NMED
New Mexico Environment Department



New Mexico Air Quality Bureau

Air Dispersion Modeling Guidelines

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Recent changes to the Modeling Guidelines are described in Appendix A at the end of this document.

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Table of Contents

Table of Contents 2

List of Figures *Error! Bookmark not defined.*

List of Tables 6

1.0 INTRODUCTION 8

1.1 Introductory Comments 8

1.2 The Modeling Review Process 8

1.2.1 Modeling Protocol Review 8

1.2.2 Permit Modeling Evaluation 9

2.0 MODELING REQUIREMENTS AND STANDARDS 9

2.1 Regulatory Requirement for Modeling 9

2.1.1 Title V Operating Permits 10

2.1.2 New Source Review (NSR) Permitting for Minor Sources 11

2.1.3 NSR Permitting for PSD Major Sources 13

2.2 Air pollutants 13

2.3 Modeling Exemptions and Reductions 14

2.3.1 Modeling waivers 14

2.3.2 General Construction Permits (GCPs) 14

2.3.3 Streamlined Compressor Station Modeling Requirements 15

2.3.3.1 Streamlined Compressor Station Location Requirements 15

2.3.3.2 Streamlined Compressor Station Modeling and Public Notice Requirements 19

2.3.4 Minor NSR Exempt Equipment 19

2.4 Levels of Protection 20

2.4.1 Air Quality Standards 20

2.4.2 Prevention of Significant Deterioration (PSD) Increments 20

2.4.3 Significance Levels 20

2.5 Concentration Conversions 21

2.5.1 Gaseous Conversion Factor for Elevation and Temperature Correction 21

2.5.2 Gaseous Conversion Factor at Standard Temperature and Pressure (STP) Conditions 22

2.6 Modeling the Standards and Increments 23

2.6.1 Carbon Monoxide (CO) Standards 23

2.6.1.1 Design value of CO standard. 23

2.6.1.2 Modeling for the CO design value. 23

2.6.2 Hydrogen sulfide (H_2S) Standards 24

2.6.3 Lead (Pb) Standards 24

2.6.4 Nitrogen Dioxide (NO_2) Standards 25

2.6.4.1 Design value of NO_2 standard 25

2.6.4.2 NO_2 Reactivity 26

2.6.4.3 Estimating NO_2 concentrations 26

2.6.4.4 Modeling for the 1-hour NO_2 design value 27

2.6.4.5 Modeling for the annual NO_2 NMAAQS design value 28

2.6.4.6 Modeling for the annual NO_2 PSD increment design value 28

2.6.5 Ozone (O_3) Standards 28

2.6.5.1 Design value of ozone standard 28

2.6.5.2 Ozone compliance demonstration for PSD minor sources 30
2.6.6 Particulate matter less than 10 micrometers in aerodynamic diameter (PM_{10}) Standards 31
2.6.6.1 Modeling for the 24-hour PM_{10} NAAQS design value 31
2.6.6.2 Modeling for the 24-hour PM_{10} PSD increment design value 32
2.6.6.3 Modeling for the annual PM_{10} PSD increment design value 32
2.6.7 Particulate matter less than 2.5 micrometers in aerodynamic diameter ($PM_{2.5}$) Standards 32
2.6.7.1 $PM_{2.5}$ design value 33
2.6.7.2 Modeling for the 24-hour $PM_{2.5}$ design value 33
2.6.7.3 Modeling for the 24-hour $PM_{2.5}$ PSD increment design value 36
2.6.7.4 Modeling for the annual $PM_{2.5}$ PSD increment design value 36
2.6.8 Sulfur Dioxide (SO_2) Standards 37
2.6.8.1 SO_2 design value 37
2.6.8.2 Modeling for the 1-hour SO_2 NAAQS 37
2.6.8.3 Modeling for the 3-hour SO_2 PSD increment 38
2.6.8.4 Modeling for the 24-hour SO_2 PSD increment 38
2.6.8.5 Modeling for the annual SO_2 PSD increment 38
2.6.9 Total Reduced Sulfur Except For Hydrogen Sulfide Standards 38
2.6.9.1 Total Reduced Sulfur design value 39
2.6.9.2 Modeling the Total Reduced Sulfur ½-hour NMAAQS 39

2.7 PSD Increment Modeling 42
2.7.1 Air Quality Control Regions and PSD Baseline Dates 42
2.7.2 PSD Class I Areas **Error! Bookmark not defined.**

2.8 New Mexico State Air Toxics Modeling 45

2.9 Hazardous Air Pollutants 46

2.10 Nonattainment and Maintenance Areas 46

3.0 MODEL SELECTION 47

3.1 What dispersion models are available? 47

3.2 EPA Modeling Conferences and Workshops 47

3.3 Models Most Commonly Used in New Mexico 47
3.3.1 AERMOD 48
3.3.2 CALPUFF 48
3.3.3 CTSCREEN 48
3.3.4 AERSCREEN 49

4.0 MODEL INPUTS AND ASSUMPTIONS 49

4.1 Operating Scenarios 49
4.1.1 Emission Rates 49
4.1.2 Hours of Operation 49
4.1.3 Time Scenarios 49
4.1.4 Operating at Reduced Load 50
4.1.5 Alternate Operating Scenario 50
4.1.6 Startup, Shutdown, Maintenance (SSM), and Other Short-term Emissions 50

4.2 Plume Depletion and Deposition 50

4.3 Meteorological Data 52
4.3.1 Selecting Meteorological Data 52
4.3.1 Wind Roses 55

4.4 Background Concentrations 55

4.4.1 Uses of Background Concentrations 56
4.4.1.1 Refined background concentrations 56
4.4.1.2 Developing 24-hour refined background concentrations 56
4.4.1.3 Developing 1-hour refined background concentrations 56
4.4.1.4 Eliminating double-counting of emissions in background 57
4.4.2 CO Background Concentration 57
4.4.3 H_2S Background Concentration 57
4.4.4 Lead Background Concentration 57
4.4.5 NO_2 Background Concentration 58
4.4.6 Total Reduced Sulfur Background Concentration 59
4.4.7 Ozone Background Concentration 59
4.4.8 PM_{10} Background Concentration 60
4.4.9 $PM_{2.5}$ Background Concentration 62
4.4.10 SO_2 Background Concentration 63

4.5 Location and Elevation 64
4.5.1 Terrain Use 64
4.5.2 Obtaining Elevation 64

4.6 Receptor Placement 64
4.6.1 Elevated Receptors on Buildings 64
4.6.2 Ambient Air 65
4.6.3 Receptor Grids 65
4.6.4 PSD Class I Area Receptors 66
4.6.5 PSD Class II Area Receptors 66

4.7 Building Downwash and Cavity Concentrations 66

4.8 Neighboring Sources/Emission Inventory Requirements 67
4.8.1 Neighboring Sources Data 67
4.8.1.1 Determining which sources to include 67
4.8.1.2 Surrounding source format 68
4.8.1.3 Handling errors in surrounding source files 68
4.8.1.4 Refining Surrounding Sources 73
4.8.2 Source Groups 73
4.8.3 Co-location with a GCP for aggregate processing facilities, asphalt plants, or concrete batch plants 73

5.0 EMISSIONS SOURCE INPUTS 74

5.1 Emission Sources 74

5.2 Stack Emissions/Point Sources 74
5.2.1 Vertical Stacks 74
5.2.2 Stacks with Rain Caps and Horizontal Stacks 74
5.2.3 Flares 74
5.2.4 Cool Stacks 75

5.3 Fugitive Sources 75
5.3.1 Aggregate Handling 75
5.3.2 Fugitive Equipment Sources 76
5.3.3 Haul Roads 77
5.3.4 Area Sources 80
5.3.5 Open Pits 81
5.3.6 Landfill Offgas 81

6.0 MODELING PROTOCOLS 81

6.1 Submittal of Modeling Protocol 81

6.2 Protocol ingredients 82

6.3 How to submit the protocol 82

7.0 DISPERSION MODELING PROCEDURE *82*

7.1 Step 1: Determining the Radius of Impact 84
7.1.1 Prepare the ROI analysis as follows: 84
7.1.2 Analyze modeling results to determine ROI 85

7.2 Step 2: Refined Analysis 85
7.2.1 Prepare the Refined Analysis as Follows: 86
7.2.2 Analyze the Refined Modeling Results 86
7.2.3 NMAAQS and NAAQS 87
7.2.4 PSD Class II increment 87
7.2.5 PSD Class I increment 87

7.3 Step 3: Portable Source Fence Line Distance Requirements for Initial Location and Relocation 87

7.4 Step 4: Nonattainment Area Requirements 88

7.5 Step 5: Modeling for Toxic Air Pollutants 89

7.6 Step 6: PSD Permit Application Modeling 89
7.6.1 Meteorological Data 90
7.6.2 Ambient Air Quality Analysis 90
7.6.3 Additional Impact Analysis (NMAC 20.2.74.304) 91
7.6.4 Increment Analysis 91
7.6.5 Emission Inventories 92
7.6.6 BACT analysis 92

7.7 Step 7: Write Modeling Report 92

7.8 Step 8: Submit Modeling Analysis 94

8.0 List of Abbreviations *95*

9.0 References *96*
Links: 96

10.0 INDEX *97*

Appendix A: Recent changes to the NM Modeling Guidelines *98*

List of Figures

Figure 1: Class I areas....43
Figure 2: Air quality control regions (each AQCR has a different color) 44
Figure 3: Wind roses for NMED pre-processed data....55
Figure 4: One-Way Road Source....80
Figure 5: Two-Way Road Source 80
Figure 6: Example modeling procedure flowchart, AAQS stands for ambient air quality standard. 83

Figure 7: Plot of pollutant concentrations showing the 5 µg/m^3 significance level and the radius of impact (dashed line circle), determined from the greatest lineal extent of the significance level from the source. 84
Figure 8: Setback Distance Calculation 88

List of Tables

Table 1: Very small emission rate modeling waiver requirements 14
Table 2: Areas Where Streamlined Permits Are Restricted 15
Table 3: List of state parks, Class I areas, Class II wilderness areas, Class II national wildlife refuges, national historic parks, and state recreation areas 16
Table 4: Streamlined Permit Applicability Requirements for facilities with less than 200 tons/year PTE 19
Table 5: Carbon Monoxide Air Quality Standards 23
Table 6: Hydrogen Sulfide Air Quality Standards 24
Table 7: Lead Air Quality Standards 24
Table 8: NO_2 Air Quality Standards 25
Table 9: O_3 Air Quality Standards 29
Table 10: O3 MERPS[a] 30
Table 11: O_3 MERPS by Distance[a] 30
Table 15: PM_{10} Air Quality Standards 31
Table 12: PM2.5 Air Quality Standards 32
Table 13: $PM_{2.5}$ MERPS[a] 34
Table 14: $PM_{2.5}$ MERPS by Distance[a] 35
Table 16: SO_2 Air Quality Standards 37
Table 17: Total Reduced Sulfur except for H_2S Air Quality Standards 38
Table 18: Air Quality Standard Summary (Without Notes) 40
Table 19: Standards for which Modeling is not Required 40
Table 20: Modeling the Design Value Summary (Default Modeling) 41
Table 21: PSD Increment Consumption and Expansion 42
Table 22: Minor Source Baseline Dates by Air Quality Control Region 43
Table 23: Major Source Baseline Dates and Trigger Dates 43
Table 24: Stack Height Release Correction Factor (adapted from 20.2.72.502 NMAC) 45
Table 25: A few common state air toxics and modeling thresholds (from 20.2.72.502 NMAC) ..46
Table 26: CTSCREEN Correction factors for 1-hour concentration 48
Table 27: Plume Depletion Parameters for $PM_{2.5}$ 51
Table 28: Plume Depletion Parameters for PM_{10} 51
Table 29: Meteorological Data Year Producing Highest Concentrations 54
Table 30: Carbon Monoxide Background Concentration 57
Table 31: NO_2 Background Concentration 58
Table 32: Ozone Background Concentration 59
Table 34: PM_{10} Background Concentration 60

Table 33: $PM_{2.5}$ Background Concentration 62
Table 35: SO_2 Background Concentrations 63
Table 36: Surrounding Source Retention Example for a Source Near Bloomfield 68
Table 37: Missing Stack Parameter Substitutions for Turbines 69
Table 38: Missing Stack Parameter Substitutions for Flares 69
Table 39: Missing Stack Parameter Substitutions for Particulate Control Devices 71
Table 40: Missing Stack Parameter Substitutions for Other Point Sources 72
Table 41: Example Dimensions of Fugitive Sources 77
Table 42: Example Haul Road Vertical Dimensions 78
Table 43: Example Haul Road Horizontal Dimensions 79
Table 44: List of Abbreviations 95

1.0 INTRODUCTION

1.1 Introductory Comments

Air pollution has been proven to have serious adverse impacts on human health and the environment. In response, governments have developed air quality standards designed to protect health and secondary impacts. The only way to predict compliance with these standards by a facility or modification that does not yet exist is to use models to simulate the impacts of the project. Regulatory models strike a balance between cost-effectiveness and accuracy, though the field of air quality prediction is not necessarily an inexpensive or a highly accurate field. The regulatory model design is an attempt to apply requirements in a standard way such that all sources are treated equally and equitably.

It is the duty of the NMED/Air Quality Bureau (the Bureau) to review modeling protocols and the resulting modeling analyses to ensure that air quality standards are protected and to ensure that regulations are applied consistently. This document is an attempt to document clear and consistent modeling procedures in order to achieve these goals. Occasionally, a situation will arise when it makes sense to deviate from the guidelines because of special site-specific conditions. Suggested deviations from the guidelines should be documented in a modeling protocol and submitted to the Bureau for approval prior to submission of modeling.

In general, the procedures in the latest version of the EPA document, Guideline on Air Quality Models[1] should be followed when conducting the modeling analysis. This EPA document provides complete guidance on appropriate model applications. The purpose of this document is to provide clarification, additional guidance, and to highlight differences between the EPA document and New Mexico State modeling requirements.

Please do not hesitate to call the Bureau modeling staff with any questions you have before you begin the analysis. We are here to help; however, we will not conduct modeling courses. There are many courses offered which teach the principles of dispersion modeling. These courses provide a much better forum for learning about modeling than the Bureau modeling staff can provide.

1.2 The Modeling Review Process

1.2.1 Modeling Protocol Review

A modeling protocol should be submitted and approved before submitting a permit application. The Bureau will make every attempt to approve, conditionally approve, or reject the protocol within two weeks. Details regarding the protocol are described in section 6.0, Modeling Protocols. Protocols

[1] Environmental Protection Agency, 40 CFR Part 51, Revision to the Guideline on Air Quality Models
https://www.epa.gov/sites/production/files/2020-09/documents/appw_17.pdf

will be archived in the modeling archives in the protocol section until they can be stored with the files for the application.

1.2.2 Permit Modeling Evaluation

When a permit application involving air dispersion modeling is received, modeling staff has 30 days to determine whether the modeling analysis is administratively complete. The modeling section staff will make a quick determination to see if the modeling analysis appears complete. This involves checking to see if modeling files are attached and readable and verifying that application forms and modeling report are present. If the analysis is incomplete, the staff will inform the applicant of the deficiencies as quickly as possible. This will halt the permitting process until sufficient information is submitted. Deficiencies not resolved prior to the completeness determination deadline may result in ruling the application incomplete.

After the application has been ruled complete, Bureau staff will perform a complete review of the modeling files. This analysis includes a review to make sure that information in the modeling files are consistent with the information in the permit application and may involve the emission rate of each emission point, the elevation of sources, receptors, and buildings, evaluation and modification of elevation data, property fence line, or other aspects of the modeling inputs. If the dispersion modeling analysis submitted with the permit application adequately demonstrates that ambient air concentrations will be below air quality standards and Prevention of Significant Deterioration (PSD) increments, the Bureau modeler will summarize the findings and provide the information to the permit writer. If dispersion modeling predicts that the construction or modification causes or significantly contributes to an exceedance of a New Mexico or National Ambient Air Quality Standard (NMAAQS or NAAQS) or PSD increment, the permit cannot be issued under the normal permit process. For nonattainment modeling, refer to 20.2.72.216 NMAC, 20.2.79 NMAC, or contact the Bureau for further information.

The application (including modeling) is expected to be complete and in good order at the time it is received. However, the Bureau will accept general modifications or revisions to the modeling before the modeling is reviewed provided that the changes do not conflict with good modeling practices. Once the modeling review begins, only changes to correct problems or deficiencies uncovered during the review of the modeling will normally be accepted, and the Bureau will provide a deadline by which changes need to be submitted to allow for them to be reviewed and for the permit to be issued. No changes to modeling will be allowed after the review has been completed.

2.0 MODELING REQUIREMENTS AND STANDARDS

2.1 Regulatory Requirement for Modeling

The requirements to perform air dispersion modeling are detailed in New Mexico Administrative Code (NMAC) **20.2.70.300.D.10 NMAC** (Operating Permits), **20.2.72.203.A.4 NMAC** (Construction Permits), and **20.2.74.305 NMAC** (Permits - Prevention of Significant Deterioration), and 20.2.79 NMAC (Nonattainment). The language from these sections is listed below for easy reference.

Basically, with a construction permit application, an analysis of air quality standards is required, which normally requires air dispersion modeling. In some cases, previous modeling may satisfy this requirement. In these cases, the applicant may seek a modeling waiver from the Bureau. In any case, it is the responsibility of the applicant to provide the modeling, or the justification for the modeling waiver, or the air quality analysis for nonattainment areas. Title V sources that have not demonstrated compliance with a standard or increment are required to come into compliance with this applicable requirement. This may be accomplished by modeling to show the area is in attainment with this standard or increment. If they are not able to model compliance, then a compliance plan will be needed.

2.1.1 Title V Operating Permits

Federal air quality standards are applicable requirements for sources required to have an operating permit. Modeling is usually not required to issue a Title V operating permit. If a facility is not required to have a construction permit (e.g., some landfills and "Grandfathered" facilities) then it will need to model any new emissions or changes that could increase ambient pollutant concentrations.

Selected Title V regulatory language applying to modeling is copied below for easy reference.

> **20.2.70.7 NMAC DEFINITIONS:** In addition to the terms defined in 20.2.2 NMAC (definitions), as used in this part the following definitions shall apply.
>
> E. "Applicable requirement" means all of the following, as they apply to a Part 70 source or to an emissions unit at a Part 70 source (including requirements that have been promulgated or approved by the board or US EPA through rulemaking at the time of permit issuance but have future-effective compliance dates).
>
> (11) Any national ambient air quality standard.
>
> (12) Any increment or visibility requirement under Part C of Title I of the federal act, but only as it would apply to temporary sources permitted pursuant to Section 504(e) of the federal act.

Note: The PSD increment analysis is required for the development of general permits for temporary Title V sources but is not an applicable requirement for regular Title V permit modeling. PSD increment modeling is required for Title V sources that are satisfying their modeling requirements through 20.2.72 NMAC modeling.

> **20.2.70.201 NMAC REQUIREMENT FOR A PERMIT:**
>
> D, Requirement for permit under 20.2.72 NMAC.
>
> (1) Part 70 sources that have an operating permit and do not have a permit issued under 20.2.72 NMAC or 20.2.74 NMAC shall submit a complete application for a permit under 20.2.72 NMAC within 180 days of September 6, 2006. The department shall consider and may grant reasonable requests for extension of this deadline on a case-by-case basis.
>
> (2) Part 70 sources that do not have an operating permit or a permit under 20.2.72 NMAC upon the effective date of this subsection shall submit an application for a

permit under 20.2.72 NMAC within 60 days after submittal of an application for an operating permit.

(3) Paragraphs 1 and 2 of this subsection shall not apply to sources that have demonstrated compliance with both the national and state ambient air quality standards through dispersion modeling or other method approved by the department and that have requested incorporation of conditions in their operating permit to ensure compliance with these standards.

20.2.70.300.D.10 NMAC

(10) Provide certification of compliance, including all of the following.

(a) A certification, by a responsible official consistent with Subsection E of 20.2.70.300 NMAC, of the source's compliance status for each applicable requirement. For national ambient air quality standards, certifications shall be based on the following.

(i) For first time applications, this certification shall be based on modeling submitted with the application for a permit under 20.2.72 NMAC.

(ii) For permit renewal applications, this certification shall be based on compliance with the relevant terms and conditions of the current operating permit.

2.1.2 New Source Review (NSR) Permitting for Minor Sources

For new permits, a demonstration of compliance with air quality standards, PSD increments, and toxic air pollutants subject to 20.2.72.403.A(2) is required for all pollutants emitted by the facility. For significant revisions, a demonstration of compliance with air quality standards, PSD increments, and toxic air pollutants subject to 20.2.72.403.A(2) is required for all pollutants affected by the modification or permit revision. For technical revisions involving like kind replacement, as specified in 20.2.72.219B(1)(d), a demonstration that the replacement unit has stack parameters which are at least as effective in the dispersion of air pollutants is required (provided previous modeling determined the area to be in compliance with air quality standards). Permits for sources not in attainment with standards should refer to 20.2.72.216 NMAC, NONATTAINMENT AREA REQUIREMENTS.

If previous modeling has demonstrated compliance for each averaging period of each pollutant with a state or federal ambient air quality standard or toxic air pollutant, and that modeling used current modeling practices and is up-to-date for that area, then a modeling waiver may be used as the discussion demonstrating compliance. Otherwise, new modeling is required. For other minor source permitting actions, modeling is not part of the permitting process. Modeling waivers do not apply to nonattainment areas.

Selected NSR regulatory language applying to modeling is copied below for easy reference. Definition of modification:

20.2.72.7 DEFINITIONS: In addition to the terms defined in 20.2.2 NMAC (Definitions) as used in this Part:

P. "Modification" means any physical change in, or change in the method of operation of, a stationary source which results in an increase in the potential emission rate of any regulated air contaminant emitted by the source or which results in the emission of any regulated air contaminant not previously emitted, but does not include:

(1) a change in ownership of the source;

(2) routine maintenance, repair or replacement;

(3) installation of air pollution control equipment, and all related process equipment and materials necessary for its operation, undertaken for the purpose of complying with regulations adopted by the board or pursuant to the Federal Act; or

(4) unless previously limited by enforceable permit conditions:

(a) an increase in the production rate, if such increase does not exceed the operating design capacity of the source;

(b) an increase in the hours of operation; or

(c) use of an alternative fuel or raw material if, prior to January 6, 1975, the source was capable of accommodating such fuel or raw material, or if use of an alternate fuel or raw material is caused by any natural gas curtailment or emergency allocation or any other lack of supply of natural gas.

Requirements for permit:

20.2.72.200 APPLICATION FOR CONSTRUCTION, MODIFICATION, NSPS, AND NESHAP - PERMITS AND REVISIONS:

A. Permits must be obtained from the Department by:

(1) Any person constructing a stationary source which has a potential emission rate greater than 10 pounds per hour or 25 tons per year of any regulated air contaminant for which there is a National or New Mexico Ambient Air Quality Standard. If the specified threshold in this subsection is exceeded for any one regulated air contaminant, all regulated air contaminants with National or New Mexico Ambient Air Quality Standards emitted are subject to permit review. Within this subsection, the potential emission rate for nitrogen dioxide shall be based on total oxides of nitrogen;

(2) Any person modifying a stationary source when all of the pollutant emitting activities at the entire facility, either prior to or following the modification, emit a regulated air contaminant for which there is a National or New Mexico Ambient Air Quality Standard with a potential emission rate greater than 10 pounds per hour or 25 tons per year and the regulated air contaminant is emitted as a result of the modification. If the specified threshold in this subsection is exceeded for any one regulated air contaminant, all regulated air contaminants with National or New Mexico Ambient Air Quality Standards emitted by the modification are subject to permit review. Within this subsection, the potential emission rate for nitrogen dioxide shall be based on total oxides of nitrogen;

Like-kind-replacement required modeling:

20.2.72.219 PERMIT REVISIONS:

B. Technical Permit Revisions:

(1) Technical permit revision procedures may be used only for:

(d) Modifications that replace an emissions unit for which the allowable emissions limits have been established in the permit, provided that the new emissions unit:

(i) Is equivalent to the replaced emissions unit, and serves the same function within the facility and process;

(ii) Has the same or lower capacity and potential emission rates;

(iii) Has the same or higher control efficiency, and stack parameters which are at least as effective in the dispersion of air pollutants;

(vi) Would not, when operated under applicable permit conditions, cause or contribute to a violation of any National or New Mexico Ambient Air Quality Standard; and

Modeling requirements for new permits or significant revisions:

> **20.2.72.203.A.4 NMAC**
> Contain a regulatory compliance discussion demonstrating compliance with each applicable air quality regulation, ambient air quality standard, prevention of significant deterioration increment, and provision of 20.2.72.400 NMAC - 20.2.72.499 NMAC. The discussion must include an analysis, which may require use of US EPA-approved air dispersion model(s), to (1) demonstrate that emissions from routine operations will not violate any New Mexico or National Ambient Air Quality Standard or prevention of significant deterioration increment, and (2) if required by 20.2.72.400 NMAC - 20.2.72.499 NMAC, estimate ambient concentrations of toxic air pollutants.

2.1.3 NSR Permitting for PSD Major Sources

PSD major sources and major modifications have additional modeling requirements beyond those of minor sources. PSD major source modeling authority is contained here:

> **20.2.74.305 NMAC AMBIENT AIR QUALITY MODELING:** All estimates of ambient concentrations required by this Part shall be based on applicable air quality models, data bases, and other requirements as specified in EPA's Guideline on Air Quality Models (EPA-450/2-78-027R, July, 1986), its revisions, or any superseding EPA document, and approved by the Department. Where an air quality impact model specified in the Guideline on Air Quality Models is inappropriate, the model may be modified or another model substituted. Any substitution or modification of a model must be approved by the Department. Notification shall be given by the Department of such a substitution or modification and the opportunity for public comment provided for in fulfilling the public notice requirements in subsection B of 20.2.74.400 NMAC. The Department will seek EPA approval of such substitutions or modifications.

2.2 Air pollutants

Emissions of Sulfur Dioxide (SO_2), Particulate matter with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}), Particulate matter with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$), Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Lead (Pb), Hydrogen sulfide (H_2S), and air toxics as listed in 20.2.72 NMAC are pollutants that may require modeling. Ozone and Volatile Organic Compound (VOC) emissions do not currently require a modeling analysis for a PSD minor source. If NO_X or VOCs are subject to PSD review, you should contact NMED and the EPA Regional Office to determine current ozone modeling requirements.

2.3 Modeling Exemptions and Reductions

2.3.1 Modeling waivers

In some cases, the demonstration that ambient air quality standards and PSD increments will not be violated can be satisfied with a discussion of previous modeling. If emissions have been modeled using current modeling procedures and air quality standards, and this modeling is still valid for the current standards, then the modeling waiver form may be submitted to request approval of a modeling waiver. The Bureau will determine on a case-by-case basis if the modeling waiver can be granted. The waiver discussion and written waiver approval should be included in the modeling section of the application.

The Bureau has performed generic modeling to demonstrate that the following small sources do not need modeling. The application must include a modeling waiver form to document the basis of the waiver. Permitting staff must approve the total emission rates during the permitting process for any waiver to be valid.

Table 1: Very small emission rate modeling waiver requirements

Pollutant	If all emissions come from stacks 20 meters or greater in height and there are no horizontal stacks or raincaps (lb/hr)	If not all emissions come from stacks 20 meters or greater in height, or there are horizontal stacks, raincaps, volume, or area sources (lb/hr)
CO	16.037	2.580
H_2S (Pecos-Permian Basin)	0.114	0.015
H_2S (Not in Pecos-Permian Basin)	0.022	0.0030
Lead	0.0050	0.0010
NO_2	0.189	0.024
PM2.5 – Point Sources	0.056	0.0090
PM2.5 – Volume Sources		0.0030
PM10 – Point Sources	0.255	0.039
PM10 – Volume Sources		0.015
SO_2	0.179	0.023
Reduced sulfur (Pecos-Permian Basin)	0.033	Waiver not available.
Reduced sulfur (Not in Pecos-Permian Basin)	Waiver not available.	Waiver not available.

2.3.2 General Construction Permits (GCPs)

General Construction Permits do not require modeling. General modeling was performed in the development of these permits.

2.3.3 Streamlined Compressor Station Modeling Requirements

Compressor stations may be eligible for streamlined permits under the authority of **20.2.72.300-399 NMAC**. Streamlined permits have reduced modeling analysis requirements.

2.3.3.1 Streamlined Compressor Station Location Requirements

Restrictions preventing use of streamlined permits in certain locations are listed in **20.2.72.301 NMAC**. Those restrictions dealing with location are described below.

According to **20.2.72.301.B.4 NMAC**, the facility cannot co-locate with petroleum refineries, chemical manufacturing plants, bulk gasoline terminals, natural gas processing plants, or at any facility containing sources in addition to IC engines and/or turbines for which an air quality permit is required through state or federal air quality regulations.

20.2.72.301.B.5 NMAC restricts the location of streamlined permit in areas predicted by air quality monitoring or modeling to have more than 80% of state or federal ambient air quality standards or PSD increments consumed. Table 2, below, is a list of these areas. This restriction means that any streamlined permit applicant wishing to locate in a nonattainment area or those areas listed in Table 2 must demonstrate, using air dispersion modeling, that the entire facility will not produce any concentrations above significance levels.

Table 2: Areas Where Streamlined Permits Are Restricted

County	Latitude	Longitude	Radius (m)
San Juan	36.73120	-107.9608189	3000
San Juan	36.48296	-108.1200487	1000

Locations within 150 meters of a facility that emits 25 tons per year of NO_X are restricted areas for streamlined compressor station permits unless modeling is performed.

20.2.72.301.B.6 NMAC prohibits the location of streamline permit from use in areas if the nearest property boundary will be located less than:
(a) 1 kilometer (km) from a school, residence, office building, or occupied structure. Buildings and structures within the immediate industrial complex of the source are not included.
(b) 3 km from the property boundary of any state park, Class II wilderness area, Class II national wildlife refuge, national historic park, state recreation area, or community with a population of more than twenty thousand people.

Table 3: List of state parks, Class I areas, Class II wilderness areas, Class II national wildlife refuges, national historic parks, and state recreation areas

County	Name	Type	Min. Distance (km)
Bernalillo	Sandia Mountain Wilderness	State Wilderness	3
Catron	Gila Wilderness	Class I Area	30
Catron	Gila Cliff Dwelling	National Monuments	3
Catron	Datil Well	Recreation Sites	3
Chaves	Bottomless Lake	Class II State Parks	3
Chaves	Salt Creek Wilderness Area	Class I Area	30
Chaves	Bitter Lake National W.R.	Class II Wildlife Refuge	3
Cibola	Bluewater Lake	Class II State Parks	3
Cibola	El Malpais	National Monuments	3
Cibola	El Morro	National Monuments	3
Colfax	Cimarron Canyon	Class II State Parks	3
Colfax	Maxwell National W.R.	Class II Wildlife Refuge	3
Colfax	Capulin	National Monuments	3
DeBaca	Sumner Lake	Class II State Parks	3
DeBaca	Ft. Sumner	State Monuments	3
Dona Ana	Leesburg Dam	Class II State Parks	3
Dona Ana	Aguirre Springs	Recreation Sites	3
Dona Ana	Ft. Seldon	State Monuments	3
Eddy	Carlsbad Caverns National Park	Class I Area	30
Eddy	Living Desert	Class II State Parks	3
Grant	Gila Wilderness	Class I Area	30
Grant	City of Rocks	Class II State Parks	3
Guadalupe	Santa Rosa Lake	Class II State Parks	3
Harding	Chicosa Lakes	Class II State Parks	3
Harding	Kiowa National Grasslands	National Grasslands	3
Lea	Harry McAdams	Class II State Parks	3
Lincoln	White Mountain Wilderness	Class I Area	30
Lincoln	Valley of Fires	Class II State Parks	3
Lincoln	Lincoln	State Monuments	3
Luna	Pancho Villa	Class II State Parks	3
Luna	Rock Hound	Class II State Parks	3
McKinley	Red Rock	Class II State Parks	3
Mora	Coyote Creek	Class II State Parks	3
Mora	Ft. Union	National Monuments	3
Otero	Oliver Lee	Class II State Parks	3
Otero	White Sands	National Monuments	3
Otero	Three Rivers Petro	Recreation Sites	3
Quay	Ute Lake	Class II State Parks	3
Rio Arriba	San Pedro Parks Wilderness	Class I Area	30

County	Name	Type	Min. Distance (km)
Rio Arriba	El Vado Lake	Class II State Parks	3
Rio Arriba	Heron Lake	Class II State Parks	3
Rio Arriba	Navajo Lake (Sims)	Class II State Parks	3
Rio Arriba	Chama River Canyon Wilderness	State Wilderness	3
Roosevelt	Oasis	Class II State Parks	3
Roosevelt	Grulla National W. R.	Class II Wildlife Refuge	3
San Juan	Navajo (Pine)	Class II State Parks	3
San Juan	Chaco Canyon	National Historic Park	3
San Juan	Aztec Ruins	National Monuments	3
San Juan	Angel Peak (National)	Recreation Area	3
San Miguel	Conchas Lake	Class II State Parks	3
San Miguel	Storey Lake	Class II State Parks	3
San Miguel	Villanueva	Class II State Parks	3
San Miguel	Las Vegas National W. R.	Class II Wildlife Refuge	3
San Miguel	Pecos	National Monuments	3
Sandoval	Bandelier Wilderness	Class I Area	30
Sandoval	Coronado	Class II State Parks	3
Sandoval	Rio Grande Gorge/Fenton Lake	Class II State Parks	3
Sandoval	Bandelier	National Monuments	3
Sandoval	Sandia Crest (State)	Recreation Area	3
Sandoval	Coronado	State Monuments	3
Sandoval	Jemez	State Monuments	3
Sandoval	Sandia Mountain Wilderness	State Wilderness	3
Santa Fe	Hyde Memorial	Class II State Parks	3
Sierra	Caballo Lake	Class II State Parks	3
Sierra	Elephant Butte Lake	Class II State Parks	3
Sierra	Percha Dam	Class II State Parks	3
Socorro	Bosque del Apache Wilderness	Class I Area	30
Socorro	Sevillita National W.R.	Class II Wildlife Refuge	3
Taos	Pecos Wilderness	Class I Area	30
Taos	Wheeler Park Wilderness	Class I Area	30
Taos	Kit Carson	Class II State Parks	3
Taos	Rio Grande Gorge	Recreation Sites	3
Taos	Latir Peak Wilderness	State Wilderness	3
Torrance	Manzano Mountain	Class II State Parks	3
Torrance	Grand Guivira	National Monuments	3
Torrance	Quarai at Salinas	National Monuments	3
Torrance	Abo at Salinas	State Monuments	3
Torrance	Manzano Mountain Wilderness	State Wilderness	3
Union	Clayton Lake	Class II State Parks	3
Valencia	Sen. Willie Chavez	Class II State Parks	3

County	Name	Type	Min. Distance (km)
Valencia	Manzano Mountain Wilderness	State Wilderness	3

(c) 10 km from the boundary of any community with a population of more than forty-thousand people, or
(d) 30 km from the boundary of any Class I area;

20.2.72.301.B.7 NMAC prohibits the location of streamline permit in Bernalillo County or within 15 km of the Bernalillo County line.

2.3.3.2 Streamlined Compressor Station Modeling and Public Notice Requirements

Modeling and public notice requirements for streamlined compressor station permits depend on the amount of emissions from the facility. Refer to the table below, using the maximum of the Potential to Emit (PTE) of each regulated contaminant from all sources at the facility to determine applicability. The potential to emit for nitrogen dioxide shall be based on total oxides of nitrogen. The effects of building downwash shall be included in modeling if there are buildings at the site.

Table 4: Streamlined Permit Applicability Requirements for facilities with less than 200 tons/year PTE

Applicable Regulation	PTE (TPY)	Modeling Requirements (from 20.2.72.301 D NMAC)
20.2.72.301 D (1)	<40	• None
20.2.72.301 D (2)	<100	• The impact on ambient air from all sources at the facility shall be less than the ambient significance levels.
20.2.72.301 D (3)	<200	• Air quality impacts must be less than 50% of all applicable NAAQS, NMAAQS and PSD increments. • There shall be no adjacent sources emitting the same air contaminant(s) as the source within 2.5 km of the modeled NO_2 impact area. • The sum of all potential emissions for NO_X from all adjacent sources within 15 km of the NO_X ROI must be less than 740 tons/year. • The sum of all potential emissions for NO_X from all adjacent sources within 25 km of the NO_X ROI must be less than 1540 tons/year.

There are other criteria that must be met for streamlined permits for compressor stations. Please refer to **20.2.72.300-399 NMAC** for more information.

2.3.4 Minor NSR Exempt Equipment

Exempt equipment under 20.7.72.202 NMAC do not need to be included in modeling for 20.2.72 NMAC permits. The exemption does not exclude them from modeling requirements under other types of permits, such as 20.2.70 NMAC or 20.2.74 NMAC.

2.4 Levels of Protection

2.4.1 Air Quality Standards

Air quality standards are maximum allowable concentrations that are designed to protect public health and welfare from harm from airborne pollutants. The Environmental Protection Agency (EPA) develops National Ambient Air Quality Standards[2] (NAAQS) to keep the air quality throughout the country safe for the most sensitive individuals and periodically reviews the scientific basis of these standards to make sure they reflect the latest scientific evidence. New Mexico Ambient Air Quality Standards[3] (NMAAQS) are based on EPA's originally proposed NAAQS values. Unless otherwise noted, standards are not to be exceeded.

2.4.2 Prevention of Significant Deterioration (PSD) Increments

To prevent relatively clean areas from degrading to levels just barely in compliance with the air quality standards, limits on the change have been established in the form of PSD increments. The PSD increment program establishes a Baseline Date after which changes in concentrations are evaluated. The total increase in concentration allowed at a location after the Baseline Date is the PSD increment. Compliance demonstrations for PSD increments demonstrate that the deterioration is less than the allowable increment.

2.4.3 Significance Levels

Modeling Significant Impact Levels (SILs) are significant ambient concentrations that are thresholds below which the source is not considered to contribute to any predicted exceedance of air quality standards or PSD increments. The definition of 'source' can apply to the whole facility or to the modifications at the facility. For a new facility or an unpermitted facility, NMED considers the entire facility to be the 'source'. For other cases, 'source' includes only the new equipment or new emissions increases described in the current application. Equipment that replaces other equipment is part of the new equipment. If the concentration (in ambient air) that is produced by a source is below the SIL at a location where total predicted concentrations are above air quality standards or allowable PSD increments, then addressing the small fraction produced by the source would not be an effective way to address the air quality standard or increment violation because that fraction of the total concentration is insignificant. The state can develop a State Implementation Plan (SIP) to pursue an effective way to address the high concentrations instead of preventing the issuance of a permit that has no significant influence over the total air concentrations.

Example of source to model for permitting:
The entire facility was modeled for annual NO_2 and 1-hour and 8-hour CO in 1999 but was never modeled for 1-hour NO_2. The facility applies to replace a widget. If this widget emits only NO_2

[2] EPA NAAQS table is at https://www.epa.gov/criteria-air-pollutants/naaqs-table.
[3] NMAAQS are defined in 20.2.3 NMAC (https://www.srca.nm.gov/parts/title20/20.002.0003.html)

and CO, then modeling review is applicable for these pollutants. For CO and for NO_2, the applicant may model only the replacement widget. If the impacts from the widget alone are below significance levels, then modeling is done for that pollutant/averaging period. If the impacts from the widget alone are above significance levels, then the entire facility plus nearby sources must be modeled for comparison with air quality standards and PSD increments.

Significance levels are listed in **20.2.72.500 NMAC** and are repeated in the sections below. Always use the maximum predicted concentration from the source for radius of impact/significance level determination. Even if the form of the standard allows it to be exceeded several times per period, that fraction is based on cumulative concentration and cannot be related to partial concentrations. If multiple years of meteorological data are used, then the average of those concentrations is compared with the significance level.

Use of the $PM_{2.5}$ significant monitoring concentration for PSD major modifications or for new PSD major sources is not allowed.

2.5 Concentration Conversions

Many of the air quality standards are written in the form of parts per million (ppm) or parts per billion (ppb), but the models generally give output in units of micrograms per cubic meter ($\mu g/m^3$). EPA has verbally communicated to NMED that AERMOD output is expressed at Standard Temperature and Pressure (STP) conditions. Therefore, most air quality standards can be compared to modeled concentration without corrections for elevation (and associated low pressure). If a need for elevation correction arises, a method to adjust for elevation is listed below.

2.5.1 Gaseous Conversion Factor for Elevation and Temperature Correction

The following equation calculates the conversion from $\mu g/m^3$ to ppm, with corrections for temperature and pressure (elevation):

$$ppm = 4.553 \times 10^{-5} \times \frac{C \times T}{M_w} \times 10^{Z \times 1.598 \times 10^{-5}}$$

or, rearranged to calculate $\mu g/m^3$:

$$C = ppm \times M_W / (T \times (4.553\ E\text{-}5) \times (10^{Z \times 1.598\ E\text{-}5}))$$

where:

C = component concentration in $\mu g/m^3$.
T = average summer morning temperature in Rankin at site (typically 530 R).
M_w = molecular weight of component.
Z = site elevation, in feet.

2.5.2 Gaseous Conversion Factor at Standard Temperature and Pressure (STP) Conditions

Federal standards are expressed as mass per unit volume or ppm or ppb under standard temperature and pressure.

> "40 CFR 50.3 Reference conditions.
> All measurements of air quality that are expressed as mass per unit volume (e.g., micrograms per cubic meter) other than for particulate matter (PM2.5) standards contained in §§ 50.7 and 50.13 and lead standards contained in § 50.16 shall be corrected to a reference temperature of 25 (deg) C and a reference pressure of 760 millimeters of mercury (1,013.2 millibars)."

If a monitored or modeled concentration has been adjusted to STP, then the following equation calculates the conversion from ppm to µg/m^3 for NAAQS:

$$C = ppm \times M_w \times 40.8727$$

or, rearranged to calculate ppm:

$$ppm = C / (M_w \times 40.8727)$$

where:

C = component concentration in µg/m^3.
M_w = molecular weight of component.

$$p = p_0 \cdot \left(1 - \frac{L \cdot h}{T_0}\right)^{\frac{g \cdot M}{R \cdot L}} \approx p_0 \cdot \exp\left(-\frac{g \cdot M \cdot h}{R \cdot T_0}\right),$$

Parameter	Description	Value
p_0	sea level standard atmospheric pressure	101325 Pa
L	temperature lapse rate	0.0065 K/m
T_0	sea level standard temperature	288.15 K
g	Earth-surface gravitational acceleration	9.80665 m/s^2
M	molar mass of dry air	0.0289644 kg/mol
R	universal gas constant	8.31447 J/(mol•K)

$[PM10]_{STP} = [PM10]_{modeled}$ $(P_{standard})(T_{measured})/((P_{calculated\ by\ elevation})(T_{standard}))$

2.6 Modeling the Standards and Increments

The general purpose of modeling is to compare the cumulative impacts of all sources impacting an area with the air quality standards or PSD increments that apply to that pollutant. This section describes the surrounding sources and background concentrations needed to produce an appropriate estimate of the total concentration. Sometimes background monitoring concentrations conservatively represent the surrounding sources and sometimes the surrounding sources will need to be explicitly modeled. The specific cases for each pollutant are described below.

One or more years of meteorological data are required for the analysis. See Section 4.3 for information about selecting meteorological data. For most air quality standards and PSD increments, when multiple years of meteorological are used, the concentrations predicted for each averaging period for each year are averaged together before comparing with the air quality standard or PSD increment. For Lead (Pb), the maximum monthly rolling 3-month average from the combined data is compared with the NAAQS. Background concentrations are averaged over three years unless otherwise specified.

2.6.1 Carbon Monoxide (CO) Standards

Table 5: Carbon Monoxide Air Quality Standards

Averaging Period	Significance Level[b] (µg/m^3)	NAAQS[c] (ppm)	NAAQS (µg/m^3)	NMAAQS[a] (ppm)	NMAAQS (µg/m^3)
8-hour	500	9	10,303.6	8.7	9,960.1
1-hour	2,000	35	40,069.6	13.1	14,997.5

[a] 20.2.3.111 NMAC (https://www.srca.nm.gov/parts/title20/20.002.0003.html)
[b] 20.2.72.500 NMAC (https://www.srca.nm.gov/parts/title20/20.002.0072.html)
[c] EPA NAAQS Table (https://www.epa.gov/criteria-air-pollutants/naaqs-table)

2.6.1.1 Design value of CO standard.

CO NAAQS are not to be exceeded more than once per year. NMAAQS are not to be exceeded. Demonstration of compliance with CO NMAAQS automatically demonstrates compliance with NAAQS.

2.6.1.2 Modeling for the CO design value.

Tier 1, 1-hour NMAAQS: Model the entire facility to determine the high 1-hour concentration. Add the high 1-hour background concentration to the high 1-hour predicted concentration to determine the total design concentration for comparison to the 1-hour NMAAQS. Sources less than 20 km from the center of Albuquerque or El Paso shall also explicitly model surrounding sources within 10 km of the facility.

Tier 1, 8-hour NMAAQS: Model the entire facility to determine the high 8-hour concentration. Add the high 8-hour background concentration to the high 8-hour predicted concentration to determine the total design concentration for comparison to the 8-hour NMAAQS. Sources less

than 20 km from the center of Albuquerque or El Paso shall also explicitly model surrounding sources within 10 km of the facility.

Optionally, all nearby sources may be modeled instead of adding a background concentration, if the facility is over 20 km from the center of Albuquerque and El Paso.

Tier 2: Hourly background concentrations may be added instead of the maximum concentrations for each averaging period.

2.6.2 Hydrogen sulfide (H_2S) Standards

Table 6: Hydrogen Sulfide Air Quality Standards

Averaging Period	Significance[b] Level ($\mu g/m^3$)	NMAAQS[a] (ppm)	NMAAQS ($\mu g/m^3$)	Notes
1-hour	1.0	0.010	13.9	For the state, except for the Pecos-Permian Basin Intrastate AQCR. Not to be exceeded more than once per year.
1/2-hour	5.0	0.10	139.3	For the Pecos-Permian Basin Intrastate AQCR
1/2-hour	5.0	0.030	41.8	for within 5-miles of the corporate limits of municipalities within the Pecos-Permian Basin AQCR

[a] 20.2.3.110 NMAC (https://www.srca.nm.gov/parts/title20/20.002.0003.html)
[b] 20.2.72.500 NMAC (https://www.srca.nm.gov/parts/title20/20.002.0072.html)

Design value of standard: For modeling ½-hour H_2S NMAAQS, use the 1-hour averaging time because the models cannot resolve less than one-hour increments.

Model the entire facility and any nearby sources and compare the high 1-hour concentration to the standard for that region. No background concentration is added.

2.6.3 Lead (Pb) Standards

Table 7: Lead Air Quality Standards

Averaging Period	Significance Level ($\mu g/m^3$)	NAAQS[a] ($\mu g/m^3$)
Quarterly	0.03	0.15

[a] 73 FR 66964 Nov 12, 2008 (https://www.govinfo.gov/content/pkg/FR-2008-11-12/pdf/E8-25654.pdf)

Design value of standard: For modeling quarterly lead averages, use the monthly averaging period as a conservative approach, unless the model being used has a quarterly averaging period or post-processing is desired to calculate quarterly values. Model the entire facility without

surrounding sources and compare the high month concentration to the standard. No background concentration is added.

2.6.4 Nitrogen Dioxide (NO_2) Standards

Table 8: NO_2 Air Quality Standards

Averaging Period	Significance Level ($\mu g/m^3$)	NAAQS[e] (ppb)	NAAQS ($\mu g/m^3$)	NMAAQS[c] (ppb)	NMAAQS ($\mu g/m^3$)	Class II PSD Increment[f] ($\mu g/m^3$)	Class I PSD Significance Level ($\mu g/m^3$)	Class I PSD Increment ($\mu g/m^3$)
annual	1.0[d]	53	99.66	50	94.02	25	0.1[b]	2.5
24-hour	5.0[d]			100	188.03			
1-hour	7.52[a]	100	188.03					

[a] EPA recommended interim significance level of 4 ppb[4] corrected to a reference temperature of 25°C and a reference pressure of 760 millimeters of mercury.
[b] Class I Area Significant Impact Levels, John Calcagni, EPA, September 10, 1991 (https://www.epa.gov/sites/default/files/2015-07/documents/levels.pdf).
[c] 20.2.3.111 NMAC (https://www.srca.nm.gov/parts/title20/20.002.0003.html)
[d] 20.2.72.500 NMAC (https://www.srca.nm.gov/parts/title20/20.002.0072.html)
[e] EPA NAAQS Table (https://www.epa.gov/criteria-air-pollutants/naaqs-table)
[f] 40 CFR 52.21(c) (https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-52/subpart-A/section-52.21)

2.6.4.1 Design value of NO_2 standard

Demonstration of compliance with 1-hour standard is automatically a demonstration of compliance with the 24-hour NMAAQS. Otherwise, the 24-hour NO_2 standard is compared with the highest 24-hour average calculated by the model.

The annual NMAAQS design value is determined by modeling the entire facility and adding the annual background concentration. The total is compared to the standard. Sources less than 20 km from the center of Albuquerque or El Paso shall also explicitly model sources within 10 km of the facility. Optionally, to determine the total design value, the facility and all nearby sources may be modeled instead of adding a background concentration if the facility is over 20 km from the center of Albuquerque and El Paso.

The annual NO_2 PSD increment is compared with the annual average calculated by the model.

[4] Guidance Concerning the Implementation of the 1-hour NO_2 NAAQS for the Prevention of Significant Deterioration Program, Stephen D. Page, EPA, June 29, 2010 (https://www.epa.gov/sites/default/files/2015-07/documents/appwno2.pdf).
See also: Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard, Tyler Fox, EPA, March 1, 2011 (https://www.epa.gov/sites/default/files/2015-07/documents/appwno2_2.pdf).

The 1-hour NO_2 standard is compared with the 3-year average of the 98th-percentile of the annual distribution of daily maximum 1-hour concentrations. If one year of on-site meteorological data is used, the 98th-percentile value associated with the 1-year period of meteorological data modeled is the design value. Each day of modeling, the maximum 1-hour concentration is determined for each receptor. The high-eighth-high value at each receptor is calculated, and the maximum of these is compared with the standard. If multiple years are modeled, the maximum value is averaged over the span of years before comparing with standards. Sources less than 20 km from the center of Albuquerque or El Paso shall also explicitly model sources within 10 km of the facility.

2.6.4.2 NO_2 Reactivity

Combustion processes emit nitrogen oxides in the forms of nitrogen oxide (NO) and nitrogen dioxide (NO_2). Only the concentration of NO_2 is regulated by air quality standards; however, emissions of nitrogen oxides (NO_X = NO + NO_2) must be modeled to estimate total NO_2 concentrations because nitrogen oxides change form in the atmosphere.

Two key reactions are most important in determining the equilibrium (or quasi-equilibrium) ratio of NO_2 to NO.

$NO + O_3$ à $NO_2 + O_2$

NO_2 + hn (energy) à NO + O

Many other reactions participate in the determination of the atmospheric concentration of NO_2. As the plume travels away from the stack, more and more ozone diffuses into the plume, enabling the relatively quick reaction to form NO_2.

2.6.4.3 Estimating NO_2 concentrations

The Bureau has approved techniques, described below, for estimating NO_2 concentrations from NO_X point sources. Note that NO_2 emissions reported by the emissions inventory are actually NO_X emissions.

Tier 1, Total Conversion Technique: 100% conversion

This technique assumes all the NO_X is converted to NO_2. This simple technique is suitable for small facilities where compliance with standards is not a problem.

Tier 2, Ambient Ratio Method 2 (ARM2) Technique

ARM2 method is included as an option in AERMOD. This method is approved without the need for EPA approval. 0.5 is the national default for minimum ambient NO_2/NO_X ratio for out of stack emissions. A minimum ambient ratio as low as 0.2 may be used by providing evidence that the in-stack ratio of the modeled emission units is equal to or lower than the minimum ambient ratio used. The default maximum ratio is 0.9. EPA maintains a database of in-stack NO_2/NO_X ratios that may provide additional information in cases where default values used in ARM2 or the methods listed below are not appropriate: https://www.epa.gov/scram/nitrogen-dioxidenitrogen-oxide-stack-ratio-isr-database.

Tier 3, Ozone Reaction Techniques

Two methods account for the ozone that mixes into the plumes and encourages NO_2 formation: Ozone Limiting Method (OLM) and Plume Volume Molar Ratio Method (PVMRM). Both these techniques are accepted and are built into AERMOD.

OLM assumes an NO_2 plume and an NO plume are each dispersing. The in-stack ratio of NO_2/NO_X is used to determine the amount of nitrogen dioxide initially in each plume. The concentration of NO at each receptor is assumed to react stoichiometrically with the background ozone concentration at that time to form NO_2. Contributions from both plumes are added to get the NO_2 concentration at that time.

PVMRM works similarly to OLM but uses the total volume of the plume by the time it reaches the receptor to calculate how much ozone is available for reaction. Both methods result in greater conversion with greater distance from the source but use different approximations for determining how much ozone has dispersed into the plume.

Both methods require additional information.

For the equilibrium NO_2/NO_X ratio, the value of 0.9 is approved.

For the in-stack NO_2/NO_X ratio, values lower than 0.5 must be justified with data. Combustion involving excess oxygen results in higher in-stack NO_2/NO_X ratios than do stoichiometric reactions. The facility may use an in-stack ratio of 0.5 without justification. Surrounding sources, if required, may be modeled with an in-stack ratio of 0.3 without justification.

Recent ozone data representative of the area should be used. See the section on background concentrations for more information.

Special techniques are required to model PSD increment with OLM or PVMRM if increment-expanding sources are being modeled. No negative emission rates can be used. See *User's Guide for the AMS/EPA Regulatory Model (AERMOD) (EPA-454/B-21-001, April 2021)*, Pg. 3-131, for more details on the PSDCREDIT option**.**
(https://gaftp.epa.gov/Air/aqmg/SCRAM/models/preferred/aermod/aermod_userguide.pdf**)**

Combined-Plume Option vs. Individual-Plume Option

AERMOD provides two options for calculating ozone-limited NO_2 concentrations, the "plume-by-plume" (INDVDL) calculation, and the combined plume (SRCGRP) calculation. The Bureau has accepted a general demonstration that if two plumes are impacting the same receptor at the same time, then the two plumes have merged. If the plumes do not impact the same receptor at the same time, then the plumes have not merged, but both options will calculate the same concentration for that hour. Therefore, the Bureau will accept either INDVL or SRCGP option without additional demonstrations.

2.6.4.4 Modeling for the 1-hour NO_2 design value

Model the entire facility and add the 98th percentile 1-hour background concentration to compare to the design value. Optionally, all nearby sources may be modeled instead of adding a background concentration if the facility is over 20 km from the center of Albuquerque and El

Paso, Texas. Refined hourly background concentrations may be used instead of the maximum 1-hour concentration as described in the section on background concentrations.

Before attempting to calculate the design value, first locate the areas with highest overall concentrations. Place a few receptors in these areas and re-run the model in these areas. The maximums will occur in nearly the same places.

Maximum modeled concentration may also be used as a conservative approximation of the design value.

"The highest of the average 8th-highest (98th-percentile) concentrations across all receptors, based on the length of the meteorological data period, represents the modeled 1-hour NO_2 design value based on the form of the standard."

2.6.4.5 Modeling for the annual NO_2 NMAAQS design value

Model the entire facility and add the annual background concentration to compare to the design value. Optionally, all nearby sources may be modeled instead of adding a background concentration if the facility is over 20 km from the center of Albuquerque and El Paso, Texas. (Use of hourly background concentrations does not affect the result for an annual average).

2.6.4.6 Modeling for the annual NO_2 PSD increment design value

Model all increment-consuming parts of the facility and increment-consuming nearby sources of the facility (or nearby sources of the Class I area for Class I analysis). Compare the result to the design value. All sources (not just increment affecting sources) will need to be modeled in order to take credit for increment expanding sources using OLM or PVMRM. See the AERMOD User's Guide Addendum for more details. Optionally, a monitored background value may be substituted for the modeled surrounding sources as a conservative approach to the increment consumption.

2.6.5 Ozone (O_3) Standards

2.6.5.1 Design value of ozone standard

Ozone is normally only modeled for regional compliance demonstrations and does not need to be modeled for most air quality permits. NMED performs ozone modeling on a regional scale as need arises, rather than requiring permit applicants to quantify their contribution to a regional ozone concentration. Comprehensive ozone modeling is too resource intensive to attach this expense to a typical permit application, and screening modeling on an affordable scale currently cannot quantify a source's impacts to ambient ozone concentrations.

Regional ozone modeling for the Four Corners area was done in 2009.

Regional ozone modeling for the Doña Ana County area was done in 2016 (see https://www.wrapair2.org/SNMOS.aspx).

Regional ozone modeling was conducted for the state Ozone Attainment Initiative in 2021 (see https://www.env.nm.gov/air-quality/o3-initiative/ and https://www.wrapair2.org/NMOAI.aspx).

Table 9: O_3 Air Quality Standards

Averaging Period	Significance Level ($\mu g/m^3$)	NAAQS (ppm)	NAAQS ($\mu g/m^3$)
8-hour	1.96 [b]	0.07[a]	137.3

[a] To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.07 ppm.
[b] 1.0 ppb converted to $\mu g/m^3$. This SIL is based on "Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program," EPA, April 17, 2018.

Permit applicants for PSD level sources that emit NO_X or VOCs should contact NMED. In most cases permit applicants required to demonstrate compliance with ozone standards may utilize Modeled Emission Rates for Precursors (MERPs) following EPA guidance[5]. EPA also has a tool that allows more region-specific evaluation and analysis based on the location of the facility and the distance the facility is from receptors of interest: https://www.epa.gov/scram/merps-view-qlik.

When necessary, O_3 secondary formation concentrations may be estimated using the following method derived from the MERP guidance. These MERP factors are location-specific and conservative. Other MERP values may be used in consultation with modeling staff and inclusion in a modeling protocol.

Below is the guiding equation to estimate 8-hour O_3 secondary formation concentration suggested by the Bureau. Choose the appropriate MERP value from Table 10 or Table 11 based on the AQCR in which the facility is located or the distance from the facility to receptors of interest.

$$[O_3]_{8-hour} = \left(\frac{NO_X \ emission \ rate(\frac{ton}{yr})}{MERP_{NOX}} + \frac{VOC \ emission \ rate(\frac{ton}{yr})}{MERP_{VOC}} \right) \times 1.96 \ \mu g/m^3$$

[5] Guidance on the Development of Modeled Emission Rates for Precursors (MERPS) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program, Richard A. Wayland, EPA, April 30, 2019. (https://www.epa.gov/sites/default/files/2019-05/documents/merps2019.pdf)

Table 10: O3 MERPS[a]

AQCR	$MERP_{NOX}$	$MERP_{VOC}$
014	571	4679
155	340	9578
The rest of New Mexico	414	7331

[a] MERP values were determined using the most conservative value for each category from hypothetical single source modeling reported on the EPA website https://www.epa.gov/scram/merps-view-qlik. AQCR 014 values were from La Plata Co, Colorado. AQCR 155 were from Terry, Texas or Roosevelt County, NM. Values for other AQCRs were the worst case from McKinley County or Otero County.

In cases where the facility is over 20 km from the area to be analyzed (such as a Class I area), refined MERPS by distance may be used in the equation. These are listed in Table 11, below.

Table 11: O_3 MERPS by Distance[a]

Distance (km)	$MERP_{NOX}$	$MERP_{VOC}$
20	340	5907
40	590	7685
60	758	8982
80	910	8982
100	1421	13858
120	1821	19852
140	1877	23521
160	1973	23521
180	2108	26018
200	2372	29505
220	2637	42771
240	2807	44854
260	3116	52623
280	3794	53031
300	4269	54946

[a] MERP values were determined using the most conservative value for each category from hypothetical single source modeling reported on the EPA website https://www.epa.gov/scram/merps-view-qlik. Values were from La Plata Co, Colorado, Terry, Texas, McKinley County, NM, Otero County, NM, or Roosevelt County, NM.

2.6.5.2 Ozone compliance demonstration for PSD minor sources

Any source that emits over 250 tons/year of NOX or VOCs is classified as a major source in the PSD program. (Some categories have lower thresholds than this, but all above 250 are PSD

major.) The MERP values presented in Table 10 and Table 11 that produce the highest concentrations indicate that facilities emitting no more than 250 tons/year of NO_X and no more than 250 tons/year of VOCs will cause less formation of O_3 than the O_3 significance level. The calculation follows.

$$[O_3]_{8-hour} = \left(\frac{250\,\frac{ton}{yr}}{340_{MERP_{NOX}}} + \frac{250\,\frac{ton}{yr}}{4679_{MERP_{VOC}}} \right) \times 1.96\ \mu g/m^3$$

$=1.546\ \mu g/m^3$, which is below the significance level of $1.96\ \mu g/m^3$.

This calculation demonstrates that any source that may be categorized as minor with respect to PSD will produce concentrations below the ozone SIL documented above. (Some PSD major sources may also be below SILs.) Sources that produce concentrations below SILs do not cause or contribute to air contaminant levels in excess of any air quality standards or PSD increments.

2.6.6 Particulate matter less than 10 micrometers in aerodynamic diameter (PM_{10}) Standards

Table 12: PM_{10} Air Quality Standards

Averaging Period	Significance Level ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	PSD Increment [b] Class II ($\mu g/m^3$)	PSD Class I Significance Level ($\mu g/m^3$)	PSD Class I Increment[b] ($\mu g/m^3$)
annual	1.0	9.0	17	0.2[a]	4
24-hour	5.0	150	30	0.3[a]	8

[a] EPA proposed significance level[6]

[b] For any period other than an annual period, the applicable maximum allowable increase may be exceeded during one such period per year at any one location. PSD increments are listed in 40 CFR 52.21(c) (https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-52/subpart-A/section-52.21).

2.6.6.1 Modeling for the 24-hour PM_{10} NAAQS design value

If PM2.5 emission rates are modeled as equal to PM10 emission rates, then the PM2.5 NAAQS demonstration will satisfy the requirement for demonstration of compliance with PM10 NAAQS. However, PM10 PSD increment demonstration is not necessarily satisfied by any PM2.5 modeling.

The 24-hour NAAQS is not to be exceeded more than once per year.
Use high second high and a single year of representative meteorological data. This is approximately equivalent to the high fourth high specified in the multi-year analysis.

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[6] EPA proposed significance levels are lower than the particulate matter significance levels contained in *Class I Area Significant Impact Levels*, John Calcagni, EPA, September 10, 1991 (https://www.epa.gov/sites/default/files/2015-07/documents/levels.pdf).

"…[W]hen n years are modeled, the $(n+1)^{th}$ highest concentration over the n-year period is the design value, since this represents an average or expected exceedance rate of one per year." (https://www.epa.gov/sites/production/files/2020-09/documents/appw_05.pdf)
Alternatively, use the high second high averaged across the multiple years.

Two tiers of modeling are available for PM_{10} NAAQS modeling. Both tiers include modeling the facility and nearby sources and adding a background concentration to that. Particulate sources typically have impacts in the immediate vicinity of the source that are not represented in background monitors, so double-counting of background concentrations is expected to be limited.

Tier 1: Use high second high predicted concentration and a single year of representative meteorological data. To the modeled concentration, add the high second high 24-hour monitored background concentration[7].

Tier 2: Add monthly maximum background concentrations to daily modeled concentrations. The high-second-high combined concentration may be compared with the 24-hour standard.

2.6.6.2 Modeling for the 24-hour PM_{10} PSD increment design value

Model all increment-consuming sources at the facility and at nearby sources. Compare the high-second-high predicted concentration with the allowable increment.

2.6.6.3 Modeling for the annual PM_{10} PSD increment design value

Model all increment-consuming sources at the facility and at nearby sources. Compare the predicted annual average concentration with the allowable increment.

2.6.7 Particulate matter less than 2.5 micrometers in aerodynamic diameter ($PM_{2.5}$) Standards

Table 13: PM2.5 Air Quality Standards[8]

Averaging Period	Significance Level [d] (µg/m³)	NAAQS (µg/m³)	Class II PSD Increment[c] (µg/m³)	Class I PSD Significance Level[d] (µg/m³)	Class I PSD Increment[c] (µg/m³)
annual	0.13	9.0[a]	4	0.05	1
24-hour	1.2	35 [b]	9	0.27	2

[a] To attain this standard, the 3-year average of the annual arithmetic mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 9 ug/m³.

[7] Guidance for PM2.5 Permit Modeling, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Pg. 58. (https://www.epa.gov/sites/production/files/2020-09/documents/guidance_for_pm25_permit_modeling.pdf)

[8] Prevention of Significant Deterioration (PSD) for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$) – Increments, Significant Impact Levels (SILs) and Significant Monitoring Concentration (SMC), ENVIRONMENTAL PROTECTION AGENCY
40 CFR Parts 51 and 52, RIN 2060-AO24 http://www.epa.gov/nsr/documents/20100929finalrule.pdf

[b] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 ug/m^3.
[c] For any period other than an annual period, the applicable maximum allowable increase may be exceeded during one such period per year at any one location. PSD increments are listed in 40 CFR 52.21(c) (https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-52/subpart-A/section-52.21).
[d] The SIL is based on *Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program*, EPA, April 17, 2018. (https://www.epa.gov/sites/default/files/2018-04/documents/sils_policy_guidance_document_final_signed_4-17-18.pdf)
and Supplement to the Guidance on Significance Impact Levels for Ozone and Fine Particles in Prevention of Significant Deterioration Permitting Program
https://www.epa.gov/system/files/documents/2024-04/supplement-to-the-guidance-on-significant-impact-levels-for-ozone-and-fine-particles-in-the-psd-permitting-program-4-30-2024.pdf
[e] 40 CFR 52.21(c) (https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-52/subpart-A/section-52.21)

2.6.7.1 $PM_{2.5}$ design value

The 24-hour design value is the 98th percentile of the combined concentrations from all sources. The annual design value is the annual average.

2.6.7.2 Modeling for the 24-hour $PM_{2.5}$ design value

AERMOD and current emissions inventories currently do not account for secondary formation of $PM_{2.5}$ in the atmosphere. Sources that emit at least 40 tons per year of NO_X or at least 40 tons per year of SO_2 are considered to emit significant amounts of precursors. Sources (including minor sources) with significant increases of $PM_{2.5}$ precursors must qualitatively and/or quantitatively account for secondary formation of $PM_{2.5}$.[9]

$PM_{2.5}$ secondary formation concentrations may be estimated using the following method derived from the MERP guidance[10]. These factors are location-specific and conservative. Other MERP values may be used in consultation with modeling staff and inclusion in a modeling protocol. EPA has a tool that includes many more sources than previously included in initial modeling, allowing more specific evaluation and analysis based on the distance of receptors from the facility being analyzed: https://www.epa.gov/scram/merps-view-qlik. All MERP values should be obtained from the MERP guidance and EPA's MERP websitehttps://www.epa.gov/scram/merps-view-qlik.

Below are the guiding equations to estimate 24-hour and annual $PM_{2.5}$ secondary formation concentration suggested by the Bureau. Choose the appropriate MERP values from the table below based on the AQCR in which the facility is located.

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[9] Guidance for PM2.5 Permit Modeling, Stephen D. Page, May 20, 2014. https://www.epa.gov/sites/default/files/2015-07/documents/pm25guid2.pdf
[10] Guidance on the Development of Modeled Emission Rates for Precursors (MERPS) as a Tier 1 Demonstration Tool for Ozone and PM2.5 under the PSD Permitting Program, Richard A. Wayland, EPA, April 30, 2019. (https://www.epa.gov/sites/default/files/2019-05/documents/merps2019.pdf).

$$[PM2.5]_{annual} = \left(\frac{NO_X\ emission\ rate(\frac{ton}{yr})}{MERP_{NOXannual}} + \frac{SO_2\ emission\ rate(\frac{ton}{yr})}{MERP_{SO2annual}} \right) \times 0.2\ \mu g/m^3$$

$$[PM2.5]_{24-hour} = \left(\frac{NO_X\ emission\ rate(\frac{ton}{yr})}{MERP_{NOX_24}} + \frac{SO_2\ emission\ rate(\frac{ton}{yr})}{MERP_{SO2_24}} \right) \times 1.2\ \mu g/m^3$$

Secondary formation from the project should be added to the modeled concentration.

Table 14: $PM_{2.5}$ MERPS[a]

AQCR	$MERP_{NOXannual}$	$MERP_{SO2annual}$	$MERP_{NOX_24}$	$MERP_{SO2_24}$
014	43833	48057	33634	11410
155	26780	14978	7331	1981
The rest of New Mexico	130260	53898	42498	9753

[a] MERP values were determined using the most conservative value for each category from hypothetical single source modeling reported on the EPA website https://www.epa.gov/scram/merps-view-qlik. AQCR 014 values were from La Plata Co, Colorado. AQCR 155 were from Terry, Texas or Roosevelt County, NM. Values for other AQCRs were the worst case from McKinley County or Otero County.

In cases where the facility is over 20 km from the area to be analyzed (such as a Class I area), refined MERPS by distance may be used in the equation. These are listed in Table 15.

Table 15: $PM_{2.5}$ MERPS by Distance[a]

Distance (km)	$MERP_{NOXannual}$	$MERP_{SO2annual}$	$MERP_{NOX24}$	$MERP_{SO2_24}$
20	26780	14978	7331	1981
40	41443	21381	7331	2659
60	56437	34384	8125	3602
80	68524	52655	11598	4939
100	73761	58281	13854	6382
120	95771	61192	15912	7535
140	110356	66632	17342	8002
160	119381	78711	22200	8281
180	159528	90342	23384	8281
200	204480	103497	24412	8948
220	248193	143167	25908	9478
240	280895	159027	30642	10188
260	313582	161042	32575	11032
280	364992	169193	34099	11786
300	394967	184939	35962	12753

[a] MERP values were determined using the most conservative value for each category from hypothetical single source modeling reported on the EPA website https://www.epa.gov/scram/merps-view-qlik. In cases where a smaller MERPs value occurs at a larger distance than the distance represented from the modeling results, the smaller value is used in place of the larger value. Values were from La Plata Co, Colorado, Terry, Texas, McKinley County, NM, Otero County, NM, or Roosevelt County, NM.

Two tiers of modeling are available for $PM_{2.5}$ modeling. Both tiers include modeling the facility and nearby sources and adding secondary formation and a background concentration to that. Particulate sources typically have impacts in the immediate vicinity of the source that are not represented in background monitors, so double-counting of background concentrations is expected to be limited.
Add the design value of the modeled direct $PM_{2.5}$ to the design value of the secondary $PM_{2.5}$ (from MERP equation) and the design value of the background $PM_{2.5}$.

Tier 1: To the modeled concentration(s), add the secondary $PM_{2.5}$ and the 98^{th} percentile 24-hour monitored background concentration.

Tier 2: Add the secondary $PM_{2.5}$ and the monthly or quarterly maximum background concentrations to daily modeled concentrations. Compare the high-eighth-high combined concentration with the 24-hour standard. If multiple years of meteorological data are used, then

the high-eighth-high from each year is averaged and the combined concentration at each receptor is compared with the standard[11].

2.6.7.3 Modeling for the 24-hour $PM_{2.5}$ PSD increment design value

Model the high-second-high concentration of all increment-consuming sources at the facility and at nearby sources. Calculate secondary formation from NO_X and SO_2 increases after the appropriate baseline date and add that to the modeled concentration. Compare the total with the 24-hour PSD increment.

2.6.7.4 Modeling for the annual $PM_{2.5}$ PSD increment design value

Model all increment-consuming sources at the facility and at nearby sources. Calculate secondary formation from NO_X and SO_2 increases after the appropriate baseline date and add that to the modeled concentration. Compare the total predicted annual average concentration with the allowable increment.

[11] Guidance for PM2.5 Permit Modeling, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Pg. 58. (https://www.epa.gov/sites/production/files/2020-09/documents/guidance_for_pm25_permit_modeling.pdf)

2.6.8 Sulfur Dioxide (SO_2) Standards

Table 16: SO_2 Air Quality Standards

Averaging Period	Significance Level ($\mu g/m^3$)	NAAQS (ppb)	NAAQS ($\mu g/m^3$)	NMAAQS (ppb)	NMAAQS ($\mu g/m^3$)	PSD Class II Increment[c] ($\mu g/m^3$)	PSD Class I Significance Level ($\mu g/m^3$)	PSD Class I Increment[c] ($\mu g/m^3$)
annual	1.0			20	52.4	20	0.1[b]	2
24-hour	5.0			100	261.9	91	0.2[b]	5
3-hour	25.0	500	1309.3			512	1.0[b]	25
1-hour	7.8[a]	75	196.4					

[a] EPA interim 1-hour significance level of 3 ppb[12] corrected to a reference temperature of 25°C and a reference pressure of 760 millimeters of mercury.
[b] EPA proposed significance level.[13]
[c] For any period other than an annual period, the applicable maximum allowable increase may be exceeded during one such period per year at any one location. PSD increments are listed in 40 CFR 52.21(c) (https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-52/subpart-A/section-52.21).

2.6.8.1 SO_2 design value

In NMAC, the SO_2 NMAAQS standards for the area within 3.5 miles of the Chino Mines Company smelter furnace stack at Hurley are set equal to the federal standards. However, since this stack no longer exists, the distance is irrelevant. The NMAAQS listed in Table 16 apply for the entire state.
Demonstration of compliance with 1-hour standard will also demonstrate compliance with the other standards, but not necessarily the PSD increments.

The form of the 1-hour SO_2 NAAQS is the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations. In AERMOD, the 1-hour SO2 should be modeled with annual or alone to adhere to special AERMOD processing. Do not model 1-hour SO2 with 3 hour or 24 hour analyses as this will disable special processing

2.6.8.2 Modeling for the 1-hour SO_2 NAAQS

The standard is calculated similarly to the NO_2 1-hour standard instructions in section 2.6.4.4, but the fourth highest is used in place of the eighth highest (and 99th percentile is substituted for

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[12] General Guidance for Implementing the 1-hour SO_2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour SO_2 Significant Impact Level, Anna Marie Wood, EPA, August 23, 2010 (https://www.epa.gov/sites/default/files/2015-07/documents/appwso2.pdf)
[13] EPA proposed significance levels are less than or equal to the SO_2 significance levels contained in *Class I Area Significant Impact Levels*, John Calcagni, EPA, September 10, 1991 (https://www.epa.gov/sites/default/files/2015-07/documents/levels.pdf).

98th percentile). All sulfur oxides are assumed to be in the form of SO_2. If multiple years are modeled, the resulting high-fourth-high values at each receptor are averaged over the years modeled and the maximum average value is compared with the standard.

Tier 1: If the facility is less than 20 km from the center of Albuquerque and El Paso, add the 99th percentile 1-hour background concentration to 99th percentile modeling for the entire facility and neighboring sources within 10 km of the facility and compare the total with the 1-hour NAAQS. If the facility is in the Pecos-Permian Basin Intrastate AQCR (AQCR 155), model the facility and surrounding sources (because representative monitoring may not be available). Sources in other areas may add the 99th percentile 1-hour background concentration to 99th percentile modeling for the entire facility (without neighboring sources) and compare the total with the 1-hour NAAQS or model the facility and all nearby sources without adding a background concentration.

Tier 2: For the cases where monitored background concentrations are described in Tier 1, add the hourly 1-hour background concentrations (as described in the background concentration section) to each hour instead of the 99th percentile 1-hour background concentration. The combined modeling results are compared the 99th percentile of the totals with the 1-hour NAAQS.

2.6.8.3 Modeling for the 3-hour SO_2 PSD increment

Model the increment consuming emissions at the facility and at nearby sources and compare the high-second-high 3-hour average with the allowable PSD increment. Optionally, a monitored background value may be substituted for the modeled surrounding sources as a conservative approach to the increment consumption, if available.

2.6.8.4 Modeling for the 24-hour SO_2 PSD increment

Model the increment consuming emissions at the facility and at nearby sources and compare the high-second-high 24-hour average with the allowable PSD increment. Optionally, a monitored background value may be substituted for the modeled surrounding sources as a conservative approach to the increment consumption, if available.

2.6.8.5 Modeling for the annual SO_2 PSD increment

Model the increment consuming emissions at the facility and at nearby sources and compare the predicted annual average with the allowable PSD increment. Optionally, a monitored background value may be substituted for the modeled surrounding sources as a conservative approach to the increment consumption, if available.

2.6.9 Total Reduced Sulfur Except For Hydrogen Sulfide Standards

Table 17: Total Reduced Sulfur except for H_2S Air Quality Standards

Averaging Period	NMAAQS[a] (ppm)	Notes
1/2-hour	0.003	for the state, except for the Pecos-Permian Basin Intrastate AQCR
1/2-hour	0.010	for the Pecos-Permian Basin Intrastate AQCR

1/2-hour	0.003	For within corporate limits of municipalities within the Pecos-Permian Basin Intrastate Air Quality Control Region.
1/2-hour	0.003	For within five miles of the corporate limits of municipalities having a population of greater than twenty thousand and within the Pecos-Permian Basin Intrastate Air Quality Control Region

[a] 20.2.3.110.C NMAC (https://www.srca.nm.gov/parts/title20/20.002.0003.html)

2.6.9.1 Total Reduced Sulfur design value

EPA test methods suggest that reduced sulfur compounds in some cases consist primarily of carbon disulfide (CS_2), carbonyl sulfide (COS), and hydrogen sulfide (H_2S). To calculate the parts per million of reduced sulfur, use the average molecular weight in the sample. For example, 1-heptanethiol ($CH_3[CH_2]6SH$) has a molecular weight of 132.3.

For modeling ½-hour total reduced sulfur NMAAQS, use the 1-hour averaging time because the models cannot resolve less than one-hour increments.

2.6.9.2 Modeling the Total Reduced Sulfur ½-hour NMAAQS

Model the entire facility and compare the 1-hour predicted concentration with the ½-hour NMAAQS. Surrounding sources and background concentrations are not added.

Table 18: Air Quality Standard Summary (Without Notes)

Pollutant	Averaging Period	Significance Level (µg/m^3)	Class I Significance Level (µg/m^3)	NAAQS (µg/m^3)	NMAAQS (µg/m^3 unless noted)	PSD Increment Class I (µg/m^3)	PSD Increment Class II (µg/m^3)
CO	8-hour	500		10,303.6	9,960.1		
	1-hour	2,000		40,069.6	14,997.5		
H_2S	1-hour	1.0			13.9		
	1/2-hour	5.0			139.3		
	1/2-hour	5.0			41.8		
Pb	Quarterly	0.03		0.15			
NO_2	annual	1.0	0.1	99.66	94.02	2.5	25
	24-hour	5.0			188.03		
	1-hour	7.52		188.03			
O_3	8-hour	1.96		137.3			
$PM_{2.5}$	annual	0.13	0.05	9.0		1	4
	24-hour	1.2	0.27	35		2	9
PM_{10}	annual	1.0	0.2			4	17
	24-hour	5.0	0.3	150		8	30
SO_2	annual	1.0	0.1		52.4	2	20
	24-hour	5.0	0.2		261.9	5	91
	3-hour	25.0	1.0	1309.3		25	512
	1-hour	7.8		196.4			
Reduced S	1/2-hour				3 ppb		
	1/2-hour				10 ppb		

Table 19: Standards for which Modeling is not Required

Standard not Modeled	Surrogate that Demonstrates Compliance
CO 8-hour NAAQS	CO 8-hour NMAAQS
CO 1-hour NAAQS	CO 1-hour NMAAQS
NO_2 annual NAAQS	NO_2 annual NMAAQS
NO_2 24-hour NMAAQS	NO_2 1-hour NAAQS
O_3 8-hour	Regional modeling
SO_2 annual NMAAQS	SO_2 1-hour NAAQS
SO_2 24-hour NMAAQS	SO_2 1-hour NAAQS
SO_2 3-hour NAAQS	SO_2 1-hour NAAQS

Table 20: Modeling the Design Value Summary (Default Modeling)

Averaging Period	Model Nearby Sources or Add Background[a]?	Cumulative NAAQS Modeled Concentration
CO 8-hour NMAAQS	Choose one (Both if near city)	high 8 hour high second high
CO 1-hour NMAAQS	Choose one (Both if near city)	high 1 hour high second high
H_2S 1-hour or ½-hour NMAAQS	Model nearby sources	high 1 hour
Pb Quarterly NMAAQS	Model nearby sources, if available	high month
NO_2 annual NMAAQS	Choose one (Both if near city)	annual average
NO_2 annual PSD increment	Choose one[b]	annual average
NO_2 1-hour NAAQS	Choose one (Both if near city)	98th-percentile 1 hour High first high or high eighth high
$PM_{2.5}$ annual NAAQS	Both	annual average
$PM_{2.5}$ annual PSD increment	Choose one[b]	annual average
$PM_{2.5}$ 24-hour NAAQS	Both	high eighth high
$PM_{2.5}$ 24-hour PSD increment	Choose one[b]	high second high 24 hour
PM_{10} annual PSD increment	Choose one[b]	annual average
PM_{10} 24-hour NAAQS	Both	high sixth high 24 hour[c]
PM_{10} 24-hour PSD increment	Choose one[b]	high second high 24 hour
SO_2 annual PSD increment	Choose one[b]	annual average
SO_2 24-hour PSD increment	Choose one[b]	high second high 24 hour
SO_2 3-hour PSD increment	Choose one[b]	high second high 3 hour
SO_2 1-hour NAAQS	Choose one (Both if near city. Model nearby sources without adding background in Permian Basin)	high fourth high
Reduced S ½-hour NMAAQS	Model nearby sources, if available	high 1 hour

[a] Background concentrations added have the same form as the air quality standard. For example, if the standard is the 98th percentile then the 98th percentile modeled (high-eighth-high) concentration would be added to the 98th percentile monitored concentration. The pollutant-specific sections above provide additional details.

[b] Assuming that all monitored background concentration consumes PSD increment is thought to be conservative compared to modeling the subset of surrounding sources that consume increment. If the background concentration is available and low enough to demonstrate compliance with PSD increment when added to the modeled concentration from the facility, then this approach may be used instead of modeling the surrounding sources.

[C] Alternatively, use high N+1 high, where N is the number of years modeled. The average of single year high second high may also be reported.

2.7 PSD Increment Modeling

2.7.1 Air Quality Control Regions and PSD Baseline Dates

Any facility that is required to provide an air dispersion modeling analysis with its construction permit application is required to submit a PSD increment consumption analysis unless none of its sources consume PSD increment. Table 21 serves as a tool to determine which sources to include in PSD increment modeling.

Table 21: PSD Increment Consumption and Expansion

Sources that do not consume PSD increment	• Temporary emissions (sources involved in a project that will be completed in a year or less). • Any facility or modification to a facility constructed before the PSD major source baseline date. • Any minor source constructed before the PSD minor source baseline date. • Any minor source constructed in a region where PSD minor source baseline date is not yet established
Sources that consume PSD increment	• Any new emissions or increase in emissions after the PSD Minor Source Baseline date (for that AQCR and pollutant). Any new emissions or increase in emissions at a PSD Major source that occurs after the Major Source Baseline Date.
Sources that expand PSD increment	• A permanent reduction in actual emissions from a baseline source.

Notes:

- EPA memos written before the publication of the Draft NSR Workshop Manual indicate that PSD regulations were not intended to apply to temporary pilot projects. The memo clearly indicated that the pilot project did not need a PSD permit[14].
- If a minor source facility once existed but shut down before the minor source baseline date, then it would not be considered to be part of the baseline.
- Haul road emissions are treated the same way other sources of emissions are treated.
- An increase in emissions due to increased utilization of a facility, such as de-bottlenecking, are treated as any other increase in emissions.
- The Bureau interprets temporary emissions to mean emissions at the location that will occur for less than one year or emissions of standby or emergency equipment that operates less than 500 hours per year. For example, if a series of three gravel crushers operate at a mine for more than one year, PSD increment modeling should be performed because the mining operations at the location are not temporary in nature, even though none of the individual crushers remained on-site for an entire year.

[14] PSD Applicability - Temporary Emissions, Director Division of Stationary Source Enforcement, December 11, 1978 (https://www.epa.gov/sites/production/files/2015-07/documents/tmpemisn.pdf)

Table 22: Minor Source Baseline Dates by Air Quality Control Region

AQCR	NO_2 Date	SO_2 Date	PM_{10} Date	$PM_{2.5}$ Date
12	8/10/1995	8/10/1995	8/10/1995	Not established
14	6/6/1989	8/7/1978	8/7/1978	Not established
152	3/26/1997	5/14/1981	3/26/1997	2/11/2013
153	8/2/1995	Not established	6/16/2000	Not established
154	Not established	Not established	Not established	Not established
155	3/16/1988	7/28/1978	2/20/1979	11/13/2013
156	Not established	8/4/1978	8/4/1978	Not established
157	Not established	Not established	Not established	Not established

Table 23: Major Source Baseline Dates and Trigger Dates

Pollutant	Major Source Baseline Date	Trigger Date
PM	January 6, 1975	August 7, 1977
SO_2	January 6, 1975	August 7, 1977
NO_2	February 8, 1988	February 8, 1988
$PM_{2.5}$	October 20, 2010	October 20, 2011

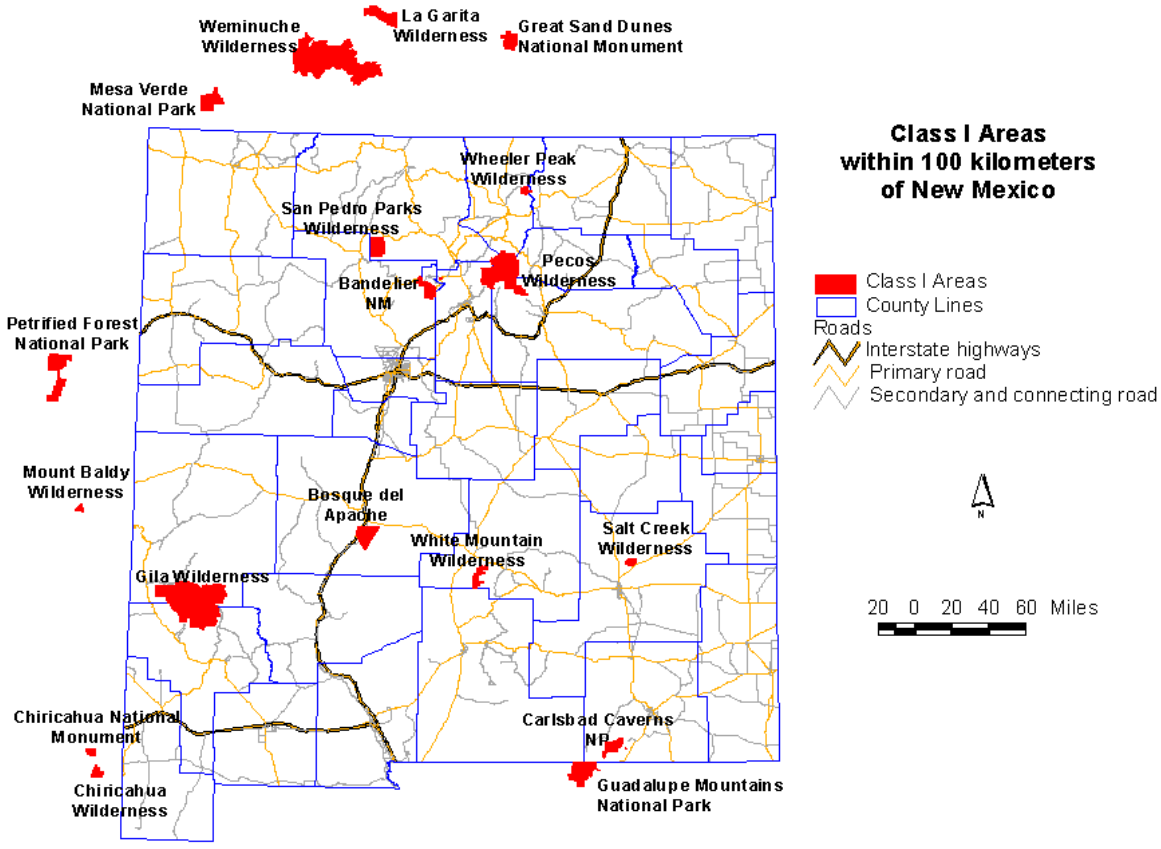


Figure 1: Class I areas

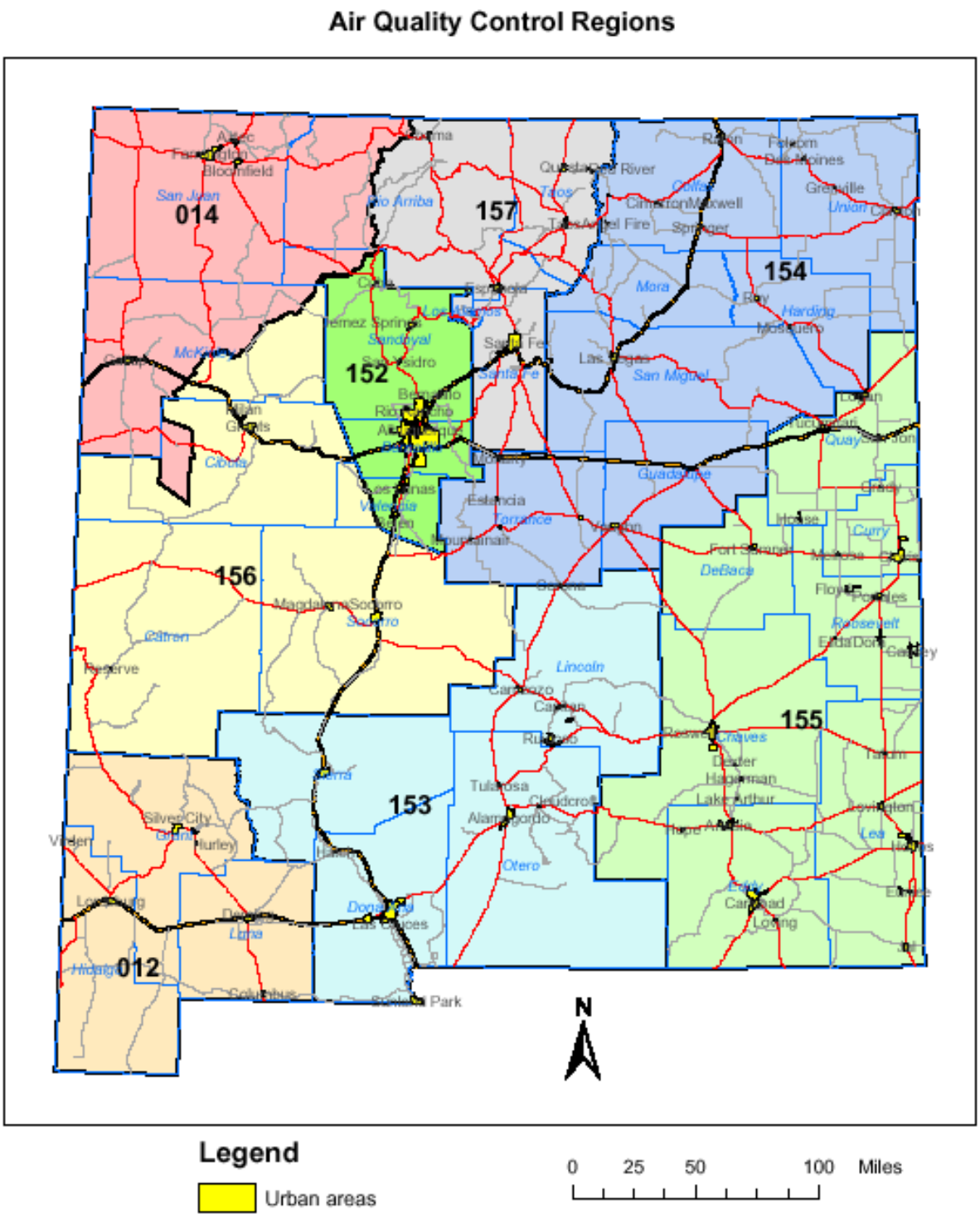


Figure 2: Air quality control regions (each AQCR has a different color)

2.8 New Mexico State Air Toxics Modeling

Modeling must be provided for any toxic air pollutant sources that may emit any toxic pollutant in excess of the emission levels specified in **20.2.72.502 NMAC** - Permits for Toxic Air Pollutants. Sources may use a correction factor based on release height for the purpose of determining whether modeling is required. Divide the emission rate for each release point by the correction factor for that release height on Table 24 and add the total values together to determine the total adjusted emission rate. If the total adjusted emission rate is higher than the emission rate in pounds per hour listed in **20.2.72.502 NMAC**, then modeling is required. The controlled emission rate (not the adjusted emission rate) of the toxic pollutant should be used for the dispersion modeling analysis.

Table 24: Stack Height Release Correction Factor (adapted from 20.2.72.502 NMAC)

Release Height in Meters	Correction Factor
0 to 9.9	1
10 to 19.9	5
20 to 29.9	19
30 to 39.9	41
40 to 49.9	71
50 to 59.9	108
60 to 69.9	152
70 to 79.9	202
80 to 89.9	255
90 to 99.9	317
100 to 109.9	378
110 to 119.9	451
120 to 129.9	533
130 to 139.9	617
140 to 149.9	690
150 to 159.9	781
160 to 169.9	837
170 to 179.9	902
180 to 189.9	1002
190 to 199.9	1066
200 or greater	1161

The table below lists a few of the commonly encountered State Air Toxics in New Mexico. This is not the complete list, which is too expansive to reprint here.

Table 25: A few common state air toxics and modeling thresholds (from 20.2.72.502 NMAC)

Pollutant	OEL (µg/m^3)	1% OEL (µg/m^3)	Emission Rate Screening Level (pounds/hour)
Ammonia	18000	180	1.20
Asphalt (petroleum) fumes	5000	50	0.333
Carbon black	3500	35	0.233
Chromium metal	500	5.00	0.0333
Glutaraldehyde	700	7.0	0.0467
Nickel Metal	1000	10.0	0.0667
Wood dust (certain hard woods as beech & oak)	1000	10.0	0.0667
Wood dust (soft wood)	5000	50.0	0.333

If modeling shows that the maximum eight-hour average concentration of each toxic pollutant is less than one one-hundredth of its Occupational Exposure Level (OEL) listed in **20.2.72.502 NMAC**, then the analysis is finished. For a source of any known or suspected human carcinogens (per **20.2.72.502 NMAC**) which will cause an impact greater than one-one hundredth of the OEL, the source must demonstrate that best available control technology will be used to control the carcinogen. If modeling shows that the impact of a toxic which is not a known or suspected human carcinogen (per **20.2.72.502 NMAC**) is greater than one-one hundredth of the OEL, the application must contain a health assessment for the toxic pollutant that includes: source to potential receptor data and modeling, relevant environmental pathway and effects data, available health effects data, and an integrated assessment of the human health effects for projected exposures from the facility.

2.9 Hazardous Air Pollutants

Hazardous Air Pollutants (HAPs) do not require modeling, as they are regulated by means other than air quality standards. Sources should be aware of the Title V major source thresholds of 10 tons/year for any Hazardous Air Pollutants (HAP) and 25 tons/year for total HAPs, which will require an operating permit to be obtained from the department under **20.2.70 NMAC**- Operating Permits.

2.10 Nonattainment and Maintenance Areas

In nonattainment areas and for those sources outside of the nonattainment area that significantly contribute to concentrations in a nonattainment area, the modeling analysis required is a demonstration of an air quality benefit. Regular modeling is required in maintenance areas, however. Further information on nonattainment area modeling is in section 7.4, Nonattainment Area Requirements. Nonattainment areas are described at https://www.env.nm.gov/air-quality/nonattainment-areas/.

3.0 MODEL SELECTION

3.1 What dispersion models are available?

The Bureau accepts the use of EPA approved models for dispersion analysis. Commercial or parallel versions of these models are fine as long as they produce the same results. This section of the modeling guidelines is designed to describe the models that are available and provide some guidance on which situations are the most appropriate for which regulatory modeling situations.

Two types of models are currently in use for air dispersion modeling: probability density function (PDF) models, and puff models. Probability density function models apply a probability function from each emission release point to calculate the concentration at a receptor based on the location of the receptor, wind speed and direction, stability of the atmosphere, and other factors. The plume is assumed to extend all the way out to the most distant receptor, no matter how far that receptor is from the emission source. Because of this characteristic, PDF models suffer in accuracy when modeling distant concentrations or unstable conditions. SCREEN3, ISCST3, ISC_OLM, CTSCREEN, ISC-PRIME, and AERMOD are all PDF models. All but AERMOD use a Gaussian, or normal, distribution for their probability density function. AERMOD uses a PDF that varies depending on nearby terrain and other factors. Currently, AERMOD and CTSCREEN are EPA-approved models for near-field modeling. As of November 9, 2006, SCREEN3, ISCST3, and ISC_OLM are no longer considered EPA-approved models. The Federal Register notice detailing the promulgation of AERMOD is located at: https://www.epa.gov/sites/production/files/2020-09/documents/appw_05.pdf

CALPUFF is a puff model, meaning that it tracks puffs, or finite elements of pollution, after they are released from their source. This strategy makes the model ideal for tracking pollution over long distances or in conditions that are not stable, and also allows chemical reactions within the plume to be modeled. Unfortunately, puff models require large amounts of computing time. CALPUFF is an EPA-approved model for modeling long range transport and/or complex non-steady-state meteorological conditions.

3.2 EPA Modeling Conferences and Workshops

EPA Modeling Conference presented a wealth of information about recent regulatory modeling developments. The EPA web page with the details is https://www.epa.gov/scram/air-modeling-conferences-and-workshops.

3.3 Models Most Commonly Used in New Mexico

Most analyses reviewed by the Bureau will begin with an AERMOD analysis, and possibly CALPUFF for Class I analyses. For dispersion modeling within 50 kilometers of the source, AERMOD should be used. CALPUFF should be used only for PSD Class I area analyses, per the Interagency Workgroup Air Quality Modeling (IWAQM) Phase II report, but may be approved for use on a case-by-case basis for other analyses.

3.3.1 AERMOD

- AERMOD is intended to be the standard regulatory model. The PRIME building downwash algorithm is used by the model. Both the Ozone Limiting Method (OLM) and the Plume Volume Molar Ratio Method (PVMRM) algorithms for nitrogen conversion are built into the model.
- AERMOD has greater accuracy in complex terrain than CTSCREEN.
- AERMOD is suggested for extremely complex terrain.

See the section on nitrogen oxides for more information and options.

3.3.2 CALPUFF

- CALPUFF is a puff model designed to calculate concentrations at distances up to and beyond 50 kilometers. The model is significantly more difficult to run than the other models discussed in these guidelines. Use of CALPUFF for NAAQS, NMAAQS, or PSD increment modeling must be approved by the Bureau before submitting the modeling.
- CALPUFF is required for additional impact analyses when Federal Land Managers require additional impact analyses for Class I areas near PSD major sources. Typically, CALPUFF light is used for this modeling.

3.3.3 CTSCREEN

- CTSCREEN is applicable only for modeling receptors above stack height.
- CTSCREEN is a difficult model to run because of the difficulty in obtaining hill contour profiles.
- CTSCREEN uses screening meteorology.
- AERMOD produced greater accuracy than CTDMPLUS (the full implementation of CTSCREEN) when modeling the data that was used to develop CTSCREEN/CTDMPLUS.
- CTSCREEN is typically used to model the terrain on top of a hill that did not pass when using AERMOD.

The following list can be used to correct 1-hour CTSCREEN concentrations to 3-hour, 24-hour and annual concentrations by multiplying by the appropriate conversion factor for the averaging period.

Table 26: CTSCREEN Correction factors for 1-hour concentration

Averaging Period	Correction factor
3-hour	0.7
24-hour	0.15
Annual	0.03

3.3.4 AERSCREEN

- AERSCREEN is a screening version of AERMOD.

4.0 MODEL INPUTS AND ASSUMPTIONS

Models should be used with the technical options recommended in the Guideline on Air Quality Models (https://www.epa.gov/sites/production/files/2020-09/documents/appw_17.pdf) except as noted in this document or approved by the Bureau.

Unless otherwise noted, information and procedures in this section refer to all of the models listed above.

4.1 Operating Scenarios

4.1.1 Emission Rates

All averaging periods shall be modeled using the maximum short-term emission rate allowed in the permit. The preferred method of modeling all averaging periods is to use maximum short-term emission rates and to use the hours of operation model input option to limit the facility's emissions.

4.1.2 Hours of Operation

If the facility is limited to operating certain hours of the day or has other operating restrictions, limiting the operating hours in the model can normally reduce the concentration produced by the model. Hours of operation can only be modeled by models that use actual meteorology, but not by screening models. Use screening models only to model facilities as if the maximum operating rate were emitting continuously.

4.1.3 Time Scenarios

Sometimes a facility has unusual operating times, for example, if the facility is allowed to operate 12 hours per day, but the hours are not specified. The facility may model as if it operates continuously, but as an option, the facility can model different time periods at the amount of time allowed per day as different operating scenarios, making sure that the maximums are modeled. In the 12 hour example, the facility might model three scenarios: 7AM to 7PM. 7PM to 7AM. And 5PM to 5AM. This way, all the hours of the day were modeled, and the modeler can be fairly certain that the maximum was modeled because the worst-case scenarios would occur when the calm blocks of time were modeled together. All scenarios should be modeled at maximum hourly emission rates. Annualized or averaged emission rates of intermittent sources should not be used to evaluate short term standards.

4.1.4 Operating at Reduced Load

Some sources (like engines and boilers) can produce higher concentrations of pollution in ambient air when they are operating below maximum load than when they are at maximum load. The applicant shall analyze various feasible operating scenarios (100%, 75%, and 50% are typical) to determine the worst-case impacts, and then use that worst-case scenario for the entire modeling analysis. This requirement is in section 8.1 of Appendix W of EPA's Guideline.

4.1.5 Alternate Operating Scenario

If the permit application contains multiple operating scenarios (such as use of different fuels or different engines) then the applicant shall model each of the scenarios for the radius of impact analysis. Whichever scenario produces the greatest impacts for that pollutant on ambient air shall be used for the cumulative analysis, if any scenario produces significant concentrations. If it is unclear which operating scenario produces the greatest impacts, each scenario shall be modeled for cumulative impact analysis.

4.1.6 Startup, Shutdown, Maintenance (SSM), and Other Short-term Emissions

If startup, shutdown, maintenance, or other temporary events have the potential for producing short-term impacts greater than the normal operating scenarios, then the applicant shall model each of the scenarios to demonstrate compliance with the ambient air quality standard.

If it is probable that an adjacent facility will have emissions higher than normal operation during the time the applicant’s facility has increased emissions, then those emissions should also be accounted for in the modeling. Otherwise, model surrounding sources at their normal operating rate. Because of the short nature of the SSM emissions, modeling does not have to demonstrate compliance with annual standards or annual increment consumption. Highest hourly SSM emission rate should be modeled for NAAQS, NMAAQS and for increment consumption modeling. Emergency equipment that operates less than 500 hours per year do not need to demonstrate compliance with PSD increment, but other SSM emissions do.

Whichever scenario produces the greatest impacts on ambient air shall be used for the cumulative analysis, if required. If it is unclear which operating scenario produces the greatest impacts, each scenario shall be modeled for cumulative impact analysis.

4.2 Plume Depletion and Deposition

Dry plume depletion may be used to reduce concentrations of particulate matter. Appropriate particle characteristics for the specific type of source being modeled should be used. Sample particle size distributions are included in tables below. Please provide documentation of different source types or particle size distributions different than in tables below. If no documentation can be found on particle size distribution of a source type, use combustion for a conservative depletion parameter as a conservative estimate. Because of the length of time required to run a

model with plume depletion, the Bureau recommends only applying plume depletion to receptors that are modeled to be above standards when the model is run without plume depletion.

The wet deposition option should not be used for the modeling analysis unless data are available and the use of wet deposition has been previously approved.

Table 27: Plume Depletion Parameters for $PM_{2.5}$

Source Type	Mass Mean Particle Diameter (µm)	Mass Weighted Size Fraction	Density (g/cm^3)
Asphalt Baghouse[a]	0.63	0.72	1.50
	1.85	0.28	1.50
Cement Handling[b]	1.5	1	2.85
Coal Handling[c]	1.57	1	1.5
Combustion[d]	1.57	1	1.5
Cooling Tower[e]	1.57	1	2.5
Fly Ash Handling[f]	1.57	1	1.04
Lime Silo[g]	1.57	1	3.30
Limestone and Gypsum[h]	1.57	1	2.7
Vehicle Fugitive Dust[i]	1.57	1	2.5
Wood Dust[j]	1.5	1	0.56

Table 28: Plume Depletion Parameters for PM_{10}

Source Type	Mass Mean Particle Diameter (µm)	Mass Weighted Size Fraction	Density (g/cm^3)
Asphalt Baghouse [a]	0.63	0.5	1.50
	1.85	0.19	1.50
	6.92	0.31	1.50
Cement Handling [b]	1.5	0.26	2.85
	3	0.25	2.85
	6	0.48	2.85
Coal Handling [c]	1.57	0.078	1.5
	3.88	0.27	1.5
	7.77	0.652	1.5
Combustion [d]	1.57	1	1.5
Cooling Tower [c]	1.57	0.078	2.5
	3.88	0.27	2.5
	7.77	0.652	2.5
Fly Ash Handling [f]	1.57	0.14	1.04
	3.88	0.33	1.04
	7.77	0.53	1.04
Lime Silo [g]	1.57	0.25	3.30
	6.91	0.75	3.30

Source Type	Mass Mean Particle Diameter (µm)	Mass Weighted Size Fraction	Density (g/cm^3)
Limestone and Gypsum [c]	1.57	0.078	2.7
	3.88	0.27	2.7
	7.77	0.652	2.7
Vehicle Fugitive Dust [i]	1.57	0.25	2.5
	6.91	0.75	2.5

[a] Particle Distribution: Particle size distribution for asphalt baghouse emissions is based on Table 11.1-3 in AP-42, section 11.1 (version 3/04). Density: CRC, "Handbook of Chemistry and Physics", 80th Edition.
[b] NIST Interagency/Internal Report (NISTIR) – 6883. Density: Analysis of the ASTM Round-Robin Test on Particle Size Distribution of Portland Cement: Phase II, Page A-36.
[c] Figure 6, July 1983, American Mining Congress Report: "Fugitive Dust Emission Factors for the Mining Industry".
[d] Unknown reference.
[f] Particle Distribution: Fly ash classification analysis of San Juan Generating Station for Phoenix Cement. Density: Powder and Bulk Engineering Resources - Bulk Density Chart (https://web.archive.org/web/20130921162403/http://www.powderandbulk.com/resources/bulk_density/material_bulk_density_chart_f.htm).
[g] Particle Distribution: particle size distribution for lime silo emissions is based on a fly ash classification analysis plus a bag house that controls to 98.8% of particles less than 2.5 micrometers, 99.4% of particles between 2.5 and ten micrometers , and 99.8% of particles between ten and 30 micrometers. Note: Particle size distribution of lime may differ from fly ash. Use this only if better information is not available.
Density: CRC, "Handbook of Chemistry and Physics", 80th Edition.
[i] AP-42 Particle size k factors for paved roads.

4.3 Meteorological Data

4.3.1 Selecting Meteorological Data

The meteorological data used in the modeling analysis should be representative of the meteorological conditions at the specific site of proposed construction or modification, or else use screening meteorological data, which contains worst-case data.

Representative, on-site data is obviously the best data to use; however, for many sources on-site data is not available. Bureau modeling staff can supply preferred meteorological data sets for various locations around the state. The National Weather Service (NWS) also collects data throughout the country. These data sets are available through the National Climatic Data Center. It is mandatory that Bureau modeling staff approve the chosen meteorological data before the analysis is submitted. At least one year of site-specific data, three years of prognostic meteorological data, or five years of NWS or comparable data must be used. Alternatively, one year of the data may be

used with evidence that the year selected produces the highest concentrations for the type of facility and standard being modeled. Table 28, below, identifies cases where the Bureau has determined a single year can be used, based on the currently processed meteorological data. If an impact is more than 95% of a significance level, limit or standard, use 5 years of data.

PSD permits contain more rigorous requirements relating to the collection of representative, on-site meteorological data. Please contact the Bureau as soon as possible if you anticipate the need to collect on-site meteorological or ambient monitoring data for a PSD permit.

Meteorological data year producing the highest concentration is provided in Table 29. This indicates where a single year of meteorological data can be used when using pre-processed NMED provided data.

Select the site description that best matches the facility being modeled. For meteorological data, the similarity of the terrain (including canyon and valley directions) is more important than finding the closest monitor. Unless otherwise noted, AQB staff will need the exact location of the facility to select or approve a set of meteorological data representative of the location. Staff will compare wind roses with prominent terrain features that influence drainage patterns or otherwise influence wind directions.

Setback distance modeling for portable sources may require separate meteorological data than that used in the rest of the modeling analysis for that facility. The conclusions of the latest analysis are identified in the table above under the heading, “Relocation modeling”. The selected meteorological data set is appropriate for locations throughout the State.

Processed meteorological data from 2020-2024 is available from the modeling web page: https://www.env.nm.gov/air-quality/modeling-publications/

The Bureau typically uses the following values for processing meteorological data. Contact Bureau staff with questions about how specific data sets were processed.

Threshold wind speed = 0.5 m/s
Arid and Dry conditions
AERMINUTE data is used when available
Adjust u_*
Randomize NWS wind directions
Adjust ASOS wind speeds
12 primary and secondary wind sectors

Table 29: Meteorological Data Year Producing Highest Concentrations

Met Station[a]	Use for Haul Road, Fugitive Sources, or Short Stacks[b]	Use for Flares or Very Tall Stacks[c]	Latitude	Longitude	Elevation (m)[d]
Alamogordo	2023	2021	32.840	-105.991	1270
Anthony	2023	2021	32.003	-106.599	1165
Bernalillo	2024	2021	35.300	-106.547	1541
Bloomfield	2020	2024	36.742	-107.977	1711
Carlsbad	2023	2022	32.384	-104.264	976
Chaparral	2021	2022	32.041	-106.410	1241
Clayton	2020	2021	36.448	-103.154	1515
Clovis	2023	2022	34.433	-103.083	1284
Coyote Ranger District	2020	2020	36.188	-106.698	2224
Deming	2023	2024	32.256	-107.723	1311
Gallup	2022	2022	35.509	-108.793	1970
Grant	2022	2020	32.633	-108.167	1642
Hobbs	2024	2023	32.727	-103.123	1106
Las Cruces (Holman Rd)	2023	2020	32.425	-106.674	1362
La Union	2023	2020	31.919	-106.633	1149
Navajo Lake	2020	2020	36.810	-107.651	1973
Raton	2023	2021	36.742	-104.508	1938
Roswell	2024	2020	33.307	-104.508	1105
San Juan Substation	2022	2023	36.798	-108.480	1641
Santa Fe	2022	2021	35.620	-106.080	1927
Santa Teresa	2023	2022	31.788	-106.683	1248
Sierra Blanca	2021	2024	33.450	-105.517	2032
Sunland Park Desert View	2023	2022	31.796	-106.584	1169
Taos	2020	2020	36.383	-105.585	2119
Truth Or Consequences	2023	2021	33.237	-107.268	1469
Tucumcari	2024	2020	35.181	-103.601	1231
West Mesa	2023	2021	32.278	-106.865	1278
Relocation Modeling	Sierra Blanca	Taos			

[a] Years processed are 2020-2024 and are available for download from modeling web page at https://www.env.nm.gov/air-quality/modeling-publications/

[b] Analysis based on volume source with 3.4 m release height, 6.05 m initial horizontal dimension, and 3.16 m vertical dimension with flat terrain.

[c] Analysis based on stack with 30.48 m height, 1273.15 K temperature, 20 m/s exit velocity, and 15.298 m diameter with flat terrain.

[d] Elevation was determined using USGS Elevation Point Query Service https://apps.nationalmap.gov/epqs/

4.3.1 Wind Roses

Wind roses may be helpful for determining what data best matches the terrain features around the proposed facility or for other reasons. The wind roses of NMED processed data are shown below in Figure 3 .

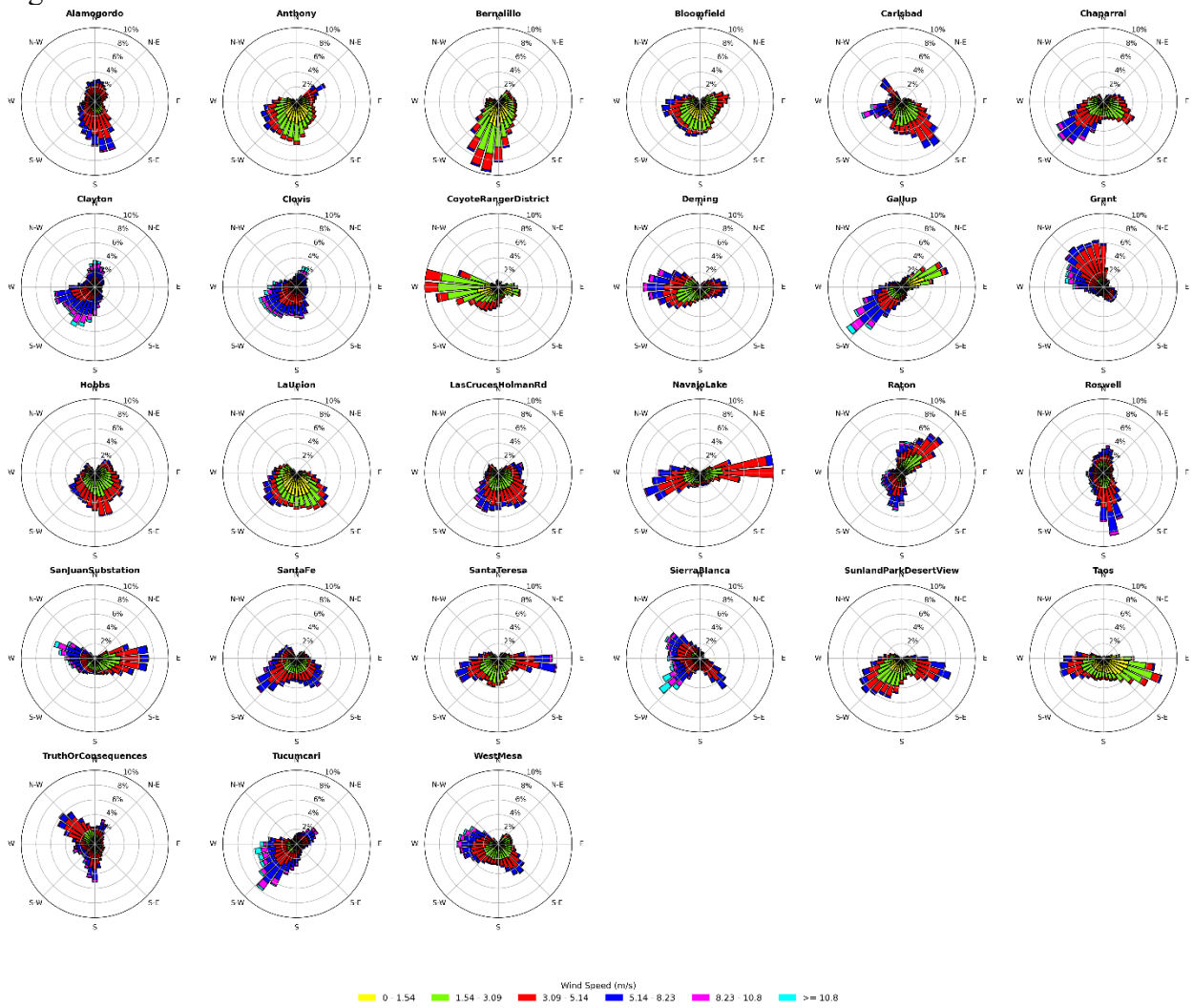


Figure 3: Wind roses for NMED pre-processed data.

4.4 Background Concentrations

> "Background concentrations should be determined for each critical (concentration) averaging time." (68242 Federal Register / Vol. 70, No. 216 / Wednesday, November 9, 2005 / Rules and Regulations)

The background concentrations listed below were derived from information downloaded from https://aqs.epa.gov/aqsweb/airdata/download_files.html.

4.4.1 Uses of Background Concentrations

Background concentrations are added to the modeled concentrations or are used for stoichiometric modeling applications such as OLM or PVMRM. Normally, a background concentration associated with the averaging period being modeled is added after the model (with all facility and nearby sources) is completed. Sometimes this approach proves too conservative to demonstrate compliance with standards. If so, monthly, daily, or hourly concentration profiles can be developed using representative sets of monitoring data appropriate for the modeling domain. Adding refined background concentrations normally requires post-processing of hourly output files.

It is very important to use recent monitoring data, because concentration trends are likely to change over time (much more so than weather patterns). If hourly meteorological data does not match hourly monitoring data, then the following methods can be used to produce a concentration profile for the refined modeling exercise.

Choose the highest background for each period for the region that best describes the modeling domain, unless adequate justification can be made that a specific monitor is most representative. For rural areas that do not match the regional descriptions above, use a monitor from Eastern NM or Southwestern NM.

4.4.1.1 Refined background concentrations

Background concentrations may be refined to take into account patterns in daily and monthly fluctuations in concentration. Since background concentrations are added to the model after dispersion is complete, there is no point mathematically in determining refined background concentrations shorter than the averaging period of the air quality standard. 24-hour concentrations do not need 1-hour background concentrations (except for ozone limiting of NO_2 concentrations, which happens during dispersion).

4.4.1.2 Developing 24-hour refined background concentrations

Each of the 12 months is represented by the maximum 24-hour concentration occurring during that month. If three years of data are available, average the three values for each month and use the average for the background. If a given month has a low maximum concentration due to the small number of samples collected that month, then the concentration from that month is not used and the average of the maximums of the two other years will be used as the 24-hour background for that month.

4.4.1.3 Developing 1-hour refined background concentrations

From the geographically nearest full set of monitoring data to the facility to be modeled, determine the maximum one-hour concentration that occurs during each hour of the day for each month. The result will be twelve different 24-hour profiles that will be repeated for the entire month that each represents. This profile can be used for all averaging periods. If three years of data are available, average the three values for each month and use the average for the background.

Example: Determine the maximum concentration for hour 1 (midnight to 1AM) in January. Use this for hour 1 for each day in January. Determine the maximum concentration for hour 2 (1AM to 2AM) in January. Use this for hour 2 for each day in January. … Determine the maximum concentration for hour 24 (11PM to midnight) in December. Use this for hour 24 for each day in December. Complete the entire year in this manner, with hour and month-specific data.

4.4.1.4 Eliminating double-counting of emissions in background

In some cases the addition of a background concentration may result in double-counting of some of the emissions, if the reference monitor is very close to the modeling domain. This effect may be reduced by placing a receptor at the monitor location and modeling the sources in the model that existed at the time of the monitoring. The modeled concentration at the monitor may be subtracted from the background (with a minimum background of zero). The averaging period should be the same as the one used for the background calculation and must be temporally correlated if the maximum monitored concentration is not being used.

4.4.2 CO Background Concentration

Ambient CO monitors to represent New Mexico are very limited. Concentrations near Sunland Park are best represented by monitors in El Paso. Monitors operated by Albuquerque should be conservative for the rest of New Mexico.

Table 30: Carbon Monoxide Background Concentration

Region	ID	Location	1-hour (µg/m^3)	8-hour (µg/m^3)	Latitude	Longitude	Address
The rest of New Mexico	350010023	Del Norte High School	1560	1035	35.1343	-106.585	4700a San Mateo NE, Albuquerque
Albuquerque	350010029	South Valley	3527	2070	35.01708	-106.657	201 Prosperity SE, Albuquerque
Albuquerque	350012022a	San Jose	2933	2300	35.06356	-106.648	2015 Galena St SE, Albuquerque
Sunland Park	481410044	El Paso Chamizal	4597	2453	31.76569	-106.455	800 S San Marcial Street, El Paso, TX

Concentrations are the average of the maximum concentrations for 2021-2023

4.4.3 H_2S Background Concentration

NMED has no H_2S monitors. The standards are generally designed to protect against noticeable changes in concentration above the background concentration for the region, and no background concentration is added. Cumulative analysis should be conducted using surrounding source modeling.

4.4.4 Lead Background Concentration

Reformulation of gasoline and other control measures have virtually eliminated ambient lead concentrations. NMED has no lead monitors. Treat as zero background.

4.4.5 NO_2 Background Concentration

Note: No 24-hour averages were calculated. Compliance with 1-hour NAAQS automatically demonstrates compliance with 24-hour NMAAQS.

Table 31: NO_2 Background Concentration

Region	ID	Location	Annual Background (µg/m^3)	1-hour Background (µg/m^3)	1-hour 98th percentile (µg/m^3)	Latitude	Longitude	Address
4-Corners	350450009	1ZB, Bloomfield	16.4	79.1	61.8	36.7422	-107.9770	162 Hwy 544, Bloomfield
4-Corners	350450018	1NL, Navajo Dam	11.4	96.0	42.2	36.8097	-107.6520	423 Hwy 539, Navajo Dam
4-Corners	350451005	1H Substation	5.1	53.0	37.3	36.7967	-108.4731	Shiprock Electrical Substation, Waterflow
Albuquerque	350010023	Del Norte High School	15.6	89.9	81.6	35.1343	-106.5850	4700A San Mateo NE, Albuquerque
Albuquerque	350010029	South Valley	14.0	93.4	67.4	35.0170	-106.6570	201 Prosperity SE, South Valley
South Central	350130021	6ZM, Sunland Park	15.0	112.0	89.6	31.7961	-106.5840	5935A Valle Vista, Sunland Park
South Central	350130022	6ZN, US-Mexico Border Crossing	12.4	105.0	87.3	31.7878	-106.6830	104-2 Santa Teresa International Blvd
Eastern NM	350151005	5ZR, Outside Carlsbad	9.7	77.1	58.6	32.3800	-104.2620	Holland St, SE of Water Tank, Carlsbad
Eastern NM	350250008	5ZS, Hobbs-Jefferson	8.5	74.8	58.3	32.7267	-103.1230	2320 N. Jefferson St, Hobbs
Southwestern NM [a]	350290003	7E, Deming	7.0	62.1	53.3	32.2558	-107.7230	310 Airport Road, Deming

Annual background is the average of three annual averages of monitoring data from 2021-2023. The maximum 1-hour NO_2 concentrations from each of three years were averaged to determine the 1-hour background concentration, using monitoring data from 2021-2023.

Refined 1-hour background profiles may be developed using the guidance described in "Refined Background Concentrations", above.

[a] Based on 2013 -2015 averages, most recent certified data available.

4.4.6 Total Reduced Sulfur Background Concentration

NMED has no total reduced sulfur monitors. The standards are generally designed to protect against noticeable changes in concentration above the background concentration for the region, and no background concentration is added.

4.4.7 Ozone Background Concentration

Ozone background concentrations are required for NO_2 modeling using PVMRM or OLM. The hourly maximum ozone concentration from the nearest ozone monitor may be used for ozone limiting. Refined 1-hour background profiles may be developed using the guidance described in "Refined Background Concentrations", above. Ozone files typically use the format, "(4I2,5X,F8.3)". Hourly concentrations use $\mu g/m^3$ to avoid elevation errors.

Table 32: Ozone Background Concentration

Region	ID	Location	1-hour Background ($\mu g/m^3$)	Latitude	Longitude	Address
4-Corners	350450009	1ZB, Bloomfield	150.9	36.7422	-107.9776	2200 N 1st St., Bloomfield
4-Corners	350450018	Navajo Dam	153.5	36.8097	-107.6522	423 Highway 539, Navajo Dam
4-Corners	350450020	Chaco Culture NHP	154.2	36.0350	-107.9042	Chaco Culture National Historical Park - Radio Repeater
4-Corners	350451005	1H Substation	155.5	36.7967	-108.4731	Shiprock Electrical Substation, Waterflow
Albuquerque	350010023	Del Norte High School	163.3	35.1343	-106.8582	4700A San Mateo NE, Albuquerque
Albuquerque	350010029	South Valley	159.4	35.0171	-106.3574	201 Prosperity SE, South Valley
Albuquerque	350011012	Foothills	163.3	35.1852	-106.5082	8901 Lowell NE, Albuquerque
Albuquerque	350012022	San Jose	191.1	35.0636	-106.6475	2015 Galena St SE, Albuquerque
Albuquerque	350431001	Bernalillo	156.8	35.2995	-106.5489	600 Oak St, Bernalillo
Eastern NM	350150010	Carlsbad-Artesia	192.7	32.1782	-104.4434	727 Carlsbad Caverns Hwy
Eastern NM	350151005	5ZR, Outside Carlsbad	183.6	32.3801	-104.2627	2811 Holland St., Carlsbad
Eastern NM	350250008	5ZS, Hobbs-Jefferson	174.4	32.7267	-103.1229	2320 N. Jefferson St., Hobbs
North Central	350390026	3CRD, Coyote Ranger District	155.5	36.1877	-106.6984	21 New Mexico 96, Coyote
North Central	350490021	Santa Fe Airport	150.9	35.6198	-106.0797	2001 Aviation Drive, Santa Fe
South Central	350130008	6O, La Union	181.0	31.9307	-106.6311	7048 McNutt, La Union
South Central	350130020	6ZK, Chaparral	171.8	32.0412	-106.4097	680 Mccombs, Chaparral

Region	ID	Location	1-hour Background (µg/m^3)	Latitude	Longitude	Address
South Central	350130021	6ZM, Desert View	190.8	31.7962	-106.5844	5935A Valle Vista, Sunland Park
South Central	350130022	6ZN, Santa Teresa	170.5	31.7879	-106.6833	104-2 Santa Teresa International Blvd
South Central	350130023	6ZQ, Solano	156.8	32.3176	-106.7683	750 N Solano Dr., Las Cruces
South Central	350610008	Los Lunas	152.9	34.8147	-106.7396	100 W Main St., Los Lunas

Unless otherwise noted, the maximum 1-hour O_3 concentrations from each of three years were averaged to determine the 1-hour background concentration, using monitoring data from 2021-2023.

[a] Based on 2022-2023 averages only

4.4.8 PM_{10} Background Concentration

Table 33: PM_{10} Background Concentration

Region	ID	Location	Annual Background (µg/m^3)	24-hour Background Maximum (µg/m^3)	24-hour Background Second High (µg/m^3)	Latitude	Longitude	Address
4-Corners	350451005	1H Substation	13.0	122.3	104.7	36.7967	-108.4731	Shiprock Electrical Substation, Waterflow, Farmington
Albuquerque	350010023	Del Norte High School	21.4	102.7	78.7	35.1343	-106.5852	4700A San Mateo NE, Albuquerque
Albuquerque	350010026	Jefferson	38.3	136.7	128.0	35.1443	-106.6047	3700 Singer, Albuquerque
Albuquerque	350010029	South Valley	40.7	143.0	132.7	35.0171	-106.6574	201 Prosperity SE, South Valley
Albuquerque	350011012	Foothills	17.1	101.0	80.3	35.1852	-106.5082	8901 Lowell NE, Albuquerque
Albuquerque	350011013	North Valley	36.0	117.3	105.3	35.1932	-106.6138	9819A Second St NW, Bernalillo
Albuquerque [a]	350012022	San Jose	41.6	138.5	126.5	35.0636	-106.6475	2015 Galena St SE, Albuquerque
Eastern NM [b]	350250008	5ZS Hobbs-Jefferson	24.0	100.7	37.3	32.7267	-103.1229	2320 N. Jefferson St, Hobbs
North Central [c]	3HM, 350490020	Santa Fe	9.4	22.7	19.0	35.6711	-105.9536	Runnels Bldg. 1190 St. Francis Dr., Santa Fe
South Central	350130016	6CM Anthony	37.1	146.0	136.0	32.0037	-106.5997	705 Church St., Anthony

Region	ID	Location	Annual Background ($\mu g/m^3$)	24-hour Background Maximum ($\mu g/m^3$)	24-hour Background Second High ($\mu g/m^3$)	Latitude	Longitude	Address
South Central	350130019	6ZL Holman Road	23.7	132.3	117.3	32.4248	-106.6747	Las Cruces Well #41, Las Cruces
South Central	350130020	6ZK Chaparral	26.2	140.7	131.0	32.0412	-106.4097	680 McCombs, Chaparral
South Central	350130021	6ZM Desert View	39.2	139.0	119.3	31.7962	-106.5844	5935A Valle Vista, Sunland Park
South Central	350130024	6WM West Mesa	15.9	118.3	102.3	32.2782	-106.8650	West Mesa Well #46, Las Cruces
Southwestern NM	350290003	7E Deming Airport	22.0	122.7	114.7	32.2558	-107.7227	3412 Raymond Reed Blvd, Deming

Concentrations are averaged from 2021-2023 unless otherwise indicated. Some monitors, such as 350010026 and 350010029, are located near industrial sources or in disturbed areas and do not represent ambient background concentrations.

Refined 24-hour background profiles may be developed using the guidance described in "Refined Background Concentrations", above.

Anomalously high values and values above AAQS were removed before calculating aggregate concentrations. Each site did have over 94% data included.

[a] Based on 2022-2023 averages only
[b] Based on 2015-2017 averages, the most recent certified data available.
[c] Based on 2012-2014 averages, the most recent certified data available.

4.4.9 $PM_{2.5}$ Background Concentration

Table 34: $PM_{2.5}$ Background Concentration

Region	ID	Location	Annual Background ($\mu g/m^3$)	24-hour Background 100th%ile ($\mu g/m^3$)	24-hour Background 98th%ile ($\mu g/m^3$)	Latitude	Longitude	Address
4-Corners [a]	350450019	Farmington Environment Department Office	4.2	14.1	11.8	36.7742	-108.1650	3400 Messina Drive, Farmington
Albuquerque	350010023	Del Norte High School	6.0	11.8	11.0	35.1343	-106.5852	4700A San Mateo NE, Albuquerque
Albuquerque	350010026	Jefferson	8.3	19.8	18.0	35.1443	-106.6047	3700 Singer, Albuquerque
Albuquerque	350010029	South Valley	9.0	22.8	20.7	35.0171	-106.6574	201 Prosperity SE, South Valley
Albuquerque	350011012	Foothills	4.9	8.7	8.2	35.1852	-106.5080	8901 Lowell NE, Albuquerque
Albuquerque	350011013	North Valley	8.8	20.2	18.9	35.1932	-106.6138	9819A Second Street NW, North Valley
Albuquerque [b]	350012022	San Jose	9.4	23.7	21.9	35.0636	-106.6475	2015 Galena St SE, Albuquerque
Eastern NM	350250008	Hobbs-Jefferson	6.6	18.7	16.7	32.7267	-103.1229	2320 N. Jefferson St, Hobbs
North Central	350550005	Taos	4.9	14.0	12.8	36.3833	-105.5839	123 Camino de Santiago Fire Station, Taos
North Central	350490021	Santa Fe	3.6	13.8	12.0	35.6197	-106.0796	2001 Aviation Drive, Santa Fe
South Central	350130016	Anthony	7.8	25.0	21.9	32.0036	-106.5992	705 Church St., Anthony
South Central	350130022	6ZN, Santa Teresa	5.6	18.0	16.0	31.7879	-106.6833	104-2 Santa Teresa International Blvd, Las Cruces
South Central	350130025	6Q, Las Cruces	5.0	14.4	12.7	32.3219	-106.7678	2301 Entrada Del Sol, Las Cruces

Concentrations are the average of three years of maximum data from 2021-2023 unless otherwise indicated. Some monitors may not represent background concentrations. Use the highest 98th percentile background concentration from the region in which the facility is located, unless another monitor is more representative of the local area. Refined 24-hour background profiles may be developed using the guidance described in "Refined Background Concentrations", above.

[a] Based on 2013-2015 averages, the most recent certified data available.
[b] Based on 2022-2023 averages only

4.4.10 SO_2 Background Concentration

Table 35: SO_2 Background Concentrations

Region	ID	Location	1-hour Background ($\mu g/m^3$)	1-hour Background 99th Percentile ($\mu g/m^3$)	Annual ($\mu g/m^3$)	Latitude	Longitude	Address
4-Corners	350451005	Shiprock Substation	15.9	11.4	0.8	36.79667	-108.473	Shiprock Electrical Substation, Waterflow
Albuquerque	350010023	Del Norte High School	6.6	5.5	0.7	35.1343	-106.585	4700A San Mateo NE, Albuquerque
El Paso	481410044	El Paso Chamizal	17.0	14.2	0.7	31.76569	-106.455	800 S San Marcial St, El Paso, TX
Northeastern NM [a]	483751025	Amarillo, 24th Ave	53.2	34.6	0.8	35.2367	-101.787	4205 NE 24th Ave, Amarillo TX
Permian Basin	No representative background concentrations are currently available for the Pecos-Permian Basin region. Cumulative analysis must be conducted by modeling surrounding sources.							
Southwest NM [b]	350171003	Hurley Smelter	6.1	1.8	0.02	32.69194	-108.124	Chino Blvd Near Hurley Park, Hurley
The rest of NM	350450009	Bloomfield	5.1	3.8	0.1	36.74222	-107.977	162 Hwy 544, Bloomfield

Concentrations are the average of three years of maximum data from 2021-2023 unless otherwise indicated.

Refined 1-hour background profiles may be developed using the guidance described in "Refined Background Concentrations", above.

[a] Based on 2021 and 2023 data only.
[b] Based on 2013-2015, the most recent certified data available

4.5 Location and Elevation

Important: Use the same UTM zone and datum for the entire facility. Facilities on the border between two UTM zones must convert all information into one zone or the other.

Make sure that the source location and parameters are the same as those listed in the application form. This is the most common mistake we see.

4.5.1 Terrain Use

Terrain classifications are defined as follows:

- **Flat terrain** – Terrain with all elevations equal to the base of the source
- **Simple terrain** – Terrain with elevations below stack height
- **Complex terrain** – Terrain with elevations above stack height
- **Intermediate (Complex) terrain** – Terrain with elevations between stack height and plume height (a subset of complex terrain).

Flat terrain should be used if the source base is higher than all the surrounding terrain or if the facility consists primarily of non-buoyant fugitive sources. Simple and complex terrain should be used for all other scenarios.

4.5.2 Obtaining Elevation

Elevation data for receptors, sources, and buildings should be calculated using AERMAP. Data are available from USGS at https://apps.nationalmap.gov/downloader/#/ in ArcGrid and GeoTIFF format. Use at least an 1/3 arc-second resolution. It is important to use the same source of data for all elevations. Surrounding sources are provided by the Bureau without elevations and AERMAP should be used to calculate the elevations.

4.6 Receptor Placement

4.6.1 Elevated Receptors on Buildings

Elevated receptors should be placed on nearby buildings at points of public access where elevated concentrations may be predicted. Use flagpole receptors in areas with multi-story buildings to model state and federal standards. In cases where nearby buildings have publicly accessible balconies, rooftops, or similar areas, the applicant should consult with the Bureau modeling staff to ensure proper receptor placement. PSD increment receptors are limited to locations at ground level.[15]

[15] NSR Workshop Manual, page C.42 (https://www.epa.gov/sites/default/files/2015-07/documents/1990wman.pdf)

4.6.2 Ambient Air

Certain areas may be excluded from an analysis of concentrations for air quality standards and PSD increments. "Ambient air means that portion of the atmosphere, external to buildings, to which the general public has access.[16]" "The atmosphere over land owned or controlled by the stationary source may be excluded from ambient air where the source employs measures, which may include physical barriers, that are effective in precluding access to the land by the general public.[17]" Historically a continuous physical barrier, such as a fence or a wall, has been used for this purpose, but other measures may be approved on a case by case basis. In addition to physically restricting the public from the area, the source must have the legal authority to restrict the public from the area. For example, a steep cliff on public land would be considered ambient air but a similar cliff on property owned or leased by a source may be non-ambient air for that source.

If plant property is accessible to the public or if any residence is located within the restricted area, receptors should be located on-property.[18] Public access is interpreted to include housing, schools, hospitals, and similar areas that are frequented by family members of employees, but the remainder of the restricted area is excluded from public access if such family members do not have access to excluded areas. For example, receptors would not be placed by dormitories on military bases but would be placed in family housing areas.

Situations may arise where multiple sources locate close to each other. Each source may have its own ambient air and non-ambient air based on the area each physically and legally controls[19]. Contributions from each source may be subtracted from inside its own non-ambient air, but all other contributions in that area will be included for determinations of compliance with NAAQS, NMAAQS, and PSD increments[20]. See also https://www.epa.gov/nsr/ambient-air-definitioninterpretations for additional guidance.

4.6.3 Receptor Grids

"Receptor sites for refined modeling should be utilized in sufficient detail to estimate the highest concentrations and possible violations of a NAAQS or a PSD increment. In designing a receptor network, the emphasis should be placed on receptor resolution and location, not total number of

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[16] 40 CFR 50.1 (e) (https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-50/section-50.1)
[17] Andrew R. Wheeler, *Revised policy on Exclusions from "Ambient Air",* EPA, December 2, 2019, pg. 1 (https://www.epa.gov/sites/default/files/2019-12/documents/revised_policy_on_exclusions_from_ambient_air.pdf)
[18] NSR Workshop Manual (Draft), EPA, October 1990, Page C.42
[19] Stephen D. Page, *Interpretation of "Ambient Air" In situations Involving Leased Land Under the Regulations for Prevention of Significant Deterioration (PSD)*, EPA OAQPS, June 22, 2007
[20] Robert D. Bauman, Ambient Air, EPA OAQPS, October 17, 1989 (https://www.epa.gov/sites/production/files/2015-07/documents/ambiet2.pdf)

receptors." (68238 Federal Register / Vol. 70, No. 216 / Wednesday, November 9, 2005 / Rules and Regulations)

The modeling domain can be defined using a Cartesian grid with 1000 meter spacing. Fine grids or fence line receptors with 50 to 100 meter spacing should fill any areas of the domain with potential to contain the highest concentration and/or any possible exceedances of NMAAQS, NAAQS, or PSD increment for the refined modeling. For the development of PRIME building downwash algorithms and for model comparison between AERMOD and other models, EPA used 50 meter spacing as the closest spacing[21]. 50 meter spacing is recommended for fence line receptors for most sources, but 100 meters is recommended for expansive sources like coal mines, copper mines, or large military bases. (Grids with 50 meter spacing and 2 km side width are recommended for medium or large neighboring point sources. 50 meter spacing and 1 km width grids are recommended for hilltops or small neighboring sources.) Once these areas of potential high concentrations have been refined, the remaining receptors may be discarded.

For sources with an ROI greater than 50 kilometers, the grid should not extend beyond 50 km, as is noted in the NSR Workshop Manual.

4.6.4 PSD Class I Area Receptors

A modeling analysis of the PSD increment consumed at the nearest Class I areas must be performed by increment-consuming sources in AQCRs where the PSD minor source baseline date has been established, or in any AQCR where a new PSD-major source is to be installed. One receptor at the near boundary of the Class I area is normally sufficient for modeling to compare with Class I significance levels. 1000 meter spacing is recommended within the Class I areas for facilities with significant concentrations. If concentrations are above 75% of the PSD increment, then 50 to 100 meter spacing should be used near the hot spots. See Figure 1 for locations of Class I areas.

4.6.5 PSD Class II Area Receptors

Other than areas that are designated as PSD Class I areas, the entire state of New Mexico is a Class II area. The receptor grid for the PSD Class II increment analysis should be the same as the one for the cumulative run.

4.7 Building Downwash and Cavity Concentrations

Building downwash should be included in the analysis when stack height is less than good engineering practice (GEP) stack height and there are buildings, tanks, or other obstacles near the facility. All buildings and structures should be identified and analyzed for potential downwash

[21] *Comparison of Regulatory Design Concentrations AERMOD vs ISCST3, CTDMPLUS, ISC-PRIME*, EPA, June 2003, pg. 18.

effects. NMED requires the use of BPIP-Prime or equivalent for this analysis. GEP stack height should be determined as per 40 CFR 51.100.

As summarized from 40 CFR 51.100:
GEP stack height is the greater of:

1) 65 meters, measured from the ground-level elevation at the base of the stack
or
2) H + 1.5L

Where

H = Height of nearby structure(s) measured from the ground-level elevation at the base of the stack.

L = The lesser of the height or the projected width (width seen by the stack) of nearby structures.

Nearby structures can be as far as 5 times the lesser of the width or height dimension of the structure, but not greater than 0.8 km.
Stacks taller than GEP stack height should be modeled as if they were GEP stack height.

4.8 Neighboring Sources/Emission Inventory Requirements

> "The number of nearby sources to be explicitly modeled in the air quality analysis is expected to be few except in unusual situations. In most cases, the few nearby sources will be located within the first 10 to 20 km from the source(s) under consideration." (Federal Register / Vol. 82, No. 10 / Tuesday, January 17, 2017 / Rules and Regulations)

4.8.1 Neighboring Sources Data

The Emissions Inventory of neighboring sources is used as input data in air quality models. This data will be provided by the Bureau within a few days of request. E-mail the UTM coordinates of the location(s) to be modeled to the Bureau to request source data. Sources may also be downloaded directly with the MergeMaster program (requires MS Access).

4.8.1.1 Determining which sources to include

This section functions as a definition for "nearby sources" as used in this document. The definition varies based on context, as illustrated below.

The contributions of distant sources are included in the background concentration. If the background concentration is added and includes all neighboring sources or a conservative approximation of them, then surrounding source modeling is not required for modeling of NAAQS or NMAAQS. For particulate matter or cases where the background concentration does not include all neighboring sources, then include all sources within 10 km of the facility in the model, and discard sources beyond 10 km from the facility. PSD increment is modeled, not monitored. (A PSD increment analysis may optionally add a background concentration instead of modeling the more distant sources.) For cases where background concentrations are not added, retain all sources within 25 km of the facility, plus sources emitting over 1000 pounds per hour within 50 km of the facility.

For PSD Class I increment analysis, retain all sources within 25 km of the Class I area, plus sources emitting over 1000 pounds per hour within 50 km of the Class I area.

Table 36: Surrounding Source Retention Example for a Source Near Bloomfield

Pollutant and averaging period	Neighboring source notes:
NO_2 1-hour NAAQS	Do not include surrounding sources. (Optionally, instead of adding background concentrations, include all sources within 25 km of the facility, plus sources emitting over 1000 pounds per hour within 50 km of the facility.)
$PM_{2.5}$ 24-hour NAAQS	Retain sources within 10 km of facility.
NO_2 annual Class II PSD increment	Retain sources within 25 km of the facility, plus sources emitting over 1000 pounds per hour within 50 km of the facility.
NO_2 annual Class I PSD increment	Retain sources within 25 km of Mesa Verde National Park, plus sources emitting over 1000 pounds per hour within 50 km of Mesa Verde.

4.8.1.2 Surrounding source format

The Bureau provides AERMOD input files with the surrounding sources (*.INP) and reference tables (*.XLS) to describe the sources in more detail. The AERMOD input files can be imported in GUI programs or edited manually.

The end of the "SO" pathway in the AERMOD input file contains source group information. Sources in the NAAQS group belong in the NAAQS/NMAAQS analysis. Sources in the PSD group belong in the PSD increment analysis. many sources are in both groups. Imported AERMOD input files should import that information if a GUI is used to manage modeling inputs. Source IDs provided can be used to identify the source in the Bureau's database.

Unless otherwise noted, units of measure used in the surrounding sources files are the metric units associated with model input format. Emissions designated as NO_2 are actually total oxides of nitrogen (NO_X).

4.8.1.3 Handling errors in surrounding source files

Please contact the Bureau if you see suspicious data in the inventory. We know that there are errors in our database and we would like to correct them.

If you find a piece of equipment that has unusual stack parameters, document the error and corrected values in your modeling report. Please also report the error to Fernando Romo (fernando.romo@env.nm.gov) as well for database correction. Include MASTER_AI_ID, SUBJECT_ITEM_CATEGORY_CODE, and SUBJECT_ITEM_ID in the documentation. Please document the reason the error is suspected.

The following parameters may be substituted for missing or invalid data. Determine the type of source that best matches the types below. For example, engines use the "other" category. Find the smallest emission rate in the table that is greater than or equal to the emission rate of the emission unit. That column contains the parameters that may be used for the parameters that are

missing. (These parameters are based on modeling for general construction permits or on existing source data for control devices.)

Table 37: Missing Stack Parameter Substitutions for Turbines

NO_2 Rate (lb/hr)	Height (m)	Temperature (K)	Velocity (m/s)	Diameter (m)
21.7	7	588	10	0.7
21	6	588	10	0.7
20	5	588	10	0.7
19	5	588	10	0.6
18	4.5	588	10	0.6
17	4.5	588	10	0.6
16	4.5	588	10	0.5
15	4.5	588	10	0.5
14	4.5	588	10	0.5
13	4	588	10	0.5
12	4	588	10	0.5
11	3.5	588	10	0.5
10	3.5	588	10	0.5
9	3.5	588	10	0.5
8	3.5	588	10	0.4
7	3	588	10	0.4
6	3	588	10	0.4
5	2.5	588	10	0.4
4	2.5	588	10	0.4
3	2	588	10	0.35
2	1.8	588	10	0.24
1	1.8	588	10	0.24

Table 38: Missing Stack Parameter Substitutions for Flares

SO_2 Rate (lb/hr)	Height (m)	Temperature (K)	Velocity (m/s)	Diameter (m)
5000	18	1273	20	20.80618
4500	16	1273	20	19.73848
4000	14	1273	20	18.60962
3500	12	1273	20	17.4077
3000	9	1273	20	16.1164
2500	6	1273	20	14.71219

SO_2 Rate (lb/hr)	Height (m)	Temperature (K)	Velocity (m/s)	Diameter (m)
2100	6	1273	20	13.48395
2000	6	1273	20	13.15899
1900	6	1273	20	12.82579
1800	6	1273	20	12.48371
1700	6	1273	20	12.13198
1600	6	1273	20	11.76975
1500	6	1273	20	11.39602
1400	6	1273	20	11.0096
1300	6	1273	20	10.60911
1200	6	1273	20	10.19291
1100	6	1273	20	9.758965
1050	6	1273	20	9.534591
1000	6	1273	20	9.304808
950	6	1273	20	9.069204
900	6	1273	20	8.827315
850	6	1273	20	8.578609
800	6	1273	20	8.322474
750	6	1273	20	8.0582
700	6	1273	20	7.784961
650	6	1273	20	7.501776
600	6	1273	20	7.207473
550	6	1273	20	6.90063
500	6	1273	20	6.579493
450	6	1273	20	6.241855
400	6	1273	20	5.884877
350	6	1273	20	5.504798
300	6	1273	20	5.096453
250	6	1273	20	4.652404
200	6	1273	20	4.161237
150	6	1273	20	3.603737
100	6	1273	20	2.942439
90	6	1273	20	2.791442
80	6	1273	20	2.631797
70	6	1273	20	2.461821

SO_2 Rate (lb/hr)	Height (m)	Temperature (K)	Velocity (m/s)	Diameter (m)
60	6	1273	20	2.279203
50	6	1273	20	2.080618
40	6	1273	20	1.860962
30	6	1273	20	1.61164
29	6	1273	20	1.584552
28	6	1273	20	1.556992
27	6	1273	20	1.528936
26	6	1273	20	1.500355
25	6	1273	20	1.471219
24	6	1273	20	1.441495
23	6	1273	20	1.411144
22	6	1273	20	1.380126
21	6	1273	20	1.348395
20	6	1273	20	1.315899
19	4	1273	20	1.282579
18	4	1273	20	1.248371
17	4	1273	20	1.213199
16	4	1273	20	1.176975
15	4	1273	20	1.139602
14	4	1273	20	1.10096
13	4	1273	20	1.060911
12	4	1273	20	1.019291
11	4	1273	20	0.9758965
10	4	1273	20	0.9304808
9	3.5	1273	20	0.8827316
8	3.5	1273	20	0.8322473
7	3.5	1273	20	0.7784961
6	3.5	1273	20	0.7207473
5	3.5	1273	20	0.6579493
4	3	1273	20	0.5884877
3	3	1273	20	0.5096453
2	2.5	1273	20	0.4161237
1	2	1273	20	0.2942439

Table 39: Missing Stack Parameter Substitutions for Particulate Control Devices

PM10 Rate (lb/hr)	Height (m)	Temperature (K)	Velocity (m/s)	Diameter (m)
22	19	0	28	4.6
21	18	0	27	4.6
20	17	0	26	4.4
19	16	0	25	4.2
18	15	0	24	4
17	14	0	23	3.8
16	14	0	22	3.6
15	13	0	21	3.4
14	13	0	20	3.2
13	12	0	19	3
12	12	0	18	2.8
11	11	0	17	2.6
10	11	0	16	2.4
9	10	0	15	2.2
8	10	0	14	2
7	10	0	13	1.8
6	9	0	12	1.6
5	9	0	11	1.4
4	9	0	10	1.2
3	9	0	9	1
2	9	0	8	0.8
1	9	0	7	0.6

Table 40: Missing Stack Parameter Substitutions for Other Point Sources

NO_2 Rate (lb/hr)	Height (m)	Temperature (K)	Velocity (m/s)	Diameter (m)
21.7	7	730	28	0.3
21	6	730	28	0.3
20	5.5	730	28	0.3
19	4.5	730	28	0.3
18	4.5	730	27	0.3
17	4.5	730	27	0.3
16	4.5	730	27	0.25
15	4.5	730	27	0.25
14	4.5	700	22	0.25
13	4.5	700	22	0.25
12	4.5	700	22	0.2
11	4.5	700	22	0.2
10	4.5	700	22	0.2
9	4.5	700	20	0.2
8	4.5	700	18	0.2
7	4.5	700	14	0.2
6	4.5	650	14	0.2
5	4.5	500	5	0.2
4	4	500	5	0.1
3	3.5	500	5	0.1
2	3	500	5	0.0762
1	2	500	5	0.0762

For GCP 2, 3, and 5 permits with 95 tons/year of $PM_{2.5}$ emissions, use the following values:

TSP emission rate = 95 TPY
PM_{10} emission rate = 71.25 TPY (TSP X 0.75)
$PM_{2.5}$ emission rate = 17.875 TPY (PM_{10} X 0.25) = (TSP X 0.1875)

For volume sources with missing parameters:

Maximum release height = 10 m
Minimum release height = 1 m
Missing release height = PM10 Rate x 20 m/(lb/hr)
Initial vertical dimension = release height x 0.93
No limit to the maximum lateral dimension.
Lateral dimension = PM10Rate x 10 m/(lb/hr)
Minimum Lateral Dimension = 0.47 m

4.8.1.4 Refining Surrounding Sources

In some cases, it will be possible to use actual emissions to model surrounding sources instead of the maximum values allowed in the permit. If actual emission rates from the most recent two years is available, then the following optional technique may be used.

Annual averaging period: For the most recent two consecutive years of operation, if that period is representative of normal operation, the emission rate for each hour (in pounds per hour) is the total tons emitted for those two years divided by 8.76 (lb x year/ton x hour).

Other averaging periods: The unit is assumed to operate continuously unless there is a permit condition or physical limitation that prevents it from operating certain hours of the day or days of the year. If data is available for the most recent two years (Continuous Emissions Monitoring (CEM) data, for example) then a temporally representative level when operating may be used. For example, a generator that provides more power during peak hours could be modeled such that the maximum emission rate would be emitted during the peak hours of the day and the minimum operating emission rate would be emitted during the lowest-demand hours and the hours the unit would normally be off.[22]

4.8.2 Source Groups

It often saves considerable analysis time to set the model up to run with multiple source groups. The following groups are recommended.

- **Source alone group** – contains the sources at the facility that are used to compare with significance levels for the pollutant and averaging period being modeled. This group determines if the facility is above significance levels at the location and time.
- **Cumulative sources group** – contains all allowable emissions of the source and surrounding sources. This group is used to determine compliance with NAAQS and NMAAQS.
- **PSD sources group** – contains all sources that consume or expand PSD increment. This group is used to determine compliance with PSD increment regulations.

Impacts from different groups can be compared to determine if a source contributes significant concentrations if there is a problem complying with air quality standards.

4.8.3 Co-location with a GCP for aggregate processing facilities, asphalt plants, or concrete batch plants

At this time, General Construction Permits (GCPs) for aggregate processing facilities, asphalt plants, and concrete batch plants currently have the requirement that no visible emissions shall cross the fence line, which has been demonstrated to show compliance with all particulate matter air quality standards and PSD increments. NMED has allowed co-located facilities operating under a GCP to rely upon the GCP modeling demonstration for when co-located facilities operate at the same time, since all facilities at the location are required to have the same, no visible emissions,

[22] **Federal Register,** Vol. 82, No. 10, pg. 5220 / Tuesday, January 17, 2017 / Rules and Regulations

requirement at the fence line. However, if a source operating under a regular construction permit co-locates with a GCP source, it must show compliance with all particulate matter air quality standards through air dispersion modeling for times when the GCP opacity requirements may not apply. The modeling for the source operating under a regular construction permit shall include all sources other than the co-located GCP sources. Gaseous pollutant modeling shall include the co-located GCP(s).

5.0 EMISSIONS SOURCE INPUTS

This section describes appropriate modeling for many types of sources. Additional guidance can be found in the User's Guide for the AMS/EPA Regulatory Model - AERMOD (EPA, April 2021, https://gaftp.epa.gov/Air/aqmg/SCRAM/models/preferred/aermod/aermod_userguide.pdf).

5.1 Emission Sources

There are two general types of sources:

Sources that come from a stack or vent – stack sources, or point sources;
And sources that don't – fugitive sources.

5.2 Stack Emissions/Point Sources

All stacks should be modeled as point sources, as detailed below.

5.2.1 Vertical Stacks

Stacks that vent emissions vertically should be modeled as point sources with stack parameters that will simulate the manner in which emissions are released to the atmosphere:

Stack exit velocity, V_s = average upward velocity of emissions at the top of the stack;
Stack diameter, d_s = stack exit diameter;
Stack exit temperature, T_s = average temperature of emissions at the top of the stack;
Stack height, H_s = stack release height.

5.2.2 Stacks with Rain Caps and Horizontal Stacks

Stacks with capped stacks should be modeled in AERMOD using the POINTCAP source type.

Horizontal stacks should be modeled in AERMOD using the POINTHOR source type.

AERMOD will set the temperature to ambient temperature if the stack exit temperature is set to 0 K. If the model being used does not do this, then set the temperature to ambient temperature or to a close approximation thereof.

5.2.3 Flares

Both process and emergency flares should be modeled for comparisons with NAAQS and NMAAQS. If parts of the facility will be shut down when the flare operates then those emission units may be omitted from the flare modeling.

Flares should be treated as point sources with the following parameters as in SCREEN3[23]:

Stack velocity = 20 m/s = 65.617 ft/s

Stack temperature = 1000°C = 1832°F

Stack height = height of the flare in meters as a conservative approach.

Alternatively, stack height may be modeled as effective stack height by adding the flame length on the physical stack height. [24]

Effective stack height $h_{eff} = H_s + 4.56 \times 10^{-3} \times HR^{0.478}$

where heff is effective stack height in meters

HS is flare physical stack height in meters

HR is total heat release rate in cal/sec

Effective stack diameter in meters= $D = \sqrt{10^{-6} q_n}$

where $q_n = q(1 - 0.048\sqrt{MW})$

and q is the gross heat release in cal/sec

MW is the weighted by volume average molecular weight of the mixture being burned in g/mol

()

Flares in the surrounding sources inventory from the Bureau should already have an effective diameter calculated; so the parameters in the inventory can be entered directly into your model input "as is". There are other methods for analyzing impacts of flares; if you wish to use another method, check with the Bureau modeling staff first.

NOTE: The NAAQS cannot be violated, even during upset conditions. All emergency flares should be modeled to show compliance with the NAAQS short-term standards under upset conditions. Emergency flares should be modeled with surrounding sources, but not including neighboring emergency flares and other sources that operate less than 500 hours per year.

5.2.4 Cool Stacks

Filters, cooling towers, or other sources without raised temperature should be modeled at ambient temperature. AERMOD will set the temperature to ambient temperature if the stack exit temperature is set to 0 K. If the model being used does not do this, then set the temperature to ambient temperature or to a close approximation thereof.

5.3 Fugitive Sources

5.3.1 Aggregate Handling

Aggregate handling emissions consist of three separate activities, namely: loading material to and from piles, transportation of material between work areas, and wind erosion of storage piles.

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[23] SCREEN3 Model User's Guide, 1995

[24] Beychock (1979), Fundamentals of Stack Gas Dispersion

Loading material to and from piles should be modeled as volume sources representative of the loading or unloading operation. Emissions for loading and unloading are calculated using AP-42 Section 13.2.4. The loading and unloading each involve dropping the material onto a receiving surface, whether being dropped by a dump truck, a front-end loader, or a conveyor. Each drop should be modeled as described in Fugitive Equipment Sources, below.

Transportation of material between work areas should be modeled according to haul road methodology if vehicles are used to transport the material, or using transfer point methodology if conveyors are used to transport the material, as described in Fugitive Equipment Sources, below.

Modeling of wind erosion of storage piles is optional, as it says in AP42 not to use the equations for wind erosion in a steady state model.

For the following example facility, aggregate is handled 6 times:

1- a pile in front of the mine face is created,
2- a pile in front of the mine face is loaded into trucks or conveyors,
3- a pile in front of the processing equipment (crusher or HMA) is created,
4- loading the equipment (crusher or HMA),
5- a pile after the equipment, and
6- loading the truck

1 and 2 would not apply if on-site mining does not occur.
5 may be considered a transfer point (conveyor) instead of aggregate handling if controls are applied.
5 and 6 may not apply for HMA plant, as material is bound in asphalt.
6 would not apply if the waste pile is left on site.

5.3.2 Fugitive Equipment Sources

Emissions coming from equipment such as crushers, screens, or material transfer points should be modeled as volume sources. Emission rates are normally calculated using AP42 factors.

The release height (H) is the distance from the center of the volume to the surface of the ground. The base of each volume source must be square. For elongated sources, use a series of volume sources with square bases. Determine the apparent size of a volume source by estimating how large the plume would look to an observer. Consider the movement of the plume source during the course of an hour when determining the apparent size. For example, if the source of emissions is from disturbances on a pile, and the entire pile is disturbed at some point in the hour, then use the size of the pile as the apparent size instead of the area of the pile that would be disturbed at any one instant. The reason for this is that the model operates in one-hour blocks of time, so using instantaneous sizes could inaccurately target nearby receptors with elevated emission concentrations.

For a single volume source, divide the apparent length by 4.3 to determine the initial lateral dimension (s_{Yo}) to input into the model[25]. For a line source represented by a series of volume sources, divide the distance between the centers of adjacent sources by 2.15 to determine s_{Yo}.

For a source on the ground, divide the vertical dimension of the source by 2.15 to determine the initial vertical dimension (s_{Zo}) to input into the model. For a source on or connected to a building, divide the height of the building by 2.15 to determine the s_{Zo}. For an isolated elevated source, divide the vertical dimension of the source by 4.3 to determine the s_{Zo}.

Example sources are described in the table below. Some sources will vary from the characteristics listed in Table 41.

Table 41: Example Dimensions of Fugitive Sources

Source Type	Height of Volume (m)	s_{Zo} (m)	Release Height (m)	Width of Volume (m)	s_{Yo} (m)
Crusher	5	2.33	6	5	1.16
Screen	5	2.33	4	5	1.16
Transfer point	2	0.93	2	2	0.47
Elevated transfer point	4	0.93	4	2	0.47
High Elevated transfer point	4	0.93	8	2	0.47
Concrete truck loading	5	2.33	4	5	1.16

5.3.3 Haul Roads

Traffic carrying materials mined or processed at the facility must be modeled as part of the facility. Haul roads to be modeled include the portion of roads that are not publicly accessible. The Bureau recommends haul road modeling to be consistent with Regional/State/Local Haul Road Workgroup Recommendations[26], as described below. Haul road emissions should be modeled as a series of adjacent volume sources, except that area sources should be used for modeling haul roads where receptors located within source dimensions are important. A

[25] *User's Guide for the AMS/EPA Regulatory Model (AERMOD) (EPA-454/B-21-001, April 2021)*,pg. 3-105 (https://gaftp.epa.gov/Air/aqmg/SCRAM/models/preferred/aermod/aermod_userguide.pdf)

[26] *Haul Road Workgroup Final Report*, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, March 2, 2012 (https://www.epa.gov/sites/production/files/2020-10/documents/haul_road_workgroup-final_report_package-20120302.pdf)

procedure to develop model input parameters follows. The applicant can use other procedures on a case-by-case basis but must demonstrate that those procedures would be appropriate.

Road Source Characterization: Follow the instructions described below.

Plume height:

The height of the volume (H) or plume height will be equal to 1.7 times the height of the vehicle generating the emissions. Use the same for top of plume height for area sources. The initial vertical sigma (s_{Zo}) is determined by dividing the height of the plume by 2.15. The release height is determined by dividing the height of the volume by two. This point is in the center of the volume.

Table 42: Example Haul Road Vertical Dimensions

Vehicle size	Truck Height	Height of Volume	s_{Zo}	Release Height
Large trucks	4 m (13.1 ft)	6.8 m (22.3 ft)	3.16 m (10.4 ft)	3.4 m (11.1 ft)
Small trucks	2 m (6.6 ft)	3.4 m (11.2 ft)	1.58 m (5.2 ft)	1.7 m (5.6 ft)

RH = H/2 = Release Height above the ground (m). It's the center of the volume source. Also use this for the source height of the area source, if using the area source alternative.
s_{Zo} = H/2.15 = initial vertical dimension of the volume (m)

Road width:

The adjusted width of the road (W) is the actual width of the road plus 6 meters. The additional width represents turbulence caused by the vehicle as it moves along the road. This width will represent a side of the base of the volume. Use W for the width of the area source, if using the area source alternative.

The initial horizontal sigma (s_{Yo}) for each volume is determined as follows:

- If the road is represented by a single volume, divide W by 4.3.
- If the road is represented by adjacent volumes, divide W by 2.15.
- If the road is represented by alternating volumes, divide the distance between the center point of one volume to the center point of the next volume by 2.15. s_{Yo} = 2W/2.15 This representation is only recommended for very long roads.
- If using area sources, the aspect ratio (i.e., length/width) should be less than 100 to 1. Subdivide the sources if they are too long.
- If using area sources, model each road segment as a straight line. Do not create a road segment with a bend in the road – divide the road into different segments when bends occur.

Road length:

The sum of the length of all volume sources should be about equal to the actual road length, unless the road is very long and half the segments are skipped to save time. The volume sources should be evenly spaced along the road and should be of equal size for a given road. It is acceptable to artificially end the haul road up to 50 meters before the intersection with a public road. The reduced length of the road is due to the observation that vehicles normally slow down or stop before exiting the property. All emissions from haul roads must be modeled, however. Emissions from the reduced road length are added to other road segments.

The two lateral dimensions (length and width) of a volume source should be equal. The number of volume sources, N, is determined by dividing the length of the road (optionally minus 50 meters) by W. The result is the maximum number of volume sources that could be used to represent the road. If N is very large, modeling time can be reduced by using alternating volume sources to reduce the number of sources.

Table 43: Example Haul Road Horizontal Dimensions

Vehicle size	Width of Volume	Length of Volume	σ_{Yo}
Large trucks	13 m (42.65 ft)	13 m (42.65 ft)	W/2.15 = 6.05 m (19.85 ft)
Small trucks	10 m (32.8 ft)	10 m (32.8 ft)	W/2.15 = 4.65 m (15.26 ft)

Road location:

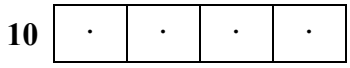
The UTM coordinates for the volume source are in the center of the base of the volume. This location must be at least one meter from the nearest receptor.

Emission Rate:

Divide the total emission rate equally among the individual volumes used to represent the road, unless there is a known spatial variation in emissions. Use the emissions calculated from the entire road length, even if you artificially end the road volume sources early before exiting the facility.

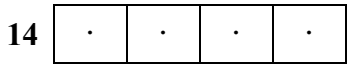
Example sources:
Use of the following modeling parameters should result in acceptable haul road modeling. Different facilities have different sized trucks, roads, and other variables. It is acceptable to use facility-specific parameters

Example One-Way Road Source



(looking from above)
Width = W = 10 m (32.8 ft)
s_{Y_0} = W/2.15 = 4.65 m (15.26 ft)
Figure 4: One-Way Road Source

Two-Way Road Source



(looking from above)
Width = W = 14 m (45.9 ft)
s_{Y_0} = W/2.15 = 6.51 m (21.4 ft)
Figure 5: Two-Way Road Source

Additional guidance can be found in Volume II of the User's Guide for ISC3 model (EPA, 1995).

5.3.4 Area Sources

Sources that have little plume rise may be modeled as area sources. Examples are: storage pile emissions, waste lagoon emissions, or gaseous emissions from landfills. Area source types include rectangle, circle, and irregularly shaped polygon. The model uses only the portion of the area source that is upwind of the receptor for calculating emissions for the hour, so it is safe to put receptors inside the area source without overly magnifying concentrations. The AERMOD input file uses emissions per area, but front-end programs for developing input files may calculate this for you based on total emissions from the source. For additional information, see the *User's Guide for the AMS/EPA Regulatory Model (AERMOD) (EPA-454/B-21-001, April 2021)*.

Extremely long or odd-shaped (like a giant “L”) area sources should be broken up into smaller area sources or modeled as a series of volume sources, because they may misrepresent emissions. Area sources, such as AREACIRC sources, may require many times as long to run the model as do volume or point sources in AERMOD.

5.3.5 Open Pits

The open pit source type should only be used to model open pits (not elevated trash dumpsters or anything else that somewhat resembles an open pit). The elevation of the pit entered into the model is the elevation of the top of the pit, which should be ground level.

The model calculates the effective depth of the pit by dividing the pit volume by the length and width of the pit. Release height above the base of the pit must be smaller than this value. Emissions from the bottom of the pit are expressed with a release height of zero.

Pit length should be less than 10 times the pit width. However, a pit cannot be sub-divided because the model needs to calculate mixing done throughout the pit. If the pit is irregular in shape, use the actual area of the top of the pit to calculate a rectangular shape with the same area.

Do not place receptors inside a pit.

The model input file requires pit emission rates to be expressed in mass per time per area [i.e., $g/(s \cdot m^2)$]. Model input front-end programs may convert actual emission rate into area-based emission rates automatically, however.

5.3.6 Landfill Offgas

Decomposition of landfill material can result in the release of gasses such as H_2S. If these gases are not collected using a negative pressure system and flared, then the area of the landfill that is releasing gas can be modeled as an area or a circular area source. If gas is collected by a negative pressure collection system and flared, then model the flare the same way other flares are modeled. Place large area sources in areas that have little effect from the negative pressure collection system. In either case, elevation of the source should be equal to that of the surface, and release height should be zero because they are released from the ground and are not significantly affected by turbulence caused by vehicles traveling over the off-gasses.

6.0 MODELING PROTOCOLS

6.1 Submittal of Modeling Protocol

A modeling protocol should be submitted prior to the performance of a dispersion modeling analysis. For PSD applications, a modeling protocol is mandatory, and must be sent to NMED/AQB for review and comment. Consultation with Bureau modeling staff regarding appropriate model options, meteorological data, background concentrations, and neighboring sources is recommended for minor sources also, and can be accomplished in writing or by phone. The applicant should allow two weeks for the Bureau to review and respond to the written protocol. To avoid delays caused by misinterpretation or misunderstanding, we strongly recommend consultation with our staff on the following topics:

a.) Choice of models;
b.) Model input options;
c.) Terrain classification (flat or simple and complex);
d.) Receptor grids;
e.) Source inventory data;
f.) Minor source baseline dates for modeling increment consumption;
g.) Nearby Class I areas;
h.) Appropriate meteorological data;
i.) Background concentrations;
j.) Setback distance calculation if a proposed facility is a portable fugitive source;
k.) Any possible sources of disagreement;

Important: Modeling that substantially deviates from guidelines may be rejected if it is not accompanied by a written approved modeling protocol.

The input data to the models will be unique to the source. Data will usually consist of 1) emission rates and stack parameters for the proposed source at maximum load capacity and at reduced load capacity; 2) emission parameters of sources in the area; 3) model options; 4) suitable meteorological data; 5) definition of source operation which creates the greatest air quality impacts if other than maximum load conditions; and 6) terrain information, if applicable. Very important: **The emission parameters used in the modeling analysis of the proposed source are normally the same as those in the permit application. Any difference between the two should be clearly documented and explained.** Failure to adhere to this rule may result in an incomplete analysis.

6.2 Protocol ingredients

The shortest acceptable modeling protocol would be a statement that the modeling guidelines will be followed and a statement of what meteorological data and background concentration monitors will be used. Ask the modeling section or check the web page for the latest sample protocols.

6.3 How to submit the protocol

E-mail the modeling protocol to the modeling manager: Sufi.Mustafa@state.nm.us

7.0 DISPERSION MODELING PROCEDURE

Note: The basic steps for performing the modeling are presented in sequential format. A sample flowchart is shown in Figure 1. Sometimes, it will make sense to perform some of the steps out of order. The sequential modeling steps are designed as an aid to modeling, not a mandatory requirement.

It is important to have an approved modeling protocol before proceeding. Modeling that substantially deviates from guidelines may be rejected if it is not accompanied by a written approved modeling protocol.

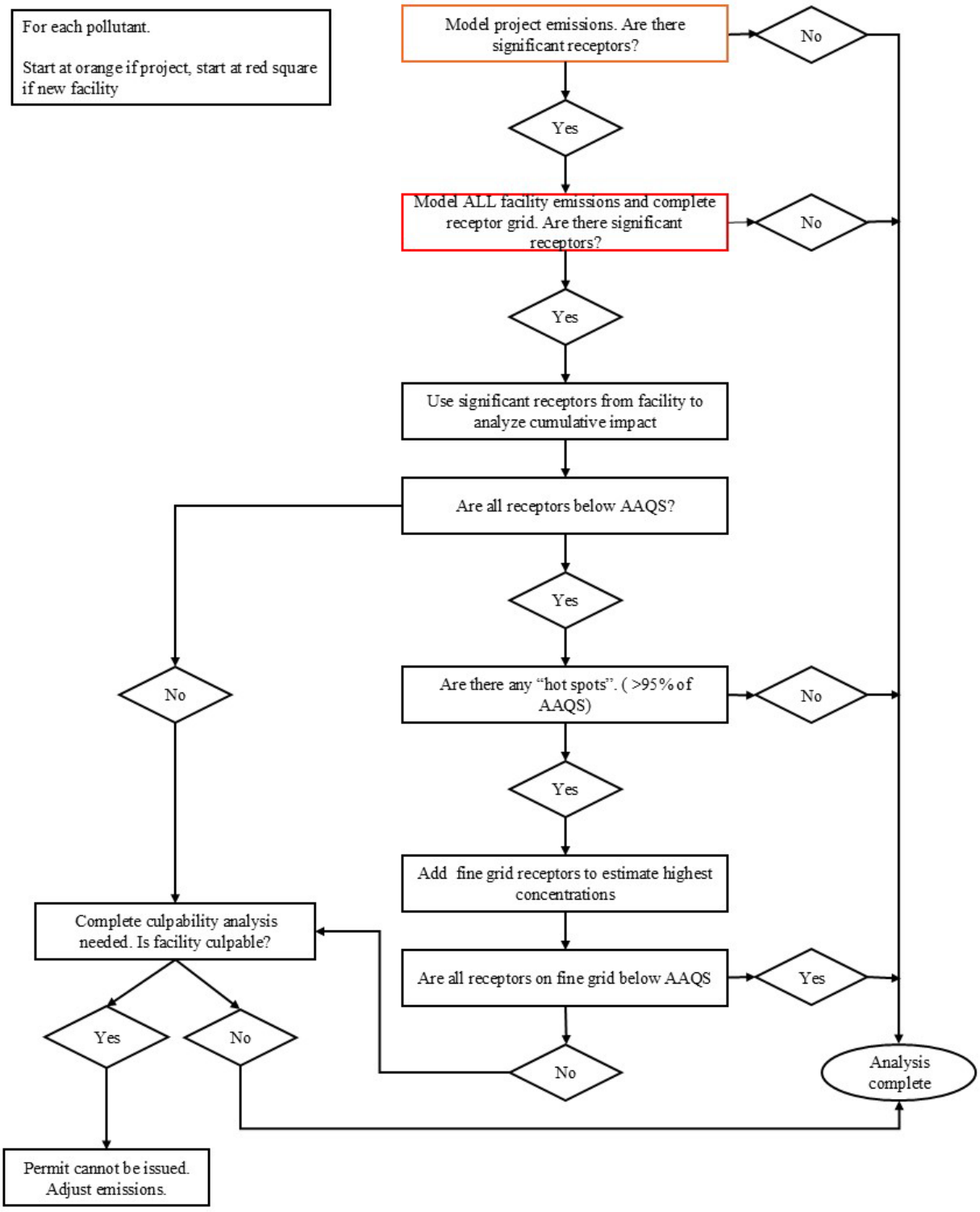


Figure 6: Example modeling procedure flowchart, AAQS stands for ambient air quality standard.

7.1 Step 1: Determining the Radius of Impact

A facility's significance area is defined as all locations outside of its fence line where the source produces concentrations that are above the significance levels listed in Table 6. The source is deemed culpable for concentrations that exceed air quality standards or PSD increments that occur at a receptor if the source's contribution is above the significance level at the same time that the exceedance of air quality standards or PSD increments occurs.

The Bureau uses the Radius of Impact (ROI) to make sure the entire significance area is analyzed. The ROI is defined as the greatest distance from the center of the facility to the most distant receptor where concentrations are greater than significance levels.

An illustration of determining an ROI from modeling output is shown in Figure 7, below. Note that the entire ROI is completely contained within the receptor grid, as required.

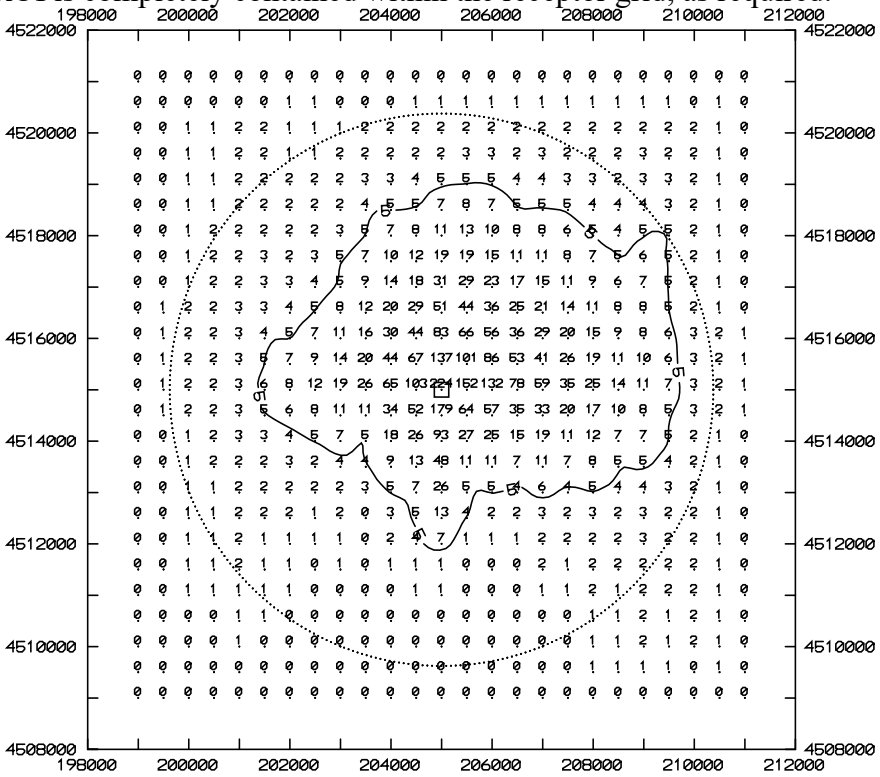


Figure 7: Plot of pollutant concentrations showing the 5 µg/m^3 significance level and the radius of impact (dashed line circle), determined from the greatest lineal extent of the significance level from the source.

7.1.1 Prepare the ROI analysis as follows:

I. Select the model that will be used for the analysis. It is usually quicker in the long run to use the same model for the radius of impact analysis as will be used for the refined analysis.

II. Model the entire source, as defined in section 2.4.3. If the project source has significant receptors, then model the entire facility. Suggestion: Plot your sources to verify locations and identify typographical errors.
III. Set up the receptors as described above. Make sure the receptor grid extends far enough in every direction to capture the entire ROI, subject to the maximum radius of 50km.
IV. Calculate the elevations of all sources, receptors, and buildings.
V. Add buildings and analyze them with BPIP or equivalent programs.
VI. Choose modeling options, as appropriate.
VII. Make sure that all sources and operating scenarios are modeled according to the guidelines in section 4 and section 5, above.
VIII. Run the model.

7.1.2 Analyze modeling results to determine ROI

I. Determine a radius of impact for each pollutant for each applicable averaging period. The largest ROI may be designated as the ROI for that pollutant, or each averaging period determined independently.
II. The ROI for NO_2 may be determined using Ambient Ratio Method 2 (ARM2).
III. Concentrations inside the facility's fence line can be ignored when determining the ROI.
IV. If no concentrations of a pollutant are above the significance levels for that pollutant, then the ROI for that pollutant is 0. Skip to Step 3 for that pollutant.
V. It is acceptable to scale impacts from one pollutant to determine impacts from another pollutant if several pollutants vent from the same stack and the ratios of emission rates and the averaging periods are the same.

Proceed to Step 2 for each pollutant with an ROI greater than zero.

7.2 Step 2: Refined Analysis

The entire area of significance must be included in the analyses for all averaging periods for each pollutant. If the ROI was determined using coarse grids, then add fine grid spacing to the potential areas of maximum concentration or concentrations above standards. If the ROI was determined using appropriate grid spacing, elevations, and building downwash (if applicable), then only the significant receptors need to be modeled for the refined analysis.

Once the ROI is determined for a specific source, neighboring sources need to be included and a cumulative impact analysis needs to be performed. As the ROI analysis is concerned with significance levels, the refined analysis is concerned with NAAQS, NMAAQS, and PSD Class I and Class II increments. The concentrations produced by the facility plus surrounding sources must be demonstrated to be below these levels in order to issue a permit under the regular permitting process.

7.2.1 Prepare the Refined Analysis as Follows:

I. If a screening model was used to determine ROI, the modeler may wish to use a refined model to reduce the area of significant impact. If so, return to *Step 1* and repeat the step with the new model.
II. Prepare a new modeling input file from the ROI file.
III. Fill the ROI with receptors with appropriate spacing (or discard receptors below significance levels if appropriate spacing was used for the ROI analysis).
IV. Add receptors near areas of high concentration if these areas are not contained within a fine grid. The modeling run must definitively demonstrate that the maximum impact has been identified. Concentrations should "fall off" from the center of the fine grid.
V. Add surrounding sources to the input file, if appropriate, as described in *Neighboring Sources/Emission Inventory Requirements*, above. Include $PM_{2.5}$ surrounding sources if particulate modeling is required. Suggestion: set up source groups so that impacts from the source alone, from the PSD increment consuming sources, and from all sources can be analyzed in a single run and compared with each other for determination of culpability.
VI. Building downwash analysis must be included in the refined analysis, if applicable.
VII. Terrain elevations must be included in the refined analysis, if applicable.

7.2.2 Analyze the Refined Modeling Results

I. Make sure the maximum impacts for each averaging period fall within a fine enough receptor grid to identify true maximums. Include fine grids (50 meter spacing) near adjacent sources and in "hot spots" to identify true maximums.
II. Compare the highest short-term and annual impacts from all sources with NAAQS and NMAAQS.
III. Determine if there is an exceedance of PSD Class II increment within the area defined by the radius of impact by the group containing all PSD increment consuming sources.
IV. Determine if there is an exceedance of PSD Class I increment within any Class I area.
V. If the facility alone will violate any NAAQS, NMAAQS, or PSD increment, then the permit cannot be issued through the normal process. Please contact the Bureau for further information.
VI. If there are exceedances of the NMAAQS or NAAQS at any receptors within the ROI, the next step is to determine if the facility being modeled significantly contributes (see significance levels in Table 6) to the exceedance at those receptors during the same time period(s) that the exceedance occurs. If so, the permit cannot be issued through the normal process. See nonattainment area requirements, below.
VII. If no exceedances are found, or if the facility does not contribute amounts above significance levels to the exceedances, then the facility can be permitted per the modeling analysis.

7.2.3 NMAAQS and NAAQS

All sources are required to submit NMAAQS and NAAQS modeling. The total concentrations of all facilities and background sources are required to be below the NAAQS. The steps required for this analysis are outlined above.

7.2.4 PSD Class II increment

PSD Increment modeling applies to both minor and major sources. If the minor source baseline date has been established in the Air Quality Control Region (AQCR) in which the facility will be located, then PSD increment consumption modeling must be performed. If the minor source baseline date has not been established in that region, then only PSD major sources must perform this analysis.

Portable sources that are not located at a single location for more than one year are not required to model PSD increment consumption.

The steps required for this analysis are outlined above.
The same significance levels that apply to NAAQS and NMAAQS standards are assumed to apply to PSD Class II increment as well.

7.2.5 PSD Class I increment

If a PSD Class II increment analysis is required and the proposed construction of a minor source is within 50 km of a Class I area (see Figure 1), then PSD increment consumption at the Class I area(s) must be determined and compared with the Class I PSD increment. If the proposed construction of a PSD major source is within 100 km of a Class I area, then PSD increment consumption at the Class I area(s) must be determined and compared with the Class I PSD increment. The PSD permit process requires a more thorough Class I analysis, which is described in *Step 6*.

See *Receptor Placement*, above, for receptor instructions.

Proceed with the Class I area analysis similarly to the other analyses described above. Class I significance levels apply for determining whether or not a facility contributes significantly to an exceedance in a PSD Class I area and for determining the Class I ROI.

7.3 Step 3: Portable Source Fence Line Distance Requirements for Initial Location and Relocation

Skip this step if the facility is not a portable source.

Portable sources should model fence line distance requirements for relocation purposes and for setback distances within the initial property. If the facility wants to be able to move equipment around within the property, or move to a new location, permit conditions will be required to ensure

the facility continues to demonstrate compliance with air quality standards as it moves. For this modeling, use meteorological data that the Bureau has approved for relocation modeling, which may be different from that used for the rest of the modeling for the facility. Model the facility with a haul road length at least as long as the setback distance and a number of truck trips equal in number to the count at the original location. Surrounding sources may be ignored, but include co-located facilities if the desire is to be able to co-locate with other facilities at the new locations. To determine setback distance, draw a line connecting the concentrations where they drop off to the point that are just under the ambient air standard or PSD increment. Make sure to add background concentration before determining the isopleths for ambient air standards. From each point on the isopleth line, determine the distance to the nearest source (excluding haul road sources). The setback distance is the largest of these distances. Setback distance is typically rounded up to the nearest meter that is above the calculated value. An example setback distance determination is pictured in Figure 8, below.

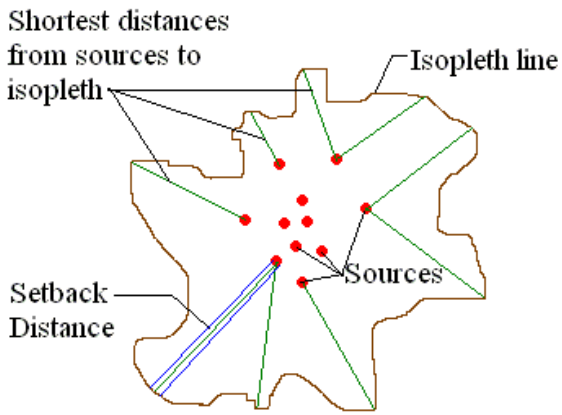


Figure 8: Setback Distance Calculation

Fine spacing is suggested within the property boundary for relocation requirement modeling.

If the applicant does not perform fence line distance modeling, relocation distance will be assumed to be the distance from the edge of a facility operations to the most distant point on the initial fence line. An irregular or elongated fence line shape can result in relocation requirements that require very large properties to be fenced off in order to relocate there without submitting modeling for each new location of the facility.

7.4 Step 4: Nonattainment Area Requirements

Skip this step if all modeled concentrations are below NAAQS, NMAAQS, and PSD Increments.

If the modeling analysis of a source predicts that the impact from any regulated air contaminant will exceed the significance level concentrations at any receptor which does not meet the NMAAQS or NAAQS, the source will be required to demonstrate a net air quality benefit and meet the requirements of 20.2.72.216 NMAC or 20.2.79 NMAC. The net air quality benefit is a

reduction of at least 20% of the maximum modeled concentration from the facility or the emission sources being modified. The 20 percent reduction shall be calculated as the projected impact subtracted from the existing impact divided by the existing impact. The existing impact for the net air quality benefit must be based on the lowest enforceable emission rate, or the actual emission rate if a unit has no enforceable emission rate. The offsets used to meet the net air quality benefit must be quantifiable, enforceable, and permanent. For more information regarding nonattainment permit requirements, see **20.2.72.216 NMAC** and **20.2.79 NMAC** – Nonattainment Areas.

7.5 Step 5: Modeling for Toxic Air Pollutants

Skip this step if there are no toxics to model at this facility. See *New Mexico State Air Toxics Modeling*, to determine if modeling of toxics is required and for other details about toxics regulatory requirements.

I. Model the toxic air pollutants similar to the way the other pollutants were modeled, as described above in step 1 and step 2. Use an 8-hour averaging period, complex terrain, and building downwash.
II. No surrounding source inventory exists for the toxics, so model only your source.
III. Make sure a fine grid is used in the area of maximum concentration.
IV. If more than one toxic pollutant is being modeled and they use the same stacks at the same ratio of emission rates, it is allowable to scale the results of the first pollutants by the emission rate ratio to determine the concentration of the other toxics.

If modeling shows that the maximum eight-hour average concentration of all toxics is less than one percent of the Occupational Exposure Level (OEL) for that toxic, then the analysis of that toxic pollutant is finished. Report details about the maximum concentrations in the modeling report. Otherwise, perform BACT analysis or health assessments, as required. Contact the Bureau on how to proceed if the $1/100^{th}$ of the OEL is exceeded.

7.6 Step 6: PSD Permit Application Modeling

Skip this step if the facility is not a PSD major source.

PSD sources and requirements are defined in NMAC 20.2.74.303 to 305. New PSD major sources and major modifications to PSD major sources must submit the following modeling requirements in addition to the NSR minor source modeling requirements. Minor modifications to PSD major sources are only subject to NSR minor source modeling requirements listed above, as required under NMAC 20.2.72.

Due to a court ruling, the use of the $PM_{2.5}$ significant monitoring concentration for PSD major modifications or new PSD major sources is not allowed. The significant ambient concentration level may still be used for minor source and nonattainment permitting.

Sources subject to PSD requirements should consult with the Bureau to determine how to proceed in the application process. For PSD applications, a modeling protocol is required for review. Please refer to EPA's *New Source Review Workshop Manual.* The following items are required for PSD permit applications and supersede other modeling requirements in this document.

7.6.1 Meteorological Data

Applicants may need to collect one year of on-site meteorological and ambient data to satisfy PSD requirements. In some cases, it may be advantageous to begin collecting on-site meteorological and ambient data to ensure that it is available at a site that may become PSD in the future. A company considering a monitoring program is advised to consult with the Bureau as early as possible so that an acceptable data collection process, including instrument parameters, can be started. Generally, the following meteorological parameters will be measured: wind direction, wind speed, ambient air temperature, solar insolation, ΔT, and σ_θ. For further information on meteorological monitoring Refer to EPA's *Guideline on Air Quality Models* and *On-Site Meteorological Program Guidance for Regulatory Modeling Applications*. Refer to *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)* for ambient monitoring guidance. In addition, a monitoring protocol and QA plan **must** be submitted and approved prior to beginning collection of data for a PSD application if these data are to be used for the analysis.

In the absence of actual on-site data, the Bureau may approve the use of off-site data that the Bureau believes mimics on-site data for that location or the Bureau may approve the use of data produced by the model MM5.

7.6.2 Ambient Air Quality Analysis

The ambient air quality analysis is the same as described above, with the exception of the following points.

- The PSD project is defined as the future potential emission rate minus the past actual emission rate.
- If the maximum ambient impact is less than significant ambient concentrations (see Table 6), then a full analysis is not required.
- Nearby sources must be considered. Discarding sources is discussed in the section on "neighboring sources data".
- A total air quality analysis must also be performed for each appropriate Class I area if the facility produces concentrations greater than the Class I significance levels in Table 6. All sources near the Class I area must be considered. The inventories for the analysis near the facility and the inventory for the analysis near Class I areas may be quite different because they are centered on different locations.
- If subject to 20.2.74.403 NMAC (Sources impacting Federal Class I Areas), an analysis of Air Quality Related Values must be included in the PSD application. If the facility will have no impact on the AQRV, then that must be stated in the application (NSR Workshop Manual, Chapter D).

- There may be additional analyses required by the Federal Land Managers (FLM) for Air Quality Related Values (AQRVs). See **F**ederal **L**and **M**anagers' **A**ir Quality Related Values Work **G**roup (FLAG) for more information at: https://irma.nps.gov/DataStore/Reference/Profile/2125044

7.6.3 Additional Impact Analysis (NMAC 20.2.74.304)

The owner or operator of the proposed major stationary source or major modification shall provide an analysis of the impact that would occur as a result of the source or modification and general commercial, residential, industrial, and other growth associated with the source or modification. This analysis is in addition to the Class I analysis, but may use some of the same techniques that were used in the Class I analysis. The analysis required for a National Environmental Policy Act (NEPA) review may work to satisfy some requirements of this section.

- Visibility Analysis: A Class II Visibility Analysis is required to determine impact the facility will have upon Class II areas. Analyze the change in visibility of a nearby peak or mountain for this analysis. In the absence of nearby mountains, analyze the visibility of clear sky from nearby state or local parks.
- Soils analysis: What changes will occur to soil pH, toxicity, susceptibility to erosion, or other soil characteristics as a result of the project and indirect growth related to the project?
- Vegetation analysis: What changes will occur to type, abundance, vulnerability to parasites, or other vegetation characteristics as a result of the project and indirect growth related to the project? The owner or operator need not provide an analysis of the impact on vegetation having no significant commercial or recreational value.
- Growth analysis: The owner or operator shall also provide an analysis of the air quality impact projected for the area as a result of general commercial, residential, industrial, and other growth associated with the source or modification.

7.6.4 Increment Analysis

- If the facility produces ambient concentrations greater than the significance levels in Table 6, then the Class II PSD increment analysis for the facility must use the inventory of all increment consuming sources near the facility. Sources in other states should be obtained from the agency in the surrounding state.
- If there is a Class I area within 100 km of the facility (or any distance, if requested by the FLM), then receptors must be located at the Class I area.
- If the facility produces ambient concentrations greater than the Class I significance levels in Table 6 in a Class I area, then the increment analysis for the Class I areas should use the inventory of all increment consuming sources near the Class I area, including those sources in other states. Sources in other states should be obtained from the agency in the surrounding state.

7.6.5 Emission Inventories

- The most current inventory of sources must be used. It should contain all sources currently under review by the Bureau that would be located within the appropriate inventory area. The applicant should check with the modeling staff to ensure that the inventory is up to date.

7.6.6 BACT analysis

- The analysis must follow current EPA procedures and guidelines.

7.7 Step 7: Write Modeling Report

A narrative report describing the modeling performed for the facility is required to be submitted with the permit application using Universal Application form 4 (UA4). This report should be written to provide the public and the Bureau with sufficient information to determine that the proposed construction does not cause or contribute to exceedances of air quality standards. The report needs to contain enough information to allow a reviewer to determine that modeling was done in a manner consistent and defensible with respect to available modeling guidance. Do not include raw modeling output in the report, only summaries and descriptions of the output or input.

This outline may be used as a checklist to determine if the analysis is complete.

I. Applicant and consultant information
   a. Name of facility and company.
   b. Permit numbers currently registered for the facility.
   c. Contact name, phone number, and e-mail address for the Bureau to call in case of modeling questions.

II. Facility and operations description
   a. A narrative summary of the purpose of the proposed construction, modification, or revision.
   b. Brief physical description of the location.
   c. Duration of time that the facility will be located at this location.
   d. A map showing UTM coordinates and the location of the proposed facility, on-site buildings, emission points, and property boundaries. Include UTM zone and datum.

III. Modeling requirements description
   a. List of pollutants at this facility requiring NAAQS and/or NMAAQS modeling.
   b. AQCR facility is located in and resulting list of pollutants requiring PSD increment (Class I and II) modeling. Include distances to Class I areas in discussion.
   c. List of State Air Toxic pollutants requiring modeling.
   d. PSD, NSPS, and NESHAP applicability and any additional modeling requirements that result if those regulations are applicable to the facility.

e. State whether or not the facility is in a federal Nonattainment area, and any special modeling requirements or exemptions due to this status.
f. Any special modeling requirements, such as streamline permit requirements.

IV. Modeling inputs

a. General modeling approach
    i. The models used and the justification for using each model.
    ii. Model options used and why they were considered appropriate to the application.
    iii. Ozone limiting model options discussion, if used for NO_2 impacts.
    iv. Background concentrations.
b. Meteorological data
    i. A discussion of the meteorological data, including identification of the source of the data.
    ii. Discussion of how missing data were handled, how stability class was determined, and how the data were processed, if the Bureau did not provide the data.
c. Receptor and terrain discussion
    i. Description of the spacing of the receptor grids.
    ii. List fence line coordinates and describe receptor spacing along fence.
    iii. PSD Class I area receptor description.
    iv. Flat and complex terrain discussion, including source of elevation data.
d. Emission sources
    i. Description of sources at the facility, including:
        1. A cross-reference from the model input source numbers/names to the sources listed in the permit application for the proposed facility.
        2. Determination of sigma-Y and sigma-Z for fugitive sources.
        3. Description and list of PSD increment consuming sources, baseline sources, and retired baseline sources.
        4. Describe treatment of operating hours
        5. Particle size characteristics, if plume depletion is used.
        6. If the modeled stack parameters are different from the stack parameters in the application, an explanation must be provided as to what special cases are being analyzed and why.
        7. Partial operating loads analysis description.
        8. Flare calculations used to determine effective stack parameters.
        9. In-stack NO_2/NO_X ratio determination, if using OLM or PVMRM.
    ii. Surrounding sources:
        1. The date of the surrounding source retrieval.
        2. Details of any changes or corrections that were made to the surrounding sources.
        3. Description of adjacent sources eliminated from the inventory.
e. Building downwash
    i. Dimensions of buildings

V. Modeling files description

a. A list of all the file names and description of these files.
b. Description of the scenarios represented by each file.

VI. Modeling results
    a. A discussion of the radius of impact determination.
    b. A summary of the modeling results including the maximum concentrations, location where the maximum concentration occurs, and comparison to the ambient standards.
    c. Source, cumulative, and increment impacts.
    d. Class I increment impact.
    e. A table showing concentrations and standards corrected for elevation.
    f. If ambient standards are exceeded because of surrounding sources, please include a culpability analysis for the source and show that the contribution from your source is less than the significance levels for the specific pollutant.
    g. Toxics modeling results, if needed.

VII. Summary/conclusions
    a. A statement that modeling requirements have been satisfied and that the permit can be issued.

Ask the modeling section or check the web page for a sample modeling reports. The modeling report documents details the standard format for the modeling report.

7.8 Step 8: Submit Modeling Analysis

Submit the following materials to the Bureau:

I. An electronic copy (in MS Word format) of the modeling report.
II. Input and output files for all model runs. Include BEEST, ISC-View, or BREEZE files, if available.
III. Building downwash input and output files.
IV. Fence line coordinates.
V. Meteorological data, if not Bureau-supplied.
VI. A list of the surrounding sources at the time the facility was modeled.
VII. An electronic copy of the approved modeling protocol.

Do not include paper copies of modeling input and output files.

8.0 List of Abbreviations

Table 44: List of Abbreviations

ACRONYM	DESCRIPTION
AQB	Air Quality Bureau
AQCR	Air Quality Control Region
AQCR	Air Quality Control Regulation (CURRENTLY NOT USED)
AQRV	Air Quality Related Values
ARM2	Ambient Ratio Method 2
BACT	Best Available Control Technology
CO	Carbon monoxide
DEM	Digitized Elevation Model
EPA	Environmental Protection Agency
FLAG	**F**ederal **L**and **M**anagers' **A**ir Quality Related Values Work **G**roup
FEM	Federal Equivalent Method
FRM	Federal Reference Method
GEP	Good Engineering Practice
H_2S	Hydrogen sulfide
ISCST3	Industrial Source Complex Short Term Model version 3
NAAQS	National Ambient Air Quality Standards
NED	National Elevation Dataset
NO_2	Nitrogen dioxide
NO_X	Nitrogen oxides
NMAAQS	New Mexico Ambient Air Quality Standards
NMAC	New Mexico Administrative Code
O_3	Ozone
OEL	Occupational Exposure Level
OLM	Ozone limiting method
Pb	Lead
PDF	Probability density function
$PM_{2.5}$	Particulate matter equal to or under 2.5 mm in aerodynamic diameter
PM_{10}	Particulate matter equal to or under 10 mm in aerodynamic diameter
PPM	Parts per million (volume ratio)
PSD	Prevention of Significant Deterioration
PVMRM	Plume Volume Molar Ratio Method
ROI	Radius of Impact
SO_2	Sulfur dioxide
TSP	Total suspended particulates
UTM	Universal Trans Mercator
VOC	Volatile organic compounds

9.0 References

Ensor, D.S. and M.J., Pilat (1971). Calculation of smoke plume opacity from particulate air pollutant properties. J.Air Poll.Cont.Assoc. 21(8): 496-501.

EPA (1995). User's Guide for the Industrial Source Complex (ISC3) Dispersion Model, Volume I - User Instructions. EPA-454/B-95-003a. September 1995.

Joseph A. Tikvart (1993). "MEMORANDUM: Proposal for Calculating Plume Rise for Stacks with Horizontal Releases or Rain Caps for Cookson Pigment, Newark, New Jersey", Joseph A. Tikvart (Model Clearinghouse), July 9, 1993.

SCREEN3 Model User's Guide (1995). SCREEN3 Model User's Guide, EPA-454/B-95-004, September, 1995. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Emissions, Monitoring, and Analysis Division, Research Triangle Park, NC.

NSR Workshop Manual, Chapter D – Air Quality Related Values

Federal Land Manager (FLM) Resources for Permit Applicants:
https://www.nps.gov/subjects/air/permitresources.htm

New Mexico Administrative Code (NMAC) Air Quality Regulations:
http://www.srca.nm.gov/chapter-2-air-quality-statewide/

EPA, 1995d*: User's Guide for the Industrial Source Complex (ISC3) Dispersion Models*, EPA-454/B-95-003a, September, 1995. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Emissions, Monitoring, and Analysis Division, Research Triangle Park, NC.

Texas 1999: ***Air Quality Modeling Guidelines***, TNRCC-New Source Review Permits Division, RG-25 (Revised), February 1999

"The Plume Volume Molar Ratio Method [(PVMRM)] for Determining NO_2/NOx Ratios in Modeling", by Pat Hanrahan of the Oregon DEQ. The paper appeared in the November 1999 issue of the AWMA journal.

Links:

Environmental Protection Agency, 40 CFR Part 51, Revision to the Guideline on Air Quality Models
Appendix W: https://www.epa.gov/sites/production/files/2020-09/documents/appw_17.pdf

Support Center for Regulatory Atmospheric Modeling (SCRAM): https://www.epa.gov/scram

10.0 INDEX

AERMOD, 49, 50
Background, 58
Building downwash, 19, 69, 89, 97
CALPUFF, 50
CTSCREEN, 49, 50, 51
Flare, 77
GEP, 69, 70
haul road, 43
ISCST3, 49, 50
meteorological, 54, 84, 85, 93, 96
nearby sources, 21, 26, 27, 29, 30, 34, 37, 39, 58, 70
neighboring sources, 70, 84, 88
NO_2, 13, 19, 28, 29, 41, 44, 88, 99
PSD increment, 9, 43, 67, 89, 90
PVMRM, 50
receptor, 48, 49, 69, 87, 88, 89, 90, 91, 96
ROI, 19, 69, 87, 88, 89, 90
SCREEN3, 49, 78, 99
temporary, 43

Appendix A: Recent changes to the NM Modeling Guidelines

Note of changes made in 2026

Updated section 4.3 with most recent certified and complete meteorological data, 2020-2024.
Updated background concentrations in section 4.4
Updated section 4.5 to clarify elevation data should use at least an 1/3 arc-second resolution
Added additional information on flare modeling
Added additional clarification on "hot spot" modeling.
Updated to include AERMAP and BPIP-PRIME calculations in ROI runs.
Changed order so PM10 is described before PM2.5 to keep consistent with permit applications.

Note of changes made in 2024:

Corrected order of cement handling depletion parameters in Table 28.
Updated PM2.5 annual standard to 9.0 $\mu g/m^3$.

Note of changes made in 2023:

Changed table notes from numbers to letters to distinguish from footnotes.
Removed *2.7.3 PSD Class I Area Proposed Significance Levels* because it contained only redundant information.
Updated *Very small emission rate modeling waiver requirements* based on recent modeling.
Added plume depletion parameters from separate NMED document.
Updated recommendations regarding using less than five years of meteorological data based on modeling the most recently processed meteorological data.
Added location, elevation, wind roses for available meteorological data.
Added additional information about ozone compliance demonstrations.
Added additional references to air quality standards sections.
Removed 24-hour refined background calculation example that was based on old data.

Note of changes made in 2022:

July 2022:
SO_2 modeling in the Permian Basin now requires surrounding sources.
If only one year of meteorological data is used, evidence is required that the year used produces the highest concentrations of the recent, available years.
Background concentrations were updated.
Obsolete references and links were updated.
Clarification of unclear language with updates to current EPA guidance.
Additional references were provided.