NC requires that TSP emissions (i.e. < 100 micron size particles) be modeled as a part of the state SAAQS demonstration. The SAAQS demonstration is not necessary if all particulate emissions fall into the more conservative PM_{10} size category. All off-site sources within the SIA must be included in the modeling. Additionally, offsite sources within 50 km (screening area) of the SIA must be evaluated for inclusion in the offsite source inventory. Offsite sources within the screening area can be excluded from the modeling if their facility-wide emission rate in tons per year is less than 20D, where D is defined as the distance from the offsite source to the PSD facility being modeled for short term emissions and as the distance from the offsite source to the nearest boundary of the SIA for long term emissions.

Initial offsite source inventories can be obtained from AQAB. The PSD applicant has the responsibility to coordinate with the appropriate regional office of DAQ to verify and correct these inventories for the specific application.

Increment Emissions

All facility emissions of the PSD criteria pollutants subject to PSD and for which PSD increments have been established (PM_{10}, SO_2, and NO_x) must be evaluated to determine the individual source emissions that consume increment and to include these sources in the PSD increment modeling analysis. All source or source emission increases that have occurred since the Minor Source Baseline Date (MiSBD) was established for the county in which the PSD application is being submitted must be modeled. A list of the MiSBDs by county is provided on the DAQ website at http://daq.state.nc.us/permits/psd. The emission rates must reflect the maximum allowable operating conditions as expressed by the federally enforceable emissions limit, operating level, and operating factor for each applicable pollutant and averaging time. Note: operating levels less than 100 percent of capacity may also need to be modeled where differences in stack parameters associated with the lower operating levels could result in higher ground level concentrations.

Off-site increment consuming sources that were created on or after the MiSBD and that are within the SIA must be included in the increment modeling analysis. In addition, all increment consuming sources within 50 km (screening area) of the SIA must be evaluated for inclusion in the offsite increment source inventory. Offsite sources within the screening area can be excluded from the modeling if their facility-wide emission rate in tons per year is less than 20D, where D is defined as the distance from the offsite source to the PSD facility being modeled for short term emissions and as the distance from the offsite source to the nearest boundary of the SIA for long term emissions. Since the MiSBD in NC is county specific, the modeling domain may contain multiple MiSBDs to apply to the source selection process. Major sources in existence prior to the

EPA-established Major Source Baseline Date (MSBD) are excluded from the increment modeling analysis. The MSBDs are Jan 6, 1975, for PM_{10} and SO_2, and Feb 8, 1988, for NO_2. Contact AQAB to obtain an initial draft of increment inventory sources. The PSD applicant has the responsibility to coordinate with the appropriate regional office of DAQ to verify and correct these inventories for the specific application.

Meteorology

Refined NAAQS and increment analyses require five years of AQAB approved surface and upper air meteorological data. If on-site meteorological data is available (latest available 5 years but no less than 1), the on-site data may be used but will require prior approval from the AQAB. Approved AERMOD processed data sets are available on a county-by-county basis on the AQAB website: http://daq.state.nc.us/permits/mets/metdata.shtml. DAQ has developed new procedures for the selection of meteorological data files to be used in AERMOD modeling for PSD permitting projects. The new procedures include selecting an appropriate meteorological data site for the project using the AQAB website, determining the surface roughness characteristic for the facility/project site, and then choosing the meteorological data file subset that best represents the surface roughness of the facility/project site.

Receptor Grid

Receptor grids may be polar, cartesian, discrete, or any combination thereof with receptors beginning at the facility fenceline and extending sufficiently outward to identify the maximum impacts from both the *onsite* and *offsite* emission sources for each pollutant and pollutant averaging period evaluated. In most cases, the receptor grid is limited to less than 10 kilometers from the facility under review. Receptor resolution may vary; however, receptors near the facility fenceline and in the area of maximum impact must be no greater than 100 meters. If a coarse grid is used to locate an area of maximum impact, then subsequent modeling must be done with 100 meter spacing in the locale of the coarse grid maximum.

Terrain elevations must be used for all receptors. In most cases the elevation data will be assigned using the USGS elevation data from the National Elevation Database (NED). The old DEMs for NC have a number of documented problems that are corrected in the NED data. The 7.5 minute USGS data with a 30 meter resolution is required unless the AQAB approves an alternative. A USGS database with a more dense resolution may be used. In setting site elevations for sources, buildings, and fenceline receptors, adjustments should be made to ensure that known site grading is represented. Absolute values of elevation will differ from different data sources, so they should not be mixed without close scrutiny and manual adjustment; e.g., receptors elevations derived from NED data and on-site source elevations derived from survey map data may require adjustments to ensure consistency.

Impacts and Standards

Each criteria pollutant and evaluation period requires a specific modeled impact (e.g., H1H, H2H, etc.) for comparison to the appropriate NAAQS and increment. Table 5-1 displays the appropriate standard and increment as well as the specific impact requirement for each criteria pollutant and averaging period.

Table 5-1. Class II Area NAAQS / Increments (ug/m3)

Pollutant	Averaging Period	NAAQS	Increment
SO_2	1-Hr	196[3]	-
	3-Hr	1300[2]	20[2]
	24-Hr	365[2]	91[2]
	Annual	80[1]	512[1]
PM_{10}	24-Hr	150[4]	30[2]
	Annual	-	17[1]
$PM_{2.5}$	24-hour	35[5]	-
	Annual	15[1]	-
NO_2	Annual	100[1]	25[1]
	1-hour	188[5]	-
CO	1-Hr	40,000[2]	-
	8-Hr	10,000[2]	-
Pb	Rolling 3-month average	.15[3]	-
	Quarterly	1.5[2]	

[1] H1H, [2] H2H, [3] H4H, [4] H6H, [5] H8H

For the NAAQS analysis, an approved pollutant specific background concentration must be added to the appropriate modeled impact for each pollutant and averaging period. The resultant concentration is then compared to the NAAQS. The approved background concentrations can be found on the NC DAQ website at: http://daq.state.nc.us/monitor/data. The conversion factors for converting parts per million (PPM) to ug/m^3 are pollutant specific and are defined in Table 5-2.

Table 5-2. Pollutant Conversion Factors (PPM to ug/m^3)

Pollutant	Conversion Factor
CO	**1,150**
NO_2	**1,880**
SO_2	**2,620**

As necessary, contact the AQAB for assistance in deriving the appropriate background concentrations for a particular application.

Class I Areas

NC Class I Areas

PSD regulations require a Class I area analysis be conducted for all proposed sources with the potential for air quality impacts on a Class I area. Although EPA defines all proposed major sources or major modifications within 100 kilometers of a Class I area as those with the potential for air quality impacts on a Class I area, the FLM is notified of all PSD applications within North Carolina and will evaluate the need for a Class I area air quality analysis based on factors such as pollutants emitted, emission rates, etc.. There are five Class I areas within North Carolina and one each in South Carolina, Virginia, and Georgia that may be impacted by PSD sources in North Carolina. They are listed in Table 4-2.

The Class I areas are managed by the Forest Service (FS), the National Park Service (NPS), or

the Fish and Wildlife Service (FWS). All Class I area air quality analyses are coordinated with the appropriate FLM. A map of the potentially impacted Class I areas and the corresponding FLM contacts are shown in Appendix A.

Increment Analysis

Class I increments have been established for PM_{10}, SO_2, and NO_2 and are listed in Table 5-3. These represent the maximum increases in ambient pollutant concentrations allowed over baseline concentrations.

Table 5-3. Class I Increments (ug/m^3)

Pollutant	Annual	24-hour	3-hour	1-hour
SO_2	2	5	25	TBD
PM_{10}	4	8	-	-
$PM_{2.5}$	TBD	TBD	-	-
NO_2	2.5	-	-	TBD

The Class I area increment analysis is only conducted if the FLM requests an AQRV analysis and the preliminary impact analysis Class I area SILs are exceeded. The class I increment analysis is conducted using the same modeling methodology as that used in the Class II area analysis and may incorporate the use of long range transport models such as CALPUFF. As discussed in the Class II area increment emissions section, all increment consuming off-site sources must also be included in the Class I area increment analysis. In addition to determining compliance with the Class I increments, the Class I increment modeling results are also used by the FLM to establish additional Class I modeling requirements (e.g., AQRV and deposition analyses).

AQRV Analysis

Air Quality Related Values (AQRVs) include such effects as acid deposition and visibility degradation. The FLM for each Class I area of concern is responsible for specifying which AQRV(s) must be evaluated. These are determined during initial conversations with the appropriate FLMs.

Acid Deposition Analysis / Deposition Thresholds

Estimates of atmospheric deposition are obtained by selecting the options in CALPUFF to calculate and output the wet and dry fluxes of the pollutants modeled. The units of the fluxes are in g/m2/s of the pollutant modeled (i.e., g/m2/s of HNO). Generally AQRV analyses require values of total deposition (background plus modeled impact) to be given in units of kg/ha/yr of an element, such as nitrogen (N) or sulfur (S). Therefore, the modeled deposition flux of each of the oxides of sulfur or nitrogen from CALPUFF must be adjusted for the difference of the molecular weight of their oxides and the element and the various forms must be summed to yield a total deposition of sulfur or nitrogen. This is accomplished using multipliers in a post-processor, POSTUTIL, to do all of the conversions, as follows: The CALPOST program will produce an average flux (i.e., annual average), therefore, the average value must be multiplied by the number of seconds in an hour and the total number of hours used in the averaging period for the total deposition. The wet and dry fluxes of SO2, SO4, NOx, HNOx, and NO3 need to be calculated and saved in a CALPUFF run. POSTUTIL is then used to process the CALPUFF-generated wet and dry fluxes. POSTUTIL repartitions nitric acid/nitrate based on total available sulfate and ammonia. Each species is normalized by the molecular weight of a common compound or element (usually S or N), output units are converted, and adjustments are made for the

total number of averaging periods used in the CALPOST run (i.e., 8760 for 1 year). Finally, CALPOST, in addition to providing output concentrations and visibility calculations, is used to provide summarize both wet and dry total calculation fluxes.

Both the National Parks Service and the U.S. Forest Service have established deposition thresholds at Class 1 Areas under their respective control. The approach used by each agency to establish the thresholds differs remarkably; however, both agencies have established a deposition threshold value of 0.01 kg/ha/yr for both sulfur and nitrogen.

Deposition values obtained from CALPUFF model output should be compared to the established threshold for each Class 1 area of concern. If either the sulfur or nitrogen deposition values exceed the 0.01 kg/ha/yr threshold, the FLM may require further evaluation of deposition impacts at the affected Class 1 area.

Regional Haze Analysis

Applicants may be required to demonstrate that visibility at nearby Class 1 areas is not degraded beyond an acceptable level by emissions from a proposed project. Nearby implies any Class I area within which the FLM expresses a concern with possible visibility degradation.

For Class 1 areas located more than 50 kilometers from the subject facility, the latest EPA-approved version of the CALPUFF modeling system (CALPUFF, CALMET, and CALPOST) should be used to compute the maximum 24-hour light extinction that is expected due to proposed emissions from the source facility. If the project-related change in extinction (commonly referred to as "delta-dv") is less than 5% (delta-dv < 0.5), then the project's regional haze impact is usually judged to be insignificant and no further analysis is required. If the delta-dv is greater than 0.5, but less than 1.0, the FLMs may take into account the number of days the 0.5 delta-dv threshold is exceeded.

The FLAG guidance document (FLAG 2000 Phase 1 Report) should be followed when conducting the regional haze analysis. A 3-year MM5 CALPUFF-ready meteorological dataset with 4-km resolution is available from DAQ upon request and is preferred by the FLMs for regional haze analyses. The MM5 dataset (sub-domain 5) has already been processed with CALMET and is prepared for direct input to CALPUFF.

CALPUFF should be run for each of the 3 years of MM5 data and then CALPOST should be used to calculate changes in deciview for each year. DAQ should be contacted on the appropriate method for determining which values (i.e. coefficients) to use for background light extinction. Coefficients based on "natural conditions" are currently preferred by the FLMs and can be found in the document "Guidance for Estimating Natural Visibility Conditions under the Regional Haze Rule" (EPA-454/B-03-005, Rev. September 2003). Coefficients can also be determined using data from the 20% cleanest days collected at IMPROVE monitoring sites; however, this method is discouraged by the FLMs and will likely generate an FLM regional haze analysis "deficiency" comment.

Specific model options should be set as follows:
- MVISBK = 2 in CALPOST (Note Method 6 using speciated PM measurements can also be used as a refinement to Method 2 if the speciated data is available).
- RHMAX = 95% in CALPOST
- MNITRATE = 1 in POSTUTIL

A more detailed discussion and description of these and other model options can be found in the "CALPFUFF User's Guide" available at www.src.com.

Maximum delta-dv values at each Class I area are obtained from the CALPOST .lst files and should be listed in a table that shows the maximum delta-dv and the number of days, if any, that the 0.5 or 1.0 threshold is exceeded.

6.0 Additional Impact Air Quality Analysis

All PSD permit applicants are required to conduct additional impact analyses for each pollutant subject to PSD and which will be emitted by the proposed new or modified sources. The additional impact analysis assesses the impacts of air, ground and water pollution on soils, vegetation, and visibility caused by any increase in emissions of any regulated pollutant from the source or modification under review, and from associated growth.

The additional impacts analysis generally has three parts, as follows:

(1) growth;
(2) soil and vegetation;
(3) visibility impairment.

Each are briefly described below. Specific guidance, references, and examples can be found in the EPA New Source Review Manual, (DRAFT, October 1990).

Growth

A projection of the associated industrial, commercial, and residential source growth that will occur in the area due to the source and an estimate of the air emissions generated by this growth. Significant increases in human population and associated activities (eg. road traffic, other industrial growth, etc.) may contribute to airshed pollution. The net growth in population and ancillary support activities should be quantified and discussed.

Soil and Vegetation

The analysis of soil and vegetation air pollution impacts should be based on 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. EPA document 450/2-81-078, "*A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals*" provides more specific guidance, screening procedures, pollutant sensitivities, etc..

Visibility Impairment

The visibility impairment analysis evaluates the impacts that occur within the SIA and is **distinct from the Class I area visibility analysis requirement**. The visibility impairment analysis consists of a Level I, Level II, or Level III screening procedure using the VISCREEN or PLUVUE II model. If the Level I analysis indicates a potential visibility impairment, a Level II analysis is then conducted and, if necessary, a Level III analysis. EPA document, *Workbook for Plume Visual Impact Screening and Analysis* will provide more specific guidance and examples.

7.0 Air Quality Modeling Report

The PSD modeling report is generally included as a part of the PSD permit application that is submitted to the DAQ permits section; however, since the modeling is reviewed by the AQAB, the modeling report should be a stand-a-lone report and should contain all the necessary documentation (e.g., site maps, survey, etc.) to allow for an independent review of the compliance demonstration. Although the length and detail of the modeling report is dictated by the complexity and scope of the modeling effort, each report should include a discussion (models, modeling methodology and assumptions, emissions, results, etc.) of the topics listed below and which were identified as a modeling requirement during the PSD pre-application meeting.

- Introduction or purpose of the modeling demonstration;

- NAAQS / PSD Increment Analysis (preliminary and full impact analysis);

- Non-regulated pollutant impact analysis (e.g., NC toxics or non-PSD pollutants for which DAQ requested further analysis);

- Additional impact analysis (growth, soils and vegetation, Class II visibility impairment);

- Class I increment analysis;

- Class I AQRV analysis.

Each of these topics is discussed in detail in the EPA NSR Workshop Manual. The modeling report should also include the modeling files (CD), site diagrams, USGS contour maps, and property maps.